

**Report of the  
Comptroller and Auditor General of India**

**for the year ended March 2013**

**Union Government (Defence Services)  
Army, Ordnance Factories and  
Defence Public Sector Undertakings  
Report No. 35 of 2014**

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## PREFACE

This Report for the year ended March 2013 has been prepared for submission to the President of India under Article 151 of the Constitution of India.

This Report of the Comptroller and Auditor General of India contains the results of audit of the financial transactions and performance reviews of projects/schemes of Ministry of Defence pertaining to Army, Ordnance Factories, Department of Defence, Department of Defence Production, Defence Research and Development Organisation, Military Engineer Services and Border Roads Organisation in 2012-13. The matters arising from the Finance and Appropriation Accounts of the Defence Services for 2012-13 have been included in Audit Report No. 1 of 2014 (Financial Audit).

The instances mentioned in this Report are those, which came to notice in the course of test audit for the period 2012-13 as well as those which came to notice in earlier years, but could not be reported in the previous Audit Reports; matters relating to the period subsequent to 2012-13 have also been included, wherever necessary.

The Report includes 39 Paragraphs (including six performance reviews and one long paragraph), reporting important audit observations as discussed from Chapter II onwards.

The audit has been conducted in conformity with the Auditing Standards issued by the Comptroller and Auditor General of India.

Audit wishes to acknowledge the cooperation received from Ministry of Defence at each stage of the audit process.

## OVERVIEW

### **Inordinate delay in indigenisation of TATRA vehicles**

In order to attain self reliance and effect savings in foreign exchange, Bharat Earth Movers Limited, a Defence PSU, signed a collaboration agreement for indigenisation of TATRA vehicles in 1986 with M/s Omnipol of Czechoslovakia to cater the continuous need of the Indian Army. The objective of attaining 86 *per cent* indigenisation by 1991 was envisaged by BEML. However, till 2014 the target is yet to be attained. BEML attributed the delay mainly to the failure of Ministry in placing order for sufficient number of vehicles between 1986 and 1991. The process for indigenisation of TATRA vehicles suffered due to lack of clear long term projection of orders by Army to BEML. Resultantly, the objective of self-reliance in production of TATRA vehicles was defeated.

*(Paragraph 2.1)*

### **Procurement of unacceptable equipment valuing ₹ 27.32 crore**

Ministry of Defence imported 999 number of Individual Chemical Agent Detectors (ICADs) worth ₹ 27.32 crore between January 2010 and October 2010 for detecting the presence of chemical agents and toxic industrial compounds. Non conducting Field Evaluation Trials in conditions where equipment is likely to be deployed as prescribed by DPP, had resulted in acceptance of defective ICADs worth ₹ 27.32 crore. These equipment were awaiting replacement since August 2011 by the firm as of June 2014.

*(Paragraph 2.2)*

### **Loss of revenue due to unauthorized use of Defence land by United Services Club, Mumbai**

Failure of the Local Military Authorities at Colaba and further lack of pursuance by Defence Estate Department for obtaining Government sanction for entering into a lease for the defence land occupied by the United Services Club, Mumbai resulted in recurring revenue loss of ₹ 5.74 crore per annum to Government exchequer. The MoD on their part, failed to monitor the assurance given to the Public Accounts Committee of the Parliament to review the arrangements with US Club which continued to commercially exploit A-1

defence land valuing ₹ 114.85 crore without Government sanction and paying a nominal rent of ₹ 0.36 lakh per annum.

(Paragraph 2.3)

### **Irregular construction on Defence leased land**

Old Grant Bungalow along with adjoining land measuring 4.56 acre at Kirkee Cantonment was leased for residential purpose. Execution of an irregular deed for reconstruction by Defence Estates Officer (DEO) with Power of Attorney Holder (POAH) and failure on the part of DEO and Cantonment Executive Officer to take appropriate action against the POAH/Holder of Occupancy Right facilitated the POAH to illegally construct a Community Centre which was misused for religious activities on Defence land worth ₹ 22.14 crore.

(Paragraph 2.4)

### **Nugatory expenditure of ₹ 88.39 crore in the procurement of Chemical, Biological, Radiological and Nuclear (CBRN) equipment**

Injudicious planning by IHQ of MoD, Army in the procurement of nine items under Individual Protective Equipment relating to Chemical, Biological, Radiological and Nuclear Equipment, resulted in non-procurement of NBC suit Permeable, the main constituent of IPE. An expenditure of ₹ 88.39 crore on other eight items of IPE without addressing the compatibility issue defeated the purpose of ensuring protection in case of NBC Warfare.

(Paragraph 3.1)

### **Loss of revenue due to non-collection of metal scrap from Field Firing Range**

Despite instructions for collecting metal scrap of fired ammunition from Field Firing Ranges through hired civil labour in case of non conclusion of regular contract for the same, Army authorities failed to collect metal scrap of 285 MT (approximate quantity) worth ₹ 2.32 crore.

(Paragraph 3.3)

### **Procurement of defective tyres**

Army Headquarters incurred an expenditure of ₹ 2.65 crore on procurement of tyres despite the knowledge that the tyres were manufactured with inferior quality material.

(Paragraph 3.4)



### **Over provisioning and uneconomical issue of Batteries by COD Agra**

Over provisioning of batteries 'A' worth ₹ 7.16 crore during 2009 by Army Headquarters led to uneconomical issue of batteries 'A' worth ₹ 1.91 crore during 2013 against demands for low cost batteries 'B' and 'C' in order to liquidate the huge stock.

*(Paragraph 3.5)*

### **Recoveries, savings and adjustment in accounts at the instance of Audit**

In pursuance of Audit observations, the audited entities recovered overpaid pay and allowances, sundry charges and recovered electricity charges, cancelled irregular works sanctions and amended annual accounts, having a net effect of ₹ 68.01 crore

*(Paragraph 3.6)*

### **Avoidable expenditure on construction of excess dwelling units**

The failure of Local Military Authorities at Chennai to correctly assess the requirement of married accommodation for JCOs resulted in construction of 17 dwelling units in excess of the requirement at a total cost of ₹ 1.79 crore.

*(Paragraph 4.1)*

### **Inordinate delay in handing over the clear site to the contractor resulted in avoidable payment of escalation charges**

Chief Engineer, Shillong Zone concluded contract for construction of 13 Ammunition storage accommodations for which GE Guwahati issued an inaccurate certificate for availability of clear site. This inordinately delayed the completion of work leading to avoidable payment of extra escalation charges of ₹ 4.58 crore over and above normal escalation charges admissible to the contractor for completion of work within completion period.

*(Paragraph 4.2)*

### **Selection of improper site resulted in foreclosure of work after an expenditure of ₹ 5.49 crores**

Military Engineer Services and Local Army authorities could not identify the proper site at planning stage for construction of other than married (OTM) accommodation for Army. This resulted in foreclosure of the work after incurring expenditure of ₹ 5.49 crore.

*(Paragraph 4.3)*

### **Unauthorised utilization of funds for construction of a Multipurpose Hall**

Funds amounting to ₹ 0.93 crore allotted for the construction of two storage accommodations for two Border Road Task Forces were unauthorisedly utilized to construct a bigger Multipurpose Hall, with an area of 1,556 sqm against the sanctioned area of 489 sqm.

(Paragraph 5.1)

### **Construction of a bridge without sub-soil investigation resulted in loss of ₹ 0.75 crore**

An expenditure of ₹ 0.75 crore incurred on excavation in foundation for a bridge work by Task Force under Chief Engineer (Project) Pushpak without sub-soil investigation as required under Codes of Indian Road Congress resulted in loss of public money as the site became landslide prone area which could have been forewarned after sub-soil investigation.

(Paragraph 5.2)

### **Project Management in Vehicle Research and Development Establishment, Ahmednagar and Combat Vehicles Research and Development Establishment, Avadi**

Audit scrutiny of the **Staff and TD/R&D projects** taken up by CVRDE and VRDE during the period April 1998 to March 2013 for delivery of products required by Defence Forces revealed the following:

#### **Staff Projects**

**At CVRDE:** Two Staff projects were closed during April 1998 to March 2013 out of which one project was undergoing Transfer of Technology but was yet to be productionised. In another project though the system developed was accepted by the user, yet the project could not be productionised due to imposition of ban on the foreign vendor.

**At VRDE:** Of the nine closed projects during April 1998 to March 2013, only one underwent productionisation. For another project though stated to have been successfully completed by the lab, the details of acceptance by the user leading to induction into Service could not be produced by the lab. Third project partly achieved the project requirement and the remaining six projects could not achieve success in terms of acceptance by the users.

Initiation of projects without firm General Staff Qualitative Requirement, failure of the laboratory to develop the desired deliverables and defective planning were the main reasons for failure.

## **Technology Demonstration/R&D Projects**

The status of **Technology Demonstration projects** undertaken by the two labs was also not encouraging as 36 out of 51 closed projects did not lead to the utilisation of such technology in Staff projects.

(Chapter-VI)

## **Defence Grants-in-Aid Scheme of Defence Research and Development Organization**

The Defence Grants-in-Aid Scheme was instituted to utilize the indigenously available research talent and facilities in IITs, Universities, Higher Technological Institute, *etc.* for undertaking research and development work on problems of scientific value and preferably in areas of interests to Defence. Audit observed that there were critical shortfalls in the management and monitoring of the Scheme such as awarding the project without arriving at viable and specific research objectives and not defining the quantitative and qualitative targets to be attained. The major expenditure was on purchase of equipments but in majority of cases the disposal of equipments was left at the discretion of the Grantee institutions in the manner desired. In these circumstances the scheme is far from satisfaction. The money was also sanctioned for creation of basic infrastructure against the provisions of the scheme.

(Chapter VII)

## **Performance of Ordnance Factory Board**

The Ordnance Factory Organisation comprising 41 Ordnance Factories (including two ordnance factories under project stage) with manpower of 96,317 is engaged in production of arms, ammunition, equipment, clothing *etc.* primarily for the Armed Forces of the country. The factories function under the Ordnance Factory Board (Board). Revenue expenditure showed 11 *per cent* increase in 2011-12 but decreased marginally by 2 *per cent* in 2012-13. Stores (48 *per cent*) and manufacture expenditure (36 *per cent*) constituted 74 *per cent* of the total revenue expenditure. Both components, however, registered a dip in 2012-13: stores by 7 *per cent* and manufacturing by 2 *per cent*.

Capital expenditure of ₹ 349 crore during 2012-13 remained almost at the same level of 2008-09 and comprised only 3 *per cent* of the total expenditure of the Board.

Of 529 items targeted for manufacture during 2012-13, Ordnance Factories achieved success rate of only 31 *per cent*. Inability to source quality components on time and fluctuations in demands were the reasons for the low success rate.

During 2012-13, the cost of production (₹ 15,972.44 crore) almost remained static when compared with 2011-12 with share of Stores, Labour and Overhead cost at 61 *per cent*, 11 *per cent* and 28 *per cent* respectively. In eight ordnance factories, the percentage of overhead to cost of production exceeded 50 *per cent*. High supervision charges, with one supervisory officer for every 1.97 direct labour, contributed to the high overhead.

During 2012-13, the Board reported an increase of total receipts of ₹ 71 crore (0.56 *per cent*) over 2011-12. On the other hand, surplus generated during 2012-13 fell by ₹ 118 crore (16 *per cent*). Cross-subsidisation across the products led to inadequate cost control by the Board.

Revenue earned from exports reduced from ₹ 46 crore in 2011-12 to ₹ 15 crore in 2012-13 (67 *per cent*)

(Paragraph 8.1)

### **Inventory Management in Ordnance Factories**

The Ordnance Factories held an inventory of ₹ 10,490 crore (31 March 2013) which accounted for two-third of the cost of production. Our audit covers the performance of Ordnance Factory Board and nine sampled Ordnance Factories in respect of Inventory Management in the years 2010-11 to 2012-13. The sampled Factories together held inventory worth ₹ 4,799 crore which represented 46 *per cent* of the total inventory held in all Ordnance Factories as of 31 March 2013.

Stores-in-hand (SIH) *i.e.* inventory of raw material with the Stores Section of the Factory is an area of concern in inventory management in the Factories. At the level of ₹ 2,425 crore, SIH constituted over 50 *per cent* of the inventory holding in the nine sampled factories as of 31 March 2013. In the nine sampled factories non-moving SIH, *i.e.* items which were not consumed for a period of three or more years after purchase, increased by 73 *per cent* during 2010-13. Our analysis showed that 95 *per cent* of the SIH in the sampled Factories exceeded the prescribed limits. Over four-fifth of these items held in excess of the limits were items which were not consumed at all during the year under our analysis, 2012-13. Items worth ₹ 96 crore were not only held in excess of the prescribed holding limits but also had not been used even once after their procurement during 2010-13. The current procedure to exhaust all options of potential usage had in effect failed and led to build-up of non-active stores. On the other hand, the definition of “active” stores (an item is

categorised as active even if only one unit is consumed during the year) creates a potential risk of token consumption in order to keep the items off the “non-moving” category. All nine sample Factories together registered token consumption against 5,925 items valued at ₹ 373 crore, indicating a common trend.

Works-in-Progress (WIP) are inventory held by the Factory Production Shop, which are under production. WIP in the nine Factories increased by 21 *per cent* during the period 2010-13 and as of March 2013, the value of WIP stood at ₹ 1,501 crore. The increase in WIP without a correlated increase in cost of production points to a risk of fraudulent booking of material or labour against open warrants *i.e.* warrants not closed although production against them had stopped for variety of reasons. Although warrants are required to be closed within six months, 17 *per cent* of warrants of eight sampled factories were over a year old. The value of warrants that were open for more than one year was ₹ 434 crore. The Factories had been reflecting rejected stocks as WIP or Stores-in-transit between Factories, in some cases for over 20 years, which remained un-detected. A protracted process for review of inventory and to fix accountability for loss due to rejections, led to a tendency in the Factories to “hide” rejections by categorising rejected stores under WIP or SIT even as delays in fixing accountability defeated the purpose.

The assurance to be provided by the physical verification was inadequate and did not reflect the correct position on physical availability of stores. The use of “loan issues” of material without a demand note from the Shop does not have the sanction of Board and constitutes a bad practice. The review of inventory holding by the Board was not comprehensive and did not yield clear and firm directions to the Factories.

(Paragraph 8.2)

### **Indigenous production of MBT Arjun and T-90 Bhisma Tank**

Against the Ministry’s revised plan to induct 124 MBT Arjun in 2002-09, Ordnance Factories issued 119 MBT Arjun to the Army during 2004-13. The production of 300 indigenous T-90 tanks, scheduled for delivery in 2006-10 based on Transfer of Technology from Russia (2001), lagged behind with production of 225 T-90 and issue of only 167 T-90 tanks to the Army during 2009-13. Inordinate delays in production of both the tanks led to fresh import (November 2007) of T-90 tanks worth ₹ 4,913 crore. While the progress of the project for augmentation of production capacity of T-90 tanks sanctioned in September 2011 was very slow, the existing facilities for MBT Arjun remained underutilised in absence of further order of MBT Arjun from the Army.

(Paragraph 8.3)

### **Capacity addition in Ordnance Factories**

Procurement of machinery in ten Ordnance Factories (test checked) did not enhance the production capacity as the availability of machine hours showed a downward trend from 683 lakh hours in 2010-11 to 639 lakh hours in 2012-13. Delays in receipt of 170 machines (36 per cent) valuing ₹ 343 crore and delays in commissioning of 213 machines (29 per cent) valuing ₹ 317 crore deprived the Factories of the timely benefits of modernisation. Deficiencies in pre-dispatch inspection and pre-commissioning trials led to delays in commissioning and in some cases, acceptance of machinery compromising the quality. High incidence of under-utilisation (21 to 24 per cent machines utilised up to 30 per cent of capacity) and of breakdowns, affected the ability of the factories to meet the targets placed on them. These issues which have a direct bearing on the performance of the Board, did not receive focused attention of the top management.

*(Paragraph 8.4)*

### **Avoidable extra expenditure on procurement of components**

Procurement of Copper Tube/Aluminium Alloy extruded Rod by Ordnance Factory Kanpur (OFC) from Ordnance Factory Katni/Ordnance Factory Ambarnath, despite material cost of those sister factories being higher than the total trade cost, led to avoidable extra expenditure of ₹ 3.99 crore.

*(Paragraph 8.6)*

### **Acceptance of defective stores before bulk production clearance**

Acceptance of defective stores before receipt of clearance for bulk production in violation of the Ordnance Factory Board's instruction led to a loss of ₹ 93.61 lakh.

*(Paragraph 8.7)*

### **Injudicious procurement leading to uneconomical manufacture**

Despite adequate stock of magazine assemblies through inter factory demand, the Rifle Factory Ishapore bought spring platforms at a cost of ₹ 1.27 crore which was avoidable and led to higher cost of production.

*(Paragraph 8.9)*



### **Defective manufacture of mines**

Manufacture of defective mines by Ordnance Factory Chanda/High Explosive Factory Kirkee coupled with their failure to seal the joints properly led to segregating of mines valuing ₹ 35.97 crore at Army Depots without repair/replacement.

*(Paragraph 8.10)*

### **Undue benefit to a private power utility provider**

Failure of the Board/Gun and Shell Factory Cossipore to recover the lease rent and premium from the private electricity supplier as per the prescribed rates resulted in revenue loss of ₹ 2.64 crore and led to undue benefit to the private electricity supplier.

*(Paragraph 8.13)*

### **Licence production of Su-30 MKI aircraft**

Since the ageing fleet of MiG 21 series of aircraft nearing completion of their total technical life were to be phased out from 2000 to 2010, Ministry of Defence (MoD) directly purchased (1996 and 1998) 50 Su-30 MK aircraft from the Russian Government. An Inter-Governmental Agreement was concluded (October 2000) with Russia for transfer of licence and technical documentation to India for production of 140 aircraft, 920 engines and 140 sets of air-borne equipment.

*(Paragraph 9.1.2.1)*

Pursuant to this and considering the immediate requirement, IAF ordered (January 2001) 140 aircraft from HAL in four phase composition stipulating the deliveries up to 2017-18. HAL in turn signed (December 2000) a General Contract with Rosoboronexport (ROE) for facilitating licence production. In March 2006, considering the sharp depletion in combat aircraft force levels the deliveries were advanced to 2014-15 with changed phase composition.

*(Paragraph 9.1.2.3)*

Based on IAF's proposal seeking additional 40 aircraft as urgent requirement, another order was placed on HAL considering its request to amend the procurement from 'buy' to 'make'. Another order for supply of 42 aircraft was placed on HAL as a repeat order to avoid depletion in IAF's force levels and to use ToT available with HAL.

*(Paragraph 9.1.2.5)*

HAL did not receive all the components of transfer of technology from ROE as required impacting the timely supply of deliverables. Production of engines from raw material stage scheduled from 2009-10 was yet to start even as of December 2013. There was delay in receipt of documentation for Repair and Overhaul of Aircraft and engines resulting in delay in setting up of facilities for Repair and Overhaul. HAL procured inventory of ₹ 1,725.41 crore in advance of requirement due to non-synchronisation of purchases production schedule. Delayed setting up of Repair and Overhaul facilities for Aircraft at HAL led to TBO life extension from 10 years to 12 years by IAF.

*(Paragraph 9.1.3.2, 9.1.3.3, 9.1.3.4, 9.1.3.5 and 9.1.3.6)*

IAF received 81 aircraft against 112 due till 2012-13 from HAL. This was due to delay in receipt of technical documents and rectification of defective toolings received from ROE. There were delays up to 275 days in ferry out of aircraft after signaling out due to snag rectification. MoD recovered liquidated damages of ₹ 96.26 crore from HAL due to delayed supply of aircraft. Though the delay was attributable to ROE, HAL could not recover the same from ROE in the absence of enabling provision. Further, due to delayed conclusion of agreements for role equipments with ROE, HAL could not deliver the same in time resulting in levy of liquidated damages of ₹ 4.77 crore by MoD. Acceptance of a new rate by HAL for procurement of engine kits disregarding the price stipulated in the General Contract of December 2000 resulted in additional expenditure of ₹ 66 crore.

*(Paragraph 9.1.4.1, 9.1.4.2, 9.1.4.4 and 9.1.4.10)*

HAL could not recover ₹ 66.61 crore in supply of Ground Handling Equipment / Ground Support Equipment to IAF due to quoting rates without reference to year of incurrence and non-inclusion of escalation clause in the contract with MoD.

*(Paragraph 9.1.4.5.1)*

Owing to adoption of incorrect exchange rate by MoD, while amending the contract, HAL incurred a loss of ₹ 101.72 crore in supply of aircrafts towards additional contract for 40 aircrafts.

*(Paragraph 9.1.4.6)*

Mandatory fatigue test of airframe was not conducted on aircraft manufactured indigenously from raw materials.

*(Paragraph 9.1.4.11)*



### **Loss due to non utilisation of power for captive consumption**

Non utilization of power generated by wind mill farm for captive consumption and sale of power to Hubli Electricity Supply Company Limited (HESCOM) by BEML Limited at a price lower than they paid to Bangalore Electricity Supply Company Limited (BESCOM) and Bhoruka Power Corporation Limited for purchase of power resulted in loss of ₹ 5.67 crore.

*(Paragraph 9.2)*

### **Non-recovery of liquidated damages**

BEML Limited's acceptance of non-enforceable terms of LD coupled with failure to withhold the payments resulted in non-recovery of LD of ₹ 12 crore.

*(Paragraph 9.3)*

### **Loss of ₹ 9.81 crore in supply of ACEMU Coaches**

Non-inclusion of Value Added Tax / Central Sales Tax in the offer for supply of Air conditioned Electric Multiple Units by BEML Limited, resulted in non-recovery of ₹ 5.51 crore and delayed supplies of coaches resulted in payment of Liquidated Damages of ₹ 2.99 crore. Further, the Company had to absorb ₹ 1.31 crore being the Excise Duty paid for deliveries beyond stipulated delivery schedule as the extension of delivery schedule was with denial clause.

*(Paragraph 9.4)*

### **Loss due to delay in procurement of material**

Delay in procurement of raw material led to non-recovery of price escalation of ₹ 15.52 crore and consequent delay in supplies resulted in levy of LD of ₹ 1.47 crore on Mishra Dhatu Nigam Limited.

*(Paragraph 9.5)*

## CHAPTER I : INTRODUCTION

### 1.1 Foreword

This Report relates to matters arising from the audit of the financial transactions of the Ministry of Defence and its following Organisations:

- Army,
- Inter Services Organisations,
- Defence Research and Development Organisation and its laboratories dedicated primarily to Army and Ordnance Factories,
- Defence Accounts Department
- Ordnance Factories, and
- Defence Public Sector Undertakings

The primary purpose of the report is to bring to the notice of the legislature important results of audit. Auditing standards require that the materiality level for reporting should be commensurate with the volume and magnitude of transactions. The findings of Audit are expected to enable the Executive to take corrective actions as also frame policies and directives that will lead to improved financial management of the Organisations, thus contributing to better governance and improved operational preparedness.

This chapter, in addition to explaining the planning and extent of audit, provides a synopsis of the significant audit observations, followed by a brief analysis of the expenditure of the above Organisations. Subsequent chapters present detailed findings and observations arising out of the audit and performance reviews of the Ministry and the aforementioned Organisations.

### 1.2 Audited entity profile

Ministry of Defence, at the apex level, frames policies on all Defence related matters. It is divided into four departments, namely, Department of Defence, Department of Defence Production, Department of Research and Development and Department of Ex-Servicemen Welfare. Each department is headed by a Secretary. The Defence Secretary who is the Head of the Department of Defence also coordinates the activities of other departments.

Army is primarily responsible for the Defence of the country against external aggression and safeguarding the territorial integrity of the nation. It also renders aid to the civil authorities at the time of natural calamities and internal

disturbances. It is, therefore, incumbent upon the Army to suitably equip, modernize and train itself to meet these challenges.

DRDO, through its chain of laboratories, is engaged in research and development, primarily to promote self-reliance in Indian Defence sector. It undertakes research and development in areas like aeronautics, armaments, combat vehicles, electronics, instrumentation, engineering systems, missiles, materials, naval systems, advanced computing, simulation and life sciences.

The Inter Services Organisations, such as Armed Forces Medical Services, Military Engineer Services (MES), Defence Estates, Quality Assurance, etc., serve the Defence forces in the three wings of the Army, Navy and Air Force. They are responsible for development and maintenance of common resources for optimising cost-effective services. They function directly under Ministry of Defence.

Ordnance Factory Board (OFB) functions under the administrative control of the Department of Defence Production and is headed by Director General, Ordnance Factories. Thirty-nine factories are responsible for production and supply of ordnance stores to the armed forces.

Defence Public Sector Undertakings(DPSUs) function under the administrative control of Department of Defence Production. There are nine DPSUs which are headed by respective Chairman cum Managing Director (CMD).

### **1.3 Integrated Financial Advice and Control**

Ministry of Defence and the Services have a full-fledged internal financial control system in place. With fully integrated Finance Division in the Ministry of Defence, the Secretary (Defence Finance) and his/her officers scrutinize all proposals involving expenditure from the Public Fund. Secretary (Defence Finance) is responsible for providing financial advisory services to Ministry of Defence and the Services at all levels, and for treasury control of the Defence expenditure.

Being Chief Accounting Officer of the Defence Services, Secretary (Defence Finance) is also responsible for the internal audit and accounting of Defence expenditure. This responsibility is discharged through the Defence Accounts Department with the Controller General of Defence Accounts as its head.

### **1.4 Authority for Audit**

The authority for our audit is derived from Articles 149 and 151 of the Constitution of India and the Comptroller and Auditor General's (Duties, Powers and Conditions of Service) (DPC) Act, 1971. We conduct audit of

Ministries/Departments of the Government of India under Section 13<sup>1</sup> of the CAG's (DPC) Act. Major Cantonment Boards are audited under Section 14<sup>2</sup> of the said Act. Principles and methodology of compliance audit are prescribed in the "Regulations of Audit and Accounts, 2007".

## 1.5 Planning and Conduct of Audit

Our audit process starts with the risk assessment of the Organisation as a whole and of each unit, based on expenditure incurred, criticality and complexity of activities, level of delegated financial powers, assessment of overall internal controls, and concerns of stakeholders. Previous audit findings are also considered in this exercise. Based on this risk assessment, the frequency and extent of audit are decided. An annual audit plan is formulated to conduct audit on the basis of such risk assessment.

After completion of audit of each unit, Local Test Audit Reports (LTARs) containing audit findings are issued to the Head of the unit. The units are requested to furnish replies to the audit findings within a month of receipt of the LTARs. Whenever the replies are received, audit findings are either settled or further action for compliance is advised. Important audit observations arising out of these LTARs are processed for inclusion in the audit reports which are submitted to the President of India under Article 151 of the Constitution of India. During 2012-13, audit of 614<sup>3</sup> units/formations and nine DPSUs was carried out by employing 18,785<sup>4</sup> partydays. Our audit plan ensured that most significant units/entities, which are vulnerable to risks, were covered within the available manpower resources.

## 1.6 Significant audit observations

Capital and Revenue procurements made by the Ministry of Defence and the Service Organisations form the critical area as far as the audit of Defence Sector is concerned. We have been pointing out deficiencies in the procurement process in the previous Audit Reports and the Ministry of Defence has taken several measures to improve the procedures involved. Periodical revisions of the Defence Procurement Procedure (DPP) and Defence Procurement Manual (DPM) are significant steps to evolve better practices.

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<sup>1</sup> Audit of (i) all expenditure from the Consolidated Fund of India (ii) all transactions relating to Contingency Funds and Public Accounts and (iii) all trading, manufacturing, profit & loss accounts & balance-sheet & other subsidiary accounts.

<sup>2</sup> Audit of receipt and expenditure of bodies or authorities substantially financed by grants or loans from the Consolidated Fund of India or of any State or of any Union Territory.

<sup>3</sup> Number of units/formations audited by O/o DGADS, New Delhi and O/o DG(OF) Kolkata.

<sup>4</sup> Number of Party days employed during the financial year 2012-13 by the O/o DGADS New Delhi, O/o DG(OF) Kolkata and O/o PDCA, Bengaluru

The present Report highlights cases which assume importance in the light of their impact on operational preparedness. The Report also brings out issues regarding improper management of Defence land, poor management of contract, inadmissible payments to contractors, procurement of substandard stores, excess payments etc which require immediate redressal.

- BEML signed a collaboration agreement for indigenisation of TATRA vehicles 28 years back in 1986, with Original Equipment Manufacturer (OEM) at the instance of the Ministry of Defence. The objective of attaining 86 *per cent* indigenisation by 1991 was envisaged by BEML. However, till 2014 the target is yet to be attained. BEML attributed the delay mainly to the failure of Ministry in placing order for sufficient number of vehicles between 1986 and 1991. The process for indigenisation of TATRA vehicles suffered due to lack of clear long term projection of orders by Army to BEML. Resultantly, the objective of self-reliance in production of TATRA vehicles was defeated. (Paragraph 2.1)
- Ministry of Defence imported 999 number of Individual Chemical Agent Detectors (ICADs) worth ₹ 27.32 crore between January 2010 and October 2010 for detecting the presence of chemical agents and toxic industrial compounds. Non conducting Field Evaluation Trials in conditions where equipment is likely to be deployed as prescribed by DPP, had resulted in acceptance of defective ICADs worth ₹ 27.32 crore. These equipment were awaiting replacement since August 2011 by the firm as of June 2014. (Paragraph 2.2)
- Injudicious planning for the procurement of nine items under Individual Protective Equipment relating to Chemical, Biological, Radiological and Nuclear equipment resulted in non procurement of NBC suit Permeable, the main constituent of IPE. An expenditure of ₹ 88.39 crore was incurred on other eight items of IPE without NBC suit Permeable which defeated the purpose of ensuring protection in case of NBC warfare. (Paragraph 3.1)
- Army Headquarters placed supply orders in February 2008 for supply of 3717 Tyres costing ₹ 2.97 crore. The firm was to deliver stores by August 2008. The firm supplied tyres of inferior material quality with manufacturing defects. The purchasing authority of AHQ also did not suspend the procurement of tyres pending finalisation of defect report. Continuance of supply of defective tyres by the firm led to payment of ₹ 2.65 crore. (Paragraph 3.4)
- Failure of Local Military Authorities at Chennai to correctly assess the requirement of married accommodation for JCOs had resulted in construction of 17 dwelling units at a cost of ₹ 1.79 crore in excess of

the requirement and their subsequent re-appropriation as field area family accommodation. In another case, Station Commander Pune irregularly re-appropriated four Lieutenant dwelling units constructed at a cost of ₹ 47 lakh as 'Guest Rooms for Brigadier and above without the approval of Government of India. (Paragraph 4.1)

- DGBR sanctioned two works worth ₹ 0.90 crore for creation of two storage accommodation. These funds were actually utilized to create a Multipurpose Hall with an area of 1556 sqm defeating the objective of storage accommodation. (Paragraph 5.1)
- The performance of the Grants-in-Aid Scheme introduced in 1969 in DRDO to utilise the indigenously available research talent preferably in areas of interest to Defence was far from satisfactory. There were critical shortfalls in the management and monitoring of the Scheme such as improper budgeting process, awarding the project without arriving at viable and specific research and defining the quantified and qualitative target attained against the outlay, circulation of the Scheme so as to ensure adequate response from all interested parties and there was no evidence to suggest that all the proposals received through online application were duly considered and properly evaluated to ensure fair competition and selection of best possible proposals. (Paragraph 7)
- Against the Ministry's revised plan to induct 124 MBT Arjun in 2002-09, Ordnance Factories issued 119 MBT Arjun to the Army during 2004-13. The production of 300 indigenous T-90 tanks, scheduled for delivery in 2006-10 based on Transfer of Technology from Russia (2001), lagged behind with production of 225 T-90 and issue of only 167 T-90 tanks to the Army during 2009-13. Inordinate delays in production of both the tanks led to fresh import (November 2007) of T-90 tanks worth ₹ 4,913 crore. While the progress of the project for augmentation of production capacity of T-90 tanks sanctioned in September 2011 was very slow, the existing facilities for MBT Arjun remained underutilised in absence of further order of MBT Arjun from the Army. (Paragraph 8.3).

### **1.7 Persistent irregularities in Defence Research and Development Establishment**

Cases of non realization of project deliverables in terms of Staff projects, Technology Demonstration / Research and Development projects have been highlighted in Report No.24 of 2011-12 and Report No.16 of 2012-13. However, no significant improvement was noticed as reported in Chapter VI. Corrective steps need to be taken urgently in this regard.

### **1.8 Response of the Ministry/Department to Draft Audit Paragraphs**

On the recommendations of the Public Accounts Committee, Ministry of Finance (Department of Expenditure) issued directions to all Ministries in June 1960 to send their response to the Draft Audit Paragraphs proposed for inclusion in the Report of the Comptroller and Auditor General of India within six weeks.

The Draft Paragraphs are forwarded to the Secretaries of the Ministry/ departments concerned drawing their attention to the audit findings and requesting them to send their response within six weeks. It is brought to their personal attention that in view of likely inclusion of such Paragraphs in the Audit Reports of the Comptroller and Auditor General of India, which are placed before Parliament, it would be desirable to include their comments in the matter.

Draft paragraphs proposed for inclusion in this Report were forwarded to the Secretaries concerned between April 2014 and October 2014 through letters addressed to them personally.

The Ministry of Defence did not send replies (October 2014) to 17 paragraphs out of 19 Paragraphs featured in Chapters II to VII, 13 of the 15 paragraphs included in Chapter VIII and 02 of the 05 paragraphs included in Chapter-IX of this report. However, the responses of Army Headquarters and Ordnance Factory Board and Management of DPSUs wherever received, have been suitably incorporated in the Report.

### **1.9 Action taken on earlier Audit Paragraphs**

With a view to enforcing accountability of the Executive in respect of all issues dealt with in various Audit Reports, the Public Accounts Committee desired that Action Taken Notes (ATNs) on all paragraphs pertaining to the Audit Reports for the year ended 31 March 1996 onwards be submitted to



them duly vetted by Audit within four months from the date of laying of the Reports in Parliament.

Review of ATNs relating to the Army as of September 2014 indicated that ATNs on 71 paragraphs included in the Audit Reports up to and for the year ended March 2012 remain outstanding, of which the Ministry had not submitted even the initial ATNs in respect of 11 Paragraphs and 18 ATNs (Sl. No.1 to 18) are outstanding for more than 10 years as shown in **Annexure-I**.

## **1.10 Financial Aspects and Budgetary Management**

### **1.10.1 Introduction**

The budgetary allocations of the Ministry of Defence are contained under eight Demands for Grants of which six grants are included under Defence Service Estimates (DSE) and two under Civil Grants.

- Two Civil Grants which include Demand No. 20 - Ministry of Defence (Civil) and Demand No. 21 - Defence Pensions.
- Six Grants of the Ministry of Defence, which include the following:
  - Demand No.22, Defence Service - Army
  - Demand No. 23, Defence Services - Navy
  - Demand No. 24, Defence Services - Air Force
  - Demand No. 25, Defence Ordnance Factories
  - Demand No. 26, Defence Services - Research & Development
  - Demand No. 27, Capital Outlay on Defence Services -Includes All Services and Departments other than those covered by the Demands for Grants of Ministry of Defence (Civil)
- The budgetary requirements for the Border Roads Organisation are provided by the Ministry of Road Transport & Highways.

The above mentioned Grants are broadly categorized into Revenue and Capital expenditure.

- **Revenue Expenditure:** This includes expenditure on Pay & Allowances, Transportation, Revenue Stores (like Ordnance stores, supplies by Ordnance Factories, Rations, Petrol, Oil and Lubricants, Spares, etc.), Revenue Works (which include maintenance of Buildings, water and electricity charges, rents, rates and taxes, etc.) and other miscellaneous expenditure.
- **Capital Expenditure:** This includes expenditure on Land, Acquisition of new weapon and ammunitions, Modernization of Services,



Construction Works, Plant and Machinery, Equipment, Tanks, Naval Vessels, Aircraft and Aero-engines, Dockyards, etc.

Approval of Parliament<sup>5</sup> is taken for the Gross expenditure provision under different Demands for Grants. Receipts and Recoveries, which include items like sale proceeds of surplus/obsolete stores, receipts on account of services rendered to State Governments/other Ministries, etc. and other miscellaneous items are deducted from the gross expenditure to arrive at the net expenditure on Defence Services for the six Demands, viz. Demands Nos. 22 to 27. A brief analysis of these grants is given below except Grant No. 23, Defence Services-Navy and Grant No.24, Defence Services-Air Force which are commented upon in a separate report.

### 1.10.2 Grant No. 20- Civil Expenditure of the Ministry of Defence

The budgetary provisions and actual expenditure including Revenue and Capital expenditure for the year 2012-13 under Demand No. 20 is shown in Table - 1 below:

**Table-1: Budgetary allocation and Actual Expenditure: MoD (Civil)**

(₹ in crore)

Budget Estimates	Revised Estimates	Actual Expenditure
16,598.24	15,800.00	15,609.71

Major components of Gross Revenue expenditure of ₹ 14,012.06 crore for 2012-13 are Canteen Stores Department (CSD) (₹10,765.51 crore), Defence Accounts Department (₹ 1,030.60 crore), Coast Guard Organisation (CGO) (₹ 944.73 crore), Jammu & Kashmir Light Infantry (J&K LI) (₹ 853.24 crore) Defence Estates Organisation (DEO) (₹ 244.10 crore) etc. In the Capital Outlay of ₹ 1,597.65 crore the actual expenditure in 2012-13, the major components are Capital Outlay on Other Fiscal Services- Customs (₹ 1,564.71 crore), housing and office buildings (₹ 35.74 crore) and Miscellaneous Loans for Unit Run Canteen (URC) by CSD (₹ 0.75 crore).

### 1.10.3 Grant No. 21 - Defence Pensions

Defence Pensions, under Ministry of Defence, provides for pensionary charges in respect of retired Defence personnel (including Defence Civilian employees) of the three services, viz. Army, Navy and Air Force, and of employees of Ordnance Factories, etc. It covers payments of service pension, gratuity, family pension, disability pension, commuted value of pension, leave encashment, etc.

<sup>5</sup> Report No.20 of Standing Committee on Defence (2012-13, Fifteenth Lok Sabha)

The position of budgetary allocation and expenditure for the year 2012-13 under this Grant is as under:

**Table- 2: Budgetary allocation and Actual Expenditure: Defence Pension**

(₹ in crore)

Budget Estimates	Revised Estimates	Actual Expenditure
39,000.00	39,500.00	43,367.71

### 1.11 Grant No. 22 to 27 – Defence Services Estimates

#### 1.11.1 At a glance

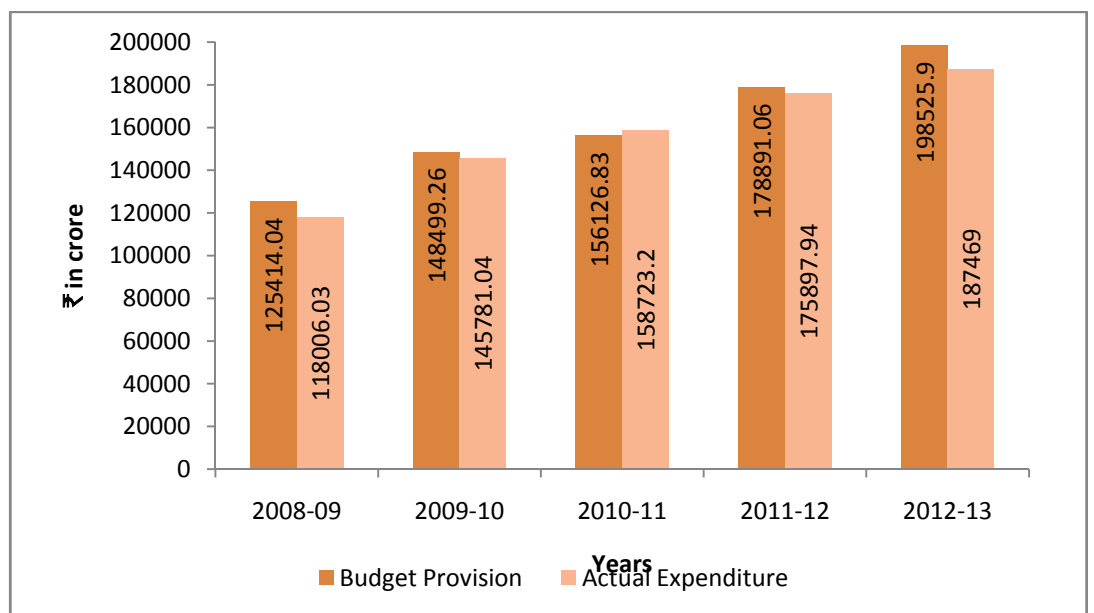
The overall Defence Budget (Grant No. 22 to 27) allocation and actual expenditure (Voted & Charged) for the period 2008-09 to 2012-13 are given in Table-3 and Chart -1 as under:

**Table-3: Total Defence Budget allocation and Actual expenditure**

(₹ in crore)

Year	Budget Provision	Actual Expenditure
2008-09	1,25,414.04	1,18,006.03
2009-10	1,48,499.26	1,45,781.04
2010-11	1,56,126.83	1,58,723.20
2011-12	1,78,891.06	1,75,897.94
2012-13	1,98,525.90	1,87,469.00

**Chart-1: Budget Provision Vs Actual Expenditure**

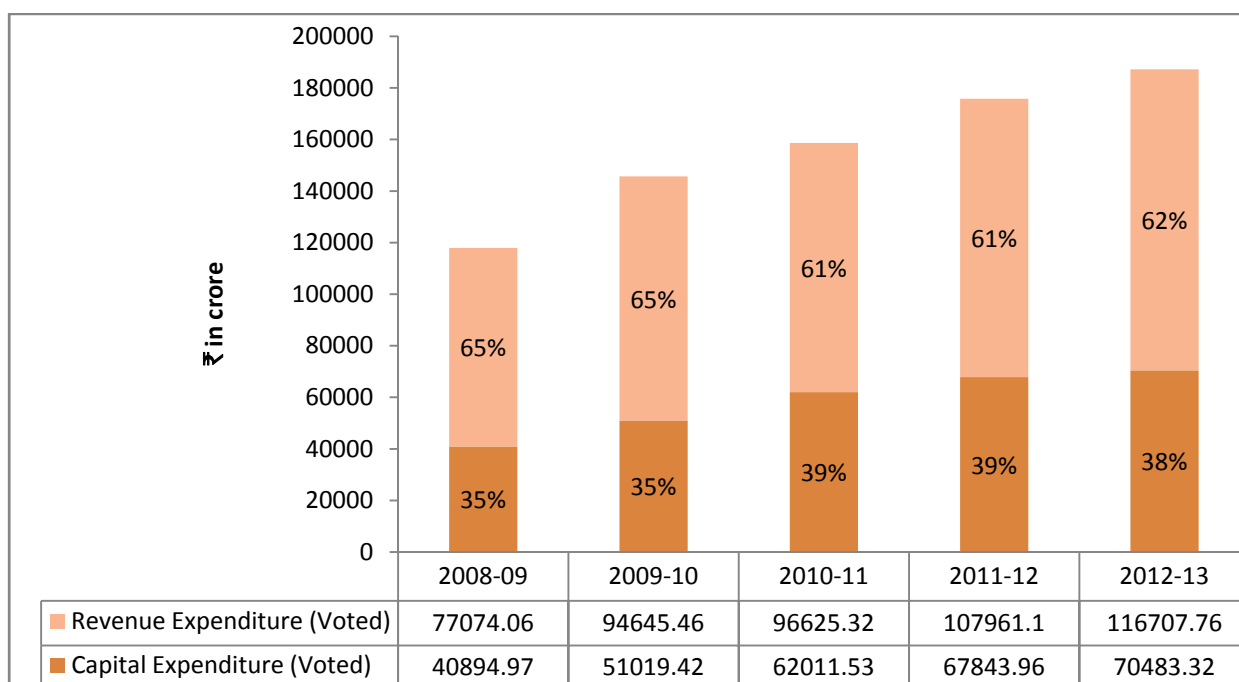


- The data relating to actual Defence expenditure shows an overall increase of 58.86 per cent during the period 2008-09 to 2012-13 whereas the increase in 2012-13 over the previous year is 6.58 per cent.

### 1.11.2 Revenue expenditure vs. Capital expenditure in Defence Services

Capital and Revenue expenditure (Voted) for the period 2008-09 to 2012-13 is given in Chart - 2 below:

**Chart - 2: Revenue expenditure vs. Capital expenditure (Voted)**



The above data shows that the proportion of Capital expenditure as a percentage of total Defence expenditure has remained between 35 to 39 per cent during the period 2008-09 to 2012-13, however, there is a decrease by one per cent over the previous year in 2012-13.

### 1.12 Break-up of Expenditure (Voted) relating to Army, Ordnance Factories & R&D (Capital & Revenue) – Grant No. 22, 25, 26 and 27<sup>6</sup>

A detailed analysis of the expenditure (Voted) for the period 2008-09 to 2012-13 relating to Army, Ordnance Factories and R & D showing Revenue and Capital expenditure is given in Table-4 below.

<sup>6</sup> Grant No. 23 – Navy and Grant No. 24 – Air Force are analysed in the Compliance Audit Report of the Union Government (Defence Services) Air Force and Navy

**Table-4: Expenditure (Voted) of Army, Ordnance Factories & R&D***(₹ in crore)*

Description of Grant	Components of Expenditure	2008-09	2009-10	2010-11	2011-12	2012-13
Army	Actual	59,663.53	77,512.29	80,789.82	86,776.05	94,274.06
	Revenue	49,052.51 (82.22%)	62,716.64 (80.91%)	65,001.96 (80.46%)	71,832.66 (82.78%)	79,516.95 (84.35 %)
	Capital	10,611.02 (17.78%)	14,795.65 (19.09%)	15,787.86 (19.54%)	14,943.39 (17.22%)	14,757.11 (15.65 %)
Ordnance Factory	Actual	3,309.13	3,520.27	1,527.00	1,704.15	2,116.26
	Revenue	2,957.00 (89.36%)	3,279.98 (93.17%)	1,073.42 (70.30%)	1,427.94 (83.79%)	1,754.03 (82.88%)
	Capital	352.13 (10.64%)	240.29 (6.83%)	453.58 (29.70%)	276.21 (16.21%)	349.07 (16.60%)
R&D	Actual	7,730.66	8,507.87	1,0191.99	9,932.29	9,860.56
	Revenue	3,873.55 (50.11%)	4,355.57 (51.20%)	5,230.88 (51.32%)	5,321.24 (53.58%)	5,218.32 (52.92%)
	Capital	3,857.11 (49.89%)	4,152.30 (48.81%)	4,961.11 (48.68%)	4,611.05 (46.43%)	4,642.24 (47.08%)

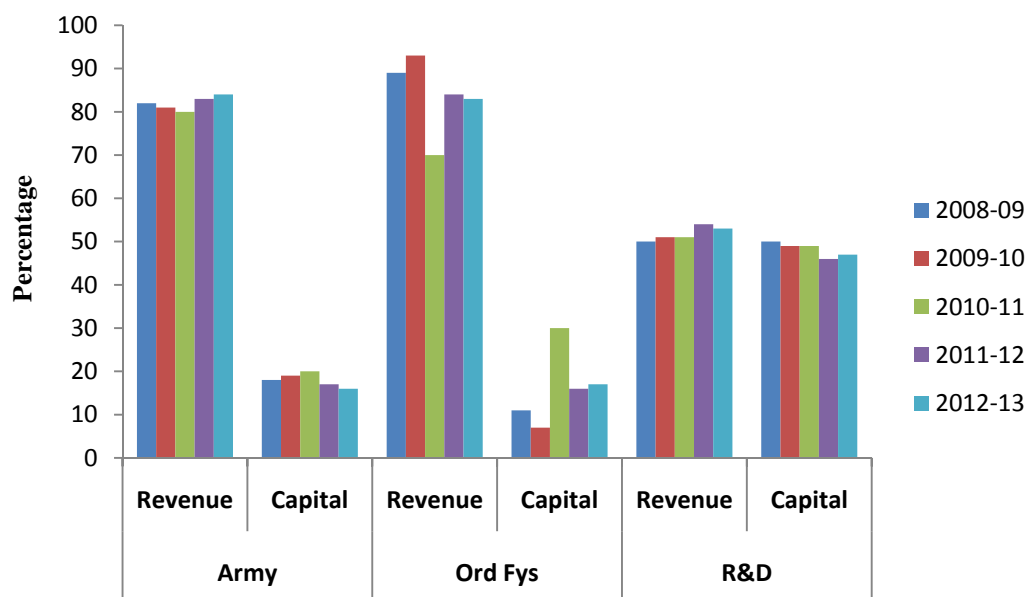
**Note:** Figure in the brackets represents the Revenue/Capital expenditure as a percentage of the Actual expenditure

- The total Army expenditure during 2012-13 has registered an increase of 8.64 *per cent* over the previous year with the Capital expenditure recording a decrease of 1.25 *per cent* and the Revenue expenditure registering an increase of 10.70 *per cent*.
- The total Ordnance Factory expenditure during 2012-13, has recorded an increase of 24.18 *per cent* over the previous year with the Capital expenditure registering an increase of 31.14 *per cent* and the Revenue expenditure an increase of 22.84 *per cent*.
- The total R&D expenditure during 2012-13, has recorded a decrease of 0.72 *per cent* over the previous year with Capital expenditure registering an increase of 0.68 *per cent* and the Revenue expenditure a decrease of 1.93 *per cent*.

#### ***1.12.1 Analysis of total Expenditure in respect of Army, Ordnance Factories and Research & Development - Capital and Revenue***

A trend of total Army, Ordnance Factories and Research and Development expenditure both Capital and Revenue as a proportion of actual expenditure during the period 2008-09 to 2012-13 is given in Chart-3 below:

**Chart-3: Analysis of total Capital and Revenue Expenditure in respect of Army Ordnance Factories (Ord Fys) and Research & Development (R&D)**



- Army:** In the year 2012-13 Revenue component of the total Army expenditure has increased by 2 per cent since 2008-09 from 82 per cent in 2008-09 to 84 per cent in 2012-13 while the Capital component has recorded a corresponding decrease during the same period from 18 per cent (2008-09) to 16 per cent (2012-13).
- Ordnance Factories:** The Revenue component of the total actual expenditure of the Ordnance Factories for the period 2008-09 to 2012-13 decreased by 6 per cent from 89 per cent in 2008-09 to 83 per cent in 2012-13, whereas the Capital component of expenditure increased by a corresponding percentage from 11 per cent to 17 per cent.
- Research & Development:** The Revenue expenditure on R&D has increased by 3 per cent from 50 per cent in 2008-09 to 53 per cent in 2012-13 during the period 2008-09 to 2012-13 while the Capital expenditure has decreased by a similar percentage from 50 per cent to 47 per cent.

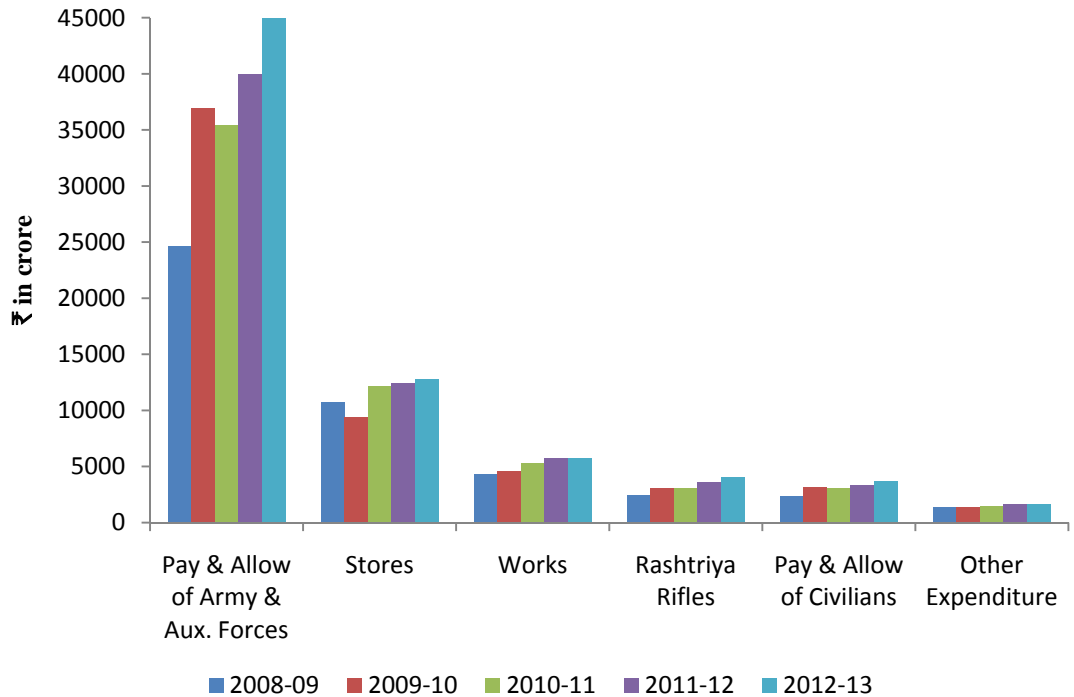
### 1.13 Analysis of Major components of Revenue expenditure (Voted)

#### 1.13.1 Army (Voted)

During the period 2008-09 to 2012-13 maximum Revenue expenditure was incurred under six Minor Heads (MH) of the Army as given in Table-5 and in the Chart-4 below:

**Table-5: Details of Major components of Revenue expenditure of Army***(₹ in crore)*

Year	Pay & Allowances (MH-101& 103)	Stores (MH-110)	Works (MH-111)	Rashtriya Rifles (MH-112)	Pay & allow. of Civilians (MH-104)	Other expenditure (MH-800)
2008-09	24,656.04	10,712.51	4,282.97	2,419.72	2,353.11	1,370.11
2009-10	36,896.23	9,404.65	4,608.34	3,047.58	3,132.27	1,380.31
2010-11	35,445.39	12,144.48	5,308.35	3,098.71	3,051.42	1,475.79
2011-12	39,996.27	12,442.20	5,708.68	3,585.38	3,361.21	1,644.18
2012-13	46,057.23	12,749.70	5,768.73	4,076.22	3,673.96	1,638.63

**Chart-4: Major components of Revenue expenditure of Army**

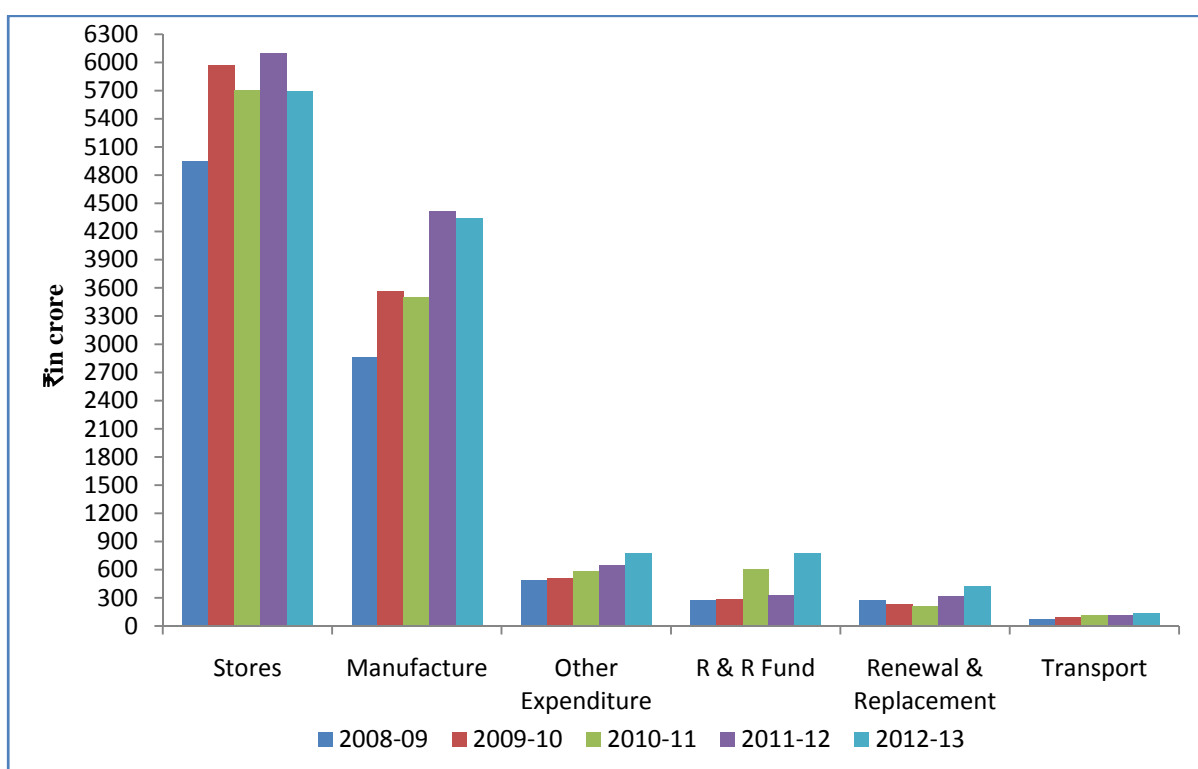
- Rise in expenditure by more than 50 per cent:** A rise in expenditure of more than 50 per cent has been recorded under Minor Heads of Pay & Allowances of Army & Auxiliary Forces, Pay & Allowances of Civilians and Expenditure relating to Rashtriya Rifles at 86.80 per cent, 56.13 per cent and 68.46 per cent, respectively during the period 2008-09 to 2012-13.

### 1.13.2 Ordnance Factories (Voted)

During the period 2008-09 to 2012-13 maximum Revenue expenditure was incurred under six MH of the Ordnance Factories as given in Table-6 and in the Chart-5 below:

**Table-6: Major components of Revenue expenditure of Ordnance Factories**

Year	(₹ in crore)					
	Stores MH-110	Manufacture- MH-054	Other expenditure MH-800	Renewal & Reserve (R&R) Fund-MH-797	Renewal & Replacement MH-106	Transport MH-105
2008-09	4,948.22	2,858.54	483.05	271.00	276.22	73.62
2009-10	5,965.16	3,566.03	506.74	280.00	228.24	86.59
2010-11	5,704.96	3,499.75	582.66	600.00	207.82	110.73
2011-12	6,101.41	4,415.33	649.75	325.00	310.25	115.98
2012-13	5,691.76	4,335.73	767.68	350.00	415.85	135.01

**Chart 5: Major components of Revenue expenditure of Ordnance Factories**

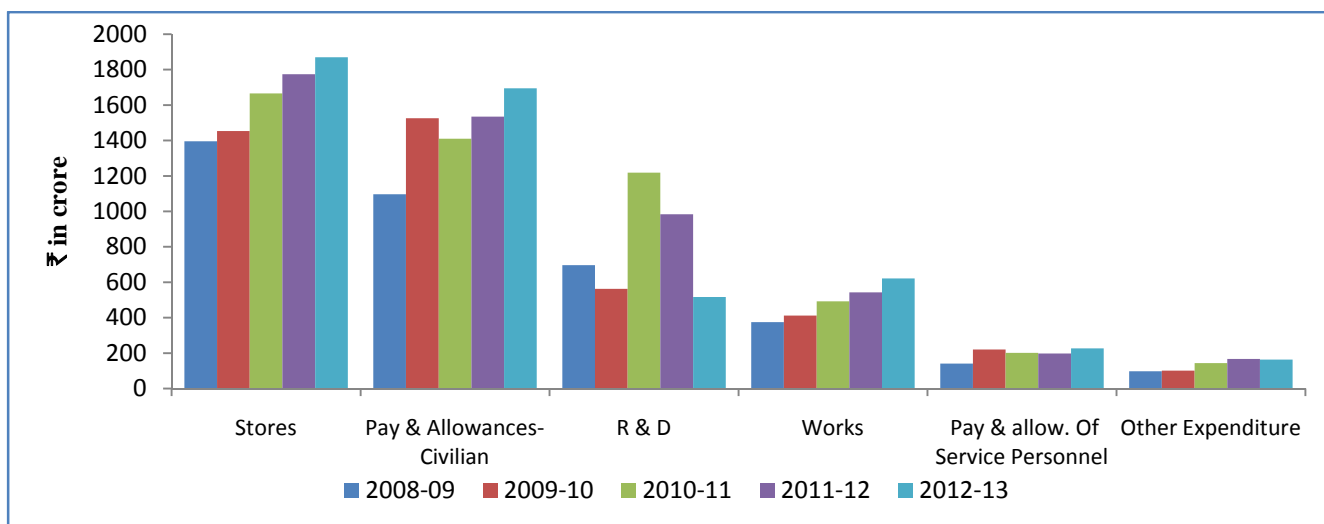
- **Expenditure under** Minor head 'Transportation', 'Other Expenditure', 'Manufacture', 'Renewal and Replacement', 'R&R Fund' and 'Stores' have shown an increase of 83.39 per cent, 63.06 per cent, 51.68 per cent, 50.55 per cent, 29.15 per cent and 15.09 per cent respectively during the period 2008-09 to 2012-13.

### 1.13.3 Research & Development (Voted)

During the period 2008-09 to 2012-13 maximum Revenue expenditure was incurred under six Minor Heads (MH) of the R&D as given in Table-7 and Chart-6 below:

**Table-7: Major components of Revenue expenditure of Research & Development***(₹ in crore)*

Year	Stores MH-110	Pay & Allowances- Civilian MH-102	R&D MH-004	Works MH-111	Pay & Allowance of Service Personnel MH-101	Other Expenditure MH-800
2008-09	1,395.99	1,096.76	696.51	374.86	140.67	97.87
2009-10	1,453.76	1,525.66	562.81	411.80	220.34	101.31
2010-11	1,665.91	1,409.71	1,218.25	492.17	201.61	144.02
2011-12	1,774.18	1,534.88	983.91	543.20	198.23	167.55
2012-13	1,870.19	1,694.22	516.97	621.39	226.38	163.43

**Chart 6: Major components of Revenue expenditure of Research & Development**

- The expenditure under Minor Head- Works and ‘Other Expenditure’ have shown an increase of 65.76 per cent and 66.99 per cent, respectively during the period 2008-09 to 2012-13.
- **“Research & Development”**: The “Research and Development’ on the other hand has shown a decrease of 25.77 per cent during the period 2008-09 to 2012-13. However, during 2012-13 there is a significant decrease of 47.46 per cent over the previous.

#### 1.14. Analysis of Capital expenditure - Major Head-4076-Grant no. 27-Capital Outlay on Defence Services

##### 1.14.1 Components of Capital expenditure

There are eight Sub Major Heads (SMH) under this Grant, viz. Sub Major Head 01- Army, Sub Major Head 02 - Navy, Sub Major Head 03- Air Force,



Sub Major Head 04- Ordnance Factories, Sub Major Head 05 - R&D, Sub Major Head 06 - Inspection Organisation, Sub Major Head 07 - Special Metal and Super Alloys Projects and Sub Major Head 08 - Technology Development.

**1.14.2 Trend Analysis of Capital expenditure (Voted) of Army, Ordnance Factories and R&D<sup>7</sup>**

The details of Capital expenditure of Army, Ordnance Factories and R&D i.e.; SMH-01, 04 and 05 during the period 2008-09 to 2012-13 is given in Table - 8 below:

**Table-8: Total Capital Expenditure (Defence Services) Vs Army, Ordnance Factories and R&D**

(₹ in crore)

Year	Total Capital Expenditure	Capital Expenditure of Army	Capital Expenditure of Ordnance Factories	Capital Expenditure of R&D
2008-09	40,894.97	10,611.02	352.13	3,857.11
2009-10	51,019.42	14,795.65	240.29	41,52.30
2010-11	62,011.53	15,787.86	453.58	4,961.11
2011-12	67,843.96	14,943.39	276.21	4,611.05
2012-13	70,483.32	14,757.11	349.07	4,642.24

- **Total Capital Expenditure of Defence Services:** The total Capital expenditure of Defence Services has recorded an overall increase of 72.35 per cent during the period 2008-09 to 2012-13. Compared to this the component-wise increase in Capital expenditure of Army, Ordnance Factories and R & D were 39.09 per cent, 2.87 per cent and 20.36 per cent, respectively.
- **Army Capital Expenditure:** The component Capital expenditure of Army against the total Capital expenditure of Defence Services decreased by 5 per cent from 25.95 per cent in 2008-09 to 20.94 per cent in 2012-13. The Capital expenditure of Army during 2012-13 has recorded a decrease of 1.25 per cent over the previous year, despite an increase of 3.89 per cent in the Capital expenditure of Defence Services.
- **Ordnance Factory Capital Expenditure:** Capital expenditure of Ordnance Factory has not seen any significant variations as a component of the total Capital expenditure during the period 2008-09 to 2012-13.

<sup>7</sup> SMH- 02 and SMH- 03 are analysed separately in Audit Report of Union Government (Defence Services) Air Force and Navy. In respect of SMH- 06- and SMH- 08 total expenditure during the period 2008-09 to 2012-13 was 71.76 crore and 111.05 crore respectively. In respect of SMH-07 the expenditure during these years was Nil.

From 0.86 *per cent* of the total Capital expenditure in 2008-09 it has decreased to 0.50 *per cent* in 2012-13. Over the previous year, the Capital expenditure on Ordnance Factory in 2012-13 has shown an increase of 26.38 *per cent*.

- **R&D Capital Expenditure:** Capital expenditure of R&D has seen a decrease of nearly 3 *per cent* i.e. from 9.43 *per cent* (2008-09) to 6.59 *per cent* (2012-13) with respect to total Capital expenditure. Compared to the previous year, the Capital expenditure of R&D has increased by 0.68 *per cent*.

#### 1.14.3 Trend of Saving/Excess in Capital Expenditure (Voted)

The trend of 'Saving' and 'Excess' in Capital expenditure for the period 2008-09 to 2012-13 is given in Table-9 below:

**Table-9: Trend of Saving/Excess in Capital Expenditure**

(₹ in crore)

Year	Total Grant (Voted)	Total Expenditure	Under Total Capital Grant	
			Saving (-)	Excess (+)
2008-09	47,976.10	40,894.98	7,081.12 (14.76%)	-
2009-10	54,779.62	51,019.42	3,760.20 (6.86%)	-
2010-11	60,776.21	62,011.52	-	1,235.31 (2.03 %)
2011-12	69,148.01	67,843.96	1,304.04 (1.89%)	-
2012-13	79,526.99	70,483.32	9,043.67 (11.37%)	

**Note:** Figure in brackets represents the saving (-)/excess (+) as a percentage of Total Grant (Voted).

- It is evident from the above table that during the period 2008-09 to 2012-13 there were persistent "Savings" except in the year 2010-11 when there was an "excess" of 2.03 *per cent*. The 'Savings' have ranged 14.76 *per cent* to 1.89 *per cent* during this period.
- An increase in 'Savings' was noticed from ₹ 1,304 crore (1.89 *per cent*) during 2011-12 to ₹ 9,043.67 crore (11.37 *per cent*) in the year 2012-13. However, funds amounting to ₹ 9,990.79 crore (4.17 *per cent*) were surrendered on the last working day of the financial year 2012-13 which was more than savings.

## CHAPTER II : MINISTRY OF DEFENCE

### 2.1 Inordinate delay in indigenisation of TATRA vehicles

**BEML signed a collaboration agreement for indigenisation of TATRA vehicles 28 years back in 1986, with Original Equipment Manufacturer (OEM) at the instance of the Ministry of Defence. The objective of attaining 86 per cent indigenisation by 1991 was envisaged by BEML. However, till 2014 the target is yet to be attained. BEML attributed the delay mainly to the failure of Ministry in placing order for sufficient number of vehicles between 1986 and 1991. The process for indigenisation of TATRA vehicles suffered due to lack of clear long term projection of orders by Army to BEML. As a result, the objective of self-reliance in production of TATRA vehicles was defeated.**

The Indian Military's dependence on the foreign suppliers for their defence products has been continuing despite several initiatives<sup>8</sup> taken by the Government to achieve self-reliance. Institute of Defence Study and Analysis (IDSA) in its report (July 2013) on Indian Defence Industries had stated that India was the world's largest importer in Defence, spending 52 to 61 per cent of its Defence Capital Acquisition budget on import during the period 2006-07 to 2010-11. In India, nine Defence Public Sector Undertakings (DPSUs) and 39 Ordnance Factories (OFs) have been accorded the role of the designer and integrator of defence products with a view to develop the industries for defence equipment. The Department of Defence Production (DDP), under the Ministry of Defence, oversees their activities. They cater to the needs of the defence sector through their in-house production programmes by Transfer of Technology (TOT) from Foreign Original Equipment Manufacturers (OEM). The product range of DPSUs include aircraft, warships, submarines, heavy vehicles and earthmovers, missiles, a variety of electronic devices and other major equipment for the defence sector.

In line with these products, TATRA vehicle which is the most extensively used vehicle for mounting the missiles and radars and procured by Indian Army from Bharat Earth Movers Limited (BEML) was selected for conduct of a holistic examination. Audit in this regard was carried out during July 2012 to December 2012 at Department of Defence Production in MOD, Army HQ, BEML, Bengaluru, Central Ordnance Depot<sup>9</sup>, Dehu Road and two Army Base

<sup>8</sup> Industrial Policy Resolutions of Government of India from 1948 onwards.

<sup>9</sup> COD Dehu Road is dedicated depot to stocking, provisioning and procurement of Tatra spares.

Workshops<sup>10</sup>. The report has been up-dated by ascertaining latest position as of October 2014.

TATRA vehicles are special 'B'<sup>11</sup> type i.e. non-combat vehicles designed for all-terrain which are used in Indian Army mostly for transportation of tanks and also as missile launcher, gun-towing tractor, ammunition carrier, fire crash tender, medium recovery vehicle, etc.

These vehicles were being imported from M/s OMNIPOL of Czechoslovakia (OEM) since 1969. The Army had imported about 1340 TATRA vehicles before May 1983, when the Government desired that their future requirement be met by indigenous production based on license agreement with the OEM, as that would help save Foreign Exchange (FE) and achieve self-sufficiency in production, spares and maintenance support of TATRA vehicles.

BEML, a DPSU, was chosen in 1983 by the Ministry for indigenous production of the TATRA vehicles and, in May 1986, BEML signed an agreement with OEM, for licensed production<sup>12</sup> of TATRA vehicles and spare parts with validity of 10 years. A Detailed Project Report (DPR) was prepared by BEML in June 1986, according to which a maximum of 86 percent indigenisation was to be achieved through production of 1030 TATRA vehicles in phases over a period of five years from 1986 to 1991. For this purpose certain production facilities including civil works and plant and machinery were required to be established at BEML by 1987 and 1991 respectively at a cost of ₹ 29.45 crore, which was approved by CCPA<sup>13</sup> (February 1987). The CCPA approval also indicated that at the stabilisation of indigenisation by the end of 1990-91, there could be savings to the tune of ₹ 19.78 crore on FE. BEML also signed other agreements/MOUs with the OEM-2 subsequently which were also related to the process of indigenisation. The brief of all the agreements are given in Table -10 below:

**Table: 10 – Particulars of Agreements signed for production of TATRA vehicles**

Year of license agreement/ MOU	Name of OEM	Period of validity	Key issues and items covered
License Agreement made in May 1986	M/s OMNI POL	10 years	1. Envisaged transfer of complete knowhow and technical documentation of the vehicles with continual upgradation with payment of ₹ 3 crore as technical documentation fee. 2. Covered extensively the component parts and spare parts. 3. Components up to the value of ₹ 39.95 crore were to be purchased by BEML.

<sup>10</sup>508 Army Base Workshop Allahabad and 510 Army Base Workshop Meerut are entrusted with overhaul of Tatra Vehicles.

<sup>11</sup> Class B vehicles are those which are used for non-combat purposes in Indian Army

<sup>12</sup> Licensed production is production after acquiring technical documentation and knowhow for the specified product in the licensed territory for 6x6 and 8x8 versions. Tatra 4x4 was included under the strategic alliance agreement in 1997.

<sup>13</sup> Cabinet Committee on Political Affairs.

			4. Provision for buy-back of component parts and spare parts by the collaborator. 5. Manufacture of three types of TATRA vehicles <sup>14</sup> .
<b>Component Parts Agreement made in June 1997</b>	M/s TATRA SIPOX (UK) LIMITED (TSUK) <sup>15</sup> (OEM-2)	10 years (this agreement was however not implemented after signing of the next agreement of September 1997)	1. 'Component parts agreement' for procurement of 104 components required for production of four types <sup>16</sup> of TATRA vehicles. 2. The buy-back clause of component parts and spare parts of TATRA (without indicating any quantity or value).
<b>Strategic Alliance Agreement in September 1997</b>	M/s TSUK	10 years	This agreement besides covering the TATRA vehicles covered other vehicles such as Katasi 4X4 vehicle, Phantoon Main Steam Bridge System, excavators and finishing machines mounted on TATRA chassis, cranes mounted on TATRA chassis etc., superseding the agreement of June 1997.
<b>MOU signed in March 2003</b>	M/s TSUK	10 years	1. Covered TATRA <sup>17</sup> as well as heavy recovery vehicles. 2. Excluded from the indigenisation process, vital aggregates such as axles and certain components which were hitherto covered by the previous Agreements.
<b>MOU<sup>18</sup> of February 2008 and MOA<sup>19</sup> of February 2009</b>	M/s TSUK	10 years	1. Covered indigenous manufacture of another variant of the TATRA vehicle <sup>20</sup> and more advanced Euro II engines for the TATRA vehicles. 2. To achieve around 60-65 <i>per cent</i> indigenization of the engine by the 36th month from commencement of production. 3. BEML would be permitted to indigenize all bought-out and proprietary items of TATRA engines and also have the option to buy engine parts which could not be manufactured in India due to technical or economic reasons. 4. The cost of this indigenization process/transfer of technology of the engine was US\$ 4.00 Mln. Towards this, a sum of ₹ 18.70 crore was paid in July 2010 and January 2011.

*Source: Extracts from License Agreements/MOU*

BEML commenced production of TATRA vehicles from the year 1987-88 after procuring components from OEM as per agreement signed in 1986. In the subsequent years also regular orders were placed on the OEM for procurement of components and assemblies as mentioned in **Annexure-II**.

<sup>14</sup> T-815 VTI 26265 8x8, T-815 VVIT 20235 6x6 and T-815 VVN 26265 8x8

<sup>15</sup> After Czechoslovakia politically split into Czech and Slovak Republics, a company called TATRA SIPOX (UK) LIMITED took over the business of the erstwhile M/s Omnipol and M/s SIPOX group of companies

<sup>16</sup> T 815 VTI 8x8, T 815 VVN 8x8, T 815 VP-13 8x8, T 815 VPR-9 8x8

<sup>17</sup> Current range of TATRA vehicles including TATRA based Heavy Recovery Vehicle AV 15.

<sup>18</sup> MOU is a legal document describing a bilateral agreement between parties, which generally lacks the bind power of a contract.

<sup>19</sup> MOA is a legal document written between parties to cooperatively work together on an agreed upon project and hold the parties responsible to their commitment

<sup>20</sup> Tipper Trucks with 22 to 28 tonne capacity.

The audit findings on indigenisation of TATRA vehicles are discussed in succeeding paragraphs.

## **Audit Findings**

### **1. Poor target achievement in the process of indigenisation**

As per the DPR prepared by BEML with approval of CCPA, 86 *per cent* indigenisation of TATRA vehicle was to be achieved by the year 1990-91. However, the progress actually achieved by BEML by the year 1990-91 was abysmally low at only 29.31 *per cent*. Even by 2012-13, i.e. after 26 years of the approval by CCPA, the achievement level of indigenisation was just 62.50 *per cent*. Though BEML claimed to have achieved additional 12.5 *per cent* in the year 2013-14 by indigenising Axle and other components, yet this additional level of indigenisation was awaiting the approval by Controllerate of Quality Assurance (CQA)<sup>21</sup>.

We observed that despite failure to achieve the envisaged targets of indigenisation a total of 7,942 TATRA vehicles were produced and supplied by BEML. The brief details of production and extent of indigenisation of TATRA between 1986-87 and 2013-14 are shown in the **Annexure-II**.

It can be seen from the **Annexure-II** that during the period 1987 to 1991, orders were not placed on BEML as planned, however, in the period since 2000 significant number of orders were placed on BEML. Even then BEML manufactured the vehicle by importing a substantial portion of the components from the foreign collaborator. This was despite the fact that transfer of complete knowhow and technical documentation pertaining to manufacture of the vehicles was provided in the agreement of 1986. Thus, despite a time overrun of more than two decades, the indigenisation was yet to reach the planned level of 86 *per cent*.

### **2. Audit examination of the process of indigenisation of TATRA revealed the following:**

#### **(i) Adverse impact on indigenization due to absence of long term projection**

Government in 1983, decided for indigenous production of TATRA by getting licence from foreign OEM, instead of import, based on the long term requirement of the vehicles assessed by Army at an average of 150 vehicles per annum. BEML, in its DPR<sup>22</sup>, proposed that 86 *per cent* indigenisation would be achieved by producing 1,030 vehicles during the period from 1986-87 to 1990-91. Production programme vis-a-vis progress in indigenisation

<sup>21</sup> Controllerate of Quality Assurance(BEML) is an authority holding sealed particulars (AHSP) of TATRA vehicles

<sup>22</sup> DPR prepared by BEML indicates that production programme of TATRA vehicles was according to the requirement of vehicles assessed by Army.

proposed in DPR was approved by CCPA in 1987. However, actual supply orders placed by the Ministry on behalf of Army for production by BEML were nowhere near the target indicated in the DPR as could be seen from Table 11 below:

**Table-11: Details showing shortfall in orders placed on BEML**

Year	No. of vehicle to be produced as per DPR	Actual orders placed on BEML	Cumulative Orders placed
1986-87	80	0	0
1987-88	200	80	80
1988-89	250	130	210
1989-90	250	190	400
1990-91	250	100	500
1992-2014	Not considered in DPR	7,695	8,195

*Source: Ministry's reply to draft Audit Report*

It could be seen from the Table-11 above that against the planned number of 1030 vehicles envisaged in the DPR for achieving indigenisation of 86 per cent, orders for only 500 vehicles were placed by the Ministry between 1986 and 1991. In a communication to the Ministry, BEML had indicated in 1988 that in the event of less numbers of orders for vehicles from Army, indigenisation was becoming costlier based on economy of scale. BEML therefore attributed the delay in indigenisation to the less number of orders placed by Ministry.

The Ministry/Army also did not convey to the BEML any commitment about continuation of orders beyond 1990-91 in terms of long term projection of order as an incentive for indigenisation. Ministry, however, subsequently placed orders for 7,695 vehicles on BEML between 1992 and 2014.

There were also certain cases of procurement of TATRA vehicles, where the orders on BEML were placed by circumventing the normal procedures and without appreciating the actual need as projected by the Army indicating lack of clarity for indigenisation as discussed below:

- (a) Army HQ projected a request for procurement of 1070 HVM GS (4x4) vehicles in December 2001. We found that the vehicles were procured by the Ministry on a single vendor basis from BEML in March 2002 at a cost of ₹ 285.72 crore. Procurement from BEML was made without considering other vehicles viz. Stallion 6x6 (Ashok Leyland) and LPTA 6x6 (TELCO) which had been approved by the Ministry for introduction in Army in February 2000, subject to execution of modifications. As stated by FA (DS) the procurement from BEML was costlier than other two 6x6 vehicles. Hence, the procurement was made at higher cost and



after paying 100 per cent interest free advance, in violation of Defence Procurement Procedure. On the one hand, BEML was producing TATRA vehicles by importing major components from OEM and on the other hand alternative opportunity to local industries was not given.

- (b) Against the governing GSQR No 486 for HMV 6x6 and HMV 4x4 applicable for Infantry Battalions, Army procured 490 GS (6x6) vehicle for Infantry under GSQR 731, which was applicable for Corps. of Engineers. Since TATRA HMV (6x6) was the only introduced vehicles under GSQR 731, the orders (March 2006) were placed on M/s BEML for supply of 490 HMVs 6x6 at a total cost of ₹ 245.54 crore. Not only were the vehicles so procured expensive by ₹ 65.46 crore, but the same also had technical disadvantages like lesser travelling speed and reduced shelf life.
- (c) Army procured 124 TATRA (4x4) vehicles at a cost of ₹ 45.57 crore in March 2006 for enhanced mobility and deployment of Air Defence (AD) Guns in the deserts. Procurement of 4x4 vehicles was made despite the recommendations of trial team (2003) which had indicated that only TATRA 6x6 vehicles would be suitable for the formations. Subsequently, during an operational exercise conducted in desert terrains in April 2007, users found that the TATRA 4x4 HMVs mounted with the AD guns were not able to keep matching mobility with army units equipped with TATRA 6x6 HMVs or 8x8 HMVs. The vehicles received under the order were eventually, proposed for sub-optimal uses as support vehicles for equipment like Radars, Command Posts etc.

**(ii) Exclusion of Axle from the scope of indigenisation**

As per the DPR prepared by BEML and CCPA approval, major components of TATRA vehicle viz. axle, which formed 25 per cent of the overall process, was to be indigenised in the last phase i.e. during 1990-91. However, axle was not indigenised and the licence agreement of 1986 expired in 1996. Subsequently, BEML signed another agreement in 1997 for component parts with validity period of ten years. While this agreement was in force, the BEML signed an MOU with the OEM-2 in March 2003 in which BEML and the OEM-2 agreed to work together to indigenise all other parts and aggregates except Axles and components. This agreement effectively diluted the provisions of earlier agreements by excluding vital aggregates like Axles and some other components, which constituted around 25 per cent of vehicle for the purpose of indigenisation. Exclusion of Axle therefore, had an adverse impact on the overall process of indigenisation and resulted in continued dependence on the foreign vendor for the vital component.

Scrutiny of records at BEML revealed that prior to the signing of this MOU by the Chairman, BEML proposal for exclusion of Axle and other components had not been deliberated upon or approved by the Board of Director of BEML.



No specific reasons for the same were recorded in BEML documents either. DDP however took cognisance of the fact in January 2010 and observed that the MOU signed in 2003 was in violation of original agreement, because the original agreement gave BEML the right to indigenous manufacture of all parts of the vehicles including the axle. It therefore directed BEML to terminate the MOU of 2003 as it gave away a valuable right which had been acquired after payment of money.

These directions of DDP were, however, not complied by BEML and the MOU was allowed to complete its full term of 10 year, up to December 2013. These events clearly indicate that the DDP neither initiated action to terminate the MOU between 2003 and 2010, nor did it enforce its annulment even after issuing directions to BEML in January 2010. This was despite the fact that the DDP had continuous representation in the Board of BEML.

It was stated in reply that BEML developed the Axle indigenously and had offered TATRA vehicles with indigenously developed axle for Bulk Production Clearance in April 2014. The BPC is yet to be accorded as of October 2014. It is evident from the above reply that successful trial evaluation of indigenised axle and subsequent accord of Bulk Production Clearance was still in the process of completion. Therefore, the claim by BEML of achieving 75 per cent indigenisation was subject to CQA approval.

**(iii) Delay in indigenisation of spares**

Ready availability of spares is not only essential for repair and up-keep of vehicles but also for overhaul of the vehicles, which is carried out by the Army Base Workshops (ABW) at Allahabad and Meerut. As per the Agreement of 1986, BEML, besides indigenizing the TATRA vehicles, was also to indigenize its spares. Scrutiny of the records revealed that:

- Indigenisation of spares did not commence till 2007 i.e.; 21 years after initial agreement of 1986. As a result, only 4,423 items of spares out of the total 10,878 items i.e. 40.66 per cent had been indigenized by 2013.
- There was a shortfall in supply in respect of 1,758 items of spares worth ₹ 39.51 crore out of 4,078 indigenised items for which orders were placed by Central Ordnance Depot, Dehu Road on BEML between 2008-09 and 2013-14. This shortfall constituted 43 per cent of the items for which orders were placed during these six years.
- It was seen that in the ABW Allahabad (June 2014) 681 items of spares parts related to overhaul are pending for supplies, despite the fact that BEML is a single window agency for supplying spares of TATRA vehicles. During the year 2013-14, the non-availability of spares was to the extent of 75 per cent in ABW Meerut.

Ministry in response to draft audit report stated (October 2013) that average availability of spares of TATRA vehicle during the period 2008-09 to 2010-11 was 74 per cent which they found satisfactory. The fact however remains that availability of spares does not address the issue of shortfall in supply of 43 per cent of indigenized spares by BEML, between 2008-09 and 2013-14.

The non availability of spares would result in considerable delay in the overhaul/repair of TATRA vehicles.

### Conclusions

Indigenisation of TATRA vehicles and spares was planned by the Ministry in 1986. The process was envisaged to be completed within five years, but even after 28 years of the license agreement, it is yet to achieve its targeted level. The BEML, therefore, continues to be dependent on OEM.

The process for indigenisation of TATRA vehicles suffered due to lack of clear long term projection of orders by Army to BEML. This led to lack of commitment of the BEML towards indigenisation. Subsequent changes in the agreements, which instead of being directed towards increasing indigenization, caused increased dependence on the OEM. Further indigenisation of spares for the vehicles was also inordinately delayed as the process itself was initiated in 2007, i.e. after 21 years of the agreement. Because of non-availability of spares, the situation has further worsened, due to a shortfall in respect of 43 per cent of indigenized spares (March 2014). This would affect the overall maintenance process of the vehicles. Given the number of TATRA vehicles used by Army there is an urgent need to speed up indigenisation by BEML and increase production levels in respect of indigenized spares.

### 2.2 Procurement of unacceptable equipment valuing ₹ 27.32 crore

**Ministry of Defence imported 999 number of Individual Chemical Agent Detectors (ICADs) worth ₹ 27.32 crore between January 2010 and October 2010 for detecting the presence of chemical agents and toxic industrial compounds. Non conducting Field Evaluation Trials /simulated trials in Indian conditions as prescribed by DPP resulted in acceptance of defective ICADs worth ₹ 27.32 crore. These equipment were awaiting replacement since August 2011 by the firm as of June 2014.**

Chem Pro 100i is a handheld Individual Chemical Agent Detector (ICAD) for real time detection of chemical warfare agents (CWAs) and toxic industrial compounds in the ambient air. It samples the immediate area to determine the presence of chemical agents. It also provides monitoring after an attack and is used by personnel who are in full Nuclear, Biological, Chemical (NBC)

protective posture, troops, counter proliferation teams, independent raid parties and Quick Reaction Teams.

Defence Procurement Procedure (DPP), 2006 (Capital) provides that Field Evaluation Trials (FETs) will be conducted by the User Services on the basis of Standard Operating Procedures (SOP) evolved by them and Staff Qualitative Requirement (SQR) of the equipment would be part of the trial directive. The field evaluation shall be conducted by the user in all conditions where equipment is likely to be deployed and detailed Field Evaluation Report (FER) shall be drawn up and sent to SHQ for preparation of Staff Evaluation.

Ministry of Defence (MoD) in November 2007 issued Request For Proposal (RFP) seeking Techno - Commercial proposal for 666 ICADs(1<sup>st</sup> lot), to 12 foreign vendors. The RFP however did not include the provision stipulated in the DPP that evaluation of equipment shall be conducted by the user in all the conditions where equipment was likely to be deployed. After analysis of the technical offers received against the RFP, two firms were recommended in May 2008 for user trials.

A combined technical delegation comprising representatives of the users, Defence Research and Development Organisation (DRDO), Director General of Quality Assurance (DGQA) and Electronics and Mechanical Engineering (EME) carried out trials only at vendor premises in December 2008 and the equipment Model Chem Pro 100i fielded by M/s Environics Oy, Finland was declared compliant to all the parameters. The above delegation tested the ICAD in the vendor's premises without evaluating the same in Indian conditions where the equipment was to be deployed. Test reports also did not indicate that Indian weather conditions were simulated during tests at vendor premises.

Thus, the equipment for Chemical Agent Detection, which would be sensitive to ambient conditions, was not tested in Indian conditions where the equipment was to be deployed before acceptance of the tender, which was against the provisions of DPP on conducting Field Evaluation Trials.

In July 2009, MoD concluded a contract with M/s Environics Oy of Finland for procuring 1st lot of ICADs at the total cost of Euro 2.85 million (then approximately ₹ 18.94 crore). After completing Acceptance Test Procedure (ATP) the entire consignment was received in January 2010. Further, repeat order for additional 333 ICADs (2nd lot) was placed in March 2010 under option clause of the same contract at the total cost of Euro 1.40 million (then approximately ₹ 8.38 crore). The 2nd lot was received in September 2010. At

the stage of receipt also, Joint Receipt Inspection (JRI) provided for functional checking of equipment. However there was no evidence to suggest that functional checking of equipment was done as part of JRI in respect of either of the two procurements.

Subsequently, in an another procurement of Chem Agent Monitor (CAM) (September 2009), vendor M/s Environics Oy, Finland offered the equipment ICADs for user trials in Indian condition which failed to meet the technical specifications and hence led Director General Perspective Planning (DGPP) to conduct Mid Course Evaluation (MCE) of both of the already procured lots of ICADs in Indian conditions with live testing facilities and expertise available at Defence Research Development Establishment, (DRDE) Gwalior.

Mid Course Evaluation team consisting inter alia representatives of NBC warfare, tested the samples at DRDE Gwalior in April 2011 for CWA exposure. Deficiency regarding failure of ICAD to detect the Blister Agent, Blood Agent and Chocking Agent within the stipulated time was observed during Mid Course Evaluation in four units of ICADs sampled from 1<sup>st</sup> lot of ICADs. Accordingly, the quality claim in respect of 1<sup>st</sup> lot ICADs was raised against the vendor in August 2011.

Further, Mid Course Evaluation of six samples ICADs from 2<sup>nd</sup> lot was conducted in October 2011 at DRDE, Gwalior. All these six samples also failed in test. The quality claim in respect of 2<sup>nd</sup> lot ICADs was also forwarded to the vendor in November 2011. The firm had initially inspected and collected data from the failed samples in October 2011 and tried to rectify the defects. The equipment rectified by the firm was again evaluated at DRDE, Gwalior in October 2012. But the ICADs again failed in test. Master General of Ordnance (MGO) Branch of Integrated HQ of MoD (Army) requested (November 2012) the firm for replacement at the earliest of both lots of ICADs as the same were under warranty till October 2012 and the firm was liable to replace the equipment free of cost within the warranty period. The firm, while not refusing to replace the equipment, however, put the onus of failure on Indian side by stating that DRDE, Gwalior was not optimally sanitized and well equipped to carry out such tests.

Replacement issue is unresolved even after lapse of more than one and half years of validity of warranty claim (October 2012) and the equipment remained without any use for its intended purpose till date with 95 *per cent* of payment already made.

In response to Audit query (February 2012) as to reasons for failure of the item within one year from acceptance of stores, MGO Branch, IHQ of MoD (Army) stated in August 2012 that the items had been accepted after successful quality inspection by DGQA during Pre Despatch Inspection(PDI). It further stated (May 2013) that during the signing of these contracts, these facilities were not available in India for carrying out CWA testing and hence the same were not included in the scope of the JRI. The reply is not acceptable as the Nerve and Blistering Agent facility existed in DRDE, Gwalior since 2005 and Blood Agent and Choking Agent testing since 2010. However, these facilities were not utilized at JRI stage. The failure in conducting Field Evaluation Trials/testing of the equipment in Indian condition/simulated Indian conditions as prescribed under DPP had resulted in procurement of an unacceptable equipment. Further, resultant procurement of deficient specification were again not subjected to functional checking, provided as part of JRI.

Therefore non conduct of field trials in Indian conditions/simulated Indian conditions and lack of functional checking at JRI stage led to unfruitful expenditure of ₹ 27.32 crore besides compromising the operational preparedness.

The case was referred to Ministry in May 2014; their reply was awaited (October 2014).

### **2.3 Loss of revenue due to unauthorised use of Defence land by United Services Club, Mumbai**

**Failure of the Local Military authorities to process the case for obtaining Government sanction for entering into a lease for the Defence land occupied by the United Services Club, Mumbai resulted in recurring loss of revenue to State exchequer to the tune of ₹ 5.74 crore per annum. Despite the lapse of nine years, the Ministry of Defence failed to monitor the assurance given to the Public Accounts Committee of the Parliament to review the arrangements with US Club which continued to commercially exploit A-1 defence land valuing ₹ 114.85 crore without Government sanction and at a nominal rent of ₹ 0.36 lakh per annum.**

A case of functioning of United Services Club (US Club) as a profitable, commercial venture on A-1 defence land without Government sanction and at a nominal rent was reported as paragraph 24 in Compliance Audit Report No. 7 of 2001 of C&AG. The Club occupied a total of 22 buildings including a squash court and 16939.31 square meters of open area, in addition to 53.50 acres of Defence land for use as Golf Course (including Club Annex measuring 1,749.84 square meters). In 1998 the Defence Estates Department had estimated the cost of 16939.31 square meters (4.19 acres) open area as

₹ 54.78 crore and the annual rent payable as ₹ 2.73 crore @ five per cent of the market value of land. As against this, the Club was paying a sum of ₹ 0.36 lakh per annum for rent towards the buildings, as last fixed by a Board of Officers appointed by Station Headquarters, Colaba, Mumbai in July 1989.

In the Action Taken Note (ATN), the Ministry of Defence (MoD) stated (December 2004) that Service Headquarters and Director General Defence Estates (DGDE) have been instructed to review all such cases in order to take necessary action for the continuance or otherwise of such clubs. MoD also stated that fresh instructions were issued to the Army Headquarters (AHQ) in November 2004 to convene a Board of Officers (BOO) involving representatives of Defence Estates Department to review the working of the US Club and to give recommendations as regards the continuance or otherwise of the existing arrangements as well as the requirement of issue of fresh lease of the buildings along with appurtenant land to the Club.

Subsequently a BOO was held (March 2005), which recommended that the existing buildings of the US Club and its Annex along with appurtenant land should be taken on charge by the Military Engineer Services (MES). A fresh lease deed should be executed including appurtenant land. The rent of the existing buildings in use by the Club should be revised and the use of appurtenant Defence land by the Club should also be regularized till the date of fresh lease deed.

In May 2006 the DEO recommended that the Government sanction should be obtained for regularizing past occupation of entire A-1 Defence land by the US Club including Golf course area. The DEO also recommended that lease rent @ five per cent of the market value of the area of 16939.31 square meters of the Defence land appurtenant to the buildings being occupied and used by the Club should be charged, as applicable for commercial use.

Director of Defence Estates Southern Command also recommended (September 2006) that fresh lease agreement be executed and fresh lease rent calculated by a Board of officers in association with the DEO.

Audit scrutiny (June 2012) at DEO Mumbai revealed:

- Though the Board proceedings were finalized (March 2005) by Local Military authorities and Defence Estates Department recommended (May/September 2006) to enter into a fresh lease for the Defence land occupied by the Club, no case has been processed by the Station Headquarters and pursued by Defence Estates Department (February 2014) to obtain the Government sanction for the same despite the lapse of more than nine years after the ATN was furnished by MoD assuring to review the arrangements with US Club. As a result, the Club continues to occupy the A-1 Defence land unauthorisedly;



- As a result, no fresh lease was executed as of April 2014. In absence of fresh lease, rent of the existing buildings in use by the Club was continued to be paid at nominal rate of ₹ 0.36 lakh per annum, while Club generated considerable revenue by way of regularly hosting reception/wedding parties, charging Tournament Green Fee ranging between ₹ 0.15 lakh and ₹ 4 lakh for Golf tournaments conducted by Defence, Government/Semi Government, Civil & Corporate offices and annual membership charges of ₹ 3.65 lakh for Golf and Swimming collected from Corporate organisations;
- The value of the 16939.31 square meters of Defence land at Colaba being used by the Club was at ₹ 114.85 crore at Government rates (as of 2012) and the annual rent at five *per cent* of the value of the land works out to ₹ 5.74 crore per annum. This was a recurring loss of revenue to the Government exchequer due to non finalisation of fresh lease agreement with the Club;
- In absence of effective MES control mechanism, new unauthorized constructions have come up in the Club on Defence land in the Club Annex, without the approval of the Government.

On pointing out in audit, the DEO in July 2012 and February 2014 while substantiating audit comments stated that no lease agreement has been entered into between the Club and Local Military Authorities/DEO/MES for the military buildings and land occupied by the Club. It was also stated that no proposal/application has been received from the Club for payment of rent/dues to the Government. Meanwhile, we noticed that a Board of Officers has been constituted by Headquarters Mumbai Sub Area in July 2013 for fixation of rent and allied charges for buildings occupied by the Club.

Thus failure of the Station Headquarters Colaba to process the case and of the Defence Estates Department to follow up for obtaining Government sanction for entering into a lease for the Defence land occupied by the US Club resulted in recurring loss of revenue to Government exchequer to the tune of ₹5.74 crore per annum. The MoD, on their part, failed to monitor the assurance given to the Public Accounts Committee of the Parliament to review the arrangements with US Club which continued to commercially exploit A-1 Defence land valuing ₹ 114.85 crore without Government sanction and at a nominal rent of ₹ 0.36 lakh per annum.

The case was referred to Ministry in May 2014; their reply was awaited (October 2014).

## 2.4 Irregular construction on Defence leased land

**Old Grant Bungalow along with adjoining land measuring 4.56 acre in Kirkee Cantonment near Pune was leased for residential purpose. The holder of occupancy rights appointed true and lawful Power of Attorney Holder to obtain necessary sanction of Government to facilitate sale of the property. The laxity on the part of Defence Estates Officer facilitated the POAH to obtain sanction for reconstruction on above Defence land and construct a Community Centre which was being used for religious purposes in gross violation of Ministry's instructions.**

As per para 7 (c) of Ministry of Defence policy of March 1995, it is the prime responsibility of the Defence Estates Officer (DEO)/Cantonment Executive Officer (CEO) to verify from time to time whether any breaches of conditions of leases have been committed by any of the lessees. The DEO/CEO concerned should notify the lessees about such breaches wherever they exist and they should call upon them to take action for removal of such breaches or to initiate action for their condonation/regularisation immediately. The Ministry had also issued instructions in March 1985 that the request from religious and charitable institutions need not be considered for allotment of Defence land for their use unless they are from very highly reputed and non-controversial institutions.

Bungalow No. 26 under GLR Survey Number 225 measuring 4.56 acre located at Bombay Road was classified as B-3 Defence land placed under management of DEO, Pune Circle and held on Old Grant terms<sup>23</sup> by Holders of Occupancy Rights<sup>24</sup> (HOR). The HOR executed a specific Power of Attorney (POA) in October 2000 and appointed two Trustees<sup>25</sup> of a Trust<sup>26</sup> as true and lawful Attorneys jointly and severally. In the above POA, the HOR clearly mentioned that they had executed an agreement on same date for sale of the said Bungalow to the Trust for consideration of ₹ 40.00 lakh, for which HOR was not authorised as per Cantonment Laws.

The Power of Attorney Holders (POAH) were authorised only to apply for necessary permission, approval and sanctions from DEO/CEO/Central Government or such other authority for purpose of sale of the property to the Trust and do any other act for facilitating the sale of property. But the DEO executed an 'Indenture<sup>27</sup> of Admission Deed' in March 2006 with the POAH

<sup>23</sup> Old Grant Sites are a legacy of Pre-independence land policies intended to provide necessary accommodation to the military officers. Under this, officers were given grant of land sites, on which they could build houses. No right of property for the land was, however, ever granted to them. Later, civilians were also allowed to build such houses on lands belonging to the State, but these houses were to be hired by the Local Military Authorities.

<sup>24</sup> (i) CV Mariwalla (ii) Kishore Vallabhdas, (iii) Hansraj Vallabhdas and (iv) Jaysingh Vallabhdas.

<sup>25</sup> (i) Rev. George Varghese and (ii) Mr. Leny John.

<sup>26</sup> St. John's Mar Thoma Parish & Community Centre, Pune a Charitable Trust registered under the Bombay Public Trust Act.

<sup>27</sup> Indenture is a contract binding one person to work for another



wherein DEO agreed to accord sanction to carry out reconstruction and further added that premises will not be used for any other purpose other than residential building or do anything thereon which was not in conformity with the instructions relating to use of land held on old grant terms. Deed also stipulates that the land shall not be sold, leased, licensed or mortgaged by the HOR. As the POAH was authorised by HOR only to obtain sanction for sale/do acts which only facilitate the sale of property, the act of execution of 'Indenture of Admission Deed' for reconstruction of the said Bungalow by the DEO with the POAH was *ultra vires*.

We noticed (May 2012) that the POAH submitted a plan to erect/re-erect/ alter the said Building to the CEO in May 2006 which was forwarded to the DEO who endorsed 'No Objection' on the plan for demolition and reconstruction of main Bungalow (with 10 *per cent* additional plinth area) within a week without verifying the legal status of POAH.

In the mean time Station Headquarters Kirkee intimated to the DEO in August 2007 regarding construction of a Community Hall and unauthorised WBM road on above land. However, DEO intimated the Station HQ in September 2007 that the site was inspected and construction of road was authorised but remained silent on issue of unauthorised construction of Community Centre in place of residential building. The laxity by DEO facilitated the irregular reconstructions on Defence land. Further, representative of the Trust sought permission (September 2008) to hold a religious function to be attended by thousands of people at the Community Centre, i.e. Bungalow Number 26. The sanction was granted by the DEO in September 2008 for use of the property for religious purpose which was against the clause of Deed made in March 2006 that premises will not be used for any purpose other than residential buildings and also in contravention of Ministry's instruction of March 1985 that Defence land would not be allotted to religious/charitable institutions. These facts corroborate our conclusion that DEO was well aware of all the events starting from execution of an 'Indenture of Admission Deed' with the unauthorised POAH to the erection of Community Centre at the site. Thus DEO did not notify the HOR about such breaches nor took the required action for resumption of the Defence land at that time.

In response to audit queries (May 2012) the DEO stated that neither HOR sought any permission for construction of Community Hall nor granted by the DEO. The reply is not comprehensive as Station HQ Kirkee intimated the DEO in August 2007 about irregular construction. The DEO issued eviction notice in December 2012 to the POAH for unauthorised construction and use for the religious purpose instead of residential purpose after pointing out in audit. The bungalow continues to be in possession of POAH as of May 2014.

Thus execution of an irregular deed for reconstruction by DEO and failure on the part of DEO and CEO to take appropriate action against POAH/HOR

facilitated the POAH to illegally construct the Community Centre on Defence land and misuse the Defence property valued at ₹ 22.14 crore.

The case was referred to Ministry in June 2014; their reply was awaited (October 2014).

## 2.5 Non recovery of overpaid rent for requisitioned land

**Delay in issue of clarification by the Ministry on implementation of the rationalized rate of rent for land held on requisition by Defence resulted in non-recovery of overpayment of ₹ 2.83 crore to the land owners even after lapse of more than four years.**

Jammu and Kashmir requisitioning and acquisition of Immovable Property Act, 1968 provides that “where the Government is of the opinion that any property is needed or likely to be needed for any public purpose, being a purpose of the State, it may by an order, notify that the property should be requisitioned”. Further, Jammu and Kashmir Requisition and Acquisition of Immovable Property (RAIP) Rules, 1969 provides payment of compensation for the requisitioned property by the competent authority and to be revised every five years.

City land falling under Jammu Municipality/Srinagar Municipality/ Poonch Municipality including Srinagar and Jammu Cantonment were under same category and other two categories were Town Area Committee and Notified Area Committee under RAIP Rules 1969. Subsequently, city land areas were classified (April 2008) as Municipal Corporations, Municipal Councils and Municipal Committees. Though Poonch Municipality was categorized as Municipal Council but remained documented in the category of Municipal Corporation in the table of rate of rent for Kashmir and Jammu Divisions issued by the Government of J&K (April 2008). Government of J&K appointed a committee (December 2008) to recommend rationalization of rent rate and remove anomalies in the rate structure. The committee recommended fixation of rates of rent for requisitioned land under occupation of Armed forces in accordance with rates notified in April 2008 and deleted Poonch Municipal Council from the category of Municipal Corporations and put it at par with rate of rent applicable to other Municipal Councils. Hence the rent applicable for the requisitioned land in Poonch would be lower from ₹ 33,750 per kanal per annum (pkpa) to ₹ 16,875 pkpa. Government of J&K accepted the recommendations of the committee and issued Government Order in this regard in January 2009 which was applicable to land under occupation of J&K Police security forces/Army on internal security/counter insurgency duties.

We observed (March 2013) that though this order was applicable to Army also but the State Government did not endorse its copies to Directorate of Defence Estates, Northern Command (DDE, NC) and MoD. In absence of any

communication, DEO Udhampur continued to pay the rental compensation at the higher rate<sup>28</sup> resulting in overpayment of ₹ 2.83 crore (year wise details in given in **Annexure-III**) for the period from 16 February 2008 to 31 March 2010 for requisitioned land measuring 829 kanals 10 marlas under Poonch Municipal Council. However, on receipt of information about the reduction in rates (August 2010) DDE, NC, directed (September 2010) DEO to restrict payment of compensation for lands falling under Poonch Municipal Council at the rate ₹ 16875/- pka and to initiate the case for recovery of excess payment made with effect from 16 February 2008.

In reply to audit query (March 2013) on overpayment of rental compensation made, DEO stated (March 2013) that the matter had been referred to the competent authority for directions to recover the excess payment of rent. Further DDE, NC stated (October 2013) that action for the recovery/adjustment would be taken up on receipt of clarifications regarding applicability of rates of rent for land falling within the limit of Poonch Municipal Council sought in October 2010 from Government of J&K and after specific decision by DGDE/MoD.

DGDE/Ministry of Defence however did not give any clarification which resulted in non-recovery of overpaid amount of ₹ 2.83 crore till date without implication of interest payment.

The case was referred to Ministry in June 2014; their reply was awaited (October 2014).

## **2.6 Unfruitful expenditure on payment of bandwidth charges by Canteen Stores Department**

**Canteen Stores Department incurred an unfruitful expenditure amounting to ₹ 3.63 crore on bandwidth charges from October 2009 to September 2013 under Integrated Canteen Stores Department System (ICS DS) project.**

The Ministry, in May 2003, accorded sanction for Computerization of all CSD Depots under Integrated Canteen Stores Department System (ICS DS) at a cost of ₹ 7.11 crore. The scheme involved computerization of all CSD Depots to include procurement of Hardware, Software, Networking, Training, Site Preparation, Installation of Software at all CSD Depots and inter-connecting them through CSD owned Internet. The Supply Order was issued to M/s Wipro Limited in August 2006, with the period of completion by August 2007. The software and networks were to be subjected to acceptance tests by the users (unit depots) who were to issue acceptance certificates on successful completion. User acceptance tests were carried out between May 2008 and

<sup>28</sup>₹ 33,750/- pka instead of ₹ 16,875 pka (per kanal per annum)

May 2009 and acceptance was accorded by CSD Mumbai subject to completion of pending jobs by M/s Wipro.

The system was handed over to CSD in two phases in July 2009 and September 2009. However, after the systems went 'LIVE', (September 2009) it encountered serious connectivity/implementation issues in all the depots based on feedback received from user depots. Most of the modules were not fully functional and as a result system was unable to carry out even a single transaction to obtain final result.

In the meantime, a work order was placed by CSD Mumbai in June 2008 on M/s Hughes Communication India Ltd. for providing VSAT Bandwidth Services for the project. Payment amounting to ₹ 3.63 crore was made by CSD Mumbai on account of bandwidth charges to M/s Hughes Communication from October 2009 to September 2013. However, we observed that the ICSDS application was still not implemented as of August 2014.

On being pointed out in audit (June 2010) about payment of bandwidth charges by CSD despite serious connectivity issues and failure of the modules to function, CSD Mumbai stated in reply (August 2010) that payment of bandwidth charges was made only after rectification of connectivity issues. The reply was not factual as connectivity issues were still unresolved till August 2014.

The draft paragraph was referred to Ministry in June 2014. Ministry in response to issues stated (August 2014) that action has been taken to terminate the contract with M/s Hughes Communication and payment of bandwidth charges was stopped from October 2013. The fact however remains that without ensuring the functioning of infrastructure created by M/s Wipro, the CSD procured VSAT bandwidth from M/s Hughes Communication and paid an amount of ₹ 3.63 crore from October 2009 to September 2013 which could not be used as most of modules were not fully functional and the system was not able to carry out a single transaction.

Thus, the CSD HQ incurred an unfruitful expenditure of ₹ 3.63 crore on bandwidth charges despite the system remaining non functional as of August 2014.

## CHAPTER III : ARMY

### 3.1 Nugatory expenditure of ₹ 88.39 crore in the procurement of Chemical, Biological, Radiological and Nuclear (CBRN) equipment

**Injudicious planning for the procurement of nine items under Individual Protective Equipment relating to Chemical, Biological, Radiological and Nuclear equipment resulted in non procurement of NBC suit Permeable, the main constituent of IPE. An expenditure of ₹88.39 crore was incurred on other eight items of IPE without NBC suit Permeable which defeated the purpose of ensuring protection in case of NBC warfare.**

Chemical, Biological, Radiological and Nuclear (CBRN) equipment consist of items for providing protection from Chemical, Biological, Radiological, Nuclear agents. These include Individual Protective Equipment (IPE) which are the life saving equipment to ensure full CBRN protection to an individual in case of threat or breakout of Nuclear Biological and Chemical(NBC) warfare / Weapons of Mass Destruction(WMD) including emergency response from any terrorist threat /attack involving CBRN agents. Forty three items are authorized to various formation/units of the Indian Army by GoI, under CBRN warfare protection equipment of which nine items constitute Individual Protective Equipment (IPE). Eight out of these nine items possess shelf life of five years and one item viz. Three Colour Detector Paper (TCDP) has a shelf life of two years only. Ready availability of all these nine items of IPE as a set was essential to ensure full and effective CBRN protection to an individual. However, we observed in March 2013 that AHQ<sup>29</sup> did not procure all the nine items of IPE simultaneously and therefore could not make available the complete set to the troops to avail full CBRN protection. These items were procured piecemeal between 2008 and 2013, thereby denying effective CBRN protection, despite an expenditure of ₹ 88.39 crore incurred for the purpose. The case is discussed below;

AHQ placed supply orders valuing ₹ 120.46 crore on trade<sup>30</sup> during the period 2008 to 2014 for procurement of IPE. Audit noticed that, without ensuring the availability of NBC suit, AHQ procured other eight items of IPE between July 2008 to August 2013 and incurred a total expenditure of ₹ 88.39 crore. All these IPE items except TCDP have a limited shelf life of five years.

<sup>29</sup> Army Headquarters

<sup>30</sup> Private Sector Companies

NBC Suit Permeable was the main item of IPE and without which, IPE remains ineffective. For the procurement of NBC Suit Permeable, AHQ placed two indents on Ordnance Factory Board (OFB) in March 2007 for 5,348 Nos and in June 2008 for 30,380 Nos. However, OFB could not make supplies against these indents and issued a 'No objection certificate' for the second indent to procure the item from trade in September 2011. Accordingly, AHQ placed a supply order in July 2013 on M/s Shri Lakshmi Cotsyn Limited for 30,380 suits for ₹ 34.41 crore. The entire qty 30,380 suits was to be supplied within seven months or earlier after approval of advance sample and bulk orders clearance by AHQ. However, the firm has submitted advance sample to Director General of Quality Assurance in July 2014, which is still awaiting approval. Thus, availability of NBC Suit Permeable was still awaited (August 2014). Procurement of other eight items of IPE without NBC Suit Permeable raises doubt on effective utilization of these stores by users.

In March 2013, a case for non-procurement of all the nine IPE items, as per their authorization, especially in view of their limited shelf life, was taken up by audit with IHQ of MoD<sup>31</sup> (Army) and solicited their views on the non-procurement of all nine items under IPE concurrently. IHQ, in their reply (July 2014) accepted the audit view of non compatibility in procurement and stated that the present system of procurement is guided by DPM 2009 in which Tender Enquiry (TE)/Request for Proposal (RFP) was floated for all separate items of IPE and contract was awarded to different vendors for different items and delivery periods resulting in non-availability of all the IPE items concurrently. The reply is not tenable as the order for NBC Suit Permeable was placed as early as in March 2007 which could not fructify and there is no justification for the procurement of other items without availability of NBC Suit Permeable. Further, AHQ citing DPM 2009 provisions to counter compatibility issue raised by Audit was only an afterthought as supply orders for two items were placed on trade in piecemeal (July 2008 and September 2008) which suggests that compatibility issue was not addressed even before DPM 2009 came into force.

The case revealed that IHQ of MoD incurred an expenditure of ₹ 88.39 crore on procurement of eight items of IPE without ensuring synchronized purchase of NBC permeable suit. Therefore protection and safety of individuals in case of NBC warfare is being compromised.

The case was referred to Ministry in July 2014; their reply was awaited (October 2014).

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<sup>31</sup> Integrated Headquarters of Ministry of Defence



### 3.2 Extra expenditure of ₹ 2.33 crore due to failure to accept the tender for procurement of tea within the validity period

**The failure of the Army Purchase Organisation and Integrated Financial Adviser to adhere to the procedure and timeframe prescribed to accept the tender for procurement of 1700 MT tea within the validity period of tenders resulted in extra expenditure of ₹ 2.33 crore.**

Army Purchase Organisation (APO) in the Ministry of Defence is responsible for procurement of dry ration items centrally which are delivered to the Armed Forces through Army Service Corps. APO contracts are governed by Manual of Office Procedure for supplies, inspection and disposals of Directorate General of Supplies and Disposals (DGS&D). DGS&D Manual stipulates time period of 21 clear days to be allowed to quote against limited tender enquiries and the tenderers are required to keep their offers open for one month after the date of opening of tender.

For procurement of 1700 Metric Tonne (MT) of Tea for the consumption year 2011-12, APO floated tender enquiry on 03 December 2010 with validity of tender upto 19 January 2011. Tender Purchase Committee (TPC) meeting was held on 20 December 2010 which recommended procurement of 1700 MT of Tea at a total cost of ₹ 15.50 crore from three lowest firms. Case was forwarded to Defence (Finance) for concurrence of procurement of 1700 MT of tea on 05 January 2011.

Defence (Finance) opined on 01 February and 09 February 2011 that the TPC Minutes did not specifically indicate how the rates were compared with either last purchase price or assessed rate and the TPC did not appear to have done a proper analysis. In reply, APO intimated Defence (Finance) on 03 February 2011 that lowest rates had been compared with last purchase price and Wholesale Price Index and were found reasonable. Finally, Defence (Finance) gave concurrence for procurement on 10 March 2011, after 80 days<sup>32</sup> from the opening of the tender, with the advice to include detailed justification in minutes of meetings in future. The firms were approached to extend validity of tender upto 22 March 2011. All the three firms refused to extend validity of their offer and the contracts could not be concluded. CFA accorded approval for retendering the entire quantity of 1700 MT Tea in March 2011.

APO again invited tenders in March 2011 for procurement of 1700 MT Tea with validity of tenders up to 02 May 2011. TPC meeting was held on 31 March 2011 which recommended procurement of 1700 MT Tea for total cost of ₹ 17.83 crore. Accordingly, APO accepted the tenders of three lowest firms at a total cost of ₹ 17.83 crore. Though the value of 1700 MT Tea was almost 15 per cent higher than the first bid, TPC recorded that the rates quoted by lowest firms were slightly higher than the previously quoted rates in the TPC

<sup>32</sup> 20 December 2010 to 10 March 2011

held on 20 December 2010. Increase in cost was attributed to changes in packing material and increase in diesel price. But description of packing material mentioned in TPC of March 2011 and December 2010 were similar. Hence the contention of TPC about increase in cost due to change in packing material was not factually correct. Defence (Finance) accepted the reasons and gave concurrence to the proposal on 25 April 2011. Finally, APO issued the Acceptance of Tender to the firms on 18 May 2011 at a total cost of ₹ 17.83 crore which was in excess of ₹ 2.33 crore<sup>33</sup> over first bid.

We pointed out (November 2012) that extra expenditure of ₹ 2.33 crore resulted due to non-adherence of time frame of tender process. In reply APO stated that the delay was on account of procedural process. APO took 80 days to finalise the tender process as against the laid down timeframe of one month from the date of opening the tender. This resulted in expiry of validity period of the bids. The retendering action resulted in enhancement of rates involving extra expenditure of ₹ 2.33 crore which could have been avoided had the laid down procedure and time frame been adhered to by the concerned authorities.

The case was referred to Ministry in May 2014; their reply was awaited (October 2014).

### 3.3 Loss of revenue due to non-collection of metal scrap from Field Firing Range

**Contract for the collection of metal scrap of fired ammunition from Field Firing Range could not be concluded during the year 2008-09. The Military authorities failed to ensure its collection through hired civil labour which ultimately resulted in foregoing of revenue of ₹ 1.92 crore.**

Director General Military Training, General Staff Branch of Army Headquarters issued administrative instruction in July 1995 regarding procedure to be adopted for conclusion of contract for metal scrap of fired ammunition from Field Firing Ranges (FFR). The instructions *inter alia* specified that in case the contract is not concluded in time due to unavoidable reasons, it will be ensured by Station Headquarters concerned that the metal scrap is collected through hired civil labour and either be deposited with the Ordnance Depots or auctioned at site. Further, Ministry of Defence (MoD) in June 2002 issued instructions regarding fixation of Reserve Guiding Price (RGP) for metal scrap contracts at FFR. The two parameters for working out RGP were quantity of scrap metal that can be retrieved and prevalent price of metals in the local market.

<sup>33</sup>₹17.83 crore (second bid)- ₹15.50 crore(first bid)



Adhoc<sup>34</sup> Station Headquarters Pokaran invited tenders in August 2008 for collection and disposal of 285 MT (approx quantity) metal scrap of fired ammunition from Pokaran FFR for the period 16 November 2008 to 30 September 2009 with RGP of ₹ 2.32 crore. However, no contract could be concluded as the highest bidder did not deposit the total bid amount of ₹ 5.59 crore before signing the contract deed and his earnest money deposit (EMD) of ₹ 0.05 crore was forfeited. Station authorities resorted to re-tendering twice but the bidders did not deposit the requisite amount of ₹ 2.59 crore and ₹ 0.70 crore before signing the contract deed in Second and Third call in January 2009 and May 2009 respectively which led to non-conclusion of regular contract and consequent forfeiture of EMD amounting to ₹ 0.35 crore<sup>35</sup>.

Two months<sup>36</sup> of collection period<sup>37</sup> had already elapsed and the contracts could not be concluded till January 2009 even in second call. Ad-hoc Station Headquarters Pokaran did not collect metal scrap in January 2009 through hired civil labour despite instruction of Army HQ (July 1995) to ensure collection of metal scrap through hired civil labour in case regular contract for collection of scrap was not finalized, but initiated action for third Call which was opened in May 2009 after four months from second Call. The highest bid showed a decreasing trend as balance collection period had direct impact on retrievable quantity of scrap metal and the amount of bid. The highest bid amount of ₹ 70.11 lakh in third call was 12.54 per cent of the highest bid of 1<sup>st</sup> call. However, case for collection of metal scrap through hired civil labour was initiated in September 2009 i.e. last month of collection period. The Ad-hoc Station Headquarters Pokaran recommended the collection through hired civil labour as cost of collection through hired civil labour was miniscule in comparison to the cost of metal scrap. However, the proposal was turned down by the HQ Southern Command.

Simultaneously Ad-hoc Station Headquarters Pokaran invited tenders (July 2009) for collection of metal scrap for the next year 2009-10 (01 October 2009 to 30 September 2010) for the average quantity of 380 MT likely to be accumulated at the FFR during 2009-10 with RGP of ₹ 1.91 crore and ignored unretrieved 285 MT (approx quantity) metal scrap worth ₹ 2.32 crore for the year 2008-09. A contract for the year 2009-10 for the period from 01 October 2009 to 30 September 2010 was concluded (September 2009) with M/s Jai Shree Trade Link Jodhpur for a sum of ₹ 2.52 crore for assessed quantity of 380 MT.

We enquired (November 2013) about the reasons for not collecting the metal scarp through hired civil labour during collection period November 2008 to

<sup>34</sup> For small Military Station having less number of units provision of adhoc station headquarters instead of full fledged one is made to function with limited powers & the specific purpose

<sup>35</sup> Second call EMD of ₹ 0.10 crore + third call EMD of ₹ 0.25 crore

<sup>36</sup> 16 November 2008 to 16 January 2009

<sup>37</sup> 01 November 2008 to 30 September 2009

30 September 2009 as the regular contract could not be concluded in time. In reply, HQ Jodhpur Sub Area stated (April 2014) that HQ Southern Command turned down the proposal twice for collection of scrap through civil labour firstly on the grounds that civil labour cannot be hired from Annual Contingent Grant (ACG) funds and secondly that contract for the year 2009-10 had already been commenced. They further stated that on proportionately reducing the availability of scrap for the balance of contractual period with reference to RGP it was not found to be cost effective. The reply contradicts the recommendation of Ad-hoc Station Headquarters Pokaran that cost of hired civil labour was miniscule in comparison to the cost of metal scrap and also its own action of initiating proposal for collection of metal scrap through hired civil labour.

Thus lack of appropriate action by Army authorities for collection of metal scrap approximate quantity of 285 MT due to failure of auction process led to a loss of ₹ 1.92 crore<sup>38</sup> as the said quantity was neither collected during 2008-09 nor taken into account during next year's bid (2009-10)

The case was referred to Ministry in July 2014; their reply was awaited (October 2014).

### 3.4 Procurement of defective tyres

**Army Headquarters placed supply orders in February 2008 for supply of 3717 Tyres costing ₹ 2.97 crore. The firm was to deliver stores by August 2008. The firm supplied tyres of inferior material quality with manufacturing defects. The purchasing authority of AHQ also did not suspend the procurement of tyres pending finalisation of defect report. Continuance of supply of defective tyres by the firm led to payment of ₹ 2.65 crore.**

As per Defence Procurement Manual 2005 a contract can be terminated when the supplier fails to deliver the contracted stores in time or when the item offered by the supplier fails in the inspection and the supplier is not in a position to offer items conforming to the quality standards. Further the Manual provides option for extension in delivery date on merits.

Army Order of 8/93 stipulates that Controllerate of Quality Assurance (Vehicles) is the AHSP<sup>39</sup> in respect of vehicles and is responsible to investigate the defect, finalise the defect report and, pending finalisation of Defect Report<sup>40</sup>, would bring to the notice of DGQA<sup>41</sup> all cases which warrant

<sup>38</sup> RGP of 2008-09 ₹ 2.32 crore Minus ₹ 0.40 crore forfeited on account of EMD during three calls i.e. ₹ 0.05 crore of First Call + ₹ 0.10 crore of Second Call + ₹ 0.25 crore of Third Call

<sup>39</sup> Authority Holding Sealed Particulars

<sup>40</sup> Defect Reports are initiated (i) to pin-point exact cause of the defect, (ii) to suggest remedial measures to overcome the defect and (iii) to approach the supplier to rectify the defect in future supplies and provide free replacement in case it is covered by warranty.

<sup>41</sup> Director General of Quality Assurance

suspension of provision, issue and/ or withdrawal of equipment from users. DGQA would advise the DGOS<sup>42</sup> to take suitable action. In this regard Directorate of Quality Assurance (Armaments) issued instructions (March 2007) to all Controllerates of Quality Assurance that all efforts should be undertaken for finalisation and closure of defect reports within stipulated time frame of three months.

We observed (January 2012) that Army Headquarters<sup>43</sup> had placed a supply order on a firm<sup>44</sup> for supply of 3622 Tyres<sup>45</sup> at a cost of ₹ 2.89 crore in February 2008. Additional quantity (95 Nos.) was ordered in June 2008, raising the total cost of the supply order to ₹ 2.97 crore. The Supply Order contained a condition that in case the defect is attributed to defective material, the firm shall provide pro-rata compensations/replacement. Original delivery period (DP) was upto 31 July 2008 which was amended as 30 August 2008. DP was again extended three times, in September 2008, January 2009 and finally in June 2009 upto 07 September 2009. The firm supplied the entire quantity of 3,717 Tyres between October 2008 and August 2009 and a sum of ₹ 2.65 crore<sup>46</sup> was paid to the firm (December 2009).

During audit it was also observed that Army HQ had placed a supply order for similar type of tyres in December 2006 on the same firm against which defects were noticed (Sept 2008). CQA (BEML) had forwarded (October 2008) the defect report raised against the defects, to CQA (V)<sup>47</sup> and endorsed a copy to Army Headquarters<sup>48</sup> amongst others. CQA (V) carried out Joint Investigation of Defect (JDI) at users premises in November 2008 which revealed manufacturing defect due to inferior material of tyre. CQA (V), however, did not finalize defect report by February 2009, i.e. within three months nor took suitable action to suspend procurement of tyres from the firm against the Supply Order of February 2008/June 2008 pending finalisation of the defect report as required under AO 8/93. JDI was again carried out in May 2009 to investigate the defects in tyres supplied by the firm. The report again highlighted manufacturing process problems and inferior material quality of tyres. CQA (V) intimated Central Ordnance Depot (COD) in December 2009, i.e. after receipt of entire quantity against supply order of February 2008, not to issue tyres to user units and get the tyres back loaded. In response, COD issued instructions (January 2010) down the line to withhold further issue of above tyres to user units but did not get the defective tyres already issued back loaded. The stock held with COD was 312 tyres as of January 2010.

<sup>42</sup> Director General of Ordnance Stores

<sup>43</sup> Integrated Headquarters of Ministry of Defence (Army), Master General of Ordnance Branch

<sup>44</sup> M/s Asian Polymers, Jalandhar

<sup>45</sup> Part No. LV6/MT 14 2610-000212 Tyre PNEU 11.00 x 20 Ply 16, ST NYLON (applicability TLR 50 Ton 12 WHLD Tank Transporter Ex BEML & EX MOL for both the front and rear wheel)

<sup>46</sup> Amount excludes a sum of ₹ 31,99,521/- withheld.

<sup>47</sup> Controllerate of Quality Assurance (Vehicles) Ahmednagar

<sup>48</sup> Directorate General of Electrical and Mechanical Engineering (Vehicles), MGO's Branch of Integrated Headquarters of Ministry of Defence (Army)

However, DGQA apprised Army HQ (February 2010) that the firm had agreed to replace the entire quantity of 3883 tyres<sup>49</sup> (both supply orders), with improved new tyres. CQA(V) again advised (April 2011) COD not to issue the above tyres to user units as the firm was to supply improved tyres. Further DGQA intimated (April 2012) COD and ADGOS<sup>50</sup> not to issue those defective tyres to units. COD intimated DGOS (December 2012) that in spite of repeated reminders the firm had not developed the tyres for inspection and requested to take up the matter with DGQA for issue of tyres held in stock to the user units to extract maximum residual mileage. Senior Quality Assurance Officer (SQAQO) (Inspecting Officer)<sup>51</sup> was responsible for initial inspection of sample tyres in each lot. SQAQO conducted inspection of tyres between September 2008 and June 2009 against supply order of February 2008 but failed to detect any defect in tyres. However in September 2010 defects were also reported by users in tyres supplied against supply order of February 2008 which further substantiate the fact that inferior material was used for manufacture of tyres. We enquired from CQA (V) (May 2013) as to how the Inspecting Officer could not detect the defects during tests while accepting the tyres. The CQA (V) replied (June 2013) that this might have taken place due to selection of good sample contained in a bad lot of tyres. The reply was not tenable and implied that only good sample in each and every lot of defective supply of tyres was selected. Thus the initial test carried out by Inspection Officer was neither foolproof nor complete which resulted in supply of defective tyres by the firm.

Army Headquarters instructed (February 2013) COD that pending clearance from DGQA, the above tyres should not be used. But, COD requested (August 2013) CQA(V) to confirm whether these tyres can be issued to non-field forces, not located in high altitude, hilly terrain with instructions to units not to raise defect report for these tyres in case of pre-mature failure. CQA (V) accepted the proposal of COD to utilise the defective tyres with additional limiting condition that user unit should avoid high speed driving to minimize chances of accident. However HQ South Western Command did not agree to the contention of COD as the above tyres are applied on Trailer 50 Ton Tank Transporter held with field-force units.

Thus lack of foolproof quality assurance at Senior Quality Assurance Officer level, failure on the part of CQA(V) to finalise defect report within three months and inaction on the part of Army HQ, despite knowing the defects in October 2008, to suspend procurement of tyres, facilitated the firm to continue to supply defective tyres for which ₹ 2.65 crore was paid to the firm. Further in spite of availability of the clause for charging compensation from the firm / replacement of defective tyres was not enforced and the decision of the Army

<sup>49</sup> S.O. of December 2006 (166 Nos.) plus S.O. of February 2008 (3717 Nos.)

<sup>50</sup> ADGOS: Additional Director General of Ordnance Services

<sup>51</sup> Senior Quality Assurance Officer, Senior Quality Assurance Establishment (Vehicle, DGQA Complex, New Delhi

to use defective tyres with restriction had resulted in compromising their own functioning and human safety.

The case was referred to Ministry in June 2014; their reply was awaited (October 2014).

### 3.5 Over provisioning and uneconomical issue of Batteries by COD Agra

**Central Ordnance Depot, Agra over provisioned 14919 numbers of batteries costing ₹ 7.16 crore due to incorrect provisioning and subsequently issued 9,258 batteries to liquidate the huge stock which resulted in loss of ₹ 1.91 crore.**

As per Director General Ordnance Stores (DGOS) Technical Instruction, Central Ordnance Depots (COD) are responsible for provisioning of Class 'B'<sup>52</sup> stores. COD Agra placed an order in March 2007 on M/s Bharat Electronics Limited (BEL) Pune for 29,485 Batteries 'A'<sup>53</sup> at a cost of ₹ 14.15 crore. These batteries are used on the Main Equipment Radio Stations and have minimum four years shelf life with a minimum cycle life of 400 cycles. To ensure that the batteries give specified/guaranteed number of cycle life, control samples are subjected to life cycle test.

We noticed in September 2011 that the provisioning was done on the basis of Annual Provision Reviews (APR) by COD for the year 2006-07. Dues out<sup>54</sup> in Provision Reviews of January 2006 included demand of 19,743 batteries by 2 Field Ordnance Depot (FOD) whereas its actual demand was for only 7,400 batteries, (3,784 batteries and 3,616 batteries placed in March 2005 & July 2005 respectively) on the COD Agra. This error led to over provisioning of 12,343 batteries 'A'<sup>55</sup> worth ₹ 5.92crore (12,343 X ₹ 4,800). The ordered quantity of 29,485 Batteries was received in the COD between May 2007 and February 2008.

We further noticed that, in the APR for the year 2008-09, quantity of batteries 'A' held in stock was shown as 3,990 numbers against 23,084 numbers actually held in stock by COD on April 2008. The error resulted in deficiency of 14,919 batteries 'A' in the APR which was proposed for procurement. COD Agra placed Supply Order on M/s Bharat Electronics Ltd in October 2009 for 14,919 Batteries 'A' costing ₹ 7.16 crore which were received in COD between February 2010 and July 2010. The item was not actually required to

<sup>52</sup> All spares and accessories for main equipment

<sup>53</sup> Battery Secondary Portable Nickel Cadmium (Sealed Cylindrical) 12 Volt 4 Ampere Hour Cat No. Z9/6140-Misc-7820-575-072-16 of item was superseded by DS Cat No. Z9/6140-005171 through Assignment list dated 24 July 2006.

<sup>54</sup> All dues out including these to other services, non-army users/payment customers as on the date of the stocks will be included in liability.

<sup>55</sup> 19,743 – 7400(Error in actual Demand) = 12343

be provisioned as the stock already held by COD was of 23,084 Batteries. Thus 14,919 Batteries 'A' costing ₹ 7.16 crore were over provisioned.

We pointed out the discrepancies about over provisioning of Batteries in November 2012. To exhaust stock holding, COD Agra issued 16,759 batteries 'A' between 11 January 2013 and 06 June 2013 out of which 9,537 batteries had out lived minimum shelf life of 4 years. We also found that out of 16,759 batteries, 9,258<sup>56</sup> batteries 'A' were issued against the demands for batteries 'B'<sup>57</sup> and batteries 'C'<sup>58</sup>. The procurement cost of battery 'B' and 'C' was ₹ 3,360 and ₹ 105 per battery respectively against the cost of Battery 'A' of ₹ 4,800. Thus issue of higher cost Batteries 'A' in lieu of low cost Batteries 'B' & 'C' was uneconomical which resulted in avoidable expenditure of ₹ 1.91 crore .

In response to Audit query (September 2011) on over provisioning, COD stated (April 2012) that anomaly had resulted owing to supersession of original part number of batteries and the fact that dues out prior to automation in 2008 could not be considered due to clerical error. The reply was however not factually correct as supersession of original part number was done in July 2006 and any anomaly in provisioning in 2008 could not be attributed to it.

On uneconomical issue of Batteries 'A' in lieu of Batteries 'B' and 'C', COD stated that Batteries 'A' were issued to ensure better utilisation of extended time before expiry of shelf life in storage and added that it was saving to the State from potential loss. Further it was stated that rechargeable battery lasts much more than the non rechargeable batteries. The justification given for issue in lieu was not however relevant against the audit contention of over provisioning of Batteries 'A'. It was only after being pointing out by Audit (November 2012), COD initiated a drive to exhaust the shelf life expired stock of batteries 'A' in January 2013. Further, the benefit of in-lieu issue of battery 'A' as purported by the COD in their reply is contradicted by the fact that 9,537 batteries 'A' issued during January 2013 to June 2013 had already outlived its minimum shelf life of four years.

Thus failure on the part of COD to verify the correctness of data related to dues out and stock holding led to over provisioning of 14,919 Batteries 'A' worth ₹ 7.16 crore which eventually resulted in loss of ₹ 1.91 crore due to issue of 9,258 Batteries 'A' against the demands of other low cost Batteries after expiry of minimum shelf life.

The case was referred to Ministry in June 2014; their reply was awaited (October 2014).

<sup>56</sup> 7492 numbers for Battery B and 1766 numbers for Battery C

<sup>57</sup> Battery B: Non chargeable 12 V,15 AH -Cat Part No. Y3/6135-001362

<sup>58</sup> Battery C:3.6V,1.6 AH Cat Part No. Y3 6135-001363



### **3.6 Recoveries, savings and adjustment in accounts at the instance of Audit**

**Based on our observations, the audited entities had recovered overpaid pay and allowances, sundry charges and recovered electricity charges, cancelled irregular works sanctions and amended annual accounts, having a net effect of ₹ 68.01 crore.**

During the course of audit, we observed several instances of irregular payments, under/non-recovery of charges, issue of irregular sanctions and accounting errors. Acting on the audit observations, the audited entities took corrective action, the net effect of which is summarised below:

#### **Recoveries**

The check of records of Defence Research and Development Organisation, Principal Controllers of Defence Accounts, Military Engineer Services (MES), Canteen Stores Department (CSD) HQ etc. revealed instances of irregular payment of pay and allowances, sundry charges, overpayment of electricity bills and rent and allied charges, etc amounting to ₹ 3.98 crore. On being pointed out, the entities concerned recovered the irregular payments.

#### **Savings**

Various sanctioning authorities such as the Principal Controller of Defence Accounts, Southern Command, Area/Sub-Area HQ of the Army, Station HQ, Corps HQ, etc cancelled irregular Administrative Approvals to works/irregular leave encashment allowed. The net result of these actions was a saving of a total of ₹4.84 crore.

#### **Amendment of annual accounts**

When we pointed out instances of irregular accounting such as interest receipts not treating a Government Revenue, under provisioning for outstanding creditors, under provisioning of freight charges, un-accounting of liability towards Value Added Tax and State Sales Tax, reduction in set off amount etc., the CSD corrected the annual accounts. But for these corrections, profit would have been inflated and sundry debtors underreported. The net effect of these corrections was ₹ 59.19 crore.

## CHAPTER IV : WORKS AND MILITARY ENGINEER SERVICES

### 4.1 Avoidable expenditure on construction of excess dwelling units

**Failure of Local Military Authorities at Chennai to correctly assess the requirement of married accommodation for JCOs had resulted in construction of 17 dwelling units at a cost of ₹ 1.79 crore in excess of the requirement and their subsequent re-appropriation as field area family accommodation. In another case, Station Commander Pune irregularly re-appropriated four Lieutenant dwelling units constructed at a cost of ₹ 47 lakh as ‘Guest Rooms’ for Brigadier and above without the approval of Government of India.**

Scales of Accommodation for Defence Services stipulates that “existence of a scale neither constitutes evidence of need nor is an authority for the construction of new accommodation and the need for a work service and its scope must be properly examined and justified before the sanction is accorded by Competent Financial Authority (CFA)”. In October 2001, Ministry of Defence (MoD) issued instructions that re-appropriation of newly constructed buildings for use other than the purpose for which they were constructed tantamount to introduction of new practice and requires sanction of Government of India. The instructions also stipulated that disciplinary action would be taken against those flouting the instructions.

In contravention of the above instructions, we noticed in the course of audit of Married Accommodation Project (MAP), Chennai (January 2012) and HQ Pune, Sub Area (November 2012) that Dwelling Units (DUs) were sanctioned and constructed in excess of requirements and were later re-appropriated to other purposes without the sanction of Government of India.

#### *Case-I*

On the basis of the recommendation of the Station Commander, Chennai (June 2009), MoD accorded Administrative Approval in March 2010 for construction of married accommodation at various stations, including 200 DUs at Chennai at a cost of ₹ 42.52 crore in Phase II of the Married Accommodation Project (MAP). The sanctioned accommodation of 200 DUs included 18 DUs for officers, 106 DUs for Junior Commissioned Officers (JCOs) and 76 DUs for Other Ranks (ORs). The work was in progress (Officers-100%, JCOs-85% & ORs-87%) as of May 2014. Audit scrutiny at Project Manager, MAP Chennai (January 2012) revealed that the net



deficiency for JCOs at Chennai Army Station was only 50 DUs. However, Station HQ, Chennai recommended construction of 106 DUs for JCOs which was also approved by MoD and resulted in provision of 56 DUs in excess at a cost of ₹ 5.91 crore.

The Station HQ accepted (June 2012) the Audit contention and stated that 36 DUs against excess provision of 56 DUs for JCOs were deleted in May 2013 from the contract, based on the request of the Army HQ (January 2013) as proposed by Station HQ, Chennai (October 2012). It was further stated that only 70 out of 106 DUs were being constructed of which 20 DUs in excess of the requirement would be converted into field Area Family Accommodation (FAFA) for JCOs. The Station HQ, further, in July 2013 clarified that of the surplus 20 DUs, three DUs would be allotted to the three JCOs of DSC Platoons authorised by the Ministry in 2011 and the remaining 17 DUs would be utilized as regular accommodation for JCOs against the existing old 17 JCOs accommodations. The existing old 17 JCOs accommodation would be converted into FAFA. The above proposal would not change the status of surplus 17 accommodations as the new DUs would be allotted to JCOs and old JCOs accommodations would be converted as FAFA.

Thus, over assessment of requirement by Station Headquarter, Chennai, which was not detected either by Army HQ or by MoD while according the sanction, resulted in construction of at least 17 JCOs' married accommodation at a cost of ₹ 1.79 crore in excess of the requirement. It was only after being pointed out by Audit that the 36 units valuing ₹ 3.80 crore were deleted from the contract.

Further, the fact remains that eventual re-appropriation of the 17 JCOs existing accommodation as field area family accommodation tantamount to introduction of new practice and required approval of Government of India which was not taken.

### ***Case-II***

MoD issued sanction (September 2005) for provision of married accommodation for 84 Majors and above, four Lieutenants, 27 JCOs and 250 ORs at Army Station Pune under Phase I of MAP at a cost of ₹ 38.53 crore. DG MAP in June 2006 concluded a contract for construction of the above DUs at a cost of ₹ 27.25 crore, which was cancelled in March 2009 as the contractor had failed to complete the work. The contract for the balance works was concluded in September 2009 at an estimated cost of ₹ 31.45 crore. The work of four Lieutenant DUs was completed in May 2011 at a cost of ₹ 47 lakh and handed over to HQ Southern Command in September 2011. The Station Commander accorded sanction (February 2012) for re-appropriation of four Lieutenants DUs into Guest Rooms from 01 March 2012 to 28 February 2014.

Audit scrutiny revealed (November 2012) that even though there was a deficiency of only two DUs for Lieutenants at Pune Station, Station Commander recommended construction of four DUs at Station Family Camp along with the other DUs. Further, the Station Commander actually changed the location in September 2006 of the four Lieutenants DUs from Station Family Camp to Southern Command Officers Mess Complex and re-appropriated the same as Guest Rooms in February 2012. This indicates that construction of the Lieutenant accommodation inside the Southern Command Officers Mess complex was specifically with the purpose of re-appropriating the same as Guest room for Brigadier and above, though the sanction taken was for construction at Station Family Camp, Pune. The change of site of four DUs for the Lieutenants was, therefore, irregular and the re-appropriation was in violation of MoD's instructions.

On the matter being pointed out by Audit (November 2012), Station HQ stated that the work under MAP Phase-1 was sanctioned prior to implementation of AV Singh Committee Report. It further stated that the officers of the rank of Lieutenant posted in the Station were mostly bachelors and hence the married accommodation was surplus which was re-appropriated as guest rooms.

The reply was not acceptable as the AV Singh Committee Report was primarily focused on the restructuring of officers' cadre of the Army and achieving optimal combat effectiveness by bringing down age profile of Battalion/Brigade Commander and the same had been implemented in December 2004 prior to the sanction of the said work (September 2005) and thus had no relevance with excess construction of DUs. Moreover, Station HQ stating that Lieutenants posted in the station were mostly bachelors and hence married accommodation remained surplus indicates that proposal for construction of DUs for married accommodation was not properly assessed and was intended to use them as guest rooms for officers.

Thus the construction of four DUs for Lieutenants at a cost of ₹ 47 lakh was irregular and the re-appropriation of the same was in violation of MoD's instructions.

The case was referred to Ministry in April 2014, their reply was awaited (October 2014).

#### **4.2 Inordinate delay in handing over the clear site to the contractor resulted in avoidable payment of escalation charges**

**GE Guwahati issued an inaccurate certificate for availability of clear site which resulted in delay in handing over of site to the contractor and led to avoidable payment of extra escalation charges of ₹ 4.58 crore over and above the normal escalation charges admissible to the contractor for completion of the work within PDC.**

Military Engineer Services, Manual on Contracts 2007 stipulates that before a tender is accepted, a certificate to the effect that site is available for all works and free from all encumbrances shall be obtained from the Garrison Engineer (GE). This is further corroborated in Para 17.1.3(d) wherein a need for arrangement with users for a well thought out programme for handing over sites /buildings before tender action has been emphasized, in order to minimize extensions.

Audit noticed that for construction of Ammunition Storage accommodation at Narangi, GE Guwahati issued an inaccurate certificate for clear available site leading to avoidable extra payment of ₹4.58 crore as escalation. Case is discussed below:

Board of Officers (BOO) convened under Headquarter Eastern Command in December 2006 recommended construction of 13 Ammunition Storage accommodation (Explosive Store House (ESH)/Magazines (Mag)) and allied infrastructure at 14 Field Ammunition Depot (FAD) Narangi (Guwahati). Ministry of Defence (MoD) accorded sanction in March 2007 for construction of 13 Ammunition storage accommodation at a cost of ₹ 23.73 crore. GE Guwahati in November 2007 issued a certificate to Commander Works Engineer Shillong and Chief Engineer Shillong Zone to the effect that site was available for all works. Chief Engineer, Shillong Zone (CESZ) accordingly concluded a contract in June 2008 for provision of Type 'A' sheds<sup>59</sup>, other buildings/ infrastructure (₹ 25.25 crore). The work was commenced in June 2008.

Audit noticed, in December 2012, that despite conclusion of contract and commencement of work in June 2008, GE Guwahati handed over the site to the contractor only in December 2009 due to delay in cutting of trees. In reply to audit observations (December 2013) about delay of 18 months in handing over the site from the date of conclusion of contract (June 2008), GE Guwahati stated that the delay was due to delay by District Forest Officer (DFO)/Defence Estates Officer (DEO) in marking, pricing and auctioning and cutting of trees. Reply also indicated that delay was compounded as buildings could not be vacated in certain locations which were handed over to

<sup>59</sup> Type 'A' shed is a classification of Explosive Store House

the contractor for demolition only in January 2013 i.e. after 20 months of due date of completion of contract (April 2011). These avoidable delays resulted in payment of escalation of ₹ 4.58 crore<sup>60</sup>, which was over and above the normal escalation amount admissible to the contractor had the work been completed within PDC. The payment of escalation charges was verified by Audit from payments made to the contractor.

Thus, the case reveals that GE issued an inaccurate certificate for availability of clear site before conclusion of contract which led to avoidable delay in commencement of work due to delay in cutting of trees and resulted in payment of extra escalation of ₹ 4.58 crore over and above the normal escalation amount admissible to the contractor.

The case was referred to the Ministry in June 2014, their reply was awaited (October 2014).

#### **4.3 Selection of improper site resulted in foreclosure of work after an expenditure of ₹ 5.49 crore**

**At Supply Depot Ahmednagar, construction of other than married accommodation could not be progressed due to ingress of sewage from civil area into low lying construction site inside the Defence Area. The local military authority failed to pursue the matter effectively with the civil authorities to resolve the matter. Poor planning and management by the Military Engineer Services resulted in foreclosure of the work after an expenditure of ₹ 5.49 crore.**

Army Headquarters (September 2004) accorded Administrative Approval for 'provision of other than married (OTM) accommodation' for Supply Depot at Ahmednagar at a cost of ₹ 9.94 crore. Time for physical completion of the work was stipulated as 156 weeks. To execute the work the Chief Engineer Pune Zone (CEPZ) in March 2005 concluded a contract with M/s Mukund Enterprises, Mumbai for ₹ 7.39 crore. The work was to be carried out in two phases i.e. Phase I - One block of two single Junior Commissioned Officers Quarters and Phase II - Office building, storage accommodation, single living accommodation and associated works to be completed by 14.12.2005 and 14.9.2006 respectively.

We observed (February 2010) that the contractor had reported to Garrison Engineer (GE) (October 2005) that sewage disposal from nearby civil residential colony was spreading in low lying area of site and the area was heavily surrounded by black cotton soil up to two to three metre in depth. Further, GE reported to the local military authorities (LMA) on 17 October 2005 that sewage discharged from a civil colony was seeping into the

<sup>60</sup> Total escalation paid ₹8.56 crore – Admissible normal escalation ₹3.98 crore = ₹ 4.58 crore

foundation trenches and requested to take up the matter with civil authorities for diversion of sewage from the Defence land to their area as it was badly hampering the progress of the work.

The Ahmednagar Municipal Corporation (AMC) expressed its willingness in a meeting in October 2005, at the time of joint inspection, to provide covered pipe line for sewage inside the Defence area till its discharge into a natural nala<sup>61</sup>. The Station Commander did not allow it and advised to take the matter for diversion of sewage outside the boundary of Supply Depot area. The matter remained under correspondence between LMA and AMC. The AMC again put the same proposal in September 2007 and was also ready to bear the cost of future maintenance. Based on the request of Station Headquarters in October 2007, Sub Area Commander finally accorded permission to the AMC in February 2009 for laying drainage line in Defence land. The AMC started tendering action in September 2012 that is after lapse of three years of obtaining permission for laying drainage line for which MES/Station authorities could not pursue effectively. The work was completed in August 2014. The execution of OTM accommodation work could not progress beyond June 2008 due to accumulation of sewage water coming from surrounding civil area in low lying areas of buildings. Progress of the work in June 2008 was 32 per cent for Phase-I and 73 per cent for Phase-II. Commander Works Engineer (CWE) recommended in April 2012 for foreclosure of the contract due to sewage flow from civil area leading to unavailability of clear site and to avoid contractual litigation as the work could not progress since June 2008. Ultimately the contract was foreclosed in March 2013 after a booked expenditure of ₹ 5.49 crore. Cost of incomplete left over work as per schedule of contract was ₹ 2.93 crore. No fresh estimate was prepared for balance work as of August 2014.

In reply to an audit query (February 2010), the CEPZ stated that at the time of initial soil investigation the exact location of the buildings were not decided and soil investigation was carried out randomly. Later fresh soil investigation as per exact location of buildings was carried out and the safe bearing capacity of the soil where some of the buildings were to be constructed was found to be less. This led to revision in drawings which could be provided in December 2005. Chief Engineer modified its reply in June 2013 and stated that soil investigation was done after conclusion of the contract and only tentative design of building was included in tender. This indicates that the work started without complete soil investigation. CEPZ also accepted that clear site could not be handed over to the contractor as sewage from civil areas was accumulating at site. Soil testing and hindrance free land are pre-requisite for conclusion of a contract but MES and LMA failed to identify suitable site which resulted in non-achievement of objective of providing key location plan to the user in time, i.e., by September 2006.

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<sup>61</sup> Bhinger Nalla

We further enquired (October 2010) about the reasons for selecting low lying area for the project, which is the main reason for sewage accumulation at site, Chief Engineer replied that flow of sewage from civil area was not mentioned in the Recce-Cum-Siting Board (June 2003). The reply is not tenable since representatives of MES were also members of the above Board of Officers (BOO) and the fact of low lying area should have been brought to the notice of BOO.

Thus MES authorities failed to identify the fact of low lying area while planning/siting of buildings at pre-Administrative Approval stage, to conduct proper soil testing at post Administrative Approval stage and to ensure hindrance free site before conclusion of contract. Further LMA also failed to resolve the issue through liaison with civil authorities in time.

The case was referred to Ministry in June 2014; their reply was awaited (October 2014).

## CHAPTER V: BORDER ROADS ORGANISATION

### 5.1 Unauthorised utilization of funds for construction of a Multipurpose Hall

**Director General Border Roads sanctioned two works worth ₹ 0.90 crore for creation of two storage accommodation. These funds were actually utilized to create a Multipurpose Hall with an area of 1,556 sqm defeating the objective of storage accommodation.**

Rule 566 (C) of Border Roads regulation stipulates that funds should be expended only on authorized items of work for which they are allotted. However, Chief Engineer (Project) Beacon (CE) utilized the funds amounting to ₹ 0.93 crore for the purpose other than which they were allotted.

Border Road Development Board (BRDB) New Delhi accorded sanction in August 2008 for construction of a Multipurpose Hall with an area of 489 square meter (sqm) for indoor games and seminars at an estimated cost of ₹ 0.88 crore in Headquarters Chief Engineer (Project) Beacon (CE) Complex at Srinagar. In April 2009, a Task force<sup>62</sup> under the CE engaged a consultancy firm to design the Multipurpose Hall with an area of 1,500 sqm. In March 2009 and July 2010 Director General Border Roads (DGBR) sanctioned two storage accommodations with an area of 505.30 sqm each for two Task Forces<sup>63</sup> under the CE at an estimated cost of ₹ 0.42 crore and ₹ 0.48 crore respectively. The storage accommodation was planned for construction alongside the Multipurpose Hall at Headquarters CE complex. As per completion report part 'A' and 'B' all the three works were reported to have been completed by TF between June 2010 and January 2011 with an expenditure of ₹ 1.88 crore<sup>64</sup>.

Audit scrutiny (August 2012) of documents related to three works however, revealed that all the three jobs were combined for construction of a bigger Multipurpose Hall with an area of 1,556 sqm violating Border Roads Regulations<sup>65</sup>.

HQ 32 BRTF agreed (October 2012) with the audit findings and stated that the funds totaling ₹ 0.93 crore<sup>66</sup> meant for construction of storage

<sup>62</sup> 32 Border Road Task Force

<sup>63</sup> 32 BRTF and 760 BRTF

<sup>64</sup> ₹ 0.95 crore (Multipurpose Hall) + ₹ 0.47 crore (storage Accommodation for 32 BRTF) + ₹ 0.46 crore (storage accommodation for 760 BRTF)

<sup>65</sup> Rule 566 (C) of Section 3 of Border Roads Regulation – The Funds are expended only on authorized items of work for which they are allotted.

<sup>66</sup> ₹ 0.47 crore (storage Accommodation for 32 BRTF) + ₹ 0.46 crore (storage accommodation for 760 BRTF)



accommodations were actually used for completion of a Multipurpose Hall with bigger area as against Multipurpose Hall with an area of 489 sqm sanctioned by BRDB in August 2008. Construction of bigger Multipurpose Hall was justified on the ground of extreme cold and insurgency. Further, HQ DGBR also accepted the facts and stated (July 2014) that all three jobs were combined for construction of bigger multipurpose hall with a thought process that a bigger Multipurpose Hall can provide more storage and shall also be utilized by troops for indoor games and recreational activities. Moreover, the documents also reveal that the consultancy agency which was given the task for designing the Multipurpose Hall in April 2009 itself with an area of 1,500 sqm. whereas remaining works were to be constructed subsequently. Further storage as well as recreational activities in same hall if done together are not likely to be as professional as they are done separately.

While the reply confirmed that though the documents related to the construction show that the three separate buildings had been constructed, in fact CE(P) Beacon and TF were predetermined to construct only one multipurpose hall with a total area of 1,556 sqm and funds amounting to ₹ 0.93 crore allotted for the construction of storage accommodations were unauthorisedly utilized for construction of one multipurpose hall. This tantamount to mis-representation of facts and the requirement of storage accommodations projected for two Task Forces<sup>67</sup> remained unfulfilled.

The case was referred to Ministry in May 2014; their reply was awaited (October 2014).

## **5.2 Construction of a bridge without sub-soil investigation resulted in loss of ₹ 0.75 crore**

**Construction of a bridge by a Border Roads Task Force without sub-soil investigation required as per the Codes of Indian Road Congress (IRC) resulted in loss of ₹ 0.75 crore. The work was commenced before the sanction was accorded by the competent financial authority.**

Technical Instructions (TI) No. 22 of Border Roads Organisation stipulates that no work should commence without a sanction by competent financial authority (CFA) except Immediate Restoration of Monsoon Damages (IRMD) works.

In April 2008, Chief Engineer, Project Pushpak (CE) recommended construction of a 30 metre span major permanent bridge with box girder superstructure along with its approaches at Km 194.450 on Jiribam Barak Road National Highway-53 in place of the existing 90 feet Bailey Bridge, 20 metres up stream of existing bridge. CE, Project Pushpak, submitted

<sup>67</sup> 32 BRTF and 760 BRTF



(December 2008) the Statement of Case (SOC) along with Approximate Estimates (AEs) for the above construction to Headquarters (HQ), Director General Border Roads (DGBR) for obtaining the required sanction.

Based on SOC of CE, Project Pushpak, HQ DGBR submitted (July 2009) a Detailed Project Report (DPR) and estimates of the work to the Ministry of Road Transport and Highways (MoRT&H), Government of India for approval. DGBR had proposed that sub-soil investigation was not required as the proposed bridge site was well defined and on soft rocky strata. MoRTH did not agree with the proposal and advised the DGBR (August 2009) to design the bridge as per design requirement laid down in various relevant IRC<sup>68</sup> Codes. MoRT&H accorded the Administrative Approval, technical approval and financial sanction for the work for ₹ 331.98 lakh (July 2010) subject to the conditions that sub-soil investigation be carried out at each foundation location followed by confirmatory borings during construction.

Audit scrutiny revealed (February 2012) that the work was sanctioned in July 2010 but Border Road Task Force (BRTF) had commenced work of the bridge in February 2009, without carrying out the sub soil investigation and before the sanction was accorded by the CFA. In March 2010 a land slide occurred from the top of the hill side and work was stopped. The Technical Board of Officers held in July 2012 declared the site as unsafe being land slide prone area. The findings of Technical Board of Officers contradicts the fact reported by HQ DGBR to the MoRTH that the site was well defined and on soft rocky strata. An expenditure of ₹ 0.75 crore had been incurred up to March 2010 which therefore became infructuous.

On this being pointed out (April 2012) in audit, BRTF admitted (July 2012) the fact that bridge work commenced in February 2009 before the same was sanctioned by MoRT&H in July 2010. BRTF also agreed that expenditure of ₹ 0.75 crore incurred on execution of formation/foundation work was a loss as the site for new bridge was changed to a different location since the existing location became unsafe.

Technical Board of Officers cum Court of Inquiry (COI) (April 2013) opined that the construction of the proposed bridge at old location was not safe and proposed for construction of permanent bridge at the existing Bailey Bridge site. However, the Board recommended sub-soil investigation before start of new construction work. Revised DPR for construction of bridge was yet to be approved by the Government as of August 2014. It is evident that, before execution of formation/foundation work of the bridge, the important requirement of sub-soil investigation was not carried out. The relevance of sub-soil investigation was paramount as was advised by MoRTH in July 2010 and again recommended by Technical Board in April 2013 for construction of bridge at new site.

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<sup>68</sup> Indian Road Congress

The case therefore reveals that;

- The finding of the Technical Board of Officers that the location of bridge was land slide prone area contradicts the assertion of DGBR that the site was well defined and on soft rocky strata and therefore sub-soil investigation was not required.
- Had sub-soil investigation been done, loss of public money worth ₹ 0.75 crore could have been avoided.

The case was referred to Ministry in May 2014; their reply was awaited (October 2014).

## CHAPTER VI: PROJECT MANAGEMENT IN VEHICLE RESEARCH AND DEVELOPMENT ESTABLISHMENT

### 6. Project Management in Vehicle Research and Development Establishment, Ahmednagar and Combat Vehicles Research and Development Establishment, Avadi

Staff projects taken up for delivery of products required by Defence Forces during the period April 1998 to March 2013 met with varying success. Two Staff projects were closed at CVRDE during April 1998 to March 2013 out of which one project was undergoing Transfer of Technology but was yet to be productionised. In another project though the system developed was accepted by the user, yet the project could not be productionised due to imposition of ban on the foreign vendor. At VRDE, of the nine closed projects during April 1998 to March 2013 only one underwent productionisation. Another project though stated to have been successfully completed by VRDE, yet the details of acceptance by the user leading to induction into Service could not be produced by the lab. Third project partly achieved the project requirement and the remaining six projects could not achieve success in terms of acceptance by the users. Initiation of projects without firm General Staff Qualitative Requirement, failure of the laboratory to develop the desired deliverables and defective planning were the main reasons for failure. The status of Technology Demonstration projects undertaken by the two labs was also not encouraging as 36 out of 51 closed projects did not lead to the utilisation of such technology in Staff projects.

#### 6.1 Introduction

Defence Research and Development Organisation (DRDO) is the prime and largest government organization engaged in Research and Development (R&D) for the Defence Services viz., Army, Navy and Air force. Two of its laboratories (labs), viz., Vehicle Research and Development Establishment (VRDE) Ahmednagar and Combat Vehicles Research and Development Establishment (CVRDE) Avadi fall under the discipline/cluster of Combat Vehicles.

VRDE is mandated with the design and development of light tracked vehicles for combat and specialist roles up to 25 ton class, wheeled vehicles piston and rotary engines for Aeronautical use in Unmanned Aerial Vehicles (UAVs) and trainer aircraft, all types of UAVs from 10 kg to 150 kg All Up Weight (AUW). Amongst its major achievements are design and development of the

Armoured Engineer Recce Vehicle on BMP<sup>69</sup>-II; Nuclear Biological Chemical (NBC) Recce Vehicle; Loader Cum Replenishment (LCR) Vehicle and Replenishment Vehicle (RV) for PINAKA, MBRLS; Jet Deflector Vehicle, Communication Vehicle (Mk-I & II), Special Purpose Transporter for SF&D (AI) Project.

CVRDE is mandated with design and development of Tracked Armoured Fighting Vehicles. Amongst its major achievements are design and development of Main Battle Tank Arjun MK-I, Armoured Patrol Car, Armoured Recovery Vehicles, 130 MM Self Propelled Gun-Catapult and Carrier Mortar Tracked on BMP-II Vehicle, Combat Improved Ajeya *etc.*

### **Organisational set-up of the two labs**

The DRDO functions under the Department of Defence Research and Development (DDR&D) of the Ministry of Defence (Ministry) and is headed by the Scientific Advisor to the RakshaMantri (SA to RM). The labs of the DRDO are organized into seven clusters based on technology domain and are headed by respective Director Generals. CVRDE and VRDE, both, function under the technical control of the Director General of Armaments and Combat Engineering Systems and are headed by a Director.

Director VRDE is assisted by Heads of Departments (HOD) heading six Project Groups *viz.*, Wheeled Vehicle Division (WVD), Tracked Vehicle Division (TVD), Vehicle Electrical Electronics Division (VEL), Mechanical Engineering Division (MED), Specialist Vehicle Division (SVD) and Engine Development Group (EDG). The laboratory activities are also supported by Management Information Group (MIG), Material Management Group (MMG), National Centre for Automotive Testing (NCAT), Vehicle Management (VM), *etc.*

Director CVRDE is assisted by Additional Directors heading 11 Project groups *viz.*, Vetrionics, Reliability and Quality Assurance (R&QA), Fire Control System, Main Battle Tank (MBT), Transmission, Engine, Simulator, Gun Control Systems, Specialist Vehicle, Running Gear and Robotics. The laboratory activities are also supported by Project Management Group, Mechanical Transport, *etc.*

VRDE and CVRDE deploy about 589 and 1,254 personnel respectively including Scientists, Technical Staff, Service Personnel and Allied Staff. During the past five years from 2008-09 to 2012-13, the expenditure on pay and allowances amounted to ₹ 131.31 crore in respect of VRDE and ₹ 354.26 crore in respect of CVRDE.

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<sup>69</sup> Boyevaya Mashina Pekhoty (BMP).

## **Types of Projects**

To achieve their respective mandates, both the labs mainly undertake two kinds of projects viz., Staff projects and R&D/TD projects.

### ***I: Staff Projects***

As per the DRDO's Technical Standing Orders (TSO) for R&D Organisation (August 1975) and DRDO's IX and X Five Year Plans, Staff projects are high priority projects based on well-defined user-requirements in terms of Qualitative Requirement (QR), deliverables and time frame. These projects are expected to culminate in the induction of the systems in the Services within a specified time frame.

### ***II: Research & Development/Technology Demonstrator (R&D/TD) Projects***

(a) R&D Projects, as per the TSO, are general competence build up projects in a given area of research or to solve specific problems arising out of or having a bearing on Staff projects.

(b) Technology Demonstration (TD) projects, as defined in DRDO's IX and X Five Year Plans, are planned in the areas where user's requirement is known but the technology is not yet matured for taking up a Staff project with well-defined cost and time frame. TD projects form basis of taking up user oriented future projects and are expected to be converted into deliverables in three to five years.

## **R&D endeavour of the labs in the past 15 years**

During the period covering April 1998 to March 2013, VRDE and CVRDE undertook 17 Staff and 70 R&D/TD projects at a cost of ₹ 162.84 crore and ₹737.38 crore respectively. Out of these, 11 Staff and 56 R&D/TD projects were closed at a cost of ₹ 29.73 crore and ₹ 272.19 crore respectively. Remaining six Staff and 14 R&D/TD projects were still in progress as on 31 March 2013 as detailed in **Annexure-IV**. Thus, in terms of expenditure DRDO had focused their efforts in these two labs on R&D/TD projects and lesser contribution towards user oriented Staff projects.

## **6.2 Scope of Audit**

We examined the project management of all the Staff and R&D/TD projects closed by VRDE (nine) and CVRDE (two) during the past 15 years *i.e.*, from 1 April 1998 to 31 March 2013, including closed sub-projects taken up by these labs on behalf of other sister DRDO labs as detailed in **Annexure-V**. The process leading to procurements made by the two labs did not form part of the scope of audit. We did not include classified projects undertaken by the

labs either. Examination of manpower, budgetary allocations and expenditure was restricted to past five years *viz.*, 2008-09 to 2012-13.

### **6.3 Audit Objective**

Audit objective was to make an independent evaluation of the success achieved by VRDE and CVRDE in their respective R&D endeavour. As such audit was carried out with a view to examine whether:

- i) the deliverables expected from Staff projects were successfully developed within the sanctioned cost and time, leading to its acceptance by the users and sound budgetary practices were followed in managing the projects;
- ii) the R&D/TD projects resulted in tangible product developments;
- iii) database indicating the area of expertise of each of its scientific/technical manpower was maintained for efficient deployment of manpower; and
- iv) the National Centre for Automotive Testing (NCAT) at VRDE is functioning effectively and efficiently.

### **6.4 Audit Criteria to determine success of Projects**

Following criteria were adopted for reviewing the performance:

- i) Adherence to the provisions of DRDO's Technical Standing Orders for R&D Organisation issued in August 1975 and Procedures for Project Formulation and Management (PPFM) in DRDO issued in 2006, regarding sanction, execution, monitoring and closure of projects;
- ii) Successful development of systems envisaged under a Staff project with reference to GSQR and its acceptance by the users resulting in introduction of the systems into Service through productionisation; and
- iii) Successful completion of R&D/TD projects with reference to qualitative requirements laid down in the project proposal and leading to undertaking Staff projects within 3-5 years as stated in the DRDO's IX and X Five Year Plans.

### **6.5 Audit Methodology**

The audit commenced in May 2013 and was completed in October 2013. Entry Conferences were held with the Directors of the two labs in May 2013 and July 2013 at VRDE and CVRDE respectively. Audit methodology mainly consisted of collection of data, cross verification of the data collected and data analysis. Procedures for sanction and execution of projects were studied and

projects were analysed. Various project related documents viz., project sanction registers, files, proposals, sanctions, user trial reports, minutes of meetings of various project monitoring committees, closure reports and expenditure cards were examined. Status of staff strength and budget provisions was also looked into.

The Draft Report was issued to both the labs in December 2013. The replies to the Draft Report received from VRDE (28 January 2014) and CVRDE (10 February 2014) were suitably incorporated in the Report. Exit Conferences with the respective Directors of the labs were held in February 2014 and their views duly taken into account while finalising the Report.

The matter was referred to the Ministry in June 2014; their reply was awaited (October 2014).

## **6.6 Audit Findings**

### **6.6.1 Non-maintenance of Project documents**

DRDO's instruction (March 1973) regarding retention and destruction of Documents/Records, stipulates that Government sanction for projects need to be maintained on permanent basis. Scrutiny of maintenance of project documents at VRDE revealed that files in respect of Staff projects for development of Multi Barrel Rocket Launcher System (MBRLS) PINAKA, SAMYUKTA<sup>70</sup> (except minutes of board meetings), Under-Carriage System for Air Defence (AD) Gun were not available. In addition, VRDE could not produce project sanctions of other projects<sup>71</sup>. In reply, the Director, VRDE stated that a new Project Management Software was underway which would improve and assist in record keeping. CVRDE however made available the documents called for in audit.

### **6.6.2 Staff Projects**

#### **6.6.2.1 Time overrun in Staff Projects**

The efficacy of project management is measured by delivery of project output within a given time frame and cost. Further, TSO for R&D Organisation (August 1975) and PPFM 2006 stipulate that the PDC of a project should normally not be changed except in very exceptional circumstances. We observed that extension of PDC of projects was a norm rather than an exception at VRDE and CVRDE.

<sup>70</sup> SAMYUKTA is a mobile integrated electronic warfare system developed jointly by DRDO, Bharat Electronics Limited, Electronics Corporation of India Limited and Corps of Signals of Indian Army and is meant for tactical battlefield use.

<sup>71</sup> Projects mentioned at Sl.No.3,13,14,16,17,18,20,23,24 and 26 of Annexure-V



A comment was earlier made in Paragraph 7.2.4 of the Report of the C&AG for the year ended March 2010 (No.24 of 2011-12 on 'Project Management in Armament Research and Development Establishment' (ARDE)) and Paragraph 7.4.4 of the Report of the C&AG for the year ended March 2011 (No.16 of 2012-13 on 'Project Management in Research and Development Establishment (Engineers) (R&DE (E)), regarding excessive time overrun in Staff projects. In the Action Taken Note (ATN) in respect of ARDE, the Ministry stated (November 2012) that DRDO HQ had drawn guidelines for undertaking new projects, monitoring and closure of projects after their successful completion. Further in the ATN in respect of R&DE (E), the Ministry stated (October 2013) that to consciously curtail time over-runs, various mechanisms were in place like (i) regular reviews at various levels, (ii) Project planning, execution and monitoring tools *etc.*, to ensure that the annual objectives were achieved.

We observed that inspite of Ministry's claim regarding various systems being in place to curtail time over-runs, eight<sup>72</sup> (VRDE: six and CVRDE: two) of the total 11 closed Staff projects underwent repeated time extensions (one to five times) resulting in time overrun of six to 173 months. Among the products of these eight projects only two<sup>73</sup> of them were accepted for induction in Service. Non induction of remaining six cases is discussed in Para 6.6.2.5.

We observed that time overrun in five projects<sup>74</sup> was on account of change in scope of the project by the user, to carry out the modifications suggested by the user in various trials and delay in fabrication of vehicle. In respect of three projects<sup>75</sup> (sub-projects of other DRDO labs), at VRDE, connected documents were not available with them.

In reply, Director VRDE stated that shortcomings regarding excessive time and cost overrun was being addressed seriously with periodic reviews of projects, implementation of project management software and greater quality checks and reviews at all stages of design and development to achieve success in the first attempt itself. No specific comments were offered by the Director CVRDE, who simply intimated reasons for PDC overrun in both of its Staff projects.

For ensuring completion of the project as per schedule, Decision Aid to Technology Evaluation (DATE) analysis has been implemented since 2002. We observed that inspite of the assurance most of the Staff projects (*i.e.*, eight out of the 11 closed Staff projects) were inordinately delayed.

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<sup>72</sup>Projects mentioned at Sl.No.1,2,3,4,5,8,10 and 11 of Annexure-V

<sup>73</sup>Projects mentioned at Sl.No. 1 and 11 of Annexure -V

<sup>74</sup> Projects mentioned at Sl.No.2,4,8,10 and 11 of Annexure-V

<sup>75</sup> Projects mentioned at Sl.No.1,3 and 5 of Annexure-V

### 6.6.2.2 Continuanace of Project activities after formal closure of the Project

As per the PPFM, no expenditure should be incurred in the project after formal closure of the project. We however observed that in seven<sup>76</sup> out of the total 11 closed Staff projects, activities like technical/user trials and related modifications were carried out after closure of the projects thus making project closures a mere formality. Further, carrying out user trials after closure of the projects precludes inclusion of the expenditure incurred on such trials and related activities, in the project cost, thereby understating the project expenditure, as was witnessed in two of the seven closed Staff projects examined by us. The details of expenditure incurred on such trials and related modifications in respect of other five projects<sup>77</sup> were not made available to us. Further, inspite of incurring expenditure on project activities after closure of the project, the two projects did not meet the user's requirement as mentioned subsequently under Para No.6.6.2.5(a) (Case-I)and under Para 6.6.2.5(c) below.

### 6.6.2.3 Cost overrun in Staff projects

A comment was made in Paragraph 7.5 of the Report of the C&AG for the year ended March 2011 (No.16 of 2012-13) on 'Project Management in Research and Development Establishment (Engineers) (R&DE (E)), regarding cost overrun in Staff Projects. No specific reply to our comment regarding cost over-run in Staff Projects was given in the ATN. However the Ministry mentioned that time and cost over-runs were due to techno-managerial reasons and despite best co-ordinated efforts, time and cost over-runs were sometimes inevitable due to reasons such as technological uncertainties associated with Research and Development, technological changes and obsolescence, changing user requirements, continuous product improvements, etc.

Analysis of the 11 closed Staff Projects revealed that in four projects<sup>78</sup> pertaining to VRDE, the total cost escalation ranged between 9.84 *per cent* and 107.30 *per cent*. Our analysis of these four projects revealed that only one project (MBRLS PINAKA) completed at 106.70 *per cent* cost escalation was successful in terms of acceptance by the user and underwent productionisation. Another project (SARVATRA) completed at 49.59 *per cent* cost escalation, partially met the user requirement with only one (15m Bridging System Vehicle) of the two Bridging System Vehicles (20m and 15m Bridging System Vehicle) being accepted by the user and undergoing productionisation as mentioned in Para6.6.2.5(c) below. In respect of the other two projects, one project completed at 107.30 *per cent* cost escalation failed to meet the user requirement as mentioned in Para 6.6.2.5(b) below and the other project, completed at cost escalation of 9.84 *per cent*, is yet to be

<sup>76</sup> Projects mentioned at Sl.No.1,2,4,7,8,9 and 11 of Annexure-V

<sup>77</sup> Projects mentioned at Sl.No.1,2,7,9 and 11 of Annexure-V

<sup>78</sup> Projects mentioned at Sl.No.1,2,3 and 4 of Annexure-V

inducted into Service due to non-achievement of the modifications desired by the user in the Limited Series Production (LSP) order placed by the user on VRDE as mentioned in Para 6.6.2.5(d) below.

In reply, the Director VRDE stated that shortcomings regarding excessive time and cost overrun was being addressed seriously with periodic reviews of projects, implementation of project management software and greater quality checks and reviews at all stages of design and development to achieve success in the first attempt itself. However, as seen in audit, the above cited measures adopted by VRDE to address the issue of excessive time and cost overrun were ineffective.

In CVRDE there was no cost overrun in the two Staff projects closed between April 1998 and March 2013.

Since Staff projects are undertaken on the basis of technologies already developed, these projects are likely to witness lower percentage of cost and time overrun as compared to R&D/TD projects which involve more uncertainties and unknown factors. But our scrutiny revealed that as compared to R&D/TD projects, the number of Staff projects with time and cost overrun were markedly more. At VRDE, as against 11.11 *per cent* (four out of 36) closed R&D/TD projects (as mentioned in Para 6.6.3.1 below) which underwent cost escalation, 44.44 *per cent* (four out of nine) closed Staff projects underwent cost escalation. Similarly as against 41.67 *per cent* (15 out of 36) closed R&D/TD projects which underwent time overrun (as mentioned in Para 6.6.3.1 below), 66.66 *per cent* (six out of nine as mentioned in Para 6.6.2.1 above) closed Staff projects underwent time overrun. At CVRDE, as against 85 *per cent* (17 out of the 20 closed R&D/TD) closed R&D/TD projects (as mentioned in Para 6.6.3.1 below) which underwent time over-run both the closed Staff projects had undergone time overrun as mentioned in Para 6.6.2.1 above.

#### **6.6.2.4** *Understatement of project cost due to non-inclusion of Manpower Cost*

Government order (February 1977) stipulates that the pay and allowances of the staff specially required to be recruited for the duration of project be taken into account for computation of cost of a project. It however does not specify inclusion of the cost of pay and allowances (P&A) of regular establishment, though a substantial portion of the overall budget allocations is spent on pay and allowances of the regular establishment of labs.

Comments were made in Paragraph 7.4 and Paragraph 7.8 of the Report of the C&AG of India, No.24 of 2011-12 and No.16 of 2012-13 regarding non-inclusion of regular manpower cost in the project cost. While the Ministry was silent about this issue in its ATN against Report No.24 of 2011-12, yet in the ATN in respect of Report No.16 of 2012-13 it was stated that both project and

the manpower cost were borne by the same Department/Ministry. However, the Ministry further stated that a suitable method of apportioning manpower cost for computation of the actual cost of a project was being explored.

Our analysis at VRDE and CVRDE revealed that during the period 2008-09 to 2012-13, the year-wise expenditure on pay and allowances of regular establishment *vis-a-vis* the overall expenditure, ranged between 43 *per cent* and 66 *per cent* but the labs continued to book the expenditure separately without charging the same to the project. Manpower cost of regular establishment forms a significant portion of the total expenditure of the labs, exclusion of manpower cost of regular establishment results in highly understating the project cost and cost overrun in respect of delayed projects.

In reply, Director VRDE stated that the decision regarding inclusion of permanent manpower cost of the lab in project costing has to be taken by DRDO Headquarters. Director CVRDE stated that inclusion of manpower cost is not part of the PPFM and therefore not incorporated as a part of the project proposal and execution.

#### **6.6.2.5 Non-achievement of objectives of Staff projects**

Staff projects are undertaken on the basis of General Staff Qualitative Requirement (GSQR) projected by the user and are sanctioned in accordance with the procedure laid down in the TSO and PPFM. The objective of these projects is to culminate in the induction of the systems in the Services within a specified time frame. All projects have an integrated review and monitoring mechanism approved by the Competent Authority at the time of sanctioning the project, for reviewing the overall progress of the project.

We observed that though review and monitoring mechanism was in place and was being adhered to at both the labs, the number of projects which finally resulted in induction into the Services through productionisation was not encouraging as described below;

Of the two Staff projects closed during the review period by CVRDE, one project<sup>79</sup> after successful development at a cost of ₹ 6.68 crore was recommended for introduction into Service by the users and was undergoing Transfer of Technology (ToT) (February 2014). The other project though accepted by the user, did not result in production, due to imposition of ban on the foreign vendor as mentioned under Para 6.6.2.5(e) below.

In respect of VRDE, the success rate of closed Staff projects in terms of achievement of its objective was low, as out of the nine closed Staff projects, only one<sup>80</sup> project underwent induction into Service through productionisation (March 2006). Another project witnessed part achievement with only one of

<sup>79</sup>Projects mentioned at Sl.No.11 of Annexure-V

<sup>80</sup>Projects mentioned at Sl.No.1 of Annexure-V

the two systems developed under the project undergoing productionisation as mentioned under Para6.6.2.5(c) below. The claim of success in respect of third project<sup>81</sup> could not be verified by us due to non-availability of project documents during the audit period. All the three projects were sub projects of other sister labs. Balance six Staff projects<sup>82</sup> did not achieve the objective of induction into Services through productionisation.

### **Reasons for non-achievement of objectives of Staff projects**

As a result of scrutiny of closed Staff projects at VRDE and CVRDE, we observed that the failure of the two labs in achieving the objective of a Staff project of induction into Services through productionisation were due to following reasons:

- (a) Taking up projects without a GSQR (VRDE: two projects);
- (b) Failure in development of the engine for Aerial applications (VRDE: one project);
- (c) Premature closure of the project resulting in part achievement of project requirement. (VRDE: one project);
- (d) Delay in completion of LSP order (VRDE: one project); and
- (e) Imposition of ban on the Foreign Vendor by the Ministry (CVRDE: one project).

The reasons for failure of the Staff projects in achieving the objective of induction into Services through productionisation, enumerated above, were similar to what was observed by us in ARDE and R&DE (E) and reported in Paragraph 7 of Report No.24 of 2011-12 and Paragraph 7 of Report No.16 of 2012-13, respectively. The Ministry in the ATN on Paragraph 7 of Report No.24 of 2011-12 had stated that DRDO HQ had drawn guidelines for undertaking new projects, monitoring and closure of projects after their successful completion. Further, the Ministry in the ATN on Paragraph 7 of Report No.16 of 2012-13 had stated that as a remedial measure, more periodic reviews with user and implementation of effective Integrated Management System for compliance of guidelines and to meet the timelines of the projects would be undertaken. We observed that an effective Integrated Management System for compliance of guidelines and to meet the timelines of the projects was yet (February 2014) to be implemented at both the labs. Also, we observed that no new guidelines for undertaking new projects, monitoring and closure of projects after their successful completion had been issued so far. (February 2014)

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<sup>81</sup>Projects mentioned at Sl.No.5 of Annexure-V

<sup>82</sup>Projects mentioned at Sl.No.2,3,6,7,8 and 9 of Annexure-V

The above referred six Staff projects, which did not meet the objective of induction into Services through productionisation, are discussed below:

**(a) Taking up projects without a GSQR**

Staff projects are to be undertaken on the basis of the requirement projected by the Services in the GSQR stipulating the functional and operational characteristics of the proposed equipment, the time frame for its development along with prototypes required for trials. As such formulation of the GSQR is of prime importance for undertaking a Staff project. We observed during the audit of VRDE, sanctioning of Staff projects by DRDO without waiting for finalisation and issue of the GSQR by the user. The following two cases illustrate our findings.

***Case-I: Development of Loader cum Replenishment Vehicle for Project PINAKA***

VRDE had successfully developed Loader cum Replenishment Vehicle (LCR) for Project PINAKA and by March 2010, 40 LCRs had been supplied for the first four regiments of the Army. Subsequently Army desired (March 2010), VRDE to reduce the overall height of the vehicle to facilitate rail transportation and to increase the operational ceiling height of TATRA vehicle of LCR from the existing altitude of 2,400m to 5,000m for Mountains/High Altitude Area (HAA) deployment for V<sup>th</sup> regiment onwards.

To meet this requirement, Director VRDE in November 2010 sanctioned a Staff project at a cost of ₹ 2.72 crore for development of the LCR Vehicle MK-II, though there was no GSQR for LCR MK-II. Consequently the LCR MK-II developed (July 2012) at a cost of ₹ 2.33 crore was neither trial evaluated nor accepted by the Army, as it had yet to firm up its requirement of the LCR MK-II vehicle. Moreover the LCR MK-II was not likely to be accepted by the user as BEML could not supply TATRA 8x8 vehicle with HAA Kit so as to enable the vehicle to be deployed in high altitude area. The project was therefore closed (July 2012) at an expenditure of ₹ 2.33 crore.

In reply, Director VRDE contended that in case VRDE waited for sanction it would not have been able to deliver in time and such risks were genuine as such it is always endeavoured to be future ready. VRDE's contention is not acceptable as, though there would have been some delay in issue of the GSQR, yet a system developed as per a GSQR would have ensured its acceptance by the Army. At present the LCR developed by VRDE has neither been trial evaluated nor accepted by the Army.



***Case-II: Development of BMP Urban Survival Kit (BUSK)***

Army in January 2010 prepared a feasibility study report for development of Urban Survival Kit for BMP for the Indian Army. Based on this feasibility study report, Director VRDE in January 2011 sanctioned a project for development of an Urban Survival Kit for BMP at a cost of ₹ 0.68 crore though there was no GSQR for the same. Consequently the BUSK developed (July 2011) at a cost of ₹ 0.42 crore was not accepted by the Army as its requirement was of a BUSK which could withstand fire from 84mm Rocket Launcher (RL), 14.5mm and 7.62 B 32 Ammunition whereas the BUSK developed by VRDE was capable of providing protection against 14.5 Armour Piercing Incendiary (API) B 32 ammunition and Rocket Propelled Guns (RPGs) only.

Director VRDE in reply stated that cases like 'BUSK' would be avoided in future.

**(b) Failure in development of the engine for Aerial applications**

Even after passage of almost 11 years, VRDE was unable to develop Two-Stroke Light Weight Engine for Remotely Piloted Vehicle (RPV) application due to certain technical problems.

***Development of Two-Stroke Light Weight Engine for Remotely Piloted Vehicle (RPV) application***

Against a sub-project allotted (August 1992) to VRDE by Aeronautical Development Establishment (ADE), Bangalore at a revised cost of ₹ 1.21 crore, for development of Two-Stroke Light Weight Air Cooled Engine for Remotely Piloted Vehicle (RPV) with power output of 38-40 hp and engine weight of 12-16 kg, VRDE developed (March 2003) three types of engines viz., (i) single-cylinder, two-stroke, air cooled (ii) Twin-cylinder horizontally opposed two stroke, air cooled, (iii) Four-cylinder horizontally opposed, two stroke, air cooled engine at a cost of ₹ 1.16 crore. However none of the engines met the user's requirement of power output (38-40 hp) and engine weight (12-16 kg). The single-cylinder two-stroke engine had maximum power output of 11 hp and the twin-cylinder two-stroke engine had the power output of 21 hp. Though, the four-cylinder two-stroke engine had the power output of 38 hp but during the various ground and endurance tests carried out by ADE, Bangalore the engine failed because of failure of the crankpin/crank shaft.

Director VRDE, while accepting that the project had failed, contended that the experience gained while attempting development of the two stroke engine for RPV was very useful in subsequent project for development of Rotary Engine and as such efforts in terms of time and cost have proven its worth. The VRDE's contention is not acceptable as the aim of the subject Staff project



was development of certain deliverables *i.e.*, light weight two-stroke engines for RPVs, for induction into Service, which had not been met. Further the project taken up for Development of Rotary Engines by VRDE was a Technology Development Project and not a Staff project.

**(c) Premature closure of the project resulted in shortfall in achieving the target requirement**

The equipment/systems developed by DRDO are inducted into the Services based on its performance during trials by the user and the project is considered for closure. In the event of user suggesting further trials/modifications, the project activities are continued, to achieve the desired results. However, closure of the projects by DRDO even before validation in trials on the grounds of having successfully developed the system precludes its acceptance by the user and introduction into Service. This not only negates the investment made in time and money on development of the equipment but also adversely impacts the user's requirement especially if the project envisages development of two systems to be used in conjunction with each other to enhance the capability of the system as a whole as detailed below.

***Development of Bridge Assault Mechanically Launched (SARVATRA)***

Army's requirement was of five span bridging system comprising of 15m and 20m bridging systems complementary to each other and to be used in conjunction with each other so as to bridge gaps from 15m to 100m. To meet this requirement, R&DE (E), Dighi undertook a project for development of Bridge Assault Mechanically Launched 'SARVATRA' in December 1992 and in February 1993 allotted a sub project to VRDE, Ahmednagar for development of suitable vehicles for transport and launching of 15m and 20m long bridges at a revised cost of ₹ 3.77 crore .

The 15m Bridge laying vehicles were accepted by the user and introduced into service but the 20m Bridge laying vehicles were found to be unsuitable for cross country mobility in desert terrain during the user trials and were not accepted. As such the user recommended (March 2001) re-powering of the engine of the prime mover and making the vehicle into 10x10 instead of existing axle configuration of 10x8, but VRDE had already closed the project in December 2000 at a cost of ₹ 3.77 crore. As a result though VRDE expended an amount of ₹ 24.96 lakh out of Build-up funds and ₹ 3.62 lakh out of another Project for Integrated Transfer of Technology (closed in October 2004), on re-powering of 20m Bridging System vehicle with an axle configuration of 10x8, but since the Army's requirement was of vehicle with 10x10 axle configuration, the same was again turned down (November 2004) by the user. As a consequence, the 'SARVATRA' Bridging system offered to the user was capable of bridging gaps of only 75m (15m x 5 span) whereas the user requirement was of bridging gaps up to 100m (20m x 5 span).

Director VRDE in reply, stated that 10x10 vehicles were not available during that period and as such non availability of technology had led to the above mentioned situation. The reply is not tenable since VRDE had as early as in December 1998 informed the user that re-powering of vehicle by 425 hp engine was being planned for 10x10 vehicle which would enhance the power to weight ratio and result in high mobility and high payload of the vehicle.

**(d) Delay in completion of Limited Series Production (LSP) order**

Prototypes accepted for introduction into service by users are expected to be promptly followed by transfer of technology by the designer to the production agencies for their bulk production. Where the accepted prototypes are stipulated to undergo further modifications, the post development activities follow the route of Limited Series Production (LSP) before entering into the phase of Series Production (Bulk Production) for delivery to the Services. Mismanagement and/or delay in the LSP Phase by the designer not only nullifies the efforts of the designer in developing the system but also results in non-availability of the system to the users thereby delaying their induction into Service. The delay in LSP Phase may also result in import by users, to meet their immediate requirement. In the case illustrated below, the LSP order suffered inordinate delay in development/ modifications of the system as per the users requirement. The delay in completion of the LSP order by the lab resulted in import of the system by the user to meet its immediate requirement:

***Development of variants on BMP- II***

Against a project sanctioned by DDR&D in January 1990, VRDE had successfully developed (June 1998) Armoured High Mobility Logistic Carrier (Ammunition), Armoured High Mobility Logistic Carrier (FOL) and Armoured Amphibious Dozer on BMP-II at a cost of ₹ 0.62 crore. Though AHMLC (FOL) and AHMLC (Ammunition) were not inducted into Service as the Army in March 1994 directed these variants be kept as reference vehicles, but the AAD was accepted for introduction into service by the Army in December 2001 as MK-I version, subject to certain modifications to Floatation, Mobility, Earth Moving Capability, Rocket Propelled Anchor (RPA), Nuclear Biological Chemical (NBC) protection *etc.*

Accordingly Ministry, in January 2002 placed an order on VRDE for purchase of six AADs at a cost of ₹ 26.94 crore. Though the Pilot sample was required to be offered in 10 months after placement of LSP order by the Ministry, however even after passage of more than 12 years since issue of LSP order, the equipment was yet (February 2014) to undergo bulk production and induction into Service because of inability on the part of VRDE to achieve the modifications desired by the user in the LSP unit. As a consequence, user per force had to consider importing the equipment to meet its urgent operational requirement. Moreover, VRDE incurred an additional expenditure of ₹ 2.07 crore to re-configure the First off Production Model (pilot sample) to

acceptable level of users, which was likely to adversely affect the production cost of the LSP order for AADs.

Director VRDE in reply stated (January 2014) that the recommendations of time bound development activity and understanding post development issues urgently had been noted down and would be kept in mind for future projects, however placing/execution of LSP order is conjunct to the commitment of funds by the user and acceptance by the Production agencies (Ordnance Factories) based on their own schedules, hence the delay was not entirely the fault of the lab. The reply is generic in nature and as such is not acceptable in audit.

**(e) Imposition of ban by the Ministry on the foreign vendor**

Dependency on a particular foreign vendor(s)/firm(s) for any technology carries the risk of non-availability of the foreign technology at a later date leading to non productionisation of a system developed. As commented in the following case, unforeseen circumstances like imposition of ban on the foreign vendor by the Ministry rendered the efforts of the developing agency fruitless despite successful development of the system by the DRDO in collaboration with the foreign vendor and acceptance of the same by the user.

***Development of Self-propelled Gun system***

DDR&D sanctioned (April 1998) a project for “Development of 155 mm SP Gun System” named BHIM T6 to integrate T6 Turret of M/s LIW (DENEL), South Africa and AS 90 turret of M/s VSEL, UK on to Arjun derivative chassis and offer the resulting two SP Gun systems for user evaluation at a cost of ₹ 3 crore. The user trials of the BHIM T6 developed by integrating T6 turret of M/s LIW (DENEL) onto Arjun derivate chasis, under the project were carried out in July-August 1998 and recommended for induction into service in November 1999, after successful trial evaluation. As the integration and user Trial evaluation of 155 mm SP Gun was successfully completed, the project was closed (12 April 2000) at an expenditure of ₹ 0.60 crore.

For integration of AS 90 turret system on Arjun MBT, though in the initial phases, M/s VSEL had been interacting with CVRDE to finalise the chassis/turret interface design, but their interaction gradually tapered off. Thus, due to non-participation of M/s VSEL with AS 90 turret, the fielding and trial evaluation of SP Gun was limited to BHIM T6 only.

M/s BEML was nominated as the production agency in 2002 and the price negotiation went up to 2004. However, further pursuit of tie-up with M/s DENEL had to be cancelled due to imposition of ban in June 2005 by the Ministry on all contracts with M/s. LIW (DENEL) on alleged payment of agency commission to a British agent. As such in the absence of turrets from M/s DENEL, BHIM T6 could not be productionised.

In reply, Director CVRDE stated (10 February 2014) that the product was found (December 1999) to be successful and recommended (December 1999) for induction by the user and finalisation of the Production Order was the responsibility of the user, in which there was no role to be played by CVRDE.

Thus due to imposition of ban on the foreign vendor by the Ministry, efforts of the developing agency were rendered fruitless despite successful development of the system by the DRDO and acceptance by the user.

### **6.6.3 Research & Development (R&D) and Technology Demonstration (TD) Projects**

During the period under review VRDE undertook 41 R&D/TD Projects (including projects in hand as on 1 April 1998) sanctioned at a cost of ₹ 279.04 crore, out of which 36 projects were closed<sup>83</sup> at an expenditure of ₹ 100.23 crore and five were on-going as on 31 March 2013. Similarly, CVRDE undertook 29 R&D/TD projects (including projects in hand as on 1 April 1998) sanctioned at a cost of ₹ 458.34 crore, out of which 20 projects were closed<sup>84</sup> at an expenditure of ₹ 171.96 crore and nine were on-going projects as on 31 March 2013 (**Annexure-IV**).

#### **6.6.3.1 Cost and Time overrun in R&D/TD Projects**

Of the 36 projects closed by VRDE, four projects involved cost overrun<sup>85</sup> which ranged between ₹ 0.36 crore and ₹ 1.5 crore and was mainly on account of change in scope of work and increase in the estimated cost of subsystems. There was no cost over-run in the 20 R&D/TD projects closed by the CVRDE.

32 projects (VRDE: 15<sup>86</sup>, CVRDE: 17<sup>87</sup>) showed time over-run ranging between two months and 66 months. The main reasons for time overrun were delay in conducting trials, increase in scope of work, delay in completion of the development activities, delay in procurement and changes/modifications suggested during the course of the project.

In reply, Director VRDE stated that further improvements to minimise the time and cost overrun were being made. Director CVRDE stated that although all efforts are made to complete the projects in time, the time delay is inevitable as various unknown factors influence R&D projects in execution.

<sup>83</sup> Projects mentioned at Sl.No.12 to 47 of Annexure-V

<sup>84</sup> Projects mentioned at Sl.No.48 to 67 of Annexure-V

<sup>85</sup> Projects mentioned at Sl.No.12,15,34 and 40 of Annexure-V

<sup>86</sup> Projects mentioned at Sl.No.12,14,18,19,24,27,32,33,34,36,38,39,40,41 and 43 of Annexure-V

<sup>87</sup> Projects mentioned at Sl.No.48 to 59,61,62,64,65 and 67 of Annexure-V

### 6.6.3.2 Degree of success achieved in R&D/TD Projects

R&D and TD projects are expected to eventually find application in Staff projects. Moreover such projects have the potential of creating a certain extent of intellectual property that is patentable. Scrutiny of 36 R&D/TD projects closed by VRDE at an expenditure of ₹ 100.23 crore revealed that 25 projects closed<sup>88</sup> at an expenditure of ₹ 89.14 crore did not find application in Staff projects, nor were any patents filed on the basis of research carried out under these projects, except in one case<sup>89</sup> where the patent was filed in respect of one of the technologies *i.e.*, ‘Hydro mechanical steering system using rack & pinion system’. Out of the balance 11 projects, five R&D/TD projects were sub-projects of other DRDO labs which were successfully completed<sup>90</sup> and the Systems developed were handed over to the main project holders. Three projects found application<sup>91</sup> in Staff Projects, one involved development of instruments and calibration facilities for NCAT which was successfully completed balance two involved work like documentation, trial & evaluation of vehicles *etc.*, which were not aimed to culminate into staff projects.

At CVRDE, our scrutiny revealed that of the 20 closed projects, five projects<sup>92</sup> involved ToT or preparation of drawings for ToT and did not involve any research activity. These projects were closed at an expenditure of ₹ 16.77 crore. Of the balance 15 R&D projects, 11 projects closed<sup>93</sup> at an expenditure of ₹ 115.39 crore did not find application in any Staff project. Three projects were closed<sup>94</sup> successfully after incurring a total expenditure of ₹ 39.80 crore and production order/Staff project was placed by the user/undertaken by CVRDE. One project was short-closed<sup>95</sup> without incurring any expenditure as user did not evince interest in the same.

Further analysis of these projects by us revealed that main reasons for the technologies successfully developed under various R&D/TD projects not finding application in any of the Staff projects were either lack of user requirement or the system developed not meeting the users requirement of the system. This is indicative of lack of co-relation between users’ requirements and the Research activities undertaken by the lab. Since these R&D/TD projects were mostly taken up on DRDO’s own initiative and the envisaged end users of the technologies/systems developed under the R&D/TD projects being the Armed Forces, it would have been more prudent had the projects been undertaken after ascertaining the requirements/futuristic requirements of the end users.

<sup>88</sup>Projects mentioned at Sl.No.12,16 to 28,30,31,34,35,37,38,39,43,45,46 and 47 of Annexure-V

<sup>89</sup>Projects mentioned at Sl.No.35 of Annexure-V

<sup>90</sup>Projects mentioned at Sl.No.32,33,40,41 and 42 of Annexure-V

<sup>91</sup>Projects mentioned at Sl.No.15,36 and 44 of Annexure-V

<sup>92</sup>Projects mentioned at Sl.No.48,49,51,59 and 62 of Annexure-V

<sup>93</sup>Projects mentioned at Sl.No.52,53,54,56,57,58,60,63,64,65 and 67 of Annexure-V

<sup>94</sup>Projects mentioned at Sl.No.50,55 and 61 of Annexure-V

<sup>95</sup>Projects mentioned at Sl.No.66 of Annexure-V

In reply, Director VRDE stated that for technology demonstration projects, irrespective of the immediate use of the technology, there is a need to continue working on the similar technology areas for their upgradation/performance improvements so that the labs achieve domain excellence in the selected areas and keep themselves fully armed for the futuristic needs of the users by way of achieving experience and expertise in the particular area. It was further stated that in most of the cases even when the complete system developed under TD project does not get into a Staff project, the sub-systems developed do find application in other projects. However, the contention is not acceptable as in terms of the definition of TD projects given in DRDO IX and X Five Year Plans, these projects form basis of taking up user oriented future projects and are expected to be converted into deliverables in three to five years. We however found in audit that none of the systems developed under these projects had resulted in undertaking of a Staff project to meet the user's (Armed Forces) requirement. Further in most of the R&D/TD projects undertaken by VRDE, the aim of the R&D/TD projects was not just development of certain enabling technologies/sub-systems/components but development of a prototype of the system/equipment.

In reply, Director CVRDE contended that GSQR is generally provided for major system broadly defining its functional requirements. He further stated that the user neither provides GSQR nor specifications for many sub-systems involved in the major systems such as tank. Under the circumstances sub-systems/components are developed under R&D/TD projects and directly incorporated in Staff product. However, no such instances of incorporating sub system components in major systems were observed in audit.

In the ATN to Report No.16 of 2012-13, the Ministry stated that constant interaction with users in the form of Quarterly Interaction Meeting and reviews at different levels is a part of the project execution process. Also the user is involved in the Peer Review Committee Meeting prior to the project sanction. The Ministry's reply is not acceptable since at VRDE, we did not come across any minutes of Quarterly Interaction Meeting held by VRDE with the users in respect of R&D/TD projects undertaken by VRDE. Further Ministry's contention that user is involved in the Peer Review Committee Meeting prior to the project sanction is also not correct as user was not involved in the Peer Review Committee Meeting in respect of R&D/TD Projects undertaken by VRDE. Further in two R&D/TD Projects the Peer Review was not at all conducted.

Thus in spite of the systems/equipment having been developed successfully as per the project closure reports by VRDE and CVRDE, the same were either not required by the user or did not meet the user's requirement indicating lack of co-relation between users' requirements and the Research activities undertaken by the labs, as illustrated in **Cases 1 to 11** below:



**Table-12: Successfully developed TD/R&D projects with no end use**

S. No.	Name of the project and objective	Date of sanction / Sanctioned Cost (₹in crore)	Completion cost (₹in crore)	Original PDC/ Revised PDC	Status	Audit comment and Auditees response
1	Design and Development of Futuristic Infantry Combat Vehicle (FICV)	July 1998 <b>38.00</b>	<b>37.37</b>	June 2004 December 2006	Closed in December 2006	<p>DDR&amp;D sanctioned a project for design and development of FICV. Draft GSQR stipulated the requirement of FICV with amphibious capability. The FICV developed by VRDE was however non-amphibious and thus did not meet the users requirement.</p> <p>VRDE in response stated that technologies like power pack packaging, cooling systems <i>etc.</i>, developed under the project were used in the development of AAD MK-I and Counter Mine Flail. The reply is not acceptable since the aim of the project was not just development of sub-technologies but development of a complete system.</p>
2	Development of Unmanned Ground Vehicle (UGV)	February 2004 <b>11.52</b>	<b>10.98</b>	February 2008	Closed in February 2008	<p>DDR&amp;D sanctioned a project for development of UGV. VRDE took up the development of the UGV based on 2.5 ton 'B' vehicle without first consulting the user. The user's requirement was a 50 kg Chemical Biological Radiological Nuclear (CBRN) UGV and hence the UGV developed by VRDE was not accepted.</p> <p>VRDE contented that most of the technologies developed under the TD project were independent of the vehicle platform and could be applied to different categories of UGVs. The reply is not tenable as we observed that another S&amp;T project for development of UGV for NBC reconnaissance had been undertaken by VRDE which indicates that the technologies developed under the project did not meet the user's requirement.</p>
3	Design and development of Extra-long Multi Axle Transporter (ELMAT)	November 1992 <b>4.05</b>	<b>4.00</b>	November 1996 May 1998	Closed in May 1998	<p>DDR&amp;D sanctioned a project for development of ELMAT to transport and launch unusually long military equipment. As the vehicle developed by VRDE was designed to carry and provide launch platform for heavy bridging equipment only, the nomenclature was changed to 'Multi Axle Bridge Carrier'. However even a lapse of 15 years since successful completion of the project; no staff project has been taken up for development of the ELMAT by VRDE, indicating lack of user interest.</p> <p>VRDE stated that the technologies of ELMAT had been implemented in the development of 10x10 and 12x12 vehicle system of Brahmos and that the knowledge base had also been used</p>



						in two other projects viz 'SARVATRA' & 'Wheeled Armoured Platform' (WHAP). The reply is not acceptable as the ELMAT developed by VRDE is essentially a bridge carrier vehicle and the projects SARVATRA & ELMAT were simultaneously sanctioned. The project for development of WHAP is not a staff project but an ongoing TD project.
4	Development of Technologies for Combat Vehicle Systems	December 2002 <b>4.40</b>	<b>3.05</b>	December 2007	Closed in December 2007	<p>DDR&amp;D sanctioned a project for development of five technologies for combat vehicle systems which were successfully developed by VRDE. However, even after lapse of six years since successful completion of the project, the technologies developed under this project did not find application in any staff project, indicating lack of user interest.</p> <p>VRDE stated that Staff projects are taken up on need basis as per users requirement and as and when the requirement was generated, the technology developed under the project would be used. The reply corroborates our comment that user requirement did not exist for the technology developed under the project.</p>
5	Development of Electronic Fuel Injection System for Two Stroke Engines (EFIS)	June 2006 <b>4.95</b>	<b>3.28</b>	December 2008 June 2010	Closed in June 2010	<p>DDR&amp;D sanctioned a project for development of EFIS for two stroke engines. The project envisaged development of Gasoline Direct Injection (GDI) system for two stroke opposed piston engine for aerial applications. This would improve the fuel efficiency and power output for a given Electronic Fuel Injection system incorporated engine against a conventional engine. However, even after three years since successful completion of the Electronic Fuel Injection System for two stroke engines by VRDE, the system did not find application in any staff project indicating lack of user requirement.</p> <p>In reply VRDE stated that the Electronic Control Unit (ECU) technology developed under the project was used successfully in the development of rotary engines for NISHANT UAV and would find applicability in future four stroke engines. The contention is not acceptable as the technology developed under this project was for two stroke engines whereas the engines currently being developed by VRDE (under two projects sanctioned in June 2010 and January 2013) are for rotary engines. Furthermore, development of EFIS for rotary engines was also separately undertaken in the project sanctioned in January 2013.</p>
6	Development of Technologies for Rotary Engine	November 2002 <b>5.40</b>	<b>5.26</b>	May 2008 December 2009	Closed in December 2009	The project was sanctioned for development of technologies for Rotary Engine. Two prototypes of rotary engines were successfully developed by VRDE. However, even after four years since successful completion of the project, the same did not find application in any staff project. We

						<p>further observed that two more TD projects were subsequently undertaken by VRDE viz. (i) Development of 15 prototypes of rotary engines for trials with NISHANT UAV (₹4.70 crore) and (ii) Development of advanced technologies for Rotary engine (₹69.23 crore).</p> <p>VRDE stated that after successful completion of the project a DRDO Mission Mode project for development of flight rotary engine to power NISHANT UAV had been undertaken to prove the complete endurance of the indigenous rotary engine to confirm its application for indigenous NISHANT UAV. However the fact remained that even after successful development of technology for rotary engines, no staff project was undertaken. Instead two more TD projects were undertaken subsequently indicating that the technology developed under the project did not meet the user's requirement.</p>
7	Development of Bullet Proof Light Vehicles (BPLV)	May 2006 <b>1.95</b>	<b>1.92</b>	May 2007 November 2007	Closed in November 2007	<p>DDR&amp;D sanctioned a project for development of BPLV. The aim of the project was development of 10 prototypes for proving automobile aggregates and armour material. The project was successfully completed and 10 BPLV's armoured through trade were handed over to various DRDO labs. However, even after six years since successful completion of the project, the technology developed under the project did not find application in any staff project indicating lack of user interest.</p> <p>In reply VRDE stated that the technologies of BPLV were successfully incorporated in Light Armoured Troops Carrier and VAJRA (Mini) and a Transfer of Technology (ToT) realized with M/s Tata Motors Ltd. The reply is not tenable as agreements for ToT with M/s Tata Motors were concluded in November 2005 &amp; February 2006 respectively <i>i.e.</i>, prior to sanction of the subject project in May 2006.</p>
8	Development of Electro Hydraulic Gun Control System (GCS).	December 1998 <b>5.99</b>	<b>4.67</b>	April 2001 December 2002	Closed in December 2002	<p>DDR&amp;D sanctioned a project for Development of GCS. The aim of the project was indigenous development of GCS for armoured fighting vehicles and supply of two systems. The project was successfully completed by CVRDE. However, even after 11 years since successful completion of the project, the technology developed under the project did not find application in any staff project indicating lack of user interest.</p> <p>In reply CVRDE stated that by the time the trial under this project was completed, the configuration of Arjun MBT MK-I was firmed up by the user for productionisation. It was further stated that the user was contemplating placement of an indent for 118 nos. of MBT Arjun MK—II, which was not an economically</p>

						<p>viable quantity for productionisation of GCS. The reply corroborates our comment that the technology developed under the project did not find application in a Staff project.</p>
9	Manufacture & Integration of Power Booster Conversion Kits on T-72 base Engines and Vehicle Trial	November 1997 <b>1.95</b>	<b>1.87</b>	November 1998 November 2001	Closed in November 2001	<p>DDR&amp;D sanctioned a project for Manufacture &amp; Integration of Power Booster Conversion Kits on T-72 base Engines and Vehicle Trial. Five conversion kits were developed and integrated with two base engines and the uprated engines were successfully integrated with the vehicles by CVRDE. However, even after 12 years since successful completion of the project, the technology developed under the project did not find application in any staff project indicating lack of user interest.</p> <p>In reply CVRDE stated that the T-72 uprated engine successfully developed by CVRDE had performed comparable to Russian T-90 engines during trials in 2011. The reply is not acceptable as we observed that during trials held in 2011 the uprated engine developed by CVRDE had multiple problems including overheating of the engines. Hence, the user recommended further trials which were yet to be under taken as of February 2014.</p>
10	Development of Experimental Tank	April 2003 <b>22.64</b>	<b>20.66</b>	April 2006	Closed in April 2006	<p>DDR&amp;D sanctioned a project to develop an experimental tank by integrating T-72 M1 chassis with the turret of modified MBT Arjun. The project was successfully closed after achieving the hybrid tank technology by integrating the upgraded chassis and automotive system of T-72 M1 tank and the optimized turret of MBT Arjun. However, even after 7 years since successful completion of the project, the technology developed under the project did not find application in any staff project indicating lack of user interest.</p> <p>CVRDE in reply stated that the system developed under the project was successful and could be used if user desired. However, the fact remained that the user did not show any interest in the system developed by VRDE.</p>
11	Projects undertaken for improvements to MBT Arjun MK-I for incorporation in MBT Arjun MK-II.	(i) April 2003 <b>9.80</b> (ii) September 2005 <b>14.99</b> (iii) May 2010 <b>13.05</b>	<b>8.73</b> <b>14.49</b> <b>11.79</b>	April 2004  September 2009 August 2010  May 2012 March 2013	Closed in April 2004  Closed in August 2010.  Closed in March 2013	<p>DDR&amp;D sanctioned three projects (i) Development of Defensive Aid Systems (ii) Demonstration of Missile Firing capability and (iii) Development of Advanced Chassis and Automotive Systems for up gradation of MBT Arjun MK-I to MK-II. The projects were successfully completed by CVRDE. However, even after successful completion of the projects, the technologies developed under the projects did not find application in any staff project.</p> <p>In reply, Director CVRDE stated that the GSQR was generally provided by the users for major systems only and not for sub systems of the main system. He further contended that the sub</p>

						systems developed under the TD projects were directly incorporated into the products which may not be through an exclusive Staff project. The reply is not tenable as the projects were taken up to meet the users requirement of MBT Arjun MK-II, the same should have been taken up as Staff projects on the basis of a GSQR which would have ensured acceptance of the systems by the user.
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#### 6.6.4 Absence of database on Scientist wise tasks and contribution

An R&D organisation, through human resource and knowledge management, builds on the available technology to develop the futuristic technologies. This implies an interactive process whereby the Scientists who have obtained exposure to technologies at an earlier stage continue to work on similar technology later. The non-maintenance of such a knowledge base precludes expertise based deployment of its personnel on projects undertaken by it, which could result in projects not coming to fruition or being inordinately delayed.

A comment was made in Paragraph 7.3 of the C&AG's Report No 24 of 2011-12 and Paragraph 7.7 of the C&AG's Report No 16 of 2012-13 regarding absence of a mechanism to correlate success or failure of projects with personnel deputed, at ARDE and R&DE (E) respectively. In the ATN on these Reports, Ministry had stated (November 2012/October 2013) that success or failure could be related to efforts put in by the entire team rather than an individual. It was further stated that accountability could not be attributed to individuals but to a team working on the Project and individuals in the laboratory work in Matrix Management where an individual may work simultaneously on multiple projects. Further in order to effectively nurture and utilise talents, a matrix based organisation structure was implemented wherein an individual simultaneously contributed to several projects of the Establishment.

Our scrutiny revealed that both the labs *viz.*, VRDE and CVRDE did not have database on Scientist-wise tasks and contribution, which could facilitate the assessment of the output of Scientists/Technical Officers. On being enquired in Audit whether any database to correlate the success or failure of projects as well as the expertise gained thereof with personnel deputed on them, was maintained by the lab, VRDE furnished project-wisedetails of some of the Scientists/Technical Officers in respect of 16 projects as against 45 projects closed during the period covered under the review.

In reply, Director VRDE stated that a new Project Management System under implementation would adequately address the issue, which substantiates our comment that there was no mechanism in place to co-relate success or failure of Projects with Personnel deputed on them.

In reply, Director CVRDE stated (January 2014) that it would be difficult to relate the success or failure of the project in comprehensive manner on an individual or smaller set of Scientists/Technical Officers as it would involve complex factors of multi-disciplinary nature. CVRDE's reply is in contravention to the Ministry's response in ATN and also not in consonance with the reply given by VRDE.

#### 6.6.5 Resource Generation in National Centre for Automotive Testing (NCAT)

Government of India, Ministry of Road Transport and Highways authorised (in late 1980s) VRDE to test all types of commercial vehicles for proving their compliance to Central Motor Vehicle Rule (CMVR) No.126. The infrastructure comprising of test tracks and various indoor testing facilities for defence and civil vehicles is available at National Centre for Automotive Testing (NCAT). These facilities are extended to the Private Industries on hiring basis. Charges for Hiring/Testing of commercial vehicles are worked out by VRDE in accordance with the provisions contained in DDR&D letter dated 01January 1993.

Scrutiny of records at NCAT revealed that an amount of ₹ 71.65 crore was generated as revenue on account of hiring of test facilities by private industries during the past five years *i.e.*, from 2008-09 to 2012-13.

**Table-13: Total number of vehicles tested and revenue generated during 2008-09 to 2012-13**

Year	No of commercial vehicles/ components tested	No of project vehicles on which technical evaluation trials were conducted and completed.	No of Army vehicles on which technical evaluation trials were conducted and completed.	Revenue generated (₹in crore)
2008-2009	607	-	5	17.67
2009-2010	702	6	7	12.00
2010-2011	1,166	6	7	13.16
2011-2012	511	6	7	16.19
2012-2013	711	8	9	12.63
<b>Total</b>	<b>3,697</b>	<b>26</b>	<b>35</b>	<b>71.65</b>

We did not come across any case regarding non availability of the testing facility for project vehicles thereby leading to delay in completion of the project. However certain interesting cases, regarding resource generation on account of hiring/testing of commercial vehicles, observed during the audit of NCAT are illustrated hereunder:

***Case-I: Undue benefit of ₹ 0.68 crore to private firms due to non-recovery of Service Tax by VRDE and payment of the same out of Resource Generation Fund***

Government of India, Ministry of Finance, under Notification (20 June 2003), introduced Service Tax on Technical Inspection and Certification Service, leviable with effect from 1 July 2003. Since Test and evaluation facilities created at VRDE are utilized for Technical Inspection and Certification of commercial vehicles of private parties, for which charges are recovered from them as per the rates fixed periodically by VRDE, Service Tax was also required to be recovered by VRDE from the private parties. However, as seen in Audit, Director VRDE neither levied nor recovered the same from the private parties from 1 July 2003 to 31 March 2006, despite the Excise authorities clarification (1 September 2005) that Service Tax was leviable on the Technical Inspection and Certification Service from Defence Establishments as well.

VRDE took up (August 2006) the matter with the DRDO Headquarters for exemption of Service Tax amounting to ₹ 2.64 crore payable to the Central Excise and Customs authority for the period 1 July 2003 to 31 March 2006, on the ground that it could not be levied on the firms at belated stage. Instead, DRDO sanctioned (8 August 2008) payment of ₹ 2.64 crore, out of Resource Generation Fund, to be paid to the Central Excise and Customs authorities to clear the dues. The actual amount payable to Central Excise and Customs Department of ₹ 2.13 crore was worked out by VRDE and payment made in March 2009 to clear the outstanding payment of Service Tax for the period from 1 July 2003 to 31 March 2006. Since the Service Tax payable by the firms/private parties was actually paid by DRDO, the loss incurred due to non-recovery of the Service Tax from the concerned private firms, was asked to be regularized by Audit. Out of the amount of ₹ 2.13 crore, an amount of ₹ 1.45 crore was recovered upto 1 January 2014. The balance amount of ₹ 0.68 crore was yet to be recovered.

***Case-II: Fixation of Hiring and Testing charges of Tracks and other facilities at NCAT on ad hoc basis***

During the review period, five Boards assembled at VRDE in 1999, 2003, 2005, 2008 and 2011 for revising the charges for testing and hiring of test tracks/instruments/facilities by private parties. Our scrutiny of the fixation of hiring/testing charges applicable for testing of commercial vehicles as detailed hereunder resulted in less recovery of hiring/testing charges.

**A: Non adherence to stipulated periodicity for fixation of hiring and testing charges in respect of commercial vehicles**

As per provisions contained in DDR&D letter dated 01 January 1993, the rates for hiring and testing facilities were required to be revised every two years.



However, we observed that during the period of 15 years from April 1998 to March 2013, on two occasions the rates were revised after a gap of four years. The biennial revision was omitted in 2001 and 2007 at the behest of Revision-Cum-Costing Board of VRDE in February 1999 and Principal Controller of Defence Accounts (PCDA) R&D in 2007 respectively. As a consequence, the rates of 1999 and 2005 were applied for four years resulting in loss of revenue due to non-revision of rates biennially as stipulated by DDR&D instructions of 1993.

**B: Inconsistency in factors considered for fixation of rates of hiring and testing charges**

- (i) The hourly cost of utilisation of the machines was required to be worked out taking into account the cost of machines/equipment/facilities along with cost of infrastructure, lands, buildings including its maintenance cost and a certain percentage added to the cost so arrived. It was however seen in audit that the land cost was considered for working out the revised rates for the first time by the Board of March 2003 and was worked out as ₹51crore, proposed to be recovered in 100 years *i.e.*, at the rate of ₹ 0.51 crore per annum. Not taking into account this element by the earlier Boards resulted in under fixation of hiring and testing charges.
- (ii) The rates of hiring/testing facilities were required to be revised by Revision-Cum-Costing Boards once in two years. Hence, manpower cost for two years needed to be taken into account while fixing the rates. We, however, observed that manpower cost for one year only was taken into account by every Board while fixing the rates resulting in under fixation of hiring and testing charges.
- (iii) The Revision-Cum-Costing Board of December 2008 worked out the cost of hiring of various tracks and testing of automobiles by considering the overheads cost at 15 *per cent* instead of 150 *per cent* overheads stipulated in the DDR&D letter of January 1993 for resource generation. Further, eight *per cent* Incidental and Miscellaneous expenses and 10 *per cent* profit were considered for working out the charges, as against, manpower cost plus 150 *per cent* overheads, 25 *per cent* overheads on manpower, material & facilities, 15 *per cent* Incidental & Miscellaneous (I&M), profit 12.5 *per cent* and five *per cent* infrastructure cost considered by the earlier Boards. The justification for adopting different percentages and elements while working out the hiring/testing charges by the various Boards were not recorded in the respective Board Proceedings.
- (iv) As per Para 5.4 of DDR&D letter of January 1993, while quoting the rental cost to the outside agencies, the market cost would also be taken into account and the profit element would be adjusted in the manner that the basic cost and the profit element does not go beyond the on-going market cost of hiring similar facilities or what market can bear. The Board



of December 2008 also opined that the testing charges at NCAT should be comparable to the charges of similar tests conducted by other testing agencies like Automotive Research Association of India (ARAI) and Central Institute of Road Transport (CIRT). However we observed that though the competitor's charges in respect of nine tracks<sup>96</sup> only were available with the Board, but the Board proposed reduction of hiring charges *vis-a-vis* existing charges in respect of 15<sup>97</sup> of the 25 Facilities/Tracks<sup>98</sup> and 11<sup>99</sup> of the 26 Instruments<sup>100</sup>. Moreover the rates recommended by the Board of 2008, were in some cases<sup>101</sup> more than the competitor's rates and in some cases<sup>102</sup> less than the competitor's/market rates. The revised rates were made applicable by VRDE with effect from 1 July 2009. As a consequence of this adhocism in fixation of rates by the Board of 2008, the unjustified reduction in charges in respect of the tracks and Instruments *vis-a-vis* existing charges resulted in less recovery of ₹ 3.21crore during the period July 2009 to June 2011.

No reply was furnished (January 2014) by VRDE in respect of our comment regarding not taking into account the manpower cost of two years while fixing the charges applicable for two years and non-inclusion of cost of land by the Boards held prior to Board of March 2003. However with reference to non-adherence of periodicity in holding Boards for revision of rates, Director, VRDE stated that the periodicity of convening the Boards was in accordance with the suggestions of the previous Boards/PCDA. From 2009 onwards the periodicity had been strictly followed.

<sup>96</sup>(1) High Speed Track (2) Straight Track (3) Steering Pad (4) Gradient track (5) Serpentine 2 wheeler (6) Serpentine 4 wheeler (7) Cross county track (8) Deep wading trough (9) Durability circuit

<sup>97</sup> (1) High Speed Track (2) Straight track (3) Belgian Track (4) Steering Pad (5) Gradient track (6) Serpentine 4 wheeler (7) Corrugated 50 mm (8) Long Wave pitching (9) Pot hole track (10) Mud track (11) Sand track (12) Shallow water trough (13) Durability circuit (14) 100t weigh M/C (15) OATS for EMI test

<sup>98</sup> 25 Facilities /Tracks –(1) High Speed Track (2) Straight Track (3) Belgian Track (4) Steering Pad (5) Gradient track (6) Serpentine 2 wheeler (7) Serpentine 4 wheeler (8) Corrugated 50 mm (9) Corrugated 100 mm (10) Long Wave pitching (11) Cross Country Track (12) Pot hole track (13) Mud track (14) Sand track (15) Shallow water trough (16) Deep Wading trough (17) Dust tunnel (18) Durability circuit (19) 100t weigh M/C (20) 30t weigh M/C (21) Anchor block (22) Crane (23) Tilting Platform (24) OATS for EMI test (25) Inspection area.

<sup>99</sup> 1) Correvit L Digital 2) Sound Level meter 3) Articulation Test Rig 4) Graphtech Meter 5) Correvit H Sensor-4 6) FFT Analyser 7) Datron EEP-2 8) Correvitvq Sensor 9) Datron Steering Wheel 10) Ride quality meter 11) Corryss DAS IA

<sup>100</sup> Instruments-(1) Correvit L Digital (2) Sound Level meter (3) Engine Tachometer (4) Articulation Test Rig (5) Steering Torque Meter (6) Graphtech Meter (7) Correvit H Sensor-4 (8) Vibration Meter (9) Human Res Vib Meter (10) Temperature Meter (11) Digital Barometer (12) Hygrometer (13) FFT Analyser (14) Datron EEP-2 (15) Datron Rolenth (16) Datron WPT (17) Datron Break Switch (18) Correvitvq Sensor (19) Datron Steering Wheel (20) Break Pedal force (21) PLU fuel Transducer (22) Ride quality meter (23) Corryss DAS IA (24) Accelerometer (25) Anemometer (26) Pressure Calibrator.

<sup>101</sup> 1) Cross Country Track 2) Deep Wading Trough 3) Measurement of interior noise for N2, N3 and M2 category 4) Measurement of interior noise for M3 category

<sup>102</sup> (1) Steering Pad (2) Serpentine 4 Wheeler (3) Mass Emission test on 4 Wheeler Chassis Dynamometer (4) Dimensional check-ups (5) EMI measurement for type approval as per AIS -004.

The reply is not acceptable since, as per Para 5.3 of DDR&D letter dated 01 January 1993 the rates were to be revised every two years. As such neither the Boards nor the PCDA were empowered to recommend revision of rates after four years.

### **Conclusion**

Comments were made in Paragraph 7.4 of the Report of the C&AG of India, No.24 of 2011-12 on 'Project Management in Armament Research and Development Establishment (ARDE)' and Paragraph 7.8 of the Report of the C&AG of India, No.16 of 2012-13 on 'Project Management in Research and Development Establishment (Engineers) (R&DE(E)) regarding certain systemic failures in management of projects by the respective labs. In response the Ministry in the ATNs (November 2012 and October 2013) had stated that DRDO HQ had drawn guidelines for undertaking new projects, monitoring and closure of projects after their successful completion. Ministry further assured that various remedial measures including more periodic reviews with user and implementation of effective Integrated Management System for compliance of guidelines would be undertaken. We however observed that lapses similar to those reported earlier persisted in VRDE and CVRDE also.

The Staff projects taken up by VRDE/CVRDE for delivery of products required by the Defence Forces witnessed very low rates of success in induction of systems into the services. Many of these failed mainly because of taking up projects before firming up of requirement by the user, failure to develop the desired deliverables, imposition of ban on foreign vendor and mismanagement in the post development activities. Time and cost overruns were significantly high in majority of the projects, which is an indication of underestimation of cost and time or overestimation of capabilities.

The main reason for the technologies developed under R&D/TD Projects not leading to their exploitation in Staff projects was lack of proper assessment of the user requirement.

Non-maintenance of any data regarding the Scientists and Technical Officers deployed on various projects by the lab and their output in terms of success or failure of the projects may, in the long run, result in failure to tap the expertise built up in the earlier projects or repeating the same mistake of deploying the same Scientists/Technical Officers who could not contribute much in the field of activities in which they were deployed earlier. Non booking of pay and allowances of the manpower deployed on project activities, even though significant, has resulted in understating the project costs.

Inconsistency in factors considered for fixation of rates of hiring and testing charges by VRDE for arriving at rates chargeable from private firms/companies for utilisation of the facilities at NCAT, even after passage of more than three decades since establishment of NCAT and utilisation of the

same by private firms as well, has resulted in under recovery of hiring and testing charges.

### **Recommendations**

- *DRDO may consider pro-active focus of their activities on user oriented Staff Projects in terms of overall expenditure and efforts.*
- *To enhance the results of Staff projects, close and formal joint monitoring by the user and DRDO since its inception to the closure is indispensable to avoid mismatch between the GSQR and technological capabilities. A suitable mechanism should be evolved to correctly reflect the user's assessment of the system developed in the closure report.*
- *High value R&D and TD projects need to be undertaken after due consultation with the users to appropriately assess user requirement, so that technologies developed under these projects by the DRDO lead to Staff Projects in three to five years.*
- *DRDO may consider developing database on scientist-wise task and contribution associated with each of the projects which may serve as an institutional memory and enhance transparency and accountability.*
- *A suitable method of apportioning manpower cost may be devised for computation of the cost of the Project.*

## CHAPTER VII: GRANT-IN-AID SCHEME OF DEFENCE RESEARCH AND DEVELOPMENT ORGANISATION

### 7. Defence Grants-in-Aid Scheme of Defence Research and Development Organization

The performance of the Grants-in-Aid Scheme introduced in 1969 in DRDO to utilise the indigenously available research talent preferably in areas of interest to Defence was far from satisfactory. There were critical shortfalls in the management and monitoring of the Scheme such as improper budgeting process, awarding the project without arriving at viable and specific research objectives and not defining the quantitative and qualitative targets to be attained, there being no evidence to suggest that all the proposals received through online application were duly considered and properly evaluated to ensure fair competition and selection of best possible proposals. The project closure reports were not being called for by DRDO in majority of cases. DRDO did not ask the Grantee institutions to necessarily deposit the grants received under the Scheme in Savings Bank Account to ensure accrual of interest and to appropriately account for the refund of unspent balances, thus depriving the Government of accrual of such benefits. Though the equipment purchased out of the grants was the property of DRDO, their disposal, however, was left at the discretion of the Grantee institutions in the manner desired.

#### 7.1 Introduction

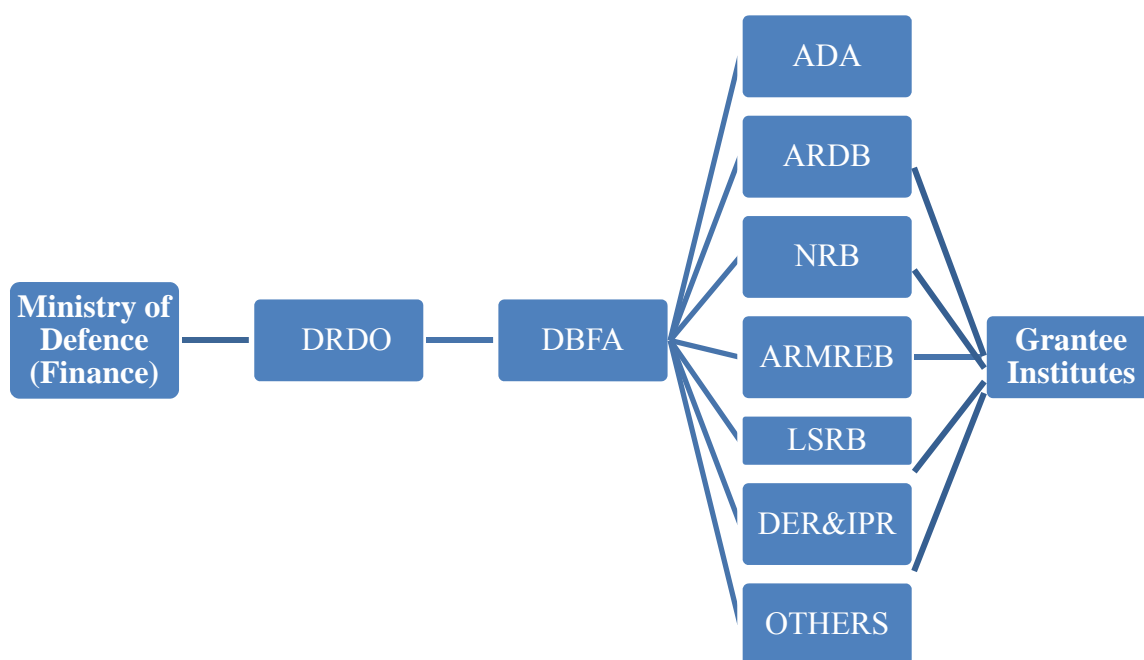
##### 7.1.1 Scheme

Defence Research and Development Organization (DRDO) works under the Department of Defence Research and Development, Ministry of Defence (Ministry). The Ministry of Defence has instituted a "Defence Grant-in-Aid" Scheme (Scheme) in April 1969 so as to utilize the indigenously available research talent and facilities in IITs, Universities, Higher Technological Institute, Engineering colleges, Service Training Schools for undertaking research and development work on problems of scientific value and preferably in areas of interests to Defence. Under this scheme, grants are offered to scientists of standing attached to an approved research institution, university or college, department or laboratory attached to a reputed industrial firm.

Under the Scheme, DRDO receives funds from Ministry and disburses the same to seven agencies/disciplines/research boards/directorate which are

Aeronautical Development Agency (ADA)<sup>103</sup>, Bangalore, Aeronautics Research and Development Board (AR&DB), Naval Research Board (NRB), Armament Research Board (ARMREB), Life Sciences Research Board (LSRB), Directorate of Extramural Research and Intellectual Property Rights (DER&IPR) and 'Others'<sup>104</sup>. The budget is allotted by Ministry of Defence (Finance) to Directorate of Budget Finance and Accounts (DBFA), a directorate of DRDO, who in turn sub-allots it to the Research Boards (RBs) and DER&IPR, which is further allotted to Grantee Institutes. The same is depicted in the flowchart given below:

### **DEFENCE GRANTS-IN-AID SCHEME OF DRDO**



#### **7.1.2 Research Boards /Directorate of ER&IPR**

The Ministry of Defence has constituted four Research Boards namely AR&DB (1971), NRB (1996), ARMREB (1997) and LSRB (1998) to cover the different focus areas under the respective disciplines and allowed the RBs

<sup>103</sup>ADA, Department of Defence R&D, Ministry of Defence headed by SA to RM is the nodal agency for the design & development of Light Combat Aircraft.

<sup>104</sup>Bharathiar University, Coimbatore, National Aerospace Laboratories Bangalore and Defence Institute of Advanced Technology (Deemed University), Pune

(a) The Bharathiar University was established at Coimbatore by the Government of Tamil Nadu in February, 1982 under the provision of the Bharathiar University Act, 1981 (Act 1 of 1982). Its mission includes contribution to the advancement to knowledge through applied research leading to newer products and process.

(b) CSIR-NAL mandate is to develop aerospace technologies with strong science content, design and build small and medium –sized civil aircraft, and support all national aerospace programmes.

(c) The Defence Institute of Advanced Technology, previously called Institute of Armament Technology, is a Deemed University specializing in Armament Technologies and is located in Girinagar near Pune.

to formulate their own rules. The four Research Boards<sup>105</sup> process the project proposals, release the funds and are required to monitor the progress of the projects as per their Rules and Guidelines.

DER&IPR<sup>106</sup> was created in May 2000 and is responsible for technology development through basic and applied research in academic / research Institutions in relevant technologies, in general for the Nation and Defence technologies in particular, in tune with current research and development programmes in the world scenario through institutions outside the boundaries of DRDO, keeping in view the future growth.

### 7.1.3 Projects sanctioned by the RBs/DER&IPR

The details of projects sanctioned by the Research Boards and DER&IPR during the period from 2008-09 to 2012-13 along with the money value are given in Table 14 below:

**Table-14: Details of Projects sanctioned during 2008-09 to 2012-13**

(₹ in crore)

Name of the RB/Dte.	Total Projects	Total Value Sanctioned	No. of Projects less than ₹20 Lakh	Value	No. Of Projects between ₹ 20-40 lakh	Value	No. Of projects above ₹ 40 lakh	Value
<b>AR &amp; DB</b>	235	59.32	171	22.30	40	10.97	24	26.05
<b>NRB</b>	155	49.04	37	5.27	78	22.20	40	21.58
<b>ARMREB</b>	58	13.88	34	4.06	20	5.34	4	4.48
<b>LSRB</b>	107	25.58	43	6.09	53	14.14	11	5.35
<b>DER &amp; IPR</b>	420	260.85	223	28.68	115	33.64	82	198.52
<b>TOTAL</b>	<b>975</b>	<b>408.67</b>	<b>508</b>	<b>66.40</b>	<b>306</b>	<b>86.29</b>	<b>161</b>	<b>255.98</b>

Source: The details furnished by DRDO

### 7.1.4 Audit Objectives

The Audit of Defence Grants-in-Aid Projects covering the period 2008-09 to 2012-13 was carried out at DRDO Headquarters, New Delhi with a view to seek assurance that:

<sup>105</sup> AR&DB is chaired by Scientific Advisor to Raksha Mantri (SA to RM) and also includes Defence Secretary, Secretary, Defence Production, DG R&D (Aeronautical Systems) and Chief Controller Research & Development (Technology Management) {CCR&D(TM)} amongst its various members. While the other three Research Boards shall be chaired by a distinguished research scientist/manager, or an eminent person with relevant experience, not currently in DRDO and include DG and CCR&D relating to their assigned discipline.

<sup>106</sup> Grants-in-Aid scheme for funding Extramural research at academic Institutions and Research centres began well before the inception of DRDO. Upon the creation of the DRDO on 1 January 1958, the Extramural Research (ER) activities started performing under the aegis of the erstwhile Directorate of Training and Sponsored Research (DTSR). The relevance of IPR on the outcome of the Science & Technology projects under ER to various DRDO projects led to creation of separate Directorate of ER & IPR on 01 May, 2000.

- Proper procedure is being followed by Research Boards for awarding the projects to the institutions, including selection of Principal Investigators (PIs), in accordance with the framework prescribed in Government orders;
- There existed a sound financial management system conforming to General Financial Rules and internal regulations framed for managing the Scheme;
- Projects achieve intended results in the timeline prescribed;
- The progress of the projects is properly monitored by the specialist panels formed by the Research Boards.

### 7.1.5 Scope of Audit

Of the seven agencies/disciplines/research boards/directorate covered by the Defence Grants-in-Aid scheme of DRDO, four Research Boards *viz.* AR&DB, NRB, ARMREB and LSRB and one Directorate *viz.* DER&IPR of DRDO were covered under the scope of this audit. The data on Defence Grants-in-Aid projects sanctioned by RBs / DER&IPR during the period 2008-09 to 2012-13 was analysed and 299<sup>107</sup> projects were examined by audit, which includes 186 completed<sup>108</sup> projects.

### 7.1.6 Audit Methodology

The Audit of Defence Grants-in-Aid commenced with an entry conference held with the Chief Controller Research & Development (Resource & Management) {CCR&D (RM)} on 06<sup>th</sup> August 2013 at the DRDO Headquarters. The data on Defence Grants-in-Aid projects awarded to various Universities / Institutes / Organizations during the period 2008-09 to 2012-13 was analysed. Replies to the audit observation issued in the course of audit have been taken into account while finalising this audit para. The draft para was issued to Scientific Advisor to RM in July 2014. The Exit Conference was held on 25<sup>th</sup> September 2014 with CCR&D (RM) and CCR&D (Technology Management) wherein important audit findings were discussed.

## 7.2 Audit findings

### 7.2.1 Defence Grants-in-Aid governing rules

The Defence Grants-in-Aid Scheme is governed by General Financial Rules, 2005 (GFR) issued by Ministry of Finance, Government of India. The

<sup>107</sup> All the projects valuing over ₹ 40 lakh, 25 per cent of the completed projects costing between ₹ 20 lakh and ₹ 40 lakh and 10 per cent of the completed projects costing below ₹ 20 lakh were sampled for audit. The overall coverage included 299 projects with sanctioned value of ₹ 338.62crore, out of which 186 were completed projects with sanctioned value of ₹ 109.24crore.

<sup>108</sup> Audit has taken the completed projects where PDC was expired.



Ministry of Defence issued Rules for Defence Grants-in-Aid Scheme in April 1969. In addition to these rules, the RBs, also framed Rules for Defence Grants-in-Aid Scheme in terms of Ministry's sanction for creation of these Boards. Audit observed that each RB formulated its own set of rules which were not approved by the Ministry and were at variance on the issues of overhead charges, date of commencement of project after sanction, time schedule for submission of project closure report, database of project proposal received, specialist panels *etc.* as shown in the **Annexure-VI**.

The DER & IPR was following the Defence Grants-in-Aid Rules, laid down by the Ministry in April 1969, which were modified from time to time with corrigenda upto 31 March 1999. However, approval of the Ministry on these modifications was not made available to audit. The procedure followed by the Directorate is different as they do not have a Research Board to evaluate the project proposals. The proposals are sent to the respective DRDO laboratories for evaluation.

During exit conference in September 2014 the Chief Controller Research & Development (Technology Management) stated that the audit requirement of taking Ministry's approval was noted for compliance. It was also assured that a common Standing Operating Procedure (SOP) would be devised and the procedure be refined with the approval of competent authority.

### **RBs/DER&IPR Rules and project sanction letters not in conformity with GFR**

The broad guidelines on principles and procedure were enumerated in GFR with the stipulation that the Ministry or Department concerned should lay down the rules or pattern of assistance under the rules. Contrary to this, the RBs rules and project sanction letters were at variance with guidelines of GFR and RBs were not even following their own formulated rules as discussed in the following instances:

- (i) As per Rule 215(3) (1) of GFR, apart from the requirement of submission of technical and financial reports on completion of the project or scheme, a stipulation should be made in such cases that the ownership in the physical and intellectual assets created or acquired out of such funds shall vest in the sponsor, whereas the grants sanctioning letters of RBs and DER & IPR stipulate that the same would vest with the Grantee Institution (GI).
- (ii) As per Rule 211 of GFR, the accounts of GIs shall be open for audit, by the C&AG, internal audit by the Principal Accounts Office of the Ministry or Department and Chartered Accountants of its own choice. However, as per rules of RBs and Defence Grants-in-Aid scheme, all accounts maintained by the GI would be subject to audit by their

respective auditors and on termination of the project accounts for the entire project/scheme duly audited by the auditors shall be submitted.

In order to achieve tangible results and smooth implementation of scheme in a fair and transparent manner, DRDO should frame rules strictly as per GFR.

### 7.2.2 Budget formulation

The Research Boards and DER & IPR formulate/forecast the budget and project it to the Directorate of Budget, Finance and Accounts (DBFA) under DRDO for allotment of funds. The DBFA consolidates the budget requirements of the Research Boards and DER & IPR and projects it to the Ministry. The Ministry allots the budget to DBFA, which is further allotted to the Research Boards and DER & IPR.

The overall year-wise budget allotment and expenditure under the Defence Grants-in-Aid scheme in respect of all the Research Boards and DER&IPR for the years 2008-09 to 2012-13 is as shown in **Annexure-VII**.

Audit observed fluctuating trend in allocation of budget over the five years (2008-09 to 2012-13) varying from ₹ 7.00 crore (2011-12) to ₹ 2.94 crore (2012-2013) for LSRB. Similarly, NRB budget fluctuated between ₹ 3.90 crore (2010-11) and ₹ 11.00 crore (2011-12).

On being pointed out in Audit (April 2014), DRDO (May 2014) stated that the budget demand is on the basis of cash outgo of committed liability and cash outgo for commitments to be entered and the money is released by the DBFA to RBs and DER&IPR on the basis of demand and expenditure pattern of previous year.

The reply is not tenable as during budget formulation the details of committed liabilities and the projects to be undertaken are not reflected. Further, unusual increase/decrease over previous year's budget also shows unrealistic preparation of budget.

However, during exit conference DRDO assured that in future the budgeting procedure would be reviewed and adequate planning would be done to forecast budget for the potential research activities.

In view of inconsistencies observed in audit and to promote sound budgeting process, all Research Boards/DER&IPR should formulate Budget Estimates to project their requirement of funds keeping in view the past trends of expenditure, on-going activities and projects to be undertaken. Proper budgeting and funds flow management ought to be done by DBFA.

### 7.2.3 Selection and sanctioning of projects

The Boards of all the disciplines are assisted by a number of specialist panels duly constituted by the Chairman of Board. Apart from DRDO's representatives, the specialist panels of NRB, AR&DB and ARMREB also have members from IITs, *etc.*, while those of LSRB, have members from Bhabha Atomic Research Centre (**BARC**), Indian Council of Medical Research (**ICMR**), Indian Council of Agricultural Research (**ICAR**), All India Institute of Medical Sciences (**AIIMS**), Shri Ramaswamy Memorial (**SRM**) University *etc.*

Rules 209(3) of GFR provides that award of grants should be considered only on the basis of viable and specific schemes drawn up in sufficient detail by the Institution or Organisation. The budget for such schemes should disclose, *inter alia*, the specific quantified and qualitative targets likely to be attained against the outlay.

As per extant procedure followed by the Research Boards, they notify the thrust areas through DRDO website and no viable and specific schemes were drawn up in sufficient details as required under GFR. The institutes submit their proposal to the Research Boards, which is deliberated upon by the members of the specialist panel of the respective Research Boards. The panel members analyse the proposals keeping in view the relevance to their field of research and give their recommendations, for further sanction of the projects by the Competent Financial Authority<sup>109</sup> (CFA).

The procedure followed by the DER&IPR is different as they do not have a Research Board to evaluate the project proposals. The proposals are either voluntarily submitted or the Principal Investigator (PI) is requested to submit proposals based on the DRDO's labs requirement to DER&IPR. Only those project proposals which are in the field of the thrust areas<sup>110</sup> are selected and sent to the DRDO laboratories working in that field. Experts in the lab evaluate both technical and financial aspects and forward their recommendations, for further sanction of the projects by the CFA at DRDO HQ.

Audit scrutiny revealed that the RBs and DER&IPR had only notified the broad thrust areas on DRDO website instead of specific areas of research. Other than online notification, no formal Expression of Interest is invited by RBs and DER&IPR from prospective institutes for obtaining proposals. The

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<sup>109</sup>The competent financial authority is decided with reference to the delegation of financial powers within which the project cost/value falls.

<sup>110</sup>The thrust areas of the DER&IPR are Low Observable Technologies, Gallium Nitride Devices, Silicon Carbide based Technology, Technologies for Soldier support, Nanotechnology, Tera Hertz, Sensors, Laser, Functional materials, Solar Energy, Multiband Conformal Antennas, Gas turbine Technologies, Hypersonics, Nanophotonics, High Energy Materials, High Power Microwave, Network Centric Operations, Micro-Electro-Mechanical System, High Efficiency Aerodynamics and Active Protection System for Armoured Fighting Vehicles.

system of analyzing the project proposals is not satisfactory as except in LSRB, we did not find the database such as details of project proposals received and the Panel's recommendations for selection or rejection of the proposals and in turn intimation to disqualified institute with the reasons for rejection of the proposals by other three RBs and DER & IPR. This is especially significant given the fact that 37 out of 117 institutions to whom 299 projects were awarded belong to private organizations.

In the exit conference it was assured that the data base for project proposals received, reasons for acceptance/rejection by the Specialist Panel would be maintained by all RBs and DER&IPR.

In order to promote transparency and audit trail of the selection procedure, DRDO must maintain a database for the all project proposals received, selected, rejected and their comparative evaluation in order to vividly demonstrate that competition was fair and best grants-in-aid proposals were selected.

#### 7.2.4 Time overrun

The Grants-in-Aid projects are normally undertaken with probable date of completion (PDC) ranging from two to five years. Rules framed by RBs and Defence Grants-in-Aid scheme provide that continuation of the projects beyond the original period will be permitted only under exceptional circumstances after due evaluation of the work done and due justification. Thus, the extension is required to be granted in cases where the circumstances leading to extension of time are beyond the control of the Grantee Institution (GI).

However, audit analysis in July 2014 found that on request of Principal Investigator (PI), the extensions were granted in a routine manner. The position of delayed cases is shown in Table-15 below:

**Table-15: Delay in completion of Projects**

Dte / Board	No. of Completed Projects Examined	Delayed Projects	Percentage of delayed projects	Period of Delay		
				Up to 6 months	6 to 12 month	More than 12 months
AR&DB	31	24	77.42	6	11	7
NRB	59	47	79.66	18	18	11
ARMREB	13	8	61.54	6	2	0
LSRB	42	20	47.62	8	11	1
DER&IPR	41	22	53.66	13	7	2
<b>TOTAL</b>	<b>186</b>	<b>121</b>	<b>65.05</b>	<b>51</b>	<b>49</b>	<b>21</b>

*Source: Details obtained from the Project files of the RBs/DER&IPR.*

Out of 186 completed projects examined, in 121 projects (65 per cent) the time schedule was not adhered to. Out of 121 delayed projects the reasons were analyzed in 36 projects and observed that

- 25 projects were delayed due to internal reasons for both DRDO and GIs as some key experiments could not be conducted due to delay in release of funds/completion of publication work/report writing, etc., which was clearly avoidable.
- 07 projects were delayed due to reasons beyond the control of grantee institutions, such as delay in getting equipment/delay in supply of specific items required for experimentation/accomplishing the enhanced scope of work by the monitoring committee, etc.
- In 04 cases no reasons were given by the PIs for the extension/delay.

While admitting the time overrun, DRDO in its reply stated that internet based software for timely submission of progress report, faster correspondence and monitoring of the project status is being developed.

The audit analysis found that in majority of cases delay was attributed to various internal reasons, which were clearly avoidable and extensions were given by RBs and DER&IPR in a routine manner, without seeking reasons on the request of Principal Investigator.

### 7.2.5 Cost overrun

Efficacy of project management is measured by the delivery of project output within the given time frame and cost. A scrutiny in November 2013 of 186 completed projects revealed that 52 projects (28 per cent) suffered cost escalation amounting to ₹ 1.27 crore as shown in Table 16 below:

**Table-16 : Details of Cost Overrun in completed projects**

Dte / Board	No. of Completed Projects Examined	Cost Overrun Projects	Percentage of Cost overrun cases in projects examined	Amount (₹ in Lakh)
AR&DB	31	4	12.90	12.40
NRB	59	14	23.73	36.22
ARMREB	13	1	7.69	2.09
LSRB	42	20	47.62	51.48
DER&IPR	41	13	31.71	24.63
<b>TOTAL</b>	<b>186</b>	<b>52</b>	<b>27.96</b>	<b>126.82</b>

*Source: Data/ information derived from project files and the details furnished by DRDO*

A detailed analysis of 33 cases out of 52, revealed during extended period the salary paid to the research staff and revision in salary coupled with cost of consumables/ chemicals/equipment caused upward revision in cost of the projects.

DRDO replied that the cost overrun is attributed to challenges relating to experiments and getting Junior Research Fellow/Senior Research Fellow.

The reply furnished is not tenable as their rules clearly stipulate that the Grantee Institution would be responsible for recruitment of Research Staff and considerable time is available with the institute once a project is recommended by the respective RBs/DER&IPR. Further, it is the responsibility of the RBs and DER&IPR to check the capability of the Grantee Institutes while sanctioning the project and to give sufficient time to them for getting Junior Research Fellow/Senior Research Fellow.

In the interest of timely completion of projects, DRDO should ensure that monitoring by Research Boards is made more stringent and effective to ensure adherence to laid down procedures and criteria of cost, time and deliverables. Exceptions to norms should be made only in rare unavoidable circumstances.

#### **7.2.6 Non-reflection of interest earned on the Grants in Annual Accounts of Projects**

As per the conditions enumerated in the Research Board's letter sanctioning the grants to the Grantee Institute (GI), the amount of grant is to be expended over a period of time and till such time the amount so received would be kept in a separate bank account of the Grantee institution and interest earned thereupon, if any, would accrue to the Research Boards. The DER&IPR is, however, not including similar clause or condition in its grant sanctioning letter.

The details relating to interest accrued or earned by the Grantee institutions and its reflection in their annual accounts is given in Table-17 below:

**Table-17 : Details of interest accrued/ earned by the grantee institutions and its reflection in their annual accounts**

Dte / Board	No. of Projects Examined	Savings Bank Account			No. of Projects in which grants were deposited in Current Bank Account	No. of Projects in which no information furnished	Percentage of projects wherein interest earned / accrued not shown
		Interest Reflected	Amount of Interest reflected (₹ in lakh)	Interest not reflected			
AR&DB	52	4	22.05	-	-	48	-
NRB	88	23	18.67	35	30	-	60.34
ARMREB	15	-	-	-	-	15	-
LSRB	46	2	1.00	5	39	-	71.43
<b>DER&amp;IPR</b>	<b>98</b>	<b>18</b>	<b>33.32</b>	<b>-</b>	<b>-</b>	<b>80</b>	<b>-</b>
<b>TOTAL</b>	<b>299</b>	<b>47</b>	<b>75.04</b>	<b>40</b>	<b>69</b>	<b>143</b>	<b>61.54</b>

*Source: Data/information derived from project files and the details furnished by DRDO*

Audit scrutiny in November 2013 revealed that:

- There is ambiguity in the RBs rules/sanction letter for not showing the types of accounts where the money would be kept with the result that in 87 (47+40) projects (29 per cent) the grant was being deposited in Savings Bank Account (SBA) by the GIs and an interest of ₹ 75.04 lakh earned was reflected in the respective annual accounts of the GIs whereas in 40 projects, the interest accrued was not even reflected in the annual accounts.
- In 69 projects (23 per cent), the grant was being deposited in Current Bank Account (CBA) by the GIs and, hence, opportunity to earn interest was missed as the sanction letter did not disclose as to which bank account the amount of grants should be deposited.
- In respect of remaining 143 projects (48 per cent), the details relating to interest accrued/earned on the grants made under the scheme, type of bank account maintained by the GIs and reflection of interest earned on the grants in the annual accounts by the GIs were not made available to Audit.

On pointing out in audit, the DER&IPR replied that only those projects where the institute maintained a CBA, the interest was not reflected and that the point had been noted for future. The AR&DB, ARMREB and NRB all stated that a letter was being written to all the GIs for implementation/compliance of the audit observation. The LSRB stated that it is regularly insisting the institutes through sanction letters to operate the grant through a separate saving bank account where some institutes are complying and some are still not, probably due to strictly following of their own policy and is still insisting the same while sanctioning the new projects. However, the reply was not corroborated by its grant sanctioning letters issued during the period covered in audit.

Contrary to the above, DRDO in September 2014 further stated that IITs and some Institutions follow their own rules and deposit the grants in CBA. Further, DER&IPR has been subtracting the interest amount during subsequent release of funds.

The reply is not tenable as DRDO did not consider it necessary to instruct its RBs and DER&IPR to include the clause in the sanction letter itself to keep the amount in a saving bank account for proper accrual of interest. Further, since the grants are being given by the RBs and DER&IPR, the contention that the GIs are following their own rules is not agreed to.

Considering the different practices being followed, the RB's and DER&IPR Rules should specifically mention about opening of separate Savings Bank Account by the GIs and reflection of interest earned on the Grants-in-Aid account for proper accountal.



### 7.2.7 Improper system of Certification of Accounts

As per Rule 211(1) of GFR, the accounts of GIs shall be open for audit, both by the C&AG and internal audit by the Principal Accounts Office of the Ministry or Department. However, as per rules of RBs and Defence Grants-in-Aid scheme, all accounts maintained by the GIs would be subject to audit by their respective auditors. On termination of the project accounts for the entire project/scheme duly audited by the auditors shall be submitted.

Audit analysis disclosed that the GIs had got their accounts audited through their internal financial wings/accounts officers in 118 cases out of 186 completed projects. In the absence of audited accounts through Chartered Accountant (CA) or an external auditor, the assurance of fair certification of accounts is not established.

**Table-18 : Details of submission of audited/unaudited accounts**

Dte / Board	No. of completed Projects examined	Total amount of sanction (₹in crore)	No. of Projects in which accounts were audited by CA / external auditor	No. of Projects in which accounts certified by internal financial wing of GI	Percentage of accounts certified by internal financial wing
AR&DB	31	14.09	4	27	87.10
NRB	59	21.78	28	31	52.54
ARMREB	13	3.56	7	6	46.15
LSRB	42	13.30	14	28	66.67
DER&IPR	41	56.51	15	26	63.41
<b>TOTAL</b>	<b>186</b>	<b>109.24</b>	<b>68</b>	<b>118</b>	<b>63.44</b>

*Source: Data/ information derived from project files and the details furnished by DRDO*

In reply DRDO stated that though audited accounts are received from all the grantee institutions but submission of audited accounts are delayed due to audit of the institutions.

The reply is not tenable because the RBs' rules are also not in line with Rule 211(3) of GFR provisions for getting the accounts audited by an external auditor/CA. In the absence of which fair reflection of accounts maintained for public money is not established.

In order to enforce financial discipline, through external and independent audit, DRDO should ensure to keep in place stringent rules for certification of accounts by appropriate authority.

### 7.2.8 Delayed and incomplete Project Closure Reports

As per the Rules for Defence Grants-in-Aid scheme/the grant sanctioning letter; on completion / closure of the project a consolidated closure report will be submitted within 60 days in respect of AR&DB, ARMREB and DER&IPR and within 90 days in respect of LSRB and NRB with all necessary certificates and financial information. The closure report should give/entail complete/sufficient technical details of the project, software activity, final statement of accounts, list of equipment purchased under the project, request for retention of the equipment, information about refund of/Demand Draft in respect of the unutilized funds, achievements in relation to the originally stated objectives of the project and utilisation of results.

Despite the above provisions, we observed that Project Closure Reports were not being submitted by the PIs within the stipulated period as shown in Table-19 below:

**Table-19 : Details of delay in submission of Project Closure Reports**

Dte / Board	No. of completed projects	No. of projects where closure reports were submitted within the prescribed time limit	No. of Projects where Closure Reports were not furnished at all by PI	No. of Projects involving delay in furnishing of Project Closure Report	Range of delay		
					Less than 6 months	6months to less than 12 months	12 months or more
AR&DB	31	05	12	14	8	8	10
NRB	59	08	21	30	15	13	23
ARMREB	13	04	0	09	05	03	01
LSRB	42	09	7	26	15	10	08
DER&IPR	41	06	17	18	21	05	09
<b>TOTAL</b>	<b>186</b>	<b>32</b>	<b>57</b>	<b>97</b>	<b>64</b>	<b>39</b>	<b>51</b>
			<b>154</b>		<b>154</b>		

*Source: Data/ information derived from project files and the details furnished by DRDO*

Audit scrutiny in December 2013 revealed that:

- In 57 out of 186 completed projects (31 per cent) examined, the closure reports were not furnished by the PIs despite lapse of a period of over 12 months from expiry of the PDC. However in one project which was sanctioned in October 2007 and was to be completed by October 2009, GI did not furnish the closure report even after a lapse of five years (September 2014).

- In 97 out of 186 projects (52 per cent) the closure reports were furnished with delays ranging up to six months to over 12 months.
- In the absence of closure report or delay in the submission of progress reports, achievements in relation to the originally stated objectives of the project and effective utilisation of funds could not be ensured.
- In addition to delay in submission of Project Closure Report, GIs have submitted incomplete closure reports as in 73 cases, the inventory details were not submitted and in 85 cases, the details of unspent amount were not furnished.

While admitting the facts, DRDO in its reply stated that GIs had been requested to submit project closure reports by repeated reminders.

The reply furnished is general as action should have been taken to debar the institutes/universities from further Grants-in-Aid because closure report is a vital document which brings out research carried out and objectives achieved, in absence of which outcome of project could not be measured. Further, the disposal of equipments, refund of unspent balance and finalisation of accounts remains pending for want of project closure report.

In view of the stated significance, the RBs/DER&IPR should monitor to ensure timely submission of project closure report by the GIs.

### **7.2.9 Non-refund of unspent balance**

As per the conditions enumerated in the Research Board's letter sanctioning the grants to the Grantee Institute (GI), the unspent balance, on completion of the project should be refunded by the GI. Further, as per the DER&IPR grant sanctioning letters, moneys remaining with the GIs at the close of the project shall be returned to DRDO.

Audit observed in December 2013 that only in 72 of the 186 completed projects (39 per cent), the GIs had refunded the unspent balance of ₹ 1.64 crore after completion of the projects. In respect of the 85 cases (45.7 per cent), the details of unspent amount were not available with DBFA/DRDO. It is the duty of the GIs to furnish the annual accounts every year and final accounts at closure of the projects but DRDO/DBFA have failed to enforce this provision leading to continuation of unspent balances with GIs.

DRDO in their reply stated that the grantee institutes refund the balance amount after completion of projects. However, in some cases the same is inordinately delayed.

The reply is not specific and only general comments have been offered as the concerned RBs/DER&IPR are responsible for ensuring that the unspent

balance, if any, on the completion of project is refunded within a specified time and deposited in the Government account.

In order to safeguard Government interest, it is recommended that the DBFA, RBs and DER&IPR should ensure that the unspent balances on the completion of projects are reflected and timely refunded while submitting final accounts by the GIs failing which there should be a provision for charging of penal interest.

**7.2.10 Non-submission of inventory details and retention of the equipment by the GI**

Rule 215(3)(1) of GFR stipulates that apart from the requirement of submission of technical and financial reports on completion of the project or scheme, a stipulation should be made in sponsored projects that the ownership in the physical and intellectual assets created or acquired out of such funds shall vest in the sponsor. Rule 215(3)(2) of GFR stipulates that on completion of the Projects or Schemes and the receipt of technical and financial reports, the Ministries or Departments should decide and communicate to the implementing agencies whether the assets should be returned, sold or retained by them. Rule 215(3) (3) of GFR stipulates that if the assets are to be sold, the proceeds there from should be credited to account of the sponsor. If the assets are allowed to be retained by the Institution / Organisation, the implementing agency should include the assets at book value in their own accounts.

Further, RBs' rules provide that all inventory details of the equipment purchased out of the Grants-in-Aid should be sent by the Grantee institutions to the RBs/DER&IPR in a prescribed format by reflecting the description of the equipment (whether expendable / non expendable) with cost thereof, date of purchase and name of the supplier, *etc.* along with certification by the Auditor of the Grantee institutions that necessary checks have been made and inventory has been found in order. The Rules also stipulate that the equipment / surplus stores will be the property of the respective Boards / Directorate, who will be responsible for their future transfer or disposal after culmination of the projects. The Board / Directorate at the written request of the grantee institution may agree to outright transfer of some or all equipment to the institution concerned based on the recommendation of the concerned Specialist Panel.

In 186 completed projects examined, the details of expenditure incurred on purchase of Plants and Equipment (P&Es) and information on P&Es not furnished by the Grantee institutions have been shown in Table-20 below:

**Table-20 : Directorate/Research Board-wise details of the inventory of P&Es furnished by the GIs**

Dte / Board	No. of completed Projects	Total amount of sanction (₹ in crore)	Amount catered for eqpt in the sanctions (₹ in crore)	Expenditure on purchase of eqpt (₹ in crore)	No. of projects in which inventory details not furnished by GI	Percentage of projects in which inventory details not furnished
(1)	(2)	(3)	(4)	(5)	(6)	(7)
AR&DB	31	14.09	7.02	5.71	16	51.61
NRB	59	21.78	10.07	9.10	18	30.51
ARMREB	13	3.56	1.43	1.61	2	15.38
LSRB	42	13.30	3.38	2.90	28	66.67
DER&IPR	41	56.51	25.91	26.28	9	21.95
<b>TOTAL</b>	<b>186</b>	<b>109.24</b>	<b>47.81</b>	<b>45.60</b>	<b>73</b>	<b>39.25</b>

*Source: Data/ information derived from project files of DRDO*

Audit scrutiny in December 2013 revealed that:

- Out of 186 completed projects, GIs did not furnish details of P&Es purchased, in 73 projects leading to inadequate account of grant money disbursed by DRDO;
- No stipulation was made in sanction letter of the sponsored project that the ownership of physical assets created would vest with the DRDO.
- In respect of 186 completed projects, the amount of ₹ 47.81 crore was catered for the procurement of P&Es and against which an expenditure of ₹ 45.60 crore was incurred by the Grantee institution as reflected in their accounts.
- Contrary to the rule, the GIs requested for retention of equipment in 51 cases. Out of which permission for retention by RBs/DER&IPR was given in 31 cases and for the balance 21 cases the disposal decision was not given as per the records examined. In 135 projects, no details were available on record to show about the retention of equipment. The RBs/DER&IPR did not ensure the compliance to rules.

DRDO in their reply stated that P&Es purchased, duly countersigned by the Administrative Authority of the Institution are submitted by the GI in all the projects in Form GFR-19.

The DRDO's reply is factually incorrect as seen from Table-20 above, 73 GIs out of 186 GIs have not submitted inventory details in any form. Further, in 135 cases the GIs have not sought permission for retention of the P&Es and in these cases the RBs/DER&IPR did not enforce the GIs to furnish the request

for retention of P&Es. The RBs/DER&IPR also did not ensure to seek the details of P&Es purchased along with cost and also P&Es surplus to the requirement of GIs and the disposal of the same.

To ensure proper accounting and accountability, RBs/DER&IPR should maintain the database of P&Es retained by the GIs. The disposal of the equipment by the Grantee institutes should be bound by the condition that the value realized there from is invariably refunded to the Government and any transfer to other organizations is done only with the prior permission of DRDO. It should also be ensured that the detail of P&Es purchased along with value thereof is shown invariably by the GIs in the requisite format.

### **7.2.11 Outcome of Scheme**

Under the Defence Grants-in-Aid Scheme, only projects or schemes of real scientific value and having Defence interest would be supported. Further, the rules stipulate that the result and any inventions or patents arising from the work will be the property of DRDO who will have the exclusive right to decide whether or not the result should be published and/commercially exploited and if so on what conditions. Transfer of Technology (TOT) for new output developed will be done with the objective of self-sufficiency and minimization of import in the field. As per rules of the Research Boards for Grants-in-Aid, the modality of TOT could be decided based on the recommendations of the Know-how Transfer/TOT Committee which could consist of concerned panel coordinator sponsoring the project, PI of the project, representatives of the Grantee Institution and representatives of the Research Board. The Know-how Transfer Committee would consider the modalities of TOT based on the applications received after advertisement in the leading newspapers.

Audit scrutiny revealed that no patents/TOT had ever resulted from the Defence Grants-in-Aid scheme of DRDO under any of the Research Boards/DER&IPR so far. As a result, tangible scientific value added by the grant-in-aid scheme in acquiring self-sufficiency in critical technologies needed for design and development of world class equipment/systems could not be confirmed in audit.

In reply DRDO stated that TOT is not applicable to RBs and DER&IPR because projects sanctioned are in basic research areas and normally do not result into development of technology. Steps are being taken to promote the filing of patents.

The reply is not specific as the projects of scientific value for the Defence needs are awarded to the institutes and universities and technical outcome of the research would be helping in the R&D activities of the DRDO. Further, their own rules provide for Patents/TOT, however, while releasing funds for

Scheme, no mention is made in the project sanction letter about the tangible output from the research done by the Universities/Institutes. Further, no effort is visible in bringing out a compendium on the completed projects and its circulation to the labs to make use of the research talent of the Universities/Institutes, etc.

#### **7.2.12 Monitoring and Control of the Defence Grants-in-Aid scheme**

The Ministry of Defence introduced the Defence Grants-in-Aid scheme for DRDO in April 1969. During audit scrutiny we observed that no regular evaluation of the functioning and management of Research Boards and the DER&IPR was carried out. Since, inception of the scheme, only one review meeting chaired by the SA to RM, was held in August 2011, wherein it has been *inter alia* suggested that:

- Effective review mechanisms need to be put in place;
- Mechanism to avoid duplication of sanctioned projects within the boards and DER&IPR should be evolved;
- There is an absolute necessity for the boards to bring out a compendium on the completed projects and circulate among the labs for proper utilization;
- A Central database on the projects, shared through DRONA<sup>111</sup> is to be created for DRDO and shared.

In the absence of any review of the scheme by the Ministry/DRDO, we observed deficiencies in the system of proper budgeting, selection and sanctioning of project without consolidated and comprehensive database, delay in completion of projects, cost overrun, non-reflection of interest earned from the grants, retention of P&Es by the GIs without the approval of RBs/DER&IPR and lack of data on the outcome of research activities undertaken under the Scheme.

While admitting the fact, DRDO stated that the effective review mechanism is already in place and measures for improvement will be adopted.

The reply is not tenable because there was no fixed timeframe decided to accomplish stated suggestions, so no action has been taken for effective review of the Scheme.

### **7.3 Projects sanctioned by DER & IPR**

Upon the creation of DRDO on 01<sup>st</sup> January 1958, the Extramural Research (ER) activities were performed under the aegis of the erstwhile Directorate of

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<sup>111</sup>DRONA stands for DRDO Rapid Online Network Access *system*, comprising of a Mail Server and Firewall Server.



Training and Sponsored Research (DTSR). The relevance of Intellectual Property Rights (IPR) on the outcome of Science & Technology projects under ER to various DRDO projects led to creation of separate Directorate of Extramural Research & Intellectual Property Rights (DER&IPR) on 01<sup>st</sup> May 2000. However, Ministry's sanction of creation of this Directorate was not made available to audit. Irregularities noticed in some of the projects sanctioned by the DER&IPR are discussed below:-

***Case-I: Irregular Creation of Centre of Excellence-Advanced Centre for Research in High Energy Materials (ACRHEM) at University of Hyderabad***

The Rules for Defence Grants-in-Aid provide that the R&D organization cannot entertain applications for assistance to build up basic facilities in a research lab.

Based on a proposal received from University of Hyderabad (UOH) for setting up of an advanced centre of research in High Energy Materials, Ministry of Defence sanctioned in March 2005 grants-in-aid of ₹ 34.79 crore to University of Hyderabad (UOH) for creation of Advanced Centre for Research in High Energy Materials (ACRHEM), as a separate entity of UOH. The project was to be completed by March 2010 which was extended up to May 2011. The sanction catered ₹ 13.35 crore for equipment, ₹ 2.04 crore for building, ₹ 2.50 crore for library, ₹ 4.78 crore for maintenance and balance ₹ 12.12 crore for various administrative costs and overheads.

A Memorandum of Collaboration (MOC) was entered into between DRDO and UOH on 09 March 2005 for five years. However, the Phase-I was completed in May 2011 after incurring expenditure of ₹ 38.99 crore against the grant of ₹ 34.64 crore, thereby incurring excess expenditure of ₹ 4.35 crore without obtaining prior approval of the Ministry.

Audit scrutiny in November 2013 revealed the following:

- The building/infrastructure was created at a cost of ₹ 4.47 crore from the Defence Grants-in-Aid which is contrary to the rules of the Scheme.
- There has been time over run of more than a year and excess expenditure of ₹ 4.35 crore over & above the sanctioned amount.

In reply, DRDO while furnishing the comments on creation of building and infrastructure stated that the proposal is within the framework of the Scheme and necessary action was being undertaken for obtaining Ministry's approval for excess expenditure.

The reply is not tenable because as per rules grant is to be given for research project to institutions having the necessary basic infrastructure. However, autonomous Centre of Excellence has been created in a University as a separate entity by building up basic facilities/infrastructure in contravention to the rules for Defence Grants-in-Aid scheme. Further, excess expenditure of ₹ 4.35 crore was incurred over and above the sanctioned cost.

**Case-II: Short closure of project**

Rule 21 of GFR stipulates that no authority should exercise its powers of sanctioning expenditure to pass an order which will be directly or indirectly to its own advantage.

The Defence Grants-in-Aid projects are required to be awarded to the institution where basic research facilities for the work and staff with necessary competence and relevant technical background are available.

Based on the discussion held in June 2010 between representatives of CR RAO Advanced Institute of Mathematics, Statistics & Computer Science (AIMSCS) Hyderabad and DER&IPR (DRDO HQ), the Secretary Defence (R&D) in July 2010 sanctioned the project on Multiple Input Multiple Output (MIMO) Radar to be undertaken by AIMSCS<sup>112</sup> at a cost of ₹ 2.88 crore for three years with PDC of September 2013 the installment of ₹ 90.30 lakh for first year was released to the institution in September 2010.

However, based on Project Advisory Committee (PAC)<sup>113</sup> recommendations, the Chief Controller Research & Development (CCR&D) in June 2012 short closed the project on the grounds of scarcity of the manpower.

Audit scrutiny in October 2013 revealed the following:

- The project was sanctioned by Secretary Defence (R&D), however, it was short closed by the lower Competent Financial Authority *i.e.* CCR&D in DRDO HQ on the grounds of scarcity of the research fellows, which proves that availability of staff with necessary competence and relevant technical background as required under rule was not ensured. The short-closure of the project not only resulted in non-achievement of the desired objectives of the project, but also in wasteful expenditure to the tune of ₹ 62.05 lakh.
- Incidentally, it was seen that the project was sanctioned by the Secretary Defence (R&D)/DG DRDO/SA to RM, who also happened to be the President of the Governing Body of the Institute and Vice President of the association responsible to run the affairs of the institute.

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<sup>112</sup> A private institute registered under the Andhra Pradesh Societies Act, 2001

<sup>113</sup> Project Advisory Committee of DER&IPR, DRDO

In reply, DRDO stated that when the project was awarded it had experts in the area of research but the PI left the institute, which adversely affected the project. The efforts were made to identify alternative expert but did not work. The effort was also made to augment resources from the lab but project could not be progressed. Further, the Secretary, Defence (R&D)/DG DRDO/SA to RM was the President of the Society, which is purely honorary position bestowed on a renowned scientist and he is not involved in day to day functioning of the society.

The reply is not acceptable as in terms of Rules of the Scheme, the Project would be sanctioned only to Universities/Institutions where basic facilities in the form of equipment/personnel exist. In contravention of this rule the project was awarded to institute, which did not have research fellows and the project was short closed without taking it to a logical conclusion. The fact remains that Ministry sanctioned and released funds to a Private Society, which could not ensure retention of adequate and suitable research fellows so as to complete the sanctioned project, resulting in wasteful expenditure due to short closure of the project. Further, the sanctioning authority of the project was holding the post of the President of the Governing Body of the Institute.

***Case-III: Sanctioning of project for a study***

Ministry sanctioned a project on “Science and Technology Dimensions of National Security” for a five years’ duration at a cost of ₹ 4.72 crore in April 2008 to National Institute of Advanced Studies (NIAS) Bangalore, a private institute registered under the Karnataka Societies Registration Regulation Act 1960. The PDC of the project was up to June 2013 which was later extended by one year up to June 2014. The scope of the project entailed study, analysis and reporting on the Science & Technology capabilities on strategic areas of other countries as follows:

- Assessment of S&T Capabilities.
- Updating and Consolidation of the NIAS work on Ballistic Missiles;
- Nuclear Weapons and their role in National Security;
- Identification and assessment of sensitive installations using openly available satellite images and other data; and
- Organizing dialogues and discussions with National and International Specialists Groups on security and strategy related issues.

Audit scrutiny in November 2013 revealed the following:

- The Defence Grants-in-Aid scheme was instituted for undertaking research & development work on areas of scientific value and preferably of interest to Defence. However, sanctioning of the project for carrying

out study on the topics mentioned above under Defence Grants-in-Aid Scheme was not justified.

- The sanctioning of study project does not fall in the mandate of DER&IPR.

In reply, DRDO stated that these study projects are of strategic importance to country's security, which helps in understanding the science and technology presently available and those being acquired by the adversaries.

The reply is not tenable because the Institute of Defence Studies and Analysis (IDSA), an autonomous body funded by the Ministry of Defence is dedicated for research and policy relevant studies on all aspects of defence & security. Further, as the objective of Defence Grants-in-Aid scheme is to utilize the available research talent in the country for undertaking research and development work of scientific values and hence carrying out work relating to general areas of concern does not fall in the mandate of DER&IPR.

#### ***Case-IV: Creation of DRDO Chairs and DRDO Fellowships***

Rules for Defence Grants-in-aid scheme do not provide for creation of Chairs and Fellows and making payments out of the Defence Grants-in-Aid. However, in disregard to this, DRDO created Chairs and Fellows in the name of former Scientists of DRDO.

#### **Case A**

The Ministry of Defence in August 2007 sanctioned creation of four Chairs<sup>114</sup> in the names of former Scientific Advisors to Raksha Mantri, with each having a term of three years and an estimated expenditure of ₹ 20.46 lakh per annum on honorarium to DRDO Chair, stenographic assistance, payment to Research Fellows, travel assistance, cost of consumables, etc., later revised to ₹ 27.69 lakh per annum in November 2010 to be booked under relevant Head<sup>115</sup> of the Scheme. Thereafter, DRDO made functional three of these Chairs at DRDO laboratories/Establishments as per the details given in **Annexure-VIII**

Further, Ministry of Defence in May 2012 sanctioned creation of 10 Chairs<sup>116</sup>, 20 Dr. Raja Ramanna DRDO Distinguished Fellows and 30 DRDO Fellows at honorarium of ₹ 80,000/-, ₹ 75,000/- and ₹ 65,000/- per month respectively. The expenditure was to be debited to Major Head 2080-Defence Services-R&D, Minor Head 110 Stores.

<sup>114</sup> (a). Padma Vibhushan Dr DS Kothari (1 chair) (b). Prof S Bhagavantham (1chair) (c). Dr BD Nagchadhuri (1 chair) (d). Padma Bhushan Prof MGK Menon (1chair)

<sup>115</sup> Major Head 2080-Defence Services-R&D, Minor Head 004 Research/R&D Sub Head (C)-Extramural Research (Grants-in-aid head).

<sup>116</sup>(a) Padma Vibhushan Dr DS Kothari (3chairs) (b). Prof S Bhagavantham (3chairs) (c). Dr BD Nagchadhuri (3chairs) (d). Padma Bhushan Prof MGK Menon (1chair)

Audit scrutiny in November 2013 revealed following irregularities:

- The sanctioning of Chairs and Fellowships did not fall in the ambit of Defence Grants-in-Aid Scheme.
- There were other irregularities like unaudited annual accounts and interest accrued on the funds was not reflected in the Accounts as shown in **Annexure-VIII**.

In reply, DRDO stated in September 2014 that the Chair appointees are required to be familiar with DRDO and its programmes. So, Chair appointments are recognition of noted scientists made with a view to benefit from their immense scientific knowledge and experience. DRDO further stated that they had taken remedial action by funding of Chairs under Stores (Revenue) Head.

The reply is not tenable as the Minor Head 110 (Store) covers expenditure on stores *etc.* for all activities related to Projects, Programmes, Schemes, Maintenance of existing infrastructure facilities, Technical literature, Stores supplied by Services, Ordnance Factories, and Information Technology related activities, *etc.* However, the expenditure on chairs included honorarium to DRDO Chair, stenographic assistance, payment to Research Fellows, travel assistance, cost of consumables, *etc.* The expenditure on creation of chairs was thus not accounted for correctly.

### **Case B**

The DRDO in April 2005 and May 2005 sanctioned an amount of ₹ 3.00 lakh and ₹ 2.00 lakh to the IIT Kanpur as an 'Outright One Time Grant' under the scheme, towards creation of Prof. Srinivasa Sampath Chair. The grant was paid to the Institute in May 2005 and August 2007.

Audit scrutiny in November 2013 revealed that above payments were not authorised under the Rules for the Grant-in-Aid Scheme, which do not cover grants for creation of basic facilities or personal payments to members of GI without assigning any task or project.

The DRDO, in reply, stated (December 2013) that points raised by audit were noted and actions needed for resolving the issues would be undertaken.

Thus, DRDO agreed to the audit contention that grant made to a chair created at IIT Kanpur was irregular.

### **Conclusion**

The Scheme was introduced in 1969 with a view to utilize the indigenously available research talent preferably in areas of interests to Defence. The

Annual Budget of the Scheme for four RBs and DER&IPR rose from ₹54.50 crore in 2007-08 to ₹ 86.67 crore in 2012-13.

Audit observed that there were critical shortfalls in the management of the Scheme such as improper budgeting process, awarding the project without arriving at viable and specific research objectives and without defining the quantified and qualitative target attained against the outlay, circulation of the Scheme so as to ensure adequate response from all interested parties and there was no evidence to suggest that all the proposals received through online applications were duly considered and properly evaluated to ensure fair competition and selection of best possible proposals. The Project Closure Reports, which contain vital information on objectives achieved, is not being called for by DRDO in majority of cases. DRDO did not consider it prudent to ask the Grantee Institutions to necessarily deposit in Savings Bank Account all grants under its Grants-in-Aid scheme and appropriately account for the refund of unspent balances, thereby depriving the Government of accrual of such benefits. The disposal of the equipment to a major extent was left at the discretion of the Grantee institutions in the manner desired, despite these being the property of DRDO. On all these issues, recommendations have been made by audit.

In light of above, the Scheme is far from satisfaction and requires a review at Ministry's level.

## CHAPTER VIII: ORDNANCE FACTORY ORGANISATION

### 8.1 Performance of Ordnance Factory Board

#### 8.1.1 Introduction

**8.1.1.1** Ordnance Factories are the oldest and largest organization in India's defence industry with a history that dates back to 1787. There are 41<sup>117</sup> factories divided under five clusters or operating groups (Table-21) and produce a range of arms, ammunitions, weapons, armoured & infantry combat vehicles and clothing items including parachutes for the defence services. They function under the Ordnance Factory Board which is under the administrative control of the Department of Defence Production of the Ministry of Defence of Government of India. The Ordnance Factory Board comprises a Chairman and eight members<sup>118</sup>.

**Table-21**

Operating group	Number of factories
Ammunition & Explosives	10
Weapons, vehicles and equipment	10
Materials & Components	8
Armoured vehicles	6
Ordnance equipment group	5
Total	39

**8.1.1.2** The objectives of the Ordnance Factory Board<sup>119</sup> are:

- To supply quality arms, ammunition, tanks and equipment to armed forces;
- To modernise production facilities to improve quality;
- To absorb latest technology through Transfer of Technology<sup>120</sup> and in-house Research & Development; and
- To meet customer satisfaction and expand consumer base.

<sup>117</sup>Two Ordnance Factories at Nalanda and Korwa are under construction. Beset with delays, the two Ordnance Factories are yet to put into operation with scheduled date of coming into operation remaining uncertain

<sup>118</sup> Members are in the rank of Addl. Secretaries, being of Finance, Personnel, Planning & Material Management, Projects & Engineering, Technical Services, Material & Components, Weapons, Vehicles & Equipment, Ammunition & Explosive, Armoured Vehicles (Avadi), Ordnance Equipment (Kanpur)

<sup>119</sup> As enunciated in Mission and Vision Statement of Ordnance Factory Board

<sup>120</sup> Transfer of Technology from Defence Research & Development Organisation or from Original Equipment Manufacturers through contracts linked to purchases



**8.1.1.3** In addition, the policy objectives of the Government on Defence Production and Procurement, list the following objectives which have a bearing on the Board:

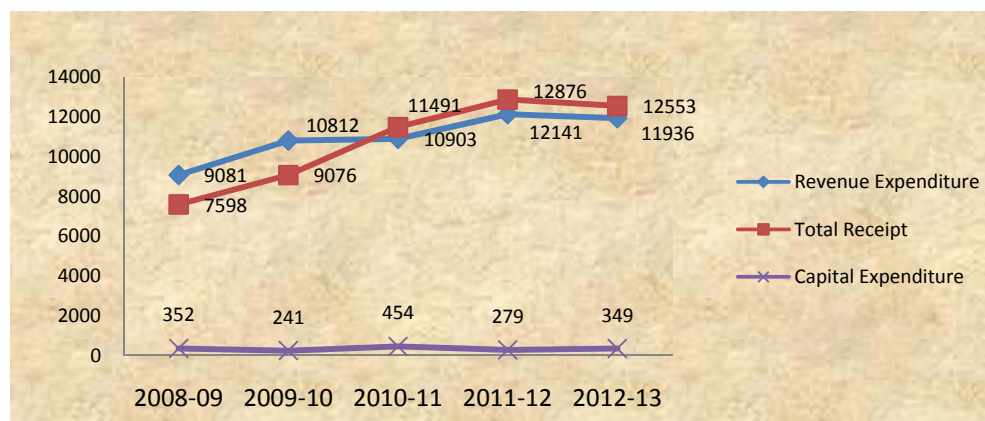
- To ensure expeditious procurement of the approved requirements of the armed forces, in terms of capabilities sought and timeframe prescribed by optimally utilizing the allocated budgetary resources;
- To achieve substantive self-reliance in design, development and production of military equipment/weapon systems/platforms required for defence in as early a time frame as possible; and
- To enhance the potential of Small and Medium Enterprises in indigenisation.

**8.1.1.4** Our analysis of the performance of the Ordnance Factory Board during 2012-13 places it, where relevant, against the above objectives.

### 8.1.2 Financial performance

Trends in expenditure are illustrated in **Chart-7**.

**Chart-7 : Trend in Receipt against Revenue and Capital Expenditure (in crore)**



#### Revenue expenditure

**8.1.2.1** The Ordnance Factory Board receives budgetary grant under the Accounts Head 2079 to meet its revenue expenditure. The grant was ₹ 11936 crore in 2012-13.

**8.1.2.2** The Ordnance Factory Board operates Accounts Head: 2079 for booking its expenses and its receipts<sup>121</sup> against issues to the Defence

<sup>121</sup>The Ordnance Factory Board debits all its revenue expenditure to the Accounts Head 2079. At the time of issue to the Defence establishment, there is (-) Debit to the Account. The receipts against sales to other clients (exports, civil trade) are recorded against the Accounts Head 0079

establishment. Another Accounts Head 0079 records the receipts against sale of products to non-defence establishments (State Police), in the open market or exports. The issue price of products is so fixed to recover the cost of manufacture. In 2012-13, the Ordnance Factory Board earned a net surplus of ₹ 617 crore, being 5 per cent of the expenditure. Further comments on pricing are at Paragraph 8.1.6.

**8.1.2.3** Revenue expenditure showed 11 per cent increase<sup>122</sup> in 2011-12 but decreased marginally by 2 per cent in 2012-13. Stores expenditure constituted 48 per cent of the total revenue expenditure; manufacturing expenditure constituted 36 per cent. Together the two components accounted for 84 per cent of the total revenue expenditure. Both the components registered a dip in 2012-13: stores by 7 per cent and manufacturing by 2 per cent. The decrease in expenditure under stores was mainly due to delays in supplies.

**8.1.2.4** It is worthwhile to note that the norm for procurement of stores was changed with effect from January 2012. Prior to January 2012, factories' procurement was restricted to the annual requirement, which was changed to two years' requirement plus 50 per cent optional clause with staggered delivery. Despite the relaxation, the stores procurement did not increase in 2012-13 showing a conservative approach in the Ordnance Factory Board taking into cognizance the uncertainties in demand. Para 8.1.3.5 highlights the impact of short-closure of indents (*i.e.* reduction of demand) on production in the factories.

### **Capital expenditure**

**8.1.2.5** The Ordnance Factory Board also receives budgetary support for capital expenditure (Major Head 4076), also called the New Capital grant. This grant meets the expenditure on new projects including procurement of plant and machinery, for which ₹ 349 crore was spent in 2012-13. In addition, a separate fund called the Renewal & Replacement Fund, funds the replacement of old machinery. Currently at ₹ 439 crore, the Fund has been created through yearly transfers from revenue grant<sup>123</sup>.

**8.1.2.6** Capital expenditure has more or less remained static over the years: in fact, capital expenditure under New Capital grant at ₹ 349 crore was almost at the same level as in 2008-09. It represented only 3 per cent of the total expenditure of the Ordnance Factory Board. The low allocation for capital expenditure was because of slow progress on the two existing projects<sup>124</sup>; two

<sup>122</sup> The spurt in revenue expenditure in 2011-12 was due to increase in production with a resultant increase of 26 per cent in manufacturing expenditure.

<sup>123</sup> The amount transferred from Revenue grants (Major Head 2027) annually for the RR fund is equal to the annual depreciation of plant & machinery and rough expenditure for annual replacement.

<sup>124</sup> Ongoing projects being on establishment of Ordnance Factory Nalanda Project and Ordnance Factory Korwa, sanctioned in November 2001 and October 2007 with an outlay of ₹ 2160 crore and ₹ 408 crore respectively. As of March 2013, ₹ 856 crore was spent on the 2 projects.

new<sup>125</sup> projects were sanctioned in 2012-13 against which there was no expenditure during the year.

**8.1.2.7** Our analysis showed that the expenditure on plant & machinery did not meet the need for new machines. As of March 2013, 572 project proposals for purchase of 1468 machines were reflected in the Ordnance Factory Board's database as pending decision at various levels. Further analysis of the level at which the procurement decision was pending is at Table-22. The delays would impact the project schedules. For instance, the project for "augmentation of capacity for production of spares relating to overhaul of T-72 and T-90 tanks" was sanctioned in October 2010 at a capital outlay of ₹ 368 crore due for completion in December 2013. As of March 2013, only ₹ 58 crore was spent on the project; 129 items of machines were yet to be ordered.

**Table-22**

<b>Status</b>	<b>Number of cases</b>
Tender opened at the factories	116
Tender Evaluation Committee meetings held at the factories	82
Tender Purchase Committee meetings held at the Factory/Board	41
No action on procurement	333
<b>Total</b>	<b>572</b>

### **8.1.3 Meeting the demand of Defence Forces**

**8.1.3.1** The Ordnance Factory Board plans production in the factories on the basis of :

- **Requirements projected by the Forces:** Since 2011, the Army prepares a 5-year perspective (roll-on) plan for its needs of weaponry. This practice is yet to be adopted by the Air Force & Navy which provide such needs annually. However, the Ordnance Factory Board plans the production on the basis of firm orders (indents) placed by the Defence forces.
- **Capacity of the factories for production:** The capacity of the feeder factories and that of the assembling factories (that assemble the final product for issue), together provide an assessment of the Ordnance Factory Board on its capacity to meet the requirements of the Forces.

**8.1.3.2** The production targets are fixed by Ordnance Factory Board in consultation with the Defence forces. These targets are intimated to the

<sup>125</sup>Creation of capacity at Grey Iron Foundry for 51mm mortar bomb body and Creation of facilities for manufacture of components for anti submarine rockets at Heavy Alloy Penetrator Project Trichy

factories: for final products and for feeder factories, which are then communicated by the Ordnance Factory Board to the factories. The performance of the Ordnance Factory Board in meeting the targets over the period 2008-13 is indicated in the Table-23. In 2012-13, the Ordnance Factory Board could meet the targets on only 39 *per cent* of the items required by the Armed Forces.

**Table-23**

Year	Number of items			Percentage of shortfall
	Targets	Production	shortfall	
2008-09	419	296	123	29
2009-10	434	300	134	31
2010-11	639	416	223	35
2011-12	547	195	352	64
2012-13	529	205	324	61

**8.1.3.3** We analysed a sample of 68 items across the operating groups, randomly selected, for the reasons for shortfall in production. Results of our analysis are at Table-24. No reasons were recorded against 28 items in the Report. It is important that the Ordnance Factory Board insisted on reasons for shortfalls from the Factories, for an effective internal control on achievement of targets. For instance, there was a 42 *per cent* shortfall in production of mine protected vehicle-Mark III by the Vehicle Factory Jabalpur, the value of shortfall being ₹ 158 crore but no reasons were recorded for the shortfall.

**Table-24**

Reasons	Number of items	Value of shortfall (₹ in crore)
Modification in demand by the clients	17	312
Non-receipt of components	16	416
No reasons recorded	28	538
Awaiting clearance for production	2	Not available
Others	5	44
<b>Total</b>	<b>68</b>	<b>1310</b>

**8.1.3.4** An important factor to the shortfall was the inability to source quality components on time. The factories meet around 55 *per cent* of their demand from local vendors. For the remaining 45 *per cent*, reliance is placed on the sister ordnance factories; this is categorized under “inter-factory demands”. There were problems in both these streams of supply affecting supply of critical items of ammunition to the Army, as illustrated in Table-25. Paragraph 8.1.6.2 further analyses the impact of inter-factory demands on losses in sister assembling factories.

**Table-25**

Item	Target (Number)	Achievement (Number)	Shortfall (Number)	Value of shortfall (₹ in crore)	Reasons for shortfall
Shell 155mm HE ERFB (BB)	15,000	7,552	7,448	50	<ul style="list-style-type: none"> <li>• Shortage in base bleed (propellant) grains from Ordnance Factory at Itarsi</li> <li>• Manufacturing defects in empty shells from Ordnance Factory at Ambajhari</li> </ul>
Rocket 84mm HE	26,000	7,750	18,250	27	Short supply of empty fuse ex trade and propellant by Ordnance Factory Bhandara
Bomb 120mm Mortar HE	47,000	21,602	25,398	38	Short supply of empty bomb body from local vendors
Bomb 120mm Mortar PWP	5,000	Nil	5,000	8	<ul style="list-style-type: none"> <li>• Successive failure in proof</li> <li>• Short supply of empty body and on hardware supplied by trade firms</li> </ul>
Round 125mm HE	60,000	40,569	19,431	92	Non availability of passed proof shells from Ordnance Factory at Ambajhari due to quality problems

**8.1.3.5** An equally significant reason for shortfalls was the vagary of demand wherein the clients, especially the Army reduced the demand during the year. Some critical items in which production was affected by short-closure of indents by the Army are illustrated in Table-26.

**Table-26**

Item	Target (Number)	Achievement (Number)	Shortfall (Number)	Value of shortfall (₹ in crore)
23mm Schilka APIT (ammunition)	50,000	8,651	41,349	11
84mm Rocket Launcher Indigenous MK-III	1,000	540	460	49
Shell 105mm IFG HE(ammunition)	1,80,000	1,03,385	76,615	90
Fuse 117 MK-20(ammunition)	1,50,000	56,470	93,530	25

#### **8.1.4 Production**

##### **Value of production**

**8.1.4.1** The trends in value of production across the five operating groups of the Ordnance Factory Board during 2010-13 are given in the Table-27. The Ammunition & Explosives group contributed to 34 per cent of production in the Ordnance Factory Board. Together with Armoured Vehicles as well as Weapons, Vehicle & Equipment group, the contribution was 79 per cent. Trends in production of these three groups have a significant impact on the overall performance of the Ordnance Factory Board.

**Table-27**

Year	Value of production (₹ in crore)					
	Ammunition & Explosives	Weapons, Vehicles & Equipment	Armoured Vehicles	Materials & Components	Ordnance Equipment	Total
2010-11	5,016	3,275	3,263	1,802	833	14,188
2011-12	5,286	3,902	3,895	2,138	967	16,188
2012-13	5,540	3,873	3,550	2,338	1,120	16,420

**8.1.4.2** The Ordnance Factory Board calculates the cost of production on finished goods; for our analysis, we treated value of production as the sum of Cost of Production plus Closing stock of Work-in-Progress minus Opening stock of Work-in-Progress. In 2011-12, the factories reported a growth of 14 *per cent* which came down to a 1.4 *per cent* growth in 2012-13. This was mainly because of a substantial dip in production in the Armored Vehicles Group, where from a growth of 19.4 *per cent* in 2011-12, the production fell by 8.9 *per cent* in 2012-13. Among this group, the fall in production in the Heavy Vehicle Factory, Avadi was ₹ 494 crore, attributable in part, to decrease in assembling of Semi-knockdown T-90 tanks. A similar pattern was seen in the Weapons, Vehicle & Equipment group: in 2011-12, it registered 19 *per cent* growth but in 2012-13, the production fell by 0.7 *per cent*.

**8.1.4.3** We found that the dip in production was accompanied by a build-up of inventory under Work-in-Progress. Work-in-Progress as a percentage of cost of production rose from 16 *per cent* in the previous two years to 19 *per cent* in 2012-13.

The trends in Work-in-Progress during the period 2010-13 is at Table-28. The Armoured Group of vehicles have a longer lead time for production which would explain the higher incidence of Work-in-Progress in the group.

**Table-28**

Year	Work-in-Progress as percentage of cost of production					
	Ammunition & Explosives	Weapons, Vehicles & Equipment	Armoured Vehicles	Materials & Components	Ordnance Equipment	Total
2010-11	12	14	28	17	6	16
2011-12	12	14	25	18	6	16
2012-13	16	20	28	15	6	19

**8.1.4.4** A factory-wise analysis showed some abnormal trends of Work-in-Progress which merit a closer review by the Ordnance Factory Board. The trends in factories which reported Work-in-Progress in excess of 40 *per cent* of cost of production are indicated in Table-29.

**Table-29**

Factory	Main product line	Years		
		2010-11	2011-12	2012-13
Ordnance Factory Medak	Combat vehicles and its overhauling	62	62	71
Gun Shell Factory, Cossipore	AK 630 Guns, 84mm RL MK-III, 84mm TPT, Empty fuse and Primer	28	53	64
Gun Carriage Factory, Jabalpur	Barrels for guns and its spares	47	35	56
Metal & Steel Factory, Ishapore	Forgings for barrel and casing, Nose adapter, Steel and Brass rod, empty cartg case for 30mm Sarath	38	40	26

**8.1.4.5** We selected Ordnance Factory, Medak and Gun & Shell Factory, Cossipore for further analysis. Ordnance Factory, Medak did not provide data. At the Gun & Shell Factory, Cossipore, the Works-in-Progress consisted mainly of ammunition items waiting for proof (tests on a sample) or rejected lots awaiting repairs (Table-30).

**Table-30**

Item	Cost (₹ in crore)	Status
Shell 125 mm HEAT ammunition: IFD item for Ordnance Factory, Chanda	76	<ul style="list-style-type: none"> <li>• 8 lots costing ₹32 crore awaiting proofs</li> <li>• 3 rejected lots valued at ₹12 crore pending repair</li> <li>• 8 lots awaiting quality clearance</li> </ul>
AK 630 gun	36	<ul style="list-style-type: none"> <li>• Awaiting proof and post-proof operations</li> </ul>
84 mm rocket launcher Mark-III	23	<ul style="list-style-type: none"> <li>• Awaiting post proof operation</li> </ul>

**8.1.4.6** Effective control on production process would stem delays at different levels and timely closure of warrants (production of each item is authorized by a warrant). Warrants are required to be closed within 6 months. Our review of inventory management in eight sampled factories showed that 16 per cent of warrants were over a year old (Table-31). The value of warrants that were open for more than one year was ₹ 434 crore. Our analysis of individual items of Work-in-Progress showed that the Factories have been reflecting rejected stocks as Work-in-Progress for long periods.

**Table -31**

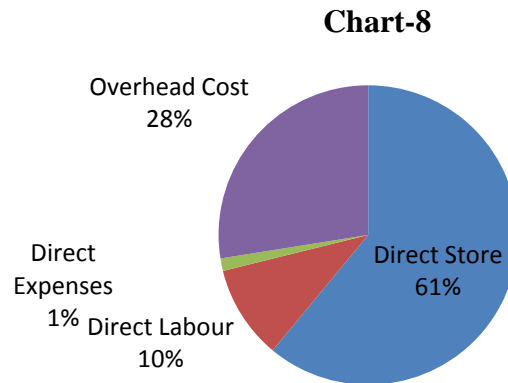
Period (in years) <sup>126</sup>	No. of warrants	Value (₹ in cr.)
1-2	2329	244
2-5	391	178
5-8	57	11
8-11	13	1
Total	<b>2790</b>	<b>434</b>

<sup>126</sup>Since the date of the warrant is not mentioned in the database of the Accounts (it mentions the year only), we could not cull out the number of warrants which were open for 6 months-1 year.



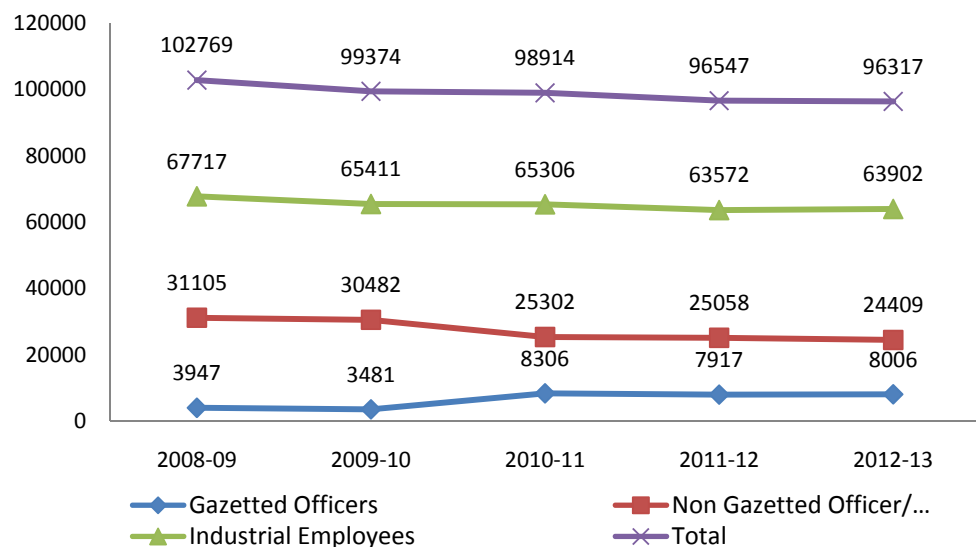
### 8.1.5 Cost of production

8.1.5.1 Stores account for 61 per cent of the cost of production. Overhead at 28 per cent of cost of production are particularly high in the Ordnance Factory Board.



8.1.5.2 The Ordnance Factory Board employed a total 96317 personnel in 2012-13 of which 63902 are categorized as Industrial Employees (Direct Labour). There had been a 5.6 per cent decline in Industrial employees over the period 2008-13. This reduction in direct labour was a consequence of retirements coupled with no recruitment at that level. However, re-classification of non-industrial employees as industrial employees, results in fluctuation in numbers, as in 2012-13 when there was a marginal increase in industrial employees by 330 (Chart-9). The ratio of industrial workers to the supervisory officers was very high - 1.97 in 2012-13, i.e. one supervisory officer for every 1.97 direct labour. In machine intensive operating groups like Armoured Vehicle and the Ammunition & Explosives Group, the level of supervisory officers were even higher.

**Chart-9: Year wise position of Staff**



**8.1.5.3** In the last five years, 2008-13, ₹ 3109 crore was spent by the Ordnance Factory Board on purchase of plant & machinery. The Ordnance Factory Board's instructions of 2004 require that every factory should assess the cost reduction and quality improvement with the introduction of new machinery. The basic premise is that the labour costs and cost of material should reduce with the introduction of new machinery.

**8.1.5.4** Over the years 2008-13, there was no major pay revision except for periodic payments of dearness allowance which is fixed in relation to movement in Consumer Price Index. We indexed the cost of direct labour to the Consumer Price Index and discounted the rates with 2008-09 as the base year. The discounted costs show that there was an increase of 42 per cent in direct labour cost in the factories during 2008-13 (Table-32). The increase in labour cost, corrected for inflation, was despite the overall reduction of 5.6 per cent in direct labour during the same period.

**Table-32**

Year	Direct labour	
	Actual	Discounted <sup>127</sup>
2008-09	768	768
2009-10	1,102	981
2010-11	1,318	1,062
2011-12	1,490	1,108
2012-13	1,617	1,091

**8.1.5.5** We further analysed the increase in labour cost with trends in utilization of man hours and machine hours to assess the efficiency effected in the factories from modernization. The results are tabulated in Table-33.

**Table-33**

*(in lakh hours)*

Year	Standard man hours			Standard machine hours			Cost of production	Increase (in per cent)
	Available	Utilised	Utilisation (in per cent)	Available	Utilised	Utilisation (in per cent)		
2008-09	1,158	1,623	140	1,696	1,294	76	10,610	-
2009-10	1,125	1,269	113	1,839	1,261	68	11,818	11
2010-11	1,078	1,349	125	1,830	1,311	72	14,012	19
2011-12	1,080	1,375	127	1,577	1,232	78	15,933	14
2012-13	1,028	1,324	129	1,603	1,213	76	15,972	0.24

<sup>127</sup> Year	Average Consumer Price Index
2008-09	145
2009-10	163
2010-11	180
2011-12	195
2012-13	215

Calculation
768
(1102/163)*145= 981
(1318/180)*145= 1062
(1490/195)*145= 1108
(1617/215)*145= 1091

**8.1.5.6** The Table above shows that despite addition of new machines every year, the capacity for production in terms of available machine hours had in fact come down during 2008-13. From 1696 machine hours in 2008-09, it came down to 1603 machine hours in 2012-13. This could be the result of the following factors:

- *Loss of machine hours due to breakdowns:* We selected a sample of ten factories<sup>128</sup> for the review of loss of machine hours due to breakdowns. Four<sup>129</sup> factories did not provide the database. One<sup>130</sup> factory did not report any breakdown. The analysis of the remaining five<sup>131</sup> factories showed that out of 398 machines, 17 to 55 machines remained under breakdown for more than one month duration during 2009-13. The breakdown period exceeded six months in respect of 14-15 machines each year. The incidence of breakdowns at 9-14 *per cent* and loss of machine hours was high in the Ordnance Factories.
- The factories *de-rate the capacity* of machines over the life span of the machine. Paragraph 8.1.2.7 points to the fact that procurement of machines did not keep pace with the demand for machines.
- *Delays in commissioning new machines:* As of 31 March 2013, 265 machines worth ₹ 519 crore were awaiting installation in the Ordnance Factory Board. The Weapon, Vehicle and Equipment Division accounted for 30 *per cent* of the uninstalled machines. We also found delays in commissioning in 29 *per cent* of the machines test checked in 10 factories during the review on Capacity addition in ordnance factories.

**8.1.5.7** The Ordnance Factory Board had fixed a capacity utilization of 80 *per cent* in the factories. The actual utilization averaged at 74 *per cent* during the last five years. On the other hand, the trends in utilization of man-hour was satisfactory and in correlation with trends in cost of production.

**8.1.5.8** The introduction of a new machine is expected to have a tangible impact on the cost of production of items produced by the machine. For this purpose, the Ordnance Factory Board requires that the Estimates for production of items should be revised: the material/labour estimates and the percentage of unavoidable rejection should be reduced after the commissioning of the machines. Payments for labour and material are made on the basis of the estimates.

<sup>128</sup> Ordnance Factory Ambajhari, Ordnance Factory Kanpur, Heavy Vehicle Factory Avadi, Ordnance Factory Khamaria, Ammunition Factory Kirkee, Rifle Factory Ishapore, Small Arms Factory Kanpur, Gun Carriage Factory Jabalpur, Gun and Shell Factory Cossipore and Field Gun Factory Kanpur

<sup>129</sup> Ordnance Factory Kanpur, Heavy Vehicles Factory Avadi, Field Gun Factory Kanpur and Ammunition Factory Kirkee

<sup>130</sup> Small Arms Factory Kanpur

<sup>131</sup> Ordnance Factory Ambajhari, Ordnance Factory Khamaria, Rifle Factory Ishapore, Gun Carriage Factory Jabalpur and Gun & Shell Factory Cossipore

We found that the factories did not conduct such a revision in 80 *per cent* of the machines commissioned during 2009-13 in the sampled 10 factories. Evidently, the review of the tangible benefits of modernization did not get adequate attention of the factories or the Ordnance Factory Board, leading to high material and labour costs. The Ordnance Factories have a captive client base; with little competition, there was no incentive to achieve economies in production and reduction in cost of production.

**8.1.5.9** The high level of overhead charges in the cost of production, at 27.5 *per cent*, is also an indicator of inadequate control on costs. The Materials & Components group has the highest level of overheads, followed closely by the Weapons, Vehicles & Equipment group as shown in Table-34.

**Table-34**

Year	Overheads as a percentage of cost of production					Total
	Ammunition & Explosives	Weapons, Vehicles & Equipment	Armoured vehicles	Materials & Components	Ordnance Equipment	
2010-11	23.0	33.8	19.8	39.3	32.7	27.5
2011-12	23.3	31.7	18.0	37.3	33.3	26.5
2012-13	23.4	33.6	20.8	35.7	30.8	27.5

**8.1.5.10** There was wide variation with some factories reporting consistently high level of overheads. Ordnance Factories with overheads above 50 *per cent* of the cost of production are listed at Table-35.

**Table-35**

Factory	Main product line	Years		
		2010-11	2011-12	2012-13
Metal & Steel Factory, Ishapore	Barrel and casing forging etc	65	61	53
Ordnance Factory Muradnagar	Castings for various ammunition	62	60	58
Rifle Factory Ishapore	5.56mm Rifle, Sporting Rifle	58	59	59
Ordnance Factory Bhandara	Propellants and charges	77	73	54
Ordnance Factory Dehradun	Sighting instruments and equipment	64	62	61
Small Arms Factory Kanpur	Carbines, Rifles and revolvers	54	56	54
Field Gun Factory Kanpur	Barrels, ordnance and revolvers	57	49	51
Ordnance Cable Factory Chandigarh	Cables and wires	63	65	52

**8.1.5.11** We reviewed Metal & Steel Factory, Ishapore to examine the reasons for high fixed overheads. The fixed overheads was ₹ 137 crore in 2012-13, of which pay & allowances (₹ 79 crore) accounted for 58 *per cent*; depreciation was another 10 *per cent*. The high overheads are a consequence of high committed cost on a workforce that is not directly deployed on production. During 2010-13, the fixed overheads increased by 23 *per cent*, while the production of principal items increased only by 13 *per cent*. The increase in cost of production even as the cost of committed expenditure increased steadily reveals the high overheads at the Ishapore factory. Included in the pay and allowances are “miscellaneous allowances granted to Industrial Employees” which are essentially incentives for production and should have been booked under direct labour. In 2011-12, this miscellaneous account was ₹ 13 crore.

### 8.1.6 Pricing of products

**8.1.6.1** The factories produce around 930 principal items. They are expected to recover the cost of production from its sales to the armed forces; from other clients in the open market, they are free to make profits. The issue price for the products is fixed in the beginning of the year based on the trends in the past three years. Hence, the issue price may be higher or lower than the actual cost of production. Moreover, the cost of production of the same item may vary across factories. Cross-subsidisation is the natural outcome of the process. In 2012-13, 31 factories earned a profit of ₹ 1044 crore while eight factories suffered a loss of ₹ 106 crore. The operating group-wise profit earned/loss incurred is illustrated in the Table-36. The Ordnance Factory Board earned a net profit of ₹ 938 crore. Included in this profit is ₹ 553 crore from issues to the Army. The Weapon group of factories registered the highest profits; in this group, the Vehicle Factory, Jabalpur with a profit of ₹ 253 crore accounted for 27 *per cent* of the total profit of the group.

**Table-36**

Profit/loss during 2012-13	Ammunition & Explosives	Weapons, Vehicles & Equipment	Armoured vehicles	Materials & Components	Ordnance Equipment	Total
IFD	-28	33	35	60	-3	97
Army	180	271	99	-	3	553
MHA	63	20	4	-	1	88
Others	38	128	6	37	-9	200
<b>Total</b>	<b>253</b>	<b>452</b>	<b>144</b>	<b>97</b>	<b>-8</b>	<b>938</b>

\*IFD: *inter-factory demand, whereby sister factories feed the need for stores of other factories*

**8.1.6.2** Issue price of Inter Factory Demand items are fixed centrally by Ordnance Factory Board in the beginning of the year. This introduces

elements in pricing which merit review since they have a significant bearing on cost of production and in pricing of products. In 2012-13, Inter Factory Demand factories earned a profit of ₹ 97 crore in issue of products to other factories as inputs for final products. As a result, the cost of material at final product factories was inflated by ₹ 97 crore since the cost at which these items were issued to the final product factories was taken as input cost by the final product factories and thereby jacking the input cost unnecessarily to the extent of profit element. This, ultimately, was loaded to the indentors particularly Armed Forces thereby making the product uneconomical.

**8.1.6.3** Though eight factories, as referred to in Table-35, reported more than 50 per cent overheads in 2012-13, as discussed in Paragraph 8.1.5.10, these eight factories together made a profit of ₹ 90.5 crore in 2012-13. The absence of a strong watch on prices by the indentors allows the loss-making factories to load, to a great extent, the cost of inefficiency on the indentors. Some factories recovered their losses from issues to the Army by substantially higher prices charged from paramilitary forces (through Ministry of Home Affairs). For instance, Rifle Factory, Ishapore suffered a loss of ₹ 0.86 crore in 2012-13 in issues to Army which was compensated by ₹ 8.05 crore profit earned from sales to Ministry of Home Affairs.

#### **Case study: Production costs & pricing at Metal & Steel Factory, Ishapore**

Metal & Steel Factory, Ishapore showed a decline in number of principal items produced in the Factory: from 66 in 2010-11 to 28 in 2012-13. The cost of production of the principal items increased from ₹ 177 crore to ₹ 200 crore during the same period. The Factory is essentially a feeder factory with Inter Factory Demand issues contributing to 86-92 per cent of the total production. Para 8.1.5.10 highlighted the high overheads in this Factory (65-53 per cent of cost of production), making the production uneconomical. Yet, the factory registered profits each year: in 2012-13, it earned a profit of ₹ 19 crore.

Against a single item, the Metal & Steel Factory, Ishapore adopted different estimates for production in 2012-13. For instance, the nose adaptor for Fuze had 11 estimates with the estimated unit cost of labour ranging from ₹ 1 to ₹ 107. The fixed overhead in these estimates varied from ₹ 1.50 to ₹ 363; the variable overhead from ₹ 0.5 to ₹ 126. As a result, the actual unit cost of production against these 11 estimates varied from ₹ 141 to ₹ 793. The unit issue price of this Inter Factory Demand item was fixed at ₹ 668. This illustrates the acceptance of inefficiencies with no attempt to contain costs and the loading of these costs to the detriment of the receiving factories, with a cascading effect on the price of the final product. The Ordnance Factory Board appears to wield a relatively free hand on pricing even as the other stakeholders: the Defence Forces or the Ministry of Defence had not held the Ordnance Factory Board accountable on cost of items.

### 8.1.7 Inventory

**8.1.7.1** Store as a percentage of cost of production was high in the Armoured Vehicles group and in the Ammunition & Explosives group at 73 per cent and 68 per cent respectively in 2012-13. The factories under these two groups are basically assembling units with input materials being procured either from sister factories or from trade.

**8.1.7.2** High inventory holding is a persistent trend in the ordnance factories. Inventory of ₹ 10490 crore as of 31 March 2013 held by the Factories accounted for two-third of the cost of production. Further break-up of inventory is at Table-37.

**Table-37**

(₹ in crore)

Year	Stores in Hand	Work in Progress	Stores in Transit	Finished Goods and components	Total inventory
2010-11	5,178	2,296	669	1,214	9,357
2011-12	5,337	2,551	537	1,212	9,637
2012-13	5,604	2,998	682	1,206	10,490

**8.1.7.3** We conducted a review of inventory management in nine sampled factories<sup>132</sup>. The results of the review show that the stock holding in all the sampled factories exceeded the prescribed levels, leading to build-up of non-active stores. Our key findings were:

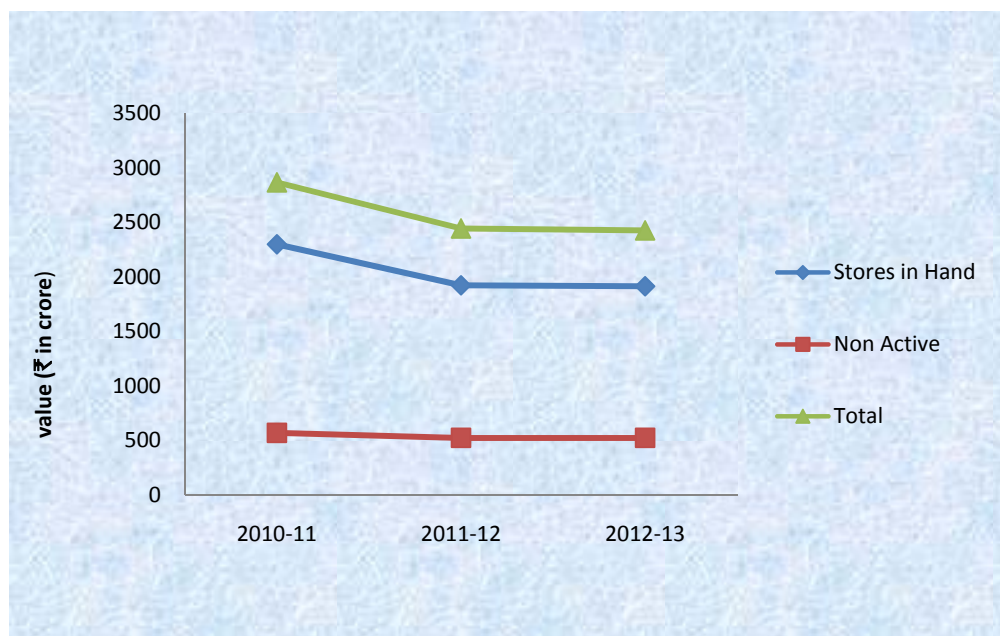
- The Stores-in-hand (or raw materials) constitute over 51 per cent of the inventory holding as of 31 March 2013. Despite a reduction of 15 per cent in this category over 2011-13, this category continues to be an area of concern in Ordnance Factories.
- The Ordnance Factory Procurement Manual lays down Factory-wise limits of stock holding to either six months' or four months' consumption, depending on the nature of factories. We found that 95 per cent of the Stores in Hand in the nine Factories exceeded the prescribed limits. Over four-fifth of these items held in excess of the limits were items which were not consumed and hence, fell in the category of non-active items. Items worth ₹ 96 crore were not only held in excess of the prescribed holding limits but also had not been used even once after their procurement during 2010-13.
- Non-active stores-in-hand are the category of stores which were not consumed at all during a period of three years or more from the date of

<sup>132</sup>Ordnance Factory Katni , Metal & Steel Factory Ishapore , Machine Tools Prototype Factory Ambernath , Ordnance Factory Ambajhari , Gun& Shell Factory Cossipore , Heavy Vehicles Factory Avadi, Ordnance Factory Medak , Opto Electronics Factory Dehradun and Ordnance Factory Dehradun



receipt. In the nine sampled Factories, non-active stores-in-hand constitute 21 *per cent* of the inventory of stores-in-hand. The value of non-active stores stood at ₹ 512 crore as on 31 March 2013; in the three years of review, the figures for non-active stores have remained almost steady.

**Chart-10: Inventory holding in nine OFs**



### 8.1.8 Diversification of client base

**8.1.8.1** Army is the principal client of the Ordnance Factory Board accounting for 80 *per cent* of the production. However, supply from the factories constitutes only 48 *per cent* of the army's total requirement. The Air Force and Navy together account for 3.6 *per cent* of the factory issues. The supplies of arms and ammunition to the paramilitary forces and the State police saw nearly 10 *per cent* spurt over the period 2011-13 and constituted 6.9 *per cent* of factory issues in 2012-13.

**8.1.8.2** A small portion, 7.9 *per cent* of the issues, was accounted by civil trade, mainly in revolvers, pistols, sporting rifles. In 2012-13, the factories reported civilian trade of ₹ 948 crore. Civil trade had seen a spurt in the last three years on which the factories earned considerable profits.

**8.1.8.3** Of considerably lower value, ₹ 15 crore, was the revenue earned from exports in 2012-13; a reduction from ₹ 46 crore earned in 2011-12. Machine Tool Prototype Factory, Ambarnath was the principal exporter. However, the exports are a result of the offset policy of the Government of India which requires importers to offset the imports with exports from domestic suppliers.

### 8.1.9 Absorption of technology

**8.1.9.1** One of the objectives of defence production in India is “to achieve substantive self-reliance in design, development and production of military equipment/weapon systems/platforms required for defence in as early a time frame as possible”. This also forms one of the objectives of the Ordnance Factory Board: “To absorb latest technology through Transfer of Technology and in-house Research & Development”.

#### Transfer of Technology

**8.1.9.2** Transfer of Technology with Original Equipment Manufacturers is an important tool towards self-reliance. During the period 1999-2005, Ordnance Factory Board entered into a Transfer of Technology agreement with four Original Equipment Manufacturers (Table-38). Since 2005, there have been no Transfer of Technology agreements in the Ordnance Factory Board. Even though the planned date of indigenization ranged between 2002-03 and 2009-10 for these Transfer of Technology products, the absorption of technology had not been fully realized as given in the Table 38.

**Table-38**

Year	Item	OEM	Cost (₹in crore)	Planned period for indigenisation	Status of indigenisation
May 2004	AK-630 Guns	Rosoboronexport Russia	96	2007-08	48 per cent
February 2005	84mm Rocket Launcher Mark-III	FFV Ordnance, Sweden	460	2009-10	47per cent
June 2000	155mm Screening Smoke Blue Emission ammunition	M/s Denel Swartklip, South Africa	-	March 2003	25 per cent
October 2003	130mm cargo ammunition	IMI Israel	40	2008-09	Nil progress because of ban on IMI
February 2001	T-90 tanks	Rosoboronexport	2424	2006-07	59 of 78 codes (main assemblies)
	Total		3020		

**8.1.9.3** Transfer of Technology did not lead to self-reliance: non-transfer of designs on critical assemblies by the Original Equipment Manufacturers, inability to develop a strong vendor base for components was the principal causes for setbacks in Transfer of Technology. This pushed the Ordnance Factory Board to rely on perennial imports of critical components. A case in example is the Transfer of Technology on T-90 tanks. The Transfer of Technology was marred by delays in translation of design documents and the Russian firm’s failure to share designs on critical assemblies like the gun assembly. The problem was compounded by delays in decisions on alternative solutions on these designs. The result: fresh imports of T-90 tanks (and kits)

worth ₹ 4,913 crore. In addition, ₹ 2,372 crore was spent on import of critical assemblies/components of T-90, which formed 62 *per cent* of the total cost of indigenous production of T-90 tanks.

### **In-house Research and Development**

**8.1.9.4** Each ordnance factory has a cell for Research & Development. In addition, 11<sup>133</sup> Ordnance Development Centres have been established in different locations with specific expertise in different generic areas. These Centres form the nodal agencies to plan and advise the factories in their Research and Development efforts. The Ordnance Factory Board is authorized with full powers for incurring Research and Development expenditure.

**8.1.9.5** The share of Research and Development expenditure to total revenue expenditure was negligible; at ₹ 48 crore in 2012-13, it accounted for only 0.40 *per cent* of the total revenue expenditure of the Board. There have been success stories in Research and Development expenditure. For instance, the Ordnance Factory Board developed, through a collaborative effort, 155 mm artillery gun which was successful in trial evaluation in February 2013, against which Army placed an indent of 114 guns.

**8.1.9.6** However, delays had affected Research and Development efforts with projects abandoned midway without fruitful results. For instance, in Ordnance Factory Dehu road, two projects for Shells 155mm Red Phosphorous and Screening Smoke Blue Emission had been delayed by 118 and 17 months. The delays led to imports of ammunition to fill the gap. Out of five projects at Heavy Alloy Penetrator Project, Trichy on Fin Stabilised Armour Piercing Discarding Sabot shot/warhead, only one project was completed successfully. Two projects were short-closed and two were under trials.

## **PART-II: OUR AUDIT PROCESS**

### **8.1.10 Audit planning**

**8.1.10.1** Our Audit process starts with the risk assessment of the organization as a whole and of each unit, based on expenditure incurred, criticality and complexity of activities, level of delegated financial powers, assessment of overall internal controls and concerns of stake holders. Previous Audit

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<sup>133</sup>Small Arms Ammunition Development centre at Ammunition Factory Kirkee, Filling Technology and initiatory composition Development centre at Ordnance Factory Chanda, Explosive and Propellant Development centre at Ordnance Factory Bhandara, Ammunition Hardware, Rocket, Mechanical Fuses and Non-ferrous alloys at Ordnance Factory Ambajhari, Electronic Fuses and Guidance at Machine Tool Prototype Factory Ambarnath, Large Calibre weapon and platform centre at Gun Carriage Factory Jabalpur, Small Arms Development at Rifle Factory Ishapore, Ordnance & Combat Equipment Development centre at Ordnance Factory Kanpur, Advance Material Development (Ferrous) center at Metal and Steel Factory Ishapore, Armoured Vehicle Development centre at Ordnance Factory Medak and Optronics Development and Electronics centre at Opto Electronic Factory Dehra Dun.

findings are also considered in this exercise. Based on the risk assessment, the frequency and extent of audit are decided. An annual audit plan is formulated to conduct audit on the basis of such risk assessment.

**8.1.10.2** After completion of audit of each unit, Local Test Audit Reports containing audit findings are issued to the Head of the Unit. The units are requested to furnish replies to the audit findings within a month of receipt of the Local Test Audit Reports. Whenever the replies are received, audit findings are either settled or further action for compliance is advised. Important audit observations arising out of these Local Test Audit Reports are processed for inclusion in the audit reports which are submitted to the President of India under Article 151 of the Constitution of India. During 2012-13, audit of 47 units was carried out by employing 4047 party days. Our audit plan ensured that most significant units, which are vulnerable to risks, were covered within the available manpower resources.

**8.1.10.3** We issued 65 Local Test Audit Reports consisting of 435 paragraphs during 2012-13. In addition, 535 Local Test Audit Reports consisting of 1816 paragraphs were outstanding as of 1 April 2012. Regular interaction with the units helped find satisfactory response on 84 Local Test Audit Reports consisting of 524 paragraphs. As of 31 March 2013 on 516 Local Test Audit Reports consisting of 1727 paragraphs, we are awaiting a response from the units.

**8.1.10.4** This Report also highlights 14 cases of infractions by Ordnance Factory Board, detected in audit, which involved substantial amount of funds.

## **8.2 Inventory Management in Ordnance Factories**

### **Executive Summary**

The Ordnance Factories held an inventory of ₹ 10,490 crore (31 March 2013) which accounted for two-third of the cost of production. The Review of Annual Accounts prepared by the Principal Controller of Accounts, Factories (PC of A, Fys) identifies as an “Area of Concern”, the high level of inventory in the factories. The database of stores is computerised in the Ordnance Factory Board (Board) and in the Factories. Hence, we felt that a review of the inventory management would help us make suitable recommendations on inventory management in the Ordnance Factories.

Our audit covers the performance of Ordnance Factories in the years 2010-11 to 2012-13. It covered the Ordnance Factory Board (Board) at Kolkata and nine Ordnance Factories selected across all operating groups of Factories. The selected Factories together held inventory worth ₹ 4,799 crore which

represented 46 *per cent* of the total inventory held in all Ordnance Factories as of 31 March 2013.

Stores-in-hand (SIH) *i.e.* inventory of raw material with the Stores Section of the Factory is an area of concern in inventory management in the Factories. At the level of ₹ 2,425 crore, SIH constituted over 50 *per cent* of the inventory holding in the nine sampled factories as of 31 March 2013. In the nine sampled factories non-moving SIH, *i.e.* items which were not consumed for a period of three or more years after purchase, increased by 73 *per cent* during 2010-13. Our analysis showed that 95 *per cent* of the SIH in the sampled Factories exceeded the prescribed limits. Over four-fifth of these items held in excess of the limits were items which were not consumed at all during the year under our analysis, 2012-13. Items worth ₹ 96 crore were not only held in excess of the prescribed holding limits but also had not been used even once after their procurement during 2010-13. The current procedure to exhaust all options of potential usage had in effect failed and led to build-up of non-active stores. On the other hand, the definition of “active” stores (an item is categorised as active even if only one unit is consumed during the year) creates a potential risk of token consumption in order to keep the items off the “non-moving” category. All nine sample Factories together registered token consumption against 5,925 items valued at ₹ 373 crore, indicating a common trend.

Works-in-Progress (WIP) are inventory held by the Factory Production Shop, which are under production. WIP in the nine Factories increased by 21 *per cent* during the period 2010-13 and as of March 2013, the value of WIP stood at ₹ 1501 crore. The increase in WIP without a correlated increase in cost of production points to a risk of fraudulent booking of material or labour against open warrants *i.e.* warrants not closed although production against them had stopped for variety of reasons. Although warrants are required to be closed within six months, 17 *per cent* of warrants of eight sampled factories were over a year old. The value of warrants that were open for more than one year was ₹434 crore. The Factories had been reflecting rejected stocks as WIP or Stores-in-transit between Factories, in some cases for over 20 years, which remained un-detected. A protracted process for review of inventory and to fix accountability for loss due to rejections, led to a tendency in the Factories to “hide” rejections by categorising rejected stores under WIP or SIT even as delays in fixing accountability defeated the purpose.

The assurance to be provided by the physical verification was inadequate and did not reflect the correct position on physical availability of stores. The use of “loan issues” of material without a demand note from the Shop does not have the sanction of Board and constitutes a bad practice. The review of inventory holding by the Board was not comprehensive and did not yield clear and firm directions to the Factories.

## Recommendations

- *The budget estimates on stores procurement should be closely linked to the production plans of the Factories. The Board may institute an annual mechanism to review reasons for variations which will help to increase the accuracy in estimation. This process should be steered by the Deputy Director General (Budget).*
- *The Board may review the high incidence of stores in excess of the authorised limits and revisit the norms for stores holding.*
- *The Board may re-examine the parameters for categorisation of Stores-in-hand as “active” and peg it to a percentage of utilisation, so as to avoid cases of nominal consumption.*
- *Non-active stores (8530 items) valuing ₹161 crore in Heavy Vehicle Factory at Avadi on account of T-72 tanks may be segregated for Technical Review (after identifying the requirements for overhaul of existing T-72 tanks) which would facilitate specific directions from the Board on these items. Such segregation would leave a more manageable inventory in the hands of the Board.*
- *The Board may recognise the risk of fraudulent booking of expenditure against warrants kept open without any production against them. An annual exercise to segregate such warrants and their review will mitigate the risk.*
- *Work-in-Progress (WIP) items on account of MBT Arjun at Heavy Vehicle Factory at Avadi may be segregated for technical review which would facilitate specific directions from the Board on these items.*
- *The Board may insist on annual item-wise analysis of items reflected as WIP and Stores-in-Transit for long periods. This could be done on a risk-based sampling which factors both value and time analysis.*
- *The Board may review the reasons against the regular practice of “loan issues” and take steps to eliminate this bad practice.*
- *The Board may simplify the process for declaration of items as surplus and their disposal to ensure timely action on items that have become “non-active” stores.*
- *The Board may fix viable timelines for constitution of and the submission of reports by the Board of Enquiry as well as for action on these reports.*
- *The Board may draw a time-bound plan for seamless integration of the two databases.*

The Board accepted all the above recommendations during the Exit Conference (September 2014).



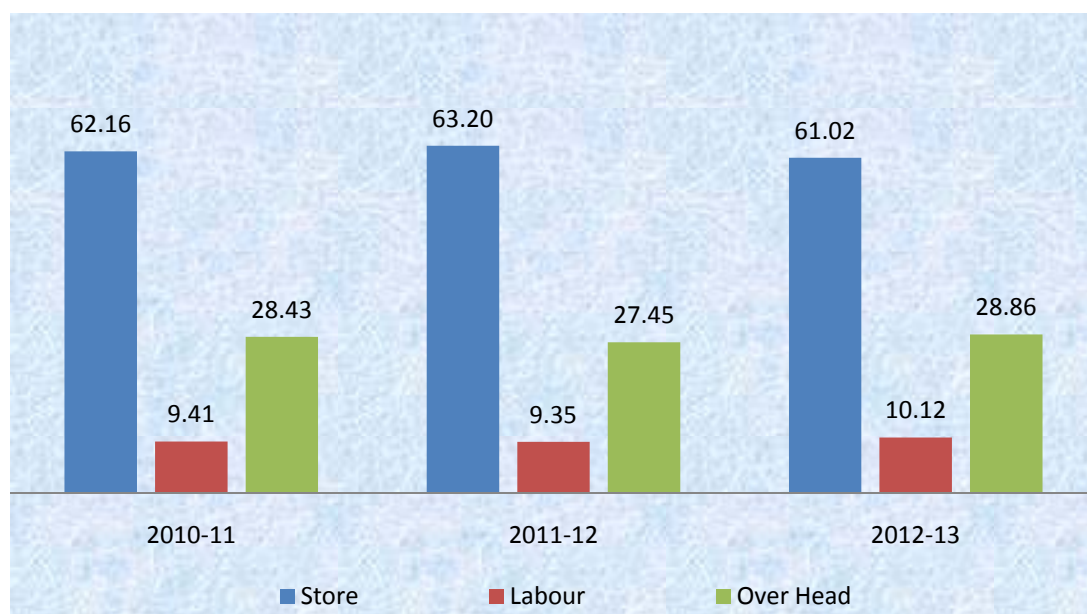
### 8.2.1 Introduction

Ordnance Factories, 39 in number, manufacture various items for the defence services. These items are segregated into five Operating Groups and include arms, ammunition, armoured vehicles, transport vehicles, clothing and equipment. The Factories work under the overall control of the Ordnance Factory Board (Board), Kolkata. Member, Planning and Materials Management and Engineering (P&MM) in the Board is in charge of inventory management. The organisation of the Member (P&MM) is given in **Annexure-IX**.

The Ordnance Factories plan their production on the basis of the requirements (annual indent) projected by, and in mutual consultation with the armed forces. Only in January 2010, the process was streamlined with the Army providing a five year roll-on plan for ammunition; such a plan for weapons was started in February 2011. Army being the major client for the Ordnance Factories, a roll-on plan aids the Board in multi-year planning for production and associated activities like procurement of stores and inventory management.

Stores constitute around 60 *per cent* of the cost of production during 2010-13 in the Ordnance Factories (Chart 11). The average annual consumption of stores in the last three years: 2010-13 was ₹ 9,500 crore and the average cost of production during the same period was ₹ 15,300 crore. The Factories purchase stores through imports, from indigenous sources and from other sister Ordnance Factories.

**Chart 11: Break-up of Cost (In percentage)**

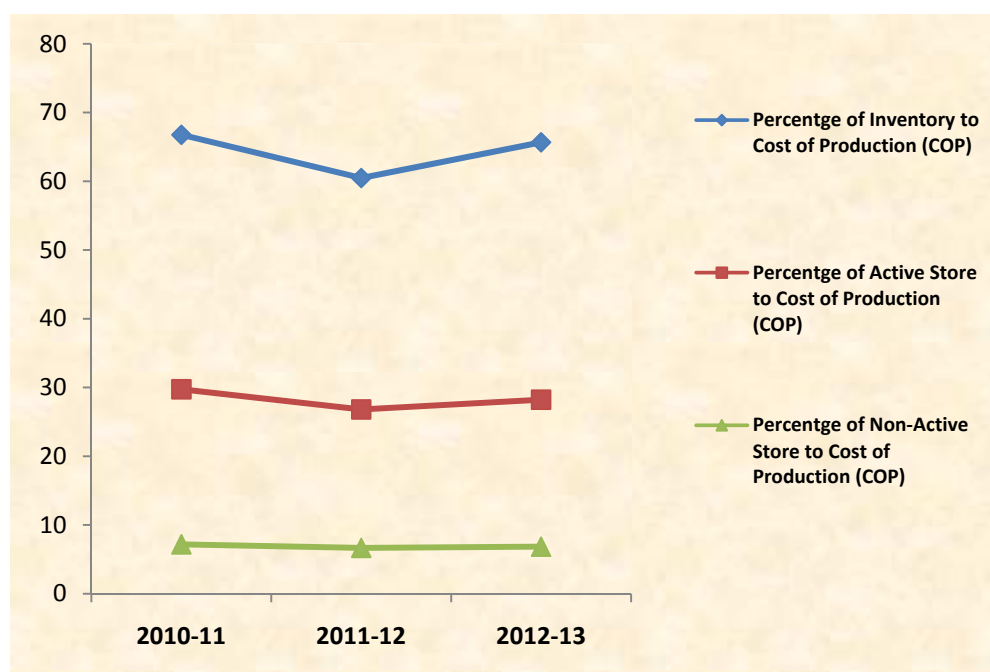




### 8.2.2 Why did we take up this audit?

Altogether, inventory of ₹ 10,490 crore held by the Factories as on 31 March 2013 accounted for two-third of the cost of production. The holding showed an upward trend in 2012-13(Chart 12) when it stood at 66 *per cent* of cost of production. The level of non-active inventory, defined as those items of store which have not been utilised at all during the year, remained static during the last three years. The Review of Annual Accounts prepared by the Principal Controller of Accounts identifies as an “Area of Concern”, the high level of inventory in factories. We felt that a review of inventory management would help us aid the Board in identifying the reasons for the inventory build-up and make suitable recommendations on inventory management.

**Chart-12**



### 8.2.3 Scope of audit and sample

Our audit covers the performance of Ordnance Factories in the years 2010-11 to 2012-13. It covered the Board at Kolkata and nine<sup>134</sup> Ordnance Factories selected across all operating groups of Factories. The selected Factories together hold inventory worth ₹ 4,827 crore which represented 50 *per cent* of the total inventory held in all Ordnance Factories. Table-39 below gives details on audit sample selection.

<sup>134</sup> Ordnance Factory Katni, Madhya Pradesh (OKAT), Metal and Steel Factory Ishapore, West Bengal (MSF), Machine Tools Prototype Factory Ambarnath, Maharashtra (MTPF), Ordnance Factory Ambajhari, Maharashtra (OFAJ), Gun & Shell Factory Cossipore, West Bengal (GSF), Heavy Vehicles Factory Avadi, Chennai (HVF), Ordnance Factory Medak, Telangana (OFMK), Opto Electronics Factory Dehradun, (OLFD) and Ordnance Factory Dehradun, Uttarakhand (OFD)

**Table-39: Population and sample selected**

Category of stores <sup>135</sup>	Population		Sample		Quantum of audit (in percentage)	Remarks
	Number of items	Value (₹ in crore)	Number of items	Value (₹ in crore)		
A	2,659	727	161	636	100	Stores items that were not included in the sample are: (a) those less than ₹ 10 lakh in value in five Factories i.e. OKAT, MSF, MTPF, GSF & OFD and; (b) less than ₹one crore in three Factories i.e. OFAJ, OFMK & OLF &(c) less than ₹ two crore in HVF.
B	2,072	592	55	79	50	
C	98,463	1,101	78	194	25	
<b>Total</b>	<b>103194<sup>136</sup></b>	<b>2,419<sup>137</sup></b>	<b>294</b>	<b>909</b>		

#### 8.2.4 Audit objectives

The objectives of our audit were to draw an assurance that:

- An effective mechanism was in place for estimating the requirement of funds and in phasing of utilization of funds on stores procurement;
- The process was adequate to ensure that Stores-in-hand held by the factories was within the prescribed norms and are utilised on time to prevent build-up of non-active stores;
- Stores categorised as “Work-in-progress” are reviewed to ensure timely completion against the authorisation for production;
- Stores-in-transit were promptly taken on charge and disputes between factories were resolved to ensure clearance of these items; and
- The internal controls on inventory management were in place and were implemented effectively.

#### 8.2.5 Source of audit criteria

The major sources of audit criteria adopted for assessing the audit objectives were:

- OFB’s Procurement Manual 2005 and 2010;
- Factory Accounting Rules (FAR);
- Defence Accounts Department Office Manual Part-VI (DAD OM Pt-VI);
- Orders and instructions issued by the Ministry of Defence and OFB;

<sup>135</sup>A category items are those items whose annual consumption value represents 80 per cent of the total consumption value, B category items are those items whose annual consumption value represents 15 per cent of the total consumption value and C category items are those items whose annual consumption value represents 5 per cent of the total consumption.

<sup>136</sup> Out of 3.04 lakh store items, 2.01 lakh store items were having nil stock balance and actual stock items were 1.03 lakh items

<sup>137</sup> The value of store in hand (SIH) as on 31 March 2013 in the database of the nine Factories is reflected at ₹ 2419.24 crore whereas ₹ 2425.25 crore in the annual store account, which is yet to be reconciled.

- Delegation of financial powers;
- Minutes of the meetings of the OFB and Ordnance Factories; and
- General Financial Rules (GFR)

#### **8.2.6 Audit methodology**

The audit was conducted during October 2013 to January 2014. The database of inventory in all the nine Ordnance Factories was analysed using a computerised audit tool, IDEA (Interactive Data Extraction and Analysis). We focused on Stores-in-hand, Work-in progress and Stores-in-transit which together accounted for 89 *per cent* of the total inventory.

The audit objectives and criteria were discussed with the Board during an ‘Entry Conference’ held in November 2013. The findings were communicated to the factory management during the audit. Response of the Board, against our original draft report issued in March 2014, was received in September 2014. Views of the Board and the Ordnance Factories have been included in this Revised Report, where appropriate. The ‘Exit Conference’ was held on 03 September 2014, wherein the report was discussed.

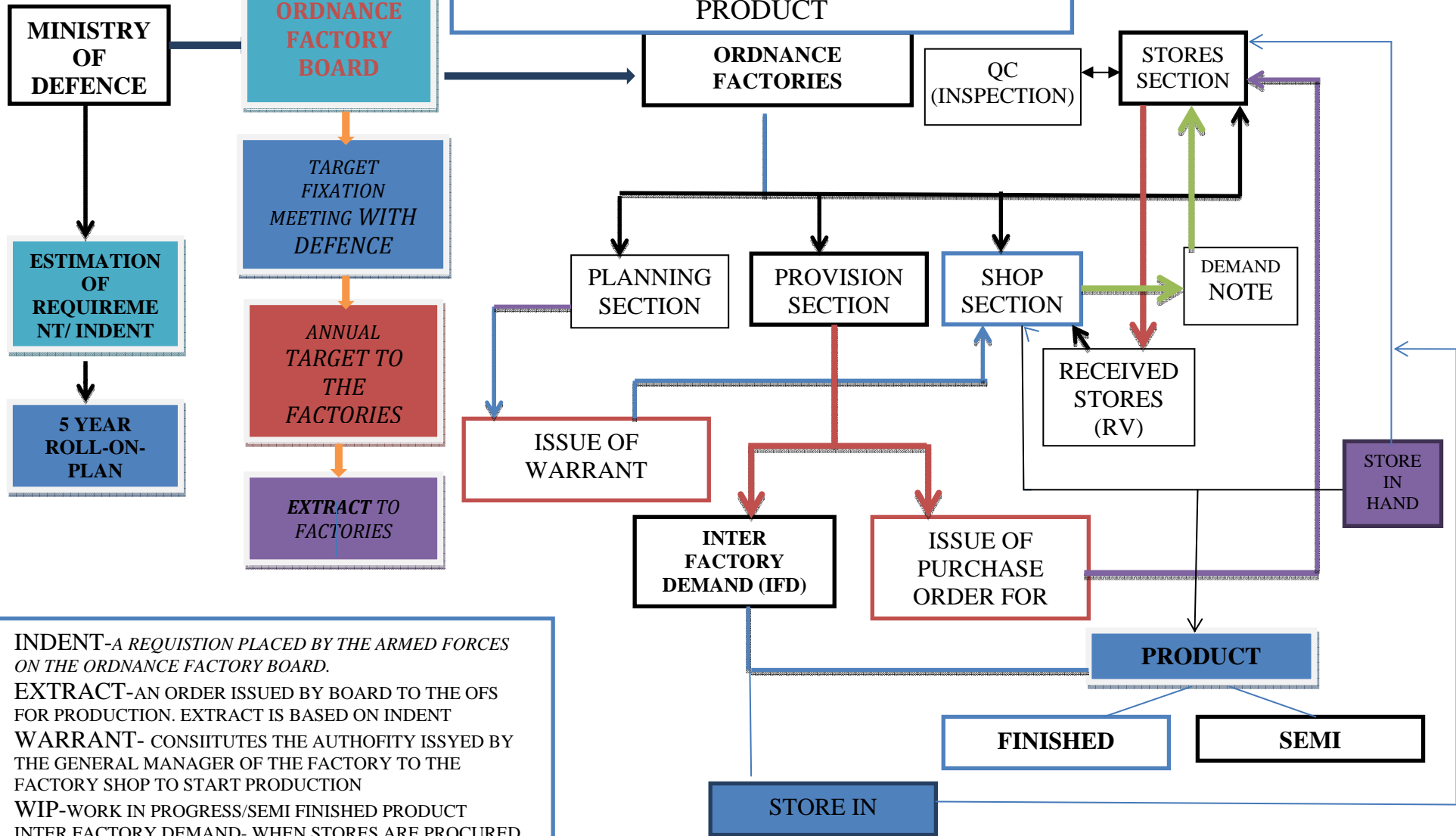
#### **8.2.7 Acknowledgement**

We would like to acknowledge the support and co-operation received from the Board and the officers and staff at the nine Ordnance Factories.

#### **8.2.8 Process flow from demand to inventory**

The flow-chart overleaf illustrates the procedures in purchase and utilisation of stores in Ordnance Factories.

**FLOW CHART FROM DEMAND TO- END-PRODUCT**



**INDENT**-A REQUISITION PLACED BY THE ARMED FORCES ON THE ORDNANCE FACTORY BOARD.  
**EXTRACT**-AN ORDER ISSUED BY BOARD TO THE OFS FOR PRODUCTION. EXTRACT IS BASED ON INDENT  
**WARRANT**- CONSISTUTES THE AUTHORITY ISSYED BY THE GENERAL MANAGER OF THE FACTORY TO THE FACTORY SHOP TO START PRODUCTION  
**WIP**-WORK IN PROGRESS/SEMI FINISHED PRODUCT  
**INTER FACTORY DEMAND**- WHEN STORES ARE PROCURED FROM SISTER ORDNANCE FACTORIES

### 8.2.9 Audit findings

**Audit Objective:** An effective mechanism was in place for estimating the requirement of funds and in phasing of utilization of funds on stores procurement

#### 8.2.9.1 Expenditure on stores management

The cost of procurement is met from Stores budget allotted by the Board at the beginning of each financial year. Details of the utilisation of funds in stores management in the sampled Ordnance Factories are given in Table-40.

**Table-40: Utilisation of funds on stores**

(₹ in crore)

Year	Budget estimate (BE)	Actual expenditure (AE)	Variation (AE – BE)	Percentage of variation
2010-11	3,632	2,515	-1,117	-31
2011-12	2,101	2,372	271	13
2012-13	2,222	2,056	-166	-07

The gap between budget estimates and actual utilisation had decreased substantially over the 3 years, indicating an improvement in estimation of stores requirement. However, factory-wise analysis (**Annexure X**) shows substantial variation between actual and estimated expenditure. For instance, Opto Electronics Factory at Dehradun exceeded its budget by 87per cent in 2012-13; in the same year, the Metal & Steel Factory at Ishapore exceeded the budget by 57per cent. On the other hand, Machine Tools Prototype Factory (MTPF) at Ambarnath could not spend 31per cent of its budget in 2012-13. The savings in five Factories netted the excess in other four Factories, keeping the overall expenditure almost within the budgeted limits in 2012-13.

Expenditure on stores decreased by 18 per cent during the period 2010-13. This was mainly because of bulk imports<sup>138</sup> of T-90 kits by the Heavy Vehicle Factory at Avadi in 2010-11 which was followed by almost nil procurement in the subsequent two years. The reduction in Avadi more than offset the increase in expenditure on stores in the remaining Factories during the period 2010-13.

The Board felt (September 2014) that budget estimates are prepared when firm indents are not available and hence, the accuracy of estimation should be judged on the revised estimates which are prepared after the receipt of indent and are more realistic.

<sup>138</sup> Of Semi-knocked down and Complete knock-down items

We accept that expenditure in the Board is squarely predicated on indents, which are not always predictable. Budgetary flows, dependent on the estimates, ensure that production proceeds un-hindered. However, significant divergence from estimates, at the factory-level, as illustrated in Opto Electronics Factory, Dehradun and Metal and Steel Factory Ishapore, is an issue that merits monitoring.

Month-wise analysis of expenditure (**Annexure XI**) shows a skewed expenditure pattern in the Factories with bulk of expenditure pushed to the fourth quarter of the financial year January–March, with the last month expenses being disproportionately high. The rush of expenditure was particularly noticeable in the Heavy Vehicle Factory at Avadi, Opto-Electronics Factory at Dehradun and Ordnance Factory, Dehradun. The Ordnance Factory, Dehradun spent 56 *per cent* of the stores budget in the last quarter in 2012-13; the corresponding figures for 2010-11 and 2011-12 were 61 *per cent* and 42 *per cent* respectively. The pattern of expenditure is a consequence of bunching of bills and of receipts against procurement orders in the last quarter. This could be a consequence of delays in procurement which in turn could affect the supply chain management and the Factories' ability to meet production and delivery against targets. The inventory database does not contain data on scheduled date of receipt of stores *vis-à-vis* actual date of submission of bills against supply of stores. As a result, we could not conduct an analysis of reasons for rush of expenditure in the last quarter.

The Board felt (September 2014) that these were stray cases of variations which were mainly due to foreign purchase and centralised purchases. The facts did not however, corroborate the Board's view.

### **Conclusion**

There was wide variation in utilisation of budget at a few sampled Factories and there is scope for substantial improvement in estimating the requirement of funds and in phasing of utilisation of funds on stores procurement.

### **Recommendation**

- *The budget estimates on stores procurement should be closely linked to the production plans of the Factories. The Board may institute an annual mechanism to review reasons for variations which will help to increase the accuracy in estimation. This process may be steered by the Deputy Director General (Budget).*

### 8.2.9.2 Analysis of inventory

**Audit Objective:** The process was adequate to ensure that Stores-in-hand held by the factories was within the prescribed norms and were utilised on time to prevent build-up of non-active stores.

Inventory held by the Factories are in the following forms:

- **Stores-in-Hand (SIH):** Raw material held by the Stores Section
- **Work-in-progress (WIP):** Items of inventory which are under production in the Factory Shop.
- **Stores-in-Transit (SIT):** Stores held by the Store section that are issued by one factory but not accounted for by the recipient factory as of 31 March of each year.
- **Finished goods/Finished components (FG/FC):** Inventory of final products and intermediary products held by the Factory Shop.

The trends in inventory across these categories in the nine Factories are given in Table-41.

**Table-41: Inventory position**

(₹in crore)

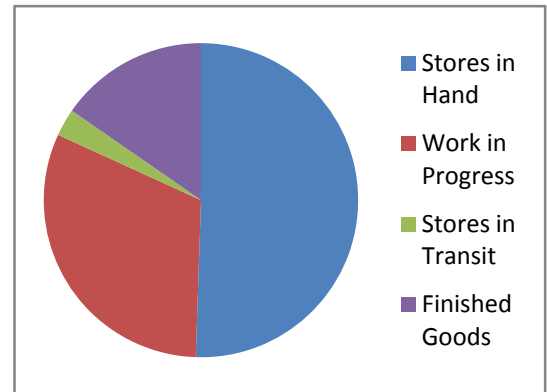
Year	Stores in Hand	Work in Progress	Stores in Transit	Finished Goods	Total inventory
2010-11	2,867	1,242	202	835	5,146
2011-12	2,443	1,446	131	808	4,828
2012-13	2,425	1,501	136	736	4,798

Although total inventory holding in Ordnance Factories as a whole increased by 12 *per cent* during 2010-13, the nine sampled Factories showed a different trend. The holding across the nine Factories reduced by 6.7 *per cent* in the three years, which was mainly due to 23 *per cent* reduction in procurement of stores coupled with 10 *per cent* increase in consumption of stores.

### 8.2.9.3 Stores- in- Hand

The Stores-in-hand (or raw material) constitute over 51 *per cent* of the inventory holding as of 31 March 2013. Despite a reduction of 15 *per cent* in

**Chart 13**



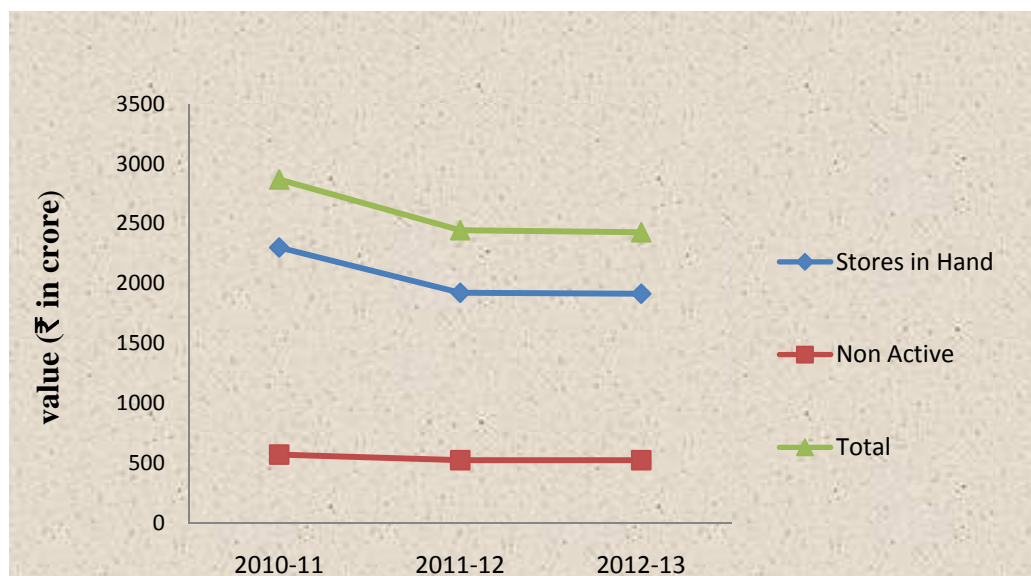


this category over 2011-13, this category continues to be an area of concern in Ordnance Factories.

Ordnance Factories classify inventory into following categories on the basis of their utilisation:

- **Active:** stores consumed during the year, regardless of the units or regularity of consumption.

**Chart-14: Inventory Holding in Nine OFs**



- **Non-active:** stores not consumed at all during the year, which is further classified as -
  - **Slow moving:** stores which were not consumed for a continuous period of one year from the date of receipt.
  - **Non-moving:** stores which were not consumed at all during a period of three years or more from the date of receipt.
  - **Surplus:** stores which cannot be utilised now or in future; are liable to deteriorate; and are declared surplus by the Factory after a review. These can be considered for use by other sister factories or Defence Public Sector Undertakings.
  - **Scrap/obsolete:** stores which are unserviceable and are declared as scrap by the Factory after a review. These are then disposed off by the Factory.

Non-active stores-in-hand in the nine sampled Factories constituted 21 per cent of the inventory of stores-in-hand during 2011-13. The value of non-active stores stood at ₹ 512 crore as on 31 March 2013. The analysis of non-active stores in the nine Factories during the three years 2010-13 is given in Table-42.

**Table-42: Non-active stores***(₹ in crore)*

Year	Slow-Moving	Non-Moving	Surplus	Scrap, Obsolete	Maintenance spare	Total non-active stores
2010-11	372	158	7	10	21	568
2011-12	274	206	6	15	21	522
2012-13	195	273	4	20	20	512

During 2010-13 the holding of non-active stores in the nine Factories reduced by 10 *per cent* which is an improvement. But the non-moving stores, *i.e.* items which were not consumed in the preceding three years, increased by 73 *per cent* during the same period.

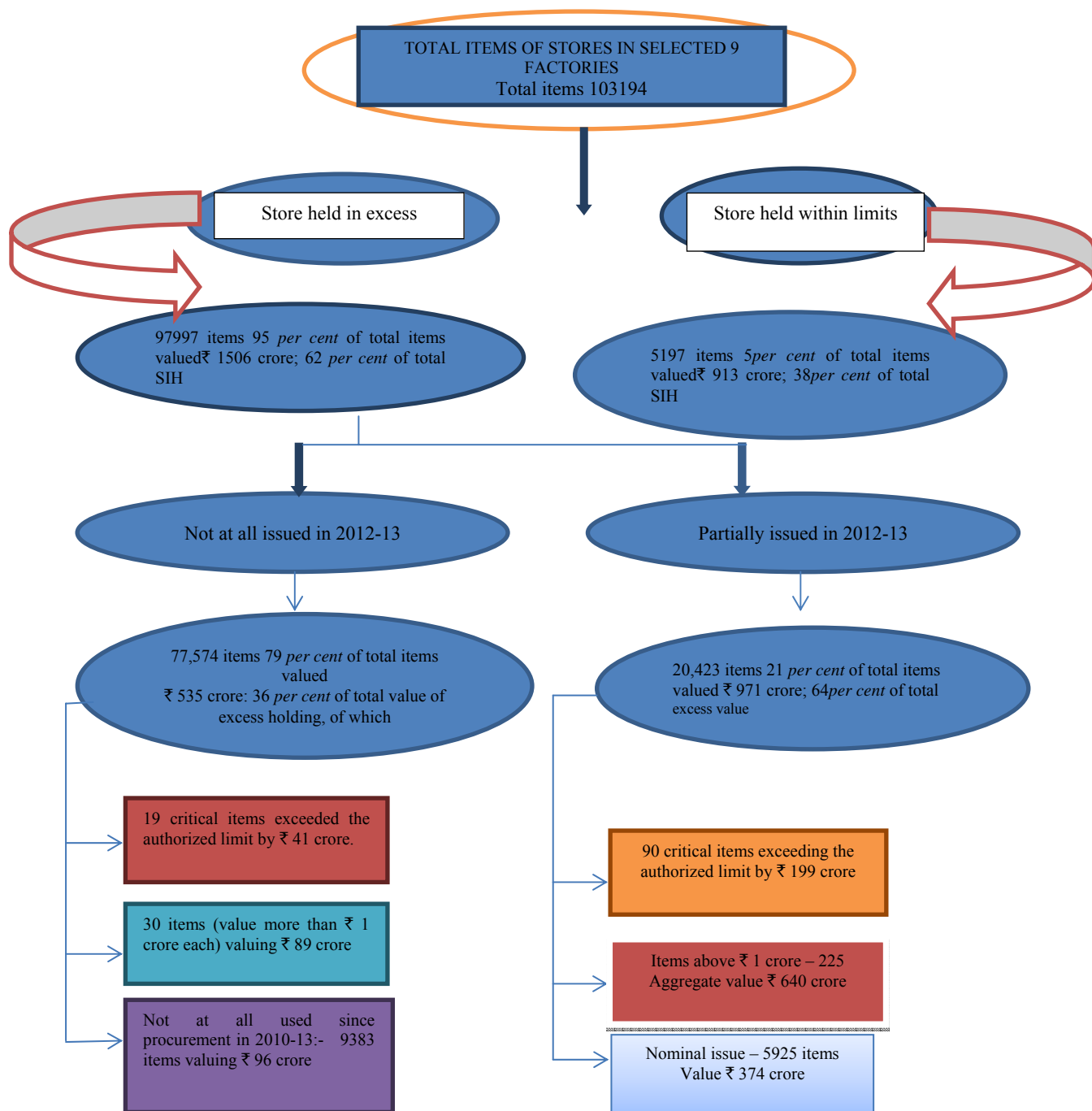
The Board stated (September 2014) that all efforts would be made to reduce the Non-active stores in the factories. Instructions were being issued to the factories to undertake a special drive to utilise or dispose non-moving stores wherever feasible.

#### 8.2.9.4 Holding against authorised limits

The Ordnance Factory Procurement Manual lays down Factory-wise limits of stock holding to either six months' or four months' consumption, depending on the nature of factories. Analysis of the pattern of consumption in the nine Factories showed that the actual stock held exceeded the prescribed limits in all the Ordnance Factories except Opto Electronics Factory at Dehradun as detailed in the **Annexure XII**. Inventory held in excess of the authorised limits was 35 *per cent* of the total stock-in-hand as of 31 March 2013. Consequently, the stores could not be consumed and fell in the category of slow-moving stores initially and later, became non-moving stores.

Chart 15 provides the results of our analysis of the database on stores-in-hand (SIH). We found that 95 *per cent* of the SIH in the nine Factories exceeded the prescribed limits. Over four-fifth of these items held in excess of the limits were items which were not consumed and hence, fell in the category of non-active items. Items worth ₹ 96 crore were not only held in excess of the prescribed holding limits but also had not been used even once after their procurement during 2010-13.

Chart – 15



### 8.2.9.5 Reasons for Excess holding

The databases maintained by the Factories on inventory do not indicate the reasons for the excess holding. We examined individual items and found that the following reasons contributed mainly to 27 cases of stores valuing ₹ 270 crore, segregated under different causes for excess inventory, as indicated in **Annexure XIII**:

- The Factory could not meet the production schedules and the delays led the buyer to cancel (or foreclose) the order. Hence, the stores bought to

meet the original production targets, remained unutilised. Illustrative cases are indicated at serial number 1 to 7 of **Annexure XIII**.

- The indents were short-closed because the items produced did not meet the quality standards and were rejected. As a result, the remaining stores were rendered surplus. Illustrative cases are given at serial number 8 to 13 of **Annexure XIII**.
- The buyer/ the Board reduced the targets mid-way through production and the stores were rendered surplus. Illustrative cases are indicated at serial number 14 to 16 of **Annexure XIII**.
- Problems in supply chain management where inability to procure one/more input material renders the other related stores procured for the production, unutilised. Illustrative cases are indicated at serial number 17 to 19 of **Annexure XIII**.
- Over-provisioning emerges as a problem across the Factories. The reasons for over-provisioning range from genuine mistakes, problems in programming and more simply, lack of accountability. Illustrative cases are listed at serial number 20 to 27 of **Annexure XIII**.

We found that the Heavy Vehicle Factory at Avadi alone accounted for inventory of ₹ 688.92 crore of stores-in-hand which exceeded the prescribed limits, of which ₹ 304.76 crore fell under non-active items as of March 2013. A major chunk of this inventory (8530 items valued at ₹ 161 crore) was related to T-72 tanks which had been in stock since 2007, lying un-utilised because the buyer, Army fore-closed the order on grounds of five year slippage in production and poor quality of the product.

The Board, in its reply (September 2014), provided an analysis for the build-up of stores in the factories, as under:

<b>Comments of the Board</b>	<b>Our remarks</b>
Increase in inventory holding of non-ferrous scrap by ₹ 40 crore at Ordnance Factory Katni was due to upward revision of price.	The increase in value of non-ferrous scrap did not form a part of closing stock as the value of closing inventory of the said store was ₹ 2 crore out of total inventory of ₹ 103 crore as of March 2013.
Value of inventory went up at Metal Steel Factory, Ishapore after physical verification revealed surplus stores lying in the production shop, which were then taken on charge.	The surplus stores were not actually taken on charge in the stores accounts without which the value of inventory could not be increased.
Inventory limit was exceeded due to suspension of project on Gas system assembly on cluster Bomb at Machine Tools Prototype Factory.	The stores were procured as back as in March 1999. Management could not take action either for alternate use or disposal of the item for more than a decade.

Out of three items at Ordnance Factory Ambajhari, Parted steel billets for 105 IFG had been consumed fully by issue to Ordnance Factory Kanpur, Magazine blank was under active consideration for disposal and parted steel billets for 155 Extended Range Full Bore ammunition would be consumed in 2014-15 and 2015-16.	Parted steel billets 105 IFG, Magazine blank and Parted steel billets for 155 Extended Range Full Bore ammunition valuing ₹ 1.81 crore, ₹ 0.06 crore and ₹ 20.83 crore respectively were still held in stock (September 2014).
Holding of two high value stores viz; AK-630 and 84 mm RL MK-III at Gun & Shell Factory was due to long procurement cycle.	The management should have a system in place to carry out advance planning for procurement of stores involving long procurement cycle.
Heavy Vehicles (Armoured Vehicles group) Factory has been authorised to hold inventory up to 365 days due to specific requirement of the nature of the factory.	This is in contradiction of OFB's own procurement manual which authorises a limit of six months' holding for Armoured Vehicles group of factory which is the maximum amongst all groups of factories in OF organisation.

However, two factories- Opto-Electronic Factory at Dehradun and Ordnance Factory, Dehradun informed (September 2014) that the SIH holding had been substantially reduced as of 31 March 2013.

#### 8.2.9.6 Nominal consumption of stores

Analysis of pattern of consumption in the Factories shows that the definition of categories of non-active stores carries an additional risk. We found 5925 items valued at ₹ 374 crore against which token consumption was registered in the Factories. The consumption of the above items was so low that if actual consumption was taken as the yardstick, the current holding would suffice for an irrational number of years. But token consumption of this kind would keep such items off the non-moving/slow-moving category which would make detection of these items as concern areas, difficult. This constitutes a potential risk. These findings are given in Table-43.

**Table-43: Nominal issue of stores**

Factory	Item code	Unit of quantity	Stock	Consumption in 2012-13	Stock in years/ consumption as a percentage of stock
OKAT	1035763004	Litre	17200	800	21 / 4.65
MSF	4203144066	Number	580	20	29/3.45
MTPF	7119047045	Number	4166	182	23 / 4.37
OFAJ	0282083096	Number	37929	1060	35 / 2.79
GSF	0133100032	Kg.	29289	0.013	2253014/0.00004
HVF	6206205142	Number	178	6	29 / 3.37
OFMK	6420086002	Kg	71736	225	318 / 0.31
OLF	7420111008	Number	64945	2300	28 / 3.54
OFD	0020024547	Number	577	1	577 / 0.17

The Board, in response (September 2014) furnished an analysis of reasons for accumulation of the stores during earlier years and present position of the particular stores highlighted as example. They failed to indicate any reasons against nominal issue of stores of 5925 items and steps being taken to curb the practice of shifting non-active stores to active stores through nominal issue.

### **Conclusion**

Stores-in-hand (SIH) is an area of concern in inventory management in the Factories. In the nine sampled factories, non-moving stores, i.e. items which were not consumed in the preceding three years, increased by 73 per cent during 2010-13. Around 95 per cent of the SIH in the nine Factories exceeded the prescribed limit. Over four-fifth of these items held in excess of the limits were items which were not consumed and hence, fell in the category of “non-active” items. On the other hand, the definition of “active” category (an item is categorised as active even if one unit is consumed during the year) creates a potential risk of token consumption in order to keep the items off the “non-moving” category. All nine sample Factories together registered token consumption against 5,925 items valued at ₹ 373 crore, indicating a common trend.

### **Recommendation**

- *The Board may review the high incidence of stores in excess of the authorised limits and revisit the norms for stores holding.*
- *The Board may re-examine the parameters for categorisation of SIH as “active” and peg it to a percentage of utilisation, so as to avoid cases of nominal consumption.*
- *Non-active stores (8530 items) valuing ₹161 crore in Heavy Vehicle Factory at Avadi on account of T-72 tanks may be segregated for Technical Review (after identifying the requirements for overhaul of existing fleet of T-72) which would facilitate specific directions from the Board on these items. Such segregation would leave a more manageable inventory in the hands of the Board.*

#### **8.2.9.7 Work in Progress (WIP)**

**Audit Objective:** Stores categorised as “Work-in-Progress” are reviewed to ensure timely completion against the authorisation for production.

Work-in-Progress constitutes those items of inventory which are under production. On receipt of a target from the Board, the General Manager of the Ordnance Factory issues a warrant to the Production Shop. The warrant is essentially an authorisation for the Shop to start production. The warrant

provides the nomenclature and quantity of the final item to be produced, the input material and the labour estimates for the production of the item. So, the quantum of WIP is essentially the cost booked (labour and material) against a warrant for an item that is still under production.

#### 8.2.9.8 Trends in holding of Works-in-Progress

Works-in-Progress in the nine Factories increased by 21 *per cent* during the period 2010-13. As of March 2013, the value of Works-in-Progress stood at ₹ 1,501 crore in the nine sampled Factories. Heavy Vehicle Factory at Avadi alone accounted for ₹ 382 crore of which ₹ 128 crore was on account of MBT Arjun for which the Factory has not received any fresh orders from the Army since 2010.

The increase of 21 *per cent* in Works-in-Progress did not correlate with 13 *per cent* increase in cost of production and less than one *per cent* increase in value of issue during the same period. This points to a risk of irregular or unauthorised booking of material or labour against open warrants *i.e.* warrants not closed although production against them had stopped for variety of reasons.

#### 8.2.9.9 Time analysis of open warrants

The rules require that a warrant will be of a normal duration of six months only, which pre-supposes that production of items should normally be completed within six months. When considered necessary, a warrant can be extended beyond the stipulated six months, but only with the approval of the Board.

**Table-44**

Period (in years) <sup>139</sup>	No. of warrants	Value (₹ in cr.)
1-2	2,329	244
2-5	391	178
5-8	57	11
8-11	13	1
Total	<b>2,790</b>	<b>434</b>

A time-analysis of open warrants for eight sampled factories<sup>140</sup> showed that around 17 *per cent* of warrants were over a year old. The value of warrants that were open for more than one year was ₹ 434 crore. There was nothing on record to indicate that the Board's approval had been received for the warrants

<sup>139</sup> Since the date of the warrant is not mentioned in the database of the Accounts (it mentions the year only), we could not cull out the number of warrants which were open for six months to one year.

<sup>140</sup> Age-wise analysis of WIP in respect of Machine Tool Prototype Factory was not available in the Local Accounts Office.



outstanding for periods in excess of six months. Review of Annual Accounts prepared by the Principal Controller of Accounts (Factories) highlighted this issue of old outstanding WIP, but we did not find on record directions by the Board in this matter.

The Board stated that (September 2014) some of the vintage warrants were pending regularisation of loss; the position had improved in all factories except Gun and Shell Factory, Cossipore and Machine Tool Prototype Factory, Ambarnath, and that all the warrants prior to 2008-09 had been closed. It was also claimed that as of March 2013, only 1,165 warrants valuing ₹ 337 crore were more than one year old.

Our audit results did not corroborate the claim as per the figures shown in the Table. The Board also felt that considering the complexities/manufacturing cycles of the product, norms on life of warrants merit a review.

Analysis of individual items in WIP showed that included in this class of inventory are items that had been rejected by the buyer or were simply lying without completion of production. Cases illustrated in **Annexure XIV** (serial number-1,2,3,4,5,6,7,8,11 and 12) show that significant number of items reflected as WIP are essentially items that were rejected in quality control.

#### **8.2.9.10** *Suspicious warrants*

Absence of managerial oversight at the level of the Board has encouraged a lax approach to an issue that has potential risk of fraud. Analysis of the outstanding warrants showed that 19 *per cent* (3,333 warrants) with a value of ₹452 crore, had only cost of stores booked against them. This essentially means that the production did not commence on these material after they were received in the Shop, since there was no labour charge or overheads booked against them. Another 1,858 warrants had no booking of material but ₹ 7 crore had been charged as labour against them. These warrants kept open though no production is currently underway against them, pose a risk of fraudulent booking of expenditure.

The Board felt (September 2014) that the above warrants may be for items in semi-finished condition. The material must have been drawn by the production section but no labour was drawn as yet. Regarding WIP in the form of labour alone, the Board stated that the warrant mentioned would be examined and remedial action be taken.

The reply of the Board is not acceptable as the warrants in the form of material only are outstanding since 2003-04 and warrants in favour of labour are outstanding since 2006-07.

## Conclusion

The increase in WIP without a correlated increase in cost of production points to a risk of fraudulent booking of material or labour against open warrants i.e. warrants not closed although production against them had stopped for variety of reasons. Although warrants are required to be closed within six months, 17 per cent of warrants were over a year old. The value of warrants that were open for more than one year was ₹ 434 crore.

## Recommendation

- *The Board may recognise the risk of fraudulent booking of expenditure against warrants kept open without any production against them. An annual exercise to segregate such warrants and their review will mitigate the risk.*
- *WIP items on account of MBT Arjun at Heavy Vehicle Factory at Avadi may be segregated for technical review which would facilitate specific directions from the Board on these items.*

### 8.2.9.11 Stores in transit (SIT)

**Audit Objective:** Stores-in-transit were promptly taken on charge and disputes between factories were resolved to ensure clearance of these items.

Stores that are issued by one factory but not accounted for by the recipient factory as of 31 March of each year, fall under the category of Stores in Transit (SIT). The guidelines on Inter Factory Demand (IFD) transactions require that:

- On receiving the IFD stores, the consignee factory should prepare receipt vouchers. The material should be taken in the stock on the basis of inspection notes issued by the consignor factory and the consignee's own inspection.
- In case the inspection reveals deficiency in quality or quantity of stores, the first option is to explore the option with the consignor to rectify the error. Thereafter, the consignee factory can either regularize the loss through a discrepancy voucher or raise the dispute with the Board.
- In all situations, the stores must be taken on charge in the stock register.

Period (years)	Value (₹ in lakh)
1- 5	2676
5-10	1286
10-15	517
15-20	95
> 20 years	168

SIT in the nine sampled Factories was ₹ 136 crore as on 31 March 2013. Age analysis showed that these items have been reflected as SIT and not taken into stock, some for over 20 years.

We further analysed individual cases of SIT. Three Factories alone, Metal & Steel Factory Ishapur, Ordnance Factory Ambajhari and Gun & Shell Factory Cossipore had SIT valuing ₹ 28 crore due to rejection of stores, loss of stores etc. Some of these cases are discussed in **Annexure XV**. The Board agreed (September 2014) that SIT arose due to inadequate documentation during issue of IFDs and due to disputes on IFDs. Specific response to cases brought out in the Annexure is awaited. The Board assured action to liquidate the long-pending SIT.

### **Conclusion**

The Factories had been reflecting rejected stocks as Store-in-transit form between Factories, in some cases for over 20 years, which remained undetected.

### **Recommendation**

- *The Board may insist on annual item-wise analysis of items reflected as WIP and SIT for long periods. This could be done on a risk-based sampling which factors both value and time analysis.*

#### **8.2.10 Internal Controls**

**Audit Objective:** The internal controls on inventory management were in place and were implemented effectively.

##### **8.2.10.1 Stock verification**

Factories are required to conduct stock verification of all inventory items as per the laid down norms: high value items<sup>141</sup> are verified twice in a year and the rest are verified annually. The General Manager of the Factory is responsible for this exercise.

All the nine sampled Factories had designated sections for physical verification<sup>142</sup>. But four Factories, Ordnance Factory Katni, Metal and Steel Factory Ishapore, Gun and Shell Factory Cossipore and Machine Tools Prototype Factory, Ambarnath did not conduct verification annually for all items; a deviation from the prescribed schedule of half-yearly verification of high value items. In one factory, Machine Tool Prototype Factory Ambarnath,

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<sup>141</sup> The top 70 to 80 per cent of annual consumption is regarded as high value items usually categorised as 'A' category

<sup>142</sup> Physical verification team comprises Junior Works Manager, Chageman under the control of Jt. General Manager

the store officer was also the officer-in-charge for store verification, which constituted a risk.

Deficiencies in physical verification affected the assurance provided from such an exercise. For instance: “Loan issues” are material issued by the Stores section without a “demand note” from the Shop, sometimes on verbal orders of superiors<sup>143</sup>. As a result, the material although not physically available with the Stores, is not deducted from the Bin Card. But in the physical verification, the material was being certified as physically available. This deficiency in physical verification was noticed in four out of the nine sampled Factories, which indicates that the physical verification did not reflect the correct position of the stores and was thus fraught with risk. Use of loan issues through which stores are used in production without documentation of quality checks and without accounting for them in stores, is in our opinion, a bad practice and introduces a serious risk. Besides, the Board’s Stores Manual does not allow “loan issues”.

Some of the cases are discussed in **Annexure XVI**. In Ordnance Factory Katni, we found loan issues to be a regular practice. In one case, Copper cathode valuing ₹ 1.70 crore was not taken into stock or authorised by the quality assurance wing, but was shown as issued. As a result, the physical balance was more than the amount reflected in the bin cards, but the discrepancy was not raised in the stock verification. In another factory, Ordnance Factory Medak, the physical verification showed 3246 items less than in the stores database in 2012-13, but the difference was not reconciled; such difference has been persisting since 2010-11. The Board’s response to cases brought out in the Annexure was awaited as of September 2014.

The Board, while agreeing to audit observations stated that (September 2014) stock verification in the factories are being strengthened. Necessary fresh directives have since been issued for effective implementations of the instruction. The Board further stated that loan issues in the factories occurred only in exigent and emergency conditions. Our audit showed that this was not the case and loan issues were frequently resorted to by the factories.

## **Conclusion**

The assurance to be provided by the physical verification was deficient and did not reflect the actual physical availability of stores. This was particularly with regard to “loan issues” which are material issued by the Stores section without a “demand note” from the Shop. The use of loan issues does not have the sanction of the Board and constitutes a bad practice.

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<sup>143</sup>Factories resort to “loan issues” when there is a shortage of material against one warrant due to high rejections on quality of raw material and a “loan” helps them to continue production till another warrant permits them to draw the material against a demand note. Or when there is a delay in quality inspection of raw material, “loan issues” form an alternative route to draw material to continue production

## Recommendation

- ***The Board may review the reasons against the regular practice of “loan issues” and take steps to eliminate this bad practice.***

### 8.2.10.2 Review and disposal of stock

Guidance on management of stores-in-hand requires the Ordnance Factories to follow the procedure as detailed below:

- The Accounts Office in the Factory in consultation with the Material Control Officer prepare, twice in a year, a list of all stock, segregating the stores-in-hand under different categories including non-moving as well as slow moving items.
- The items in the above list are physically verified by the stock verification group.
- The “Slow moving” and “non-moving” items are referred to the Stock Review Committee twice in a year. This Committee reviews the likely usage of these non-active items within the factory or alternatively, list the items under “surplus” stores.
- Surplus stores of value exceeding ₹ 10 lakh are circulated through Mutual Aid Scheme (MAS) to explore options of their use in other sister Factories.
- Where such items are not accepted by other Factories under MAS, the matter is referred to the Board which will constitute a Technical Committee to examine the potential use of the items including by other defence PSUs.
- At the factory level, for items below ₹10 lakh, a Technical Committee is constituted by the General Manager, who is authorized to take action to dispose the items.
- Review of disposal of identified stores is one of the items for monthly review in the Factory by the Unit Level Monitoring Committee (ULMC)

#### ***(i) Effectiveness of Stock Review Committee***

The Board issued instructions in July 2008 to the Ordnance Factories to form Stock Review Committee (SRC) for review of stores-in-hand. Out of nine sampled Ordnance Factories, six had constituted a Stock Review Committee. On the other hand, we did not find a significant improvement in those Factories which had constituted the Committee. The Committee comprises Sr. General Manager/General Manager as the Chairman with Additional General Manager of the user, planning and material management

section, Controller of Accounts/Jt. Controller of accounts as Members. The Members are thus not independent of factory management.

All sampled Factories had significant stock of non-active stores. Clearly, the constitution of a Committee is a good step but there are problems elsewhere which the Committee alone cannot solve. We examined the reasons in detail in two factories, Gun & Shell Factory, Cossipore and the Metal & Steel Factory, Ishapore.

***(ii) Identification and alternative use of surplus stores in sister factories***

In the nine Factories, the total value of non-active stores is ₹ 492 crore<sup>144</sup>, of which only items worth ₹ 24 crore *i.e.* 5 per cent had been declared surplus or scrap. The Factories tend to shy away from declaring stores as surplus. The MAS scheme was ineffective and sister Factories were not incentivised to explore the possibility of use of surplus stores of other Factories. For instance GSF circulated (February 2010) 169 items valuing ₹ 16 crore through MAS but as of May 2014, there was no response from other sister factories. The scheme has a cascading effect prolonging the period of non-use of surplus stores and further lowering its residual value. A good practice would be one in which the procedure for use of surplus stores tracks the period since the item was lying un-utilised or its shelf-life; a practice that did not exist in the Board.

***(iii) Other potential use***

The Technical Committee is another rung in this chain which did not reveal promising results. Gun and Shell Factory, Cossipore referred (February 2010) 17 items valued at ₹ 14 crore to the Technical Committee of the Board for circulation to other defence PSUs. The records of the Gun and Shell Factory, Cossipore did not show the length of the time these items were lying as surplus stores. Gun and Shell Factory, Cossipore reported disposal of seven items (May 2012) valuing ₹ 4 crore only.

***(iv) Disposal of stores***

The Disposal of surplus stores is another hurdle. Gun and Shell Factory, Cossipore had surplus stores of ₹ 1.87 crore as on March 2011, out of which stores worth ₹ 0.32 crore only could be eventually disposed of. The situation in the other years remained the same, with only 17 per cent of the surplus stores being disposed of. In all, 1732 items valuing ₹ 1.55 crore out of the surplus stores of ₹ 1.87 crore remained static without disposal during the last three years.

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<sup>144</sup> The total value of non-active stores was ₹ 512 crore as of March 2013, which includes "maintenance stores" of ₹20 crore, which cannot be declared as surplus because of its prolonged shelf life.

**(v) Regularisation of loss and fixing of accountability**

It is important to note that a large chunk of stores booked under WIP and SIT for years, are rejected stores. The General Manager of the Ordnance Factory is authorised to regularise loss due to rejection upto ₹ 2 lakh where there is negligence of the staff and officers of the Factory; and ₹ 10 lakh where there is no such negligence. All items above this list are to be referred to the Board. In case the loss is over ₹ 50 lakh, where there is no negligence or ₹ 20 lakh where there is negligence, the matter has to be referred to the Ministry of Defence (MoD). Associated with this delegation is the requirement that responsibility must be fixed through a Board of Enquiry.

We found that a significant number of cases of loss were pending for regularisation by the MoD and the Board for years together. For instance: out of 39 cases of loss regularisation in manufacture of stores in Metal and Steel Factory, Ishapore, 23 cases valuing ₹ 976 crore were pending at MoD for a period ranging from one to 21 years. The balance 16 cases valuing ₹108 crore were pending at the Board level for a period ranging between three to 28 years.

Regularisation of loss is subject to investigation of the case by a Board of Enquiry to fix responsibility, which is expected to submit its Report within two months. The Board of Enquiry is a lengthy procedure with delays at each step. For instance, Metal and Steel Factory, Ishapore constituted (July 2010) a Board of Enquiry to look into 16 number of rejection cases that had been accumulated in 16 warrants during the period 2004- 2009. The Board submitted its report in March 2011. In all the cases the Board held no individual person as responsible and instead, suggested review of quality control process as a remedial measure. In another case, the Ordnance Factory at Ambhajari constituted a Board of Enquiry in December 2005 on three rejected stores valuing ₹ 0.30 crore lying under SIT. The Report was not submitted and a fresh Board of Enquiry was constituted in July 2012. A third Board of Enquiry was approved in August 2013, the Report of which is awaited. The requirement of submission of Reports by the Board of Enquiry clearly did not hold much sanctity in the Ordnance Factories. The delays in different stages stymie the deterrent impact of this control.

This protracted process, meant as a deterrent to negligence leading to loss , also creates a disincentive for the Factories to come clean on the stock holding of rejected stores, fostering a tendency to let them remain under WIP or SIT. Open warrants also allow the factory a convenient window to book items of expenditure: material or labour when required, although there is no production against them.

The Board stated (September 2014) that instructions have since been issued to reactivate Stock Review committee.



## Conclusion

A protracted process meant as a deterrent leads to a tendency to “hide” rejections by categorising stores under WIP or SIT even as delays in fixing accountability defeated the purpose. The current procedure to exhaust all options of potential usage had in effect failed and led to build-up of non-active stores.

## Recommendation

- ***The Board may simplify the process for declaration of items as surplus and their disposal to ensure timely action on items that have become “non-active” stores.***
- ***The Board may fix viable timelines for constitution of and the submission of reports by the Board of Enquiry as well as for action on these reports.***

### 8.2.10.3 Controls in accounting of inventories

The receipt, utilisation and issue of stores are recorded in the Stores Department and in the Accounts Section. The Factories use the Production Planning Control (PPC) system on UNIX platform since 1993. The Accounts Office uses a separate database in FOXPRO that manually collects data through a CD from the PPC package.

As discussed earlier, the inventory module of the accounting software has several deficiencies. The sub-modules of the inventory module did not contain data on scheduled date *vis-a-vis* actual date of submission of bills against supply of stores, reasons for warrant outstanding beyond the authorised period of six months and booking of only labour/ only material against those warrants. The inventory module did not also indicate the reasons for high incidence of SIH, surplus stores as well as non-utilisation /disposal of such stores

The two software packages have not been integrated leading not only to sub-optimal use of PPC package but also led to discrepancies in data that remained un-reconciled. Mention was made on this issue in Paragraph 5.4.1 of the Audit Report No 3 of 2006. The Ministry provided (December 2009) the following status on the issue:

- A Committee had been set by the Principal Controller of Accounts (Factories) Kolkata to examine the reasons for differences between Management Information System generated by two systems and to suggest necessary modification to ensure seamless flow of date across the systems.

- The Report submitted by the Committee was not accepted by the Board. Principal Controller of Accounts (Fys) Kolkata was then requested to re-convene the Committee to elaborate the report.

The Board stated (September 2014) that moving towards a common database between two organisations was a major task that would need to address the requirements of both the organisations and as such, it was difficult to give a definite time line. However, efforts were being taken in a phased manner and are being monitored regularly to ensure early migration towards a common database.

We found persistence of differences in the sampled Factories, which totaled to ₹ 214 crore. The difference was as high as ₹ 165 crore as of 31 March 2013 in Ordnance Factory, Medak. The cases are discussed in **Annexure XVII**. The Board's specific response to cases brought out in the Annexure was awaited (September 2014).

We also found accounting errors in different Factories. An illustrative list as detected in Gun& Shell Factory, Cossipore as discussed below:

- Store worth ₹ 3.96 crore was taken on charge with zero value, understating inventory.

The Board stated that (September 2014) necessary rectification has been carried out by preparation of receipt/issue voucher according to the procedure laid down in the books.

- Scrap valued at ₹ 2.84 crore was taken on charge as input material and not as reduction of input cost, thus overstating cost of production.

The Board while contradicting the figure of ₹ 2.84 crore stated (September 2014) that debit item number 9 of stores account showed a nil balance. The reply substantiates the fact that accounting errors do exist in the system which requires to be reconciled.

- Overhead expense of ₹ 4.01 crore included stores and finished components consumed thus overstating overheads and understating stores.

The Board stated that (September 2014) replacement and rectification work on defective items was accounted as overheads.

However, the details of replacement/repair works undertaken were not furnished.

### **Conclusion**

The non-integration of databases maintained by the Factory and of the Accounts office, led to discrepancies which remained un-reconciled.

## Recommendation

- *The Board may draw a time-bound plan for seamless integration of the two databases*

### 8.2.11 Monitoring by top level management

The Board is presented with a report on inventory on a quarterly basis. An examination of the minutes of the meetings did *not* reveal a comprehensive review or a risk-based examination of high-value items of stock holding. In the absence of a sustained and focused review, the Factories did not get the benefit of a clear direction from the Board to mitigate the build-up of stores-in-hand.

From a review of the Minutes of the meetings of the Board it was observed that out of 36 meetings held, between April 2010 and March 2013, issues relating to inventory were discussed only in 17 meetings. The deliberations in these meetings were general. For instance: the Board directed (July 2011) all its Operating Divisions to interact with the Senior General Managers/General Managers to work out the plan to liquidate the slow-moving and non-moving stores in phases and watch the progress on the monthly basis. But here too, no firm quantity target was fixed for liquidation of slow-moving and non-moving stores or a specific timeframe for their disposal was fixed.

## Conclusion

The review of inventory holding by the Board was not comprehensive and did not yield clear and firm directions to the factories.

The matter was referred to the Ministry in March 2014; their reply was awaited (September 2014).

## 8.3 Indigenous production of MBT Arjun and T-90 Bhisma Tanks

### 8.3.1 Introduction

**8.3.1.1** In order to achieve self-reliance in manufacture of Armoured Fighting Vehicles, Ministry of Defence (Ministry) sanctioned a project in May 1974 for design and development of first indigenous tank of India *i.e.* Main Battle Tank – Arjun by Defence Research and Development Organisation (DRDO) at a cost of ₹ 16 crore. The scope of the project was to manufacture 12 prototypes by April 1982. The DRDO completed its work on the design of MBT Arjun in March 1995 at a cost of ₹ 306 crore; the Ordnance Factory Board (Board) was tasked (1999) to establish the facilities for its manufacture.

**8.3.1.2** In 2000, the Army reported a 38 *per cent* shortage of tanks against its authorised holding of 3,717 tanks. The steps taken by the Ministry during 2000-2004 to fill this need were:

- Import of 124 fully formed T-90 tanks (February 2001) from a Russian firm M/s Rosoboronexport (ROE) at a total cost of ₹ 1,774 crore;
- Import of 186 T-90 tanks (February 2001) as 86 Semi-knock down (SKD) and 100 Complete Knock-Down (CKD) at a cost of ₹ 2,312 crore with transfer of technology (TOT) for manufacture of T-90 tanks by the Board and training of Indian personnel;
- Phased production and issue of 124 Main Battle Tank – Arjun (MBT Arjun) by the Board over the period 2002-07. The Board was sanctioned ₹ 100 crore (May 2002) to set up the facilities for manufacture of 30 MBT Arjun per annum; and
- Indigenous production of 300 T-90 Bhisma tanks (T-90 tanks) with ToT from M/s ROE over the period 2006-10. The Ministry sanctioned ₹ 96 crore (December 2003/ February 2004) for developing infrastructure for indigenous manufacture of 100 T-90 tanks per annum.

The Heavy Vehicles Factory at Avadi (HVF) was assigned the task of the roll-out of the indigenously produced/ assembled MBT Arjun and T-90 tanks. In all, 734<sup>145</sup> tanks were to be made available to the Army by 2010. **Annexure-XVIII** gives the details of the agencies involved.

**8.3.1.3** Our Audit Reports of 1998 and 2006<sup>146</sup> had covered the development of MBT Arjun. The Public Accounts Committee (PAC) in its Report<sup>147</sup> directed (December 2003) the Ministry to:

- Closely monitor the production schedule at HVF to make available the requisite number of MBT Arjun to the Army within the stipulated time; and
- Ensure that the infrastructural facilities created were utilised optimally so that the desired volume of production of MBT Arjun would enable progressive reduction of import content to 45 *per cent*.

**8.3.1.4** We conducted audit in five Ordnance Factories<sup>148</sup> and the Armoured Vehicles Headquarters Avadi (AVHQ) to review the production and issue of MBT Arjun and T-90 tanks up to 2012-13, with particular reference to the

<sup>145</sup> MBT Arjun – 124, T-90 tank (FF) – 124, T-90 tank (SKD/CKD) – 186, T-90 tank (Indigenous) - 300

<sup>146</sup> Paragraph 26 of Report No. 7 of 1998 and 3.8 of PA Report No. 3 of 2006 of the Comptroller & Auditor General of India

<sup>147</sup> Report No. 57 of 2003-04 placed in the Parliament in December 2003

<sup>148</sup> Heavy Vehicles Factory Avadi (HVF), Engine Factory Avadi (EFA), Ordnance Factory Medak (OFMK), Gun Carriage Factory Jabalpur (GCF), Opto Electronic Factory Dehradun (OLF)

directions of the Public Accounts Committee. The AVHQ at Avadi comprises five Ordnance Factories including HVF, Avadi and functions under the direct control of the Board.

### 8.3.2 Indigenous production of MBT Arjun

8.3.2.1 The Army placed an indent (March 2000) on the Board for delivery of 124 MBT Arjun within a tentative schedule of 2000-06. In 2002, the production schedule was shifted to 2002-09. The HVF was tasked to produce 15 MBT Arjun under the Limited Series Production (LSP) by 2004. The bulk production of 109 MBT Arjun was to commence after the field trials by the Army.

8.3.2.2 Table-45 provides the year-wise production and issue of MBT Arjun. Despite the fact that the production schedule was shifted from 2002-07 to 2002-09, the Board could not produce on time, the quantity indented by Army. There was a slippage in production; production picked up only in 2006-07. The cumulative production of 122 MBT Arjun was still short of the indent by two MBTs which were under production and three MBTs were under inspection as of December 2013. The delays in production led to cost escalation by more than 2.5 times: from ₹ 17 crore per MBT to ₹ 44 crore.

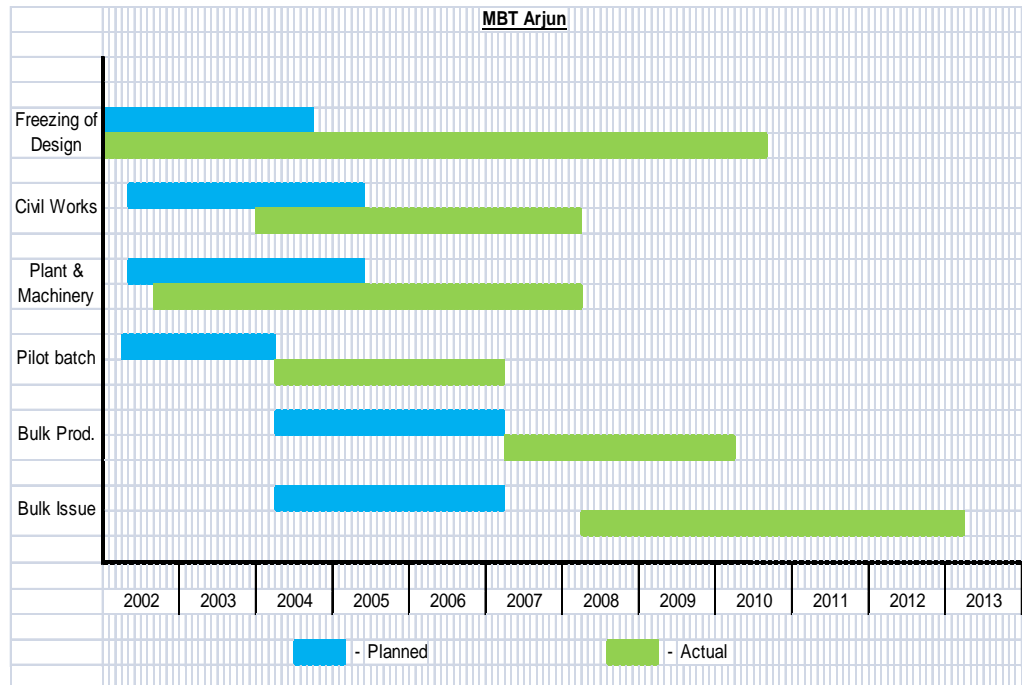
**Table-45**

Year	Schedule		Production		Issues	
	No.	Cum.	No	Cum.	No	Cum.
2002-03	2	2	Nil	Nil	Nil	Nil
2003-04	6	8	5	5	Nil	Nil
2004-05	9	17	6	11	5	5
2005-06	19	36	18	29	Nil	5
2006-07	30	66	24	53	Nil	5
2007-08	30	96	18	71	9	14
2008-09	28	124	30	101	18	32
2009-10			21	122	37	69
2010-11			Nil	122	33	102
2011-12			Nil	122	11	113
2012-13			Nil	122	6	119
<b>Total</b>		<b>124</b>	<b>122</b>	<b>122</b>	<b>119</b>	<b>119</b>

8.3.2.3 The Ministry stated (May 2014) that though the production was completed as per original design, changes in design affected the timely delivery. Ministry's reply is not entirely acceptable. Frequent and several amendments to the design significantly affected the production but tardiness in creation of infrastructural facilities at the Ordnance Factories, also led to delays in meeting the Army's indent as commented in Paragraph 8.3.2.4 and

8.3.2.7. Chart-16 illustrates the timeliness in achievement of the milestones against the targets.

**Chart-16: Timeliness in achievement of milestones against targets**



#### 8.3.2.4 Delays in Civil Works

The Ministry sanctioned ₹ 23 crore (May 2002) for civil works at HVF to augment the capacity of HVF in tank production, in order to meet its commitment on MBT Arjun. Civil works had two main components:

- Provision of facilities for Assembly Shop:* The decision to use pre-fabricated structure was taken (September 2003) by the Ministry 16 months after the sanction. The Administrative Approval for this component was eventually given in January 2004, 20 months after the sanction. The Administrative Approval was revised in May 2005 due to price escalation of steel and cement as discovered in tendering. The work was completed in June 2006. Pending completion of the civil works, HVF used its existing facilities and by 2005-06, produced 29 MBT Arjun, of which five MBTs were issued (2004-05) to the Army. The production could pick up in full steam in 2006-07, once the infrastructure of which the civil works was a part, was put in place. Ministry stated (May 2014) that the lowest offer for civil works relating to assembly shop had exceeded the sanctioned amount which involved financial concurrence from the user and was accordingly processed for issue of revised Administrative Approval (May 2005). It was also stated that the work was completed within the stipulated time, a claim that is

not acceptable since the work targeted for completion in July 2005 was completed only in June 2006.

- *Strengthening of test track:* The existing test track in HVF had been reported to be damaged and a need was felt to strengthen the track for testing of MBT Arjun. A team<sup>149</sup> constituted to finalise the requirements was convened (August 2005) 39 months after the Ministry's sanction of the project (May 2002). The Administrative Approval for this work was received by HVF, Avadi only in April 2006 and the work completed in March 2008. By this time, 71 MBT Arjun had already been manufactured, of which 14 were issued to the Army. The Ministry did not provide to us the impact of the delay in completion of this work on production and issue of MBT Arjun.

#### 8.3.2.5 Delays in production of critical assemblies

The HVF, Avadi was to receive the assemblies of the bare structure of the tank: the hull and the turret, from the Ordnance Factory Medak (OFMK). Hull is the lower part of the tank consisting of chassis and automotive system (Engine and Power pack), while turret is the upper part of the tank for mounting the weapon system. Against the schedule to provide 109 sets of hull and turret during 2002-08, OFMK could provide only 72 hulls and 75 turrets during 2002-11 to HVF. Six years taken to procure and commission the plant and machinery (September 2002 to March 2008) and delays in receipt of armour plate from Steel Authority of India Limited were main reasons for the inability of OFMK to meet its commitment.

Meanwhile, HVF, Avadi began (2007) manufacture of the hull and turret, thus ending its dependence on OFMK. While the resolution of the issue would have streamlined the production of MBT Arjun, the plant and machinery installed at a total cost of ₹ 51 crore in OFMK, remained unutilised since 2011.

Ministry stated (May 2014) that hull and turret were also manufactured at HVF to comply with manufacturing programme and that there was no adverse impact on production of the complete tank at HVF. The reply sidestepped the delays consequent of the shift and the idling of machinery purchased for the purpose.

#### 8.3.2.6 Problems in sourcing major assemblies

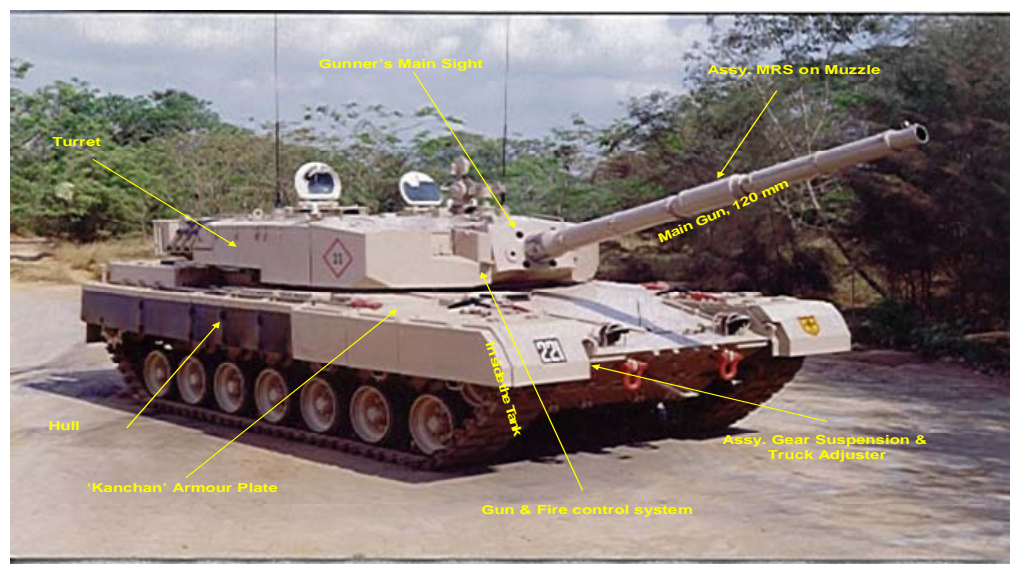
The HVF, Avadi began production of MBT Arjun based on the design provided by DRDO with tie-ups for supply of assemblies from sources identified by the DRDO after evaluation between June 2005 and May 2008.

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<sup>149</sup> Recce-cum-costing-cum-siting Board comprising Officers from the HVF, MES, DGQA and DRDO was ordered to study the scope of conducting repair of the test track.



The field trials and accelerated usage-cum-reliability trials by Army of MBT Arjun produced under Limited Series Production (LSP) indicated quality problems in respect of major assemblies. The modification of designs by DRDO led to delays in supply of modified assemblies and in repair of defective parts, which in turn delayed the production of MBT Arjun as indicated in Table-46.



**MBT – Arjun and its major assemblies**  
**Table-46: Delays in supply of major assemblies**

Assemblies	Supplier	Delays	Comments
<b>Gunner's Main Sight (GMS):</b> Fitted on turret weapon system to control aiming, tracking and ranging before firing.	Bharat Electronics Limited (Defence PSU)	51 months (1 <sup>st</sup> order) 30 months (2 <sup>nd</sup> order)	Repair of defective components at a cost of ₹1.2 crore.
<b>Commander's Panoramic Sight (CPS):</b> Part of the turret weapon system, enables the commander to acquire a target independent of gunner.	Bharat Electronics Limited (Defence PSU)	9 months	Modified design led to delays.
<b>Hydraulic suspension unit (HSU):</b> Fitted on chassis and automotive system for cushioning the impact, shock and vibration of the hull.	(a) Kirlosker Pneumatic Co. Ltd. (b) Bharat Earth Movers Limited Bangalore	25 months	10 units of HSU were declared beyond economical repair and 18 units were yet to be sent by HVF to M/s BEML for repair.
<b>Gun Control System (GCS):</b> Fitted on turret weapon system, serves to control the turret in traverse and gun in elevation.	Bharat Heavy Electricals Limited, Bhopal	8 years	High cycle time for repair through OEM, M/s B.R.Germany led to delays.
<b>Power pack (Propulsion unit, engine and transmission):</b> Fitted in chassis and automotive system of the hull to supply power for driving the tank	a) RENK, Germany b) MTU Germany	5 years	Repair of nine power packs was awaited. Decision was taken to source 10 new power packs from Germany.

The Ministry stated (May 2014) that the modifications required by the Army were incorporated by DRDO and that rectifications were made by the manufacturers free of cost under warranty. But the fact remains that the defects had the impact of delays in production and issue of MBT Arjun to Army.

### 8.3.2.7 Changes in design

Mention was made in Report No. 3 of 2006 of the Comptroller and Auditor General of India about the frequent changes in design leading to delay in development of MBT Arjun. The development of MBT prototype was to be completed by April 1982 but after going through several modifications in design, the prototype was cleared by the Army in 1998.

Given this concern on several changes in design, the Scientific Advisor to the Raksha Mantri had confirmed (2004) in a note to the Ministry that the design for MBT stood frozen. This was, however, not the case. We found that 316 amendments to design of various assemblies were carried out even after freezing of the design and up to August 2010. The changes were mostly justified by the Ministry in its reply (May 2014) as necessitated for product improvement and modifications based on user's feedback on quality problems.

The reply does not take cognizance of the fact that even after clearing the production after acceptance of the prototype (1998), the designs continued to be re-worked for 12 years thereafter and frozen only in 2010.

The most significant setback to production of MBT Arjun was the change in requirements put forth by the Army in February 2007. The tanks produced by HVF, Avadi were to be issued to the Army after inspection at the factory site in the Joint Receipt Inspection by the representatives of HVF, DRDO and Army. The issued tanks were put through two trials - the Field Trial and the Accelerated usage-cum-reliability trials (AUCRT), by the Army. Joint Receipt Inspection was conducted (March 2005) for first five MBT Arjun manufactured (2003-04) in the pilot phase<sup>150</sup>, one year after production. The inspection of the second lot of nine pilot MBT Arjun, took place in February 2007, two years after production. By 2007, 53 MBT<sup>151</sup> had already been produced by HVF, Avadi. It was during this inspection in February 2007 that Army reported water ingress in the fighting compartment of tank while crossing shallow parts of a river and raised two additional requirements in the design of the MBT Arjun viz. zero level ingress of water in the fighting compartment and lead time for fording (time from tank's entry into water to exit from water) to be minimised to 30 minutes.

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<sup>150</sup> Limited Series Production

<sup>151</sup> 15 under Limited Series Production and 38 under bulk production

We noticed that the corresponding benchmark fixed by the Army for T-90 tank was more relaxed, allowing 2.5 litres<sup>152</sup> of water ingress. The requirement of zero level water ingress for medium fording was not stipulated in the Army's requirements (GSQR of 1985) or in subsequent stages of development which had seen many changes in design. In fact, the Joint Action Plan (of Army and DRDO), in August 1999, had cleared the medium fording capability of MBT Arjun. This issue was also not raised in the Joint Receipt Inspection of the first batch of pilot MBT Arjun.

The new requirements necessitated the DRDO to modify the design of the second lot of nine pilot MBT Arjun. The same got modified and were issued to Army by September 2007. The first lot of five pilot tanks was brought back from Army, got modified and issued to Army till October 2007. Balance 39 tanks of the bulk production were dismantled, reworked and issued to the Army in 2008-10. The whole task of dismantling and reassembly of 53 MBTs entailed an additional cost of ₹ 84 lakh.

The Ministry stated (May 2014) that modifications were considered essential to improve overall performance from user's perspective. The reply undermines the impact of the modifications in derailing the production and issue of MBT Arjun, which was a significant factor that led to an import of T-90 tanks that cost ₹ 4,913 crore in November 2007 as discussed in Paragraph 8.3.4. The reply also does not address why the benchmarks on MBT Arjun regarding water ingress and fording, were more stringent than the corresponding requirements on T-90 tank.

Medium fording was one of the eight instances we noticed, where Army placed benchmark of parameters on MBT Arjun which were more stringent in comparison to those placed on T-90 tanks. These are detailed in **Annexure XIX**. We could not assess the impact of these benchmarks on the performance of the two tanks from our scrutiny of the Report on comparative trials of MBT Arjun and T-90 tank (February/ March 2010- referred to in Paragraph 8.3.2.8). While we appreciate the Army's quest for improving the quality of MBT Arjun, the imposition of more stringent parameters precluded a level playing field and more importantly, the inability to freeze the designs led to several changes in design, consequent delays in acceptance of MBT Arjun by the Army and in the overall, the production and issue of MBT Arjun.

#### **8.3.2.8 Testing and issue of MBT Arjun**

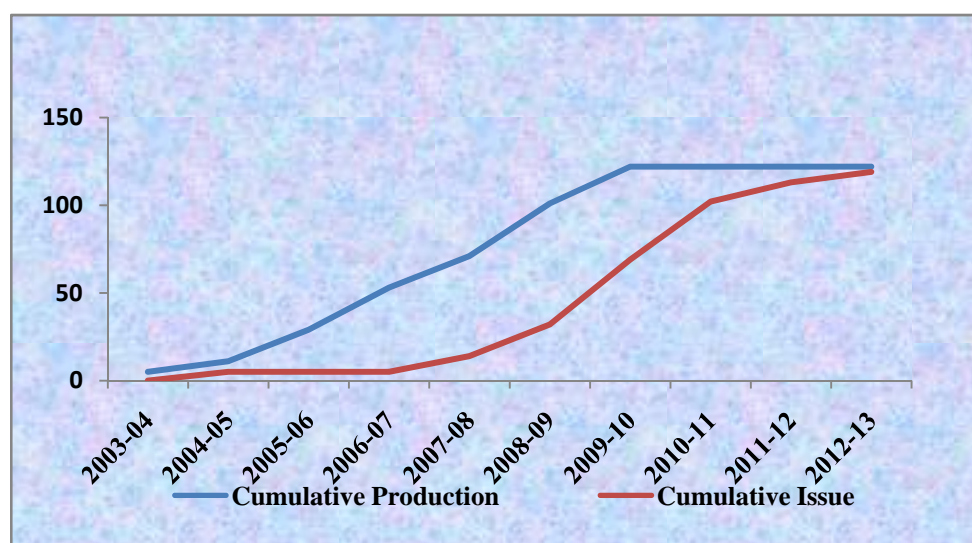
The production of MBT Arjun picked up in 2005-06 when the cumulative production reached 29 MBT. In 2006-07, HVF, Avadi stepped up the production to 53. We found that the issue of MBT Arjun to the Army lagged

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<sup>152</sup>Permissible limit of water ingress for medium fording was derived with reference to acceptable limit of 5 litre of water ingress for full-dip fording as mentioned in the trial directive for T-90 tank

behind production. The joint inspections of the manufactured MBT<sup>153</sup> which was an essential requirement before issue, was inexplicably delayed. Till March 2008, HVF produced 71 MBT Arjun, of which only 14 (20 per cent) were tested in joint inspections. But close on the heels of the second import of T-90 tank contracted in November 2007 as discussed in Paragraph 8.3.4, the inspections and issues of MBT Arjun picked up and within the next three years, 102 MBT Arjun out of 122 produced were accepted by the Army, as illustrated in Chart-17.

**Chart-17: Cumulative production and issue of MBT Arjun**



Comparative field trials of MBT Arjun with T-90 tanks took place in February/ March 2010. Till such time, the Army had been consistently reporting quality problems in MBT Arjun; this was also reported to the Standing Committee on Defence (2007-08). The comparative trials were on four parameters viz. fire power, survivability, reliability and miscellaneous issues of the tank with weightage of 40, 35, 15 and 10 respectively. As per the trial report, MBT Arjun performed marginally better than the T-90 tank in accuracy and consistency of firepower. However, T-90 tank performed better in lethality and missile firing capability. The Army concluded (April 2010) that “Arjun had performed creditably and it could be employed both for offensive and defensive tasks with same efficacy of T-90 tank.” The Army also recommended upgrades<sup>154</sup> to make the Arjun tank a superior weapon platform. We were informed (February 2014) that the Mark-II version of MBT Arjun was under trials by the Army and that it would include the upgrades recommended by the Army.

We found that the MBT Arjun and T-90 tank were not exactly comparable in missile firing ability; the higher score of T-90 tank was mainly due to missile

<sup>153</sup> Joint inspections were to be carried out by HVF, DRDO and the Army

<sup>154</sup> The upgrades recommended were among others, inclusion of anti-tank missile, increase in penetrating power of ammunition and mounting of explosive reactive armour panels

firing ability which was not in the design of MBT Arjun. Barring missile firing ability, the scores of MBT Arjun and T-90 tank would be 25.77 and 24.50 respectively in firepower. In the overall comparative score, T-90 tank scored 75.01, marginally higher than MBT Arjun which scored 72.46, mainly because of higher score on missile firing ability of T-90 tank.

### **8.3.2.9 Future of MBT production facilities**

The Public Accounts Committee had urged (December 2003) the Ministry to utilize the infrastructural facilities optimally so that the desired volume of production of MBT Arjun would enable increase of the indigenous content to 55 per cent. The Ministry assured the Committee that a production level, initially of 300 MBT Arjun to be raised to 500 tank later, would reduce the import content to under 30 per cent.

However, barring the initial indent of 124 tanks, the Board did not receive any further indents for MBT Arjun. Production has come to standstill since 2009-10 and to that extent, capacity created at a cost of ₹ 87 crore<sup>155</sup> for annual production of 30 MBT Arjun awaits utilization against Ministry's decision for fresh orders. Meanwhile, HVF, Avadi holds idle inventory of ₹ 128 crore reflected as "Work-in-progress", which remains unutilised in the absence of fresh orders. The cost per MBT Arjun was ₹ 21 crore (2009-10), against which the import content was ₹ 13 crore. This brings the level of indigenisation in MBT Arjun to 38 per cent only. The initial development project on MBT Arjun had envisaged that barring the engine, all components/assemblies would be indigenously produced. Problems in sourcing major assemblies other than engines have been discussed in Paragraph 8.3.2.6.

The Ministry told (May 2014) us that imported items could not be indigenized due to non-availability of technology/ design on these items. This reply does not comprehensively cover the indigenization issue because items that were designed for manufacture by defence PSUs (Paragraph 8.3.2.6) were also being imported for the production of MBT Arjun.

### **8.3.3 Indigenous production of T-90 tanks**

The Board received (November 2004) the indent for manufacture of 300 indigenous T-90 tanks which was scheduled for supply during 2006-10. A production schedule was fixed to meet the indent: 50 tanks in 2006-07, 100 tanks annually in 2007-08 and 2008-09 and balance 50 tanks in 2009-10. However, the production started only in 2009-10 and gathered momentum in 2010-11. Table-47 details the production and issue of T-90 tanks against the targeted schedule.

<sup>155</sup>The initial sanction of May 2002 was for ₹100 crore but due to reduction in scope of plant & machinery, the actual expenditure was only ₹87 crore

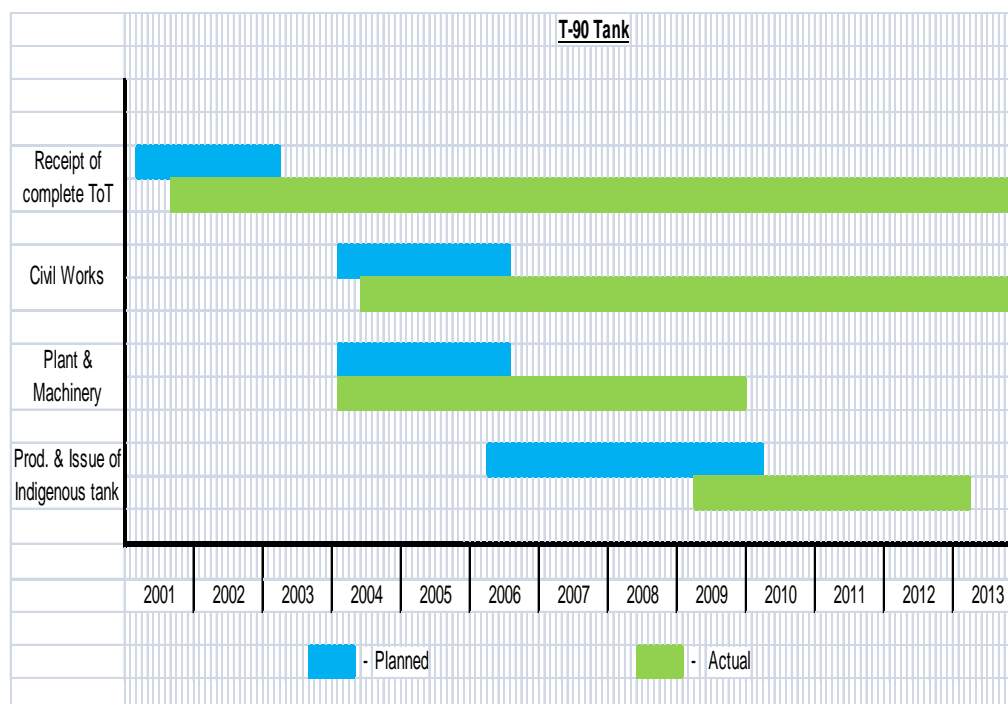


**Table – 47**

Year	Schedule	Production	Issue
2006-07	50	Nil	Nil
2007-08	100	Nil	Nil
2008-09	100	Nil	Nil
2009-10	50	24	14
2010-11		51	36
2011-12		60	65
2012-13		90	52
Total	300	225	167

Chart-18 summarises the delays in different stages of production that led to the Board’s inability to meet the indent for T-90 tanks on time.

**Chart-18: Timeliness in achievement of milestones**



**8.3.3.1 Translation of design documents**

The Russian Firm, M/s Rosoboronexport (ROE) was expected to transfer the design details in the Transfer-of-Technology (ToT) documents by March 2003. The documents were in Russian; the Army/Ordnance Factories’ efforts to get translated documents from ROE, failed. The documents were received between September 2001 and January 2003 following which HVF, Avadi concluded four contracts between September 2003 and September 2006 for translation of the documents. The translation was completed by July 2007 after

the expiry of scheduled delivery period of first batch of 50 indigenous tanks by 2006-07. In all, the translation of ToT documents took almost six years.

The Ministry stated (May 2014) that translation of critical documents for indigenous manufacturing was carried out with available resource of Russian translators at HVF and there was no delay in production due to pending translation. The reply is not acceptable because delay in translation of ToT documents had certainly impacted on the indigenous production of T-90 tanks as production could not commence without the availability of translated documents.

### 8.3.3.2 Development of production facilities

While according sanction of ₹ 96 crore in February 2004 for setting up facilities<sup>156</sup> for production of T-90 tanks, Ministry did not lay down a time frame for the installation of facilities at Avadi. But the Board set an internal target date of July 2006. The facilities were installed in November 2013, more than seven years later, at a total cost of ₹ 95 crore (break-up of cost being - Plant and machinery: ₹ 71 crore and Civil works: ₹ 24 crore).

We found that the civil works were close to schedule in Engine Factory, Avadi. But two components of works at HVF, Avadi viz. Assembly Shed and Tank Storage Accommodation were completed in September and November 2013 after a delay of seven years. The delays were because when put to tender, the estimates were revealed to be unreasonable which necessitated reduction in the scope of work.

The procurement and commissioning of plant and machinery kept pace with the schedule except in case of two items at HVF, Avadi. These items being: Boring and milling machine (required for manufacturing gear boxes) and Special purpose Automatic Rolling machine (required for manufacturing torsion bars). The delay of around three years in commissioning (March/December 2009) the two vital machines was due to delays in procurement and in completion of civil foundation. The HVF had to resort to import (November 2007 – February 2009) of gear boxes and torsion bar at a cost of ₹ 31 crore, till such time the facility was created for the two assemblies.

The Ministry admitted (May 2014) that due to delayed procurement of automatic rolling machine, torsion bars were imported to meet the production target. On the other hand, the gears were imported because of the lead time in development of the gear box with the new design.

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<sup>156</sup>Facilities were to come up at Heavy Vehicles Factory Avadi, Engine Factory Avadi, Ordnance Factory Medak and Opto Electronic Factory Dehradun



### 8.3.3.3 Non-receipt of design documents for critical assemblies

We found that ToT documents in respect of some critical assemblies<sup>157</sup> were not transferred by the Russian manufacturer, ROE, even after lapse of 12 years as of July 2013. An important component was the gun system (including barrel) for which the design had not been received as of May 2014. In fact, the Ministry cited this issue as the main reason for slippage in indigenous production of T-90 tank.

Ordnance Factories were using “modified chemistry”<sup>158</sup> on an earlier version of the tank: T-72, which was also based on ToT from the same firm, ROE. Both T-72 and T-90 tanks have similar gun barrel assembly. In the absence of the ToT designs for the T-90 barrel, the Board suggested use of “modified chemistry” for the barrel. But the Director General of Quality Assurance (DGQA) did not concur (February 2006) with the proposal. The Ministry intervened in March 2006 to insist for field trials of modified chemistry barrels. The first lot of modified chemistry barrels was put through field trials in July 2008 and then again in September 2010. Eventually, the DGQA cleared the use of modified chemistry barrel in November 2010.

Thus, it took four years for a decision on the use of modified chemistry barrels in T-90 tank. As the schedules were slipping, indigenous production of T-90 tank was undertaken with fully imported gun assembly in 2007. The import continued till 2012 till the production of the modified chemistry barrel gained steam. The total cost on import of 175 gun assemblies was ₹ 119 crore. In addition, the Ordnance Factory Kanpur imported (2007-10) the barrel with other components of the gun at a cost of ₹ 59 crore.

The preceding analysis illustrates the impact of delayed decision making on the indigenous production of T-90 tank. It also highlights the continued reliance of the Ordnance Factories on import of various assemblies/components. In all, ₹ 2,372 crore, representing 62 *per cent* of the total cost of indigenous production of 225 T-90 tanks (₹ 3,813 crore), was spent on import of assemblies as of March 2013. **Annexure-XX** gives further details on the import.

### 8.3.3.4 Continued reliance on imports: impact on indigenisation

The indigenisation plan on T-90 tank envisaged reduction of import content from 80 *per cent* in 2007-08 to 15 *per cent* in 2010-11 with four assemblies<sup>159</sup> identified for perennial import. The Ministry claimed (May 2014) 76 *per cent*

<sup>157</sup> 130 mm Armour plate, specification for Armour steel, sensors for GO27 and Modified GO27, specification GOST B5192-78.

<sup>158</sup>The ordnance factories changed (2000) the composition of materials used in the barrel of the gun assembly.

<sup>159</sup> 7.62 PKTM Gun, Tadiran Radio Set, Gyro Directional Indicator and Ventilation system

indigenisation in production of T-90 tanks, a claim that was not supported with data.

We sought (May 2013) details of item-wise achievement in indigenisation. HVF, Avadi did not provide the details but informed us that six critical assemblies/components<sup>160</sup> which were planned for indigenisation, were yet to be indigenised. These items had been imported from M/s ROE at a total cost of ₹ 226 crore during 2007-11. The reasons provided were: quality issues in production; inability to source components from domestic suppliers and non-availability of ToT designs from ROE.

Ministry stated (May 2014) that the indigenisation and import content were two different aspects. While indigenisation was acquiring the technology to manufacture the tanks, importation was to meet the production target due to lead time involved in indigenous source development and capacity building. The reply is silent on the fact that the factories could not achieve the planned indigenisation within the stipulated time schedule resulting in continuous dependence on imported product supports. The Ministry did not provide a time bound plan for achieving the indigenisation goals, whereby constraints of lead time do not force the country for high reliance on import of assemblies.

#### 8.3.3.5 *Quality problems in indigenous T-90 tanks*

During March 2010 to November 2013, HVF received 45 defect reports (DRs) from the Army relating to minor and major defects in the indigenous T-90 tanks. The defects mainly pertained to failure of gear box and defects in auto/electrical portion of the tanks. A Working Group was proposed (March 2012) to address these deficiencies which was not formed. The HVF, Avadi constituted (November 2004) a Failure Review Board (FRB) at factory level to investigate the reasons for defects at the users end. The FRB discussed (September 2013) the major failures and recommended remedial measures. Accordingly, HVF implemented:

- a process audit to eliminate non-conformances in assembling process;
- introduction of 100 *per cent* pre-fitment and component level inspection and additional quality assurance checks at local supplier's premises;
- extensive trials of samples supplied by the local firms after introducing improvements and before their induction into regular production; and
- deputing of HVF's teams to field locations to ensure technical and maintenance support to the users.

Ministry told us that the FRB was a quality tool which facilitated timely action on defects. The delay in discussion of the FRB (September 2013), even when

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<sup>160</sup> Electric smoke generation switch, Smoke generation system, Hull electrical assembly, Fire fighting system, Ventilation system, AAGM

the Army was raising quality concerns since March 2010, was not however, commented upon by the Ministry.

#### **8.3.3.6 Future production of T-90 tank**

The production of T-90 tank at HVF, Avadi was short of the indent of November 2004 for 300 tanks, by 75 tanks as of March 2013. Even as the production was underway against the first indent, the Army placed a second indent for 236 T-90 tanks in December 2013.

Meanwhile, the Ministry sanctioned (September 2011) ₹ 971 crore for capacity augmentation of T-90 tank production by March 2014. This was expected to raise the capacity of Ordnance Factories from 100 *per cent* to 140 *per cent* of T-90 tanks. It is noteworthy that ₹ 96 crore was sanctioned (February 2004) for creating production capacity for 100 T-90 tanks, whereas augmentation of capacity from 100 to 140 tanks is slated for ₹ 971 crore, a ten times increase in estimation over a period of seven years. Reasons for the extraordinary increase were not provided by the Ministry, in its response of May 2014.

As of March 2014, only an amount of ₹ 17 crore had been spent on the augmentation project and in the revised schedule, the project is expected to be completed in December 2016. The Board appears to have put the augmentation plan on a slow track as of now.

#### **8.3.4 Import of T-90 tank**

The Ministry had planned (February 2001) to meet the Army's requirement of tanks through import from Russia of 124 fully formed T-90 tanks supplemented by the assembling of 186 T-90 imported in semi-knocked down (SKD) and completely knock-down (CKD) form. Indigenous production of MBT Arjun and T-90 tanks was expected to add 424 tanks<sup>161</sup> to the Army's arsenal by 2010. The indigenous production lagged behind the schedule for variety of reasons, but mainly due to frequent changes in design of MBT Arjun as discussed in Paragraph 8.3.2.7. With regard to T-90 tank, production was hampered mainly due to non-transfer of technology on critical assemblies by the Russian firm as well as delays in decision-making in the Ministry on alternatives as discussed in Paragraph 8.3.3.3.

The frequent changes in design of MBT Arjun and delays in decision-making on alternatives for problems in T-90 tanks, were both within the control of the Ministry. Absence of timely and effective intervention by the Ministry on these issues, significantly derailed the indigenous production of tanks. This created a situation of shortage and was decided to be mitigated by fresh

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<sup>161</sup> The production of 124 MBT Arjun and 300 T-90 was originally scheduled to be completed by 1985-2000 and 2006-10 respectively

imports of 124 Fully Formed T-90 tanks and 223 T-90 tanks in SKD valuing ₹4913 crore in November 2007.

The decision to import T-90 tanks was based on the recommendation of the Chief of Integrated Headquarters in September 2007 that import was an operational necessity to make up the deficiency of tanks. While on the one hand, the Army delayed field trials of MBT Arjun and made frequent changes to its design as discussed in Paragraph 8.3.2.7, it cited critical requirement of tanks as the reason for the need for fresh imports.

In response to our query on the import of T-90 tanks, the Ministry replied (May 2014) that import was the jurisdiction of the Army, a reply which does not take cognizance of the fact that the decision for import was taken by the Cabinet Committee on Security based on a note submitted by the Ministry.

### **8.3.5 Mechanism to monitor the augmentation of tank fleet in Army**

Steering Committee (SC)<sup>162</sup> chaired by the Secretary, Defence Production, Ministry of Defence was formed to meet every quarter to monitor the progress of production / issue of MBT Arjun and its induction in Service. We observed that, the SC met only on ten occasions in eight years (2002-10), on an average once in 10 months. No Steering Committee meeting was held after July 2010. The follow-up on the decisions taken in the meetings was inadequate partly because the meetings were not held regularly. The Steering Committee was not able to enforce its decisions in critical areas. For instance, the fourth meeting in July 2006 decided that the design documents would be frozen but changes in design continued well into 2010, which had an adverse impact on the production schedule.

There was no Steering Committee at the Ministry level for review of production and issue of indigenous T-90 tank. However, 10 Institutionalised Interaction and Special Board meetings were held between Army and the Board during 2008-09 to May 2013. The Minutes of monthly meetings of the Ordnance Factory Board indicate that major issues were discussed mainly in seven meetings held during 2010 to 2013 out of 67 Board meetings held during 2008 and 2013.

Important decisions taken in these meetings and their actual implementation are indicated in **Annexure-XXI**. It would be seen from the Annexure that there were cases where decisions were not implemented or implemented partially but belatedly. Thus, monitoring of production of MBT Arjun and T-90 tanks by the Ministry and the Board were not adequate and effective.

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<sup>162</sup> Co-Chairman- Director General (R&D), Members- Chairman (OFB), DGQA, CC (R&D), Additional DGOF (AV), Additional FA (MoD), Additional Director General (WE), Joint Secretary (OF), Director (CVRDE).

## Conclusion

The Ministry planned to achieve self reliance in manufacture of tanks by a phased induction of MBT Arjun during 1985-2000, the schedule later shifted to 2002-09. The production of indigenous T-90 tanks based on Transfer of Technology from Russia was slated to be accomplished during 2006-10.

However, production of the indigenous tanks did not meet the schedule planned for timely fulfillment of Army's needs. In numbers, the Ordnance Factories have met the indent for MBT Arjun (119 out of 124 indented); there is a gap of 133 against the indent for 300 T-90 tanks. The production of MBT Arjun was derailed due to frequent changes in design, contrary to the assurance in 2004 that the design had been frozen. Introduction of new requirements not envisaged in the original GSQR by the Army led to dismantling of already manufactured MBTs. Delays in the Ordnance Factories in erection of infrastructure facilities and problems in sourcing quality assemblies, added to the woes in production of MBT Arjun.

The Transfer of Technology for indigenous production of T-90 tank was marred by delays in translation of design documents and the Russian firm's failure to share designs on critical assemblies like the gun assembly. The problem was compounded by delays in decisions on alternative solutions on these designs. A case in point is the DGQA thwarting the proposal by the Ordnance Factories for using "modified chemistry" proposed for the barrel for T-90 tank. This was despite the fact that the Factories had experience with "modified chemistry" for barrel of T-72 tanks (precursor to T-90 tank); the T-72 and T-90 tank use similar gun barrel. The result: impact of delays was mitigated by fresh imports of T-90 tanks (and kits) from the very same firm in November 2007 worth ₹ 4913 crore, an import our analysis shows was unjustified given the production profile of MBT (production began to keep pace with the planned schedules by 2005-06) and the inexplicable delays in decision-making on the T-90 tank production issues. In addition, ₹ 2372 crore was spent on import of critical assemblies/components of T-90 tank, which formed 62 per cent of the total cost of indigenous production of T-90 tanks.

The Public Accounts Committee had opined that with regular production of MBT Arjun, the indigenous content in production would be increased. But after the initial indent of 124 MBT Arjun in 2000, the Ordnance Factories have not received any further indents from the Army for MBT Arjun. Production of MBT Arjun has come to a standstill since 2009-10 and to that extent, capacity created at a cost of ₹ 87 crore remains underutilized. On the other hand, a second indent of 236 T-90 tanks was placed in December 2013 even as the production against the first indent was short by 75 tanks. Another project for augmentation of the production capacity of T-90 tanks was sanctioned by the Ministry (September 2011), progress on which was negligible.

## 8.4 Capacity addition in Ordnance Factories

### 8.4.1 Introduction

**8.4.1.1** Modernisation in the Ordnance Factory Board (Board) is a continuous process for replacement of outdated machines with new machines for achieving higher productivity, reduction in cost of production and improving quality of the products.

**8.4.1.2** Our past Audit Reports<sup>163</sup> had highlighted deficiencies in the areas of procurement, receipt and commissioning of plant & machinery (P&M). Action Taken Notes<sup>164</sup> of the Ministry of Defence had assured the Parliament of the remedial measures taken to mitigate the shortcomings pointed in Audit. The present audit was to review the impact of the measures in this regard.

**8.4.1.3** We conducted audit in 10<sup>165</sup> out of 39 Ordnance Factories and the Board at Kolkata for the period from 2009-10 to 2011-12<sup>166</sup>. The selected factories spent ₹ 755 crore during 2007-12 on new machinery. They together held P&M worth ₹ 1,376 crore as of 31 March 2012 which represented 50 per cent of the total P&M held in all Ordnance Factories. Table-48 represents population and sample selected in audit.

**Table-48: Population and sample**

Major issues	Population		Sample	
	Number	Value (₹ in crore)	Number	Value (₹ in crore)
Receipt	631	787.07	475	754.57
Commissioning, utilisation and other aspects	1087	1,102.25	731	1,022.81

**Note:** Machine valuing less than ₹10 lakh not considered in the population

### 8.4.2 Constraints to Audit

Our Audit Report of 2004 had pointed out the deficiencies in documentation which limit a review of the benefits of modernisation. The Ministry in its Action Taken Note of February 2006 had informed of the Board's instructions to all factories to maintain the basic documentation in standard formats

<sup>163</sup> Paragraph 7.3 of Audit Report No. 6 of 2004, Report No. 19 of 2007 and Report No. 15 of 2010-11 of the Comptroller and Auditor General of India

<sup>164</sup> February 2006, December 2008 and June 2010

<sup>165</sup> Ordnance Factory Ambajhari (OFAJ), Heavy Vehicles Factory Avadi (HVF), Ordnance Factory Kanpur (OFC), Rifle Factory Ishapore (RFI), Small Arms Factory Kanpur (SAF), Gun & Shell Factory Cossipore (GSF), Gun Carriage Factory Jabalpur (GCF), Field Gun Factory Kanpur (FGK), Ammunition Factory Kirkee (AFK) and Ordnance Factory Khamaria (OFK)

<sup>166</sup> subsequently updated in July/August 2014 for 2012-13, wherever stated in this Report

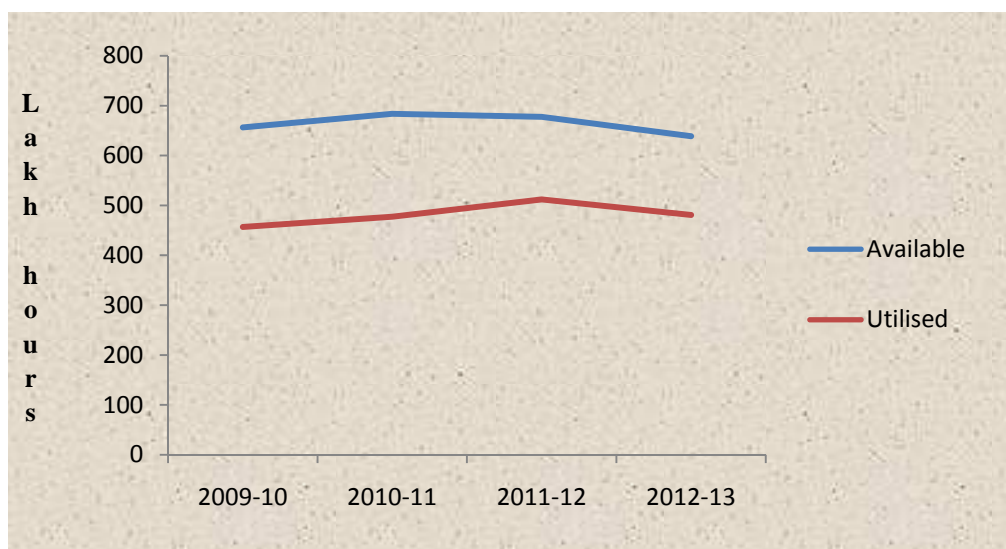


including machine-wise Production Log Book<sup>167</sup>. But none of the ten factories maintained these documents in the prescribed format. Hence, we could not examine the capacity utilisation of individual machine with reference to the records. While accepting the facts, the Board clarified (June 2013) that production data could be generated at Gun and Shell Factory Cossipore for only stand-alone tooled up machine. It was also stated that Ordnance Factory, Kanpur maintained Production Log Book along with requisite details, which we found was factually not correct. In fact, Ordnance Factory, Kanpur itself confirmed (May 2012) to us that history card and log book of the machines were not maintained in their production sections.

### 8.4.3 Impact of new machines

**8.4.3.1** The objective of purchase of modern machinery is to maintain the existing capacity (when the old machinery is being replaced) as well as to augment the capacity (when new machinery is added). We examined the availability and utilisation of machines in three years (2010-13) in the sampled factories and found that the machine availability came down over the years despite procurement (Chart 19). These factories together spent ₹ 755 crore during 2007-12 on procurement for replacement of old machinery and augmentation of machine capacity.

**Chart-19: Machine hours**



**8.4.3.2** The decrease in machine hours was marked, in excess of 10 per cent in three factories viz. Ordnance Factory, Kanpur; Rifle Factory, Ishapore; and Gun Carriage Factory, Jabalpur as given in Table-49.

<sup>167</sup> The log book should include the date, components manufactured, warrant number and date, quantity produced, accepted and rejected and signature of competent authority.



**Table-49: Machine hours availability**

Factory	Ordnance Factory, Kanpur	Rifle Factory, Ishapore	Gun Carriage Factory, Jabalpur
<b>Main product line</b>	Gun barrel, ordnance of tank, shell body of ammunition	Rifle, pistol, revolver	Mortar, gun, spare barrel
<b>Machine hours availability (in lakh hours)</b>			
<b>2010-11</b>	76.41	88.81	104.81
<b>2011-12</b>	45.44	68.38	105.50
<b>2012-13</b>	47.71	67.31	92.49

**8.4.3.3** Our audit showed that the reduction in machine availability, particularly in the above-mentioned factories, was the result of a combination of factors, viz.

- Pace of replacement of machinery lagging behind condemnation/capacity de-rating of old machines
- Delays in receipt and in commissioning of new machines
- High incidence of breakdowns

**8.4.3.4** Subsequent paragraphs detail these findings.

#### **8.4.4 Timeliness in installation**

##### **8.4.4.1 Delays in receipt**

The supplier, after satisfactory pre-despatch inspection, is required<sup>168</sup> to despatch the machinery to the factory as per the delivery period stipulated in the purchase order. We examined the status of delivery of 475 machines in the selected factories and found delay in delivery in respect of 170 machines (36 per cent) valuing ₹ 343 crore (Table-50). Further, 33 machines (₹ 50 crore) were received after delay of more than nine months beyond the original delivery schedule, while another 16 machines were yet to be received by four factories as of March 2013.

**Table-50: Delayed receipt of machinery**

Factory	No. of machines	Value (₹ in crore)	Range of delays beyond delivery schedule				
			Up to 3 months	3-9 months	9-12 months	More than 12 months	Yet to be received
OFAJ	15	15	9	2	1	3	0
OFC	47	118	19	13	2	6	7
FGK	23	98	6	14	0	0	3
HVF	28	51	5	11	4	3	5
OFK	14	25	5	6	1	1	1
AFK	9	5	6	1	2	0	0
RFI	14	18	2	2	0	10	0
SAF	5	4	4	1	0	0	0
GCF	7	5	5	2	0	0	0
GSF	8	4	1	7	0	0	0
<b>Total</b>	<b>170</b>	<b>343</b>	<b>62</b>	<b>59</b>	<b>10</b>	<b>23</b>	<b>16</b>

<sup>168</sup> Paragraphs 6.5.1, 6.8 and 6.5.7 of OFB's guidelines

**8.4.4.2** We examined the reasons for belated receipt of 62 machines in eight factories<sup>169</sup>. Illustrative cases of delayed receipt of machines are given in **Annexure XXII**. The factories could not enforce the conditions of the supply orders and take firm steps when confronted with poor performance of suppliers. There were also delays on the part of factories in deputing their teams for on-site pre-dispatch inspection and in sending trial components for such inspection. There were also instances where the suppliers requested for modifications in specifications after the supply order was placed with delays in finalisation of revised specifications.

**8.4.4.3 Delays in commissioning**

The Board did not fix time schedules for commissioning machinery although the factories are required (circular of July 2000) to incorporate specific time schedule for commissioning in the supply orders. The machine is considered as commissioned once it achieves the prescribed performance standards in the trial run.

**8.4.4.4** Out of 10 factories, only Small Arms Factory, Kanpur specifically mentioned the time schedule for commissioning in 21 (75 per cent) out of 28 supply orders test-checked by us. In the absence of specific time frame for commissioning in the supply orders for other nine factories, we considered six months<sup>170</sup> from the date of receipt as reasonable time for commissioning of machines. Table-51 summarises the results. We found that 211 machines (29 per cent) valued at ₹ 317 crore were commissioned after six months, while 11 other machines valuing ₹ 47 crore were not commissioned in five factories as of March 2013.

**Table-51: Time taken for commissioning of machinery**

(₹ in crore)

Factory	No. of machines commissioned with delay	Value	Number of machines with time taken for commissioning (months)				Machines not commissioned (up to March 2013)	
			6-9	9-15	15-18	>18	Number	Value
OFAJ	64	135	17	29	3	15	2	13.74
OFC	27	41	11	15	1	0	1	0.15
HVF	8	44	2	4	0	2	1	0.55
OFK	7	6	3	4	0	0	0	0
AFK	5	3	2	2	1	0	4	29.16
RFI	27	29	6	8	0	13	0	0
SAF	6	6	3	3	0	0	3	3.59
GCF	49	46	14	19	0	16	0	0
GSF	18	7	6	5	0	7	0	0
<b>Total</b>	<b>211</b>	<b>317</b>	<b>64</b>	<b>89</b>	<b>5</b>	<b>53</b>	<b>11</b>	<b>47.19</b>

<sup>169</sup> OFK (11), GCF (7), HVF (9), OFC (28), FGK (2), AFK (1), RFI (1) and SAF(3)

<sup>170</sup>This time limit was earlier accepted as a criterion in the Performance Audit on 'Procurement of stores and machinery in Ordnance Factories' (Report No. 19 of 2007).

**8.4.4.5** Specific cases of delays in commissioning of machines are illustrated in **Annexure XXIII**. Difficulties in establishing the prescribed performance standard in terms of quality, capacity and cycle time (time taken to manufacture a particular component in a machine) in the trial run, were the main reasons for delay in commissioning the machines. In some cases, these difficulties were an offshoot of compromises in pre-dispatch inspection (before the machine is despatched by the supplier) as discussed in Paragraph 8.4.5.3. Delays in completion of civil works for erection of the machinery also delayed the commissioning of the machines. Two case studies are illustrated below to substantiate the finding.

#### **Case study 1**

Ordnance Factory, Kanpur placed an order on M/s Goratu, Spain in October 2009 for procurement of one Heavy Duty CNC Lathe machine at ₹ 8 crore. During the pre-dispatch inspection at the firm's premises, the team from the Factory did not prove the cycle time. The machine received in June 2011 (against scheduled delivery by January 2011) was belatedly commissioned in July 2012 mainly due to the firm's inability to prove the job and cycle time. Moreover, the machine went under breakdown since September 2012, within two months of commissioning and was yet to be put into operation as of March 2013.

#### **Case Study 2**

Ammunition Factory, Kirkee received the Totally Integrated Plant for .22" ammunition in August 2010 from a foreign firm at a cost of ₹ 27 crore with scheduled commissioning by November 2009. In the pre-commissioning trial, performance standards were to be established on production of practicing grade ammunition as well as match ammunition. However, only practicing grade ammunition was established, due to which the plant could not be commissioned as of March 2013. Delays were also attributed to non-completion of civil works and provisioning of AC plant.

**8.4.4.6** The Board's response (June 2013) to the cases illustrated in **Annexure XXIII** and our comments are given in Table-52.

**Table-52: Board's response and our comments**

Board's response	Audit comments
<ul style="list-style-type: none"> <li>• There was no mention of time frame for commissioning of machines in the guidelines. <i>(Gun Carriage Factory Jabalpur, Rifle Factory Ishapore - Sl. No. 5 and 8 of Annexure XXIII)</i></li> <li>• Delay was due to non-availability of the site and non-synchronisation of civil work for erection of machines in certain cases. <i>(Ammunition Factory Kirkee- Sl. No. 4 of Annexure XXIII)</i></li> <li>• Delay in commissioning was regularly reviewed by the top management to decide action plan. <i>(Gun and Shell Factory Cossipore- Sl. No. 6 of Annexure XXIII)</i></li> <li>• 90 per cent payment was made to the firm after receipt of the machine and 10 per cent made after commissioning. <i>(Ordnance Factory Khamaria- Sl. No. 3 of Annexure XXIII)</i></li> <li>• Efforts were made to commission the Flow Forming Machine from outside sources. <i>(Ordnance Factory Ambajhari- Sl. No. 7(a) of Annexure XXIII)</i></li> <li>• The machine was commissioned with proving of the stipulated cycle time. <i>(Ordnance Factory Kanpur- Case Study 1)</i></li> </ul>	<ul style="list-style-type: none"> <li>• Reply is not acceptable because guidelines specifically require the factory managements to include the commissioning clause in the supply orders. Failure to include the same led to non-imposition of penalty on the defaulting suppliers for delayed commissioning of the machines.</li> <li>• Reply itself indicates factory's failure to make the site available as well as to synchronise the civil works, which led to delayed commissioning.</li> <li>• In the quarterly review meetings, the Board did not indicate the bottlenecks for commissioning. Operating Members were requested by the Board to expedite the commissioning without giving any specific directions to sort out the bottlenecks.</li> <li>• Deferment of 10 per cent payment after commissioning cannot justify non-realisation of value for money towards 90 per cent investment on machines for a considerable period.</li> <li>• Non-commissioning of the machine led to outsource machining of the indented components valuing ₹ 92.27 crore during March 2009 to June 2012.</li> <li>• The machine could not be put to intended use due to breakdown since September 2012 (Two months after much delayed commissioning).</li> </ul>

The Board did not furnish reply to the instances (Sl. No. 2(d) and (e) of Annexure XXIII) pertaining to Heavy Vehicles Factory Avadi.

#### 8.4.5 Quality assurance

**8.4.5.1** Two important stages in procurement provide quality assurance: Pre-dispatch inspection and Pre-commissioning trial runs. The Factories are also required to measure the tangible results of induction of new machinery by reducing the estimates on cost of production of items produced in the new machines.

#### 8.4.5.2 Pre-dispatch inspection

Before receipt of machines by the OFs, pre-despatch inspection (PDI) is carried out at supplier's premises to ensure that machines conform to the desired quality and specifications as per the contract. General Managers of the

factories are to function as Inspection Authorities to ensure efficient PDI because 80/90 per cent payment is released to suppliers on proof of despatch/receipt of the machine after clearance in PDI. Supply orders should indicate the basis<sup>171</sup> for carrying out PDI by the authorised representative of the factory.

**8.4.5.3** We examined PDI of 286 machines (189 supply orders) valuing ₹ 362 crore in seven<sup>172</sup> factories. Except for Small Arms Factory, Kanpur, there were inadequacies and shortcomings in PDI of 32 machines valuing ₹ 63 crore in six factories as detailed in **Annexure-XXIII**. The deficiencies included: failure to prove the required cycle time/components, deficient testing of the manufacturing process, acceptance of machines despite repeated failure and significant deviations in technical features against contractual terms. As pointed out in Paragraph 8.4.4.5, these deficiencies led to delay in final commissioning of the machines as well as acceptance of some machines by compromising the quality, as discussed in subsequent paragraphs.

**8.4.5.4** The Board's response (June 2013) to the cases illustrated in **Annexure XXIII** and our comments are given in Table-53.

**Table-53: Board's response and Audit comments**

<b>Board's response</b>	<b>Audit comments</b>
Proving of cycle time was not possible within the limited time during PDI. ( <i>Ordnance Factory, Kanpur- Sl. No.1 of Annexure XXIII</i> )	Timeframe for carrying out the PDI including proving of cycle time was decided mutually between the OF and suppliers.
Two machines were commissioned and working satisfactorily. Commissioning of Gear box test stand was completed and its performance was under observation. ( <i>Heavy Vehicles Factory, Avadi- Sl. No. 2(a,b,c) of Annexure XXIII</i> )	Reply is silent as to why the PDI team cleared the Horizontal Broaching machine for dispatch without proving the six components. HVF also failed to utilise the punch press for the intended components due to quality constraints.
Machine operation was same for all types of components. Hence, PDI was carried out with one component. ( <i>Ammunition Factory Kirkee-Sl.No. 4(a) of Annexure XXIII</i> )	Proving trial of one component in PDI did not absolve the PDI team's responsibility of carrying out trial of seven components.
Factory could not supply trial components of correct size to the supplier due to non-availability. Hence, the supplier was suggested to arrange trial component of required size, which led to delay. ( <i>Gun Carriage Factory Jabalpur- Sl.No. 5(a) of Annexure XXIII</i> )	Reply is not acceptable because the factory is responsible to arrange right sized trial components for ensuring PDI in time.
The PDI team assessed that deficiencies were minor in nature and M/s HMT would respond to arrange the required accessories and spares on urgent basis. ( <i>Gun and Shell Factory, Cossipore- Sl.No. 6 of Annexure XXIII</i> )	GSF did not explain reasons for delay of 4 years in commissioning the machine and that too with higher cycle time of 9 hours against contractual cycle time of 27 minutes.

<sup>171</sup> Paragraphs 8.1 and 8.3.1 of Board's guidelines (May 2001) for procurement of plant and machinery in Ordnance Factories

<sup>172</sup> OFC, HVF, OFK, AFK, GCF, GSF & SAF

#### 8.4.5.5 Pre-commissioning trial

The factories are also required<sup>173</sup> to accept the machines only when they are successfully commissioned after carrying out trial and guarantee runs for a mutually agreed period for proving the cycle time and components as per the supply order.

8.4.5.6 We found that four factories<sup>174</sup> accepted 32 machines valuing ₹59 crore out of 213 belatedly commissioned machines valuing ₹317 crore despite inadequacies found in performance trial runs (**Annexure XXIV**). Machines were accepted and commissioned despite deficiencies found in pre-commissioning trials. One case study is given below to substantiate the audit finding.

#### Case Study 3

Gun and Shell Factory, Cossipore commissioned five CNC machines valued at ₹ 1.7 crore in September 2009. The machines were accepted and commissioned with a much higher cycle time, exceeding by 94 to 186 *per cent* the cycle time prescribed in the supply order.

#### 8.4.5.7 Impact on cost of production

The Factories are required<sup>175</sup> to measure the tangible benefits of introduction of new machines by revising the material/labour estimates and percentage of unavoidable rejection (UAR) of the produced items downwards after commissioning. We found that the Factories did not maintain any database with regard to the number of components that required revised cost estimates consequent to commissioning of new machines.

8.4.5.8 We examined cost estimates of the components relating to 202 machines in respect of eight factories<sup>176</sup> and observed that:

- Estimates for the components relating to 80 *per cent* machines (161) were not revised downwards.
- For Heavy Vehicles Factory, Avadi and Field Gun Factory, Kanpur, only labour estimates were revised downwards for components relating to 58 and 53 *per cent* machines respectively.

8.4.5.9 The response of the Board (June 2013) on the cases pertaining to five factories and our comments are tabulated below:

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<sup>173</sup> Paragraphs 10.3.7 to 10.3.9 of OFB's guidelines of May 2001

<sup>174</sup> GCF, OFC, HVF and GSF

<sup>175</sup> As per instruction of OF Board's Chairman under his DO letter dated 30.3.2004/1.4.2004

<sup>176</sup> HVF, OFK, OFC, SAF, FGK, OFAJ, GSF and RFI

**Table-54: Response of the Board and Audit comments**

<b>Board's response</b>	<b>Audit comments</b>
Relevant estimates were revised as and when new CNC machines came into operation. <i>(Rifle Factory, Ishapore)</i>	Estimates for 2 components (Bracket and Breach Block) were not revised after commissioning of 10 machines. Though estimates for 4 components involving 9 machines were revised, labour-hours indicated in the estimates were still higher than the cycle times accepted for the machines.
Estimates were revised whenever there was scope for revision, consistent with process improvement. <i>(Gun and Shell Factory, Cossipore)</i>	Estimates were not revised as per cycle time established for the components in respect of 16 machines, test checked by us.
Revision of estimates was taken up whenever there was change in process of manufacture and reduction in cycle time. <i>(Heavy Vehicles Factory, Avadi)</i>	Revision of estimate was carried out in 2 out of 13 cases test checked by us; the purchase proposals envisaged for revision of estimates for all 13 cases.
Downward revisions of estimates were done for 14 principal products during 2005-06 to 2011-12. <i>(Ordnance Factory, Kanpur)</i>	The reply is not factually correct because Additional <b>GM of the factory</b> had indicated non-revision of estimates for the designated components in respect of 40 machines in his Note dated 19 October 2011.
Question of revision of estimates did not arise as the components earlier manufactured by CNC machines were shifted to new CNC machines. <i>(Small Arms Factory, Kanpur)</i>	During 2007-08 to 2011-12, eight CNC machines were procured against conventional machines but no revision of estimate was carried out by the factory.

The Board did not furnish any reply to non-revision of estimates by Ordnance Factory, Ambajhari; Field Gun Factory, Kanpur and Ordnance Factory, Khamaria.

**8.4.5.10** Our analysis of the production trend of components through conventional as well as CNC machines in two factories (Gun and Shell Factory, Cossipore and Rifle Factory, Ishapore), revealed use of conventional machines despite availability of CNC machines that the Board must take cognizance of. Rifle Factory, Ishapore manufactured four components (bracket, breech block, piston extension and hammer) in conventional machines during 2008-13, though CNC machines had the capacity to meet the



targeted workload. Similarly, Gun and Shell Factory, Cossipore manufactured fuze 162 MK-8 (for ammunition) through conventional machines during 2009-12, in spite of capacity available with the CNC machines to produce the same. The cost of production through conventional route being higher, the continued use of these machines over the more efficient CNC machines, was questionable. A test check in these factories showed a tendency to prefer the conventional machines which are more labour intensive.

**8.4.5.11** The response of the Board (June 2013) and our comments are given in Table-55.

**Table-55: Response of the Board and Audit comments**

<b>Board's response</b>	<b>Audit comments</b>
Production system should have the liberty to allocate machines for different components dynamically. No extra expenditure was incurred for the components manufactured in conventional machines. <i>(Rifle Factory, Ishopore)</i>	Reply is not acceptable because the factory had to incur extra expenditure in manufacturing components in conventional machines due to their higher cycle time and unavoidable rejections as compared to CNC machines. Moreover, the objective of purchase of CNC machines is to reduce cost which was not realised.
The factory was forced to utilise conventional machines to meet the enhanced target of Fuze 162 as the supplier (M/s HMT) failed to prove the stipulated cycle time for new CNC machines. <i>(Gun and Shell Factory, Cossipore)</i>	The reply is not correct because even with the reduced cycle time achieved, capacity of CNC machines (393846 nos) was sufficient to meet the actual production (60499, 123062 and 112906) of fuzes during 2009-10 to 2011-12.

#### **8.4.6 Utilisation of machinery**

The rated capacity of a machine is calculated as numbers of particular component manufactured per hour based on cycle time needed to manufacture the component on the machine<sup>177</sup>. The Management told us that utilisation of the machine at the level of 65 per cent<sup>178</sup> and above is considered acceptable for production viability and economic return on investment.

**8.4.6.1** We checked capacity utilisation of 340 machines for the years 2009-10 to 2012-13 in the six factories out of sample of 731 machines in ten factories.

<sup>177</sup> Normal capacity of a plant in production shop was to be reckoned on the basis of its working in two shifts (eight hours in each shift) daily for 25 days per month. Thus machine-hours per annum are worked out to 3840 hours after deducting 20 per cent towards breakdown, tool setting time, absenteeism, etc.

<sup>178</sup> Considering 80 per cent machine efficiency and 80 per cent human efficiency

The same exercise could not be carried out in four factories viz. Field Gun Factory, Kanpur; Ammunition Factory, Kirkee; Rifle Factory, Ishapore and Gun and Shell Factory, Cossipore as we did not get machine-wise and year-wise production data/production log book, cycle time involved or because the factories had not assessed the rated capacity of the machines. Details of percentage of utilisation of machines in respect of six factories are shown in **Annexure-XXV**.

**8.4.6.2** Only 55 to 59 per cent of the machines were utilised above 65 per cent of the capacity, while 21 to 24 per cent of the machines were utilised up to 30 per cent of the capacity (Table-56). The incidence of under-utilisation was highest in Small Arms Factory, Kanpur (100 per cent), Ordnance Factory, Kanpur (96 per cent), Gun Carriage Factory, Jabalpur (56 to 75 per cent) and Ordnance Factory, Khamaria (44 to 59 per cent).

**Table-56: Percentage of utilisation of machines**

Year	Number of machines checked <sup>179</sup>	Range of percentage of utilisation		
		0 to 30	31 to 65	Above 65
		Number of machines		
2009-10	340	76 (22)	78 (23)	186 (55)
2010-11	340	70 (21)	71 (21)	199 (58)
2011-12	340	74 (22)	65 (19)	201 (59)
2012-13	340	80 (24)	65 (19)	193 (57)

**Note:** Figure in parenthesis indicates percentage of number of machines under each category to total number of test checked machine.

**8.4.6.3** Illustrative cases are given in **Annexure XXVI**. The high incidence of under-utilisation was because the production targets for items were reduced or because the project, in which the machine was a part, was delayed. For instance, machines bought in Ordnance Factory, Khamaria for production of 30mm cartridge case at a cost of ₹ 2 crore remained un-utilised since purchase because the factory did not get the production orders. Similarly, two machines worth ₹ 5 crore commissioned in December 2008 and February 2009 at Ordnance Factory, Kanpur for production of new items: 130mm and 155mm cargo ammunition, remained unutilised because the development project was delayed<sup>180</sup>. The machines that were lying un-utilised were then diverted for other alternative purposes and yet, remained under-utilised. For instance, four machines purchased for manufacture of 81 mm mortar and tail unit (part of the shell body of the ammunition) at a cost of ₹ 1.4 crore could not be used in Ordnance Factory, Kanpur because the workload was withdrawn from the

<sup>179</sup> Number of machines checked was less than the sample size in respect of OFC, HVF, SAF and GCF due to availability of data in respect of production related machines only.

<sup>180</sup> Following the ban of Israeli firm, IMI, who was involved in the co-production

Factory. The Factory was using these machines for manufacture of other components, which was at best a compromise.

**8.4.6.4** We also examined the production performance/achievement reports *vis-a-vis* targets<sup>181</sup> of the selected 10 factories and found that nine factories, except Heavy Vehicles Factory, Avadi, failed to meet the targets in respect of 17 to 100 *per cent* items. Under-utilisation of the capacity is a contributing factor for shortfall in achievement of the targets in factories.

#### **8.4.7 Breakdown**

**8.4.7.1** Our analysis of utilisation of machines revealed high incidence of breakdowns as an area of concern. We examined 398 machines<sup>182</sup> in the five factories (Ordnance Factory, Ambajhari; Ordnance Factory, Khamaria; Rifle Factory, Ishapore; Gun Carriage Factory, Jabalpur and Gun and Shell Factory, Cossipore). A similar analysis could not be undertaken in respect of Ordnance Factory, Kanpur; Heavy Vehicles Factory, Avadi; Field Gun Factory, Kanpur and Ammunition Factory, Kirkee for want of supporting data. No major breakdown was noticed in Small Arms Factory, Kanpur.

**8.4.7.2** The details are given in Table-57, which can be summarised as under:

- 37 to 55 machines (9 to 14 *per cent*) remained under breakdown for more than one month's duration in a particular year during 2009 to 2012;
- The breakdown period exceeded six month's duration in a year in respect of 14 to 15 machines in five factories every year; and
- Maximum instances of breakdown were observed in Gun Carriage Factory, Jabalpur and Rifle Factory, Ishapore.

**8.4.7.3** Further, in four factories (Ordnance Factory, Khamaria; Ordnance Factory, Ambajhari; Rifle Factory, Ishapore and Gun and Shell Factory, Cossipore), 15 machines valuing ₹16 crore were lying under breakdown for over a period of 20 to 100 months since their commissioning due to various technical problems.

**8.4.7.4** High incidence of breakdown was due to various reasons. These included inadequate preventive maintenance schedule whereby machines are put to continuous use or because electronic parts were not covered during preventive maintenance. Delays in repair and in putting the machines on production line after rectification also led to prolonged periods under breakdown. Details of factory-wise breakdown of machines are given in Table-57.

<sup>181</sup> Given by OFB for items for the Services, Ministry of Home Affairs and sister factories

<sup>182</sup> OFAJ-110, OFK-81, RFI-70, GCF-58, GSF-79.

**Table-57: Details of factory-wise breakdown**

Year	Period of breakdown	Number of machines under breakdown					Total
		OFAJ	OFK	RFI	GCF	GSF	
2009	31 to 90 days	0	0	10	11	1	22
	91 to 180 days	0	1	4	11	2	18
	above 180 days	0	2	5	5	3	15
	<b>Total</b>	<b>0</b>	<b>3</b>	<b>19</b>	<b>27</b>	<b>6</b>	<b>55</b>
2010	31 to 90 days	0	0	3	11	1	15
	91 to 180 days	1	0	1	9	1	12
	above 180 days	0	3	8	1	2	14
	<b>Total</b>	<b>1</b>	<b>3</b>	<b>12</b>	<b>21</b>	<b>4</b>	<b>41</b>
2011	31 to 90 days	0	0	1	21	0	22
	91 to 180 days	0	0	2	4	1	7
	above 180 days	3	3	5	0	3	14
	<b>Total</b>	<b>3</b>	<b>3</b>	<b>8</b>	<b>25</b>	<b>4</b>	<b>43</b>
2012	31 to 90 days	0	0	5	9	1	15
	91 to 180 days	0	0	3	3	1	7
	above 180 days	3	3	6	1	2	15
	<b>Total</b>	<b>3</b>	<b>3</b>	<b>14</b>	<b>13</b>	<b>4</b>	<b>37</b>

8.4.7.5 The Board's response (June 2013) and our comments are given in Table-58.

**Table-58: Response of the Board and Audit comments**

Board's response	Audit comments
Breakdown of machines was normal and attended to on urgent basis. Delay in repair/restoration was unavoidable and there was no production loss as there was in-built additional capacity for war scenario. <i>(Rifle Factory, Ishapore and Gun and Shell Factory, Cossipore)</i>	Reply is not specific as to what remedial measures had been taken to curb the high incidence of breakdown (24 to 79 months for certain machines). The claim of 'No production loss' is not correct as RFI and GSF failed to achieve production target of 19 to 86 per cent items and 38 to 69 per cent items respectively during 2009-12.
Preventive maintenance schedule and monitoring of condition of critical machines were strictly adhered to. <i>(Ordnance Factory Khamaria)</i>	Maintenance of machines was not efficient and effective as there were prolonged breakdown of three machines for 30 to 100 months.

The Board did not furnish replies to the cases of breakdown of machines pertaining to Gun Carriage Factory, Jabalpur and Ordnance Factory, Ambajhari.

#### **8.4.8 Internal controls**

**8.4.8.1** According to the Board's guidelines with respect to laid down timeframe, target and expenditure, regular monitoring is required to be done at the Board through periodical reports of factories as relevant in each case. The factories generate monthly reports on the status of un-commissioned machinery which were also placed quarterly in the Board's meetings. Our scrutiny revealed that the reports did not indicate the specific reasons for delay in commissioning the machines along with the agency responsible for such delay. There was also no mention in the monthly reports about corrective action taken to commission them expeditiously.

**8.4.8.2** The Board meets once a month to discuss different issues related to the factories. Scrutiny of the minutes of the Board meetings revealed that despite persistent deficiencies in pre-despatch inspections, receipt and commissioning, utilisation of machinery and their documentation, the Board did not flag those effectively nor did it recommend the corrective action to plug the shortcomings so as to ensure efficient and effective running of machines and to achieve the benefits intended for.

#### **Conclusion**

Addition of machinery in the factories did not enhance the capacity in production. In fact, the machine hours available in the factories showed a downward trend in 2010-13. Delays in receipt and in commissioning of machinery led to a time lag in reaping the benefits of modernisation. Quality controls in pre-dispatch inspection and pre-commissioning trials were compromised which led to delays in commissioning and in some cases, acceptance of machinery that was below par. High incidence of under-utilisation and of breakdowns, undoubtedly affected the ability of the factories to meet the targets placed on them. These issues which have a direct bearing on the performance of the Board, did not receive the attention due from the top management.

The matter was referred to the Ministry in March 2013; their reply was awaited (September 2014).

## Procurement of Machinery / Stores

### 8.5 Extra expenditure due to delay in commissioning and improper handling of machine

**Delayed commissioning and improper handling of an imported machine resulted in avoidable expenditure of ₹ 2.06 crore on import and extra expenditure of ₹ 0.55 crore on repair of the machine.**

Ordnance Factory Board (Board) approved (November 2004) ₹ 10.8 crore for purchase of a CNC grinding machine<sup>183</sup> for Engine Factory Avadi (Factory), Tamil Nadu to replace an old condemned Crankshaft Pins Grinder and to meet the shortfall in standard machine hours of existing other two old grinding machines. The machine was to be used for grinding operation of Pin and Journal of the raw Crankshaft forgings for tank and infantry combat vehicle engines.

A global tender enquiry was issued (July 2005) by Factory for supply, erection and commissioning of CNC grinding machine. But the tender was not finalized since the Factory was directed by Armoured Vehicles Headquarters Avadi (March 2007) to recast the specification of machine. The Factory thereafter issued (August 2007) a global tender for the same item with recasted specification. The tender was finalized (April 2009) and an order was placed on M/s. Cinetic Landis Limited, U.K. (Firm) for supply, erection and commissioning of the grinding machine at a total value of ₹ 8.17 crore<sup>184</sup>. Thus, there was time lag of 49 months in placement of order from the date of Board's approval as against six months provided in the Board's circular of July 1998. The contractual conditions stipulated that:

- The machine was to be delivered by 28 February 2010 and commissioned by 31 May 2010;
- The Factory would carry out the pre-dispatch inspection before delivery of the machine at the firm's works. The Factory would provide five crankshaft forgings each of tank and infantry combat vehicle engine as trial components to the firm to enable them to prove cycle time stipulated in the order while grinding these crankshafts forgings during pre-dispatch inspection.
- The firm would dispatch the machine after the Factory approved the test certificate on trial samples inspected during pre-dispatch inspection ;

<sup>183</sup>CNC Crank Shaft Pins and Journal Grinding Machine

<sup>184</sup>Great Britain Pound (GBP) 11,11,996.75 equivalent to ₹ 8.17 crore at the exchange rate of 1 GBP = ₹ 73.51

- The firm assured free replacement of defective material, if any, during the guarantee period of 12 months reckoned from the date of commissioning.

The firm requested the Factory for dispatch of the five trial components each by October 2009 to enable pre-dispatch inspection by March 2010. But the Factory could supply the components to the firm only by February 2010. Owing to this delay, the delivery period was extended from 28 February 2010 to 30 June 2010.

Following the PDI (May 2010), the machine was received in July/August 2010. We noticed that the PDI report (May 2010) did not indicate the Factory's approval of the test certificates of trial components prior to dispatch of the grinding machine. Despite this, Factory released ₹ 6.78 crore to the firm towards 90 *per cent* of the order value in violation of the supply order.

Against the scheduled period of commissioning by November 2010, the firm actually commissioned the machine 14 months later, in February 2012. The delay was attributed to a variety of reasons<sup>185</sup>. The Factory accepted the machine and released the balance contractual amount of ₹ 1.01 crore in March 2012.

Our scrutiny revealed that owing to delay in receipt and commissioning of the grinding machine, Factory imported 150 crankshaft between May 2011 and February 2013 against its two supply orders of October 2010 (50 crankshafts) and November 2011(100 crankshafts) at a higher cost of ₹ 2.06 crore, when compared with Factory's in-house cost, to meet its requirement of crankshafts for tank engines.

The Factory utilized the machine till January 2013 when it broke down owing to defects in wheel spindle. As the machine was under warranty period (up to February 2013), the Factory approached the firm for replacement of the defective part. The firm did not accede to the request on the ground that wheel spindle had developed defects due to misuse of the machine. The Factory eventually got the part repaired from the firm in October 2013 at a cost of ₹ 55.28 lakh.

The Board accepted (July 2014) the delays but clarified that the machine was actually commissioned in April 2011; the commissioning report being signed later in February 2012 to protect Government interests. The reply is not factually correct because had the machine been actually put into operation in April 2011, there was no requirement of import of 100 crankshafts against its supply order of November 2011.

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<sup>185</sup>Delay in deputation of service engineers, non-supply of spares, deficiency in training imparted to the operators, interruption in achievement of cycle time/abrupt stoppage of machine on 17 occasions *etc.*



Thus, delay in supply and commissioning of a new grinding machine coupled with improper handling of the machine led to avoidable extra expenditure of ₹ 2.06 crore on import of crankshaft and ₹ 0.55 crore on repair of the machine.

The matter was referred to the Ministry in June 2014; their reply was awaited (September 2014).

## 8.6 Avoidable extra expenditure on procurement of components

**Procurement of Copper Tube/Aluminium Alloy extruded Rod by Ordnance Factory Kanpur (OFC) from Ordnance Factory Katni/Ordnance Factory Ambarnath, despite material cost of those sister factories being higher than the total trade cost, led to avoidable extra expenditure of ₹3.99 crore.**

Mention was made in Audit Paragraph 8.4 of the Comptroller and Auditor General of India's Report No 6 of 2005 that in deviation of Ordnance Factory Board (Board)'s Circular (October 1997), Ordnance Factory Dehu Road, Maharashtra procured component (Tail Adapters)<sup>186</sup> from Ordnance Factory Kanpur (OFC), Uttar Pradesh though material cost alone of Tail Adapters supplied by Ordnance Factory Kanpur (OFC), Uttar Pradesh was higher than the trade cost of finished goods, leading to an additional expenditure of ₹ 3.04 crore.

Ministry in their Action Taken Note (ATN) stated (November 2009) that Board had reviewed (November 2006) the policy guideline on trade procurement *vis-à-vis* Inter Factory Demand expenditure and issued a Circular (December 2006) directing Senior General Managers/General Managers of all Ordnance Factories, to procure 100 *per cent* of the total requirement of any item from trade if the material cost of that item at the component making factory is more than the total trade cost. Board's Circular also stipulated that wherever the (i) marginal cost or (ii) direct material cost, as per cost estimates furnished by sister factories (Inter Factory Demand manufacturing factories) are found to be higher than the trade price, procuring factory should intimate the position to the Inter Factory Demand manufacturing factory. Based on such inputs, Inter Factory Demand manufacturing factories should review their material and labour estimates, manufacturing process and material usage rates so as to prune down the redundancies contained therein and reduce the cost to bring it at comparable level with the trade price. Finance Division at Board should also be kept informed about such cases, who in turn should maintain a data bank of such cases for utilization in pricing decisions and review of issue prices during subsequent years.

<sup>186</sup> A component used to fit Tail Unit with Shell body of ammunition by adjustment.

During 2010-11, Ordnance Factory Kanpur, Uttar Pradesh procured Copper Tube and Aluminium Alloy extruded Rod, a component required for manufacture of 105 mm IFG ammunition and Tail unit 8A<sup>187</sup> respectively, from trade firms as well as from Ordnance Factory Katni, Madhya Pradesh and Ordnance Factory Ambarnath, Maharashtra.

We examined (February 2013) the cost pattern at Ordnance Factory Katni, Madhya Pradesh/Ordnance Factory Ambarnath, Maharashtra and noticed that the unit material cost of Copper Tube (₹ 509.31) at Ordnance Factory Katni, Madhya Pradesh during 2010-11 had exceeded the total unit cost of finished goods ex-trade (₹ 499.16). Similarly, unit material cost of Aluminium Alloy extruded Rod at Ordnance Factory Ambarnath, Maharashtra (₹ 260.60) during 2010-11 had outstripped the total unit cost of finished goods ex-trade (₹ 189.70). Despite this abnormal material cost trend at Ordnance Factory Katni, Madhya Pradesh/Ordnance Factory Ambarnath, Maharashtra, as compared to trade prices, Ordnance Factory Kanpur Uttar Pradesh, in violation of Board's Circular (December 2006) purchased 43,591 Kg Copper Tube from Ordnance Factory Katni, Madhya Pradesh against one Inter Factory Demand (March 2010) at the rate of ₹ 900 per Kg and procured 65,385 Kg Aluminium Alloy extruded Rod from Ordnance Factory Ambarnath, Maharashtra against two Inter Factory Demands placed during 2010-11 at the rate of ₹ 533 per Kg. During the same time, Ordnance Factory Kanpur Uttar Pradesh also purchased 80,264 Kg Copper Tube from trade at much cheaper rate of ₹ 499.16 per Kg as well as 7,434 Kg Aluminium Alloy extruded Rod at rate of ₹ 189.70 per Kg against two supply orders (April 2010 - September 2010).

We observed that though Inter Factory Demands were repeatedly placed at higher rates in violation of existing Circular, neither did the Ministry nor Board address this issue in any of its Board meetings held after issue of its Circular of December 2006.

While justifying the procurement at higher cost from Ordnance Factory Katni Madhya Pradesh/Ordnance Factory Ambarnath Maharashtra, Ordnance Factory Kanpur Uttar Pradesh stated (May 2013) that in maximum cases Inter Factory Demand items were costlier than trade because of overheads, included in the Inter Factory Demand cost.

The reply is not acceptable as procurement from sister factories had been resorted to, though material cost was itself higher than total trade cost. This violated Board's own Circular of December 2006 which instructed Senior General Managers/General Managers of all Ordnance Factories to procure 100 *per cent* requirement from trade if the material cost of the item at component

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<sup>187</sup> A component used in the 51mm Mortar Bomb to stabilize the direction of the ammunition during its flight.

making factory was more than the trade cost. Further, neither Ordnance Factory Kanpur Uttar Pradesh informed the trade price to Inter Factory Demand supplying factories (Ordnance Factory Katni, Madhya Pradesh and Ordnance Factory Ambarnath, Maharashtra) to review their manufacturing process and material usage to bring their cost comparable to the trade price nor referred such cases to Finance Division of Board for maintaining appropriate data bank for use in pricing decisions and review of issue prices during subsequent years. This, ultimately resulted in avoidable extra burden of ₹3.99 crore.

Thus, procurement of 1.09 lakh Kg Copper Tube and Aluminium Alloy extruded Rod from Ordnance Factory Katni, Madhya Pradesh /Ordnance Factory Ambarnath, Maharashtra, at a significantly higher cost than the trade cost in violation of Board's Circular of December 2006, resulted in extra expenditure of ₹ 3.99 crore.

The matter was referred to the Ministry in June 2014; their reply was awaited (September 2014).

### **8.7 Acceptance of defective stores before bulk production clearance**

**Acceptance of defective stores before receipt of clearance for bulk production in violation of the Ordnance Factory Board's instruction led to a loss of ₹ 93.61 lakh.**

Adrushy Mine of Mark-II version, an anti - tank land mine used by the Indian Army, was developed through an indigenous Transfer of Technology by the Armament Research and Development Establishment Pune (ARDE), a laboratory of the Defence Research and Development Organization (DRDO). Army placed an indent (September 2006) on Ordnance Factory Board (Board) for supply of 20,000 mines.

The production of mines<sup>188</sup> was to be in phased manner with a pilot batch of 55 mines initially with a subsequent scale-up to 10,000 mines. Clearance for Bulk Production (BPC) was to be accorded after the clearance of the pilot batch of filled<sup>189</sup> mines in user trials. The target for meeting the indent was placed by the Board on Ordnance Factory Chanda (Factory), Maharashtra.

The Factory was directed by the Board to procure the first 5,000 empty hardware from the sources of ARDE. Against the limited tender enquiry to

<sup>188</sup> A mine has for components-empty hardware, fuse assembly, package assembly and key combination set

<sup>189</sup> Empty hardware is assembled with fuse assembly, packing assembly and key combination set. It is thereafter filled with chemical/explosive at Ordnance Factory Chanda. This is known as filled mines

two ARDE sources, the supply order was placed (March 2007) for 5,141<sup>190</sup> empty hardware on M/s. Auro Engineering Private Limited, Pune (Firm) at unit cost of ₹ 10,650 with ARDE Pune as the Inspecting Authority.

The Board had specifically directed (February 2007) the Factory to include in the supply order a condition that 55 numbers would be supplied within eight weeks and full delivery would be completed within four months from the date of BPC clearance. Audit scrutiny (June 2012) revealed that the 'delivery schedule' of the supply order placed by the Factory had conflicting conditions. At one place, it stipulated supply of 55 numbers by 31 May 2007 and bulk manufacturing/supply at the rate of 1,000 per month after BPC only. But in another place, the supply order provided firm delivery schedules of 55 numbers by 31 May 2007 and the balance 5,086 empty hardware by 31 October 2007.

The Firm supplied (August 2007) 55 empty hardware to the Factory after getting inspection clearance (July 2007) from ARDE as per supply order. The Firm also intimated (10 September 2007) the Factory that they had already undertaken bulk manufacture of 5,100 empty hardware for inspection by September 2007 and October 2007 in two batches. The Factory advised (19 September 2007) the Firm that bulk manufacture was not in order pending receipt of BPC<sup>191</sup> and re-scheduled (December 2007) bulk delivery schedule to April 2008 in anticipation of receipt of BPC.

In March 2008, the Firm again requested the Factory to take delivery of 1,000 empty hardware. They offered to replace empty hardware free of cost in the event of any defect observed subsequently. The Factory sought (April 2008) clearance from ARDE for purchase of 1000 empty hardware, on receipt (8 May 2008) of which, the Factory accepted (26 May 2008) delivery of 1000 empty hardware at a cost of ₹ 126.73 lakh. Further, instead of recovering a performance security deposit of ₹ 66.23 lakh (10 *per cent* of the total value of the contract) as required under the supply order<sup>192</sup> the Factory recovered a performance security deposit of ₹ 33.12 lakh (5 *per cent* of the total value of the contract). As a result, the performance security deposit was under recovered by ₹ 33.11 lakh. This was clearly an undue benefit to the firm.

We observed that pilot lot of 55 empty hardware was rejected in the trial tests of ARDE (2009). Joint inspection was carried (March/April 2010) by the ARDE and Factory on 555 out of 1,000 empty hardwares received from the firm, of which 507 numbers failed in the tests due to defects in quality of gaskets and cracks on body of the empty hardware leading to leakage at various points. The remaining 48 numbers were accepted. Factory made

<sup>190</sup> Of the 5141 sets empty hardware ordered for 55 sets empty hardware are meant for pilot lot and remaining 5086 sets meant for bulk supply

<sup>191</sup> Bulk production clearance of the filled mines

<sup>192</sup> As per clause 9 (a) of the tender instruction enclosed with the Supply Order

(March 2010 to January 2011) repeated requests to the Firm to replace the rejected empty hardware, which was not done. Ultimately, entire lot of 1,000 empty hardwares was finally rejected (June 2010) by ARDE and Factory. However, no penal action was initiated by the Factory. This also raises question on ARDE's initial clearance of empty hardware.

Thus, placement of an order with a deficient delivery schedule, accepting the delivery of 1,000 empty hardware even before clearance for bulk production, in violation of the Board's instruction led to a loss of ₹ 93.61 lakh.

The matter was referred to the Ministry in August 2014; their reply was awaited (September 2014).

## 8.8 Avoidable procurement

**Incorrect assessment of requirement of a Chemical used for production of propellant by Ordnance Factory Itarsi led to avoidable procurement of Chemical at a cost of ₹ 0.66crore.**

Ordnance Factories (OFs) plan<sup>193</sup> the purchase of raw materials (or direct materials) on the basis of the annual estimated requirement of products projected by the Defence Forces. Factories under the Chemical Group are authorized<sup>194</sup> to hold inventory equivalent to four months' requirement. In exceptional circumstances inventory in excess of this level can be held, but only with the approval of the Member of the Operating Division in the Ordnance Factory Board.

Ordnance Factory Itarsi (Factory), Madhya Pradesh produces propellants used for manufacturing 130 mm and 105 mm ammunition<sup>195</sup>. A raw material for the production of the propellant is Potassium Sulphate (Chemical). We found that while estimating the requirement, the unit requirement of Chemical was taken as 0.5793 kg per 130 mm ammunition as against the standard requirement of 0.0793 kg per 130 mm ammunition. As a result, the requirement of the Chemical was projected at 1,01,563.60 kg, nearly five times the actual requirement, as per Table 59 below:

<sup>193</sup> Paragraph 2.2.9 of Material Management and Procurement Manual (MMPM), 2010 of the Board

<sup>194</sup> Paragraph 2.2.3.1 of the MMPM specifies the authorized level for holding

<sup>195</sup> Ammunition for 130 mm Reducing Variable Charge and 105 mm Indian Field Gun

**Table-59**

1	Annual requirement of ammunition 2011-14		
	(i)	130 mm	2,07,296 nos
	(ii)	105 mm	1,21,500 nos
2	Standard requirement of Chemical per ammunition		
	(i)	130 mm	0.0793 kg
	(ii)	105 mm	0.0058 kg
3	Total requirement of Chemical for 3 years 2011-14 <sup>196</sup> (Sl. No: 1*Sl. No:2)		
	(i)	130 mm	16,438.6 kg
	(ii)	105 mm	704.7 kg
	(iii)	<b>Total</b>	<b>17,143.3 kg</b>
4	Stock balance of Chemical as of December 2011		19,227.7 kg
5	Actual requirement of Chemical to be purchased during 2011-14 (Sl. No: 3 – Sl. No: 4)		(-) 2,084.4 kg
6	Requirement of Chemical worked out by OFI		
	(i)	130 mm (at the rate of 0.5793 kg per ammunition)	1,20,086.6 kg
	(ii)	105 mm	704.7 kg
	(iii)	Total	1,20,791.3 kg
7	<b>Projected requirement of Chemical by OFI</b> (Sl. No: 6 – Sl. No: 4)		<b>1,01,563.6 kg</b>
8	Excess provisioning		<b>1,01,563.6 kg</b>

**Source:** - Enclosure to Store Holder Inability Sheet No 21 dated 9 December 2011

The error made at the level of Junior Works Manager (JWM) of Material Control Office, while assessing the requirement of chemical to be procured, was not detected by the Deputy General Manager, Provisioning and the Local Accounts Office (LAO). The approval for the provisioning was given (December 2011) on Store Holder's Inability Sheet <sup>197</sup> in which the relevant column on "monthly required quantity" was left blank.

Accordingly, the Factory placed (March/ May 2012) two supply orders<sup>198</sup> for supply of 101.6 tonne of Chemical against which 79 tonne was received at a total cost of ₹ 66.2 lakh by April 2013 and July 2013 when both the supply orders were short closed. The orders were short-closed by the General Manager on the ground of "change in production pattern". Audit scrutiny revealed that reasons attributed by the Factory for short closure of their two supply orders was incorrect because the Factory continued to manufacture

<sup>196</sup> Indicates requirement from January 2012 to March 2014 after considering the opening balance of material as of December 2011.

<sup>197</sup> Is a demand requisitioned by the planning section of the factory detailing the quantity of items to be procured after considering the target for the end product, per unit requirement of item as extracted from the material estimate, stock in hand and shop, dues in quantity against the existing supply orders

<sup>198</sup> M/s. Impex Chemicals Corporation (55 tonne), M/s. Surabhi Industries (46.6 tonne)

propellant<sup>199</sup> during 2013-14 and 2014-15 (till August 2014). The proposal for short closure of one order was not placed<sup>200</sup> before the Tender Purchase Committee.

As of July 2014, the Factory held 72 tonne of Chemical valuing ₹ 60.3 lakh which at the current level of consumption of 5.86 tonne of Chemical per annum, can meet the requirement for next 12 years.

In response to the audit observation, the Factory while accepting (July 2014) the excess provisioning claimed that the surplus stock would be consumed in sister Ordnance Factories<sup>201</sup>; so far it had received a requirement of 3600 kg from the Cordite Factory Aruvankadu, Tamil Nadu. Even after the above transfer of Chemical, the Factory would still be left with a stock of 68.40 tonne of Chemical valuing ₹ 57.32 lakh, which at the current level of consumption would be sufficient for meeting the requirement for more than 11 years. This is a pointer to the failure of internal controls that a requirement of five times the actual was projected for an item that constitutes a regular item of production for the Factory and yet it went undetected at higher levels of the management at the time of giving approval for procurement of chemicals.

Thus, incorrect assessment of requirement of Chemical for production of propellant by the Factory led to unnecessary procurement of Chemical at a cost of ₹ 66.2 lakh.

The matter was referred to the Ministry in August 2014; their reply was awaited (September 2014).

## 8.9 Injudicious procurement leading to uneconomical manufacture

**Despite adequate stock of magazine assemblies through inter factory demand, the Rifle Factory Ishapore bought spring platforms at a cost of ₹ 1.27 crore which was avoidable and led to higher cost of production by ₹ 0.34 crore.**

Procurement of stores from sister ordnance factories is termed as “inter-factory demands” (IFD) in the Ordnance Factory Board (Board). Rifle Factory Ishapore, West Bengal relies mainly<sup>202</sup> on IFD of magazine assembly from

<sup>199</sup> 127000 numbers during 2013-14 and 28000 numbers during 2014-15 (upto August 2014)

<sup>200</sup> The short closure of the order was required to be placed before the Competent Financial Authority as per Para 6.11.7 of MMPM-2010 of the Board.

<sup>201</sup> Surplus stores in one factory are intimated to other sister factories under the Ordnance Factory Board through the Mutual Aid Scheme

<sup>202</sup> Rifle Factory Ishapore was manufacturing magazine assembly of 5.56mm Rifles by assembling magazine rounds and spring platform sourced from Ordnance Factory Dum Dum and Trade sources respectively. In view of satisfactory performance of magazine assembly supplied by Ordnance Factory



Ordnance Factory Dum Dum, West Bengal for production of 5.56mm Rifles. A magazine assembly comprises spring platforms and magazine rounds.

We found (February 2013) that the Rifle Factory Ishapore, West Bengal made an avoidable purchase of 5,68,991 spring platforms at a cost of ₹ 1.27 crore from three trade firms during May 2011 to January 2013 despite adequate supply of magazine assemblies through the IFD route (Table-60):

**Table-60**

		2011-12	2012-13	2013-14
1	Target for rifles	64,549	67,456	57,216
2	Requirement of magazine assemblies (Sl.No. 1 x 5 nos)	3,22,745	3,37,280	2,86,080
3	Opening balance of magazine assemblies	10,329	94,930	1,34,176
4	Opening balance of magazine rounds	1,43,280	Nil	Nil
5	Opening balance of spring platform	26,056	3,17,695	5,68,991
6	IFD placed for magazine assemblies on OFDC	3,22,745	4,53,226	-
7	Magazine assemblies received from OFDC	1,92,365	3,97,745	1,93,226
8	Magazine rounds procured from OFDC	70,000	Nil	1,82,718
9	Spring platform procured from trade	5,04,919	2,51,296	Nil
10	Spring platform ought to have been procured from trade ((4)+(8)-(5)) as these were procured against orders placed prior to January 2011	1,87,224	Nil	-
11	Excess procurement of spring platform (9-10)	3,17,695	2,51,296	-
7	Value of avoidable trade purchases of spring platform	₹ 0.71 crore	₹0.56 crore	-

With an excess stock of spring platforms, the Rifle Factory Ishapore, West Bengal had to procure magazine rounds from Ordnance Factory Dum Dum, West Bengal during 2013-14, assembly of which led to excess cost of ₹ 34 lakh. Even after this measure, the Rifle Factory Ishapore, West Bengal was left with excess stock of magazine assemblies, magazine rounds and spring platforms aggregating ₹ 3.35 crore<sup>203</sup> in mismatched condition as of January 2014.

In reply, the Board stated (June 2014) that the IFD supplies were inadequate to meet the targets and hence the need for trade procurement. This is not borne from the data as tabulated. The Board also contended that extra cost due

Dum Dum, the General Manager directed (January 2011) the factory to stop procurement of spring platform from trade and to source complete magazine assembly from Ordnance Factory Dum Dum.

<sup>203</sup> 181937 magazine assemblies valuing ₹ 1.55 crore, 112718 magazine rounds valuing ₹ 0.68 crore and 498991 spring platform valuing ₹ 1.12 crore.

to in-house manufacture of magazine assembly at the Rifle Factory Ishapore, West Bengal was only ₹ 3.95 lakh and not ₹ 0.34 crore as worked out by Audit. But we worked out the extra cost based on the data obtained from the original document viz cost card at Rifle Factory Ishapore, West Bengal.

Thus, procurement of spring platform at a cost of ₹ 1.27 crore was avoidable and led to higher cost of production of magazine assemblies at Rifle Factory Ishapore, West Bengal.

The matter was referred to the Ministry in March 2014; their reply was awaited (September 2014).

## Manufacture

### 8.10 Defective manufacture of mines

**Manufacture of defective mines by Ordnance Factory Chanda/High Explosive Factory Kirkee coupled with their failure to seal the joints properly led to segregating of mines valuing ₹ 35.97 crore at Army Depots without repair/replacement.**

Anti Tank Mine- a type of land mine designed to damage and destroy vehicles including tanks and armored fighting vehicles- is required by the Indian Army. Anti Tank Mines 1A ND<sup>204</sup> (mines) is developed by the Armament Research and Development Establishment, Pune (ARDE) and High Energy Materials Research Laboratory, Pune (HEMRL) on behalf of the Indian Army. Ordnance Factory Chanda (OFCh), Maharashtra, has been entrusted with the assembly and filling of the mines since December 2004. High Explosive Factory Kirkee, Maharashtra supplies Tri Nitro Toluene (TNT), a chemical, to Ordnance Factory Chanda, Maharashtra.

All the hardware and filled Anti Tank Mine manufactured by Factories are duly inspected by the Inspectorates<sup>205</sup> of Director General of Quality Assurance, New Delhi before issue to the Army.

During 2008-09 to 2010-11, Ordnance Factory Chanda, Maharashtra manufactured and issued 2,71,794 mines to the Army depots, after due inspection by the inspectorates. During receipt inspection<sup>206</sup> (May 2010 and

<sup>204</sup>1A is a version of the Anti Tank and ND stands for Non-Detective

<sup>205</sup> Controllerate of Quality Assurance (Ammunition) Kirkee, Controllerate of Quality Assurance (Military Explosives) Kirkee and Senior Quality Assurance Establishments stationed at Chanda and Kirkee

<sup>206</sup>Receipt inspection refers to inspection by the Army depots on receipt of mines from the Ordnance Factory

June 2010), Army depots, however, observed TNT exudation<sup>207</sup> from the joints of mine body and socket provided for assembly of anti lifting mechanism in 54 lots comprising 1,07,244 mines valuing ₹ 35.97 crore. Further, other lots developed manufacturing defects such as side plug missing, mine body broken, base plug missing and body scratched.

In order to investigate the reasons for the exudation of TNT, a Joint Committee (Committee), constituted (June 2011) with the representatives from Army, Ordnance Factory Board, Inspectorates, ARDE and HEMRL, held series of meetings between June 2011 and October 2012. In the first meeting of the Committee investigating this issue held on 27 June 2011, Controllerate of Quality Assurance (Ammunition) Kirkee (CQA/A) emphasized the urgent need to look into the matter of exudation from mines received at various depots and suggested that time bound actions were to be initiated to settle the issue to ensure user's satisfaction and also to avoid accident.

In the test report (February 2012), CQA had attributed exudations to low set point<sup>208</sup> of TNT fillings in the mines which exudated at elevated temperature during storage of mines, while ARDE ascribed (October 2012) the same to improper joint sealing also. As a remedial measure, the Committee recommended (October 2012) to: (i) clean the exudated mines lying at depots with Carbon Tetra Chloride/Acetone for dynamic testing to ascertain its serviceability for which modalities would be forwarded by CQA/A to Ordnance Factory Chanda, Maharashtra; (ii) frame detailed repair procedure by Ordnance Factory Chanda, Maharashtra for approval by CQA/A after carrying out dynamic testing of the mines duly cleaned; and (iii) forward few lots of mines from random batches (50 per cent exudated and 50 per cent unexudated ) from 2004-05 vintage to the CQA/A by the Army depots to ascertain the set point of TNT for creating data bank to serve as a reference point. The Committee did not, however, address other defects<sup>209</sup> of the mines, observed by the Army.

We observed that even after lapse of more than three years the modalities for undertaking repair of defective mines at Army depot were not formulated (May 2014) since exudated mines collected from Army depots when 'filled with inert<sup>210</sup>' and high explosive and applied with proposed sealant by Ordnance Factory Chanda, Maharashtra turned brownish during environment testing (December 2013) at ARDE. This had an effect on environment in the form of air pollution. Accordingly, the Committee directed Ordnance Factory Chanda, Maharashtra to forward further quantity of sealant to HEMRL for

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<sup>207</sup>Exudation is due to low set point of TNT fillings in the mines which had exudated at elevated temperatures during storage of mines.

<sup>208</sup>Low set point means low melting point of TNT

<sup>209</sup>side plug missing, mine body broken, base plug missing and body scratched

<sup>210</sup>Mines without explosives

testing. The performance of sealant<sup>211</sup> subsequently issued to HEMRL by Ordnance Factory Chanda, Maharashtra was found satisfactory (April 2014) subject to evaluation in environmental test by ARDE, scheduled to be held during July- October 2014.

The Board, while accepting the facts, stated (July 2014) that the methodology for repairs/rectification of mines had since been finalized and after receipt of the report of the efficacy of sealant applied on affected mines after environmental tests from ARDE, action for bulk rectification would be initiated. However, the reply did not specify the time schedule by which the bulk rectification would be completed. Further, reply was silent on action taken to rectify the other defects observed by the Army.

Thus, manufacture of defective mines by Ordnance Factory Chanda, Maharashtra /High Explosive Factory Kirkee, Maharashtra coupled with their failure to seal the joints properly led to idling of mines valuing ₹ 35.97 crore in segregated condition at Army Depots without repair/replacement, thereby adversely affecting the anti tank mine operation of the Indian Army.

The matter was referred to the Ministry in June 2014; their reply was awaited (September 2014).

## Miscellaneous

### 8.11 Loss of revenue due to differential selling price

**Differential selling price adopted by Ordnance Factory Board (Board) and non-compliance by two factories of the Board's order for revision of selling price of Rifle led to a loss of revenue of ₹ 1.37 crore.**

Ordnance Factories at Trichy, Tamil Nadu and Ishapore, West Bengal sell 0.315 Sporting Rifles (rifles) in the market to private arms dealers. The selling price for items sold in the market is fixed by the Ordnance Factory Board (Board)<sup>212</sup>.

In September 2011, the Board revised the unit selling price of rifles from Trichy factory to ₹ 43,200; the selling price of rifles from Ishapore factory was retained at the prevailing rate of ₹ 40,000. This was revised in November 2012 to ₹ 45,900 for both factories.

We noticed (September 2013) that on the instructions of the General Manager, Trichy factory sold 1220 rifles (September 2012 to November

<sup>211</sup> Sealant is an adhesive applied to seal the joints of the mines

<sup>212</sup> As per Para 7.3 of Guide to Civil Trade Activities of Ordnance Factories

2012) at ₹ 40,000 each. The approved selling price was ₹ 43,200 and thereafter ₹ 45,900. The differential from the approved rate caused a loss of revenue of ₹ 61.76 lakh. Similarly, the Ishapore factory sold 1270 rifles at unit rate of ₹ 40000 during November 2012 to March 2013, although the selling price had been revised by the Board to ₹ 45,900 with effect from November 2012. This led to a loss of revenue of ₹ 74.93 lakh.

The Ministry clarified (August 2014) that the Trichy Factory had begun to receive complaints on higher pricing and in fact suffered low off take of rifles. This was raised by the GM with the Board which gave verbal orders to the Factory to bring down the selling price on par with the Ishapore factory, *i.e.* at ₹ 40,000. The Board took a view that timely remedial action helped to liquidate the accumulated stock and avert a possible loss of ₹ 8 crore.

It is also indicative of the fact that the Board had been taking injudicious decisions regarding the selling price (September 2011 and November 2012) without keeping in view the likely effect of sale at the two factories and thereby failing to enforce compliance to its own instructions. There was nothing on record to support the claim of complaints or of the impact on off take. The decision taken informally, in verbal discussions, to reduce the selling price led to loss of revenue of ₹ 61.76 lakh. The two factories also did not comply with second revision by the Board in November 2012. The total loss of revenue to the Board was ₹ 1.37 crore on account of non-compliance to the two orders of revision of selling price of the sporting rifles.

## 8.12 Excess payment of royalty charges

**Heavy Alloy Penetrator Project Trichy paid an excess royalty charges of ₹ 1.01 crore to the Tamil Nadu Government owing to payment on the basis of maximum contracted demand instead of actual consumption of water during April 1996 to March 2013.**

Heavy Alloy Penetrator Project Trichy, Tamil Nadu (Factory)<sup>213</sup> was drawing water from the river Cauvery to meet its needs on the basis of permission (September 1986) granted in this regard by Public Works Department of State Government of Tamil Nadu (Government). Royalty charges were payable in advance for the maximum contracted demand; the advance was to be adjusted against actual consumption of water during the year. The permission required the Factory to enter into an agreement with the Government before drawing water.

We observed (April 2013) that the agreement by the Factory with Government (April 1996<sup>214</sup>) provided for advance payment of royalty charges

<sup>213</sup> HAPP came into existence in March 1990

<sup>214</sup> Factory drew water without an agreement till March 1996 and from April 2006 onwards.

for the maximum contracted demand which would not be adjustable in case consumption of water fell below this demand. A reading of the agreement revealed that though the clause was detrimental to the Factory's interests and deviated from September 1986's order, the Factory failed to raise the same with Government. However, the actual consumption of water was always less than the contracted demand. At the instance of Audit, the Factory assessed (November 2013) the royalty charges payable at ₹ 97.17 lakh based on actual quantity of water consumed, against ₹ 1.98 crore already paid based on the maximum contracted demand for water during April 1996 to March 2013. Accordingly, the Factory sought a refund of excess royalty of ₹ 1.01 crore which was yet to be recovered (August 2014).

Thus, Factory paid an excess royalty charges of ₹ 1.01 crore to the Tamil Nadu Government owing to payment on the basis of maximum contracted demand instead of actual consumption of water during April 1996 to March 2013.

The matter was referred to the Ministry in March 2014; their reply was awaited (September 2014).

### **8.13 Undue benefit to a private power utility provider**

**Failure of Ordnance Factory Board/Gun and Shell Factory Cossipore to recover the lease rent and premium from a private electricity supplier as per the prescribed rates resulted in revenue loss of ₹2.64 crore and led to undue benefit to the private electricity supplier.**

According to the policy guidelines (August 1990) of the Ministry of Defence (Ministry), defence land required for establishing facilities<sup>215</sup> by the Central/State Government etc are required to be licensed for such purpose on a nominal fee of rupee one per annum, for an initial period of thirty years and thereafter, the license be renewed if the facility/services being provided is mainly for the benefit of the factory and its employees. As and when the sites are not required the site should revert to the factory. The guidelines also provide for recovery of license fee for use of defence land by the unauthorized occupants for the unauthorized period. The rates shall be fixed, initially for a period of five years by the General Manager in consultation with the Defence Estates Officer (DEO) having jurisdiction in the area and Member (Finance) of Ordnance Factory Board (Board). In case lease is renewed, new license fee is required to be enhanced by at least 25 *per cent* over the existing license fee.

Indian Railways had been using a railway line passing through the Gun and Shell Factory Cossipore, West Bengal's (Factory) land measuring 1661 square

<sup>215</sup> Police force, Telephone Exchange, Post/Telegraphic office, Electricity substation, State Transport Authority



meters for carrying coal wagons to New Cossipore Generating Station of CESC Limited till November 1999. Thereafter, the Factory did not take over the site; instead, on the request of the Railways (November 1999), unauthorizedly allowed CESC Limited to use the line for carrying coal to the New Cossipore Generating Station.

The Factory approached (February 2002) the Board to allow CESC Limited to use the land at commercial rate of ₹ 2.52 lakh per annum (being 5 per cent of market rate of land of ₹ 50.40 lakh) worked out in consultation with DEO, Kolkata. But the Board directed (June 2002) the factory to collect annual rent of ₹ 5.04 lakh (10 per cent of the market rate of land) based on Director General of Defence Estates (DGDE) rate communicated (October 2001) to Ordnance Factory Ambajhari, Maharashtra by Estate officer, Mumbai circle for leasing of land for commercial use. Accordingly, the Factory, entered (August 2002) into an agreement with CESC Limited at an annual rent of ₹ 5.04 lakh for a period of five years. However, the Board/Factory did not collect the requisite premium of ₹ 50.40 lakh at 10 times <sup>216</sup>the annual rent from CESC Limited.

We further noticed that for renewal of agreement for another period of five years (August 2007 to July 2012), the Factory, instead of fixing the annual rent at ₹ 16.14 lakh<sup>217</sup>, allowed (December 2008) the CESC Limited to use the land at the annual rent of ₹ 5.54 lakh, without the approval of the Board. This also fell below the annual rent of ₹ 6.30 lakh *i.e.* increase of minimum of 25 per cent over the existing annual rent of ₹ 5.04 lakh as required under the Ministry's guidelines. Again, the factory did not collect the premium charges of ₹ 1.61 crore at 10 times the annual rent worked out on the basis of 10 per cent of the commercial market value of the land under Cantonment Land Administration Rules. After expiry of the agreement in July 2012, the factory did not renew the agreement and directed the CESC Limited to stop using the Railway track. But the CESC Limited did not respond. No legal action was action against CESC Limited.

Thus, failure of the Board/Factory to recover the lease rent and premium from a private electricity supplier as per the prescribed rates resulted in revenue loss of ₹ 2.64 crore<sup>218</sup> for the period August 2002 to July 2012 and led to undue benefit to the private electricity supplier.

Board stated (January 2014) that Factory had not fixed lower rate by surpassing them since it was directed to fix the rent by consulting DEO by observing the Ministry's guidelines and without referring the matter once again to them for approval. Board also added that the perception of loss is a matter of judgment.

<sup>216</sup> As per Rule 6(ii) of the Chapter 17 to the Cantonment Land Administration Rules and DGDE communication of October 2001

<sup>217</sup> At the rate of 10 per cent of the commercial market rate of ₹ 161.40 lakh

<sup>218</sup> Premium charges of ₹ 0.50 crore and ₹ 1.61 crore for the period August 2002 to July 2007 and August 2007 to July 2012 respectively and under recovery of ₹ 0.53 crore as annual rent for the period August 2007 to July 2012.



The reply is not acceptable because the Factory failed to comply with the direction of the Ministry as well as the Board in fixing the annual rent that led to loss of revenue. Further, Board's contention regarding 'perception of loss is a matter of judgement' is also not factually correct because the Factory/Board actually sustained revenue loss due to non-fixation of lease rent and premium charges in tune with the Ministry's guidelines.

The matter was referred to the Ministry in March 2014; their reply was awaited (September 2014).

#### **8.14 Avoidable payment of electricity charges**

**Failure of Ordnance Factory Kanpur to comply with the requirement of 'interlocking' between two feeders meant for supply of powers under Indian Electricity Rules as well as inordinate delay in replacement of power transformers resulted in avoidable payment of ₹ 3.66 crore towards demand and electricity charges at higher rate.**

To augment and integrate the power supply of Ordnance Factory Kanpur, Small Arms Factory Kanpur and Field Gun Factory Kanpur, Uttar Pradesh the Ministry of Defence (Ministry) accorded (March 2006) sanction for a new 132/33 Kilo Volt (KV) sub-station at Armapur at a cost of ₹ 22.89 crore. The work was to be executed through M/s Uttar Pradesh Power Corporation Limited, Lucknow (UPPCL) and M/s Kanpur Electricity Supply Company Limited, Kanpur (KESCO) as deposit work. It was also decided to surrender existing 11 KV and 6.6 KV feeders to M/s KESCO after installation and commissioning of proposed new lines of 132/33 KV.

We observed that the installation and commissioning of new lines at 132 KV was completed (May 2009). After energizing of new lines, 11 KV feeder was surrendered immediately to KESCO. However, Ordnance Factory Kanpur could not hand over the 6.6 KV feeder to KESCO because one of the two 3 Mega Volt Ampere (MVA) 11/6.6 KV transformers was damaged due to occurrence (July 2008) of fire. Consequently, 6.6 KV feeder had to be utilised to give the power-supply to production shops, maintenance sections, main administrative building and allied establishments.

The Board of Enquiry, constituted (July 2008) by Ordnance Factory Kanpur to enquire into circumstances leading to electrical fire, concluded (September 2008) that fire had occurred as no interlocking arrangement existed between 11 KV and 6.6 KV supply system and as a result, 'wrong switching could not be ruled out', leading to 'heavy flashover and fire'.

Though the Joint Director/Engineering Services of the Board had pointed out during Safety audit as early as in February/March 1994 that there was no interlocking arrangement between 6.6 KV and 11 KV supply, as required under Indian Electrical Rules, no action was taken by Ordnance Factory Kanpur to set right the deficiency even after a lapse of 14 years for which no reason was recorded. We observed that this displayed lack of monitoring by the top factory management on the follow-up action on the Safety audit report.

We further noticed that two 3 MVA transformers of 6.6 KV feeder had out lived their shelf life in 1986 and 1990 respectively. Ordnance Factory Kanpur had failed to take action to replace them even after lapse of nearly two decades. It was only in August 2008 after the fire accident that Ordnance Factory Kanpur action for replacing the two old transformers and obtained Board's sanction in April 2009. Again, Ordnance Factory Kanpur took excessive time and ultimately placed a supply order on a private firm for supply and commissioning of two transformers after nearly a year in February 2010 in violation of Paragraph 14 of the Defence Procurement Manual, 2005 which requires that supply order be placed within 22 weeks from the date of approval of the competent authority. The new transformers were commissioned in January 2011 and the old 6.6 KV feeder was handed over to KESCO in March 2011.

Failure on the part of Ordnance Factory Kanpur to comply with the requirement of interlocking between two feeders meant for supply of power under Indian Electricity Rules as well as inordinate delay in handing over 6.6 KV feeder resulted in Ordnance Factory Kanpur incurring an additional expenditure of ₹ 3.66 crore towards higher electricity charges and demand charges<sup>219</sup> during May 2009 to February 2011.

While accepting (April 2014) the payment of ₹ 3.66 crore as avoidable charges in response to the Audit query (February 2014), Ordnance Factory Kanpur contended that they had saved ₹ 8.68 crore approximately by energizing 132/33 KV system. The reply is not acceptable as additional expenditure of ₹ 3.66 crore incurred due to delay in handing over 6.6 KV feeder cannot be set off against the savings of ₹8.68 crore by energizing 132/33 KV system as stated as the dedicated new substation was sanctioned to achieve more reliability in supply of power and savings of ₹ 2.22 crore per annum as well. The reply was also silent as to why no action was taken to set right the deficiency in interlocking system, despite the same being brought to their notice during safety audit in February/March 1994.

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<sup>219</sup>Electricity charges refer to charges which are variable with reference to actual units of electricity consumed whereas the demand charges are fixed charges which are levied with reference to the contract demand of electricity.

The matter was referred to the Ministry in June 2014; their reply was awaited (September 2014).

### **8.15 Recoveries at the instance of Audit**

**At the instance of Audit, seven Ordnance Factories recovered ₹ 2.18 crore.**

During the course of Audit (February 2011 to January 2013), we observed instances of excess payments, irregular payments, under/non-recovery of charges etc. Factories recovered ₹ 2.18 crore as per the details given in the **Annexure-XXVII**.

The matter was referred to the Ministry in August 2014; their reply was awaited (September 2014).

## CHAPTER IX: DEFENCE PUBLIC SECTOR UNDERTAKINGS

### 9.1 Licence production of Su-30 MKI aircraft

#### 9.1.1 Introduction

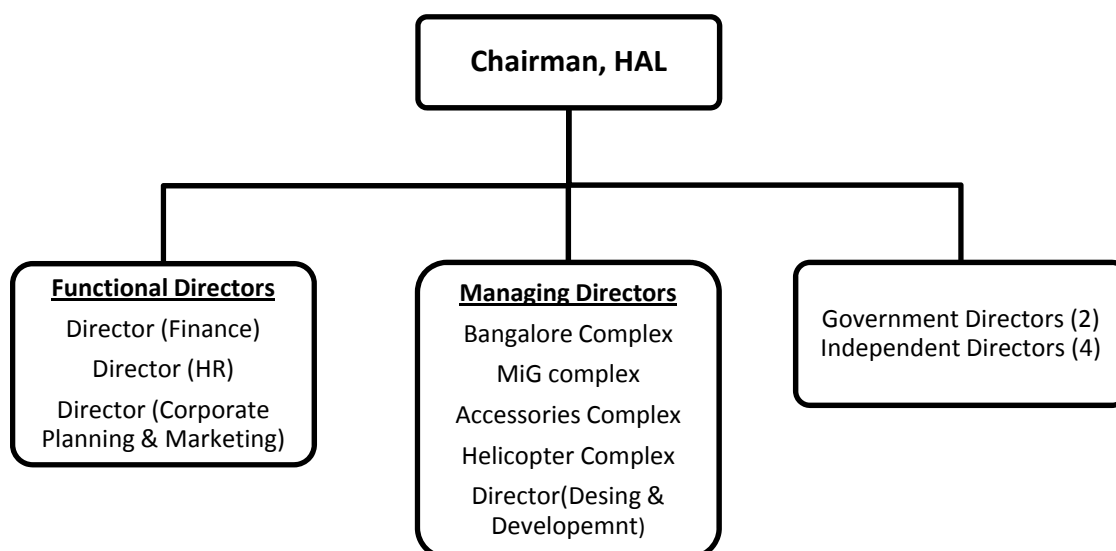
##### 9.1.1.1 Company's profile

Hindustan Aeronautics Limited (HAL), a Navratna company under the Ministry of Defence is engaged in design, development, manufacture, upgrade, repair and overhaul of aircraft, helicopters, aero-engines, avionics and navigation system equipment and marine & industrial gas turbine engines for both military and civil applications.

##### 9.1.1.2 Organisational structure

The management of HAL is vested in the Board of Directors headed by a Chairman assisted by Functional Directors (eight), Government Directors (two) and Independent Directors (four) as detailed in Chart-20 below:

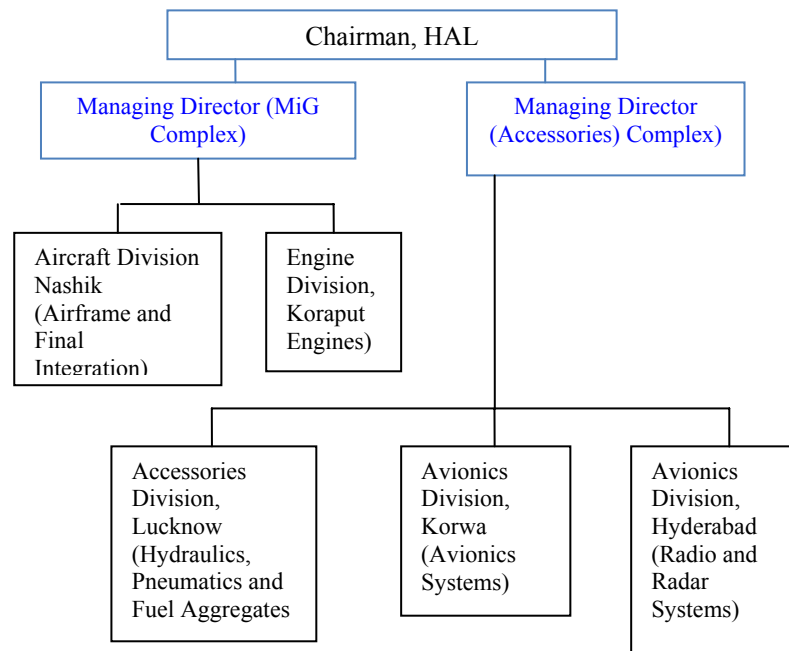
Chart- 20



The Company has 20 production units under five complexes<sup>220</sup>. While the Design Complex is headed by a Director (Design and Development), each of the others is under a Managing Director. The Company also has 10 Research and Design Centres located at various places.

The manufacture of Su30 MKI aircraft is done in five divisions of HAL which is under the control of MiG complex at Nashik and Accessories complex at Lucknow as shown in Chart-21 below:

**Chart-21**



**9.1.1.3 Previous audit coverage**

Report (No.4 of 2006) of the Comptroller and Auditor General of India on Performance Audit relating to Union Government (Defence Services) mentioned about payment of licence fee in advance though manufacture was to take place over 14 years, non-provision for supply of technical documentation in English leading to extra expenditure on translation, non-provision for technology for extension of total technical life and time between overhauls, terms and conditions of warranty clause not being finalised in the contracts with HAL, non-provision of engineering support package, cost effectiveness of indigenous manufacture, cost escalation risks, impact of compressed delivery schedule and the lagging behind in the repair and overhaul facilities. MoD furnished Action Taken Note on the observations in Report No.4 of 2006 in May 2011.

<sup>220</sup> Bangalore Complex, Design Complex and Helicopter Complex all at Bangalore, MiG Complex at Nashik and Accessories Complex at Lucknow

In view of the size/magnitude and strategic importance of the project, slow progress in licence manufacture of aircraft, multiplicity of units involved in the production of the aircraft, and delays in the delivery of aircraft due to various reasons, it was proposed to conduct a study on the progress in the implementation of the project.

#### **9.1.1.4 Audit objectives**

The objectives of the performance audit were to examine compliance to contractual provisions and their execution with particular emphasis on whether-

- transfer of technology and progress of indigenization was timely and adequate,
- level of absorption achieved resulted in –
  - a) achievement of indigenization plans
  - b) timely delivery of quality aircraft;
- setting up and utilization of infrastructure for various activities was ensured as and when required.

#### **9.1.1.5 Audit criteria**

The performance of the project was assessed against following criteria:

- Sanctions for the project
- Inter Governmental Agreement between Governments of India and Russia, General Contract between ROE and HAL;
- Supplementary Agreements between HAL and ROE for licensed production of 140 Su-30 MKI aircraft, engines and airborne equipment;
- Proceedings of Monitoring/Steering /Review Committees of MoD;
- Production Plans of the concerned Divisions;
- MIS, Proceedings of the Board, Management Committee, Audit Committee and Procurement Committee; and
- Feedback from suppliers and customers.

#### **9.1.1.6 Scope and methodology of audit**

Audit commenced after holding an entry conference with the Management on 13 August 2013 where the scope, objectives, criteria and methodology of audit were discussed. This was followed by review of records of five<sup>221</sup> divisions, collection and analysis of data, issue of preliminary observations to elicit

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<sup>221</sup> Aircraft Division, Nashik, Engine Division, Koraput, Accessories Division, Lucknow and Avionics Divisions at Korwa and Hyderabad

responses pertaining to production, quality, supplies and maintenance issues in all the three contracts together with all the supplementary agreements. Discussions were held with the Management at different levels to familiarise with the process, constraints of operations and their root causes. Draft report was issued to Management on 30 October 2013. Replies of the management received (January 2014) have been suitably incorporated in the Report. Audit was concluded with an exit conference with the top management of HAL on 20 February 2014 where major findings of audit and audit recommendations were discussed. The report has been finalised considering additional inputs provided by the Management during the exit conference.

**9.1.1.7 Acknowledgement**

Audit acknowledges the co-operation extended by the Management at all levels in production of records and information, clarifications of issues and furnishing of replies.

**9.1.1.8 Audit findings**

Audit findings in line with the objectives are detailed in the following chapters as detailed in Table-61 below:

**Table-61**

9.1.3	Transfer of technology
9.1.4	Timely delivery of quality aircraft
9.1.5	Setting up of infrastructure

**9.1.2 Background**

**9.1.2.1 Sanction for licence production of the aircraft**

As per Note for consideration of the Cabinet Committee for Security (September 2000), level of the combat force of Indian Air Force (IAF) was expected to fall significantly due to likely phasing out of MiG 21 aircraft during the period from 2000 to 2010. To replace them, IAF concluded (November 1996) a contract with the Russian Government for supply of eight Su-30 K<sup>222</sup> air defence aircraft and 32 upgraded Su-30 MK<sup>223</sup> multi-role aircraft. In December 1998, IAF ordered procurement of 10 more Su-30 MK aircraft.

<sup>222</sup> Su-30K-Commercial(export) version of the basic Su-30

<sup>223</sup> Su30MK-Commercial version of Su 30M revealed in 1993. Export versions include navigation and communication equipment from HAL



The original contract (November 1996) for supply of 40 aircraft also envisaged development of Su 30 MKI aircraft by integrating the Russian Su 30MK aircraft with selected latest Western, Russian and indigenous avionics and their licence manufacture through nominated aviation industry for indigenous production under Transfer of Technology (ToT) agreement with Rosobornexport (ROE).

In accordance with the provision for indigenous production under ToT agreement in the original contract, an Inter-Governmental Agreement (IGA) was concluded (October 2000) between the Governments of Russian Federation and Republic of India for transfer of licence and technical documentation to India for production of 140 aircraft, 920 AL-31 FP engines and 140 sets of air-borne equipment to cater for the life time exploitation of the aircraft. Pursuant to IGA and approval (December 2000) of the Cabinet Committee on Security (CCS), a general contract (GC) was concluded (December 2000) by Hindustan Aeronautics Limited (HAL) with ROE, the Russian agency. Ministry of Defence (MoD) conveyed (January 2001) sanction for the manufacture of 140 aircraft in four phases as detailed in Table-62 below:

**Table -62**

<b>Phase-I</b>	Flight Testing Phase (FTS) envisaged delivery after system checks, Ground and Flight Tests and final finishing (Fully Imported).
<b>Phase-II</b>	Final assembly of major assemblies and equipping of aircraft plus above phase activities (Final assembly of major assemblies by HAL)
<b>Phase-III</b>	Raw material participation to commence from this phase. All components and assemblies to be manufactured in the division except the fuselage, which was to be imported, plus above phase activities (Only fuselage was to be imported and rest all manufactured by HAL).
<b>Phase-IV</b>	Manufacture of airframe from raw materials plus above activities (Fully indigenised)

The total cost was ₹ 22122.78 crore and delivery was to be during 2004-05 to 2017-18. For the ease of contracting, the supply was broken up into four Blocks with overlapping time periods. The details are given in Table-62.

The licence technical documentation to be transferred by ROE to HAL within 45 months from December 2000 was to ensure full capability to HAL to produce, test and operate aircraft, engines and airborne equipment with certain exceptions<sup>224</sup>.

<sup>224</sup> Equipment of third country/Indian origin, armaments, general purpose articles, Russian equipment for which contracts were signed or are being signed after November 1996, equipment in the list annexed to the agreement, raw materials, semi finished articles and consumables

### 9.1.2.2 Preparation of DPR

HAL entered (May 2001) into a Supplementary Agreement (SA) with ROE for preparation of Technical Part of Project Report (TPP) detailing requirement of infrastructure and Non-Standard Equipment (NSE) and Toolings and man-hour content. The TPP was received by HAL from the Russian team in October/November 2001.

Division wise Detailed Project Reports (DPR) were prepared based on the inputs furnished by ROE in TPP. The Board of HAL approved (February 2002) the consolidated DPR.

As provided in General Contract, HAL concluded a number of Supplementary Agreements (SA) with ROE from time to time specifying the nature, quantities and time of supplies such as licence documents, aircraft kits etc., required for manufacturing.

### 9.1.2.3 Compression of Delivery Schedule

MoD concluded (December 2003) a contract with HAL for supply of 34 aircraft in Block I comprising 3 aircraft from Phase I, 5 aircraft from Phase II, 18 aircraft from Phase III and 8 aircraft from Phase IV. After an assessment of the combat aircraft force levels, in March 2006, by which time eight aircraft due under Block I contract (three pertaining to Phase I (fully imported) and five pertaining to Phase II (final assembly of major assemblies done by HAL) had been delivered, MoD compressed the delivery schedule to secure completion of deliveries of all the 140 aircraft by 2014-15 instead of 2017-18 as originally agreed to by changing phase-wise composition as per Table-63 below:

**Table-63**

Block No.	Year of delivery	Original					Compressed				
		Phases					Phases				
		I	II	III	IV	Total	I	II	III	IV	Total
I	2004-05	2	0	0	0	2	2	0	0	0	2
	2005-06	1	5	0	0	6	1	5	0	0	6
	2006-07	0	0	8	0	8	4	5	4	0	13
	2007-08	0	0	6	2	8	0	7	6	0	13
	2008-09	0	0	4	6	10					
	<b>Total</b>	<b>3</b>	<b>5</b>	<b>18</b>	<b>8</b>	<b>34</b>	<b>7</b>	<b>17</b>	<b>10</b>	<b>0</b>	<b>34</b>
II	2008-09						0	7	8	0	15
	2009-10	0	0	0	10	10	0	3	8	4	15
	2010-11	0	0	0	12	12	0	0	0	0	0
	2011-12	0	0	0	12	12	0	0	0	0	0
	<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>34</b>	<b>34</b>	<b>0</b>	<b>10</b>	<b>16</b>	<b>4</b>	<b>30</b>

Block No.	Year of delivery	Original					Compressed				
		Phases					Phases				
		I	II	III	IV	Total	I	II	III	IV	Total
III	2010-11	0	0	0	0	0	0	0	8	8	16
	2011-12	0	0	0	0	0	0	0	4	12	16
	2012-13	0	0	0	12	12	0	0	0	0	0
	2013-14	0	0	0	12	12	0	0	0	0	0
	2014-15	0	0	0	12	12	0	0	0	0	0
	<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>36</b>	<b>36</b>	<b>0</b>	<b>0</b>	<b>12</b>	<b>20</b>	<b>32</b>
IV	2012-13	0	0	0	0	0	0	0	4	12	16
	2013-14	0	0	0	0	0	0	0	4	12	16
	2014-15	0	0	0	0	0	0	0	0	12	12
	2015-16	0	0	0	12	12	0	0	0	0	0
	2016-17	0	0	0	12	12	0	0	0	0	0
	2017-18	0	0	0	12	12	0	0	0	0	0
<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>36</b>	<b>36</b>	<b>0</b>	<b>0</b>	<b>8</b>	<b>36</b>	<b>44</b>	
<b>Grand Total</b>	<b>3</b>	<b>5</b>	<b>18</b>	<b>114</b>	<b>140</b>	<b>7</b>	<b>27</b>	<b>46</b>	<b>60</b>	<b>140</b>	

Accordingly, MoD concluded contracts for Block II (30 aircraft), Block III (32 aircraft) and Block IV (44 aircraft) in March 2006, December 2007 and February 2009 respectively besides revised contract for Block I in March 2006. Due to compression of delivery schedule, number of fully imported aircraft (Phases I and II) increased by 26 (from 8 to 34) while the number of fully indigenised aircraft (Phase IV) decreased by 54 (from 114 to 60).

As per the contracts for supply of aircraft, HAL was to receive payments from MoD based on achievement of milestones like signing of contract, starting of manufacturing activity and start of structural assembly. Accordingly, MoD released milestone payments amounting to ₹ 41,928.18 crore to HAL upto 31<sup>st</sup> March 2013 in respect of all the block contracts (for 140 aircraft) as well as contracts for additional 40 and 42 aircrafts.(Refer Table-63)

#### 9.1.2.4 Non-revision of Detailed Project Report

The Manual on Policies and Procedures for Procurement of Works prepared in conformity with General Financial Rules 2005 (GFR) states that if the project cost was likely to vary by more than 10 *per cent* of the sanctioned cost, a revised project report taking into account various possible reasons for variation like change in scope, design of work, material/labour cost, time over run, etc. shall be prepared and sanction of competent authority shall be obtained.

In view of alteration in March 2006 of the phase-wise composition prescribed in January 2001, the import content increased and HAL's participation reduced. The compression of deliveries also decreased the degree of

absorption of technology from time to time and the project cost stood revised from ₹ 22,122.78 crore to ₹ 39,605.95 crore, an increase of 79 per cent in the project cost. Changes in the scope of the project, total project cost, delivery schedule and absorption of technology called for revision of DPR. However, DPR was not revised.

Management stated (January 2014) that DPR was prepared at the inception of the project keeping in view the total investment in the project and to seek sanction of investment in capital and DRE. It added that DPR was not revised since the compressed delivery did not have significant impact.

The reply was not acceptable since the DPR was prepared based on the inputs furnished by ROE in TPP and the changes in the phase-wise delivery due to compressed delivery schedule increased the import component with corresponding decrease in indigenous component and increase in project cost by 79 per cent which necessitated preparation of revised DPR.

#### 9.1.2.5 Contracts for aircraft

While execution of the main contract entered (December 2000) into by HAL with MoD was under way, two more contracts were concluded with it by MoD - one in March 2007 and the other in December 2012 as detailed in Table-64 below:

**Table-64**

Contract Reference	Date of Signing of Contract	No. of aircraft	Original Delivery schedule	Original amount (₹ in crore)	Revised delivery schedule	Revised amount (₹ in crore)
I contract	March 2006 (Revised Block I and Block II) December 2007 (Block III) February 2009 (Block IV)	140	2004-05 to 2017-18	22,122.78	2004-05 to 2014-15	39,605.95
II contract	March 2007	40	2008-09 to 2010-11	9,036.84	2008-09 to 2011-12	9,479.69
III contract	December 2012	42	2012-13 to 2016-17	16,147.28	-	16,147.28
<b>Total</b>		<b>222</b>		<b>47,306.90</b>		<b>65,232.92</b>

While the 140 aircraft were to be supplied in four phases as detailed in para 9.1.2.3, additional 40 and 42 aircraft were to be supplied in three phases (phase I (16 aircraft), phase 1+<sup>225</sup> (20 aircraft) and phase II (4 aircraft)) and four phases (phase I (10 aircraft), phase II (4 aircraft), phase III (4 aircraft) and phase IV (24 aircraft)) respectively.

<sup>225</sup> Aircraft ground tested, flight tested and painted in Russia before delivery to HAL

### 9.1.3 Transfer of technology

**Audit Objective:** Whether contractual provisions were complied and transfer of technology and progress of indigenization was timely

#### 9.1.3.1 Introduction

The Inter Governmental Agreement envisaged transfer of technology to India to ensure full capability to the Indian side to produce, test and operate aircraft, engines and airborne equipment. In order to assess whether the transfer of technology was timely, audit reviewed the arrangements for receipt of technology by HAL which was to utilise it for manufacture, repair and overhaul. The observations are detailed below:

#### 9.1.3.2 Delay in transfer of documents relating to designs

The General Contract<sup>226</sup> envisaged transfer of Licence Technical Documentation (LTD), Design Documentation and Technical Equipment Means (DDTEM), toolings and non standard equipment, test benches, ground handling equipment, etc. within 45 months from December 2000. As required under the General Contract, HAL concluded (May 2001, September 2002 and November 2002) Supplementary Agreements (SAs) with ROE for procurement of the said items. However, ROE did not supply these items as per agreed schedule as tabulated in Table-65 below:

**Table-65**

Sl. No.	Activities/Stages	Original Plan	Actual	Average delays (months)	Reasons for delay
1 (a) (b)	Licence Technical Documentation Receipt of LTD. Receipt of amendment to drawings. Receipt of amendment to technologies.	I Quarter 2002 to III Quarter 2004	II Quarter 2002 to I Quarter 2007	30	Delayed release of drawings and technologies, 26140 amendments to the drawings, and 1174 amendments to technologies by ROE, rejection/ re-work of components/ assemblies already manufactured/ made by ROE.
2	DDTEM (Tool drawings) to be furnished. Offer of contracts/SAs from ROE and corresponding delivery by ROE Amendments to tool drawings and rework.	II Quarter 2002 To I Quarter 2004	II Quarter 2003 To II Quarter 2004	12	Delayed launch of indigenous tool manufacture resulting in hold up/ delays during production, non-availability of production tools to HAL

<sup>226</sup> No.PB/835611233630 dated 28 December 2000

Sl. No.	Activities/Stages	Original Plan	Actual	Average delays (months)	Reasons for delay
3	Russian Tooling/NSE Conclusion of contract/ supplies against signed contract (due to delay in D&D Phase)	2004	2006	24	Delay in supply of assembly jigs; non-coordination of assembly jigs with mock up during commissioning; rework of production tools; rework of tooling due to technological amendments; delay towards stabilizing the production line.

It could be seen from the above that documents which were to be received between I quarter of 2002 to 2004 were actually received between II quarter of 2002 to I quarter of 2007 after a delay ranging from 3 to 36 months. This affected the progress of indigenization and HAL had to resort to outsourcing to meet the delivery schedule.

As per the compressed delivery schedule, 17 aircraft under Phase II and 10 aircraft under Phase III were to be delivered to IAF between 2005-06 and 2007-08. Due to delay in transfer of technology, HAL resorted to offloading its work share in respect of 11 Phase II aircraft and nine Phase III aircraft to ROE by concluding (October 2005, October 2006, September 2007 and October 2008) supplementary agreements for ₹ 115.17 crore. Against ₹115.17 crore, HAL was to receive only ₹ 91.51 crore in respect of 20 aircraft as per the contract. The details of agreement-wise purchase cost and amount receivable from MoD is detailed in Table-66 below:

Table -66

Sl. No.	Phase	Agreement Date	No. of aircraft	Amount receivable from MoD	Procurement Cost	Additional expenditure
				(₹ in crore)		
1)	III	27/10/2005	4	17.89	28.72	10.83
2)	II	23/10/2006	4	5.68	10.91	5.23
3)	II	27/9/2007	4	6.60	9.97	3.37
4)	II	2/10/2008	3	5.34	9.73	4.39
5)	III	2/10/2008	3	32.58	30.65	-1.93
6)	III	7/10/2008	2	23.42	25.19	1.77
		<b>Total</b>	<b>20</b>	<b>91.51</b>	<b>115.17</b>	<b>23.66</b>

As could be seen from Table-66, due to outsourcing the supply of 20 aircraft to ROE, HAL incurred additional expenditure of ₹ 23.66 crore.

Further, against 42 aircraft in Phase III and 36 aircraft in Phase IV that were to be manufactured by 2012-13 (as brought out in Table -63), HAL manufactured 37 aircraft in Phase III and eight aircraft in Phase IV upto 2012-13 which confirms the fact that progress of indigenization did not proceed as envisaged.

Management stated (January 2014) that the excess expenditure was incurred for meeting the commitment of delivery to the customer and the same was met from the contingency provision available for meeting the unforeseen expenditure arising during production/delivery of 140 aircraft programme.

This reply did not address the main audit issue that HAL had to resort to offloading of indigenous work content due to delay in Transfer of documents by ROE as brought out in Table-65 which resulted in additional expenditure of ₹ 23.66 crore to HAL.

#### **9.1.3.3 Delay in transfer of technology for manufacture of engines**

The Detailed Project Report (DPR) envisaged production of engines in five phases at the Engine Division of HAL at Koraput as detailed in Table-67 below:

**Table-67**

Phase I	Receipt of fully tested engines from Russia for re-testing and delivery (Fully imported).
Phase II	Receipt of engine after first test, dismantling, defect analysis, rework, assembly and work under above phase.
Phase III	Disassembly, assembly of assembly units and engines for acceptance test, disassembly, flaw detection and assembly for acceptance test and performing the acceptance test.
Phase IV	Manufacture of parts, assembly and testing of units, sub-units and modules of engine and work under Phase III.
Phase V	Manufacture of blanks (forging and castings) and work under Phase IV (Fully indigenized).

While the aircraft was to be supplied in four phases, the engines were to be supplied/manufactured in five phases. The number of engines in each phase was finalised considering the compressed delivery schedule stipulated by MoD for supply of aircraft as brought out in Table -63.

Koraput Division was to supply engines for the delivery of Su-30 MKI aircraft of Phase II and onwards. HAL was required to manufacture 410<sup>227</sup> engines at the Koraput Division to cater to the requirement of supply of 222 aircraft from all the three contracts. The supplies were required to be made over a period of 13 years from 2004-05 to 2016-17 with production targets ranging from 4 to 74 engines per annum as given in Table -68 below:

<sup>227</sup>266 engines for 140 aircraft contract in line with compressed delivery; 5 and 47 engines for Blocks II and III GHE/GSE after compression, 28 engines for additional 40 aircraft contract, 64 engines for additional 42 aircraft contract



**Table-68**

Year of Manufacture	Phases					No. of Engines
	I	II	III	IV	V	
2004-05	4	0	0	0	0	4
2005-06	2	16	0	0	0	18
2006-07	6	10	4	0	0	20
2007-08	11	14	12	0	0	37
2008-09	8	14	20	2	0	44
2009-10	4	7	14	12	2	39
2010-11	2	40	4	20	8	74
2011-12	6	0	2	10	20	38
2012-13	0	0	0	12	20	32
2013-14	0	0	8	4	28	40
2014-15	0	0	8	0	8	16
2015-16	0	0	24	0	0	24
2016-17	0	0	20	2	2	24
	<b>43</b>	<b>101</b>	<b>116</b>	<b>62</b>	<b>88</b>	<b>410</b>

The General Contract and DPR stipulated that licence technical documentation (LTD), tools and Non Standard Equipments of all the five phases were to be supplied between January 2002 and July 2007 by ROE to HAL.

Audit scrutiny (September-October 2013) revealed that the Koraput Division received all LTD for Phases I to III on schedule during 2004-05 to 2006-07. However, there was delay of 2 to 4 years in receipt of LTD and other items for Phases IV and V as detailed in Table-69 below:

**Table-69**

S. No.	Activity	Schedule as per General Contract	Actual receipt	Delay in months	Remarks
1.	Receipt of LTD for engine manufacture	III Quarter 2004	I Quarter 2007	30	Technology for critical items like vector jet nozzle (VJN) supplied only in March 2007, blade manufacturing technology through CNC route supplied in 2008-09
2.	Receipt of DDTEM for Tools and NSE	I Quarter 2003	I Quarter 2007	48	Pneumo-thermo furnace for VJN part manufacturing received in 2009-10.
3.	Receipt of Tools and NSE	III Quarter 2004	IV Quarter 2006	24	

The delay in receipt of documents led to resultant delay in the production programme for Phase IV and Phase V engines as detailed in Table-70 below:

**Table-70**

Phase	Number of engines	Phase description	Commencement		Remarks
			Scheduled	Actual	
IV	62	Raw material kits (with imported casting and forging)	2008-09	2011-12	Delay of three years (approx.) in building engine and carrying out Long Test that were completed only in March 2011 and non-commissioning of Manned Chamber Welding (MCW) equipment
V	88	Raw material kits (in house casting and forging)	2009-10	Yet to start	Delay of 4 years; Long Test to include VJN and MCW parts planned in 2013-14

The details of number of engines supplied/manufactured in phases IV and V during the period from 2004-05 to 2012-13 is furnished in Table-71 below:

**Table -71**

Year of Manufacture	Phases					No. of Engines
	I	II	III	IV	V	
2004-05	4	0	0	0	0	4
2005-06	2	15	1	0	0	18
2006-07	8	10	2	0	0	20
2007-08	15	10	5	0	0	30
2008-09	0	19	18	0	0	37
2009-10	1	28	19	0	0	48
2010-11	8	19	8	0	0	35
2011-12	0	0	1	5	0	6
2012-13	0	6	0	7	0	13
<b>Total</b>	<b>38</b>	<b>107</b>	<b>54</b>	<b>12</b>	<b>0</b>	<b>211</b>

It could be seen from Table-68 that as against 306 engines to be delivered from 2004-05 to 2012-13, 106 engines were to be in Phases IV and V. However, as could be seen from Table 71, only 12 against 56 engines were manufactured by HAL under Phase IV and no engine against 50 engines were manufactured under Phase V till 2012-13.

Audit scrutiny (September-October 2013) revealed that to meet the IAF's requirement of aircraft for next three years from 2013-14, HAL procured (December 2012) 20 engine kits of Phase II (at ₹ 27.81 crore each) and 30

engine kits of Phase III (at ₹ 21.71 crore each) for use in Phase IV aircraft (fully indigenized). Considering the expenditure incurred by HAL for conversion of the kits into engines, the actual cost per engine was ₹ 31.10 crore. Since the budgetary quote for Phase IV aircraft submitted to MoD included cost of ₹ 24.19 crore per engine, HAL would incur a loss of ₹ 345.50<sup>228</sup> crore for the 50 engines. Six of these engines were used up in delivery of three aircraft under Phase IV in 2012-13.

Management stated (January 2014) that the 50 engine kits were procured to replenish the engines diverted from 140 aircraft programme; though delivery of engine from Phase IV/V was planned under Block III/IV, due to difficulty in production of engines in Phase IV/V, it was decided to deliver the engines from Phase II/III kits; the decision was taken to maximise the aircraft delivery to IAF. They added that the Division had booked a profit of ₹ 23.49 crore against delivery of six engines.

The fact remains that due to delay in receipt of technical documentation, the indigenisation programme did not proceed as envisaged. Consequently, HAL was forced to resort to outsourcing resulting in extra expenditure.

**9.1.3.4 Supply of documentation by ROE for creation of Repair and Overhaul facilities by HAL**

The Inter Governmental Agreement (October 2000) and the General Contract (December 2000) stipulated rendering of technical assistance by ROE to HAL for setting up of repair facilities for the aircraft, their engines and airborne equipment without additional licence fee. The technical assistance envisaged transfer of technology for overhauling taking into consideration requirement in equipment and training, not later than 12 months from December 2000.

HAL signed (September 2005) a separate General Contract (0204) with ROE for repair and overhaul of aircraft and its aggregates. The contract enjoined on ROE to prepare and supply technical documents for repair and overhaul and design documentation by November 2010/February 2011. However, supply of documentation was delayed by ROE resulting in consequent delay in setting up of facilities for the same by HAL (Details vide **Annexure - XXVIII**).

It could be seen from the Annexure that

- Repair Technical Documents (RTD) and Design Documentation and Technical Equipment Means were received only in December 2012 as against November 2010;
- Technical equipments and Tooling were received partially and
- Spares for repair and overhaul were yet to be supplied fully.

<sup>228</sup>(( 31.10 (Cost per Engine to HAL) – (24.19 (Budgetary quote to MoD)) \* 50 engines

### 9.1.3.5 Holding up of inventory

As brought out in para 9.1.2.3, the number of aircraft due in Phase IV was reduced to 60 with distribution of four in 2009-10, eight in 2010-11 and 12 each from 2011-12 to 2014-15. Under the revised delivery schedule for Block I contract (December 2003), no aircraft under Phase IV was included. In the Block II contract concluded (March 2006), four aircraft under Phase IV were to be supplied to IAF during 2009-10.

The extant capacity (May 2011) in Nashik Division was for production of only eight aircraft annually. Since the contract with IAF was for supply of 12 aircraft per year from 2011-12 onwards, the production facilities needed to be augmented.

The original delivery schedule and total production cycle time for the aircraft was 48 months comprising lead time of 12 months for obtaining supply of raw materials from ROE and cycle time of 36 months for manufacture and delivery. In January 2008, HAL placed supplementary agreements to make up for the deficiency in supplies to complete manufacture of four aircraft and again in November 2008 for kits for 20 aircraft and in February 2010 for kits for 36 aircraft.

By end of 2012-13, HAL had received aircraft kits for manufacture of 58 aircraft and had accumulated inventory of ₹ 3,318.09<sup>229</sup> crore as of March 2013. Considering the installed capacity of eight aircraft per year and the cycle time of 36 months for manufacture, HAL held inventory of aircraft kits for 26<sup>230</sup> aircraft valued at ₹ 1,725.41 crore (after excluding eight aircraft manufactured during 2010-11 (1 aircraft), 2011-12 (3 aircraft) and 2012-13 (4 aircraft)) in advance of requirement as these aircraft kits will be used for manufacture only after three years.

Management stated (January 2014) that the accumulation was due to shift in the delivery programme of the aircraft, concurrent design and development phase in Russia and delay in absorption of technology. It was further stated that the inventory is funded from the advances from the customer.

The reply was not justified as the Company was aware of the reasons attributed and hence could have avoided placing order in 2010 when the Division was already in possession of unutilised aircraft kits for production of 15 aircraft. Further, as per the contractual terms of payment, HAL had received only ₹ 2,450.47 crore as advance till the start of manufacturing activities. Since this was less than the inventory of ₹ 3,318.09 crore (inclusive

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<sup>229</sup> As per Inventory Valuation

<sup>230</sup> 58 (No. of Kits received) – 8 (already manufactured) - (8 (Capacity)x3 years (Lead Time))

of Work in progress) held, the reply that the inventory was procured from the funds provided by the customer was also not factual.

#### **9.1.3.6 Overhaul of aircraft**

The scope of work of overhaul to be carried out at Nashik Division included repair of airframe, its 228 Russian aggregates (153 repairable and 75 non-repairable) as per Repair and Overhaul documents and final integration of aircraft as also 92 in-house manufactured aggregates. The DPR considered a cycle time of 22 months for completion of overhaul of one aircraft. Nashik Division was allocated (August 2009) ₹ 283.35 crore at 2008 level (₹ 311.44 crore at incurrence level) for civil works, factory, plant & machinery, services office, material handling equipment/assembly aids, runway up-gradation, etc. Though the last batch of Repair Technological Documents and Design Documentation and Technical Equipment Means had been received by December 2012 from ROE, supplies of technical equipment, tooling and spares had been partial.

IAF intimated (August 2007) HAL that ten Su-30 MKI aircraft inducted into service in 2002 would be due for overhaul in 2012. A lifing committee was constituted (May 2011) for carrying out calendar based Time Between Overhaul (TBO) life extension study for examining the feasibility of extending TBO life of the aircraft beyond 10 years. Two aircraft were received at HAL in January 2012 for the purpose. IAF stated (October 2013) that a sizeable number of Su 30 MKI aircraft were approaching their TBO calendar life and needed to be inducted for overhauling but due to delay in setting up of Repairs and Overhaul facilities at HAL, the TBO life of aircraft was being extended from 10 years to 12 years.

Audit noticed that as of March 2014, the two aircraft received for TBO life extension study had been dismantled and study was in progress (August 2014).

Management informed (January 2014) that they expected the facilities to be ready by June 2014.

The fact however remained that funds were sanctioned by MoD in August 2009 and readiness for overhaul was required to be kept by February 2012 but HAL had not achieved this (August 2014). Due to delay in setting up of Repair and Overhaul facilities by HAL, IAF was forced to extend the TBO life of aircraft from 10 years to 12 years which may not be a prudent option.

#### **Conclusion**

HAL did not receive all the components of transfer of technology from ROE as envisaged impacting the timely supply of deliverables to IAF. Similar issue was observed in respect of Transfer of Technology to Ordnance Factories as

brought out in para 8.1.9.2. Consequently, HAL could not achieve the required level of absorption of technology to meet the compressed schedule of deliveries and had to resort to outsourcing to ROE which increased the import component and had an impact on the indigenisation programme.

### Recommendation

- Suitable clauses may be incorporated in the contracts with foreign vendors to safeguard the interests of defence forces in respect of delay in meeting contractual obligations including transfer of technology.
- PERT charts drawn up for each major activity including indigenisation should be adhered to.

#### 9.1.4 Timely delivery of quality aircraft

**Audit Objective:** Level of absorption of technology resulted in timely delivery of quality aircraft

##### 9.1.4.1 Progress in delivery (ferry out)<sup>231</sup> of aircraft

The status of supply of aircraft against the compressed delivery schedule is furnished in Table-72:

**Table-72**

Phase	2004-05		2005-06		2006-07		2007-08		2008-09		2009-10		2010-11		2011-12		2012-13		Cumulative		
	S	A	S	A	S	A	S	A	S	A	S	A	S	A	S	A	S	A	S	A	
I	2	2	1	1	4	-	-	4												7	7
II	-	-	5	2	5	4	7	6	7	1	3	0	-	3						27	16
						2*		2*		4*		3*									11*
III	-	-	-	-	4	0	6	0	8	5	8	4	8	8	4	10	4	6	42	33	
										2*										2*	
					2#		2#				3#									7#	
IV	-	-	-	-	-	-	-	-	-	-	4	-	8	-	12	1	12	4	36	5	
Total	<b>2</b>	<b>2</b>	<b>6</b>	<b>3</b>	<b>13</b>	<b>4</b>	<b>13</b>	<b>10</b>	<b>15</b>	<b>6</b>	<b>15</b>	<b>4</b>	<b>16</b>	<b>11</b>	<b>16</b>	<b>11</b>	<b>16</b>	<b>10</b>	<b>112</b>	<b>61</b>	
						2*		2*		6*		3*								13*	
						2#		2#				3#									7#

S=Scheduled delivery; A=Actual delivery (Ferried out)

\* Aircraft fully assembled in Russia and only flight test conducted at HAL

# Manufacture of wings, empennage, air intake and coupling of fuselages, wings was in Russia and aircraft were supplied by it in coupled condition along with parts required in final assembly with looms, panels and relay boxes

<sup>231</sup> Final acceptance of the aircraft by the Contractee's Inspector after issue of Signaling Out Certificate

As can be seen from the table-72, as against 112 aircraft due during the nine years from 2004-05 to 2012-13, only 81 aircraft had been delivered leaving a shortfall of 31 aircraft (28 *per cent*). HAL had adhered to the delivery schedule only for two (2004-05 and 2007-08) of the nine years. Shortfall occurred in all the remaining seven years despite resorting to outsourcing of 20 aircraft during the period 2006-07 to 2009-10 from ROE, as commented in para 9.1.3.2.

Management attributed the shortfall in deliveries mainly to delays in receipt of technical documents and rectification of defective toolings received from ROE and consequent delay in absorption of technology.

Management has accepted the delay in absorption of technology as brought out in paras 9.1.3.2 and 9.1.3.3.

#### **9.1.4.2** *Liquidated damages on delayed supplies to IAF*

The contracts with IAF stipulated payment by HAL of liquidated damages at 0.5 *per cent* of the contract price of the delayed/undelivered stores/services for each and every week of delay or part of a week for which stores have been delayed, subject to the maximum value of the Liquidated Damages being not higher than 5 *per cent* of the value of delayed stores.

(i) Under the compressed delivery schedule, 36 Phase IV aircraft were to be delivered between 2009-10 and 2012-13 under Blocks II, III and IV (March 2006, December 2007 and February 2009). However, no aircraft was delivered within the stipulated schedule. ROE delayed transfer of technology and as a result HAL was handicapped as it could not progress ahead with indigenization. Consequently, supply of aircraft to IAF was delayed for which MoD recovered ₹96.26 crore upto September 2013 towards liquidated damages.

(ii) Under Block III and Block IV contracts (December 2007 and February 2009), eight types of role equipment<sup>232</sup> required to be supplied by HAL to IAF along with the aircraft during 2010-11 and 2011-12 under Block III and during 2012-13 to 2014-15 under Block IV and were to be procured as ready-made products at additional cost through separate Supplementary Agreements<sup>233</sup>. HAL initiated the agreement process (February 2010) after delay of 25 months. At that time, ROE asked for enhanced rates. HAL ultimately concluded (January 2013) supplementary agreements with ROE for these equipments and due dates of delivery were during 2013 for Block III and during 2013 to 2015 for Block IV. As the delivery dates of the equipments did not match with delivery to IAF, supplies were delayed resulting in levy of liquidated damages of ₹ 4.77 crore against Block III contract.

<sup>232</sup>Role equipment is any equipment, other than installed aircraft components, required to be operated in aircraft during flight.

<sup>233</sup>As per Article 6.2 and paragraph 1.7 of Annexure II to the INTER GOVERNMENTAL AGREEMENT (OCTOBER 2000)



Management stated (January 2014) that the delay in signing of supplementary agreements for role equipment was due to steep price increase by Russian Side and all out efforts were made by Indian Side to maintain prices in line with earlier procurement and agreed escalation, which was achieved with protracted negotiations and the issue would be taken up with Air Headquarters for waiver of liquidated damages.

These replies were not justified since design and development phase of the aircraft was being done by ROE concurrently with process of indigenisation at HAL and hence, HAL should have taken precautionary measures considering the anticipated amendments due to technological changes occurring during development phase. Though HAL was aware of the committed delivery schedules and General Contract (December 2000) also envisaged entering into separate contracts with ROE for supply of Role Equipments, HAL delayed the process for agreement for procurement of Role Equipments which resulted in delay in supply and consequent recovery of liquidated damages by the MoD.

#### **9.1.4.3** *Deficiency in accrual of envisaged benefits to IAF*

Each aircraft was to fetch 240 flying hours per annum to IAF. Compression of the delivery schedule resulted in increase in deliveries under Phases I and II from 8 to 34 aircraft. It was envisaged that the compressed delivery programme would enable IAF to induct 4-5 additional aircraft each year from 2006-07 up to 2013-14, i.e., almost five years ahead of the earlier approved delivery programme. This would also have enabled IAF to get additional flying hours ranging from 1200 hours in 2006-07 to 8640 hours during the years 2013-14 to 2016-17 with cumulative additional flying hours of 58,080 during 2006-07 to 2016-17 and result in meeting the operational preparedness of IAF.

While considering the compressed delivery with net additional expenditure of ₹ 2,734.92 crore, MoD had forewarned that the compressed delivery would be justified if HAL delivers the aircraft within the revised schedule of delivery and in case of any slippages, ROE would be benefitted without any benefits to IAF.

The net increase in cost of ₹ 17,483.17 crore (₹ 22,122.78 crore to ₹ 39,605.95 crore) was due to escalation of price, cost of DRE and technical kits. The additional outflow of ₹ 2,734.92 crore (USD 594.54 million) was due to change in phase composition of the technical kits. As brought out in para 9.1.2.3, MoD compressed the delivery schedule to secure completion of deliveries of all the 140 aircraft by 2014-15 instead of 2017-18. This compression was after signing of Inter Governmental Agreement (October 2000) and General Contract (December 2000) and preparation of DPR. As the progress of indigenization was not at the same pace as envisaged in compressed delivery schedule, the import content increased.

Management claimed (January 2014) that it had delivered 88 aircraft against 80 stipulated for delivery in the original schedule and hence had excelled in its achievement.

This had no significance since IAF derived additional flying hours only from actual deliveries after ferry out of aircraft and was not benefited by deemed deliveries<sup>234</sup> claimed by HAL in terms of additional flying hours.

**9.1.4.4 Additional expenditure due to non adherence to original contract terms regarding price**

Though Inter Governmental Agreement (October 2000) envisaged (October 2000) licence production of 920 reserve engines and 140 sets of aggregate (airborne equipment) along with 140 aircraft, the General Contract 3630 (December 2000) covered licence production of only 140 aircraft. Due to non-inclusion of licence production of 920 reserve engines and 140 sets of aggregate (airborne equipment) in the General Contract, HAL entered (October 2012) into a separate General Contract (1050) with ROE for supply of the same. Though the price of technological kits, engine and airborne equipment for the manufacture of 140 aircraft as per various production phases was fixed in the General Contract (December 2000), the same was not considered by HAL while signing the new contract in October 2012.

As against USD 4.78 million and USD 3.73 million being the prices applicable for Phase II and III engine kits under December 2000 contract, the rates agreed in October 2012 contract were USD 5.05 million and USD 3.95 million respectively resulting in additional cost of ₹ 66<sup>235</sup> crore for these engine kits.

Management stated (January 2014) that during discussions for the III contract (December 2012) the Russian side refused (November 2011) to maintain the GC rate for Phase II and III kits stating that delivery schedule was too long to maintain the agreed price at the same level.

This reply is not justified as December 2000 contract did not stipulate any time restriction for additional requirement, HAL had already paid (between September 2002 and November 2004) the licence fee for 920 engines for life time exploitation of the aircraft and delay in achievement of rated capacity of production by Koraput Division was mainly attributable to the delayed supplies of licence technical documentation, tools, NSE, etc as discussed in para 9.1.3.3. Acceptance of a new rate disregarding the price stipulated in December 2000 contract resulted in additional cost of ₹ 66 crore to HAL.

<sup>234</sup> The Management reply of 88 aircraft is based on number of aircraft signalled out and not actually delivered.

<sup>235</sup>  $((5.05-4.78)*20+(3.95-3.73)*30)* 55)/10 = ₹ 66$  crore

#### 9.1.4.5 Supply of accessories

##### 9.1.4.5.1 Under quoting for line items

The firm and fixed price contract for Block III (December 2007) with IAF included USD 2.14 crore (₹85.78 crore) towards cost of 176 items of Ground Handling Equipment/Ground Support Equipment and other associated equipment. HAL had initially submitted quote for these items based on the reference prices given by MoD which were also incorporated in the contract. As these prices were not agreed to by ROE, HAL concluded (February 2012) supplementary agreements for supply of these items at a cost of USD 2.79 crore (₹152.39 crore) resulting in short recovery of ₹ 66.61 crore.

Management stated (January 2014) that as the contract with IAF was on firm and fixed price, there was no opportunity for HAL to revise the contracted price; however, amendments to delivery schedule and waiver of LD were being taken up.

Nevertheless, due to delay in finalization of contract for supply of Ground Handling Equipment/Ground Support Equipment and other associated equipment, IAF could not derive envisaged benefits of increased combat effectiveness. Further, non-inclusion of clause for price escalation with reference to year of incurrence in the agreement with MoD for supply of Block III aircraft (December 2007) resulted in loss of ₹ 66.61 crore to HAL.

##### 9.1.4.5.2 Non-inclusion of cost of accessories

Ground Handling Equipment and Ground Support Equipment (GHE/GSE) including 107 bomb racks was to be supplied for aircraft in accordance with the contracts for Blocks I and II and additional 40. HAL concluded (between March 2005 and November 2007) six supplementary agreements with ROE and got them supplied to IAF by November 2010. However, IAF informed (June 2011) that they could not be utilised due to non-availability of six lines of attachment forming their part and required for suspension on the aircraft.

When the matter was taken up in the meeting of Indo-Russian Sub-group co-operation in the field of production, operation and overhaul of Avionics equipment (IRSA), ROE stated (August 2011) that these accessories were not part of the bomb rack but would be supplied against separate supplementary agreements.

Accordingly, HAL concluded (February 2012) a supplementary agreement for ₹3.17 crore and the supplies were made to IAF. However, HAL's request to IAF for issue of a formal order for the supplies to enable it to make the claim was rejected (September 2012) by Air Headquarters stating that these attachments were supplied free of cost against its direct supply contract.

Management stated (January 2014) that Air Headquarters had informed about the deficiencies in the supply of one bomb rack (MBD3-6U-68) and when the issue was taken up ROE stated that the said items were to be procured separately. It further stated that the expenditure was met through contingency fund and hence there was no loss to HAL.

Failure to specify that the Bomb racks were to be supplied along with accessories while concluding the supplementary agreement with ROE deprived IAF of the envisaged benefits from the aircraft supplied besides additional expenditure of ₹ 3.17 crore to HAL.

**9.1.4.6** *Loss due to adoption of incorrect exchange rate in execution of contract for additional 40 aircraft*

The contract (March 2007) between IAF and HAL envisaged conversion rate of ₹59 per Euro and ₹45 per USD. The prices stipulated in the contract were up to 2007 level with provision for escalation to the year of delivery based on the principles of escalation for Su-30 MKI agreed between IAF and ROE.

Audit scrutiny (September-October 2013) revealed that while working out the impact of price revision for submission to IAF, HAL considered (February 2009) exchange rates as ₹ 45 per USD and ₹ 59 per Euro as in the original contract and sought (February 2009) the approval for contract price of ₹ 9,479.69 crore. However, when the amendment was issued (February 2009), MoD had approved (February 2009) the contract price as proposed by HAL but had adopted FE rates as ₹ 45.50 per USD and ₹ 60 per Euro. Thus, due to adoption of incorrect exchange rate, HAL incurred a loss of ₹101.72 crore.

Concurring with this audit contention, Management stated (January 2014) that amendments towards the change in exchange rate also would be covered in the proposal (covering certain other issues) for final amendment to the contract.

**9.1.4.7** *Injudicious acceptance of delivery schedule*

IAF concluded (December 2012) the contract with HAL which stipulated delivery of 42 aircraft in four phases over the period from 2012-13 to 2016-17. These included 4 of Phase I and 2 of Phase II to be supplied in 2012-13. HAL concluded a General Contract (December 2012) for licence production and a supplementary agreement for six aircraft kits of Phase I and two aircraft kits of Phase II with ROE specifying that the supplies be made within three months. HAL supplied all the six aircraft due in 2012-13 from Phase I.

Audit further noticed that the Russian side had expressed inability to supply 10 kits of Phase IV in 2012 as requested but offered to supply 18 kits in 2013 up to 1st quarter of January 2014 and 6 kits in 2014 up to 1st quarter of 2015. Thus, considering the cycle time of nine months, HAL was not in a position to

supply any Phase II aircraft before end of 2013. As a result, the acceptance (in December 2012) of delivery of Phase II aircraft during the year was injudicious.

#### **9.1.4.8 Recovery of interest on ad hoc advances released by MoD**

As brought out in para 9.1.2.3, MoD entered into a contract with HAL in December 2003 for Block I contract of 34 aircraft. Even before signing of the contract, MoD had released *ad hoc* advances totaling ₹ 3,725.76 crore during 1999-2000 to 2002-03. Subsequent to conclusion (December 2003) of the contract for Block I, stage payments were released from 2003-04 onwards and the *ad hoc* advances paid were adjusted. In July 2004, MoD also stipulated that HAL was to annually (on financial year basis) credit to the respective project the interest on the ad hoc advances outstanding (after adjusting the expenditure) at the actual annual interest rate earned by it on investment of surplus funds for the relevant year.

As per the records of HAL, the interest payable to MoD on the *ad hoc* advances kept unutilised worked out to ₹ 851.78 crore against which an amount of ₹ 1,215.91 crore<sup>236</sup> was actually recovered by MoD from HAL towards interest on the unused funds. Thus, there was excess recovery of ₹ 364.13 crore from HAL dues.

Management stated (January 2014) that based on the Government orders sanctioning the on account advances and approval of the Standing Committee, the interest earned by HAL was passed on to MoD and hence there was no loss to HAL.

HAL's reply that there was no loss is not acceptable as there was excess recovery of ₹ 364.13 crore as per details furnished by Defence Accounts Department and HAL. Further, it also indicates lack of reconciliation of dues and payments in respect of this project by HAL.

#### **9.1.4.9 Delay in ferrying out of aircraft after signalling out**

The I, II and III contracts referred to in Table 63 entered into with IAF stipulated that the IAF's inspector after satisfying himself about completeness of the aircraft and readiness for acceptance shall signal out (Signalling Out Certificate (SOC)) the aircraft. The contracts further stipulate that the buyer shall depute within 15 days of receipt of SOC his representative for acceptance of the aircraft (referred to as ferry out).

Audit scrutiny (September-October 2013) of SOC's issued during the years 2011-12 and 2012-13 revealed that though the production of aircraft were

<sup>236</sup> As per Letter dated 21<sup>st</sup> April 2014 of Defence Accounts Department of Nashik

certified therein as conforming to Standard of Preparation (SOP), a number of concessions from the SOP were mentioned. Audit also noticed that while 121 out of 134 aircraft were deemed to have been delivered up to 2012-13, ferry out happened 1 to 275 days beyond 15 days of issue of SOC in as many as 110 cases. An analysis of the delay in ferry out revealed that it was mainly on account of rectification of snags noticed after signalling out.

Management stated (January 2014) that concessions were granted by the customer and there was no deviation from SOP. They also stated that the aircraft was flight worthy and accordingly the customer had accepted it through SOC. This reply is to be seen in the light of the specific concessions from SOP listed in SOC for which compliance was mentioned in Work Done Reports. Management further stated that the pilot's observation was for software modification to 10i which was an additional requirement against the build of aircraft already accepted by IAF.

The Management's reply is not addressing the main audit issue viz. delay in ferry out of aircraft after signaling out. Further, the Management's reply that software modification to 10i was an additional requirement is factually not correct since all the three contracts referred to in Table-63 stipulate that the aircraft manufactured shall be new and shall incorporate all the latest improvements and modifications thereto. Further, it was decided (February 2010) in the 23rd Indo-Russian Sub-group co-operation in the field of production, operation and overhaul of Avionics equipment (IRSA) meeting that all licence build aircraft from the year 2009-10 were required to be delivered with 10i software.

#### **9.1.4.10** *Fatigue test of airframe not conducted*

Divisional DPR for Nashik aircraft division as well as technological part of the project of ROE proposed *inter alia* repeated static (fatigue) test of the aircraft's airframe. This test was to ascertain the strength of the structure of the aircraft.

It was envisaged that the test could be conducted in National Aeronautical Laboratory or any other agency or in Russia on any one airframe to be manufactured by HAL indigenously in the phase IV of the production programme (original delivery schedule). It was also mentioned that necessary test parameters and failure criteria and load distribution would be provided by ROE if the test was to be carried out in India.

With the compression of the delivery schedule, all the six aircraft of Phase IV identified for the fatigue test fell in Block II contract concluded in March 2006. The test was not conducted on any of the eight aircraft supplied in Phase IV during 2010-11 to 2012-13 aircraft. In the absence of this testing, whether the aircraft supplied could withstand the rigor of designed



performance could not be ascertained.

Scrutiny of records revealed that HAL, in response to Regional Centre for Military Airworthiness (RCMA), had informed (August 2010) that the static test of airframe was planned during Phase IV production but documents required for the same were not yet handed over by ROE and that the aircraft number to be subjected to the test would be decided after their receipt. However, it was observed that HAL placed the supplementary agreement for their supply only in December 2011 at a cost of ₹8.70 crore and the supplies were to be received by September 2013.

Management stated (January 2014) that in the DPR these tests were not planned to be carried out; as such no provision was made for the funds required to carry out these tests and additionally there was no provision for manufacture of additional two airframes for carrying out these tests. It also stated that the data on static and fatigue load details contracted from ROE would be utilised for carrying out life extension and upgrade of aircraft as well as integration of 'X'.

The reply was not acceptable as TPP prepared by ROE as well as Divisional DPR for Nashik aircraft division contained this as one of the testing parameters of the first aircraft of Phase IV and not only on aircraft identified for fitment of 'X'. The reply of HAL does not explain as to why and how this critical test was eliminated from the consolidated DPR. Further, there was an option of conducting the test in Russia in case the setting up of facilities was delayed at HAL and justification for not considering this option has not been stated by the Management. It has also not been explained by HAL as to why funds for the test and manufacture of two additional airframes were not provided for when the Division-wise DPR had provided for this test.

#### ***9.1.4.11 Operationally Grounding of aircraft supplied due to Fuel leakage***

HAL delivered 60 of the 64 aircraft due under Blocks I and II up to 2009-10. A review of 42 cases of site repairs undertaken by HAL up to March 2010 relating to 29 aircraft disclosed that fuel leakage was the main snag in 36 cases and complaints relating to leakage from fuel tank were reported by IAF immediately after delivery of the aircraft. The leakages had caused pre-mature withdrawal of the aircraft.

Management stated (January 2014) that ROE had attributed the leakages to operating the aircraft at higher 'g' level, operation of TVC causing torsional force and vibrations on structure, high manoeuvres and hard landings, aircraft parked without fuel for longer time and aircraft parked outside under hot conditions. They added that fuel leakages/seepages could not be fully excluded due to inherent design features of the aircraft and repair had to be



undertaken immediately whenever the leakages were more than permissible limits.

The fact remains that as evident from the reply of ROE that fuel leakages/seepages could not be fully excluded due to inherent design features of the aircraft and hence, called for immediate corrective action from HAL to avoid operational grounding of aircraft.

#### **9.1.4.12 Excess vibration levels leading to scrapping of two engines**

Two engines manufactured by HAL from Phase III kits procured from ROE in 2008 at a cost of ₹ 16.41 crore each were damaged (February 2011) during testing at Koraput Division. Considering that the vibration levels of both the engines exceeded the acceptable norm, HAL and ROE decided (October 2012) that reconditioning was not feasible. As a result, the engines had to be replaced by HAL with new engines procured from ROE.

Audit scrutiny (September-October 2013) revealed that supplementary agreements placed (December 2012) for replacement of engines was at ₹21.71 crore each. Thus, HAL had to absorb ₹ 43.42 crore due to withdrawal of the engines.

Management stated (January 2014) that the engines were being brought to use by replacement/reworking (salvaging) damaged parts as per salvaging programme/procedure obtained from RCMA.

Management reply is not acceptable in view of the fact that salvaging operations have not been completed even after lapse of three years and hence, usability of the engines was doubtful.

#### **Conclusion**

Neither HAL ensured timely delivery of the aircraft despite resorting to outsourcing thereby depriving IAF of the full quota of flying hours nor did it ensure total compliance with standards of preparation and foolproof quality.

Compression of delivery schedule warranted preparation of a revised DPR but HAL did not comply with it. There were instances of inadequate planning and contract management which resulted in additional expenditure, loss and untimely procurement of materials.

#### **Recommendation**

- Compliance with all mandatory tests and standards of preparation before going in for customer's acceptance tests may be ensured.

- Suitable clauses may be incorporated in the contracts with foreign vendors to safeguard the interests of Indian counterparts in respect of delay in meeting contractual obligations to customer.
- Inventory management needs to be improved.

### 9.1.5 Setting up of infrastructure

**Audit Objective:** Setting up and utilisation of infrastructure for various activities was ensured as and when required.

#### 9.1.5.1 Introduction

The DPR envisaged capital investment of ₹ 762.70 crore (USD 150 million) at 2002 price level towards provisioning of machines, construction of factory buildings and residential accommodation (Details vide **Annexure XXIX**). The capital investment proposed (February 2002) project specific equipment necessary to establish indigenous manufacturing capabilities. The funding was to be done by HAL from internal resources/commercial borrowings which were proposed to be recovered through man-hour rate (MHR). In order to examine the progress in completion of planned infrastructure, Audit examined major facilities. The observations are given below:

#### 9.1.5.2 Delay in construction of Structural Assembly Complex

Construction of a Structural Assembly Complex at Nashik to accommodate additional machinery, equipment, non-standard equipment and tooling was envisaged in the DPR to provide space for assembling and was to be taken up from April 2002 and completed by December 2003. HAL awarded (July 2003) the contract to M/s Engineering Projects India Limited at a cost of ₹23.89 crore. The work which was to be completed by April 2004 was completed in December 2007 (after rectification of defects).

It was noticed by Audit (September–October 2013) that Nashik Division did not initiate timely action for awarding the contract though the DPR had categorically specified the timelines for completion of the civil works by December 2003 so as to ensure readiness for the licence production.

The delay in construction of the complex resulted in non-erection of coupling jigs for production of aircraft in Phase III and led to offloading (October 2005) of coupling activities to ROE at an avoidable expenditure of ₹ 28.73 crore.

Management stated (January 2014) that delay in finalisation of consultancy contractors, delay after award of civil contracts due to various reasons beyond its control, delay in supply of LTD, Tooling and NSE by ROE resulted in outsourcing the labour content of four aircraft due under Phase III to ROE. Management also stated that the extra expenditure incurred in outsourcing to ROE was offset by savings in HAL effort and there was no idle labour.

The reply was not specific to the audit observation with regard to delay in award of civil contract. HAL, having accepted a firm schedule for delivery of aircraft, should have ensured availability of infrastructure for manufacture.

**9.1.5.3 Construction of non-echo chamber**

The DPR envisaged construction of a non-echo chamber at Nashik Division for foolproof checking of the radar complex and snag investigation on ground. The estimated cost was ₹ 3.63 crore and the work was to be completed by December 2003. HAL concluded (December 2003) a supplementary agreement with ROE for transfer of working documentation for establishment of non-echo chamber at the flight hangar and functional test laboratory at a cost of ₹ 54.51 lakh.

The contract for construction of a non-echo chamber was awarded (July 2005) to M/s Vishal Infrastructure Limited (VIL) at a cost of ₹ 5.54 crore with scheduled completion by April 2006. However, the work was completed only in May 2008 after a delay of 25 months. Owing to delay in construction of civil works, was thereafter installed in October 2008. Owing to these delays, ROE recommended partial checks in functional test laboratory and flight hangar and the performance of radar (air to air) being certified by the pilot. The delayed establishment of the non-echo chamber prevented foolproof checking of the radar complex and snag investigation on ground till October 2008.

Management stated (January 2014) that radar complex was received from Hyderabad Division where complete checks/tests were carried out before dispatch to Nashik, similar checks were carried out in the non-echo chamber at Nashik and that these checks/tests were subsequently done on aircraft during flight testing which was final and also that non-establishment of non-echo chamber did not affect the production programme.

The reply was not acceptable as the checks/tests done at Hyderabad were before fitment on the aircraft but the tests were required to be done on aircraft both when on ground and in air. Therefore, the delayed establishment of the non-echo chamber prevented foolproof checking of the radar complex and snag investigation on ground till October 2008.

**9.1.5.4 Delay in commissioning of Computerised Numerically Controlled (CNC) equipment**

Based on technological requirements, workload for peak production, availability of similar machines in-house and feasibility of subcontracting the work, requirement of 205 items of plant and machinery costing ₹ 116.20 crore for Nashik Division were projected in the DPR. These included CNC machines which were required to be ordered by December 2002 and commissioned by June 2004.

Scrutiny revealed that supply of two CNC Axis machines at a cost of ₹ 18.66 crore was ordered in July 2004 and were to be delivered by June 2006. Though the machines were delivered as per schedule, the installation and

commissioning was done only in September 2007 due to non-availability of cranes. The delayed commissioning resulted in slippage of productionising of long cycle spars and main attachment and fittings for vertical fins. Consequently, the Division concluded (October 2007) a supplementary agreement with ROE for supply of two sets of readymade components at ₹3.38 crore to comply with the delivery of aircraft in Phase III during 2007-08. Thus, the delay in commissioning of the machinery led to outsourcing of items required for vertical fins delaying indigenization programme besides additional expenditure of ₹ 3.38 crore.

Management stated (January 2014) that delay in delivery and commissioning of the machines was due to delay in preparation of civil site for machines and technical problems faced by vendor during installation and commissioning besides delay in absorption of technology resulting in additional expenditure of ₹ 3.38 crore which was funded from contingency fund.

Management reply confirmed that the delay in building up infrastructure led to non-achievement of indigenization plan besides additional expenditure.

#### **9.1.5.5** *Delay in establishment of welding chamber*

Nashik Division proposed (May 2003) to procure robotized welding chamber for welding of critical components of turbine, compressor and diffuser assembly. A contract for supply, erection and commissioning of TIG welding system in argon chamber was awarded (July 2008) to M/s Hind High Vacuum Company Pvt. Ltd after negotiations at a cost of ₹ 31.09 crore stipulating completion by July 2010. The installation was completed by February 2013 but was commissioned only in October 2013.

Audit noticed (September-October 2013) that due to non-installation and commissioning of the new facility, the Division resorted (November 2007, December 2011 and April 2012) to procurement of 40 sets of readymade Manned Chamber Welding (MCW) assemblies from ROE at a cost of ₹ 18.02 crore.

Management stated (January 2014) that although there was delay in procurement and installation of the equipment, indigenous capability had been established. They also stated that additional cost was incurred to facilitate engine production for supporting aircraft delivery as otherwise other consequential losses would have occurred.

The reply was not acceptable as HAL delayed finalisation of tenders called in December 2006 by 18 months which necessitated outsourcing for ₹ 14.18 crore in December 2011 and April 2012. Besides, delay in setting up of Manned Chamber Welding also affected the indigenization plan.

#### **9.1.5.6** *Creation of facilities for repair and overhaul of aircraft*

HAL planned (August 2009) setting up of facilities for overhaul of the aircraft (airframe and its aggregates) at Nashik, Lucknow, Hyderabad and Korwa so as

to be completed by February 2012 since 50 aircraft directly procured by IAF from ROE between (May 1997 and December 2004) as well as aircraft supplied by HAL under I and II contracts (for 140 and additional 40 aircraft) would be due for overhaul from 2011-12 onwards after completion of their Time Between Overhaul of 1500 flying hours or Total Technical Life of 10 years.

Government of India sanctioned (August 2009) ₹ 1,793.17 crore for setting up of these facilities by February 2012. The sanction included ₹ 401.02 crore towards capital expenditure and ₹ 1,392.15 crore towards Deferred Revenue Expenditure.

The delay in establishment of facilities of ROH at HAL and the adverse impact on the fleet serviceability had been commented in the Report (No.4 of 2006) of the C&AG of India on Performance Audit relating to Union Government (Defence Services) presented in May 2006. In the Action Taken Notes, MoD had reported (May 2011) that the delay in setting up of the facilities was primarily due to delay in development of this version of aircraft and lack of its exploitation experience. It had also stated that Engineering Support Facilities had been planned by MoD and were being implemented in a phased manner.

The Division wise project timeframe (**Annexure XXVIII**) and total sanctions and actual expenditure as of September 2013 are given in **Annexure XXX**. Scrutiny of these details show that the repair/ overhaul facilities which were required to be in readiness by February 2012 were incomplete even as of December 2013 resulting in a delay of 22 months.

#### **9.1.5.7** *Augmentation of engine production and overhaul capacity*

As brought out in para 9.1.3.3, engines were to be produced in five phases at the Engine Division of HAL at Koraput. The TPP Report envisaged investment of ₹ 406.66 crore at 2000 price level towards 2,043 items of plant and machinery to manufacture 24 engines. However, DPR projected only ₹ 279.51 crore for 1,330 items of plant and machinery to manufacture 24 engines citing fund constraints.

A study instituted (May 2012) by HAL to assess the Division's capacity build up reported (July 2012) that due to non-inclusion of balance items of plant and machinery, the envisaged built up capacity for manufacture of 24 engines was not achieved.

Audit noticed (September-October 2013) that in January 2001 itself, the Government, while according sanction for manufacture of Su-30 MKI aircraft, had mentioned that the capital investment of USD 150 million (₹ 690 crore) towards standard machine tools and civil works required for setting up of new lines or increasing capacity would be funded by HAL from its internal resources/commercial borrowings and no budgetary support would be provided. It had also specified that this would be recoverable by HAL through man-hour rate. Though HAL was aware of its commitment from the beginning, HAL Board accorded sanction only in August 2012 for capital

investment of ₹ 556.71 crore for augmenting manufacturing capacity to 24 engines per annum with timeline for completion up to 2014-15. HAL had initiated (September 2012) procurement action and committed an expenditure of only ₹ 20.99 crore with expected date of completion by March 2016 as of December 2013. It was further noticed that, HAL's decision to restrict the expenditure on augmentation of capacity citing funds constraints was also not justified as it held Reserves and Surplus ranging from ₹ 1,379.11 crore as of March 2001 to ₹ 13,257.69 crore as of March 2013.

Thus, HAL was behind the scheduled completion of 2014-15 for augmentation of Repair and Overhaul facilities.

Management stated (January 2014) that the capacity was assessed by the Study Team based upon various factors including possibilities of subcontracting and that only after gaining experience in the manufacturing of Phase IV engine, the Division realised (July 2012) the need to augment the existing capacity.

The reply was not justifiable because DPR should have been prepared considering all the relevant aspects based on acceptance (March 2006) of the compressed delivery schedule. As brought out in Table-67, HAL was to manufacture more than 12 engines per annum from 2009-10 onwards under phases IV and V. Hence, the present capacity was not adequate for delivering the required number of engines. In view of the same, the Board's decision (August 2012) to augment the capacity was delayed.

### **Conclusion**

HAL was behind schedule in respect of creation of facilities for all the major activities like manufacture of aircraft including avionics systems, engines and accessories as also repair and overhaul. Consequently, it resorted to outsourcing of the related activities to the OEM. These contributed to delay in deliveries and inability to take up overhaul of aircraft inducted after completion of TBO.

The Inter Government Agreement (October 2000) did not provide for protection against delays and resultant escalation in cost attributable to ROE. As a result HAL had to absorb additional financial costs attributable to delays by ROE at various stages as pointed out in paras 9.1.3.2, 9.1.4.2, 9.1.4.4, 9.1.4.5, 9.1.5.2 and 9.1.5.5.

### **Recommendation**

- Synchronisation of availability of infrastructure with production schedule may be ensured.

The matter was reported to the Ministry in April 2014. Their reply was awaited (October 2014).



**BEML LIMITED****9.2 Loss due to non utilisation of power for captive consumption**

**Non utilization of power generated by wind mill farm for captive consumption and sale of power to Hubli Electricity Supply Company Limited (HESCOM) at a price lower than they paid to Bangalore Electricity Supply Company Limited (BESCOM) and Boruka Power Corporation Limited for purchase of power resulted in loss of ₹ 5.67 crore (April 2014).**

BEML Limited (Company), proposed (January 2006) to the Board of Directors to set up a 5 MW Wind Mill Farm for captive consumption at a project cost of ₹ 25 crore. While according in principle approval (January 2006), the Board desired a project report for consideration and clearance. Accordingly, M/s. Environment & Power Technologies Private Ltd., (EPTPL) were appointed (January 2006) as consultants for the preparation of a detailed project report (DPR).

The DPR (April 2006) of EPTPL considered two financial options viz., (i) generation of wind power for captive consumption against Electricity Supply Company's (ESCOM) rate of ₹ 4.30 per unit and (ii) sale of wind power to ESCOM/Karnataka Power Transmission Corporation Limited (KPTCL) @ ₹ 3.40 per unit. It envisaged savings of about ₹ 3.26 crore per year and ₹ 2.18 crore per year against the two options respectively. DPR was placed before the Board (April 2006) with a proposal to set up 5 MW wind mill farm for captive consumption at a cost of ₹ 30 crore. The Board approved (April 2006) the proposal envisaging a saving of over ₹ 2 crore per annum. Accordingly, the Company placed (June 2007) three purchase orders<sup>237</sup> on M/s. Suzlon Energy Limited for setting up of 5 MW wind farm project at a total cost of ₹ 26.54 crore. Simultaneously, the Company applied (July 2007) to Karnataka Renewable Energy Development Limited (KREDL)<sup>238</sup> for development of wind farm project meant for captive consumption based on a Wheeling and Banking arrangement<sup>239</sup>. Electricity Supply Act, 2003 provided for open access<sup>240</sup> and captive generation of power. Karnataka Electricity Regulation Commission (KERC) (Terms and Conditions for Open Access) Regulations were issued/notified in December 2004.

The Company installed (December 2007) a 5 MW wind mill farm project<sup>241</sup>. Subsequently, deviating from the Board's earlier approval (April 2006) to utilise the power for captive consumption, the Company entered into (February 2008) a Power Purchase Agreement (PPA) with Hubli Electricity Supply Company Ltd., (HESCOM) to sell the generated power for a period of 20

<sup>237</sup>One Purchase Order for supply of Wind Energy Generators, one for Erection, Testing and Commissioning and another for land

<sup>238</sup> Nodal Agency appointed by Govt. of Karnataka for permitting and regulating Renewal Energy Projects.

<sup>239</sup> Wheeling means the operation whereby the distribution system and associated facilities of a transmission licensee or distribution licensee, as the case may be, are used by another person for the conveyance of electricity on payment of charges;

<sup>240</sup> Open access means the non-discriminatory provision for the use of transmission lines or distribution system by any licensee or consumer or a person engaged in generation in accordance with the regulations specified by the Appropriate Commission;

<sup>241</sup> At Kappatguda-2, Mundargi Taluk, Gadag District;



years<sup>242</sup>. The Company had earned ₹ 19.63 crore during the period January 2008 to April 2014 on sale of electricity to HESCOM.

Audit scrutiny revealed that, during the period January 2008 to April 2014 as against the generation of 5.77 crore KWH units of energy and revenue generation of ₹ 19.63 crore, the Company in KGF Complex had incurred an expenditure of ₹ 27.27 crore towards consumption of 5.77 crore KWH units of energy purchased from Bangalore Electricity Supply Company Limited (BESCOM) and Bhoruka Power Corporation Ltd.

Thus, not utilizing the power generated by the windmill resulted in loss of ₹5.67<sup>243</sup> crore for the period from January 2008 to April 2014.

Ministry (March 2014) stated that Karnataka Electricity Regulatory Commission (KERC) had passed orders in the matter of Wheeling and Banking agreement only in July 2008. As there was no provision for captive consumption through wheeling and banking agreement during December 2007, there was no other choice than opting for PPA with HESCOM. Ministry further stated that the matter regarding termination of PPA and captive utilisation of wind energy was being pursued vigorously by the Company.

Reply is not tenable as the order passed by KERC in July 2008 was only to finalise the standard Wheeling and Banking Agreement for all renewable energy projects. The provisions for Wheeling and Banking facility existed even before installation of Wind Mill (December 2007). Despite the fact that the Company applied to KREDL for development of wind farm project meant for captive consumption and wind mill project was intended only for captive consumption even as per the Board approval, Wheeling and Banking agreement was not entered into even after 6 years of installation of wind mill farm. Further, even though PPA<sup>244</sup> provided for termination of contract, the same was not invoked to utilise the power generated for captive consumption.

Thus, non utilization of the power generated for captive consumption and purchase of power at higher rate from BESCOM and Bhoruka Power Corporation Limited resulted in loss of ₹ 5.67 crore till April 2014.

### 9.3 Non-recovery of liquidated damages

**Acceptance of non-enforceable terms of LD coupled with failure to withhold the payments resulted in non-recovery of LD of ₹ 12 crore.**

BEML Limited (the Company) received a Letter of Intent (LOI) (October 2007) from Northern Coalfields Limited<sup>245</sup> (NCL) for supply of BEML-Bucyrus 20 Cu. M. Rope Shovels<sup>246</sup> followed by a purchase order (PO) (November 2007) for supply of two Rope Shovels along with accessories and

<sup>242</sup> At the rate of Rs.3.40 per KW hour for the first 10 years. From 11<sup>th</sup> year onwards, at the rate determined by KERC;

<sup>243</sup> Actual expenditure incurred is ₹27.27 crore and revenue generation is ₹19.63 crore. The loss works out to ₹5.67 after considering wheeling and banking charges of ₹1.97 crore that would have been incurred for captive consumption;

<sup>244</sup> Clause 9.2.1 (b) read with 9.3.1 clarifies the provisions in respect of default and termination.

<sup>245</sup> NCL, Singrauli, Madhya Pradesh - A subsidiary of Coal India Limited, a Government of India undertaking;

<sup>246</sup> Model 295 series Electric Rope Shovel;

consumables within 15 months and 15 days from the date of placement of order at a total value of ₹ 91.99 crore. The purchase order was amended (February 2008) for supply of three Rope shovels at a total value of ₹ 137.99 crore, which stipulated delivery of the third Rope shovel within 18 months and 15 days from the original date of PO (November 2007). Erection and commissioning was to be completed by BEML within 60 days of the receipt of complete equipment at site. As per the terms of the PO, delay in delivery of the equipment attracted liquidated damages (LD) of 0.5 *per cent* per week, of the price of any stores not supplied, subject to a maximum of 10 *per cent* and delay in erection/commissioning of the equipment attracted LD of 0.5 *per cent* per week of the landed price of equipment, subject to a maximum of 5 *per cent*.

On receipt of the order from NCL in November 2007, BEML placed a PO (December 2007) on M/s. Bucyrus International Inc., USA, (BII) for supply of two sets of CKDs<sup>247</sup> of Rope Shovels on back to back basis, which was subsequently amended (February 2008/April 2008) for supply of three sets for a total value of US \$ 16785000 (₹ 70.50 crore). As per the terms of the PO placed on BII, the delivery schedule for Bucyrus supply items and complete groups/components was 24 weeks and 44 weeks for two sets and 30 weeks and 50 weeks for the third set respectively, to be reckoned from the date of the 1<sup>st</sup> purchase order (19 December 2007). Subsequently, PO was amended (November 2008) to exclude electrical items thereby reducing the value of the PO to US \$ 14140315 (₹ 59.39 crore). Another PO was placed (December 2008) on M/s. Bucyrus India Pvt. Ltd., Kolkata (BIPL) for supply of electrical items at a value of ₹ 11.90 crore. BIPL is the Commercial Arm of BII.

As per the terms of the POs placed (February 2008 and December 2008) on BII and BIPL, payment to BII was to be made through Letter of Credit (LC) and payment to BIPL was to be made within 30 days from the date of receipt of goods. Further, for delay in supply of equipment by BII, LD was to be levied at the rate of 0.5 *per cent* per week subject to a maximum of 10 *per cent*, which was payable in the form of OEM parts credit. For delay in erection and commissioning of equipment beyond 60 days from the date of receipt of complete consignment at site, LD was to be levied at the rate of 0.5 *per cent* per week subject to a maximum of 5 *per cent*, which was also payable in the form of OEM parts credit to BEML. The parts credit could be used by BEML either for purchase of spare parts or towards supply of third set of CKD. However, LD was payable by BII only if LD was levied on BEML by NCL for delay in supply and delay in erection and commissioning of the Rope shovels to NCL.

We observed that BII supplied three CKD sets during September 2008 to November 2009 with a delay of about 2 to 43 weeks. Consequently, BEML supplied the equipment to NCL during April to June 2009 with a delay of 3 to 10 weeks and erection and commissioning at NCL was completed between December 2009 and August 2010 with delay of about 7 to 15 months. NCL deducted (April 2009 to September 2010) LD of ₹4.48 crore from BEML

<sup>247</sup> Complete Knock Down of groups and components;

towards delay in supply of Rope shovels and ₹ 7.56 crore towards delay in erection and commissioning.

As NCL had levied LD on BEML, BEML raised (February 2010/March 2011) a back to back claim on BII for refund of LD of ₹ 12<sup>248</sup> crore. Although BII agreed to settle the claim in respect of only one Rope Shovel, BII did not agree for refund of LD in respect of balance two Rope Shovels (July 2013). The parts credit as per the terms of the contract was also not given/extended to BEML.

We further observed (September 2013) that although 79 (\$ 117.301 lakh) orders were placed by BEML on BII for procurement of spares during 2009-10 to 2011-12, recovery of LD through OEM parts credit in line with the terms of PO was not enforced at all. Further, the alternate option that OEM parts credit which could be used against supply of third set of CKD, was also not enforceable, as payment to BII was through LC and LD was recoverable only on back to back<sup>249</sup> basis. In view of the fact that LC was established by BEML (July 2008 to February 2009) for payment to BII before recovery of LD by NCL (April 2009 to September 2010), LD could not be recovered from BII from the payments due to them.

Management stated (March 2013) that it was important to bag the order to penetrate into the higher end electrical shovels in the mining business. Supply of spare parts is against advance payment through LC/sight draft irrespective of agreed terms for supply of equipment. In the event of invoking LD clause in respect of equipment PO, in the POs issued for spares, BII would not have supplied the spares against customer orders and maintenance and repair contracts. Management further stated that issue of LD was being followed up with BII/CGM<sup>250</sup>.

The reply is not agreeable as the terms and conditions agreed by BEML were not enforceable and did not safeguard the interest of the Company. Further the Company had made payments to BIPL towards electrical items, out of which an amount of ₹ 2.97 crore had also been paid before deduction of LD by NCL from the payments made to BEML. The company also had an opportunity to withhold balance amount of ₹ 9.91 crore. However, BEML did not initiate action to withhold the payment made to BIPL against LD recoverable from BII similarly, as done in the case of POs placed for 10 Cu. M. Rope Shovels. LD claim had not been settled even after a lapse of 3 years (October 2014). Ministry, while endorsing (March 2014) the reply of the Management, stated that instructions have been issued (March 2014) to all DPSUs to review the provisions in such contracts carefully and ensure that sufficient recourse is available for recovery of LD.

Thus, acceptance of non-enforceable terms for recovery of LD coupled with failure to withhold the payments resulted in non-recovery of LD of ₹12 crore.

<sup>248</sup> BEML claimed ₹11.91 crore from BII as applicable, against ₹12.05 crore deducted by NCL. ₹11.91 crore also includes LD of ₹0.23 crore towards supply of electrical items from BIPL;

<sup>249</sup> LD was payable by BII only if LD was levied on BEML by NCL;

<sup>250</sup> BII has been taken over by M/s. Caterpillar Global Mining in July 2011;

#### 9.4 Loss of ₹ 9.81 crore in supply of ACEMU Coaches

**Non-inclusion of Value Added Tax / Central Sales Tax in the offer for supply of Air conditioned Electric Multiple Units resulted in non-recovery of ₹ 5.51 crore and delayed supplies of coaches resulted in payment of Liquidated Damages of ₹ 2.99 crore. Further, the Company had to absorb ₹ 1.31 crore being the Excise Duty paid for deliveries beyond stipulated delivery schedule as the extension of delivery schedule was with denial clause.**

Ministry of Railways (MoR) invited tenders (June 2007) for fabrication and supply of Alternating Current Electric Multiple Units (ACEMU) coaches. As per the tender conditions, presently applicable rate and quantum of Sales Tax (ST) / Value Added Tax (VAT) including the quantum of input tax credit / set off of tax paid on raw material, output tax and net tax of VAT / ST was to be clearly indicated in the offer. M/s BEML Limited (BEML) submitted (September 2007) their offer of ₹ 140.12 crore for supply of 16 rakes<sup>251</sup> and 17 loose coaches. As per the offer, the prices quoted were exclusive of Excise duty (ED). CENVAT credit was not considered since during 2007, ED was not leviable for supply of Coaches to Indian Railways. It was stated in the offer that in case payment of ED was applicable at a later date, the same would be charged extra at actual as applicable at the time of delivery and the prices quoted were exclusive of ST / VAT. ST considered was NIL.

MoR intimated (November 2008) BEML that their offer for supply of ACEMU coaches had been accepted for 8 rakes and 17 loose trailer coaches and sought for unconditional acceptance within seven days from the date of issue of the letter. BEML, in response, conveyed (December 2008) their acceptance subject to amending the clause relating to ST / VAT so as to enable them to claim the reimbursement of actual ST / VAT paid. However, MoR did not consider the request of BEML and placed (March 2009) a regular order for 8 rakes and 17 loose trailer coaches at a total all inclusive cost of ₹ 75.40 crore and the same was accepted (May 2009) unconditionally by BEML. As per the order, deliveries were to commence within 12 weeks after placement of the order and completed within 31<sup>st</sup> March 2010. The order also stipulated levy of liquidated damages (LD) at the rate of one *per cent* of the fabrication cost for each and every month for which delivery was delayed beyond the period specified in the contract. The order also provided Quantity Option clause as per which MoR was entitled, at any time during the currency of the contract, to increase the quantity by not more than 30 *per cent*. In accordance with this clause, MoR increased (May 2011) the quantity by adding three rakes and the total contract price was ₹ 99.67 crore. Delivery of the additional quantity was to commence within three months of issue of the order and completed within three months thereafter. The delivery period of the additional rakes was extended (July 2012) by MoR at the request of BEML upto December 2012 and further upto March 2013 without levy of LD but with denial clause.

Audit observed the following:

<sup>251</sup> One rake includes 3 nos. of Motor Coaches, 4 nos. of Trailer Coach C and 2 nos. of Trailer Coach D

**a) Non-inclusion of Value Added Tax in the quote resulting in non-recovery of Value Added Tax / Central sales Tax paid - ₹ 5.51 crore**

The quotation by BEML stating that ST was NIL was not in order since as per Karnataka Value Added Tax Act, 2003, four *per cent* VAT was payable on the sale of Railway products with effect from 01 April 2005. This was further enhanced to five *per cent* with effect from 01 April 2010. Thus, submission of offer stating that ST considered was NIL was erroneous. BEML paid ₹ 3.79 crore towards VAT / Central Sales Tax (CST) against supply of 8 rakes and 17 loose trailer coaches (₹ 3.34 crore (VAT) and ₹ 0.44 crore (CST)) and further ₹ 1.72 crore against supply of additional three rakes. Owing to non-inclusion of sales tax component in the offer, BEML could not recover the same.

**b) Loss of ₹ 2.99 crore due to delayed supply of coaches**

As per the order, delivery of 8 rakes and 17 loose trailer coaches were to be completed within 31 March 2010. As the coaches were not supplied within the stipulated time, MoR, at the request of BEML, extended the delivery period initially (June 2010) upto December 2010 without levy of LD but with denial clause. The delivery period was further extended (January 2011) upto March 2011, again (April 2011) upto June 2011 and finally (November 2011) upto November 2011 with levy of LD and denial clause. BEML completed the supplies between March 2010 and November 2011 and as the supplies beyond December 2010 were with levy of LD, Railway Board recovered ₹ 2.99 crore due to delayed supplies.

**c) Non-recovery of Excise Duty of ₹ 1.31 crore**

At the time of submission of offer to MoR, ED was not leviable for supply of Coaches to Indian Railways. However, the exemption was withdrawn (March 2011) and a concessional duty of one *per cent* besides education cess (one *per cent*) and higher education cess (two *per cent*) was imposed. This was further enhanced (March 2012) to two *per cent* besides education cess (one *per cent*) and higher education cess (two *per cent*). As the extension in delivery schedule beyond March 2010 were with denial clause viz. any increase in statutory levies were to be borne by the supplier, BEML had to absorb the ED paid amounting to ₹ 0.79 crore being the ED paid on the original order for deliveries effected after March 2011. MoR decided (March 2012) to reimburse Excise Duty at one *per cent* and three *per cent* Education cess for the quantity added under the option clause. As per the order, the deliveries were to be completed before November 2011 but were actually supplied between December 2012 and March 2013. As the ED was enhanced from March 2012 and deliveries beyond stipulated delivery schedule were with denial clause, BEML had to absorb ₹ 0.52 crore being the ED paid on additional quantity.

In response to the Audit observation, Ministry replied (September 2013) that

- BEML was not discharging VAT for Rolling Stock supplied during that period and the order was bagged under stiff competition;



- MoR had not considered the request of BEML for reimbursement of VAT favourably;
- Delay in deliveries were due to delay in free supply of steel raw material and wheel sets;
- BEML earned a contribution of ₹ 36.68 crore on executing the main order (8 rakes and 17 loose trailer coaches); and
- It was a commercial decision to exclude VAT in the price quotation.

The reply is not acceptable since

- BEML was aware that VAT was payable since 2005 and exclusion of VAT was not deliberate but an omission as BEML requested (December 2008) MoR for reimbursement of VAT only after the submission (September 2007) of tender and communication (November 2008) of acceptance by MoR.
- Bagging the order under stiff competition does not allow exclusion of statutory payments while quoting the price, more so when VAT was to be specifically indicated in the quotation.
- Delayed supplies were not due to delay in free supplies since as per the Stores records, BEML had sufficient stock of wheel sets.

Thus, non-inclusion of Value Added Tax while giving the offer and levy of Liquidated Damages due to delay in delivery resulted in loss of ₹ 8.50 crore to BEML. Further, as the extension of delivery schedule was with denial clause, the Company was forced to absorb Excise Duty of ₹ 1.31 crore paid during the extended delivery schedule.

## MIDHANI

### 9.5 Loss due to delay in procurement of material

**Delay in procurement of raw material led to non-recovery of price escalation of ₹ 15.52 crore and consequent delay in supplies resulted in levy of LD of ₹ 1.47 crore**

Mishra Dhatu Nigam Limited (the Company) entered (March 2003/July 2003) into two contracts with M/s. Vikram Sarabhai Space Centre (VSSC), Department of Space, Thiruvananthapuram (customer) for supply of Maraging steel (M250) Forged Rings, Plates, Filler Wires and Rods at a cost of ₹ 40.38 crore and ₹ 63.59 crore. The base price of the contracts were corresponding to October 2001 and February 2002 price levels and governed by price escalation formula. Average cost of power, LPG, labour and weighted average cost of the monthly wholesale price indices prevailing during 18<sup>252</sup> months from the date of contract and actual weighted average cost of raw material (Nickel, Cobalt, Moly and Pure Iron) were reimbursable to the Company. The Company

<sup>252</sup> The period of 18 months was the average cycle time from procurement of raw material to forging stage. Hence price escalation was limited to 18 months in the price escalation formula;

received (March/July 2003) advance of ₹ 47.98 crore<sup>253</sup> against the two contracts towards procurement of raw material.

As per the delivery schedule<sup>254</sup>, deliveries for both the contracts (March/July 2003) were to start within six months and to be completed within 45 months from the date of signing the contract. Accordingly, the supplies were to be completed by December 2006 and April 2007.

Considering 18 months period as allowed in price escalation formula for various elements of cost, procurement of raw material were to be completed by the Company within September 2004 and January 2005. However, procurement of material for two contracts was completed only in January 2008 and October 2008. Consequently, the supplies were completed belatedly in February 2010 and May 2009 with a delay upto 38 months. Liquidated damages (LD) amounting to ₹ 1.47 crore was levied by VSSC.

The Company raised (August 2010/November 2009) claims for ₹ 38.86 crore<sup>255</sup> for two contracts towards price escalation. VSSC did not settle the claim expressing reservations on the amount claimed.

Finally, in a meeting (January 2011) held for negotiating the price escalation claims, it was decided to restrict price escalation claim up to 18 months for all the elements of cost and therefore, the price escalation claim was reduced from ₹ 38.86 crore to ₹ 23.34 crore<sup>256</sup>. The revised claim (January 2011) for ₹ 23.34 crore was realised (March/April 2011) by the Company. Thus, the additional cost, on procurement of raw materials over and above the base price indicated in the contract, incurred by the Company on procurement of material beyond the 18 months period amounting to ₹ 15.52 crore had to be absorbed by the Company.

Management stated (April 2014) that there was no specific clause in the contract stipulating procurement of raw material within 18 months and materials were procured in small quantities over a longer period expecting the downward trend in the international market and also due to inadequate cash flow. Management also claimed that there was no financial loss since reduction in price variation claim was accepted as a good gesture keeping long term relationship in view and investment by customer in critical equipment.

The reply of the Management was not acceptable as

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<sup>253</sup> ₹ 16.19 crore (March 2003) and ₹ 31.79 crore (July 2003);

<sup>254</sup> As per the delivery schedule of the first contract (March 2003), delivery of Rings, Plates and Filler wires was to commence within 28 months and to be completed **within 45 months** and Rods were to be delivered **within 6 months** from the date of signing the contract. The delivery schedule of the second contract (July 2003) stipulated that delivery of Rings was to commence within 36 months and to be completed **within 45 months**, Plates and Filler wires was to commence within 24 months and to be completed within 36 months and Rods were to be delivered **within 6 months** from the date of signing the contract;

<sup>255</sup> Original claim was for ₹ 18.45 crore and ₹ 20.41 crore for two contracts respectively totaling to ₹38.86 crore;

<sup>256</sup> Revised claim was for ₹ 7.15 crore and ₹ 16.19 crore for two contracts respectively totaling to ₹23.34 crore;




- The price escalation clause allowed 18 months period for price escalation in respect of labour, power, LPG and wholesale price index. Though no limitation was prescribed for raw materials (Nickel, Cobalt, Moly and Pure Iron), the fact that the other elements of cost viz. labour, power, LPG and wholesale price index for which the limitation of 18 months was applicable could be incurred only after procurement of raw material indicated that raw material should have been procured within that period. Further, the customer, in fact, enforced the limitation to raw materials whereby the Company had to absorb ₹ 15.52 crore.
- Despite initial payment of 50 *per cent* advance, the Company did not procure the material within 18 months.
- Absorbing the loss as a 'good gesture' was not in order as the customer, in addition to, disallowing the claim also levied liquidated damages on delayed deliveries in line with contractual provisions.

Thus, delay in procurement of raw material led to non-recovery of price escalation of ₹ 15.52 crore and consequent delay in supplies resulted in levy of LD of ₹ 1.47 crore.

The matter was reported to Ministry of Defence (May 2014); their reply was awaited (October 2014).

**New Delhi**  
**Date: 01 December 2014**

  
**(PARAG PRAKASH)**  
**Director General of Audit**  
**Defence Services**

**Countersigned**

**New Delhi**  
**Dated: 01 December 2014**

  
**(SHASHI KANT SHARMA)**  
**Comptroller and Auditor General of India**

## ANNEXURE-I

(Referred to in Paragraph 1.9)

## Position of outstanding ATNs

## Ministry of Defence - excluding Ordnance Factory Board

## (i) Pending for more than ten years

Sl.No.	Report No. and Year	Para No.	Subject
1.	No. 2 of 1989	11**	Purchase and licence production of 155mm towed gun system and ammunition
2.	No.12 of 1990	9**	Contract with Bofors for (a) purchase and licence production of 155mm gun system and (b) Counter Trade
3.	No.8 of 1991	10*	Procurement of stores in excess of requirement.
4.		13*	Central Ordnance Depot, Agra.
5.	No.8 of 1992	20**	Procurement of sub-standard goods in an Ordnance Depot.
6.		28**	Avoidable payment of maintenance charges for Defence tracks not in use.
7.		29*	Import of mountaineering equipment and sports items
8.		31*	Avoidable payment of detention charges
9.	No. 7 of 1997	18**	Management of Defence Land
10.		23**	Avoidable expenditure on Demurrage charges
11.		27**	Non-realisation of claims from the Railways.
12.	No. 7 of 1998	32*	Infructuous expenditure on procurement of substandard cylinders
13.		36**	Procurement of batteries at higher rates

Sl.No.	Report No. and Year	Para No.	Subject
14.	No. 7 of 2001	15**	Procurement of an incomplete equipment
15.		32**	Wrongful credit of sale proceeds of usufructs to regimental fund
16.	No.7A of 2001	@Entire Report (ATN for 8 out of 42 paras yet to be received even for the 1 <sup>st</sup> time)	Review of Procurement for OP VIJAY(Army)
17.	No. 6 of 2003	2**	Exploitation of Defence lands
18.		14*	Irregular recruitment of personnel
<b>(ii) Pending more than 5 years upto 10 years</b>			
19.	No. 6 of 2004	3.2*	Recoveries/Savings at the instance of Audit.
20.	No. 6 of 2005	3.2*	Recoveries/savings at the instance of Audit
21.	Report No. 4 of 2007	3.3**	Unauthorized use of Defence assets and public fund for running educational institutes
22.		3.5*	Recoveries/savings at the instance of Audit
23.		6.2**	Irregular payment of counter insurgency allowance
24.	Report No. PA 4 of 2008 (Performance Audit)	Chapter I**	Supply Chain Management of General Stores and Clothing in the Army
25.	Report No. CA 17 of 2008-09	2.7*	Non-renewal of lease of land occupied by Army Golf Club
26.		3.4*	Unauthorized use of A-1 Defence land by Army Welfare Education Society
27.		3.5*	Utilisation of Government assets for non-governmental purposes
28.		3.10*	Recoveries and savings at the instance of Audit
29.		4.1**	Irregular diversion of savings of a project for execution of new works

Sl.No.	Report No. and Year	Para No.	Subject
<b>(iii) Pending more than 3 years upto 5 years</b>			
30.	Report No. 12 of 2010-11	2.1**	Defective import of SMERCH Multi Barrel Rocket Launcher System
31.		3.2**	Irregular procurement of Punched Tape Concertina Coil
32.		3.6*	Recoveries and savings at the instance of Audit
33.		4.1**	Irregular sanction and construction of accommodation for a Golf Club
34.		4.3**	Additional expenditure on execution of a work due to indecision by the users
35.	Report No. 6 of 2010-11 (Performance Audit)	Standalone Report***	Supply Chain Management of Rations in Indian Army
36.	Report No. 14 of 2010-11 (Performance Audit)	Standalone Report***	Canteen Stores Department
37.	Report No. 35 of 2010-11 (Performance Audit)	Standalone Report*	Defence Estates Management
<b>(iv) Pending upto 3 years</b>			
38.	Report No. 11 of 2011-12 (Performance Audit)	Entire Report*	Special report on Adarsh Co-operative Housing Society, Mumbai
39.	Report No. 24 of 2011-12	2.5*	Deficient pre-despatch inspection
40.		3.1**	Extra expenditure due to acceptance of higher rates
41.		3.4**	Irregular de-hiring of house constructed on leased land
42.		3.8*	Avoidable expenditure due to rejection of a valid tender
43.		3.10**	Injudicious procurement of Tippers
44.		3.11**	Irregular payment to Civil Hired Transport Contractors
45.		3.13**	Procurement of defective spares from foreign vendor

Sl.No.	Report No. and Year	Para No.	Subject
46.		3.14*	Recoveries and savings at the instance of Audit
47.		5.2**	Non-completion of bridge after twelve years of sanction
48.	Report No.16 of 2012-13	2.1*	Loss of revenue on renewal of lease of Government land
49.		2.3*	Loss due to non-levy of licence fee on vehicles entering Cantonment Board Ahmednagar
50.		3.1*	Unauthorised use of defence assets and manpower for the benefit of Army Welfare Education Society
51.		3.3**	Failure of HQ Southern Command to Safeguard Defence land from commercial exploitation
52.		3.6*	Extra expenditure due to non-acceptance of reasonable L1 rates
53.		4.1*	Overpayment of water charges by Garrison Engineer Kamptee
54.		4.3**	Construction of sub standard bunkers
55.		4.4*	Extra payment to a contractor
56.	Report No. 18 of 2012-13	Entire Report*	Performance Audit of the Medical Establishments in Defence Services
57.	Report No. 30 of 2013	2.1*	Improper management of Defence land
58.		2.2***	Non-recovery of service charges from Railways
59.		2.3***	Non introduction of Air Conditioners in Tanks
60.		2.4***	Non synchronization of payments without corresponding progress of work
61.		2.5***	Absence of effective controls resulting in non recovery of outstanding dues
62.		3.1***	Acceptance of sub-standard stores without prior technical inspection from an unregistered and inexperienced firm
63.		3.2***	Holding of X-ray generators in stock for nine years

Sl.No.	Report No. and Year	Para No.	Subject
64.		3.3***	Loss due to non-maintenance of batteries
65.		3.4***	Avoidable expenditure on re-transportation of stores
66.		3.5*	Extra expenditure on account of provision of unauthorised strengthening measures in buildings
67.		3.6***	Unauthorised use of Defence accommodation
68.		3.7*	Recoveries, savings and adjustment in accounts at the instance of Audit
69.		4.1*	Avoidable extra expenditure of ₹1.03 crore due to acceptance of conditional contract
70.		4.2*	Poor planning resulting in suspension of work and damage to the Government property
71.		4.4*	Inadmissible payment of escalation charges to the contractors

\* Action Taken Notes examined by Audit but yet to be finalised by the Ministry in the light of Audit remarks – 32

\*\* ATNs vetted by Audit but copy of the finalised ATNs awaited from Ministry – 27

\*\*\* Action Taken Notes not received even for the first time - 11

@ Part ATN received – 01

**ANNEXURE-II**

(Referred to in Paragraph 2.1)

**Year wise target and actual achievement towards indigenization of TATRA vehicles**

Year	No. of vehicles to be produced	Supply Orders placed on BEML ( for No of vehicle)	No. of Vehicles actually produced	Cumulative percentage of indigenisation to be achieved	Cumulative percentage of indigenisation actually achieved
1986-87	80	0	-	10	Nil
1987-88	200	80	86	20	5.06
1988-89	250	130	142	40	15.14 <sup>1</sup>
1989-90	250	190	191	61	23.07
1990-91	250	100	104	86	29.35
1991-92		26	1		29.35
1992-93		22	7		31.35
1993-94		119	7		40.00
1994-95		24	146		
1995-96		121	55		
1996-97		138	143		
1997-98		48	128		
1998-99		304	159		
1999-2000		699	326		
2000-01		729	509		
2001-02		1864	606		
2002-03		296	1082		
2003-04		163	900		
2004-05		285	289		
2005-06		1125	257		

<sup>1</sup> The percentage of small items not indicated separately but included in cumulative *per cent*.



<b>Year</b>	<b>No. of vehicles to be produced</b>	<b>Supply Orders placed on BEML ( for No of vehicle)</b>	<b>No. of Vehicles actually produced</b>	<b>Cumulative percentage of indigenisation to be achieved</b>	<b>Cumulative percentage of indigenisation actually achieved</b>
2006-07		103	181		33.00
2007-08		33	754		33.00
2008-09		83	409		44.00
2009-10		843	438		47.50
2010-11		243	541		62.50
2011-12		427	223		62.50
2012-13		Nil	208		62.50
2013-14		Nil	50		
<b>Total</b>		<b>8195</b>	<b>7942</b>		

**ANNEXURE-III**

(Referred to in Paragraph 2.5 )

**Statement showing the details of excess payment of rent to the land owners for land falling under Poonch Municipal Council**

<b>Sl. No.</b>	<b>Period</b>	<b>Payment made (₹)</b>	<b>Payment due (₹)</b>	<b>Excess payment (₹)</b>
1.	16.2.2008 to 31.3.2008 (45 days)	5,70,632	2,10,665	3,59,967
2.	01.04.2008 to 30.09.2008	1,39,82,624	69,91,320	69,91,304
3.	01.10.2008 to 31.03.2009	1,39,82,624	69,91,320	69,91,304
4.	01.04.2009 to 30.09.2009	1,39,82,624	69,91,320	69,91,304
5.	01.10.2009 to 31.03.2010	1,39,82,624	69,91,320	69,91,304
	<b>Total</b>	<b>5,65,01,128</b>	<b>2,81,75,945</b>	<b>2,83,25,183</b>

## ANNEXURE-IV

(Referred to in paragraph 6.1 )

Number and Cost of projects undertaken by VRDE and CVRDE during the period from 1<sup>st</sup> April 1998 to 31<sup>st</sup> March 2013 including projects in hand as on 1<sup>st</sup> April 1998

(₹ in crore)

Name of the Lab	Total Projects Sanctioned				Projects closed				Ongoing projects			
	Staff projects	Sanctioned Cost	TD/R&D Projects	Sanctioned Cost	Staff projects	Exp incurred	TD/R&D Projects	Exp incurred	Staff projects	Sanctioned Cost	TD/R&D Projects	Sanctioned Cost
VRDE	12	46.51	41	279.04	09	22.45	36	100.23	03	20.82	05	168.03
CVRDE	5	116.33	29	458.34	02	7.28	20	171.96	03	106.58	09	267.29
<b>Total</b>	<b>17</b>	<b>162.84</b>	<b>70</b>	<b>737.38</b>	<b>11</b>	<b>29.73</b>	<b>56</b>	<b>272.19</b>	<b>06</b>	<b>127.40</b>	<b>14</b>	<b>435.32</b>

Source: Compiled from Project Sanctions and data furnished by VRDE and CVRDE.

## ANNEXURE-V

(Referred to in paragraph 6.2 )

**Details of Closed Staff and TD / R&D Projects at VRDE Ahmednagar and CVRDE, Avadi from April 1998 to 31<sup>st</sup> March 2013**

Sl. No.	Project No. & Nomenclature	Remarks
1	Development of Surface to Surface Multi Barrel Rocket System(MBRS) – (SL-PX-87/VRD-W9.08)	VRDE
2	Development of variants on BMP-2 – (SL-PX-90/VRD-F15.01)	VRDE
3	Development of Two-Stroke light weight engine for Remotely Piloted Vehicle - (SL-PX-93/VRD.04 (ADE 176.06))	VRDE
4	Dev of Bridge Assault Mech. Launched - (SL-PX-93/ VRD.03)(RDE-378.01)	VRDE
5	Development of Vehicles and Shelters for CSD Entities of Programme – “Samyukta” – (SL-PX-94/DLR-190/V)	VRDE
6	Development of Undercarriage System - SL-PX-2k/VRD-40(ARD 1148.02)	VRDE
7	DRDO-Army Biodiesel Programme. Performance Evaluation of Bio-Diesel in Defence Vehicles – (SL-P1-07/DAR-71)	VRDE
8	Loader Cum Replenishment (LCR) vehicle for Project PINAKA – (MM-2010/VRD-01(V))	VRDE
9	Development of BMP Urban Survival Kit(BUSK) – (MM-2011/VRD-02(V))	VRDE
10	Development of 155mm SP Gun System (BHIM T6) - (SL-PX-98/VRD-212)	CVRDE
11	Development of Carrier Command Post Tracked on BMP-II (CCPT) - (SL-PX-05/CVR-228)	CVRDE
12	Design & Development of Extra long multi Axled transporter – (RD-P1-92/VRD-02)	VRDE
13	Trials & Evaluations of Vehicles & Systems – (RD-P1-93/VRD-05)	VRDE
14	Development of Advanced Instrumentation for Vehicle & Engine Testing – (RD-P1-94/VRD.11)	VRDE
15	Design & Development of Articulated Extra Long Transporter. - (RD-P1-95/VRD.13)	VRDE
16	Technology Development of Petrol Vehicles to Operate on CNG. – (RD-PX-97/VRD.21)	VRDE
17	Technology Development of Electronic Controller for Battery Powered Vehicle Application – (RD-P1-97/VRD-22)	VRDE
18	Technology Development of Traction Motor for Battery Powered Vehicle Application – (RD-P1-97/VRD-23)	VRDE
19	Technology Development of Battery Charger for Battery Powered Vehicle Application – (RD-P1-97/VRD-24)	VRDE
20	Development of Vehicular Technology for High Altitude Turbo-charging of Engine & Cab Heating Demisting Device & Winterisation Kit - (RD-PX-97/ VRD-26)	VRDE
21	Technology Development of Under Carriage for 30 mm Towed Light AD Gun – (RD-P1-97/VRD-27)	VRDE
22	Development of High Speed Crankshaft for High Specific Power Engine – (RD-P1-97/VRD-29)	VRDE
23	Design & Development of Under Carriage for 30mm , light, towed, Air Defence Gun - (RDS-PX-97/ARD-1080.01(VRD-28)	VRDE
24	Preparation of Full Scale Mock-up of Futuristic ICV – (RD-PX-97/VRD-30)	VRDE
25	Technology Development of Light Weight Bullet Proof Vehicle – (RD-PX-98/VRD-31)	VRDE
26	Development of Hybrid Electric Vehicle – (RD-PX-98/ VRD-32)	VRDE
27	Development of Futuristic Infantry Combat Vehicle - (RDS-P1-98/ VRD.34)	VRDE
28	Up-gradation of Existing Mobile Decontaminating System. - (RD-P1-98/ VRD-36)	VRDE
29	Preparation of Documents of Mobile Decontaminating System & Launcher Trailer for CLMC(V) - (RD-P1-98/ VRD-37)	VRDE
30	Integrated Transfer of Technology - (RD-P1-99/ VRD-39)	VRDE
31	Feasibility Study of Unmanned Ground Vehicle – (RD-P3-01/VRD-41)	VRDE
32	Design, Development & Fabrication of Two numbers of bullet Proof Vehicles(BPV) – (RDR-PX-02/VRDE-42(PXE-1156))	VRDE
33	Development of Trailer Mounted Container for LASER Interferometer - (RDR-PX-02/ VRD-1135.01)	VRDE

34	Development of Rotary Engine – (RDR-PX-02/VRD-43)	VRDE
35	Development of Technologies for Combat Vehicle Systems - (RD-P1-02/ VRD-44)	VRDE
36	To Provide Collapsible Tarpaulin System on Vehicles as well as Digitalisation of Drawing & Documents - (RDS-PX-03/ ARD-1176.01 - (VRD-45)	VRDE
37	Development of Unmanned Ground Vehicle (UGV) - (RDR-P1-04/ VRD-46)	VRDE
38	Bullet Proof Light Vehicles – (S&T-PX-06/VRD-47)	VRDE
39	Electronic Fuel Injection System (EFIS) for two stroke engines – (TD-P1-06/VRD-49)	VRDE
40	<b>Development of Mobile Trailer Platform &amp; Vibration Isolation System for Laser Beam Director System, (Aditya)</b> – (LASTEC-CDC-3(253)- 07/VRDE)	VRDE
41	Design & Development of Mobile Shelter for B/C contamination Analysis station – (RD-P1-08/Sub.Proj-DRDE-187/02)	VRDE
42	Design of Operator Control Unit - (TD-08/RDE-405.01)	VRDE
43	Development of Enabling Technologies for Futuristic Infantry Combat Vehicle(GSQR 1053) – (TD-08/VRD – 50)	VRDE
44	Development of Advanced Hydraulic and Allied systems for improved dozing and floatation capabilities in BMP-2 class vehicles. – (TD-10/VRD – 53)	VRDE
45	Design and Development of Anti Terrorist Vehicle. – (TD-10/VRD – 54)	VRDE
46	Study & Experimentation on Micro Unmanned Aerial Vehicle (MUAV) for Deployment in high altitude – (TD-2010/VRDE–LIC - 11)	VRDE
47	Development of Mine Protected Vehicle (MPV) – “KAVACH” - (TD-2010/ VRDE-LIC-14)	VRDE
48	Preparation of Production drawings for Combat Improved Ajeya tank - (RDS-PX-96/VRD-205)	CVRDE
49	Technology Transfer for productionisation BMP II variants - (RDS-PX-96/VRD-206)	CVRDE
50	Improvements to system MBT Arjun - (RDS-PX-1997/VRD-208)	CVRDE
51	Documentation, preparation to assist productionisation of MBT-Arjun - (RDS-PX-1997/VRD-209)	CVRDE
52	Manufacture and integration of power booster conversion kits on T-72 base engine and vehicle trials - (RDS-PX-1997/VRD-211)	CVRDE
53	Development of Electro Hydraulic Gun Control Systems(GCS) - (RDS-PX-07/CVR-213)	CVRDE
54	Design and development of Arjun derivative chassis automotive system for basic launching vehicles for bridge laying system Arjun based side launch - (RDS-PX-99/RDE/85/VRD-214)	CVRDE
55	Gunnery Arjun Part Task Training Simulator - (RDS-PX-2000/VRD-215)	CVRDE
56	Integrated Future Combat System(IFCoS) development programme-Definition phase - (RDS-PX-2000/VRD-216)	CVRDE
57	Development of Core Technology for Armoured Fighting Vehicles(AFVs) - (RDS-PX-2000/VRD-217)	CVRDE
58	Indigenisation of sub-systems for AFVs - (RDS-PX-2000/VRD-219)	CVRDE
59	Sealing of Production drawings for Carrier Mortar Tracked (RDS-PX-2000/VRD-221)	CVRDE
60	Demonstration of Missile firing capability for MBT-Arjun - (RDS-PX-2002/VRD-223)	CVRDE
61	Development of air craft bearings - (RDS-PX-2002/VRD-224)	CVRDE
62	Armoured Fighting Vehicles Technology transfer from DRDO to OFB/PSUs/DGQA/EME and users - (RDS-PX-2003/VRD-225)	CVRDE
63	Development of Experimental Tank - (RDS-PX-2003/VRD-226)	CVRDE
64	Development of Integrated Arjun Simulator - (RD-PX-2004/CVR-227)	CVRDE
65	Development of Defensive Aid System for AFVs - (RD-PX-05/CVR-229)	CVRDE
66	Development of Arjun Recovery & Maintenance System (ARMS-WZT-3) - (RDS-PX/07/CVR-230)	CVRDE
67	Development of advanced chassis and automotive system - (TD-10/CVR-236)	CVRDE

**ANNEXURE-VI**

(Referred to in paragraph 7.2.1)

**(i) Comparison of Rules & Guidelines for Defence Grants-in-Aid Scheme of DER&IPR and Research Boards**

<b>Subject Matter</b>	<b>Directorate of ER&amp;IPR</b>	<b>Life Sciences Research Board</b>	<b>Armament Research Board</b>	<b>Aeronautics Research Board</b>	<b>Naval Research Board</b>
<b>Year of Formation</b>	<b>Formed in May 2000</b>	<b>Formed in March 1998</b>	<b>Formed in March 1997</b>	<b>Formed in February 1971</b>	<b>Formed in August 1996</b>
Scrutiny of project proposals, recommending the project for sanction, review of progress and evaluation of closure report and recommending project closure	Project proposals are scrutinized and recommended by the labs Specialized in the particular field. Only high value project costing more than ₹ 50 lakhs is evaluated by the committee created for it	Project proposals are scrutinized and recommended by the Panel	Project proposals are scrutinized and recommended by the Panel	Project proposals are scrutinized and recommended by the Panel	Project proposals are scrutinized and recommended by the Panel
Overhead Charges provided in the project sanction	Not mentioned	Not mentioned	15 % of the total cost of project subject to maximum of ₹ 5.00 lakhs	10% of the total cost of project subject to maximum of ₹ 1.00 lakh	Up to 20% of total cost of project subject to maximum of ₹ 5.00 lakh
Date of commencement Of the project	Date of receipt of first installment of the grant	Date of sanction of the project	Date of receipt of first installment of the grant	Date of receipt of first installment of the grant	Date of receipt of first installment of the grant

Time schedule for submission of project closure report	Within 60 days from the date of completion of project	Within 3 months from date of completion of project	Within 60 days from the date of completion of project	Within 60 days from the date of completion of project	Within 90 days from date of completion of project
Preparation of Compendium of the completed projects	The compendium of the completed projects is prepared.	The compendium of the completed projects is prepared.	The compendium of the completed projects is not prepared.	The compendium of the completed projects is prepared in the form of Annual Report.	The compendium of the completed projects is not prepared.

(ii) **Comparison of procedure for sanctioning of projects adopted by DER&IPR and Research Boards**

<b>Subject matter</b>	<b>Directorate of ER&amp;IPR</b>	<b>Life Sciences Research Board</b>	<b>Armament Research Board</b>	<b>Aeronautics Research Board</b>	<b>Naval Research Board</b>
	<b>Formed in May 2000</b>	<b>Formed in March 1998</b>	<b>Formed in March 1997</b>	<b>Formed in February 1971</b>	<b>Formed in August 1996</b>
Data-base of the project proposals received during the year	No data-base is maintained	The data-base of project proposals received during the year is maintained	No data-base is maintained	No data-base is maintained	No data-base is maintained
Sanctioning of projects	Based on the recommendations of the lab(s), the project is sanctioned by the CFA in DER&IPR / DRDO HQ.	Based on the recommendations of the Panel, the project is sanctioned by the CFA in LSRB / DRDO HQ.	Based on the recommendations of the Panel, the project is sanctioned by the CFA in ARMREB / DRDO HQ.	Based on the recommendations of the Panel, the project is sanctioned by the CFA in AR&DB / DRDO HQ.	Based on the recommendations of the Panel, the project is sanctioned by the CFA in NRB / DRDO HQ.



(iii) Comparison of procedure for budget formulation adopted by DER&IPR and Research Boards

(Major Head 2080, Minor Head 004-Research/R&D)

Subject matter	Directorate of ER&IPR (Code Head 852/06)	Life Sciences Research Board (Code Head 852/05)	Armament Research Board (Code Head 852/04)	Aeronautics Research Board (Code Head 852/02)	Naval Research Board (Code Head 852/03)
Budget formulation and forecasting	The budget is formulated and based on ongoing projects and projected for next year with an estimated 10-15% revision	Initially the budget was predetermined as ₹ 1.00 crore. Over a period of time, keeping in view the number of projects received and fund requirement for ongoing projects, the budget was gradually enhanced	The budget formulation/forecast depends upon previous commitments under sanctioned projects, project proposals considered as well as potential project proposals likely to be recommended by the Panels	The budget forecast is formulated by taking into account already sanctioned & running projects and project proposals under consideration of Specialist Panels	The budget is formulated based on current ongoing projects and projected for next year with an approximate 10-15% revision
Whether budget forecast is related to thrust areas of research	The budget projection is related to the thrust areas of research	The budget is not projected as related to Annual Plan, however, projects are considered keeping in view the thrust areas of research	The budget projection is related to the thrust areas of research	The budget forecast factors the expected outgo for thrust areas of research	The budget projection is related to the thrust areas of research

## ANNEXURE-VII

*(Referred to in paragraph 7.2.2)*

**Showing details of increase/decrease in projection/allotments of funds over that of previous year(s)**

*(₹ in crore)*

Sl No	Name of the Board / Dte	2007-08		2008-09			2009-10			2010-11			2011-12			2012-13		
		Allot	Exp	Allot	Exp	% Increase / decrease over previous year's allotment	Allot	Exp	% Increase / decrease over previous year's allotment	Allot	Exp	% Increase / decrease over previous year's allotment	Allot	Exp	% Increase / decrease over previous year's allotment	Allot	Exp	% Increase / decrease over previous year's allotment
1	AR&DB	6.50	6.23	7.50	7.50	15	9.55	7.96	27	18.36	18.37	92	40.78	36.51	122	19.27	18.01	(-)53
2	NRB	10.00	9.78	10.00	9.78	0	7.70	7.51	(-) 23	3.90	3.88	(-)49	11.00	10.98	182	11.66	11.57	06
3	ARMREB	1.10	1.03	2.00	1.43	82	3.50	3.01	75	4.04	3.88	15	3.25	2.37	(-)20	2.80	2.35	(-)14
4	LSRB	4.00	4.36	10.00	9.45	150	11.00	10.35	10	11.35	11.00	03	7.00	6.78	(-)38	2.94	3.45	(-)58
5	ER&IPR	32.90	32.50	30.00	29.81	(-) 9	25.00	23.99	(-)17	36.50	36.48	46	46.00	44.10	26	50.00	49.83	9
	<b>Total</b>	<b>54.50</b>	<b>53.90</b>	<b>59.50</b>	<b>57.97</b>		<b>56.75</b>	<b>52.82</b>		<b>74.15</b>	<b>73.61</b>		<b>108.03</b>	<b>100.74</b>		<b>86.67</b>	<b>85.21</b>	

*Source: Data/details provided by DRDO*

## ANNEXURE-VIII

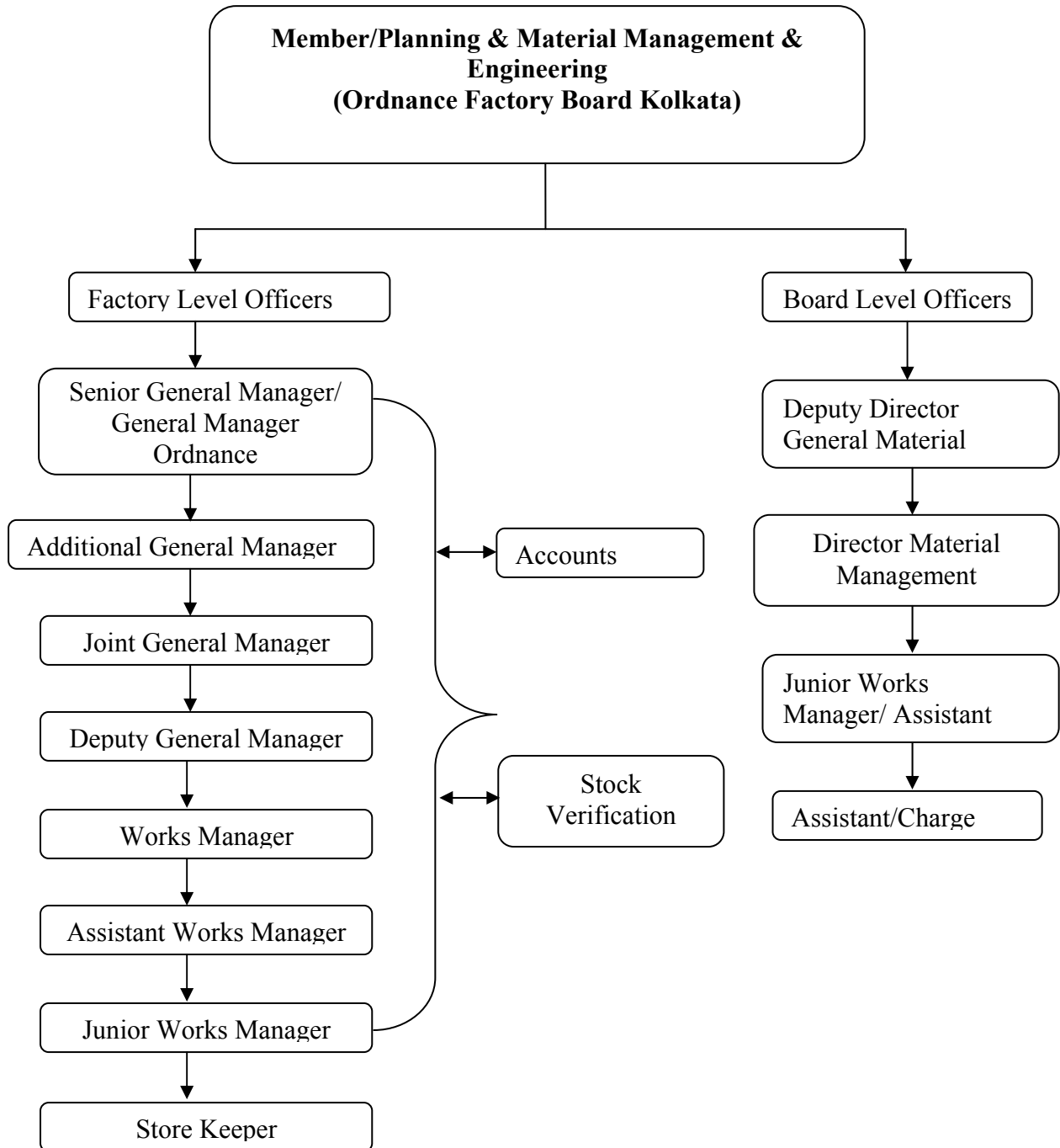
(Referred to in paragraph 7.3)

## Details of creation of DRDO Chairs and DRDO Fellowships

Name of the Chairperson (Chair / Lab)	Date of Sanction	Amount Released (₹ in lakh)	Area of research given to the Chairperson	Audit remarks
Dr. Kota Harinarayana (Dr. D.S.Kothari Chair/ADA, Bangalore)	December 2010	March, 2011 (₹27.69 lakh) March 2012 (₹24.43 lakh) March 2013 (₹23.55 lakh)	a) Advisor on technology development b) Review of new projects on unmanned vehicles, new generation regional aircraft, product improvements for LCA variants and indigenisation program, etc. c) Participate along with DRDO labs' team in development of system engineering studies, and integrated vehicle health management technology, etc.	i) Dr. Kota Harinarayana, Vice Chancellor of University of Hyderabad was awarded chair at ADA, Bangalore. ii) The chairperson had furnished unaudited Annual Accounts and Utilization Certificate. iii) The interest earned on the funds had not been reflected in the Annual Accounts. iv) No income tax has been deducted while making payment of honorarium to the chairperson.
Dr. S.K.Salwan (Dr. B. D. Nagchaudhari Chair/SPIC, Delhi)	January 2011	May, 2011 (₹27.69 lakh)	a) Advisor for threat assessment and analysis, technology forecasting and matching and evolving war doctrines. b) Review of Design and Development of Artillery Gun and Gun system of Pinaka variants, futuristic tank gun and ammunition and other indigenization gun & ammunition programme. c) Research in (i) forecasting and evolving development of strategy for technologies needed for defence of country in next two decades (ii) technology needs for development of weapon system and its integration in futuristic war scenarios (iii) futuristic warhead technologies for missiles/anti-missile applications.	i) Dr. S.K.Salwan was the Chairman of Armament Research Board of DRDO and he was also offered a Chair at SPIC which indicates conflict of interest. ii) Out of Grant of ₹ 27.69 lakh, an expenditure of ₹ 21.43 lakh was incurred which included ₹ 21.05 lakh on honorarium and travel of the Chairperson. iii) No Research scholars were appointed during the currency of project. iv) The project was short closed one year before expiry of PDC of project i.e. May 2014. v) The interest accrued on the funds had not been reflected in the Accounts. vi) The income tax had not been deducted and remitted to Income Tax Department while making payment of honorarium to the Chairperson.
Dr. P.S.Goel (Prof. M G K Menon Chair/RCI, Hyderabad)	March 2012	June 2012 (₹27.68 lakh)	a) Mentor Kautilya (ELINT) program and to build capacity to develop satellite technology base at RCI, payloads at DLRL, etc. b) Mentor satellite on demand capability in DRDO including building satellite and payload at RCI and other labs. c) Mentor space security directorate (to be created at DRDO HQ) for addressing issues like Satellite Based Surveillance Program and Communication for Defence, etc. d) In addition, SA to RM may utilize his expertise from time to time in other areas relevant to DRDO.	i) Unaudited Annual Accounts / Utilisation Certificate were furnished by the Chairperson which resulted in non-release of second installment to chairperson. ii) Though one year of project had been completed but no project report or project review had been carried out so far.

**ANNEXURE-IX**

(Referred to in paragraph 8.2.1)



## ANNEXURE-X

(Referred to in paragraph 8.2.9.1)

Statement showing budget estimate *vis a vis* actual expenditure on stores

(₹ in crore)

Factory	2010-11				2011-12				2012-13			
	<u>BE</u>	<u>Actual Expenditure</u>	<u>Variation (AE-BE)</u>	<u>Percentage of variation</u>	<u>BE</u>	<u>Actual Expenditure</u>	<u>Variation (AE-BE)</u>	<u>Percentage of variation</u>	<u>BE</u>	<u>Actual Expenditure</u>	<u>Variation (AE-BE)</u>	<u>Percentage of variation</u>
OKAT	60.10	41.21	- 18.89	-31.43	130.20	159.33	29.13	22.37	143.22	134.31	-8.91	-6.22
MSF	63.78	64.85	1.07	1.68	72.20	92.78	20.58	28.50	71.04	111.70	40.66	57.24
MTPF	29.89	16.03	-13.86	-46.37	32.34	34.35	2.01	6.22	45.33	30.95	-14.38	-31.72
OFAJ	261.18	266.46	5.28	2.02	334.10	288.99	-45.11	-13.50	311.53	252.00	-59.53	-19.10
GSF	147.15	74.10	-73.05	-49.64	206.40	157.36	-49.04	-23.76	199.95	156.97	-42.98	-21.50
HVF	2140.32	1594.92	-545.40	-25.48	707.98	862.97	154.99	21.89	945.86	703.70	-242.16	-25.60
OFMK	282.61	270.70	-11.91	-4.21	307.10	382.50	75.4	24.55	323.18	342.85	19.67	6.08
OLFD	618.15	168.64	-449.5	-72.72	288.62	379.39	90.77	31.45	155.76	291.10	135.34	86.89
OFD	28.38	17.7	-10.68	-37.63	22.08	14.04	-8.04	-36.41	26.25	32.22	5.97	22.74
<b>Total</b>	3631.56	2514.61			2101.02	2371.71			2222.12	2055.80		

## ANNEXURE-XI

(Referred to in paragraph 8.2 9.1)

## Statement showing rush of expenditure in the last quarter/last month

Factory	2010-11			2011-12			2012-13		
	AE (₹ in crore)	Last quarter Expenditure (in per cent)	Last month Expenditure (in per cent)	AE (₹ in crore)	Last quarter Expenditure (in per cent)	Last month Expenditure (in per cent)	AE (₹ in crore)	Last quarter Expenditure (in per cent)	Last month Expenditure (in per cent)
OFKAT	41.21	47.74	14.30	159.33	29.22	14.82	134.31	32.07	11.88
MSF	64.85	31.98	14.65	92.78	30.81	8.06	111.70	18.93	7.73
MTPF	16.83	31.26	35.06	34.35	32.67	15.23	31.19	33.32	8.87
OFAJ	266.46	30.50	10.60	288.99	28.63	7.26	252.00	24.36	7.51
GSF	74.10	34.43	10.09	157.61	54.39	10.02	156.97	26.13	11.28
HVF	1594.92	53.91	17.65	862.97	57.40	21.10	703.70	37.02	9.66
OFMK	270.70	49.69	31.08	382.50	47.53	29.27	342.85	20.30	8.21
OLF	168.64	42.71	20.06	379.39	67.42	29.98	291.10	30.24	21.25
OFD	17.70	61.41	42.21	14.04	43.03	26.79	32.22	56.38	41.92

## ANNEXURE-XII

(Referred to in paragraph 8.2.9.4)

## Stores in excess of authorised limit

Factory	Stores in hand as of 31 <sup>st</sup> March 2013 * (₹ in crore)	Consumption of stores during the year * (₹ in crore)	Monthly consumption of stores during the year <sup>1</sup> (₹ in crore)	Norms for holding	Holding in terms of number of months	Excess holding in terms of months	Value of excess holding. (₹ in crore)
1	2	3	4	5	6 (2/4)	7 (6-5)	8 (7*4)
OKAT	103.52	184.47	15.37	4.0	6.7	2.7	42.00
MSF	62.85	111.78	9.32	4.0	6.7	2.7	25.60
MTPF	21.70	50.01	4.17	4.0	5.2	1.2	5.00
OFAJ	253.24	379.88	31.66	4.0	8.0	4.0	126.60
GSF	195.95	237.07	19.76	4.0	9.9	5.9	116.90
Total: A	637.26	936.21	80.28				316.10
HVF	1,197.53	1,648.00	137.33	6.0	8.7	2.7	373.50
OFMK	374.56	456.16	38.01	6.0	9.9	3.9	146.50
OLFD	193.33	391.07	32.59	6.0	5.9	-0.1	-2.20
OFD	22.57	30.26	2.52	6.0	9.0	3.0	7.40
Total: B	1,868.27	2,525.49	210.45				525.20
Grand total: (A+B)	2,425.25	3,488.70	290.73				841.30

\* Source: Printed Annual Accounts for the year 2012-13.

<sup>1</sup> Consumption of stores during the year (column 3) / 12 months



## ANNEXURE-XIII

(Referred to in paragraph 8.2.9.5)

## Cases of excess holding of Stores-in-hand

Sl. No	Reason for holding	Factory	Brief of the case
1	Cancellation or short-closure of orders mainly due to slippages in production	HVF	<p>Army's order for supply of 1380 tanks was scheduled to be completed by 2002. However, the production schedule got delayed by five years to 2007. Army foreclosed the indent due to slippages in production as well as poor quality of the product by HVF. This resulted in holding 8530 original equipment (OE) items valuing ₹ 161.28 crore since 2007. Board stated (September 2014) that Army foreclosed the Indent due to their operational requirement to induct State of the Art technology Tanks. Further, 8530 Original Equipment (OE) items valuing ₹ 161.28 crore pertain to T-72 Tank, which are not obsolete. The same would be drawn and consumed during production of Bridge Layer Tank and Trawl Tanks.</p> <p>Reply is not acceptable because efflux of time by five years from 2002 to 2007 was a factor leading to changed operational requirement and consequent foreclosure of order by Army. Further, even after non-utilization of 8530 nos. of T-72 OE items during last seven years, the management could not indicate a time bound programme for utilization of the same.</p>
2		MTPF	<p>In order to meet an order under Inter-Factory Demand from OFMK, 2504 numbers of forging for track shoe valuing ₹ 0.19 crore was procured between October 2005 and May 2006 and were lying in MTPF since then. It was seen that the IFD on MTPF had been short closed.</p> <p>Board stated (September 2014) that track shoe forgings would be utilised in the production of Infantry Combat Vehicle (BMP) at OFMK during 2014-15.</p>
3			<p>MTPF procured 132.70 Kgs of loctite between February 2010 and August 2011 valuing ₹ 0.13 crore. The store was required for manufacture of 84 mm Tracer Path Target (TPT). Since the pilot sample of 84 mm TPT was not confirmed in the trials, the manufacture of the item was suspended. It was seen that the stock of earlier procurement had expired its shelf-life in January 2012 and the fresh procurement made in the year 2011-12 had since also expired its shelf life and lying in the factory stock awaiting disposal thereon.</p> <p>Board stated (September 2014) that the store could not be utilized before the expiry date due to non-receipt of Bulk Production Clearance of 84 mm TPT; however is being utilized for maintenance, carpentry shop and Bar Mill section.</p> <p>The reply of the Board is contradictory as the store had already expired its shelf life and the utilisation of the store is questionable.</p>
4			<p>105 numbers of band forging valuing ₹ 0.21 crore were procured for manufacture of hydraulic coupling. As Machine Tool Prototype Factory (MTPF) failed to manufacture the item, the store was lying in stock without any use. The failure of MTPF to complete production targets contributed to the holding of band forging valuing ₹ 0.21 crore. Board stated (September 2014) that disposal action had been initiated for the store as a serviceable surplus.</p>

5			<p>163 numbers of electro magnet valuing ₹ 0.32 crore, 64 numbers of synchro resolver valuing ₹ 0.31 crore and 50 numbers of electro motor valuing ₹ 0.58 crore required for code 94 assembly ( tank item) was procured between February 2008 and June 2009, October 2007 and May 2010 and May 2008 and July 2009 respectively. Code 94 was yet to be supplied by MTPF.</p> <p>Board stated (September 2014) that the factory is consuming the item in part quantities for manufacture and supply of the sub-assemblies as per HVF's production plan.</p> <p>Board, however, did not specify any reason for non-utilization of the item for the last four years along with reasons for part utilization.</p>
6		<b>MTPF</b>	<p>During January 1997 - March 1999, 6097 sheets of stainless steel maraging strip valuing ₹ 1.71 crore procured for manufacture of Cluster Bomb were lying for more than a decade.</p> <p>Board stated (September 2014) that the orders were suspended by the consignee factories and items were offered under Mutual Aid Scheme (MAS) but no positive response was observed. Finally item had been cleared for disposal under surplus.</p> <p>Storage of materials without any tangible results from MAS indicates lack of inventory control and disposal of store.</p>
7		<b>MSF</b>	<p>Mention was made in Audit Para 7.2 under Audit Report No6 of 2004 regarding production of 9638 MT of different types of steel blooms and billets at a total cost of ₹ 22.66 crore over a period of time at the Bar Mill section. But the items could not be utilized due to mismatch between the stock and outturn orders and also due to gradual shortage of load. These items were stored in the open yard and exposed to the vagaries of nature over the years due to which they became rusted and lost their identity. These were converted as steel scrap mixed billets and blooms of 7252.91 MT and taken on charge at a value of ₹ 18.95 crore and accounted for against a new folio (bin card) in November 2012. However, store was lying unutilized as of March 2013.</p> <p>Response of the Board was awaited (September 2014).</p>
8	<b>Excess stores due to quality problems</b>	<b>GSF</b>	<p>Steel Sheet is required for manufacture of various parts of 81mm Base Plate Assembly. GSF placed a supply order in March 2012 on M/s MIDHANI Ltd. Hyderabad for supply of 14,884 Kgs steel sheets at a cost of ₹ 2.76 crore. GSF received 14,884 Kgs of steel sheet between July 2012 and Sept 2012. During quality checking by GSF, it was observed that thickness variation in various sheets apart from low thickness than a specified one (thickness variation had been observed from 2.46 mm to 2.91 mm). Subsequently, SQAE stated (March 2013) that they had observed low thickness of 2.77 mm +/- 0.22 mm. Although GSF communicated the matter to M/s MIDHANI in March/April 2013, but no response from them was received. The Controller of Quality Assurance (Weapons) Jabalpur [CQA(W)] during his visit on 01 March 2013 had directed that GSF should identify new suppliers in the country who can supply correct raw materials plates of uniform thickness in order to ensure smooth production of the critical assembly in future. Only 2990.862 Kg of steel sheet was drawn by shop during 2012-13. Thus, GSF accepted 14,884 kg of defective store, 2991 kg was drawn by the shop during 2012-13 and 11,893 kg defective steel sheet valuing ₹ 2.07 crore was lying in stock as of March 2013.</p> <p>Board stated (September 2014) that the store supplied by the firm with minor deviations which was earlier rejected by the inspector was, however, accepted. Some parts of stores have since been utilized and the balance stores would be utilized during 2014-15.</p>

			Reply of the Board was not acceptable because instead of claiming for replacement, GSF had accepted a defective item from the supplier. Moreover, violation of directive of DGQA for stringent vigilance before accepting raw materials for critical assemblies was indicative of compromising with quality of final product.
9		<b>MTPF</b>	For manufacture of 84 mm TPT projectile for the first time, MTPF procured all stores required prior to bulk production clearance. As the stores procured did not meet the inspection standards' the production of 84 mm TPT was suspended resulting in stores valuing ₹ 0.56 crore procured for the item became surplus, till the BPC was issued. Factory management stated (December 2013) that the materials supplied by the firm were accepted based on the detailed inspection at the time of receipt in MTPF. Board (September 2014) stated that the material would be utilized in 2014-15 after establishing the product.
10		<b>GSF</b>	The factory had placed an IFD (October 2010) on Ordnance Factory, Ambajhari (OFAJ) for supply of 59,000 kg Aluminum Alloy Rod 35 dia for manufacture of body of empty fuze percussion DA5A. OFAJ offered (October 2010) Aluminium Alloy rod of 36 mm dia as against the IFD requirement of 35 dia. GSF, accordingly, cancelled the IFD for 35 mm dia. Aluminium Alloy Rod (December 2010) at nil quantity and placed two IFDs (December 2010 and March 2012) on OFAJ for Aluminium Alloy Rod 36 mm for 30,000 kg and 42,000 kg respectively. GSF received 72,000 kg of Aluminium Alloy Rod 36 mm dia valuing ₹ 2.70 crore during September 2011 and August 2013. The balance stood at 71,700 kg as of October 2013 after drawing meager quantity of 300 kg in January 2012. Thus, due to procurement of 36 mm dia rods instead of 35 mm dia rods 71,700 kgs of Aluminium Alloy Rod valuing ₹ 2.70 crore were lying unutilised as of March 2013. Board stated (September 2014) that as difficulties were faced in provisioning of Aluminium alloy rod of 34 mm dia from trade, so it was planned for procurement through IFD from OFAJ for Al alloy rod 36 mm dia. Board also stated that surplus stock of 36 mm dia would be consumed during 2014-15 and 2015-16 and no procurement action for the item was taken during 2014-15 and 2015-16. Reply of Board is not acceptable as the factory had been regularly procuring Al alloy rod of 34 mm dia from trade sources even during 2012-13 and used the same in production of the end store (84 mm TPT) during 2012-13. Unsuitability of the material for the production of the end store was the main reason for non utilization.
11		<b>MSF</b>	During the year 2009-10, 342 MT out of 382 MT of Steel flat valuing ₹ 3.41 crore for manufacture of 23mm schilka cartg case were lying for more than three years. Board stated (September 2014) that the production of 23 mm Schilka ammunition had been suspended based on the decision of the Indian Army. The existing inventory would be utilized after resolving technical problems and resumption of production.
12			During the year 1986-87, 4584 numbers of Finished cavity body valuing ₹ 0.32 crore were procured for manufacture of 81mm Bomb against GSF's IFD of November 1985. This item, after production (October 1986 and November 1986), was issued to GSF. However, GSF back loaded the same due to discrepancy on quality front, which was taken on charge by MSF and were lying in stock for the last 26 years. Board stated (September 2014) that the production of store had been discontinued for last several years and instructions would be issued to regularize the loss by raising loss statement.

13			During 2006-07, 9418 Nos of Cartridge Case valuing ₹ 1.71 crore issued to Ordnance Factory Badmal for manufacture of 30mm BMP-II were back loaded to the Metal and Steel Factory Ishapore (MSF) in August 2006. These items were lying in stock since its receipt at MSF. Board stated (September 2014) that regularization action will be taken by raising loss statement as per procedure.
14	Reduction of target	OFAJ	Copper Tube is required for production of 105 mm IFG shell. The factory was having 44,948 kg Copper Tube valuing ₹ 1.91 crore as of March 2014. Withdrawal of target by the Board for the year 2012-13 and 2013-14 resulted in overstocking of the material. Factory while admitting the fact stated (May 2014) the matter had been taken with Board/sister factory for allotment of target and utilization. Response of the Board was awaited as of September 2014.
15			Parted steel is required for production of 105 mm IFG HE. The factory was having 14478 nos of material valuing ₹ 1.81 crore as of March 2014. Withdrawal of target by the board for the year 2012-13 and 2013-14 resulted in overstocking of the material. Factory while admitting the fact stated (May 2014) the matter had been taken with Board/sister factory for allotment of target and utilization. Response of the Board was awaited as of September 2014.
16			Nose adopter is required for production of 125 mm shell HE1A. The factory was having 84254 Nose adopter valuing ₹ 34.45 crore as in August 2014. Withdrawal of target by the Board for the year 2012-13 and 2013-14 resulted in overstocking of the material. Factory while admitting the fact stated (May 2014) that the material would be utilized in subsequent years against which targets are available. Reply of the Board was awaited as of September 2014.
17	Supply chain problems	HVF	19 types of armour plates were imported (July 2007) from M/s Rosoboronexport under a Supplementary Agreement (SA). The armour plates were meant for production of T-90 Tanks. Out of 19 types of armour plates, two types <i>i.e.</i> Armour steel 60 (611.95 tonne) and 85 grade (215 tonne) valuing ₹ 18.99 crore were received in 2009. Due to non availability of thermo pressing facility by M/s BHEL, the armour plates could not be utilized and had thus become surplus. HVF, however, utilized 276.776 ton of the items between November 2009 and October 2012 and balance quantity of 550.174 ton valuing ₹ 15.25 crore were lying unutilized. Board stated (September 2014) that in-house manufacture of hull assembly could not be undertaken due to the fact that thermo pressing facility at BHEL, the only indigenous source, was under breakdown. The stock of armour plates would be gainfully utilized for manufacture of Hulls for BLT and Trawl. Reply itself indicates that lack of procurement activities of thermo pressing plates and import action of fully formed Hulls led to non-utilization of armour plates for the last seven years.
19		OFD	Buckle toothed is required for production of Goggles GS MK-II NIV. The factory held a stock of 24110 Nos as of March 2011 and the stock remained unutilized up to March 2012. A supply order was placed (August 2012) against which 2,52,700 Buckle toothed were procured in August 2012 from a trade firm thereby increasing the stock level to 276810 as of March 2013. As there was no utilisation of the store during the year 2012-13, the whole material valuing ₹ 0.21 crore remained surplus. Factory management stated that CA Sheet was also required for manufacture of Goggles GS MK-II NIV which was difficult item to procure and the same could not be procured. This rendered above material stocked and unutilized as of March 2013. Thus, procurement of a material without ensuring availability of

			<p>matching item rendered avoidable procurement of buckled toothed valuing ₹ 0.21 crore. Response of the Board was awaited as of September 2014.</p>
20	Improper planning	HVF	<p>In HVF, 5491 items valuing ₹ 0.84 crore received from 1950 to 1987 were not drawn at all and 3723 vintage items valuing ₹ 0.72 crore were last drawn between September 1963 and December 1987. The items valuing ₹ 1.56 crore were held in the factory and categorized as Non-moving. Factory had not taken any effective action to liquidate the non-moving stock for the last 27 years. Board stated (September 2014) that the non-moving stock consists of Vijayanta tank tools and other items against which disposal/liquidation action was under consideration.</p>
21		OFMK	<p>75,832 kg of T 160 CR12 Plates valuing ₹ 0.45 crore purchased in February 1990 were not utilized till date. Board stated (September 2014) that all stores of exclusive items are meant for BMP-II which had been inducted in 2012-13. The store items would be consumed in 2014-15. Board could not justify the reasons for procurement of a store in 1990 against production of an item which had been inducted in 2012-13.</p>
22	Over provisioning of stores	MSF	<p>Material Requirement Planning and Forecasting modules (MRP) in the Production Planning and Control (PPC) software package is used in calculating the net requirement of stores for provisioning did not have the provision to consider the quantity of stores held in the Shop (as a part of WIP) while working out the net requirement of stores for procurement. Absence of such provision in the module had resulted in over provisioning of stores valuing ₹ 6.16 crore. Board, while accepting (September 2014) the programming error in the calculation of dues, stated that the programming error affected only those cases where material was received and rejected later. The contention of the Board is not acceptable as programming for calculation of dues has universal applicability to all the cases of assessment for requirement and cannot be used as a tool for post mortem exercise for isolated cases for analysis of rejections.</p>
23		GSF	<p>Based on the production target of 2010-11, 2011-12 and 2012-13, GSF placed two IFDs (January &amp; September 2010) on OF Katni for supply of 87,106 and 1,73,306 numbers of die casting safety cap for Fuze DA5A. GSF received the ordered quantity by March 2013. Considering 25% material provision of 15705 caps for production target of 2013-14 at 60000 fuzes, we noticed that there was over provisioning of 1,25,243 caps valuing ₹ 0.86 crore as of 31 March 2013. Factory stated (February 2014) that it is expected that the material would be consumed in the year 2014-15 and 2015-16. Response of the Board was awaited as of September 2014.</p>
24			<p>Against a target for manufacture of 12000 nos. pistol for the year 2012-13, GSF voluntarily enhanced the target to 15000 nos for the year and assessed the net requirement of receiver in finished condition at 4000 nos for manufacture of pistol. They could however, achieve production of 10840 nos during the year by utilizing the available stock and dues in hand some part of fresh procurement Accordingly a stock of 2796 nos of receiver valuing ₹ 0.75 crore was held in excess of authorized holding. Response of the Board was awaited as of September 2014.</p>

25			<p>Factory placed an IFD (June 2010) on MSF for procurement of 41883 nos of Brass Stamping Body for production of 62500 nos of Fuze Percussion DA 117 during 2010-11. Quantity held in stock was 25617 nos as of April 2010. MSF supplied 15985 nos of the item between December, 2010 and July 2011. The factory however did not produce Fuze Percussion DA 117 during the year 2010-11 to 2012-13. Last material was drawn in January 2006 for 450 nos. and subsequently, 20533 nos in August 2010, out of which 16000 nos were returned to store in September 2013 and bin stock quantity became 37069 no valuing ₹ 2.68 crore as of March 2014.</p> <p>It was also observed that there had been no target for this item since the year 2009-10. Placement of IFD on MSF without production target resulted in avoidable procurement.</p> <p>Response of the Board was awaited as of September 2014.</p>
26		<b>OFAJ</b>	<p>Parted steel Billets was required for production of shell 155 mm M-107 HE. For the requirement of 2012-13, OFAJ placed a Supply Order in March 2012 for 27741 Nos. Subsequently, considering the requirement of 2013-14 also, 100 <i>per cent</i> option clause was operated and quantity of the above Supply Order was raised to 55482 numbers. The firm had supplied 58569 numbers, of which OFAJ accepted 55177 numbers as of March 2013. The target of 2013-14 was reduced by the Board from 46000 to 6000 numbers. Hence, requirement of above material was 6908 only for 2013-14. Thus, 28,342 parted steel billets valuing ₹ 6.83 crore was held in stock in excess of requirement.</p> <p>Board stated (September 2014) that the inventory will be gainfully utilized to meet the production target for the year 2014-15.</p>
27		<b>OFD</b>	<p>Gls. EDF is required for production of lenses used in Day Sight Telescope 5.56 MM RIFLE. Factory placed a supply order (July 2012) for 1000 Kg of the said material and received in March 2013. It is noticed that there was an excess holding of the material valuing ₹ 0.23 crore as of March 2013.</p> <p>Factory management stated (May 2014) that store was procured for production of lenses in factory; however, lenses required for Day Sight Telescope were outsourced. Consequently the store procured remained unutilized.</p> <p>Thus, outsourcing of material despite its availability resulted in excess holding of procured material.</p> <p>Response of the Board was awaited as of September 2014.</p>



## ANNEXURE-XIV

(Referred to in paragraph 8.2.9.9)

## Cases of old outstanding WIP

Sl. No	Reasons for non-clearance	Factory	Brief of the case
1	Rejected stores lying in WIP	MSF	Nine T- 72 tank barrels valuing ₹ 0.90 crore manufactured against warrant 5272/0 (March 2006) were rejected and lying as WIP since 2005-06. Board stated (September 2014) that action plan has been made and the WIP will be liquidated by 2016-17 after converting the same into alternative stores like Breech block etc.
2			13,514 numbers of 23 mm schilka cartridge case valuing ₹ 0.76 crore was manufactured in warrant 7187/0 (August 2010) with CED coating done through trade. The entire quantity was lying as WIP since 2010-11. Board stated (September 2014) that the exiting two lots will be regularized by raising loss statement and the warrants will be closed.
3		OKAT	1000 rejected cartridge cases valuing ₹ 0.34 crore were transferred from warrant 0541/0 to 1468/0 during 2011-12, but the warrant number 1468/0 was kept open. Board stated that (September 2014) the store manufactured under the warrant was rejected by proof establishment and the process of reproof of rejected lot would take a long time. As such the store manufactured under the warrant had been transferred to new warrant. The reply violates its own order of July 1998 which stipulates that rejected items against any warrant should be regularized against the same instead of transfer to another warrant.
4			Rejection of 4.80 tonne of Brass cup NATO valuing ₹ 0.22 crore was transferred from warrant 0354/0 to another warrant during 2010-11. Board stated (September 2014) that the material has been re inspected and passed by DGQA. The warrant is under closure. Reply is silent about violation of its own order of 1998 which prohibited the transfer of rejected item from one warrant to another.
5		MTPF	Primer percussion cartridge cases valuing ₹ 0.65 crore manufactured against two warrants of 2002-03 and five warrants of 2003-04 were rejected and lying as WIP. Board stated (September 2014) that the store manufactured under warrant was rejected in filled proof. Detailed investigation was carried out and the revised loss statement as per Board of Enquiry's recommendation is under consideration.
6			30 numbers of 64 Teeth Gear wheel valuing ₹ 0.25 crore was manufactured during the period from 1999-2000 to 2002-03 against two warrants. This product was misplaced and could not be issued to the Chittaranjan Locomotive works (CLW). MTPF conducted repeated enquiries on the loss of stores without any results. The same was being shown as WIP. Factory management stated (November 2013) that the BOE has been approved by GM and the matter was transferred to Disciplinary Section for further action of loss statement. After approval/ recommendation of loss statement, warrant would be closed and removed from WIP. Response of the Board was awaited as of September 2014.



7			<p>Three warrants valuing ₹ 0.76 crore for manufacture of 84 mm TPT were operated during 2011-12. The items were lying as WIP due to failure in proof trial of 1<sup>st</sup> lot.</p> <p>Factory management stated in November 2013 that the item was not confirmed at proof trials in the first lot and the production would resume by re-establishing the process in 2014-15.</p> <p>Response of the Board was awaited as of September 2014.</p>
8		GSF	<p>10 nos. of warrants valuing ₹ 72.83 crore relating to the years from 2005 to 2012 were lying outstanding due to rejections in manufacture/failure in proof.</p> <p>Reply of the Board was awaited as of September 2014.</p>
9	<b>Non availability of matching item</b>	MSF	<p>One WIP on 30 mm Ghasha cartg cases valuing ₹ 2.61 crore (warrant 7043/0 dated 22.05.2010) was lying since 2010-11 due to non availability of propellants.</p> <p>Board stated (September 2014) that complete quantity of 30 MM Ghasa cartridge case have since been used during 2013-14 and there was no WIP as on date.</p> <p>Reports produced by the management did not, however, authenticate the acceptance of store by the inspectorate.</p>
10		GSF	<p>The factory manufactured firing pin for 84 mm RL valuing ₹ 1.70 crore against one warrant of March 2011.</p> <p>Management stated (May 2014) that the warrant was yet to be closed because of linking problem with the main warrant.</p> <p>Response of the Board was awaited as of September 2014.</p>
11	<b>Production without specific demand</b>	MSF	<p>One WIP of Steel flat strips (300 MT) valuing ₹ 2.52 crore manufactured in 2004-05 in anticipation of IFD was kept as WIP since then.</p> <p>Board stated (September 2014) that the warrant quantity was amended from 300 MT to 100 MT. Out of 100 MT, 58 MT has since been utilized for manufacture of 30 mm Cartridge Case and balance 42 Mt will be consumed during 2014-15 and warrant will be closed in 2014-15.</p> <p>Reply failed to indicate the reasons for manufacture of steel strip in anticipation of IFD and non-utilization for a period of seven years.</p>
12	<b>Non completion work</b>	HVF	<p>12 WIPs relating to the period from 2008-09 to 2011-12 valuing ₹ 128.28 crore lying due to non-completion of work of MBT Arjun.</p> <p>Board stated (September 2014) that after modification works of MBT Arjun Tanks, those warrants will be closed.</p>

## ANNEXURE-XV

(Referred to in paragraph 8.2.9.11)

Statement showing cases of SIT lying outstanding due to losses etc.

Reasons for non-clearance	Factory	Brief of the case
Rejected stores lying in SIT	MSF	<p>OFAJ had placed an IFD on MSF for supply of 12,000 Nos. of Brass Blanks required for 105mm IFG cartg. cases. In turn, MSF had manufactured and issued 11,998 numbers the Brass Blanks to OFAJ between December 2004 and January 2006. During trial run, samples developed rupture after drawing process due to higher hardness than specified. Subsequently, OFAJ intimated MSF in December 2006 and the Board in this regard. Due to discrepancies in drawing and specification of above stores, OFAJ had not accepted the material. Even though OFAJ had taken up the matter with MSF and some samples were annealed and tried out by OFAJ, the result was not satisfactory. Since no further communication was received from MSF and no improvement in the blanks case was carried out, OFAJ decided to backload the entire quantity to MSF.</p> <p>Between April and June 2008, OFAJ back loaded 11,177 brass blanks valuing ₹ 1.66 crore to MSF. These blanks were lying at MSF without any corrective measures.</p> <p>Factory management (December 2013) that on receipt of brass blanks, samples were drawn tested and found conforming to specification. MSF further stated there is no Board's guideline available for regularisation of backload store by the consignor. In September 2009, OFAJ were requested to re-examine the case and settle the complaint but there was no response from OFAJ.</p> <p>Response of the factory is not satisfactory as they failed to bring the matter to the notice of the Board for necessary solution.</p>
	GSF	<p>Various types of rejected back loaded stores valuing ₹ 9.58 crore were received by GSF between 1988-89 and 2010-11 and were lying without rectification as of 31 March 2013. Out of the total back loaded stores valuing ₹ 9.58 crore as of March 2013, the major part was in respect one item viz, Fuze A-670M of quantity 60,103 numbers valuing ₹ 3.79 crore rejected and back loaded by Ordnance Factory Badmal. Other fuze and shell items valuing ₹ 5.67 crore consisted of rejected items, back loaded by Ordnance Factory Ambajhari, Ordnance Factory Chanda and Ordnance Factory Khamaria. Further scrutiny revealed that 60,103 numbers of Fuze A670M consisting of 11 lots were produced and issued by GSF to OFBL between August 2001 and March 2005. These items were again back loaded by OFBL between December 2002 and March 2005. Out of above numbers, GSF re-issued 45,000 numbers of fuzeA-670M to OFBL in March 2009. OFBL again back loaded the same item between August 2010 and September 2010.</p> <p>Thus, rejected items valuing ₹ 9.58 crore were lying as SIT as of 31 March 2013.</p>

		GSF, instead of repair/rectification of rejected store, prepared Certified Receipt Vouchers/Certified Issue Vouchers in respect of Fuze DA5A valuing ₹ 0.32 crore, to regularize the SIT items for the year 2010-11.
Non existant/ fictitious SIT	GSF	<p>Cases of issue of fictitious Certified Issue Vouchers (CIVs) during the year 2008-09 of similar store valuing ₹ 4.71 crore were also noticed which was lying in SIT.</p> <p>Management stated (May 2010) those CRVs/ CIVs were prepared to regularize the SIT. GSF further stated that the loss statement was being prepared by the consignee factory and GSF would dispose of the scrap and credit scrap value to the consignee. Further AFK stated that they had regularized the rejected stores.</p> <p>GSF, however, failed in their reply to furnish the scrap value credited to AFK after disposal of the same.</p>
		70 general production items valuing ₹ 6.95 crore were lying under SIT as on 31 March 2013 which were received by GSF between 1999-2000 and 2012-13 i.e. store were outstanding for one to 12 years due to non preparation of receipt vouchers.
	OFAJ	<p>117 numbers of stabilizer assembly valuing ₹ 4.33 crore ex-Ordnance Factory Kanpur was received at OFAJ in March 2011. While the factory prepared the material inward slip on 18 March 2011, the receipt voucher was not prepared as a fire accident took place and the whole quantity damaged. The item continued to appear under SIT.</p> <p>Factory management stated in December 2013 that findings of Board of Enquiry (BOE) were awaited.</p> <p>The factory reply is, however, silent about reasons for delay in finalisation of the findings of BOE.</p>
		<p>4156 numbers of Primer GUV-7 valuing ₹ 0.29 crore was received from O.F Chanda for rectification in 1998. The same was not traceable at OFAJ. Even after lapse of more than 15 years the item continued to appear under SIT.</p> <p>Factory management stated in December 2013 that findings of BOE are awaited.</p> <p>The reply is however, silent about reasons for delay in finalisation of the findings of BOE.</p>

## ANNEXURE-XVI

(Referred to in paragraph 8.2.10.1)

## Deficiencies in functioning of stock verification group

Factory	Audit findings	Replies of the factories																								
OKAT	<p>1. Test check of 58 bin cards revealed that stock verification was not carried out in respect of items included in 56 bin cards. In 56 bin cards, entries were stated to have been made on verbal orders viz; 'ordered verbally by DGM/WM in heavy pressure', 'verbally pressured by DGM/WM', 'as per orders of JT GM/ QSS', 'verbally ordered by DGM/JWM' etc.</p> <p>2. Adjustment entries had been made in three bin cards on the basis of online balance without any recorded reason. These adjustments had resulted in reduction in the running balance of stock but the same was not effected after issuing Material Demand Notes, as required under Para 13(a) of the Factory Accounting Rules.</p> <p>3. Stores valuing ₹ 0.59 crore had been issued on loan i.e. without material demand notes.</p> <p>4. 32000 Kg Copper cathode valuing ₹ 1.70 crore were issued in November 2012 to production shop without any reference of inward gate pass (IGP), MIS, and authorisation of quality assurance wing (stores inspection).</p>	<p>Stock verification was not carried out in 2012-13 due to poor strength of Stock Verification group.</p> <p>The on-line adjustment will not be treated as physical balance.</p> <p>Reply was awaited (September 2014).</p> <p>Reply was awaited (September 2014).</p>																								
MSF	<p>1. Nine instances were noticed where physical balances in the bin cards ought to have been lesser due to quantity issued on loan but the same was not noticed by stock verification group.</p> <p>2. Population of stock items shown in the Annual report by Stock Verification Group did not tally with the population of stock items of data base (Item Stock Master) maintained by Accounts Office. Details are as under:</p> <table border="1" data-bbox="395 1653 1034 1966"> <thead> <tr> <th rowspan="2">Year</th> <th colspan="2">As per Stock verification report</th> <th colspan="2">As per Database of MSF</th> </tr> <tr> <th>Total Stock</th> <th>Items with 'Nil' Balance</th> <th>Total Stock</th> <th>Items with 'Nil' Balance</th> </tr> </thead> <tbody> <tr> <td>2010-11</td> <td>12467</td> <td>8166</td> <td>6076</td> <td>3866</td> </tr> <tr> <td>2011-12</td> <td>12425</td> <td>8166</td> <td>5825</td> <td>3845</td> </tr> <tr> <td>2012-13</td> <td>12699</td> <td>8166</td> <td>6573</td> <td>4779</td> </tr> </tbody> </table>	Year	As per Stock verification report		As per Database of MSF		Total Stock	Items with 'Nil' Balance	Total Stock	Items with 'Nil' Balance	2010-11	12467	8166	6076	3866	2011-12	12425	8166	5825	3845	2012-13	12699	8166	6573	4779	<p>Factory stated that loan issues had since been stopped.</p> <p>Reply was awaited (September 2014)</p>
Year	As per Stock verification report		As per Database of MSF																							
	Total Stock	Items with 'Nil' Balance	Total Stock	Items with 'Nil' Balance																						
2010-11	12467	8166	6076	3866																						
2011-12	12425	8166	5825	3845																						
2012-13	12699	8166	6573	4779																						

	3. Stock verification not done as per time schedule i.e. twice in a year for 'A' category items and once in a year for 'B' and 'C' category items.	Reply was awaited (September 2014)												
<b>MTPF</b>	1. The store officer was holding the charge of stock verification officer. 2. Verification of 'A' category items were not carried out twice a year.	Factory Management accepted the audit findings. Reply was awaited (September 2014).												
<b>OFAJ</b>	As per para 13 (a) of Factory Accounting Rule, Stores holder will not issue any material for use in the factory without a material demand note. We observed cases of loan issues which were not entered in 71 bin cards and consequently, the stock verification did not detect the discrepancies in stock.	Factory stated that there was no discrepancy.												
<b>GSF</b>	1. Rule 13 of Factory Accounting Rules stipulates that material can be drawn by the production shop from store against demand note for production activities. It is noticed that in contravention of the above procedure, production shop had drawn material valuing ` 1.54 crore from store on loan basis during the year 2012-13. As these loan issues were not entered in the bin cards, there was mismatch between ground balance and bin card balance which was not detected by the stock verification group during stock verification. This indicates the ineffectiveness of stock verification group. 2. Stock verification of 11 'A' category stores was not carried out for past one to eight years.	Due to exigency of requirement loan issues were made. Reply was awaited (September 2014).												
<b>OFMK</b>	The number of items verified by SV group during the three years were less than the number of items reflected in factory records <sup>(213)</sup> as shown below: <table border="1" data-bbox="477 1321 951 1597"> <thead> <tr> <th>Year</th> <th>Items verified by SV group</th> <th>Items as per factory records</th> </tr> </thead> <tbody> <tr> <td>2010-11</td> <td>18,000</td> <td>19,901</td> </tr> <tr> <td>2011-12</td> <td>16,625</td> <td>19,677</td> </tr> <tr> <td>2012-13</td> <td>16,625</td> <td>19,871</td> </tr> </tbody> </table>	Year	Items verified by SV group	Items as per factory records	2010-11	18,000	19,901	2011-12	16,625	19,677	2012-13	16,625	19,871	Reply was awaited (September 2014).
Year	Items verified by SV group	Items as per factory records												
2010-11	18,000	19,901												
2011-12	16,625	19,677												
2012-13	16,625	19,871												
<b>OLFD</b>	Number of stock item to be physically verified remained static during the last three years.	Factory accepted that the number of items to be verified was not updated. Reply was silent on action taken to increase the number of stock items for verification.												

**ANNEXURE-XVII**

*(Referred to in paragraph 8.2.10.3)*

**Unresolved accounting discrepancies**

Sl. No.	Nature of discrepancies	Name of factory involved	Value of difference ( in crore)	Impact
1.	Difference in Price Production Ledger (PPL) items	MSF	4.68	Under/over valuation of PPL items
2.	Mismatch between online bin card and manual bin card in respect of seven items. The factory stated (December 2013) that three out of seven items had been reconciled and the reconciliation in respect of four items was in progress	MSF	0.19	Erroneous reflection of stock position
3.	Difference in consumption of store items between Factory and Accounts records	OKAT	4.47	Under valuation of stores utilised in production
4.	Difference in surplus stock between Accounts and Factory records	OKAT	0.05	Over valuation of stores holding
5.	Difference in stock of stores between Priced Stores Ledger and Bin Cards	OKAT and GSF	4.62	Under/over valuation of stores in hand
6.	Difference between Accounts and factory figures with respect to WIP quantity as on March 2013	OKAT	0.26	Non reflection of true and fair view in accounts
7	Difference in inventory holding between accounts and factory records	OFMK	164.93	Under/over valuation of stores in hand
		OLFD	18.92	
		OFD	3.41	
8.	Difference in factory and accounts figures with respect to finished components	MTPF	12.68	Over valuation of closing stock
<b>Total</b>			<b>214.21</b>	

**ANNEXURE-XVIII**

*(Referred to in Paragraph 8.3.1.2)*

**Responsibility and agencies involved**

Responsibility	Agencies involved	
	MBT Arjun	T-90 tank
Development	Combat Vehicles Research and Development Establishment (CVRDE), an organization of DRDO	Licensed production based on ToT from M/s Rosoboronexport Russia
<b>Production</b>		
Hull and Turret	Ordnance Factory Medak (OFMK)	Heavy Vehicles Factory Avadi (HVF)
Engine	Perennial import from Germany	Engine Factory Avadi (EFA)
Main assemblies and sub-assemblies	Bharat Electronics Limited Bharat Heavy Electricals Limited Bharat Earth Movers Limited Private firms	GCF Jabalpur, OLF Dehradun, OFMK, OF Kanpur, FGF Kanpur, M/s BEL and foreign firms (for certain items)
Final assembly of tank and issue to Army	HVF	HVF
Joint Receipt Inspection	Army, CVRDE, HVF and Director General of Quality Assurance (DGQA) (July 2007 onwards)	Army, HVF and DGQA



## ANNEXURE-XIX

*(Referred to in Paragraph 8.3.2.7)*

### Comparison of benchmarks for evaluation of MBT Arjun vis-à-vis T-90 tank

Activity	Benchmark for MBT Arjun	Benchmark for T-90 tank	Audit Remarks
Run in terrain	Running of tank in medium and heavy dunal terrain at MFFR <sup>2</sup> which imposed running in low gear due to gradient and rolling resistance	Running of tank (automotive trials) at Chaba only.	Desert condition at MFFR was tougher than that existed at Chaba.
Scientific stress model technique	Firing of 25 EFC <sup>3</sup> after each mobility cycle of 250 km	Firing after completion of automotive trials	Relaxed parameter for T-90 tank
Effect of oil temperature on operational speed	(i) Running in first gear until temperature comes down which imposed limitation of speed. (ii) Provision of software for automatic engagement of first gear to bring down the temperature of transmission oil.	(i) Lowering of gear was effected to bring down the temperature of transmission oil (ii) No such provision	(i) Operational constraints due to reduced speed are equally applicable to both the tanks. (ii) Relaxed parameter for change of gear in case of T-90 tank.
Check of lubricants/oils	i) Validation of oil properties after every 250 km run ii) Examination of oil from engine after every 25 hours of engine run	No such checks prescribed	Relaxed parameter for T-90 tank
Obstacle performance	Gradient 35 <sup>0</sup>	Gradient 30 <sup>0</sup>	Relaxed parameter for T-90 tank
System reliability	Facility for pull-back of gun and strip examination of Recoil system at every five years	No such conditions prescribed	Relaxed parameter for T-90 tank
Laser range finder	i) Facility for multiple target discrimination ii) Accuracy of range + / - 10 metre iii) Duty cycle 12 ranging in 2 minutes followed by 4 ranging in 8 minutes	No such facility  + / - 25 metre  No such condition	Relaxed parameter for T-90 tank
Firing of armour piercing ammunition	Speed of tank and target was 20 km per hour in opposite direction	Speed of the target tested was 10 km per hour	Relaxed parameter for T-90 tank
Medium Fording	<b>Zero level water ingress</b>	<b>2.5 litre<sup>4</sup> water ingress</b>	Relaxed parameter for T-90 tank

<sup>2</sup> Mahajan Field Firing Range

<sup>3</sup> Equivalent Full Charge

<sup>4</sup> Permissible limit of water ingress for medium fording was derived with reference to acceptable limit of 5 litre of water ingress for full-dip fording as mentioned in the trial directive for T-90 tank.

## ANNEXURE-XX

(Referred to in Paragraph 8.3.3.3)

## Details of Factory/item-wise status of indigenization

Reasons for delayed/non-indigenisation	Impact
<b>Heavy Vehicles Factory Avadi (HVF)</b>	
<b>Hull and Turret:</b> Non-availability of thermo-pressed plates indigenously for hull and ToT for 130mm Armour plate for turret from M/s ROE.	Import of 150 hulls, 100 turrets and thermo-pressed plates from four firms <sup>5</sup> at a total cost of ₹499.18 crore between January 2007 and September 2012.
<b>Tracks:</b> Non-development of the item by sister factory (OF Muradnagar) and poor supplies from indigenously trade source.	Import of 191 tracks from M/s ROE and M/s UVZ, Russia between November 2007 and March 2011 at a total cost of ₹79.28 crore.
<b>PKTM Gun (7.62 mm):</b> Non-indigenisation of the gun due to low volume of production despite receipt of ToT in May 2003.	Import of 450 guns valuing ₹13.01 crore between October 2008 and July 2012.
<b>Tadiron Radio set:</b> Efforts for indigenisation were not taken by HVF. Alternative radio set developed by M/s BEL was yet to be accepted by the Army.	Import of 1083 radio sets from M/s Elbit Systems, Israel between May 2007 and April 2010 at total cost of ₹130.39 crore.
<b>Rubber Components:</b> Quality problems in indigenously developed rubber components.	Import of various rubber components valuing ₹12.32 crore in March 2011 and June 2012 from M/s ROE.
<b>Lubrication System:</b> Inability of sister factory (OFMK) to supply the required components/assemblies due to increased workload. The system was under development through trade as of May 2014.	Import of 150 sets of the lubrication system from M/s ROE at a total cost of ₹11.54 crore against orders of April and August 2011
<b>Engine Factory Avadi (EFA)</b>	
<b>Engine:</b> Slow progress in absorption of ToT leading to 95 per cent import contents in manufacture of engines during 2007-08.	Import of 92 engines (22 FF, 20 SKD and 50 CKD) at a total cost of ₹51.27 crore between December 2005 and June 2007.
<b>Turbocharger:</b> Non development of indigenously source despite availability of ToT.	Import of 457 turbochargers from ROE at a cost of ₹92.28 crore between January 2007 and January 2013.
<b>Opto Electronics Factory Dehradun (OLF)</b>	
<b>TI-ESSA:</b> Non-availability of ToT as it was not part of the ToT contract of February 2001.	a) Import of 200 sights (FF) and arrangement of co-production of 100 sights against contract of March 2007 with M/s Beltechexport, Belarus at a cost of ₹351.11 crore. b) Achievement of 24 per cent indigenization till February 2014 and delayed supply of 290 sets between 2007-08 and 2012-13 against HVF's IFD (May 2006).

<sup>5</sup> M/s ROE and M/s UVZ Russia, M/s Bumar and M/s BBT Poland

Reasons for delayed/non-indigenisation	Impact
<b>Fire control system:</b> Non-availability of indigenous source for critical components resulted in slow progress of indigenization (78 per cent as of June 2013).	Various sub-assemblies/components of the system were imported from ROE between January 2007 and November 2012 at a total cost of ₹630.41 crore.
<b>Commander's sight (PNK-4S):</b> Indigenous development was not undertaken as it required additional investment of ₹14.95 crore for test equipment and alternative sight was being developed indigenously.	a) 303 sets valuing ₹159.04 crore were imported (March 2007 – August 2011) from RoE with obsolete technology <i>i.e.</i> old vintage Image Converter (IC) tubes instead of Image Intensifier (II) tubes. Hence, the system was found deficient in night operation. b) Delayed supply of 287 sets to HVF between February 2008 and July 2013.
<b>Seven items<sup>6</sup> for optical sighting equipment:</b> Change of internal design required design approval, functional/firing trial involving long time in indigenization through Indian trade firms. The prototypes were under advanced stage of evaluation as of June 2013.	a) Import of the items in fully formed/component level from ROE at a total cost of ₹164.54 crore between June 2006 and November 2012. b) Belated supplies of 240 to 278 sets to HVF between February 2008 and July 2013.
<b>Gun Carriage Factory Jabalpur (GCF)</b>	
<b>125mm Smooth Bore Gun:</b> Non-parting of material specification of the gun barrel in ToT by ROE was main hurdle in indigenization.	a) Import of 175 Guns at a cost of ₹118.83 crore between May 2007 and June 2012 from ROE. b) Manufacture of 125 guns based on imported barrel supplied by OFC and FGK. c) Belated supply of guns to HVF between December 2008 and December 2013 against original supply schedule of September 2006 – December 2009.
<b>Ordnance Factory Kanpur (OFC) and Field Gun Factory Kanpur (FGK)</b>	
<b>Barrel of T-90 Tank Guns:</b> a) Absence of material specification of gun barrel b) Delayed trials of indigenous barrel/gun based on modified chemistry <sup>7</sup> and approval of modified chemistry by CQA(AVA) in November 2010 for production of barrels for T-90 tank gun despite decision taken (September 2006) by all the stakeholders (Army, OFB, DGQA, DRDO, etc.) to use modified chemistry for the barrel after successful trial evaluation.	a) OFC imported 200 sets ordnance (tube, casing, breaching <i>etc.</i> ) from the ROE at a total cost of ₹58.94 crore in piecemeal against four purchase orders placed between September 2007 and March 2010. b) Delayed decision for import coupled with piecemeal procurement led to avoidable extra expenditure of ₹2.18 crore on import of 100 sets of tube and casing against the orders of March 2010 as GCF's IFDs (January 2005) on OFC and FGK stipulated staggered delivery of 300 ordnance between 2005-06 and 2008-09. c) Belated supplies of 145 ordnances to GCF up to July 2013.

<sup>6</sup> BPV 29, voltage converter, BG 29, wind sensor, tilt sensor, BV 29 and automatic control unit.

<sup>7</sup> Material of new chemistry introduced in 2000 for manufacture of T-72 tank barrels is known as modified chemistry. T-72 and T-90 tank are having similar gun barrel.

## ANNEXURE-XXI

(Referred to in Paragraph 8.3.5)

**Implementation of decisions taken in Steering Committee meetings for MBT Arjun and Institutionalised Interaction/ Special Board/Board meetings in respect of T-90 tanks**

Issue discussed	Decision taken	Actual implementation
<b>MBT Arjun</b>		
<b><u>First meeting (December 2002)</u></b> Production facilities	Completion of civil works and commissioning of plant and machinery by December 2004	Major works were completed/ taken over in June 2006 and March 2008. Commissioning of machines was completed in March 2008.
Production of 124 MBT Arjun	Completion of production of 124 MBT by 2006-07	Only 53 tanks were manufactured and only 5 tanks issued to Army till March 2007.
<b><u>Second meeting (April 2005)</u></b> Revision of production schedule	Completion of production of 124 MBT by 2007-08	71 MBT produced till 2007-08.
Placement of further indent by Army	By March 2006 but after completion of AUCRT.	No further indent for MBT MK-II placed by Army till May 2014.
<b><u>Third meeting (July 2005)</u></b> Modification and reissue of five MBT (Limited Series Production)	By 20 October 2005 with the improvements of the defects observed in user trials (June 2005).	After modification the same were returned to Army in October 2007.
<b><u>Fourth meeting (July 2006)</u></b> Rescheduling of meeting	Holding of meeting at least once in three months	Not implemented as next meeting was held in March 2007
Design of MBT	Freezing of design documents by the design agency.	Amendments to specifications/design continued up to 2010 against the claim of freezing of design in September 2004.
<b><u>Fifth Meeting ( March 2007)</u></b> Production schedule	Production schedule for 124 tanks further deferred to 2008-09.	Only 101 MBT produced up to 2008-09
Rectification of defects	All defects observed in user trials to be rectified within next three months.	Not implemented within the stipulated time of three months.
<b><u>Sixth Meeting ( May 2007)</u></b> Joint Receipt Inspection for 15 MBT (15 <sup>th</sup> to 29 <sup>th</sup> )	From August 2007	These tanks were issued in 2008-09.
<b><u>Seventh Meeting ( May 2008 )</u></b> Holding of Steering Committee meeting	To be held every quarter.	Not implemented as next three meetings were held in November 2008, July 2009 and July 2010.
<b><u>Eighth Meeting (November 2008)</u></b> Issue of 124 tanks	By December 2009 with modifications implemented.	Only 69 tanks were issued to Army up to March 2010.
Comparative trials of MBT and T-90 tank	To be conducted in June 2009.	Actually conducted in February/March 2010.
<b><u>Ninth Meeting (July 2009)</u></b> Issue of 124 tanks to Army	By 2009-10.	69 tanks issued up to 2009-10.
<b><u>Tenth Meeting (July 2010)</u></b> Placement of further indent by Army	Placement of indent for 62 Arjun MK-II with six major improvements and balance 62 with 13 major improvements.	No indent for Arjun MK-II was placed by Army as this version was still under validation trials as of May 2014.

Issue discussed	Decision taken	Actual implementation
<b>T-90 tank</b>		
<b>A) Institutionalised Interaction Meeting</b>		
<b>Meeting dated 22 Sept. 2011.</b> Roadmap of indigenization	To be discussed in 39 <sup>th</sup> special board meeting for November 2011.	No specific issue on T-90 tank was discussed in 39 <sup>th</sup> Special Board Meeting (9.8.2012).
<b>Meeting dated 6 March 2012.</b> a) OFB's repeated revision of target impacted planning and execution at the operational level.	OFB to ensure production of 100 tanks per year.	Actual production ranged from 24 to 90 tanks during 2009-2013.
b) Shortage of requisite command tanks in Army.	Backlog of command tanks to be made up during 2012-14.	Against requirements of 42 command tanks HVF manufactured 18 in 2012-2013 and issued 7 tanks to Army between December 2012 and May 2013
c) High incidence of defects in T-90 tanks	Working group to be formed to monitor defects and ensure rectification.	No working group was formed except Failure Review Board(FRB) to investigate defects.
<b>Meeting dated 26 Sept. 2012.</b> a) Defects relating to auto and electrical portions of indigenous T-90 tanks reported by Army	OFB to immediately address the problems	FRB meeting was held in September 2013 to discuss the major failures/defects. Out of 25 defects reports (except engine) received during 2013, 5 defects were still under investigation as of February 2014.
b) Setting up of own rubber production facility	Plan to be finalized.	Plan was not finalised till January 2014.
<b>Meeting with DGOS dated 30 May 2013.</b> a) Deficient quality of Indian rubber items	Import of rubber items and to obtain ToT from Russia.	OFB authorised GM, OFMK to prepare DPR for rubber manufacturing unit in consultation with Indian Rubber Manufacturers Research Association (IRMRA) as of February 2014.
<b>B) Special Board Meeting</b>		
<b>34<sup>th</sup> meeting held on 6.6.2008</b> Hold up in production of T-90 tank due to non-availability of product support	To make required product supports as part of main contract along with suitable price escalation formula to bind OEM for uninterrupted supply of product supports.	Yet to be implemented.
<b>35<sup>th</sup> Meeting dated 16.10.2008</b> Indigenous production of T-90 gun barrel	Quality Assurance to be provided by DGQA for production of 20 guns using indigenous developed metallurgy	Modified chemistry for production of indigenous barrel was approved by CQA(AVA) only in November 2010. Requirement was met by import of 200 sets of Ordnance by OFC.
<b>36<sup>th</sup> Meeting dated 27.01.2009</b> Slippage in production	Special Board noted shortfall in supply to Army due to delayed receipt of product support. No decision taken.	Slippages in production of indigenous T-90 tank continued till 2012-13.

<b>Issue discussed</b>	<b>Decision taken</b>	<b>Actual implementation</b>
<b>37<sup>th</sup> Meeting dated 8.3.2011</b> a) Roadmap for indigenization	Additional DG/AV to organize the same in May 2011.	Roadmap presented by GM/HVF in July 2011 (38 <sup>th</sup> Special Board Meeting). It was planned to achieve 80 <i>per cent</i> in 2011-12.
b) Fresh indent from Army to continue the production line	To form Indent monitoring committee between OFB and Army so as to liquidate old indent.	OFB constituted a team from all operating division. Officers from Army were yet to be nominated.
<b>38<sup>th</sup> Meeting dated 8.07.2011</b> Status of indigenization of T-90 tank (66% achieved as stated by GM/HVF)	To closely monitor the progress for early completion of indigenization.	Envisaged indigenization (85 <i>per cent</i> ) was yet to be completed as of May 2014.
<b>39<sup>th</sup> Meeting dated 9.8.2012</b> No specific issue on T-90 tank discussed	No decision taken.	Not applicable.
<b>C) Monthly Board Meetings of Ordnance Factory Board</b>		
<b>8<sup>th</sup> (2010) Meeting dated 31.8.2010</b> Augmentation of production capacity of T-90 tank	Recommendation to the Ministry for capacity augmentation from 100 to 140 tanks per annum.	Ministry sanctioned the augmentation project (₹971 crore) in September 2011 with planned completion by March 2014. Only ₹17 crore was spent till March 2014 indicating slow progress.
<b>2<sup>nd</sup> and 4<sup>th</sup> (2012) Meetings dated 27.2.2012 and 30.4.2012</b> Manufacture of Track Link Assembly for T-90 tank and other armoured vehicles at OF Muradnagar	To recommend to the Ministry for approval of the Detailed Project Report for manufacture of Track Link Assembly	The project was yet to be sanctioned by the Ministry as of March 2014.
<b>10<sup>th</sup> (2012) Meeting dated 31.10.2012</b> In-house R&D project for development of Track Assembly for T-90 tank at OF Muradnagar	Board noted completion of the R&D project.	Bulk production was yet to commence as of March 2014.
<b>11<sup>th</sup> (2013) Meeting dated 30.12.2013</b> Review of status of augmentation of production capacity of T-90 tanks from 100 to 140 tanks per annum.	To progress the project with probable date of completion as December 2016 and also to make budgetary provisions accordingly.	Against sanctioned amount of ₹971 crore, only ₹17 crore was spent on the project till March 2014 indicating tardy progress.

## ANNEXURE-XXII

(Referred to in Paragraph 8.4.4.2)

## Factory-wise details of delayed receipt of machinery

<u>Name of machine</u> Value of machine (₹ in crore)	Date of purchase order	Delivery Period as per order	Date of receipt	Reason for delay
<b>Ordnance Factory Khamaria (OFK)</b>				
<u>Booster complete line</u> 2.04	7.11.2007	30.6.2008	24.1.2009	Delay in Board's approval for waiver of Pre-despatch inspection and delay in transit
<u>CNC lathe machine (3 axis)</u> 0.73	30.5.2008	30.11.2008	31.3.2009	Poor performance of the supplier in delivery
<u>Progressive Power Press</u> 7.39	30.6.2008	31.12.2009	15.04.2012	Delay on the part of the supplier despite extension of delivery period eight times
<u>Semi automatic spot welding machine</u> 0.28	26.7.2008	30.11.2008	7.10.2009	Poor performance of the supplier in delivery despite extension of delivery period
<u>War head body filling line</u> 2.14	2.6.2008	30.6.2009	24.8.2009	Delayed shipment by the supplier and time taken in transit
<u>Outdoor type oil immersed power transformer</u> 0.77	26.7.2010	30.11.2010	25.1.2011	Delay in approval of drawing and pre-despatch inspection by the factory
<b>Gun Carriage Factory Jabalpur (GCF)</b>				
<u>CNC Vertical Machining Centre</u> 1.78	17.2.2011	30.8.2011	29.10.2011	Delay in sending proper trial components for pre-despatch inspection
<u>CNC Hydraulic Brake Press</u> 0.66	27.3.2008	30.9.2008	24.12.2008	Poor performance of the supplier in delivery
<u>CNC Vertical Machining Centre</u> 0.47	17.1.2011	30.6.2011	28.3.2012	Poor performance of the supplier in delivery
<b>Heavy Vehicles Factory Avadi (HVF)</b>				
<u>Double column gantry type milling machine (2 nos.)</u> 22.09	12.11.2007	31.8.2009 31.10.2009	10.12.2009 4.5.2010	<ul style="list-style-type: none"> <li>• Delayed delivery by the supplier due to frequent power cut, belated receipt of bought out items</li> <li>• Delay in deputing pre-despatch inspection team by the factory</li> <li>• Delay in pre-despatch inspection due to delayed/non-arrangement of required tools</li> </ul>
<u>CNC Gear Hobbing machine</u> 2.46	1.11.2007	30.11.2008	March 2010	
<u>Horizontal Broaching machine</u> 1.48	5.11.2007	15.2.2009	April 2009	
<u>CNC Vertical Machining Centre</u> 0.50	30.5.2011	31.10.2011	February 2012	
<u>Surface Grinding machine</u> 0.37	18.6.2007	31.12.2007	December 2008	
<u>Autofrettage Plant</u> 13.28	19.7.2007	29.5.2008	23.5.2009	
<b>Ordnance Factory Kanpur (OFC)</b>				
<u>Autofrettage Plant</u> 13.28	19.7.2007	29.5.2008	23.5.2009	Delay in transit



<b>Name of machine Value of machine (₹ in crore)</b>	<b>Date of purchase order</b>	<b>Delivery Period as per order</b>	<b>Date of receipt</b>	<b>Reason for delay</b>
<b>Ordnance Factory Kanpur (OFC)</b>				
Vertical Slot Milling <u>machine</u> 1.85	23.8.2007	22.8.2008	7.10.2008	Delay in pre-despatch inspection and transportation of the machine by the supplier
Overlay welding <u>machine</u> 2.91	24.9.2007	23.4.2008	23.8.2008	Poor performance of the supplier in delivery
Power Transformer (4 nos) 1.43	5.2.2010	31.3.2010	12.5.2010	Amendment of the supply order by the factory after one month of placing order
VCB Panel 11 KV 0.24	22.5.2007	8.9.2007	21.12.2007	Delay in manufacture of the machine by the supplier and delay in pre-despatch inspection by the factory
<b>Field Gun Factory Kanpur (FGK)</b>				
Horizontal Honing <u>machine</u> 4.36	20.10.2008	30.10.2009	February 2010	<ul style="list-style-type: none"> <li>• Delay in sending pre-despatch inspection team by the factory</li> <li>• Time taken in placing trial components by the factory</li> <li>• Delay in transit</li> </ul>
Deep Hole Boring <u>machine</u> 8.96	28.10.2010	28.1.2012	25.5.2012	
<b>Ammunition Factory Kirkee (AFK)</b>				
Horizontal Transfer <u>Press</u> 6.74	4.3.2009	31.5.2010	4.8.2010	Delay in pre-despatch inspection by the factory and delay in transit
<b>Rifle Factory Ishapore (RFI)</b>				
Vacuum Heat Treatment <u>Furnace</u> 4.32	19.4.2006	28.2.2007	31.7.2007	Delay in readiness of the machine by the supplier and consequent delay in pre-despatch inspection
<b>Small Arms Factory Kanpur (SAF)</b>				
Phosphating Plant <u>Automatic</u> 1.25	10.7.2007	25.1.2008	19.2.2008	Delay in arrangement of the machine and transportation by the supplier
Direct Reading <u>Spectrometer</u> 0.46	24.7.2008	10.12.2008	20.2.2009	Delayed delivery by the supplier

## ANNEXURE-XXIII

***(Referred to in Paragraphs 8.4.4.5, 8.4.4.6, 8.4.5.3 and 8.4.5.4)***

### **Cases of inadequate pre-despatch inspection and delayed commissioning/ non-commissioning of machines**

Gist of case
<p><b>1. Ordnance Factory Kanpur (OFC)</b></p> <p>PDI was carried out partially in respect of 17 orders (24 machines valuing ₹49.57 crore). Even the PDI report did not indicate any data relating to result of trial of the machines carried out at the firm's premises, as required under the supply orders.</p> <p>Capacity of the machine was not proved in tooled up condition for two orders. For instance, factory received four machines (₹17.82 crore) - <b>(i)</b> without inspection of one major part of one machine, <b>(ii)</b> without verifying cooling capacity and proving one component of one machine, <b>(iii)</b> without proving cycle time of one machine and <b>(iv)</b> despite repeated failure of one machine in PDI. Subsequently, three machines were under frequent break-downs after commissioning, while one machine was yet to be proved and commissioned as of October 2012. The management did not frame any time schedule by which the machine would be put into operation nor did it take remedial action to ensure the trouble free operation of three machines.</p>
<p><b>2. Heavy Vehicles Factory, Avadi (HVF)</b></p> <p><b>(a)</b> The PDI team could not carry out full-fledged testing of gear box in the gear box test stand (₹0.55 crore) due to power fluctuation and persistent leakages. Despite this, the team issued inspection note (March 2009) stating that the test would be carried out during commissioning at HVF. However, the machine received in March 2009 was not commissioned as of March 2013 due to certain fundamental and manufacturing defects.</p> <p><b>(b)</b> PDI team cleared (March 2009) the despatch of one horizontal broaching machine (₹1.43 crore) from the HMT premises despite proving only four out of six components required, as per terms of the order, as HMT failed to arrange the required number of broaches (tools). The machine was received (April 2009) at HVF without complete PDI. However, the machine was commissioned only in January 2011 after a lapse of 21 months due to deficiency of broach holders and breakage of broachers in commissioning trials.</p> <p><b>(c)</b> PDI team cleared (August 2007) despatch of one imported CNC turret punch press (₹1.49 crore) despite lot of deviations in technical features against supply order terms. Besides, surface finish of four components out of nine offered for inspection was not as per the drawing. The machine received in December 2007 revealed various defects attributable to tool breakage during trial run and was finally commissioned in December 2010.</p> <p><b>(d)</b> One imported CNC Double Column Plano Miller machine valuing ₹37.26 crore was received in September 2008. The machine was commissioned in March 2011 i.e. after two and a half years of its receipt due to delay in obtaining Government sanction for deputing PDI team and improper selection of site for foundation work leading to delay in completion of civil works.</p> <p><b>(e)</b> Two imported CNC Double Column Gantry Type Milling Machine costing ₹22.09 crore were received in December 2009 and May 2010. These machines were belatedly commissioned in March 2013 due to improper planning and delay in completion of foundation, non-inclusion of specific time frame for erection and commissioning of the machine in the supply order and slow progress on the part of the foreign firm in commissioning the machines though the matter had been repeatedly taken up by HVF with the foreign firm.</p>
<p><b>3. Ordnance Factory, Khamaria (OFK)</b></p> <p><b>(a)</b> Based on HMT's request, factory gave relaxation (March 2009) in PDI of one 3-axis CNC lathe machine (₹0.73 crore) by way of conducting trial of one component against five stipulated in the order considering the supplier as PSU and closure of the financial year. The machine received in March 2009 was commissioned in September 2010.</p> <p><b>(b)</b> Warhead filling line valuing ₹2.14 crore received in August 2009 was commissioned in November 2010. The delay was due to non-achievement of the desired density in filling of Warhead of 84 mm ammunition</p>

(HEAT-551). Delayed commissioning of the machine led to import of 32525 filled warheads in December 2009 and July 2011 at a total cost of ₹103.09 crore.

**4. Ammunition Factory, Kirkee (AFK)**

(a) PDI team conducted proving trial of one horizontal transfer press (₹6.74 crore) for only one component against seven required as per PDI clause of the order of March 2009. The machine was received in August 2010 and commissioned in November 2010.

**5. Gun Carriage Factory, Jabalpur (GCF)**

(a) PDI was due to be carried out in May 2011 in respect of two vertical machining centre (₹1.77 crore). However, PDI was delayed by three months due to factory's failure to supply accurate sized trial components to the supplier and ultimately, the same had to be corrected to the required size by the supplier at their end which delayed the entire process of PDI. The machine was finally received in October 2011, after slippages of two months.

(b) Three machines (CNC Vertical Machining Centre) valuing ₹7.44 crore were received in January and March 2005. However, the machines were commissioned in February 2009, after delay of 41 to 43 months. The delays were due to recurring defects observed in various parts during commissioning trial run.

**6. Gun and Shell Factory, Cossipore (GSF)**

The factory placed an order (October 2003) for procurement of one CNC Internal Grinding machine at a cost of ₹0.47 crore for 84 mm Rocket Launcher. Factory's Inspection Team could not complete the PDI of the machine as the supplier (M/s HMT) failed to arrange the required accessories or spares. However, the supplier was allowed by the factory to despatch the machine in March 2004 without complete PDI ostensibly on the ground of urgency to meet the enhanced target of 84mm Rocket Launcher (RL) MK-II barrel as well as to avoid the lapse of funds allotted. The machine was received in March 2004 and finally commissioned in June 2008 by compromising the quality viz. acceptance of higher cycle time of nine hours against 27 minutes stipulated in the order. Incomplete PDI due to inadequate accessories or spares also contributed to considerable delays in final commissioning trials.

**7. Ordnance Factory Ambajhari (OFAJ)**

(a) One Flow-forming machine valuing ₹12.89 crore, was imported and received in November 2011 against original delivery period of 28 February 2009 for production of Pinaka Rockets. Despite final payment of ₹12.27 crore after deduction of LD and other charges, the machine was yet to be commissioned (as of September 2012) as the supplier, M/s HESS Engineering Inc., USA became bankrupt and was not in a position to commission the machine.

(b) An AC plant procured at a cost of ₹85.10 lakh, received in August 2011, was belatedly commissioned in March 2014. The delay in commissioning was due to poor performance of the supplier.

**8. Rifle Factory, Ishapore (RFI)**

The factory placed an order in April 2006 for procurement of one vacuum hardening plant at a cost of ₹4.32 crore. The plant was received in July 2007 and commissioned in March 2009 after 20 months due to inordinate delay in execution of civil works by RFI and delay in procurement of auxiliary equipments required for commissioning for which both RFI and supplier trade firms were responsible.

## ANNEXURE-XXIV

(Referred to in Paragraph 8.4.5.6)

## Acceptance of machines without adequate trial runs

<b>Description of machine Value</b>	<b>Date of commissioning</b>	<b>Nature of deficiencies in commissioning trial run</b>
<b>Gun Carriage Factory, Jabalpur &amp; Ordnance Factory, Kanpur</b> <u>21 machines</u> ₹50.92 crore	June 2008 to July 2012	Factories accepted the machines without recording data on proving of cycle time in the commissioning certificate signed by the supplier and factory managements.
<b>Ordnance Factory, Kanpur</b> Vertical slotting <u>machine</u> ₹1.85 crore	December 2008	Against the requirement of proving two items (Shell 130 mm and 155 mm cargo), the machine was actually proved for one item (130 mm cargo). Despite this, factory accepted the machine.
<b>Heavy Vehicles Factory, Avadi</b> Horizontal broaching <u>machine</u> ₹1.43 crore	January 2011	Out of six components only four could be proved in PDI.
<u>CNC turret punch press</u> ₹1.49 crore	December 2010	Acceptance of machine with deviations in PDI
<b>Gun &amp; Shell Factory, Cossipore</b> 2 CNC Vertical <u>Machining Centre</u> ₹1.05 crore	December 2007 January 2008	Factory management accepted both the machines without ensuring sufficient performance trial/ guarantee run by the supplier. Later on, deficiencies were noticed in some parts of the machines when they were put into operations for production of breech block and sear safety. Consequently, machines were not used for production of above mentioned items, but for manufacturing of slide.
<u>Laser engraving machine</u> ₹0.26 crore	July 2007	The machine did not show the reference point and software did not deliver the definite size of the characters in pre-determined manner during commissioning trial run (March-June 2007). However, under the direction of AGM, machine was accepted and considered as commissioned in Gun-C Section. Subsequently, it was shifted and commissioned (July 2008) to Gun-D section where it developed problems. Despite repair, the machine could not be put into operation.
<u>5 CNC machines (Drill Tap Centre)</u> ₹1.68 crore	September 2009	Factory management accepted these machines from HMT and considered as commissioned with cycle time much higher by 94 to 186 per cent than the cycle time prescribed in the supply order.

## ANNEXURE-XXV

(Referred to in Paragraph 8.4.6.1)

## Factory-wise percentage of utilisation of machines

Factory	No. of machines examined	2009-10			2010-11			2011-12			2012-13		
		Range of percentage of utilisation			Range of percentage of utilisation			Range of percentage of utilisation			Range of percentage of utilisation		
		0 to 30	31 to 65	above 65	0 to 30	31 to 65	above 65	0 to 30	31 to 65	above 65	0 to 30	31 to 65	above 65
Ordnance Factory Ambajhari	110	2	1	107	3	1	106	4	1	105	6	11	93
Ordnance Factory Kanpur	55	40	13	2	36	15	4	36	14	5	40	11	4
Heavy Vehicles Factory Avadi	35	0	0	35	1	1	33	0	1	34	1	1	33
Ordnance Factory Khamaria	81	21	27	33	16	20	45	19	21	41	21	24	36
Small Arms Factory Kanpur	23	13	10	0	14	9	0	15	8	0	12	11	0
Gun Carriage Factory Jabalpur	36	0	27	9	0	25	11	0	20	16	0	7	27*
Ammunition Factory Kirkee	Data not furnished in required format.												
Rifle Factory Ishapore	Data not furnished in required format.												
Gun & Shell Factory Cossipore	Data not furnished in required format.												
Field Gun Factory Kanpur	Data not furnished in required format.												
<b>Total</b>	<b>340</b>	<b>76</b>	<b>78</b>	<b>186</b>	<b>70</b>	<b>71</b>	<b>199</b>	<b>74</b>	<b>65</b>	<b>201</b>	<b>80</b>	<b>65</b>	<b>193</b>

(Source: Factory's report on utilization of machines furnished to OFB and data furnished by the factory management to Audit)

\* Utilisation figure of two machines (Regd. No. 10231 and 10241) out of total 36 examined were not furnished by Gun Carriage Factory Jabalpur

## ANNEXURE-XXVI

*(Referred to in Paragraph 8.4.6.3)*

### Illustrative cases of under/non-utilisation of machinery

Gist of the cases	Factory's reply
<p><b>1. Ordnance Factory, Khamaria</b></p> <ul style="list-style-type: none"> <li>• Two semi-automatic profile machines (Regd No 10090 and 10091) valuing ₹1.12 crore taken on charge in January 2004, required for machining of primer and manufacturing tools, could not be utilised since April 2009 and January 2009 respectively mainly due to non-providing spares and non attending to the problems of break-down by the supplier sister factory (MTPF).</li> <li>• Four equipment viz. Test Instrument for Electric System (Regd No 10006), Arming Time Checking Equipment (Regd No10007), Test Instrument for Electric System (Regd No.10008) and Low Speed Spinning Machine (Regd No 9763) valuing ₹1.36 crore could not be utilised in 2010-11 and 2011-12 due to non allotment of production targets for fuze of 84 mm HEAT ammunition for which the machines were required.</li> <li>• HMT six Spindle Auto (Regd No10082), Case Trimming Machine (Regd No10146) and Oil Hydraulic Press (Regd No. 10089) valuing ₹1.88 crore required for 30 mm cartg. case were received between October 2003 and August 2004 but had not been utilised since 2008-09 due to want of production target.</li> <li>• Arming Device Assembly Line (Regd No 10424) valuing ₹1.78 crore was utilised for only six months since its commissioning (January 2009) due to delay in indigenization of the fuze of 84 mm HEAT ammunition.</li> </ul>	<p>No jobs were done as the machines were designed for limited profile on non-ferrous material.</p> <p>The machines could not be utilised as there was no production programme.</p> <p>Efforts were being made to use the machines for alternative purpose.</p> <p>The planned date for indigenization of Arming Device was re-scheduled to March 2013.</p>
<p><b>2. Ordnance Factory, Ambajhari</b></p> <p>As per cost benefit analysis of Scanning Electron Microscope valuing ₹1.02 crore, the utilisation was proposed for three to four samples per day. The cost was to be recovered within a span of five - six years, but OFAJ was utilising the Microscope for only four to six samples per month.</p>	<p>Samples received from various sections were analysed regularly.</p>
<p><b>3. Ordnance Factory, Kanpur</b></p> <ul style="list-style-type: none"> <li>• Two machines worth ₹4.76 crore procured and commissioned in December 2008 and February 2009 for production of shell body of 130mm and 155 mm Cargo ammunition could not be utilised due to suspension of production of these ammunition.</li> <li>• Hydraulic Autofrettage plant valuing ₹18.51 crore for autofrettage operation on barrel, commissioned in September 2009, remained under-utilised to the extent of 37.34 to 74.67 per cent during the period 2009-12.</li> <li>• OFC procured one Shot blasting machine valuing ₹0.50 crore for shot blasting operation. The machine commissioned in January 2009 remained under-utilised to the extent of 84.61 to 95.20 per cent during the period 2009-12.</li> <li>• Four machines valuing ₹1.42 crore procured for manufacture of 81 mm Mortar and Tail Unit 2A were not utilised for the intended purpose during the period 2009-12.</li> <li>• Twelve machines valuing ₹7.07 crore procured for manufacture of 120mm Warhead RDMS, 100Lbs Air Bomb, Rifle Grenade, Shell 30 mm BMP-II, 30mm GHASA, 23mm GHASA and various tools were not utilised for the intended purpose during the period 2009-12.</li> </ul>	<p>These special purpose machines would be used only after receipt of production target for the ammunition from OFB.</p> <p>Underutilisation of the plant was due to its requirement for strategic purpose.</p> <p>This being a special purpose machine and of strategic nature could not be utilised fully.</p> <p>The workload of 81 mm Mortar was transferred from OFC. These machines were being utilised for manufacture of other components.</p> <p>The machines were utilised for production of other items and not for the intended purpose.</p>

Gist of the cases	Factory's reply
<ul style="list-style-type: none"> <li>Four CNC machines valuing ₹2.99 crore procured for machining of stabilizer assembly of Pinaka Rocket were grossly under-utilised during the period 2009-12.</li> </ul>	<p>The machines were utilised for Shell 130mm and 155mm apart from achieving targets for pinaka components.</p> <p>We found that OFC failed to meet the target of Pinaka stabiliser assembly as it issued only 1219 sets against target of 3646 sets during 2009-12.</p>
<p><b>4. Heavy Vehicles Factory, Avadi</b> One CNC Turret Punch Press valuing ₹1.49 crore tooled up for cutting nine components up to 6 mm thickness by Completing Articles (CA) shop, was received in December 2007. But the press was shifted to Sheet Metal (SM) shop in February 2008 as the facilities available in CA shop were found inadequate to fabricate the said components. As the firm failed to restore the machine as ordered, HVF after analyzing various deviations in specification, tools breakage, failure of the firms to commission the machine <i>etc.</i>, finally decided not to use aluminum sheets but to use the machine only for cutting mild steel sheets with thickness up to 3 mm by SM shop.</p>	<p>Tooling was the problem area and some more tools were developed/ manufactured with the special materials in addition to the tools supplied by the firm to use in SM shop.</p> <p>Since the machine was originally tooled up for CA shop, shifting it to SM shop on the pretext of available Laser cutting machine in CA shop resulted in underutilisation of the machine even in SM shop.</p>
<p><b>5. Ammunition Factory, Kirkee</b> The factory imported (March 2009) a Horizontal Transfer Press valuing ₹6.74 crore and commissioned it (November 2010) to produce 19.20 million rounds of aluminium tubes required for various detonator. After commissioning, the factory produced two million tubes during 2011-12, thereby utilising only 10 <i>per cent</i> of its capacity. AFK initially justified in their demand that the spare capacity would be utilised for civil trade and export.</p>	<p>Detonator cannot be sold for civil trade and export. This led to underutilisation.</p>
<p><b>6. Gun and Shell Factory, Cossipore</b> The Factory procured one Twin Spindle Vertical Honing machine at a cost of ₹1.28 crore in April 2002 for manufacture of three components (Pistol barrel, 30 mm AGL barrel and 9 mm sub-caliber adopter barrel.) Out of three components, GSF manufactured only one component <i>viz.</i> Pistol barrel during the years 2009-10 to 2011-12 and utilisation was to the extent of 5.66 to 17.12 <i>per cent</i> during the said period.</p>	<p>In the past, factory had manufactured 30 mm AGL barrel and 9 mm SCA barrel. As the project of 30 mm AGL barrel was closed, no AGL barrel was being manufactured at present. However, the machine was capable to meet up the enhanced target of 0.32" pistol.</p>
<p><b>7. Rifle Factory, Ishapore</b></p> <ul style="list-style-type: none"> <li>One vacuum hardening plant (furnace) costing ₹4.32 crore was commissioned in March 2009 for heat treatment of components like cover, housing body, pin firing and cylinder gas of 5.56 mm rifle. The machine could be utilised to the extent of only 1.53 <i>per cent</i> in 2009-10 to 16.92 <i>per cent</i> in 2011-12.</li> <li>One cold swaging machine valuing ₹5.02 crore for manufacture of barrels of 5.56 mm rifle, 0.315" and 0.22" sporting rifle (SPR) barrel was commissioned in June 2004 with cycle time of 3.1 minute for 5.56 mm barrel and 3.8 minute for SPR barrel. Thus the average cycle time was 3.5 minute per barrel. Against the capacity of 65828 barrels, RFI manufactured 6555, 12665 and 23972 barrels during 2009-10 to 2011-12 resulting in underutilisation to the extent of 63.58 <i>per cent</i> to 90.04 <i>per cent</i> during that period.</li> </ul>	<p>Due to substantial reduction in workload full utilisation of the furnace could not be achieved. Efforts were being made to shift the furnace to other sister factories.</p> <p>Average cycle time was 4.5 minute instead of 3.5 minute. Further, break down hours were not considered by Audit. But Audit considered all the factors during assessment of the capacity of the machine.</p>



Gist of the cases	Factory's reply
<ul style="list-style-type: none"> <li>There was gross underutilisation of capacity in respect of seven CNC machines installed in barrel section ranging between 45 and 95 per cent during 2009-12.</li> </ul>	<p>Less utilisation of CNC machines was not due to inefficiency but due to less annual target allotted to the factory.</p>
<ul style="list-style-type: none"> <li>The factory held 35 CNC machines in CNC-I &amp; CNC-II Shop for production of 5.56 mm rifle components viz. bracket, breach block, piston extension and hammer. All these machines ran for three shifts daily. The machines were underutilized to the extent of 42.70 per cent to 85.05 per cent during 2008-09 to 2011-12.</li> </ul>	<p>The machines were engaged for components produced as per target and surplus capacity were utilised for other components.</p>
<ul style="list-style-type: none"> <li>The factory procured (February 2010) one tooled up CNC 3 axis vertical machining center at a cost of ₹0.76 crore for manufacture of Slide Retracting of 5.56 mm rifle. The machine received in October 2010 was commissioned in February 2011. But the same was diverted for milling operations of magazine pocket and dovetail of Sporting Rifle (Body).</li> </ul>	<p>The machine was initially utilised for production of Slide Retracting. Later due to non-availability of input material, production was stopped. Subsequently, the machine was utilised for making body of Sporting Rifle and 12 bore Gun.</p>
<ul style="list-style-type: none"> <li>The factory procured five CNC HMC machines in December 2006 at a cost of ₹5.43 crore for manufacture of bracket for 5.56 mm Rifle. The machines were received in March 2008 and commissioned between August and December 2008. Out of the five machines, three machines (Regd. No. 12936, 12937 and 12941) valuing ₹3.26 crore were diverted for production of piston extension (5.56 mm) and pistol (9 mm).</li> </ul>	<p>As the production of piston extension was carried out in age old machines, diversion of two machines was necessitated for piston extension.</p>
<ul style="list-style-type: none"> <li>The factory placed an order in September 2006 for procurement of five CNC HMC machines at a cost of ₹5.35 crore for production of block breach for 5.56 mm rifle. The machines were commissioned between December 2008 and February 2010. Out of five machines, two machines valuing ₹2.14 crore were diverted for production of bracket, block rear and piston extension, resulting in nonutilisation for the intended item.</li> </ul>	<p>Six old machines with higher cycle time were already engaged for manufacture of breech block and maximum nine machines could be used for the said component.</p>

## ANNEXURE-XXVII

(Referred to in paragraph 8.15)

(Statement showing the details of recoveries effected by Ordnance Factories at the instance of Audit)

Case No	Nature of irregularities	Amount objected (₹ in lakh)	Amount accepted (₹ in lakh)	Amount recovered (₹ in lakh)
1	Hyderabad Metropolitan Water Supply and Sewerage Board revised water charges with effect from December 2011. But, Ordnance Factory Medak did not recover the revised water charges from the occupants of their estates up to January 2013.	37.14	38.19	37.82
2	The water charges were fixed by the Public Health and Engineering Division, Bolangir, Government of Orissa from time to time for consumption of domestic consumption of water. Ordnance Factory Bolangir did not recover the water charges as per the rate fixed by the Government of Orissa during May 1990 to December 2011	175.00	11.63	11.63
3	Cordite Factory Aruvankadu (Factory) entered into a contract with M/s Engineers Project India Limited Kolkata (EPIL) in October 2006 for procurement, erection and commissioning Sulphuric Acid Concentration Plant. The soil and survey investigation charges were to be borne by EPIL. But, the Factory reimbursed soil and survey investigation charges to the EPIL while releasing payment in June 2007.	13.00	13.00	13.00
4	Ordnance Factory Itarsi (OFI) against supply order of January 2011 received 15 lakh litres of furnace oil from Indian Oil Corporation against payment on the basis of "rate per kg" instead of "rate per litre" as well as reimbursing transportation charges like octroi, entry tax and other levies despite having provided exemption certificate to that effect.	164.69	61.49	61.49
5	Ammunition Factory Kirkee remitted service charges to the Kirkee Cantonment Board for possession of 1146.97 acres of land although they were in actual possession of 865.684 acres of land in the Kirkee Cantonment Area resulting in excess payment of service charges.	85.56	62.92	62.92
6	The Ministry of Defence enhanced the rates of licence fee, in April 2011, to be recovered from the occupants of factory's estates retrospectively from July 2010. Ordnance Equipment Factory Kanpur and Ordnance Factory Muradnagar did not recover the licence fee at the enhanced rates from the occupants of their estates from July 2010 to January 2012.	40.56	40.56	31.39
	Grand Total	515.95	227.79	218.25

## ANNEXURE-XXVIII

(Referred to Para 9.1.3.4 and 9.1.5.6)

**Statement showing Receipt of Documents pertaining to Repair and Overhaul at various Divisions of HAL**

Major Milestones	Duration as per Government Sanction	Current Status			
		Nashik	Lucknow	Hyderabad	Korwa
Date of Signing Contract	T <sub>0</sub> (August 2009)	13 August 2009	August 2009	13 August 2009	August 2010
Supply of RTD & DDTEM by Russian side	T <sub>0</sub> + 15 months (November 2010)	All documents received by December 2012	All documents received.	All documents received	All documents received by December 2012
Supply of Technical equipment & tooling from Russian side	To+18 months (February 2011)	Partial supply received. Expected by December 2013	Supply of all Technical equipment and tooling received	All NSE tooling received. Commissioning under progress.	All NSE tooling received by January 2013.
Supply of spares for ROH	To+24 months (August 2011)	SAs for Spares signed in April 2013. Spares for 35 lines received. Balance was expected (Sept. 2013).	SAs for Spares signed in March 2013. Group sets of spares are expected by December 2013.	Material in respect of 11 sets received. The balance is expected by March 2014.	SAs for Spares signed in March 2013. Partial supply received. Balance was expected by December 2013.
Readiness for undertaking overhaul	To+30 months (February 2012)	-Facilities for Dismantling & Structural repair of Airframe available. -Complete facility expected by December 2013. -ROH for airframe and aggregates commenced.	ROH tasks of 70 LRUs already accepted. For the remaining 17 LRUs have been planned from 2013-14 onwards		Existing manufacturing facility is being utilized for common items.

**ANNEXURE-XXIX**

(Referred Para 9.1.5.1)

**Division wise break up for capital investment of ₹ 762.70 crore**

**I. Civil Works**

<b>Division</b>	<b>Main areas</b>	<b>Value (₹ in crore)</b>
Nasik	1) Flight Hangar complex including main hangar, Non-Echo Chamber, Fuel hangar, Engine ground run hangar etc. 2) Functional Test Lab for the new equipment and new Looms Manufacturing shop 3) Extension / modification in Sub assembly complex. 4) Extension to NC shop Complex.	62.90
Koraput	1) A new Complex including NC Shop, Sheet metal Shops, Machine shops and Assembly shop with associated facilities 2) New Foundry for the blade castings and titanium castings 3) Extension to the Forge shop for forgings 4) Test beds for engine & modules testing	85.00
Lucknow	1) New Assembly & Testing Blocks for fuel, Hydraulic Aggregates 2) Extension of Machine Shop & Process Shop.	21.47
Hyderabad	New Assembly & Testing Block for new units	22.86
Korwa	New Assembly & Testing Block for OLS and Navigation Systems.	12.43
		<b>204.66</b>

**II. Number of machines and equipment identified division-wise**

<b>Division</b>	<b>No of machines</b>	<b>Total Cost</b>	<b>Foreign Exchange Component</b>
		(₹ in crore)	
Nasik	205	116.20	91.61
Koraput	1330	274.62	149.25
Lucknow	423	58.34	40.80
Hyderabad	199	64.08	54.58
Korwa	275	44.80	25.54
<b>Total</b>	<b>2432</b>	<b>558.04</b>	<b>361.88</b>

Source : Detailed Project Report

**ANNEXURE-XXX***(Referred Para 9.1.5.6)***Statement showing Sanction and Expenditure for Repair and Overhaul at various Divisions of HAL**

<b>A. Allocation of Sanctioned amount</b>				
<i>(₹ in crore)</i>				
<b>Capital expenditure</b>				
	<b>Nashik</b>	<b>Lucknow</b>	<b>Hyderabad</b>	<b>Korwa</b>
At 2008 level sanctioned	283.35	29.20	55.14	33.88
Incurrence level	311.44	31.76	60.31	34.99
<b>Deferred Revenue Expenditure</b>				
At 2008 level sanctioned	816.19	165.50	250.58	159.90
Incurrence level	923.79	188.38	282.81	179.84
<b>Expenditure as of September 2013</b>				
Capital expenditure	95.47	16.88	16.54	4.71
Deferred Revenue Expenditure	465.23	121.57	200.32	124.81