CHAPTER-VII: ORDNANCE FACTORY ORGANISATION

7.1 Performance of Ordnance Factory Board

7.1.1 Introduction

7.1.1.1 Ordnance Factories are the oldest and largest organization in India's defence industry with a history that dates back to 1787. There are 41[58] Factories divided under five clusters or operating groups (**Table-27**) 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 Board comprises a Chairman and eight members[59].

Table-27

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

Source : Annual Accounts of Ordnance Factories – 2013-14

7.1.1.2 The objectives of the Ordnance Factory Board[60] 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[61] and in-house Research & Development;
- To meet customer satisfaction and expand consumer base.

7.1.1.3 In addition, the policy objectives of the Government on Defence Production and Procurement, list the following objectives which have a bearing on the Ordnance Factory 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;

[58] 2 OFs at Nalanda and Korwa are under construction. Beset with delays, the 2 OFs are yet to put into operation with scheduled date of coming into operation remaining uncertain.
[59] 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)
[60] As enunciated in Mission and Vision Statement of Ordnance Factory Board
[61] Transfer of Technology (ToT) from Defence Research & Development Organisation (DRDO) or from Original Equipment Manufacturers through contracts linked to purchases

- 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;

- To enhance the potential of Small and Medium Enterprises in indigenization.

7.1.1.4 Our analysis of the performance of the Ordnance Factory Board during 2013-14 places it, where relevant, against the above objectives.

7.1.2 Performance of the Ordnance Factory Board

The data on key areas of management in the Ordnance Factory Board for the three years 2013-14 are summarized in **Table-28** below. **Annexure-XV** gives the details segregated across operating groups.

Table-28

(₹in crore)

		Years			
		2011-12	**2012-13**	**2013-14**	**Variation 2011-14 (percentage)**
I	**Financial Performance**				
1	Revenue expenditure	12141	11936	12834	6
2	Budget utilisation for revenue expenditure (in per cent)	97	99	98	1
3	Revenue receipts	12876	12553	12001	(-) 7
4	Budget revenue surplus/deficit	735	617	(-) 833[62]	(-) 213
5	Cost of production (CoP)	15934	15973	15637	(-) 2
6	Value of issues	17273	17119	16122	(-) 7
7	Profit	1339	1146	485	(-) 64
8	Capital expenditure	279	349	465	67
9	Budget utilization (in per cent): capital expenditure	93	87	100	7
II	**Cost of Production: Components**				
10	Cost of stores	10070	9746	9303	(-) 8
11	Cost of labour	1490	1617	1705	14
12	Overheads	4214	4393	4389	4
13	Other costs *i.e.* Direct Expenses	159	216	239	50
14	Overheads as percentage of CoP (12/5*100)	26	28	28	8
15	Labour cost as percentage of CoP (11/5*100)	9	10	11	22
III	**Inventory**				
16	Stores-in-hand	5336	5604	5588	5
17	Work-in-progress (WIP)	2551	2999	3538	39
18	Stores-in-transit	538	682	854	59

[62] Even though the appropriation account of Ordnance Factory Board for the year 2013-14 showed a deficit of ₹ 833 crore, the cost accounts of the Ordnance Factory Board showed a profit of ₹407 crore in issue of products to the indentors during 2013-14. This is because, the appropriation accounts reflects actual cash transactions that had taken place during the year whereas the cost accounts reflects the profit based on the actual sale value realized from the indentors and actual cost incurred by the factories in producing the items issued. The cost incurred may relate either to previous years or the current year.

19	Finished goods/components	1212	1206	1305	8
20	Inventory as percentage of CoP	60	66	72	20
21	WIP as percentage of CoP	16	19	22	38
IV	**Labour and Machinery**				
22	Numbers of direct industrial employees (DIEs)	46568	47166	46206	(-) 1
23	Ratio of DIEs : Supervisory officers	1.41 :1	1.46:1	1.5:1	
24	Productivity (production per employee)	16,74,490	16,82,000	16,79,736	Static
25	Labour hour utilization (in *per cent*)	127	129	127	Nil
26	Machine hours available (in lakh hours)	1577	1603	1203	(-) 24
27	Machine hour utilization (in *per cent*)	78	76	73	(-) 6
V	**Issues: Indentor-wise**				
28	Army	10027	9609	8609	(-) 14
29	Air Force &Navy	433	433	539	24
30	Other Defence Departments	192	138	147	(-) 23
31	Central Paramilitary Police Organizations (Ministry of Home Affairs)	826	831	782	(-) 53
32	Civil trade including Exports	913	963	1046	15
VI	**Research & Development (R&D)**				
33	Expenditure on R&D	36	48	43	19
34	R&D expenditure as percentage of total revenue expenditure	0.30	0.40	0.34	13

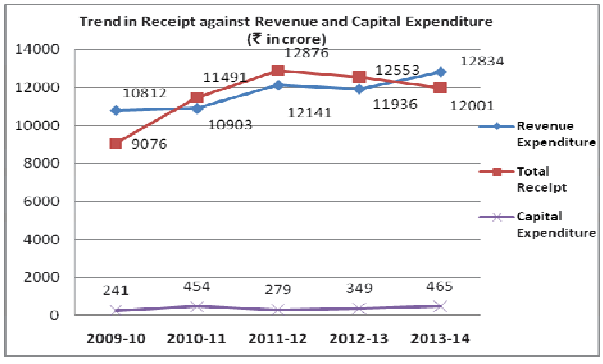
Source : Budget & Expenditure Statement of OFB and Annual Accounts of Ordnance Factories

7.1.3 Financial performance

Trends in receipt and expenditure are illustrated in **Chart-8**.

Revenue expenditure & receipt

Chart-8



The Ordnance Factory Board receives budgetary grant under the Account head 2079 to meet its running expenses *i.e.*, the revenue expenditure. The grant was ₹12834 crore in 2013-14.

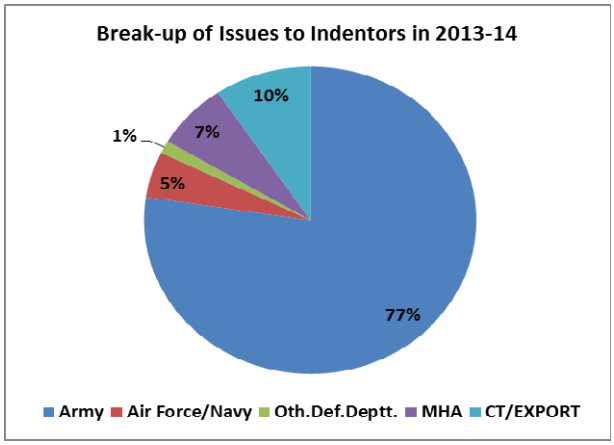
The same Account head: 2079 is operated for booking its expenses and its receipts[63] against issues to the Defence establishment**.** Another Account head 0079 records the receipts against sale of products to non-defence establishments (state police), in the open market or exports. The Ordnance Factory Board is

[63] The Board debits all its revenue expenditure to the Account head-2079. At the time of issue to the Defence establishment, there is (-) Debit to the Account.

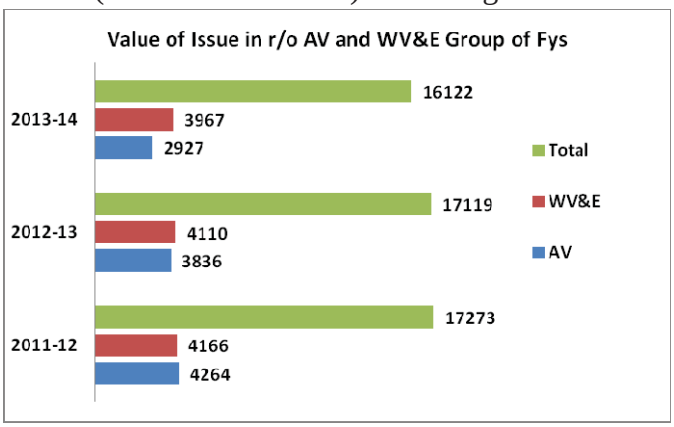
allowed to recover the cost of manufacture while fixing the issue price of products with a provision to "limit the annual price increase up to eight *per cent* on overall basis with an emphasis to keep this to the minimum."

After peak production and issue in 2011-12, the value of issues declined by seven *per cent* over the period 2011-14. As a result, the profit came down (by 64 *per cent* over 2011-14) from ₹1339 crore in 2011-12 to ₹1146 crore in 2012-13 to ₹485 crore in 2013-14.

Chart-9



The Army is the major indentor for the products of the Ordnance Factories, accounting for nearly 77 *per cent* of the total issues during the year 2013-14 with Civil Trade and Export being a distant second at 10 *per cent*. The decline in value of issues by seven *per cent* during 2011-14 was mainly due to 14 *per cent* reduction in issues to the Army during the period; there was fall in issues to Central Paramilitary Forces which form the second largest indentor. The two operating groups: WV&E (Weapons, Vehicles & Equipment), and AV (Armoured vehicles) which together account for 42 *per cent* of the production in the Ordnance Factory Board, registered a decline of 14 *per cent* in 2011-14. The AV group saw a 23 *per cent* decline in 2011-14 mainly because of halt in production of MBT Arjun in the absence of further indents from the Army; and decline in issue of T-90 tanks. The production performance of operating groups is discussed in detail in **Paragraph 7.1.4**.



Our audit in 10 factories showed a persistent trend of overstatement of performance in the form of advance issue vouchers. Factories prepare "advance issue vouchers" whereby they raise demands for payment from the Army without physical issue of the stores. This practice followed in order to inflate the performance against targets, comes with attendant risks of accounting mistakes and distortions in production figures *viz.*, inflation of revenue receipts and of cost of production; of distortion value of work-in-progress. Taking cognizance of the risks, the Controller General of Defence Accounts (CGDA), New Delhi instructed all Controllers of Finance and

Accounts (Factories)[64] in October 2007, not to accept advance issue vouchers without despatch particulars. Despite the directive, the practice persisted in 2013-14 as shown in **Table-29**, with the incidence being particularly high in Ordnance Factory Badmal, Itarsi, Ordnance Clothing Factory Shahjahanpur and Ordnance Parachute Factory Kanpur.

Table-29

(₹in crore)

Factory	Value of advance vouchers in 2013-14	Total issues in 2013-14	Advance vouchers as percentage of total issues
Chemical Group of Factories: A&E group			
OF, Itarsi	60	234	26
OF, Bhandara	15	241	6
High Explosives Factory, Kirkee	6	145	4
Ordnance Factory Badmal	128	667	19
Weapon Group of Factories: WV&E group			
OF, Trichy	22	160	14
Field Gun Factory Kanpur	8	250	3
Gun and Shell Factory Cossipore	8	523	2
Armoured Vehicle:AV group			
Ordnance Factory Medak	9	534	2
Ordnance Equipment:OE group			
Ordnance Clothing Factory Shahjahanpur	58	351	17
Ordnance Parachute Factory Kanpur	34	166	20

Source : Annual Accounts of Ordnance Factories – 2013-14

Similar findings were reported in our compliance audit when issues were reported on items which had not even been produced. It was observed that 4221 Kg of Copper Nickel Alloy Tube valued at ₹55.5 lakh was reported as issued by Ordnance Factory Katni in 2013-14 although by the Factory's own admission, the item was not manufactured due to problems in the billet heater/extrusion press. Thus, the value of issues and the cost of production of Ordnance Factory Katni were overstated to that extent.

While the Ordnance Factory Board noted the audit observation for future compliance, Principal Controller of Accounts (Factories) Kolkata mentioned that branch Accounts Offices had been instructed not to accept issue vouchers without despatch details. The fact, however, remains that despite persistent audit observations, neither the Ordnance Factory Board nor the Principal Controller of Accounts (Factories) Kolkata took steps to curb the incorrect practice of booking issues without actual physical despatch of the products.

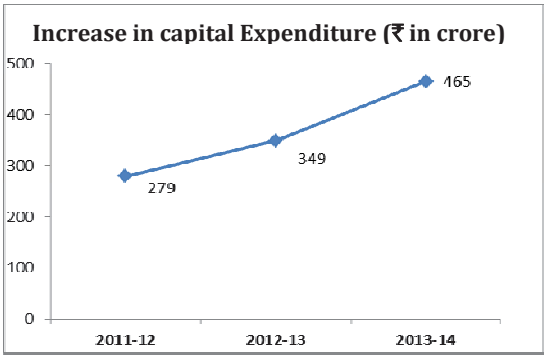
[64] Controller of Finance and Accounts (Factories) functions under the PCA (Factories) Kolkata for a group of factories on regional basis

Revenue expenditure which had decreased marginally by two *per cent* in 2012-13, increased by eight *per cent* in 2013-14. Stores expenditure constituted 47 *per cent* of the total revenue expenditure; manufacturing expenditure constituted 36 *per cent* during 2013-14. Together the two components accounted for 83 *per cent* of the total revenue expenditure during 2013-14. Both the components registered an increase in 2013-14 by five *per cent* despite the fall in production in the year indicating a fall in rate of conversion of raw materials to products and their issue. This had a direct impact on inventory: work-in-progress increased by 39 *per cent* in 2013-14 over the levels in 2011-12. Inventory has been analysed in further detail in **Para 7.1.5.**

Capital expenditure

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 ₹465 crore was spent in 2013-14. In addition, a separate fund called the Renewal and Replacement Fund (RR Fund) funds replacement of old machinery. Currently at ₹117 crore, the Fund has been created through yearly transfers from revenue grant[65].

Chart-10



Capital expenditure under New Capital grant represented only two to three *per cent* of the total expenditure of the Ordnance Factory Board over the years. There had been a 67 *per cent* increase in capital expenditure in 2013-14 over 2011-12 **(Chart-10).** However, slow progress on the two largest projects[66] in 2012-14 necessitates a strong intervention by the Ministry.

7.1.4 Production to meet the targets

The Ordnance Factory Board plans production in the factories on the basis of:

- ***Requirements projected by the Forces***: Since 2011, the Army prepares a Five-year perspective (roll-on) plan for its needs of weaponry. This practice is yet to be adopted by the Air Force and 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.

[65] 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.
[66] 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 September 2014, ₹ 878 crore was spent on the 2 projects.

- ***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 defence forces.

The production targets are fixed by Ordnance Factory Board in consultation with the defence forces. These targets are intimated to the factories: for final products and for feeder factories, which are then communicated by the Ordnance Factory Board to the factories.

Our analysis of principal items (of direct issue to the Forces) across operating groups revealed the Ordnance Factory Board's greatest challenge in the recent years: of fall in demand of its traditional product base. The results are summarized in **Table-30.** Particularly affected are the Armoured Vehicles Group and the Weapons Group. In the Ammunition Group, the demand has been sustained in few items that are not of the vintage group of ammunition: 84mm HEAT 551, 130mm RVC, 84mm Target Practice Tracer (TPT) Rockets and the relatively new item, Pinaka Rocket. But the traditional base of ammunition for vintage weapons has gone down.

Table-30

Item	2011-12	2012-13	2013-14	Variation over 2011-14
Armoured Vehicle Group				
T-90 Bhisma (IND)	75	85	35	(-) 53
MBT Arjun	14	9	0	(-) 100
Engine V46-6 (OH) for T-72 Ajeya	100	100	60	(-) 40
BMP (OE)	75	75	60	(-) 20
BMP (OH)	40	40	36	(-) 10
Weapon, Vehicle and Equipment Group				
84mm Rocket Launcher	1789	589	1000	(-) 44
Rifle 5.56mm INSAS	60000	18733	0	(-) 100
Pistol Auto 9mm	5000	2093	1000	(-) 80
81mm Mortar	471	338	25	(-) 95
105mm LFG	50	55	30	(-) 40
Ammunition and Explosive Group				
84mm HEAT 551	7000	7000	7000	0
130mm RVC	132000	140000	140000	(+) 6
Rocket Pinaka PF	1000	1000	1000	0
Rocket 84mm TPT	350000	400000	400000	(+) 14
81mm Mortar HE	650000	650000	635000	(-) 2
130mm FVC	20000	10000	12000	(-) 40

Item	2011-12	2012-13	2013-14	Variation over 2011-14
120mm FSAPDS	5000	5000	4000	(-) 20
84mm Illuminating	45000	40000	40000	(-) 11
81mm Mortar Illuminating	50000	40000	40000	(-) 20
51mm Illuminating	30000	23000	19000	(-) 37
105mm IFG Illuminating	5000	4000	4000	(-) 20
120mm Illuminating	2500	2000	2000	(-) 20
105mm IFG HESH Charge	15000	0	0	(-) 100
Mine AP NM 14	400000	300000	170000	(-) 58
Mine A/TK No 1A/2A	50000	17000	16000	(-) 68
Ordnance Equipment Group				
Jacket Combat Army Logo	550000	575000	667500	(+) 21
Trouser Combat Army Logo	550000	575000	667500	(+) 21
Boot High Ankle DVS	400000	280000	300000	(-) 25
Coat Combat Army Logo	115000	130000	160000	(+) 39
Shirt Men Angola Drab	372929	325000	264634	(-) 29
Blanket Barrack NG	390000	250000	90000	(-) 77
Cap FS Disruptive with Army Logo	350000	208000	145773	(-) 58
Fly Outer	20299	13050	13600	(-) 33
Short Plain Waive PV DD Khaki	450000	280000	400000	(-) 11
Jacket Wind Cheater	54000	24735	28766	(-) 47

Source : Database of Ministry's Indent placed on OFB

The Production Performance Report of the Ordnance Factory Board compiles target and achievement of all Ordnance Factories (**Table-31**). Despite the decline of 30 *per cent* in assigned workload (targets), the Factories continued to fall short of targets with only 57 *per cent* achievement of targets in 2013-14.

Table-31

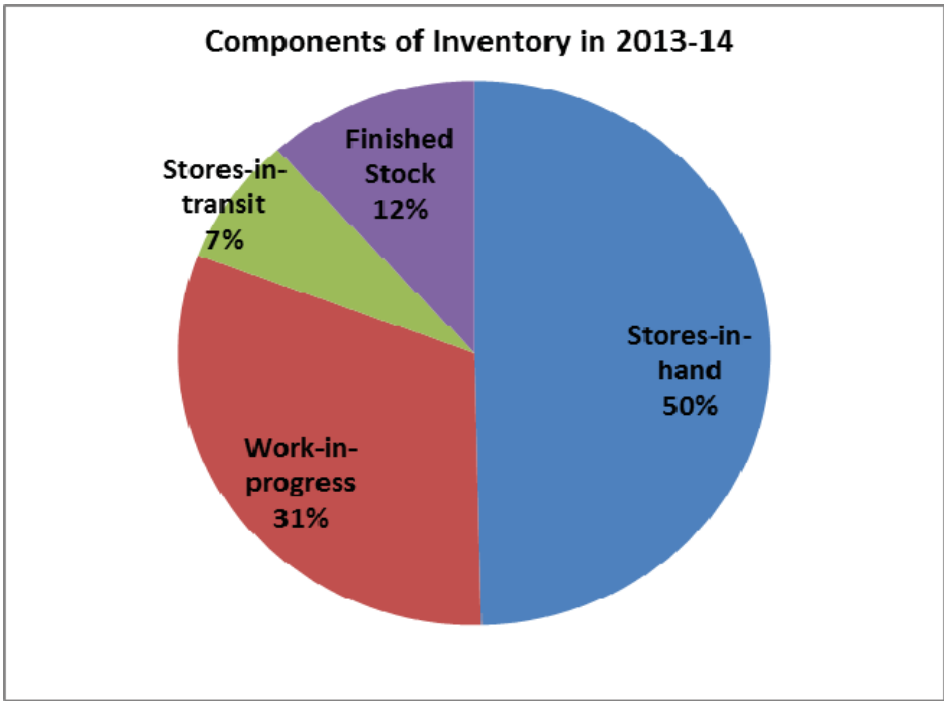
Year	Targets	Achievement	Percentage of shortfall
2011-12	547	195	64
2012-13	529	205	61
2013-14	382	163	57

Source : Production Performance Report of OFB for 2013-14

7.1.5 Inventory

The inventory holding in the Factories stood at ₹11285 crore in 2013-14, registering a marginal increase of eight *per cent* over the holding in 2012-13. The increase in holding and decline in production together have increased the level of inventory as a percentage of cost of production from 60 *per cent* in 2011-12 to 72 *per cent* in 2013-14. The high level of inventory in the Factories was a sign of inefficiency in stock holding practices and in application of funds **(Chart-11).**

Chart-11



Stores-in-hand

Store in hand (SIH or stock of raw material) at ₹5588 crore accounting for 50 *per cent* of the inventory holding, declined by ₹16 crore in 2013-14 as compared to 2012-13. Our audit on inventory management: 2010-13 had showed that 95 *per cent* of the SIH in the nine Factories exceeded the prescribed limits and that one-fifth of the SIH had become non-active *i.e.* not consumed at all during the current year. The Procurement Manual prescribes limits of stock holding to either six months' or four months' consumption, depending on the nature of factories. While the instructions allow factories to place procurement orders to meet the need for two years (plus 50 *per cent* option clause), a staggered delivery is envisaged to conform to budget allotment and shelf life of the stores, as well as maintain the levels of holding to the prescribed limits. But high holding of stores prevails in the Factories, with five factories[67] reporting excess holding of 147 days to 190 days as of 31 March 2014. On the one hand, inability to procure stores on time, stalls

[67] Ordnance Factory Katni, Ordnance Factory Chanda, Ordnance Factory Bhusawal, Gun and Shell Factory Cossipore and Ordnance Factory Trichy

production in Factories and on the other, excess holding on other stores blocks the capital, highlighting why the Ordnance Factory Board must place this issue on high priority.

The Ordnance Factory Board stated (August 2015) that in terms of the decision taken in the Ordnance Factory Board's meeting (27 February 2015) all the factories had been directed to bring down the inventory holding in terms of value by 15 *per cent* over the inventory holding as on March 2014 during 2015-16.

Finished Components and Stock

Finished components increased by ₹48 crore (five *per cent*) in 2013-14. The value of inventory holding in terms of days in respect of finished components for 2013-14 increased by 20 days over the previous year. The holding of Finished stock increased by ₹51 crore and as a result of which holding in terms of day's consumption had increased from three days in 2012-13 to five days in 2013-14.

The Principal Controller of Accounts (Factories) stated (August 2015) that branch accounts offices had been instructed to take up the matter with the factory management to keep the stock of component in a comfortable position. The latest position of stock of finished components was awaited.

Stores-in-Transit

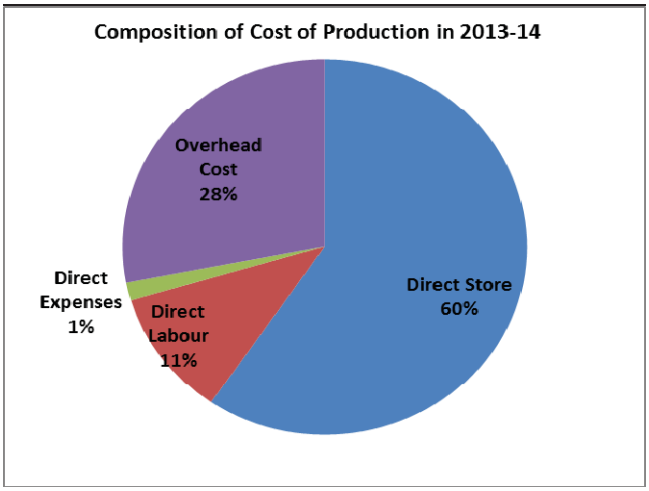
Stores in Transit (SIT) between the factories for the Ordnance Factory Board as a whole increased by ₹171 crore (25 *per cent*) in 2013-14 as compared to previous year. The value of SIT at Ordnance Factory Chanda (₹252 crore), Ordnance Factory Bolangir (₹141 crore) and Heavy Vehicles Factory Avadi (₹95 crore) constituted 30 *per cent*, 16 *per cent* and 11 *per cent* of the total value of SIT in the Ordnance Factory Board.

The pendency of huge stores in transit was attributed by the Principal Controller of Accounts (Factories) to non-acceptance by a Factory of the stores issued to it by a sister Factory due to defects or due to deviation from specifications. The reply was silent on action taken to carry out the reconciliation amongst the Factories to set right the high incidence of SIT.

7.1.6 Cost of Production

Stores account for 60 *per cent* of the cost of production in the Ordnance Factory Board. Overheads at 28 *per cent* of cost of production are particularly high in the Ordnance Factory Board as depicted in **Chart-12.**

Chart-12



The cost of production during 2013-14 at ₹ 15637 crore has remained nearly at the same level during 2011-14 as unit cost of production increased despite decline in production. The composition of costs varies across operating groups (**Annexure XV)** with the Armoured Vehicle Group and the Ammunition and Explosive (A&E) Group being most material intensive. The Ordnance Equipment Group which manufactures clothing and general purpose items was the most labour intensive among the Factories.

We observed that the high overheads are a consequence of high committed cost on a workforce that is not directly deployed for production. As a result, overheads are showing an increasing trend over the years with decline in production. Material and Components Group with some of the oldest factories of the Ordnance Factory Board and with falling production levels/low production base reported the highest levels of overheads: fixed overheads and variable overheads being 27 *per cent* and 11 *per cent* respectively, a total of 38 *per cent* being the overheads as percentage of the cost of production. Our analysis showed that the Fixed overheads were high in the Weapons Group of Factories

The practice of fixing issue price for products in the beginning of the year based on the trends in the past three years could have worked in a set-up in which cost control was effective to closely monitor abnormal fluctuations in cost. This was not, however, the case in the Factories with the two controls: Concurrent review by the Local Accounts Office and the Quarterly Financial Review, being weakened by structural deficiencies. As a result, the issue price of a product in a year had no correlation to its cost of production, leading to wide fluctuations in inter-year profit/loss.

For the Ordnance Factories to be competitive, they will have to exercise effective control over the cost of production, which presently is very high. The present structure and processes are not geared for such control, impacting the Ordnance Factory Board's ability to meet the new challenges when the defence sector is being opened for competition.

7.1.7 Our Audit Process

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 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.

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 2013-14, audit of 42 units was carried out by employing 4008 party days. Our audit plan ensured that most significant units, which are vulnerable to risks, were covered within the available manpower resources.

We issued 36 LTARs consisting of 377 paragraphs during 2013-14. In addition, 516 LTARs consisting of 1727 paragraphs were outstanding as of 1 April 2013. Regular interaction with the units helped find satisfactory response on 65 LTARs consisting of 476 paragraphs. As of 31 March 2014 on 487 LTARs consisting of 1628 paragraphs, we are awaiting a response from the units.

This Report also highlights seven cases of infractions by Ordnance Factory Board, detected in audit, which involved substantial amount of funds. We also conducted two Performance Audits on Weapon group of Factories and Chemical group of Factories.

7.2 Production of Weapon Manufacturing Factories

Executive Summary

The Ordnance Factory Board (Board) is recognised as a manufacturer of small arms in which it has an established presence. The six weapon manufacturing factories *viz*. Rifle Factory Ishapore (RFI), Small Arms Factory Kanpur (SAF), Gun and Shell Factory Cossipore (GSF), Ordnance Factory Trichy (OFT), Field Gun Factory Kanpur (FGK) and Gun Carriage Factory Jabalpur (GCF) with the total cost of production of ₹5278 crore during 2011-12 to 2013-14 contributed to 11 *per cent* of the total cost of production in the Board.

Key Findings

The Ordnance Factories' production of weapons is meant mainly for meeting the needs of the Army; in turn, the reliance of the Army on the Factories is also substantial. Ministry of Home Affairs procure weapons for the Central Paramilitary Forces, but this forms a small part of the sale of weaponry from the Factories. With such a limited client base, a clear projection of requirement from the Army is a keystone to the performance of the Factories. The Army's Roll-on Plan: 2011-12 to 2015-16 projecting requirements for the next five years, aided the Board in short term planning. The Roll-on Plan covered strategic although few items, but revision of requirements mid-year create uncertainties which inhibit the Board in its strategic plans for capacity augmentation or diversification. During 2011-12 to 2013-14, the Board fixed targets less than the requirements projected by the clients. The Board communicated the targets to the Factories three months in advance but mid-year revisions were frequent, covering three to 14 of the sampled items, which are disruptive and do not constitute a good practice.

The Factories achieved the production targets at the level of 80 *per cent* and above in 38 instances (51 *per cent*) in 2011-12 to 2013-14. But in 21 instances (28 *per cent*), the achievement was less than 60 *per cent*. In all, the indentors' requirements were fully met in 16 of 75 instances. Total value of shortfall in issue of the selected weapons against the revised targets stood at ₹1479 crore during 2011-12 to 2013-14. Delays in receipt of input stores were the predominant cause for slippages across the Factories. However, the malpractice of advance issue vouchers whereby items were shown as issued although not physically issued, carried a risk of inflation of achievement of targets and of distortion of Accounts. The Factories justified the practice on the ground that these items were mainly those that were held up for want of transportation.

Delay in procurement of stores was a predominant factor that limited the Factories in full achievement of their targets. Three out of the six Factories placed 60 to 70 *per cent* of their supply orders in 2011-12 to 2013-14, within five months of identifying the requirement of stores. The remaining Factories could meet the timelines in three to 52 *per cent* of the supply orders. Compounding the delays in procurement from trade firms, was the inability of

sister Factories in meeting the requirements of forgings for manufacture of barrels for high-calibre weapons. In 51 *per cent* of the instances, the Factories completed the quality control of stores within the mandated 15 days. The Field Gun Factory Kanpur and Gun Carriage Factory Jabalpur reported the longest lead time, with 63 *per cent* of the instances crossing the 15-day time limit. This was attributed to stringent quality requirements on the products (forgings) although the Board accepted that a closer examination was required to plug the choking points. All the Factories reported high incidence of piece work profit to direct industrial employees which were not commensurate with the achievement of targets, indicating the need for a review.

The Factories have a well-established system of multi-tiered quality checks involving the Factory's own Quality Control (QC) sections and the Senior Quality Assurance Establishments (SAQE) attached to each Factory. But quality problems besiege the Factories with impact on cost, achievement of targets and above all, the reputation of the Board and its products. The internal quality control in respect of major items (Rifle 5.56mm, 7.62mm MAG) test-checked in audit was found inadequate. The incidence of "Return for Rectification" by the SQAE (although not mandated in the laid-down process) and rejection were high on certain products like 5.56mm rifle, 7.62mm MAG, 30mm cannon and spare barrel T-90. Defects such as variations in gauge dimensions fall in the realm of inspections by the Factory QC, which remained undetected and were raised at subsequent stages by SQAE.

The practice of fixing issue price for products in the beginning of the year based on the trends in the past three years could have worked in a set-up in which cost control was effective and fluctuations, especially in overheads are controlled. This was not, however, the case in the Factories. The weapon group of Factories operate on high overheads, particularly, the fixed overheads. The apportionment of the overheads over products was irrational, overloading it on some products, making them uneconomical. Ordnance Factories are generally focused on meeting the demand placed on them without due regard to cost control and reduction. The absence of competition and high cost of import coupled with the availability of assured funds with the indentors, created a situation in which the Armed Forces generally accepted the products from the Board regardless of the high issue prices.

The Board prepared a Perspective Plan 2007-08 to 2011-12 to provide the Armed Forces with "timely supply of state-of-the–art technology with greater value for money". The dreams of the Perspective Plan could not be translated into reality, with implementation marred by delays in decision making and in development of the new items. Even as the Board did not prepare a plan for the subsequent period, the environment has changed substantially. The Army prepared (2013) the Long Term Integrated Perspective Plan (LTIPP) covering a period of 15 years, but did not communicate the same to the Board. Hence, the Board was yet to formulate a plan to position itself as an important player. The Defence Procurement Procedure 2013 has also been approved to steer the goals of indigenisation but one in which the Board has to compete with other manufacturers.

Small Arms Factories were facing multiple challenges like declining demand from indentors and quality problems; poor response from clients for its new products; and delays in development and trials for new generation carbines. The increasing demand for medium calibre weapons is a positive sign for sustenance. The traditional weaponry in the high calibre range (81mm Mortar, 105mm LFG) is facing a downturn. Besides, delayed indigenisation and continued reliance on imports of certain assemblies posed a challenge to the Factories in meeting the demand.

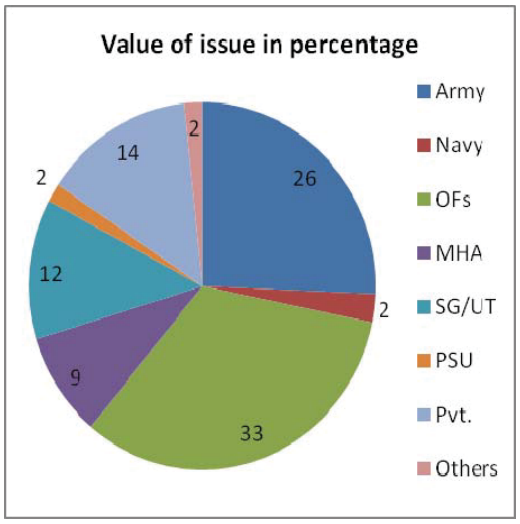
7.2.1 Introduction

7.2.1.1 The operating group

Ordnance Factories are segregated into five product-based Operating Groups. The weapons manufacturing Factories fall under Weapons, Vehicles and Equipment (WV&E) group. This group accounted for 23 *per cent* of the total cost of production in the Ordnance Factory Board (Board) during 2011-12 to 2013-14. The six weapon producing factories *viz.* Rifle Factory Ishapore (RFI), Small Arms Factory Kanpur (SAF), Gun and Shell Factory Cossipore (GSF), Ordnance Factory Trichy (OFT), Field Gun Factory Kanpur (FGK) and Gun Carriage Factory Jabalpur (GCF) with the total cost of production of ₹5278 crore during 2011-12 to 2013-14 contributed to 11 *per cent* of the cost of production in the Board.

The products cater primarily to the needs of the Armed Forces and the Ministry of Home Affairs[68] (MHA). These Factories also supply weapon components like Barrel and Ordnance to sister factories for assembly in armoured & combat vehicles. The value of issues of six weapon manufacturing Factories aggregated to ₹5722 crore[69] during 2011-12 to 2013-14. Indentor-wise distribution of issues by the weapon factories is depicted in **Chart-13**.

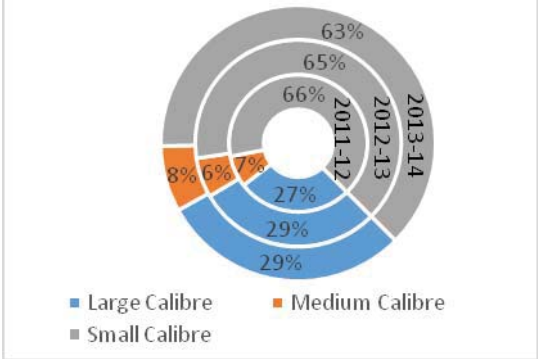
Chart-13



[68]The weapons bought by MHA are for issue to the Central Paramilitary Forces and the State Police.
[69] The gap between value of issues and cost of production represents profit.

The Armed Forces rely almost exclusively on the Board for weapons. During 2011-12 to 2013-14, the import of weapons was only to the extent of ₹245 crore[70]. The weapons are categorised as small arms, medium calibre and large calibre depending on the size of the barrel bore. The Board mainly catered to small arms (65 *per cent* of the total value of issues during 2011-12 to 2013-14), where the production is gradually declining to offer a larger share to the more costly and technology intensive large calibre weapons (**Chart-14**). However, despite a decline, the INSAS rifles 5.56mm have a pre-eminence in the Board's arsenal of small arms.

Chart-14: Value of Issue



7.2.1.2 Organisational structure

The Member (Weapon, Vehicles and Equipment) in the Board is responsible for policy formulation, planning and supervision of this operating group. The Factories are headed by General Managers. Internal quality control in the Factories is looked after by Additional/Joint General Managers of the Factories.

Directorate General of Quality Assurance (DGQA), independent of the Board, provides quality assurance of the products. It discharges this function through its representatives at the Factories. The Principal Controller of Accounts (Factories) Kolkata [PCA (Factories)] is responsible for compilation of consolidated annual accounts, cost control along with an advisory role on finance. The PCA (Factories) performs its functions through the Local Accounts Offices (LAOs) attached with every Factory.

7.2.1.3 Why did we take up this audit?

In view of significance of weapon manufacturing Factories in providing strategic weapons to the Armed Forces and MHA, we decided that a comprehensive coverage with focus on the areas of production planning, performance, quality and cost control would add value to the Management and provide inputs for policy formulation in the Government and in the Parliament.

7.2.1.4 Scope of audit and sample audited

Our audit covered the performance of all six weapon manufacturing factories for three years: 2011-12 to 2013-14. We arrived at the audit findings after test

[70]The imports were covering mainly Sub Machine Gun, Micro UZI 9mm Pistol with Silencer, Galil Sniper Rifle 7.62mm (Army), AK-103 Rifle, 9mm MP5A3 Rifles, KH-35 for IL-38 (Navy)

check of the records at the Board and six factories[71], the Controllerates of Quality Assurance (Weapon and Small Arms) at Jabalpur and Ishapore, Senior Quality Assurance Establishments attached with those factories. Relevant matter relating to 2014-15 has been included wherever necessary.

We selected 25[72] weapon items with cost of production of ₹2860 crore that together accounted for 79 *per cent* of total cost of production (₹3618 crore) during 2011-12 to 2013-14 relating to 68 weapon items in the product-line of the six factories. The selection was based on strategic use of the items by the Armed/Paramilitary Forces, diversity of client base and cost of production. The details of sample selected for examination are at **Annexure-XVI**.

7.2.1.5 Audit objectives

The aim of our audit is to form an opinion on the Board's ability to provide quality products on time to its clients, mainly the Armed Forces. The broad objectives of our audit, framed to address this audit question, were to seek an assurance that:

- *The Board fixed annual production targets for the Factories based on indentors' needs and the capacity of Factories, and the targets were met by the Factories on time;*
- *The Factories were able to marshal their resources timely to implement the production plan;*
- *Strong quality control measures ensured timely issue of quality weapons to indentors;*
- *The Factories instituted controls for a close watch on utilisation of funds as well as on cost of production and recovery of costs; and*
- *The Factories were geared to meet the perspective needs of the Armed Forces in order to reduce the dependence on imports.*

7.2.1.6 Audit criteria

We identified following sources to adopt the audit criteria for assurance on the audit objectives:

- Board's Procurement Manual 2010 (OFBPM), Standard Operating Procedure and DGOF Procedure Manual;
- Minutes of monthly Board meeting of the Board;
- Standing Orders (Tech) for Defence Quality Assurance organisation;
- Defence Accounts Department Office Manual Part-VI (DADOM); and
- Policies/Orders/instructions issued by the Ministry and the Board.

[71]Rifle Factory Ishapore, Small Arms Factory Kanpur, Gun and Shell Factory Cossipore, Ordnance Factory Trichy, Field Gun Factory Kanpur and Gun Carriage Factory Jabalpur
[72] Small Arms : 12 items, Medium Calibre : 3 items, High Calibre : 10 items

7.2.1.7 Audit Methodology

After a preliminary study at the Board and four weapon manufacturing Factories, an entry conference was held in August 2014 wherein the scope, audit objectives and audit methodology were discussed and audit criteria were agreed upon. Detailed audit was carried out in the units selected for coverage as indicated in **Para 7.1.7** above during the period from July 2014 to December 2014 to evaluate the performance against the audit criteria. Field audit included examination of records, collection of information through issue of audit memos and questionnaires. Audit also analysed the data extracted from the computerised packages used in the Factories.

The draft report was issued to the Ministry and the Board in February 2015 and discussed in the Exit Conference held with the Board in May 2015. While the Board had furnished their responses in May 2015, the same from the Ministry was awaited (September 2015) even after lapse of stipulated time frame of six weeks for the reply. Responses of Board and deliberations during Exit Conference have been considered while finalising this report. Recommendations in the draft report were also accepted by the Board in their replies.

7.2.1.8 Acknowledgement

We acknowledge the co-operation received from the Chairman of the Board, Member of the Weapon, Vehicles and Equipment Division of the Board, Senior General Managers/General Managers and the Accounts Officers of the Factories and Senior Quality Assurance Establishments stationed at the six weapon manufacturing factories. Their inputs helped us plan our audit and provide a Report which we hope, will add value to the work of the Board and the Factories.

A list of abbreviation and glossary of terms used in this report are given in **Appendix-I** and **Appendix-II** respectively.

Audit findings

7.2.2 Towards Meeting the Requirements of Indentors

Audit objective 1: *The Board fixed annual production targets for the Factories based on indentors' needs and the capacity of Factories, and the targets were met by the Factories on time.*

7.2.2.1 Target fixation with reference to client needs

The Army is the main indentor for the weapon items produced in the Factories. The concept of a 'five year roll-on-procurement plan' (2011-12 to 2015-16) was introduced in February 2011, which projects the multi-year

requirement[73] of the Army. However, it is the firm indent[74] received from the Army, which forms the basis for fixing production targets by the Board for the Factories.

The target for Ministry of Home Affairs (MHA) which procures weapons for the paramilitary forces, is fixed through an annual target fixation meeting held in November/December of the previous year. A roll-on-plan was received for the first time in 2010 which is, however, only an indicative wish-list.

Navy's requirements form a meagre part of product line (2 *per cent* of the total value of issues during 2011-12 to 2013-14). The annual indent for Navy is the only means for fixing targets by the Board[75]. Audit was informed by the Board that the production target for private indentors is based on an assessment of the demand but being dynamic in nature, is not documented.

In its Special Board Meetings (July 2011/August 2012), the Board discussed the need for providing long term firm requirements by the clients which would provide adequate lead time for production. This issue was raised specifically with the Army, to consider placement of roll-on-indent for weapons, based on the Army's long term induction/de-induction plan of weapon systems, which would enable the Board to dovetail its modernisation and capacity augmentation plan with the Army's requirement.

7.2.2.2 Projection of requirements by the clients

The multi-year Roll-on Plan of the Army helps the Board in production planning. However, the projections in the Roll-on-Plan were 'tentative' and subject to change for increased requirement based on actual deficiencies emerged after Annual Provision Review by the Army. Accordingly, Army was to plan supplementary indents for increased requirements. We found that the Roll-on Plan of Army covered only 13 of the 21 weapon items manufactured by the Factories for the Army. The requirement for the remaining products was still being communicated only through indents from the Army.

Out of 11 items, issued directly to the Army and sampled in our audit, the Roll-on plan covered eight strategic items; the remaining three items were those which had faced uncertainties in production[76]. In this connection we found that:

- In respect of four items *viz*., 5.56mm Rifle, 105mm Light Field Gun, 40mm UBGL and 9mm Pistol, the Factories (RFI, SAF,OFT and GCF)

[73]The plan indicates the minimum essential requirement based on trends in wastage.
[74]The indents represent a firm order. Technical Instructions (Director General Ordnance Services Technical Instruction 307 governing provision review of Class-'A' stores) require that the Army conducts Annual Provision Review in November each year, to assess its annual requirements against the availability of stock and issues pending from the Factories against past indents.
[75] except for AK-630 Gun being a major item, for which the Navy intimated its total requirement in December 2011.
[76]These items included 5.56mm Rifle-Foldable butt, 5.56mm Light Gun Machine, 7.62mm Gun Machine. The production of 5.56mm Light Gun Machine and 7.62mm Medium Gun Machine had been stopped for a long time and re-started only during 2012-14. The bulk production clearance for 5.56mm Rifle-Foldable butt was given by the Army only in October 2012.

produced these items during 2011-12 to 2013-14 to liquidate the Army's indents lying outstanding as of 1 April 2011 with the Board. Consequently, the Board had not revised the targets significantly with reference to the Army's Roll-on Plan during 2011-12 to 2013-14. Moreover, the Army's requirement of 5.56mm rifle (fixed butt) and 9mm Pistol was declined and reduced to nil in 2013-14.

- With respect to other four items *viz.* 81mm Mortar, 84mm Rocket Launcher MK-III, Spare Barrel (T-72 tank) and Spare Barrel (T-90 tank), the Army increased the annual indented quantity by 80 to 172 *per cent* as compared to the quantity projected in the Roll-on Plan during 2011-12 to 2013-14 (**Annexure XVI-A**). Moreover, five out of eight indents relating to these items were received from the Army after the commencement of the year during the same period. But the Board did not revise the targets upwards given to the Factories (GCF and GSF), which were already facing capacity constraints.

- On the whole, the targets were fixed lower than the Army's requirements in 23 of 31 instances (11 items) during 2011-14 (**Annexure-XVII-A**).

We found that in the case of MHA also, the targets fixed for the years 2011-12 to 2013-14 in the Target Fixation Meetings and accepted by the Board, varied largely from the roll-on-plan **(Annexure XVI-B)** with reduction in targets in 83 *per cent* instances (six items) during Target Fixation Meetings (December 2010, November 2011 and November 2012). In particular, the Board objected (November 2012) to reduction of targets for three items (5.56mm Rifle, LMG and 9mm Carbine) in 2013-14 during Target Fixation Meeting as it would result in idling of capacity in small arms manufacturing Factories. The Board also expressed (July/August 2012) serious concern to the MHA regarding less/nil receipt of fund allocation from the MHA for 9mm Pistol Auto and Carbine (2012-13) as compared to the targets indicated in the target fixation meeting (November 2011). With the Armed Forces, payment for issues is made through book adjustment and hence not an important parameter while fixing the delivery schedule. This is not, however, the case for MHA, where late or non-receipt of payments became a critical factor that forced the factories to re-schedule deliveries against targets or revise the production targets itself.

The Board stated that the quantities under Roll-on-Plan were not covered through matching indents and in the absence of long-term requirements, the Factories could not strategically plan modernisation or diversification to optimally utilise their available capacity. All these factors adversely affect the capability to meet Customer's strategic needs on time.

7.2.2.3 Target fixation with reference to capacity

The Board fixes and communicates annual targets to the Factories, keeping in regard the client indents and the production capacity of the Factories.

Correlation of the indentors' requirements, production capacity[77] in the Factories and the annual targets revealed the following:

- When targets were fixed in excess of capacity, the Factories failed to meet the targets. This happened in 31 instances covering 17 items, where cumulative shortfalls over 2011-14 were observed for 16 items (spare Barrel T-72 being the exception). The shortfall was in the range of five to 71 *per cent*.

- The Board faced capacity constraints in 17[78] of 25 sampled items with the capacity in the Factories being lower than the requirements[79] of the indentors (**Annexure-XVIIA & Annexure-XVIIB**). Some of these were strategic weapons as shown in **Table-32**.

Table-32: Significance use of strategic weapons

Name of weapon	Significant use of the weapons
40mm Under Barrel Grenade Launcher	Fitted with INSAS Rifle used by infantry soldier to fire bullet & grenade from rifle & grenade launcher without changing firing posture.
T-90 Ordnance/ Spare Barrel T-90	Main armament of T-90 tank used by the armoured regiment of Indian Army.
AK-630 Gun	Main armament comprising six concentric 30mm Gun Barrels fitted with battle ships of Indian Navy and used as anti-aircraft and anti-missile defence.
105mm LFG	Light Field Gun used by artillery regiment of Indian Army.
84mm RL MK-III	Used as anti-tank weapon but also suited for attacking armoured personnel carriers, machine gun posts and troops in the open.
81mm Mortar	Light Weight Weapon to provide quick, accurate and heavy firepower in any phase of battle and all types of terrain including mountains.

- Targets for items were fixed lower than the client's needs particularly in those items for which the Factories had production problems, like 5.56mm Light Machine Gun (2011-12 to 2012-13) in which the production re-started after a hiatus of 10 years. Similarly, targets for spare barrel T-72 was fixed lower than capacity during 2011-12 to 2012-13 due to problems in sourcing forgings and priority given to the needs on T-90 barrel. However, Audit did not find mention of capacity shortage or production problems in the documents relating to target fixation or any communication to the indentors in this regard. It was also observed that on the same item, the gap between client indents and the targets was higher in the case of Army as compared to MHA. Some of these items were 5.56mm Rifle Fixed Butt and Foldable Butt, 81mm Mortar, 5.56mm LMG and Pistol Auto 9mm.

[77] Under the Board's direction (May 2010), two committees assessed (August 2010) the product-wise capacity of the selected weapon manufacturing factories. But subsequent capacity assessment was not done in five of the six sampled factories. Small Arms Factory, Kanpur assessed a reduced capacity keeping in view the available manpower in the Factory. We used the data provided by the Board on capacity for our analysis.

[78] Rifle 5.56mm (Fixed & Foldable Butt), Rifle 7.62mm, Gun machine 7.62mm, Pistol Auto 9mm, 40mm UBGL, AK-630 Gun, 105mm LFG, Spare Barrel T-72 & T-90, 81mm Mortar, 84mm RL, 0.32" Pistol, T-90 Ordnance, LMG 5.56mm, 12.7mm Prahari and 12.7mm AD Gun

[79] Including outstanding dues against past indents

While accepting the audit observation, the Board highlighted (May 2015) specific constraints for certain items like 7.62mm MAG where production was being re-started after a hiatus of 12 years (1999-2000 to 2010-11) or 84mm RL, where the capacity of the foreign collaborator to supply barrels, was the limiting factor. The Board's reply was silent on the Board's failure to document the facts of the capacity shortage/ production problems during Target Fixation Meetings or to communicate the same to the indentors.

7.2.2.4 Capacity augmentation

Audit observed that weapon manufacturing Factories had been facing capacity shortages across the range of weapons in meeting annual indents **(Annexure-XVIIA)**. However, the Chairman of the Board in its Special Board Meeting (August 2012) intimated that the Board had undertaken capacity augmentation only for large calibre weapons (LCW)[80] where the capacity was lower than current and future requirements as indicated in the Roll-on-Plan (2011-12 to 2015-16) and capacity data furnished by the Board to Audit.

Capacity augmentation for LCW at a total cost of ₹377 crore in four factories was sanctioned in March 2012 with due date of completion by March 2015. The four Factories were Metal & Steel Factory Ishapore, Field Gun Factory Kanpur, Ordnance Factory Kanpur and Gun Carriage Factory Jabalpur. As of December 2014, only ₹47 crore (12 *per cent* of sanctioned cost) had been spent with orders placed on 47 *per cent* of the equipment required as eight of 11 civil works required were still in the tendering stage.

While accepting the delays in execution of civil works and procurement of plant and machinery, OFB stated (May 2015) that LCW project was linked with the finalisation of 155/52 calibre Towed gun for which selection process was not yet completed by the Army.

The contention is not acceptable because implementation of LCW project is not linked solely with the finalisation of the 155mm Towed Gun as the scope of the LCW project covered also other items like T-90 Ordnance, T-72/T-90 Spare Barrel, 130/155mm up-gunning, 155mm (45 calibre) gun, *etc*. The Board's reply was silent on reasons for delays in augmentation of capacity of these two items which are in the regular product line.

7.2.2.5 Communication of targets to Factories

According to Paragraph 5.5.2 read with Annexure-I of Board's Procurement Manual 2010, time-frame required for the procurement process for input materials is six months. Maximum time required for procurement under Ministry's power. Hence, the Factories must receive targets at least six months before the production year (by September of the preceding year). The indents placed subsequently by the users are adjusted in a staggered manner through mid-term revision of targets, commensurate with the available capacity of the Factories.

[80] T-90 Ordnance, Spare Barrel T-72/T-90, 130/155mm up-gunning and 155mm Gun

We, however, found that timely communication from the Board to the factories was not received for all the years. There was two to three months' delay (by November-December of the preceding year) by the Board in communicating the targets to the Factories. Targets were further revised by the Board during the production year for three to 14 items during 2011-12 to 2013-14 (**Table-33**). But revisions of targets mid–year disrupted the production of 11 items as discussed in the succeeding paragraph.

We further analysed the reasons for revisions of targets. In 2011-12, the revisions were made on receipt of the Roll-on Plan from the Army which was for the first time introduced in February 2011; the Roll-on Plan projected requirements that varied from the annual indent received for the year. The revisions led to increase in target for five items and decrease in target for nine items. The targets revisions by the Board were fewer in 2012-13 with only increase of targets for one item (84mm Rocket Launcher) due to enhancement in requirements of Army and MHA and decrease for two items (Pistol Auto 9mm, Carbine 9mm). In 2013-14, the targets were increased for seven items mid-year which we found were not caused due to mid-year revisions in indents from the users. Targets for Rifle 7.62mm was increased on the request of the concerned Factory and for 40mm UBGL, the same was increased due to availability of sufficient indent and healthy production trend at OF Trichy. For remaining five items[81], no specific reason was recorded by the Board while communicating increase in targets to the Factories.

Table-33: Comparison of original with revised targets in a year

Year	*Nature of revision*	*No. of items*
2011-12	*Increase in target*	*5*
	Decrease in target	*9*
	Status quo	*11*
	Total	***25***
2012-13	*Increase in target*	*1*
	Decrease in target	*2*
	Status quo	*22*
	Total	***25***
2013-14	*Increase in target*	*7*
	Decrease in target	*1*
	Status quo	*17*
	Total	***25***

Further we found from **Annexure-XVIIA and XVIIB** that out of 13 instances of upward revision, the Factories could not meet the targeted quantity in respect of 11 instances (11 items); in five instances[82] , they could not even meet the original targets. The downward revision helped the Factories to meet the targets only in four instances but there were eight other instances[83] where the Factories could not achieve the targets despite the reduction.

The Board justified (May 2015) the revision of targets as necessitated by changes in client requirements, which our analysis showed was not always the case as discussed above.

[81] 5.56mm Rifle fixed butt, LMG 5.56mm, Pistol Auto 9mm, Carbine 9mm, 12.7mm Prahari
[82] 5.56mm Rifle (fixed butt), Rifle 7.62mm, Pistol Auto 9mm, 12.7mm Prahari, 84mm Rocket Launcher MK-III
[83] 5.56mm LFG, Pistol 9mm, Carbine 9mm, 12.7mm Prahari, 84mm Rocket Launcher, AK 630 Gun, T-90 Ordnance, Overhaul with new barrel

7.2.2.6 Achievement of targets

Table-34 illustrates the production performance of the Factories in 2011-14 against the targets fixed by the Board. Further details are at **Annexure-XVIIA and Annexure-XVIIB**.

Table-34: Year-wise production performance

Year	Production as percentage of revised targets : No. of items						Total No. of items	Value of Short-fall (₹ in crore)
	≥ 100	99-80	79-60	59-40	39-20	<20		
2011-12	8	8	4	2	2	1	25	199
2012-13	4	10	5	3	3	0	25	495
2013-14	4	4	7	4	5	1	25	785
Total	**16**	**22**	**16**	**9**	**10**	**2**	**75**	**1479**

As seen from the Table that on an average, the Factories achieved the production targets at the level of 80 *per cent* and above in 38 instances (51 *per cent*) in 2011-14. But in 21 instances (28 *per cent*), the achievement was less than 60 *per cent*. The Factories registered their best performance in 2011-12, with 16 items (64 *per cent*) achieving the targets by 80 *per cent* and above against only eight items (32 *per cent*) in 2013-14. In 2012-13 and 2013-14, the number of products with 100 *per cent* achievement of targets came down to four. However, there were shortfalls in production/ issue in the range of 21 to 100 *per cent* in 37 instances (49 *per cent*) comprising 22 items[84]. Total value of shortfall in issue of the selected weapons against the revised targets stood at ₹1479 crore during 2011-14 with 294 *per cent* increase (₹586 crore) in 2013-14 over 2011-12 mainly due to shortfall in production/issue of six items[85].

Against 23 instances of fixing targets lower than the Army's requirements during 2011-12 to 2013-14 as discussed in **Paragraph 7.2.2.2**, the production was achieved at the level of 60 *per cent* and above in 13 instances (eight items) against the indented quantity. Production achievements were found far below the requirements of Army in respect of 5.56mm Rifle (Foldable Butt) for 2011-12 and 2012-13, Gun Machine 7.62mm for 2011-12 to 2013-14, 40mm UBGL for 2011-12 and 2012-13, 81mm Mortar for 2011-12 and 2012-13 and T-90 Spare Barrel for 2011-12 to 2013-14. Even the Board's targets could not be fully achieved in respect of 15 instances (nine items) *viz.* 5.56mm Foldable Butt (2011-12 and 2012-13), 5.56mm LMG (2013-14), Gun Machine 7.62mm (2012-13 and 2013-14), 40mm UBGL (2011-12 and 2012-13), 81mm Mortar (2012-13), 105mm LFG (2012-13 and 2013-14), 84mm Rocket Launcher (2012-13 and 2013-14), Spare Barrel T-72 (2013-14) and Spare Barrel T-90 (2012-13 and 2013-14).

[84] 5.56mm Rifle (Foldable Butt),5.56mm Rifle (Fixed Butt), 5.56mm LMG, Gun Machine 7.62mm, Rifle 7.62mm, Pistol Auto 9mm, Carbine 9mm, 40mm UBGL, AK 630 Gun,81mm Mortar, 84mm Rocket Launcher, 12.7mm Prahari, 12.7mm AD Gun, Final Gun Assembly of T-90 Tank, Spare Barrel T-72, Spare Barrel T-90, T-90 Ordnance, Overhaul with Old Barrel, Overhaul with New Barrel, 105mm LFG Ordnance, 0.315" Sporting Rifle, 105mm LFG with CES

[85] 84mm Rocket Launcher-2188 Nos-237 crore, 5.56mm Rifle fixed butt-28740 Nos-103 crore, 105mm LFG-41 Nos-107 crore, 12.7mm Prahari-100-29crore, 5.56mm LMG-4671 Nos- 26 crore, AK 630 Gun-2Nos-14 crore.

We analysed the production performance against revised targets on main weapon items in each Factory, result of which are shown in **Annexure-XVIIIA**. Delays in receipt of input stores are the predominant cause for slippages across the Factories as shown in **Annexure-XVIIIB**. This issue is further analysed in **Paragraph-7.2.3** against audit objective 2.

While accepting the audit observation, the Board stated (May 2015) that they were making all out efforts to meet the users' requirements of upgraded weapons with existing resources in spite of constraints and simultaneously modernised its resources. It added that the limitations in achieving the targets in physical terms were due to alteration of priorities based on interaction with the users apart from constraints in arranging all input stores for all the products in time. With regard to MHA, budget limitations were a constraint. During the Exit Conference the Board pointed out that despite the limitations, it achieved an increase of ₹400 crore in issue of weaponry in 2014-15.

The contention is not acceptable since apart from delay in receipt of payments from MHA, there were considerable delays in procurement of input stores. During the Exit Conference, the Board assured that a strong message would be sent to the Factories in this regard. We also found that the internal control exercised by the Board to monitor the Factories' performance against targets was inadequate, as further discussed in detail in **Paragraph 7.2.2.8**.

7.2.2.7 Reliability of production data

According to Paragraphs 668 and 670 of Defence Accounts Department Office Manual Part-IV (DAD OM), the manufactured items are accepted after inspection and thereafter, the accepted items are brought on charge in the Production Ledger. Subsequently, those items, when issued to the indentors through production issue vouchers are priced with reference to OFB's firm price list and accordingly, debited to the relevant Services' head.

However, it was observed that Factories prepare "advance issue vouchers" whereby they raise demands for payment from the Army without physical issue of the stores. Taking cognizance of the risks of accounting irregularities (depiction of unrealistic profit in the accounts, distortion of cost of production and work-in-progress, disparity between value of issues and actual expenditure booked under manufacturing head, *etc*.) and distortion in production figures, the Controller General of Defence Accounts (CGDA), New Delhi instructed all Controllers of Finance and Accounts (Factories)[86] in October 2007, not to accept advance issue vouchers without despatch particulars.

We had commented on this issue in Para 6.1.4.1 of Compliance Audit Report No. 30 of 2013. Ministry, in their Action Taken Note, stated (March 2015) that close monitoring of item-wise/factory-wise production and issue *vis-à-vis* monthly/quarterly plans was done and all out efforts were made to avoid recurrence of such incidence. Despite this, we found that such practice continued in four out of six Factories checked for the selected items. During

[86]Controller of Finance and Accounts (Factories) functions under the PCA (Factories) Kolkata for a group of factories on regional basis

2011-14, advance vouchers of ₹222 crore were prepared representing 10 *per cent* of the total issues of these Factories, as detailed in **Table-35** below**:**

Table-35: Factory-wise value of advance vouchers

Factory	**Value of advance vouchers (` in crore)**			
	2011-12	**2012-13**	**2013-14**	**Total**
Gun Carriage Factory, Jabalpur	79	57	0	136
Ordnance Factory, Trichy	14	33	22	70
Field Gun Factory Kanpur	0	0.5	8	8
Gun and Shell Factory Cossipore	0	0	8	8
Total spill-over issues	**93**	**91**	**38**	**222**
Total value of issues (Selected Items of four Factories)	838	763	697	2298
Percentage of spill-over issues to total issues	**11**	**12**	**5**	**10**

(Source: Database of Production Issue Vouchers and related gate pass)

The incidence of advance vouchers was highest in Gun Carriage Factory Jabalpur in 2011-12 and 2012-13. The Factory reported maximum value of issues (₹385 crore) in 2011-12, 21 *per cent* of the achievements represented an inflated figure which marginally came down to 19 *per cent* in 2012-13.

The Board stated that the vouchers were prepared only after complete manufacture of store and issue of inspection note by Quality Assurance Establishment, however, the despatch might be delayed due to reasons of economy in transportation to ensure full load for dispatch in each case. But the findings do not support the Board's claim as against target of 2012-13, Ordnance Factory Trichy and Gun Carriage Factory Jabalpur dispatched 12.7mm Gun and Spare Barrel T-90 to indentors up to November 2013, even though the items were shown as issued by March 2013.

The Board assured (May 2015) Audit during the Exit Conference that a serious view was taken of this issue and there was no spill-over issue in 2014-15.

7.2.2.8 Internal control on achievement of targets

The Planning Section in the Factory prepares the production plan and is required to monitor the pace of production. The Section collects the data on issues of products on daily basis and the Factory sends monthly production performance report to the Board. Monthly Production Review Meeting in the Factory is another tier of control. This meeting is attended by the General Manager and the heads of production shops as well as the Planning Section. Paragraph 4032 of the Board's Procedure Manual stipulates that the Factories should report to the Board the reasons for delayed production and issue of the products to indentors and action taken by the Factory to obviate causes of delay. We found that the meetings were conducted; the monthly reports were also prepared and sent to the Board. But five Factories (except Ordnance

Factory Trichy) did not report specific bottlenecks in production and instead, merely communicated the data on production and issue of items.

As per Ministry's order of February 1979, the Board is responsible for overall planning, monitoring and implementation of the production programme through the respective operating group and at the Board level, through monthly Board Meeting. Paragraph 4039 of the Board's Procedure Manual also stipulates that the Board is required to examine monthly progress reports of the Factories for suitable action taken in all cases where delivery schedule has not been maintained or is not likely to be maintained. We, however, found that the Board, in a routine manner, only instructed the General Managers of the Factories to make all out efforts for meeting the production targets. Even the minutes of the monthly Board meetings, did not indicate a threadbare discussion on the hold-outs in production.

The Board stated that the constraint in availability of input material and any other constraint in production were reported by the Factories through monthly reports to the Board. But we found that Factories' production performance/achievement report of March every year (2011-12 to 2013-14) lacked specifics, with only Ordnance Factory Trichy, highlighting the item-wise specific bottlenecks in production. Moreover, the reporting mechanism, being routine exercise, had not become effective to curb the malpractice of preparing advance issue vouchers by the Factories.

Conclusion

Army's Roll-on -Plan 2011-12 to 2015-16 projecting its requirements for the next five years, was a good practice that aided the Board in short term planning. However, indents received from the Army were not matching with the Army's Roll-on-Plan. MHA, an important buyer of weaponry, projected a Roll-on-plan in 2010. But its requirements were largely reduced in the annual target fixation meetings.

On 50 per cent of the items, the Army revised, in its subsequent indents, the requirements substantially from the projections in the Roll-on Plan. 60 per cent of the indents were received after commencement of the production year. But the Board did not revise the targets already given to the Factories.

The Board faced capacity constraints in 68 per cent of the items and hence, fixed lower targets than the Army's requirements for most of the items. However, the Board had taken up capacity augmentation project (₹377 crore) only for high calibre weapons with scheduled completion by March 2015. The project was yet to be completed as of August 2015.

The Board provided original target to the Factories in December/November of the previous year, giving only three months for advance planning by the Factories against six months time required for the procurement process for input materials. These targets were also revised mid-year which disrupted the production.

The Factories achieved the targets by 80 per cent and above for eight to 16 items during 2011-12 to 2013-14. But for five to 10 items, the achievement was less than 60 per cent. Delays in receipt of input stores are the predominant cause for slippages across the Factories. The indentors' requirements were fully met for four to eight items (in 16 of 75 instances) with reference to targets.

The malpractice of advance vouchers without actual physical issue continued in four Factories despite clear directions prohibiting it.

Recommendation 1: *The Ministry may support the Board's efforts for a comprehensive and firm commitment on the long term requirements for weaponry from the Army and Ministry of Home Affairs.*

Recommendation 2: *The practice of revision of targets mid-way through the production year by the Board is disruptive and may be resorted to, only in exceptional circumstances.*

Recommendation 3: *The Ministry may take effective measures to stop the practice of advance issue vouchers in the Factories so as to avoid distortion of accounts and production data.*

Response of audited entity on recommendations

The Board accepted the recommendations.

7.2.3 Marshalling resources for production

Audit Objective 2: *The Factories were able to marshal their resources timely to implement the production plan.*

On receipt of the targets from the Board, each Factory formulates the production plan. A key input are the resources to be deployed for the production: stores, labour and machines. It is important that the stores of the specified quality are procured on time and the labour and machines are used optimally.

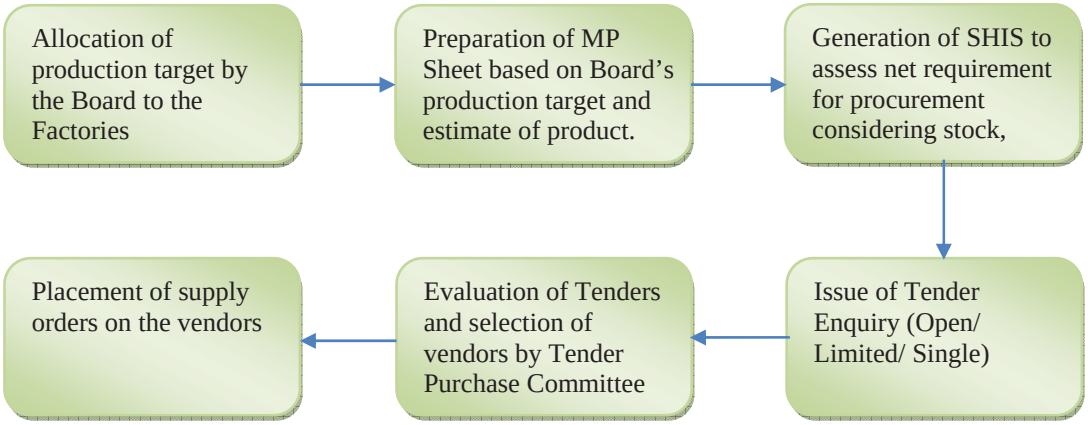
7.2.3.1 Timeliness in procurement of stores

According to Manual provisions[87], based on production targets allotted by the Board, the Factories are required to prepare Material Planning Sheet (MPS) which determines the quantum of materials required for each product. The MPS is sent to the Material Control Officer who issues the Stores Holder Inability Sheet (SHIS) to validate the estimation of procurement by the Planning Section. The SHIS forms the basis for initiating the procurement by the Stores Provisioning Section. A Tender Enquiry is issued to invite tenders from prospective suppliers. After evaluation of the tenders received from the potential suppliers by the Tender Evaluation/ Purchase Committee, competent

[87] Para 348 & 349 of Defence Accounts Department Office Manual Part-VI, Para 4.5.1, 4.6.1, 4.15.5, 4.15.6, 5.2.1 of Board's Procurement Manual 2010

authority decides to place supply orders on the selected vendors. The flow chart of procurement is given at **Chart-15**.

Chart-15: Flow Chart of Procurement



7.2.3.2 Procurement from trade sources

Paragraph 2.6.1 of the Board's Procurement Manual 2010 (OFBPM) stipulates that every individual in the chain of the procurement process is accountable for taking action in a specified time period so that the requirements of the indentors are met on time. Accordingly, a time limit[88] of two weeks is prescribed for issue of Tender Enquiry after preparation of the Stores Holders Inability Sheet (SHIS)[89]. For Limited Tender Enquiry and Open Tender Enquiry, 15 and 19 weeks (approx five months) respectively are provided to complete the procurement action, reckoned from the date of initiation of the SHIS to placement of orders[90]. We examined the timeliness in procurement during 2011-12 to 2013-14 in the sampled Factories, against the above benchmarks. Results of our examination are given in **Annexure XIX-A**. It was observed from the Annexure that:

- All the selected six Factories took inordinate time (1 to 8 months and beyond) against prescribed time of four weeks for issue of Tender Enquiry: 45 to 94 *per cent* of TEs were issued belatedly in five Factories (RFI, SAF, GSF, GCF and FGK) during 2011-12 to 2013-14.

- The time schedule for placing supply orders (after the receipt of the tenders) could be adhered only in 60-70 *per cent* of the supply orders in three Factories: Rifle Factory Ishapore, Small Arms Factory Kanpur and Gun & Shell Factory Cossipore. Gun Carriage Factory Jabalpur and Field Gun Factory Kanpur, whose products (Gun assembly for T-90 Tanks, Ordnance/Barrel for T-90 Tanks and 105mm LFG) mainly form components for the assembling Factories[91], substantially delayed the

[88] Annexure–I read with paragraph 2.6.1 of OFBPM
[89] SHIS indicates total requirement, present stocks and dues, net requirement *etc.*
[90] Those orders within the power of General Manager of Factory
[91] Heavy Vehicles Factory Avadi assembles T-90 tanks for which gun is supplied by Gun Carriage Factory Jabalpur, Gun Carriage Factory Jabalpur assembles Gun for which Ordnance/Barrel is supplied by Field Gun Factory Kanpur

placement of 97 *per cent* and 48 *per cent* orders respectively. While Ordnance Factory Trichy took more than five months in placing 69 *per cent* of the orders, Gun Carriage Factory Jabalpur took more than eight months to place supply orders in 68 *per cent* of the orders.

It was further observed that three Factories had delayed in placing 59 supply orders even after the due process had been completed and a vendor had been recommended by the Tender Purchase Committee (**Table-36**). Ordnance Factory Trichy was particularly tardy in this regard.

Table-36: Placement of orders after TPC approval

Time taken for placing supply order after TPC approval in days)	Number of orders			
	GCF	RFI	OFT	Total
Up to 15	9	7	8	24
15 -30	6	1	4	11
30-90	4	1	14	19
>90 days	1	0	4	5
Total	20	9	30	59

(Source: Supply orders data-base)

Delayed processing of procurement and finalisation of supply orders by the Factories adversely impacted on achieving the production targets. Illustrative cases of shortfall in production of end products linked with delayed procurement of related components are depicted in **Table-37** below**:**

Table-37: Delayed procurement of components and shortfall in production of weapons

Name of component	Time taken in placement of orders (in days)	Name of end product (Factory)	Shortfall in production (in *per cent*)
Return spring, Contactor Assy., Electric Trigger Assy.	306, 252, 183	30mm Cannon (OFT)	17 (2011-12) 20 (2012-13)
Barrel extension,	174	40mm UBGL (OFT)	36 (2011-12) 13 (2012-13)
Steel round 38mm diameter	154	7.62mm Rifle (OFT)	22 (2011-12)
Foldable Butt, Grip, Guard Hand Assy.	210, 180, 210	5.56 Rifle Foldable (RFI)	62 (2011-12) 22 (2013-14)
Lanyard, Extractor, Hammer, Trigger, Locking Piece, Catch magazine	570, 600, 420, 390, 510, 210	Pistol Auto 9mm (RFI)	11 (2012-13) 48 (2013-14)

(Source: supply order database and production performance reports of factories)

The Factories (FGK, RFI & SAF) attributed the delays to insufficient number of vendors, time taken for price negotiation, shortage of manpower, frequent change in targets, dropping of tenders due to receipt of "freakish" rates quoted, lack of awareness of the vendors about e-procurement system, delay in capacity verification of the vendors *etc*. But the data on delays in placing orders even after the selection of the vendor is a strong indication of inefficiencies in the Factories that they will be served to recognise and correct.

The Board in its reply (May 2015) stated that:

- Open Tender Enquiry (OTE) cases took lot of time due to limitations of procurement procedure specified in the procurement manual. For Limited Tender Enquiry (LTE), the delay was due to receipt of single response/no response in the first attempt;

- The time taken in placement of supply orders in case of OTE could be substantially reduced once the process of capacity verification was delinked from the tendering process. Besides, the problem of non-availability of finance members in some of the factories also posed problems;

- Efforts were being made to reduce the time taken for issue of tender enquiries and placement of supply orders; and

- Delay in procurement had no real impact in achievement of targets.

Board's claim of no impact of delayed procurement of stores contradicted its own admission (against audit objective 1 on meeting targets) that arranging input stores was also a constraint in production.

During the Exit Conference (May 2015), these issues were discussed in detail. The Factories rely substantially on LTE and delays in issue of Tender Enquiry and in placement of supply orders even after the selection of the vendor in the Purchase Committee, are weaknesses in implementation of Rules rather than limitations in the Rules themselves. The Board took a strong view on tardiness in placing orders with the Chairman directing an investigation into the issue.

7.2.3.3 Procurement from sister factories

Apart from procuring the input materials from trade firms, weapon manufacturing Factories also source components from sister Factories. Field Gun Factory Kanpur and Ordnance Factory Kanpur receive various forgings from Metal and Steel Factory Ishapore for production of T-72/ T-90 barrels. Similarly, Gun Carriage Factory Jabalpur relies on Ordnance Factory Kanpur and Field Gun Factory Kanpur for T-90 and T-72 barrels required for production of guns.

It was observed that the production of barrels for the high calibre weapons: 105 mm Field Gun, T-72 and T-90 guns, was affected by the absence of capacity of the Annealing Furnace for metal forgings (particularly the improved "Pre-Yield Trial" forgings) in Metal and Steel Factory Ishapore. The capacity was only for 330 barrel PYT/forging, while the combined demand for barrels each year averaged to 490 during 2011-12 to 2013-14. Further, this Factory had also capacity constraints to manufacture Electro Slug Remelting (ESR)[92] slugs (input steel) for their conversion into forgings. Hence, the Factory placed orders on a Defence Public Sector Undertaking *viz.* MIDHANI.

[92]The electroslag remelting (ESR) process is used to remelt and refine steels and various super-alloys, to produce high-quality ingots

Against an annual requirement of 5592 MT of ESR slugs for all the high calibre barrels, the existing capacity (including the capacity in MIDHANI) was only 3000 MT. As a result, there were short-supplies of forgings from Metal and Steel Factory Ishapore to Field Gun Factory Kanpur and Ordnance Factory Kanpur for production of barrels. This, in turn resulted in short supply of barrels from Field Gun Factory Kanpur and Ordnance Factory Kanpur to Gun Carriage Factory Jabalpur, as detailed in **Annexure XIX-B**.

The Board stated (May 2015) stated that the constraints in arranging inputs of large calibre barrels arose from surge in requirement of Army for T-72 barrels, however all the requirement of large calibre weapons for Army were being met.

The contention is not acceptable as the Army's requirement of large calibre weapons were not met fully because there was shortfall in production of Spare barrel T-72 (2013-14), Spare barrel T-90 (2012-13 and 2013-14), 105mm LFG (2012-13 and 2013-14) as discussed in **Paragraph 7.2.2.6**.

7.2.3.4 Inspection of input materials

Quality control of input stores is critical to ensure the required specifications in weaponry. Paragraph 1.4 of the Board's Standard Operating Procedure stipulates that all materials are required to be inspected within 15 days for acceptance after their receipt in the Factory. It was observed that in 51 *per cent* of the instances, the Factories completed the quality control of stores within 15 days **(Annexure XIX-C)**. As can be seen from the Annexure that in 27 *per cent* instances, they took 16 to 30 days for inspection of stores. It is noteworthy that there were 8775 instances (22 *per cent*) where the time taken exceeded one month. The Field Gun Factory Kanpur and Gun Carriage Factory Jabalpur reported the longest lead time, with 63 *per cent* of the instances crossing the 15-day time limit.

Field Gun Factory Kanpur informed (October 2014) Audit that the excess lead time beyond time limit of 15 days was because of the requirement of ultrasonic testing (for detecting bubbles/ cracks in barrels), sometimes twice, on forgings of T-72 and T-90 Barrels and its components.

The delays in inspection and taking charge of the input materials were attributed (September-October 2014) by the other Factories to:

- Delayed receipt of test certificates, pre-despatch inspection report and guarantee certificate from the suppliers (SAF);

- Limited infrastructure for inspection and delays in machining trials by the production shop (OFT);

- Average inspection time for input materials for 84mm Rocket Launcher and AK 630 Gun was 29 and 32 days respectively due to quality assurance and surveillance done by DGQA authority after completing the inspection by the Factory for final acceptance (GSF);

- Delayed receipt of test reports from outside laboratory, non-supply of sample materials for testing and time taken by the DGQA authority for testing of certain critical items (GCF).

The Board needs to take cognizance of specific practical constraints faced by different Factories in inspection of the input materials.

While explaining delays in inspection of input materials, the Board stated that the point raised by Audit was noted and instructions were being issued to the Factories to comply with the norms specified in the Standard Operating Procedure.

7.2.3.5 Internal control and monitoring of procurement

We examined the internal control and monitoring of procurement within the Factories as well as at the Board level and observed that:

- Five Factories (SAF, FGK, GCF, RFI and GSF) monitored progress of generation of Material Inward Slip (MIS) and its conversion to receipt voucher after inspection of the input materials through management information system. But no other periodical reports and returns were generated for monitoring timely receipt and inspection of stores. No systemic review was also done for timely issue of tender enquiries and placement of orders. Scrutiny of minutes of adhoc committee meetings held between the Factory managements and Internal Audit during 2011-12 to 2013-14 revealed that the issue of receipt/inspection of stores did not figure during discussion. Similarly, these issues were never discussed in the meetings of Unit Level Management Committee held between Factory management and Accounts Office except at Rifle Factory Ishapore.

- The Board had not put in place any mechanism for monitoring of positioning stores by the Factories at its level, nor was there any procedure for sending periodical reports and returns by the Factories to the Board regarding progress of procurement of stores with reference to production targets till 2012-13. Subsequently, while communicating production targets for 2013-14 to the Factories, the Board instructed the Factory managements to furnish fortnightly progress report on material procurement action. Despite inordinate delays in procurement process and inspection of input materials at the Factories, this issue was never discussed in the monthly Board Meetings to plug the holes.

The Board stated that several measures had been put in place. For instance, a weekly Input Material Review meeting was held under chairmanship of General Manager at Small Arms Factory, Kanpur. In the Field Gun Factory, the entire procurement activity was mapped on-line which got continuous attention of the management. Ordnance Factory Trichy claimed (August 2014) a day-to-day review of bottleneck items.

The contention is not acceptable because all the selected Factories did not generate periodical reports for monitoring timely receipt and inspection of

stores, nor did they create reports on timely issue of tender enquiry and placement of orders. The Board's reply was silent on inadequacy in monitoring at the Board level.

7.2.3.6 Manpower utilisation

Optimum and effective utilisation of manpower and machinery is essential to ensure the productivity in Factories so as to meet the production targets and minimise the cost for timely delivery of quality products to the indentors.

Direct Industrial Employees[93] (IEs) are engaged in production based on the workload in each production shop. The available Standard Man-hours (SMH) for each month are worked out based on number of direct IEs engaged in production for eight hours a day for 25 days in a month. The output SMH is determined based on the total quantity of each item manufactured during the month and the SMH required for all the items as per the labour estimate. The Piece Workers are given piece work profit as an incentive, based on their actual output SMH compared to the input SMH. Piece work profit is calculated[94] as a percentage of excess output SMH over the input SMH.

We examined as to how the Factories effectively marshalled the direct IEs for production activities for a sample period of 2013-14 at the selected Factories based on available SMH and output SMH data furnished by the Board. Accordingly, we plotted Factory-wise and month-wise actual output SMH **(Annexure-XX-A & B)** against the following two standards adopted by the Board for assessment of requirement of direct IEs:

- Manhours available with 10 *per cent* absenteeism; and
- Manhours available with 10 *per cent* absenteeism and 50 *per cent* piecework profit.

We found that all the Factories reported high incidence of piece work profit to direct IEs. Output SMH of these four Factories crossed the reasonable limit of maximum output SMH with 50 *per cent* piece work profit in good number of months in 2013-14; RFI- eight times, OFT- six times, SAF- 11 times, FGK- four times. We also charted **(Annexure-XX-B)** the trends in production and issue across the 12 months of 2013-14 in order to draw a correlation between utilisation of manpower and production. Despite substantial labour efficiency and output SMH, these Factories recorded shortfall in production (against targets) for 13 items by 3 to 81 *per cent* during 2013-14 as discussed in **Paragraph 7.2.2.6**. The persistent trend of high piece work profit of 50 *per cent* and above indicates that labour estimates were inflated which impacted the cost of production.

The Board stated that labour estimates prepared by proven industrial engineering method were not high. Proficiency of a worker engaged in a particular operation for a long period was one of the reasons for higher piece

93 Labourers directly engaged in production process involving machines and materials
94 Piece work profit percentage = {(Output SMH-Input SMH)/ Input SMH} X 100

work earnings. In any case, the factories always met the allotted targets and there were no shortfalls.

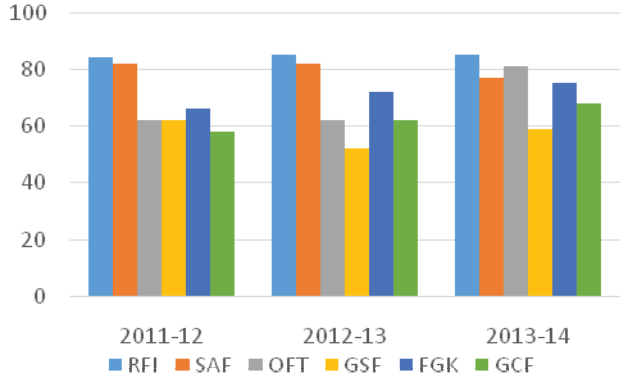
The Board's reply is not acceptable because shortfalls in achievement of targets (ranging from three to 81 *per cent* for 13 items) were reported in RFI, SAF, FGK and OFT during 2013-14. Continuous trend of high piece work profit at 50 *per cent* or more was a strong indicator of inflated labour estimates which merits review as it ultimately resulted in increase in cost of production.

7.2.3.7 Utilisation of machine-hours

As per Ministry's order of February 1979, Ordnance Factories are required to utilise at least 80 *per cent* of their installed capacity. However, the Board revised (August 2013) the Manual for procurement of Plant and Machinery without the approval of the Ministry. Paragraph 3.2 of the Manual stipulates calculation of capacity based on 80 *per cent* efficiency each of machine and manpower *i.e.* overall 64 *per cent* efficiency.

The machine hour utilisation against availability of total machine hours at the six Factories during 2011-12 to 2013-14 is given in **Chart-16**. Declining trend of machine hour utilisation was found in Small Arms Factory Kanpur (82 to 77 *per cent*) and Gun and Shell Factory Cossipore (62 to 59 *per cent*) while upward trend was observed in Ordnance Factory Trichy (62 to 81 *per cent*), Field Gun Factory Kanpur (66 to 75 *per cent*) and Gun Carriage Factory Jabalpur (58 to 68 *per cent*). Utilisation of machine hours at Rifle Factory Ishapore was almost static at the level of 85 *per cent* during 2011-12 to 2013-14. Utilisation of machine hours was achieved at the level of 80 per cent and above only in six of 18 instances in three Factories (RFI-3, SAF-2 and OFT-1).

Chart-16: Utilisation of Machine Hours



Conclusion

Delay in procurement of stores had impacted the Factories in achieving the targets placed by the Board. Three out of the six Factories placed 60 to 70 per cent of their supply orders in 2011-12 to 2013-14, within five months of identifying the requirement of stores. The remaining Factories could meet the timelines in 3 to 52 per cent of the supply orders. Gun Carriage Factory Jabalpur took more than eight months to place supply orders in 67 per cent of the orders. Ordnance Factory Trichy delayed placement of orders in 69 per cent instances. Compounding the inefficiencies in procurement from trade sources, was the inability of a sister Factory in meeting the requirements for

forgings for manufacture of barrels for high-calibre weapons at Field Gun Factory Kanpur.

We found that the Factories could not complete the quality control of stores within prescribed 15 days time in 40 to 63 per cent instances. It is noteworthy that in 22 per cent instances, time taken for inspection exceeded by one to three months and beyond.

All the Factories reported high piece-work profit. Even after exceeding the maximum labour hours available and with labour reported to have contributed 1.5 times its normative output within those hours through most of the year test checked (2013-14), the production did not meet the targets. This indicates that the labour estimates in production are inflated which allows space for high piece work profit payments.

Recommendation 4: *The Board may take cognizance of the tardiness in procurement and inspection of stores. The stipulated timeline of five months for placing orders may be reviewed to seek an achievable benchmark.*

Response of audited entity on recommendations

The Board accepted the recommendation. We were informed (May 2015) that the Board has approached the Ministry for special dispensation for procurement of exceptional items which are difficult to procure, powers to place long term contracts and streamline the procurement procedures.

7.2.4 Quality control and Quality Assurance

Audit Objective 3: *Strong quality control measures ensured timely issue of quality weapons to indentors.*

7.2.4.1 Quality control and assurance framework

Quality of weaponry is paramount as it ensures predictability in usage particularly in accuracy in firing as well as safety of the soldiers using it. We examined the performance of the Board in this regard particularly with reference to its internal controls on quality assurance.

Ordnance Factories follow a system of multilayer quality assurance before issue of final products to the indentors. The first tier of checks is by the Quality Control (QC) section of the Factory. The second tier is of the Senior Quality Assurance Establishment (SQAE) attached to each Factory, representing the Directorate General of Quality Assurance (DGQA).

QC section of the Factory inspects and accepts the input materials/ components on their receipt, it checks at designated control points during the manufacturing process. Paragraph 14 (d) of DGQA Standing Orders Technical Vol-II stipulates a requirement of 100 *per cent* quality control checks of the finished products by the Factories before their submission to the DGQA for quality assurance. The QC in the Factory can result in clearance for the items for inspection in DGQA's Quality Assurance or "Return for Rectification"

(RFR), by which the Factory's Production Shop is required to rectify the defects pointed by QC. However, the Board confirmed (May 2015) us that 100 *per cent* QC check is done for critical items/components.

DGQA carries out quality assurance (QA) inspection on the basis of sampling of the finished products[95] before issue to the indentors. DGQA is required to sentence the products either as 'accepted' or 'rejected'. Under the DGQA's Standing Orders (December 2010), 'Return for Rectification' (RFR) should not be awarded by the DGQA at final inspection stage; RFR being the responsibility of the Factory QC.

The Factories informed Audit that the QC is normally restricted to visual examination of the item and gauge measurements. The functional testing of the weapons by firing is done only in QA and RFR in QA, although not envisaged in the system, is inevitable.

The DGQA also issues "Quality Improvement Notes" for future reference, suggesting measures for quality improvement. These are issued on the basis of inspection at control points in the Production Shop (during production) or at the time of inspection of final products. The Factories are required to provide SQAE a feedback on implementation of these notes.

Although a multi-tiered structure for quality control and assurance is laid down and well-established in the Factories, the Board did not prescribe time limit for quality inspection by the Factory; the DGQA also did not fix a time frame for quality assurance inspection of the finished products. Our sample analysis revealed that in most Factories, the quality tests were completed within 15-30 days at each level: QC and QA.

7.2.4.2 Quality control by Factories

Quality Control section of the Factory is required to conduct 100 *per cent* inspection at hand functioning stage both for components and complete weapons. Different stages of inspection as stipulated in the Quality Audit Plan (QAP) for components are material verification, dimensional checking both at various control points and surveillance points, crack detection, checks of hardness/protective finish. Similarly, for complete weapon, the assembly stage inspection is carried out to verify protective finish, colour matching of all components, damage, gauging of dimensions, safety-fire and other technical parameters[96] and rifle assembly view records (RAVR) are accordingly generated.

We examined quality control (QC) activities for sampled months[97] during 2012-13 and 2013-14 in respect of:

- **5.56mm Rifle (Fixed Butt)** - complete weapon and its one major component *viz.* Breech Block at Rifle Factory Ishapore, and

[95] In addition, DGQA tests

[96] Trigger pull, cover fitment, functioning of various parts/components.

[97] June-July 2014 for complete weapon (Rifle 5.56mm) and January-March 2013 and 2014 for Breech Block at RFI. August-October 2012 for 7.62mm MAG at SAF.

- **7.62mm MAG** - complete weapon along with component *viz.* Block Front at Small Arms Factory Kanpur.

Results of our examination are as under:

- Scrutiny of inspection notes (January to March 2013 and 2014) of the Factory for the component *viz*. Breech Block of Rifle 5.56mm revealed that while the control point inspection required for dimensional checking of component was conducted by the QC section of the Factory, dimensional checking at the surveillance point was not carried out. We found that due to dimensional variations, 1909, 1398 and 1177 Breech Blocks were declared rejected at the QA stage during 2011-12, 2012-13 and 2013-14 respectively, even though the QC section had carried out dimensional checking at control points.

- The Factory management intimated (September 2015) audit that 100 *per cent* inspection/check of complete weapon (including visual inspection) was carried out by the QC section of the Factory. However, the Factory management could not furnish the check sheets for 2012-13 and 2013-14 in support of their claim. It was reported to have been destroyed after one year. This was contrary to the provisions of the APEX Quality Manual at the factory (RFI) which stipulates that all record of monitoring and measurement of product must be maintained by the production sections and allied QCs for a period of two years. The Factory management submitted 323 check sheets (RAVR stage) only for the month of June and July 2014 which indicated the extent of checking under various parameters.

  On scrutiny of those check sheets we found that the parameters of inspection (*viz.* protective finish, colour matching of components, safety-fire, gauging inspection of barrel bore *etc.*) as indicated in the inspection schedule of Quality Audit Plan were not included in the check sheets. This indicates that the requirement of QC plan was not properly addressed in the check sheets to ensure 100 per cent checking of all the prescribed parameters.

- Small Arms Factory Kanpur did not prepare the QC plan for Block Front (component) and complete weapon (7.62mm MAG). No check sheet for inspection of different parameters in respect of the component and complete weapon was formulated to ensure 100 *per cent* inspection of all the parameters. The Factory only maintained daily work register and inspection notes to record the extent of acceptance, RFR and rejections of components and complete weapons without recording the details of checks carried out against the prescribed norms. Therefore, the QC in the Small Arms Factory Kanpur was inadequate despite high incidence of RFR (52 *per cent*) and rejection (53 *per cent*) as declared by SQAE wing after QC inspection by the Factory during 2011-12 to 2013-14 as discussed in **Paragraph 7.2.4.3.**

7.2.4.3 Awards in quality assurance: RFR and final rejections

Although awarding of Returned for Rectification (RFR) is the responsibility of the Factory's QC section, the same was continued to be awarded for weapon items by the Senior Quality Assurance Establishment (SQAE) who is no longer authorised to do it as mentioned in **Paragraph 7.2.4.1**.

We examined the instances of RFR by SQAE, rejections by SQAE and by the indentors and implementation on quality improvement notes in all the six Factories. The Board did not prescribe the acceptable level of RFR against different classes of items. As RFR leads to delays in issue of finished items to the indentors and increase in cost for rectification, introduction of modern machinery, standardisation of specifications for components and finished products, quality checks at the time of receipt of components, are all steps to reduce the incidence of RFR, particularly of established items. A case study of 5.56mm Rifle, an established product of Rifle Factory Ishapore, Small Arms Factory Kanpur and Ordnance Factory Trichy at **Annexure- XXI** provides insights into the problems on quality faced by the Board.

In addition to the 5.56mm Rifle, defects were noted against major items of manufacture in all Factories, with Small Arms Factory Kanpur reporting the highest incidence of RFR and rejection mainly of 7.62mm Machine Gun, 5.56mm LMG. Details of Factory/item-wise incidence of RFR and rejections along with reasons are indicated in **Annexure-XXII**. Total value of RFR and rejections during 2011-12 to 2013-14 worked out to ₹390 crore and ₹145 crore respectively for 13 items.

Particularly noteworthy were RFR (52%) and rejections (53%) in 7.62mm Machine Gun (MAG), RFR in 30mm cannon (34%) and 12.7mm Air Defence Gun (100%) in Ordnance Factory Trichy and RFR in 84mm Rocket Launcher-Mark III series (19% to 66%) during 2011-12 to 2013-14.

During the Exit Conference, Small Arms Factory Kanpur informed Audit that although the documents of SQAE cited them as rejections, the 7.62mm MAG were actually returned to the Factory which rectified the defects and thereafter, the weapons were issued to the Army. However, we did not receive documentary evidence in this regard, though called for (June 2015).

Besides the delays leading to slippages in target, repeated testing led to excess consumption of ammunition[98] worth ₹7 crore in proof testing of 5.56mm Rifle, 5.56mm LMG, 7.62mm MAG and 9mm Pistol in 2011-12 to 2013-14. Further, the quality inspection notes of SQAE pointed out dimensional deviations in T-72 barrel with overhaul, T-90 Ordnance and 105mm Light Field Gun Ordnance manufactured by Field Gun Factory Kanpur, which should have been detected by the Quality Control section of the Factories; an indication of inadequate quality control.

While accepting the audit observation, the Board stated (May 2015) that:

[98] The SQAE conducts proof firing of weapons with the ammunition as per scale laid down on the basis of which it is accepted.

- Defects of RFR items were trivial in nature and subjective, and had not affected function of the weapons. The sentencing of RFR by SQAE involved minor adjustment of weapon which was necessitated after dynamic firing.

- As regards rejection at SAF, most of the weapons got repaired and re-submitted and few finally rejected weapons were converted for drill purpose.

- Defects/problems reported by the users were due to prolonged use of vintage weapon and sometime occurred due to mishandling/improper maintenance of the weapons by the users.

The reply of the Board did not justify high incidence of RFR and rejections in respect of 7.62mm MAG, 30mm Canon, 12.7mm AD Gun and 84mm Rocket Launcher which led to delay in issue of these weapons after carrying out rectification work. The Board, however, assured that detailed analysis of RFR and rejection would be carried out by Quality Audit Group (QAG) of the Board. Reply did not indicate the specific time-frame by which QAG would complete its assignment and recommend corrective measures for implementation.

7.2.4.4 Acceptance of weapons with deviations

We found that SQAE accepted weapons with minor deviations in manufacturing not affecting design, material, serviceability/functions, safety etc. The SQAE attached to Field Gun Factory Kanpur accepted 84 weapons (34 *per cent*)[99] worth ₹38 crore with 'Production Deviation' for issue to Gun Carriage Factory Jabalpur during 2011-12 to 2013-14. In response to Audit observation, Field Gun Factory Kanpur stated (October 2014) that the deviations were of minor nature which "would not affect function inter-changeability and safety of gun."

Similarly, despite non-achievement of specified firing rate of 900 to 1000 rounds per minute, the SQAE (Small Arms) Kanpur accepted 592 Machine Gun 7.62mm (71 *per cent*) worth ₹27 crore produced by Small Arms Factory Kanpur for issue during 2011-12 to 2013-14. SQAE (Small Arms) informed (September 2014) Audit that such types of deviations had been granted since November 2009 after intervention of the Chairman of the Board and the Ministry.

Gun Carriage Factory Jabalpur also accepted various components of 105mm LFG (cradle, saddle, valve, rod, bracket, *etc.*) and of T-90 Gun (cradle assembly, sleeve) with deviations during 2011-12.

We noted that the Army had also raised (May 2012) concerns on quality with the Board and the Ministry. It was felt that given the "high dependence on supplies from the Board", these issues must be addressed on priority. The Army noted (May 2012) that "the number, frequency and types of defects

[99]Out of 250 weapons (105mm LFG, T-72 Overhaul and T-90 Ordnance) issued during 2011-14.

occurring in equipment is a matter of serious concern and is eroding the confidence of the users in the field. With no accountability in place and no punishments being meted out to the defaulting officials, urgent measures are required to check this malaise."

The Board did not communicate its response to the observations of the Army.

7.2.4.5 Internal controls and monitoring on quality

In order to effectively monitor the quality control and quality assurance, monthly interaction meeting is required[100] to be held between General Manager of Factories and head of the Quality Assurance Establishment to resolve technical and administrative issues. As per Para 30 to 32 of DGQA Standing Orders (Technical), QA Establishments are required to submit report on quality assurance bottlenecks and heavy rejections for providing additional controls as under:

- Cases of heavy rejections by the SQAE and causes for such rejections need to be reported to the AHSP[101] and the DGQA; and

- Cases of rejections/hold-ups should be immediately subjected to investigation by the Factories or jointly by the Factories and quality assurance establishment of DGQA and remedial measures taken urgently to avoid recurrence. However, no timeframe has been laid down for such investigations.

We found that the Factories held meetings regularly with their respective SQAE which also generated monthly reports with details of RFR, rejection, consumption of ammunition in proof etc. Audit analysis also showed high rejections on items like 5.56mm rifles, 5.56 mm LMG, 7.62 MAG. But investigation reports on the rejections were not available; nor were there documents to show intimation of such rejections to the AHSP and DGQA.

Formation of Committee/Teams

In 2008, the Ministry issued directions on the composition of the *alteration committee* with General Manager of the Factory and representatives from DGQA and users who would be responsible for identifying potential improvements in design, which may, *inter alia*, be necessitated by investigation of quality defects. Despite the instructions, Small Arms Factory Kanpur did not form the alternation committee till March 2014. No alteration committee meeting was held at Ordnance Factory Trichy and Gun & Shell Factory Cossipore during 2011-12 to 2013-14. Only two such meetings were held in March 2012 and March 2014 in respect of Gun Carriage Factory

[100] Paragraph 26 of Standing Orders(Technical) for Defence Quality Assurance Organisation (2010)
[101] Authority Holding Sealed Particular *i.e.* Controllerate of Quality Assurance for Small Arms and Weapons

Jabalpur. Some important issues[102] were not taken up by the Field Gun Factory Kanpur in the alteration committee meetings.

In order to address quality concern on a systemic basis, the Ministry ordered (October 2013) the Board and DGQA to constitute a team of officers comprising users, Quality Assurance agencies, DRDO and production agency to review effectiveness of quality assurance and quality control practices. The team was required to generate annual report for each Factory for consideration of the Board for improvement in quality assurance and quality control practices. The Factories were yet to institute this mechanism as of September 2014. These deficiencies indicate inadequate monitoring of the quality control and quality assurance activities by the top level managements.

The Board stated that quality related observations raised at various levels were discussed in monthly liaison meeting with the inspectors and corrective actions in the process were implemented and any modifications/changes required in the drawings and methods of inspection were also incorporated. The Board added that alteration committee was already in place at Factories and meetings conducted as expected. But Audit observed that the alteration committee was not formed at Small Arms Factory Kanpur; the Committee though formed did not meet during 2011-12 to 2013-14 at Ordnance Factory Trichy and Gun and Shell Factory Cossipore. Besides, the reply is silent about constituting a team of all stakeholders to review effectiveness of quality assurance/quality control practices as per Ministry's order (October 2013).

Conclusion

The Factories have a system of multi-tiered quality checks involving the Factory's own Quality Control (QC) sections and the Senior Quality Assurance Establishments (SAQE) attached to each Factory. But quality problems besiege the Factories with impact on cost, achievement of targets and above all, the reputation of the Board and its products. The incidence of "Return for Rectification" by the SQAE (although not mandated in the laid-down process, the SQAE returns a defective weapon for rectification by the Factory) and rejection were high on certain products like 5.56mm rifle, 7.62mm MAG, 30mm cannon and spare barrel T-90. The recurrence of defects previously pointed out by the SQAE in its Quality Inspection Notes indicates inadequate attention to these Notes. Defects such as variations in gauge dimensions fall in the realm of inspections by the Factory QC, which remained undetected and were raised at subsequent stages by SQAE. The users, the Army noted the erosion of trust in field units because of weapon defects. The Factories consider the defects pointed out by SQAE as "minor" and as "subjective judgments". Some defects are seen as a consequence of poor handling by the users, Army/MHA. On the other hand, the common perception is that the Ordnance Factories produce weapons of poor quality. It is not in public interest that the citizens perceive that its Armed Forces are being provided with weapons with quality problems.

[102] Issues like premature expiry of 669 Guns 105mm LFG without completing prescribed 4500 rounds of firing

Recommendation 5: *The Board may segregate the critical, major and minor defects[103] raised by SQAE and the users, on major items of weaponry and identify short and medium term strategy to address the quality issues, including modernisation of plant & machinery so as to strengthen quality control as well as to increase the accountability of the Factories.*

Recommendation 6: *The DGQA may re-look its policy with regard to prohibiting "Return for Rectification", which is not being followed in its units. In such a case that "Return for Rectification" is considered acceptable by DGQA, the Board may fix the acceptable limits for "Return for Rectification", with different levels for established and new items.*

Response of audited entity on recommendations

The Board accepted the recommendations.

7.2.5 Financial management

Audit Objective 4: *The Factories instituted controls for a close watch on utilisation of funds as well as on cost of production and recovery of costs.*

7.2.5.1 Utilisation of budgeted funds

The Accounts are prepared by the Principal Controller of Accounts (Factories), Kolkata. Local Accounts Office (LAO) of each Factory compiles the monthly accounts which are sent directly to the Principal Controller of Accounts (Factories) for consolidation. These accounts are integrated into the Appropriation accounts on the utilisation of the budget allocations from the Consolidated Fund of India.

The Board receives budgetary grant to meet its running expenses *i.e.* the revenue expenditure. Receipts, including those from sales of products to Defence Establishment[104] are booked as credit. The Board is allowed to recover its cost from the sale of products to the indentors. There was net surplus in the Account from the operations of the six Weapon manufacturing Factories (**Table-38**) in all the three years.

[103] CRITICAL DEFECT: A defect that on analysis, judgement and experience indicates that it is likely to result in hazardous or unsafe conditions for individuals using maintaining or depending upon the product or is likely to affect the performance of the function of a major end item.
MAJOR DEFECT: A defect, other than a critical defect, that is likely to result in a failure or to reduce materialistically the ability to use the item for its intended purpose.
MINOR DEFECT: Departure from established specification having a little bearing on the effective use/operation of the product.
[104] Another Account records receipts against sales to non-defence establishments (MHA, State, Pvt. and Export).

Table-38: Budget estimates and actual expenditure/income

(₹in crore)

Year	Expenditure			Income			Net budget support (Actual)
	Budget Estimate	Actual	Variation (*per cent*)	Budget Estimate	Actual	Variation (*per cent*)	
1	2	3	4	5	6	7	8 (3-6)
2011-12	1632	1768	8	2079	1919	-8	-151
2012-13	1823	1758	-4	2258	1885	-17	-127
2013-14	2133	1957	-8	2543	2031	-20	-74
Total	**5588**	**5483**	**-2**	**6880**	**5835**	**-15**	**-352**

(Source: Statement of Budget Utilisation as furnished by Budget Section of Board)

As can be seen from the Table that the Board was fairly realistic in budget estimation of expenditure with the variation between actual and the estimates being within 10 *per cent*. However, actual income fell short of the estimated income by 8-20 *per cent* in 2011-12 to 2013-14 because of the inability of the Factories to meet the production targets. The actual production fell short of the target in 49 *per cent* cases by 21-100 *per cent* as discussed in **Paragraph 7.2.2.6**. Further, if advance issue vouchers[105] as discussed in **Paragraph 7.2.2.7** were to be taken into account, the actual income would be reduced by ₹222 crore during 2011-12 to 2013-14. Consequently, the variation between actual and estimated income would be higher by 12 to 22 *per cent* during the same period.

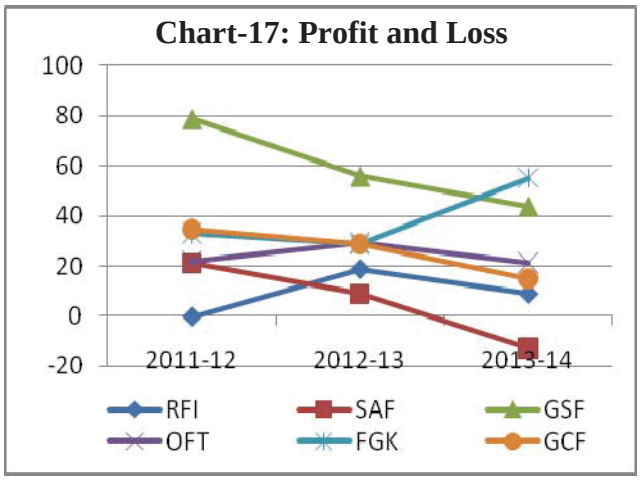
7.2.5.2 Analysis of profit and loss

In addition to the Appropriation Accounts, the Board also prepares the Consolidated Annual Accounts which are cost accounts that guide the costing and pricing of products across the Factories. The Factories are expected to recover the cost from its sales to the Armed Forces.

As per pricing policy of the Board, the prices are fixed on the basis of actual cost of production for the past three years and the trend in material, labour and overhead for the current year. The Ministry allowed (March 1994) OFB to limit the annual price increase up to eight *per cent* on overall basis with emphasis to keep this to a minimum. The issue price for the products is fixed in the beginning of the year by the Price Fixation Committee[106]. The price list is issued after the approval of the Board which includes a representative from the Army who is an invitee to the Board's meetings. Since the issue price is fixed before the commencement of production, it may be higher or lower than the actual cost, resulting in profit or loss respectively, as discussed in the succeeding paragraphs.

[105] The factories accounted for the issue of items although these items did not leave the factory gates

[106] The Committee consists of the Controller of Finance. Director of the Operating Division, Nominee of the General Manger of the Factory, Local Accounts Office of the Factory and the Joint Controller of Finance.



We analysed the trends in production, cost of production as well as issue prices of the selected products in the six Factories. On the whole, the six Factories earned profit each year except loss sustained by Rifle Factory Ishapore in 2011-12 (₹40 lakh) and Small Arms Factory Kanpur in 2013-14 (₹13 crore). However, the six Factories earned cumulative profit of ₹491 crore over 2011-12 to 2013-14. **Chart-17** illustrates the trends of profits/losses in the six Factories. As seen from the Chart, profit was continuously declining during 2011-12 to 2013-14 in Small Arms Factory, Gun and Shell Factory and Gun Carriage Factory over. A detailed analysis of Factory-wise trends in profit/loss is given in **Annexure-XXIII.** The synopsis of the Factory-wise reasons for profit and loss is indicated below:

- Profit of Small Arms Factory was reduced from ₹21 crore (2011-12) to ₹9 crore in 2012-13 and loss of ₹13 crore incurred in 2013-14 due to high incidence of labour cost (21 to 25 *per cent)* and overhead (55 to 63 *per cent*) of principal weapon items (7.62mm MAG and 9mm Carbine), whereas the issue price[107] fixed by the Board was on the lower side as compared to estimated/actual cost mainly due to non-increase of price by eight *per cent* in 2013-14 over 2012-13. In fact, labour cost of 7.62mm MAG was 399 to 466 *per cent* of the material cost during 2011-12 to 2013-14 owing to higher in-house labour cost for manufacturing components in the Factory as compared to component cost sourced from trade firms.

- At Rifle Factory Ishapore, profit declined from ₹19 crore (2012-13) to ₹9 crore (2013-14) due to reduction in issue of 5.56mm Rifles (Foldable and Fixed butt) and 9mm Pistol to MHA by 35 to 81 *per cent* in 2013-14.

- Gun and Shell Factory Cossipore earned profit aggregating ₹179 crore in all three years mainly because of reduction of cost by eight *per cent* and fixing of issue price at higher margin for 0.32" pistol issued to civil indentors over 2011-12 to 2013-14. However, profit was decreased by 10 *per cent* in 2013-14 due to loss in issue of AK-630 Gun to Navy. This arose because issue price was not revised in 2013-14 despite increase in estimated and actual cost by 11 and 21 *per cent*.

- At Gun Carriage Factory Jabalpur, profit decreased from ₹35 crore to ₹15 crore over 2011-12 to 2013-14 due to substantial loss sustained in issue of 105mm LFG, spare barrel T-72/ T-90, Kavach Modified to Army. This

[107] For 7.62mm MAG, issue price - ₹337154; estimated cost - ₹490654; actual cost - ₹527082

was attributable to significant increase in cost of production by 15 to 22 *per cent* as well as losses incurred in other items issued to sister Factories. Main contributing factors for cost increase in 2013-14 were 21 *per cent* and 33 *per cent* hike in labour cost for Spare Barrel T-90 and 105mm LFG, and 24 *per cent* increase in material cost for Spare Barrel T-72 over 2012-13.

- At Ordnance Factory Trichy, shrink in profit by 27 *per cent* in 2013-14 was mainly due to heavy loss (₹4 crore) on issue of 30mm cannon owing 49 *per cent* increase in cost of production. This occurred because increase in issue price by eight *per cent* in 2013-14 over 2012-13 could not match with 75 *per cent* and 49 *per cent* hike in overheads and labour respectively.

- At Field Gun Factory Kanpur, the profit increased to ₹55 crore (2013-14) from ₹33 crore (2011-12) because of increased volume of sale of revolver 0.32" in civil trade (accounting for 40 *per cent* of the profits in 2013-14) as well as increase in production of barrels for indigenised version of the Russian Anti-Submarine Rocket Guided Bomb 60 (RGB 60) for issue to the Indian Navy.

While noting the audit observation the Board stated that the pricing policy adopted by the Board ensured realisation of value of production from the Services on an overall basis with efforts being made to restrict the issue price of final product within eight per cent. The reply was however silent on action taken to reduce the wide gap between cost and issue price to make the products competitive. The Board assured that all vicarious pricing cases were examined and prices would be rectified in a realistic manner within next two to three years.

7.2.5.3 Overheads in cost of production

As discussed in **Paragraph 7.2.5.2**, high overheads contributed to rising cost of production and decline in profits. We further analysed the reasons for the high overheads.

Overheads charged in the cost of production include indirect labour cost, indirect stores, supervision, transportation, electricity, depreciation, *etc.* According to Paragraphs 541 to 549 of DADOM Part-VI, Section Budget Committee[108] of each production shop of a Factory estimates the rate of apportionment of overheads, based on the actual in the previous year and on the estimates of direct labour in the current year after considering the anticipated changes in the production programme for the ensuing year. The estimates from all the Shops are compiled to arrive at the rate of overheads for the entire Factory. The 'Central Budget Committee'[109] assess all factors involved in the fixation of variable overhead rate *e.g.* anticipated direct labour hours, anticipated direct material, variable charges, *etc.*

[108] The Committee comprises the Divisional officer and head of particular shop and the Local Accounts Officer(LAO).
[109] The committee comprises General Manager and selected Works Manager of Factory and LAO.

We examined the trends of cost of production of selected factories and found that four Factories (FGK, SAF, OFT and RFI) operated on high overheads, particularly the fixed overheads. **Table-39** provides the data for 2013-14 across the Factories, the trends in 2011-12 and 2012-13 were not remarkably different from 2013-14. Analysis of major elements of overhead revealed that high supervision charges and indirect labour charges (48 to 73 *per cent*) were main contributors to high overhead.

Table-39: Overheads in cost of production (2013-14)

Particulars	**FGK**	**SAF**	**OFT**	**RFI**
Overheads as percentage of cost of production	47	55	50	59
Fixed overheads as percentage of total overheads	63	25	78	69
Supervision charges as percentage of total overheads	34	45	48	33
Indirect labour charges as percentage of total overheads	20	21	25	14

(*Source: Annual Accounts of Ordnance Factory Organisation*)

We observed that the trends of fixed overheads and their absorption were uneven across the range of products. Analysis of the cost-data of three selected items indicates the irrational trends in apportionment of fixed overheads to those items as detailed in **Table-40**.

Table-40: Apportionment of fixed overhead

Items	**40mm UBGL**	**30mm Canon**	**12.7mm AD**
Unit cost of production (₹)			
2011-12	29473	2932107	1186996
2012-13	51745	2529893	830962
2013-14	55557	3765225	893376
Unit Fixed overheads (₹)			
2011-12	7504	1096199	554576
2012-13	18667	938545	399062
2013-14	16210	1523754	463332
Quantity issued (Number)			
2011-12	2538	82	76
2012-13	4001	84	40
2013-14	7000	72	60
Change in total cost of production/Fixed overheads at OF Trichy (₹ in crore)			
	2012-13	**2013-14**	**Percentage of decrease**
Total cost of production	167.80	166.60	-
Total fixed overheads	70.80	64.30	9

Analysis of the Table showed that:

- The production of 40mm UBGL increased by almost three times during 2011-12 to 2013-14. The unit fixed overheads increased by 149 *per cent* in 2012-13 over 2011-12 even though (a) the total fixed overheads of the

Factory increased marginally by eight *per cent* and; (b) the production of UBGL had increased by 58 *per cent* during the same period. The trend of fixed overheads on UBGL did not correlate with the trends of fixed overheads in the Factory. With increase in production, the unit cost, particularly fixed overheads, would be distributed over a larger quantity and therefore, should come down. Despite 176 *per cent* increase in production of 40mm UBGL in 2013-14 over 2011-12, the unit cost of production of the item increased by 89 *per cent* during the same period.

- The total fixed overheads of the Factory was reduced by nine *per cent* in 2013-14 over the figures in 2012-13 but unit fixed overheads on 30mm cannon was disproportionately raised by 62 *per cent* during the same period.

- The unit fixed costs on 12.7mm Air Defence (AD) Gun was increased by 16 *per cent* in 2013-14 over 2012-13 figures although the production increased from 40 to 60 *per cent* during the period and more importantly, the total fixed costs of the Factory reduced by nine *per cent* over the same period.

While noting the audit observations, the Board further clarified that overheads are high in Ordnance Factories because of War Wastage Reserve capacities (which remain largely idle), social costs such as on estate/hospitals/schools, higher labour wages and supervisory cost *etc.* and assured that instructions were being issued to the Factories to control their overheads as these were affecting the overall issue prices of weapons.

The reply was, however, silent on irrational apportionment of overheads across the range of products.

7.2.5.4 Internal controls

The Local Accounts Office (LAO) under the overall supervision of the Principal Controller of Accounts (Factories) is responsible for review of production cost to help the Factory Management to take corrective steps for cost reduction. As per Paragraphs 635 and 637 of DAODM Part-VI, LAO is required to conduct quarterly concurrent review of production cost to identify cases of substantial variation between estimate cost and actual expenditure booked in a running manufacture warrant[110] and to bring it to the notice of Factory management for remedial measures.

Apart from concurrent review of production cost, Paragraph 1026 of DADOM Part-VI stipulates LAO to prepare Quarterly Financial Review (QFR) report on value of issues, progressive expenditure, element-wise cost of production, analysis of overheads, *etc*. amongst other inputs with comparative figures for the last quarter and corresponding period of the previous year. Principal Controller of Accounts (Factories) is required to scrutinise, analyse and

[110] Warrant is the authority of the General Manager of the Factory to the production shop for manufacture of a product.

consolidate the report of all the Factories for submission to the Board and Controller General of Defence Accounts (CGDA) for appraisal.

The procedures suffer from many constraints in actual practice, as discussed below:

- The stipulated activities of Section/Shop Budget Committee and Central Budget Committee and its review were either not practiced or were ineffective in ascertainment and allocation of overheads to individual weapon item as discussed in **Paragraph 7.2.5.2.** For instance, shop budget and central budget committee meetings were not convened at Ordnance Factory Trichy in 2012-13 and 2013-14. When conducted, it failed to meet the purpose since the review of variations from the estimated cost which exceeded 10 *per cent*, had not been carried out since September 2009.

- Concurrent review of production cost and production activity was not done by the selected Factories in a systematic manner as cost cards were not closed in time. Although two Factories (FGK & SAF) claimed that the LAOs conducted the concurrent review, they could not provide any documentary evidence. Despite this, the Board had not taken any action against the Factories for conducting concurrent review of cost nor did it review the trend of product-wise cost periodically in its meetings to take corrective measures against the rising cost.

- The QFR reports were neither analysed nor submitted to the Board and CGDA by the Principal Controller of Accounts (Factories). Even the Board did not insist to place the QFR report before them. Consequently, the QFR did not get the attention it deserved to control the costs.

The fluctuations and the erratic apportionment of overheads did not ensure the integrity of recording costs and reliability of cost data for arriving at the reliable cost of production or for pricing control. Ordnance Factories being the sole production unit for the Armed Forces are generally focused on meeting the demand placed on them, but no effective exercise has been carried out for cost control and reduction. On the other hand, the availability of assured funds with the Armed Forces led them to accept the products from the Board regardless of the high issue prices for certain items. Thus, the Board had no pressure to cut costs in the absence of any benchmark for comparable products.

The Board stated that the Section Budget Committees were formed for review of fixation of overheads and the Factories remained in close contact with LAO for overall control of the cost. It added that products of Factories were cost effective compared to the import cost.

The reply of the Board is not acceptable because the absence of effectiveness of Section Budget Committees as well as failure to hold the concurrent review of cost led to ineffective cost control resulting in increase in costs and decline in profits in the six Factories from ₹189 crore to ₹131 crore over 2011-12 to 2013-14.

Conclusion

The practice of fixing issue price for products in the beginning of the year based on the trends in the past three years could have worked in a set-up in which cost control was effective and fluctuations, especially in overheads were controlled. This was not, however, the case in the Factories.

The weapons group of Factories operated on high overheads, particularly, the fixed overheads. The apportionment of the overheads over products was irrational, overloading it on some products, making them uneconomical. Ordnance Factories are generally focused on meeting the demand placed on them without due regard to cost control and reduction. The availability of assured funds with the Armed Forces helped them to accept the products from the Board regardless of the high issue prices. The presence of the representative from the Armed Forces in the pricing committee meetings is a good practice, but this client interface is compromised due to lack of benchmarks with comparable products.

Recommendation 7: *The Board may strengthen the costing mechanism to ensure collection and consolidation of reliable cost data and efficient apportionment of cost across the product ranges. The mechanism of periodical review of estimated and actual cost should be operationalised for cost control.*

Response of audited entity on recommendations

The Board accepted the recommendation.

7.2.6 Planning for future

Audit objective 5: *The Factories were geared to meet the perspective needs of the Armed Forces in order to reduce the dependence on imports***.**

7.2.6.1 Perspective plan of the Board

The Board prepared the First Perspective Plan in 2000 followed by the Second Plan 2007-08 to 2011-12 which was co-terminus with the XIth Five-Year Plan. The Perspective Plan 2007-08 to 2011-12 recognised the expectations from the Board to meet the dynamically changing Indian defence system with timely supply of state-of-the art weapons with greater value for money. The perspective production master plan indicating the present production level and the production level expected to be achieved at the end of 2011-12 was drawn up after interaction with Armed Forces and MHA.

The Board did not prepare a plan for the subsequent period starting from 2013. Meanwhile, though the Army prepared (2013) the Long Term Integrated Perspective Plan (LTIPP) covering 15 years, the same was not communicated to the Board despite repeated requests. In absence of the LTIPP and a perspective plan beyond 2012, the Board was yet to chalk out a production master plan to position itself strongly on strategic items of weaponry listed in

the LTIPP. The Defence Procurement Procedure 2013 has also been approved to steer the goals of indigenisation but one in which the Board has to compete with other manufacturers. New challenges that have arisen in the last one year after the period covered in audit (2011-12 to 2013-14) are opening of the defence sector with 49 *per cent* FDI and the 'Make in India' policy of the new Government which would impact the Board.

Our analysis in the subsequent paragraphs in this Chapter is with reference to the Perspective Plan of the Board 2007-08 to 2011-12 and the recent changes in the defence sector.

7.2.6.2 Implementation of the Perspective Plan

In the perspective plan, the Board made projections against three classes of weapons: Small Arms, Medium calibre and High calibre weapons. The status on development of 12 items against the milestones indicated in the perspective plan was analysed and discussed in **Annexure XXIV**.

As can be seen from the Annexure, major bottlenecks in development and regular production of new major items are as follows:

- Against the expectation of producing 5.56mm Carbine (Protective) in 2008-09, the production was yet to come up due to delays in development of the product by the Board and DRDO as well as shortcomings noticed in trials.

- Production of 5.56mm Carbine (Close Quarter Battle) under Transfer of Technology (ToT) was yet to materialise against the scheduled year (2009-10) due to delay in selection of the Carbine for import by the Army along with ToT.

- Production of 30mm Automatic Grenade Launching System (AGS) was yet to be established against the milestone (2010-11) due to quality problems noticed in several trials, changes in design as well as delay in endurance test owing to non-availability of ammunition for proof trials.

- Against the milestone (2010-11) for production of 155mm (45 calibre) gun 'Dhanush', the same developed in 2012 was still under confirmatory trials and the bulk production clearance was awaited (May 2015).

- Production of 130mm Up-gunning to 155mm in collaboration with an Israel firm, M/s Soltam could not commence within the scheduled year (2010-11) owing to delayed development and trials as well as ban imposed on M/s Soltam.

- Delayed development (2012) of 5.56mm Rifle (Folding Butt) against milestone of production (2008-09) led to short-closure of Army's indent (2006) for 20000 Rifles after delivery of 8454 Rifles. No further demand was received from the Army.

The analysis reveals that the milestones projected in the Board's perspective plan for development and production of new items could not be translated into reality mainly because of delays in development; lack of promising response from the users leading to delays in finalising the requirements and in conducting trials; incomplete/non-availability of ToT resulting in non-receipt of designs of critical components, which led to perennial reliance on imports.

7.2.6.3 Challenges and opportunities

The challenges and opportunities in each of the weapon manufacturing Factories are discussed in **Annexure-XXVI**. The analysis is to aid a prognosis for the Factories to remain relevant to their principal role of equipping the Armed Forces with state-of-the-art weaponry.

As can be seen from the Annexure, Small Arms Factories were facing multiple challenges. The Board has not been successful in getting sufficient orders for modern version of INSAS rifles (Foldable butt) as discussed in **Paragraph 7.2.6.2**. Rifle Factory Ishapore and Small Arms Factory Kanpur faced a downturn in the production of principal items (5.56mm Rifles, 9mm Pistol) due to fall in demand from the Army as discussed in **Paragraph 7.2.2.2.**

As discussed in the meeting (January 2013) held between the Board and the General Managers of the Small Arms group of Factories, MHA had been impressed upon to increase their demand for small arms in commensurate with the roll-on-plan so as to increase the workload of the Factories keeping in view declining demand for the small arms from the Army. Besides, in view of regular import of Glock Pistol and AK-47 rifles by MHA, the Board had also requested MHA to import these weapons with a provision for Transfer of Technology (ToT) which could help the Board in indigenous manufacture. However, the development of Glock Pistol and AK-47 rifles with ToT from foreign firm was not envisaged in the Board's Perspective Plan.

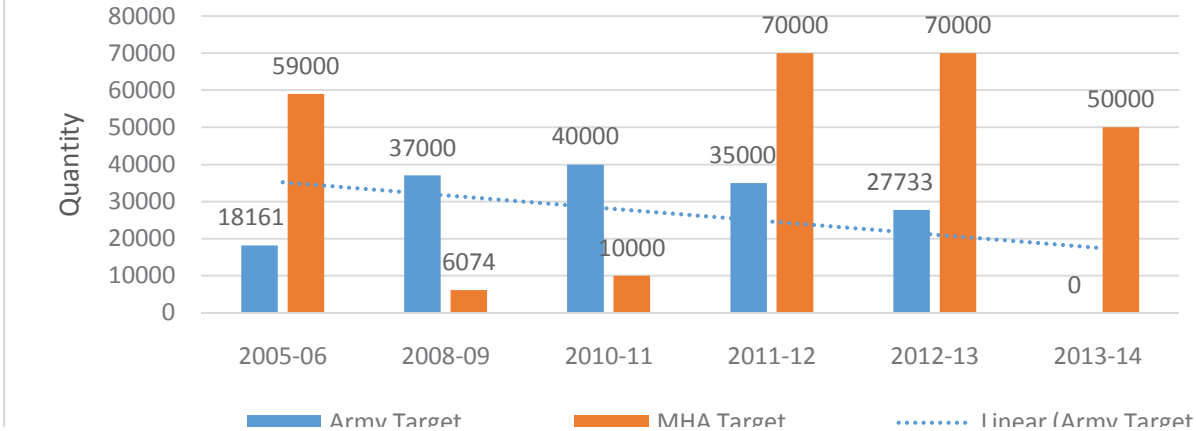
The Board directed (January 2013) the Small Arms group of Factories (RFI, OFT and SAF) to take up R&D projects for product improvement and also for development of new weapons so as to meet the user requirement. A case study of Rifle Factory Ishapore serves as an exemplar of a Factory trying to revive itself to meet the depleting business scenario with the development of new products.

Case Study of Rifle Factory Ishapore: Adapting to changing times

Rifle Factory Ishapore has its core products: Rifle 5.56mm (Fixed & Foldable Butt), Pistol 9mm (Army/MHA items) and 0.315" Sporting Rifle (Civil Item). Over the years the Factory has witnessed a steady decline in demand from the Armed Forces because of non-receipt of further orders. **Chart-18** shows the trend analysis in production of 5.56mm Rifle Fixed Butt, indicating no demand from the Army[111] in 2013-14; the current production was exclusively for the MHA.

[111]The Army has surplus stock of rifles with them and Army Headquarters is looking for replacement of INSAS with Multi Role Assault Rifle (MRAR).

Chart-18: Army & MHA Targets for Rifle 5.56 mm INSAS (Fixed



The Rifle Factory Ishapore attempted to develop the following products **(Table-41)** mainly to cater to the needs of the MHA even though firm order from MHA was yet to be received.

Table-41: Products developed by RFI (Production/Issue *vis-a-vis* Targets)

Sl. No.	Product	Year	Target	Produc-tion	Issue	Remarks
1.	12 Bore Pump Action Shot Gun	2012-13	4000	4025	4007	
		2013-14	13000	10807	10807	
		2014-15	6058	5826	3630	
2.	Tear Gas Gun	2013-14	3500	299	173	Bulk production clearance received in January 2014
		2014-15	10919	7546	6316	
3.	Anti-Riot Gun	2013-14	4000	1998	1998	Payment not received from State Police
		2014-15	10000	1242	1129	Constraints in receipt of payment
4.	0.32” Pistol	2013-14	2000	650	0	Production tapered down due to less payment from private indentors.
		2014-15	12000	3653	1853	
5.	7.62mm Sniper	2014-15	15	0	0	Material under procurement
6.	7.62mm Assault Rifle (Ghaatak)	2015-16	30000			Under trial by Central Armed Police Forces.

(Source : Rifle Factory Ishapore letter dated 10-01-2015)

Further, Rifle 5.56mm Ex-Calibre was newly developed as a substitute of Rifle 5.56mm and it was demonstrated successfully to the MHA and State Police. However, substantial orders were yet to be received from MHA.

Thus, with the development of the new product line Rifle Factory Ishapore should pursue with the users to get substantial orders in order to meet the challenging scenario.

In the high calibre range of weapons manufactured in the Gun & Shell Factory Cossipore and Gun Carriage Factory Jabalpur, it was observed that the demand for established products like 81 mm mortar and 105 mm Field Gun fell down as indicated in **Annexure XVII-A**. However, the demand for the high calibre weapons like 84 mm Rocket Launcher Mark III, AK-630 guns, T-90 ordnance and spare barrels T-72/T-90 indicated an increasing trend during 2011-12 to 2013-14 as indicated in **Annexure XVII-A** and **Annexure XVII-B**. Incomplete ToT agreements had disrupted the levels of indigenization, forcing the Factories to rely on perennial imports for critical assemblies of AK-630 guns and 84 mm Rocket Launcher Mark III as discussed in **Annexure-XXIV** and **Annexure-XXV**.

Field Gun Factory Kanpur and Ordnance Factory Kanpur also faced capacity constraint in production of barrels for high calibre weapons with inadequate capacity for forgings in Metal and Steel Factory Ishapore as discussed in **Paragraph 7.2.3.3.** In respect of another important high calibre weapon *viz.* 155mm Gun, the Board received an indent for 114 indigenous 155mm (45 calibre) Dhanush guns, but the bulk production clearance from the Army was awaited (May 2015).

The ability of the Board to develop indigenous alternatives reducing reliance on imports (AK-630 Gun, 84mm Rocket Launcher), receive bulk production clearance for its 155mm (45 calibre) 'Dhanush' guns; address quality and capacity constraints, together would determine the future of the Board in high calibre guns. This largely holds good for all the class of weaponry in the ordnance factories. However, the future of the Board would largely depend upon the proper coordination amongst all stakeholders *viz.* Armed forces, DRDO, DGQA and the Board for technological upgradation and indigenous development of weaponry.

While accepting the audit observation, the Board stated:

- They were striving hard to cater for additional load for Small Arms Factory by development/production of new products through in-house R&D and DRDO or through ToT. Next generation weapons like MRAR (5.56mm &7.62mm), LMG 7.62mm and CQB Carbine were under selection by the Army for ToT;

- The Board would be the ToT recipient for production of 155 x 52 Towed Gun and would compete in the Army's Request for Proposal for 155x52 Calibre Mounted Gun.

The Board's endeavour to meet the milestone and expectations as projected in their Perspective Plan 2007-12 was not encouraging both in terms of quality and timeliness as discussed in Paragraph 7.2.6.2. The Board had also attempted to develop small arms without the firm orders from the users. In order to achieve the desired results of development of new products, users should be pursued to get the firm orders for the survival of the Factories.

Conclusion

The Board prepared a Perspective Plan 2007-12 to provide the Armed Forces with "timely supply of state-of-the–art technology with greater value for money". The dreams of the Perspective Plan could not be translated into reality, with implementation marred by delays in development of the new items.

Even as the Board did not prepare a plan for the subsequent period, the environment has changed substantially. The Army prepared the Long Term Integrated Perspective Plan (LTIPP) covering a period of 15 years, to which the Board was yet to formulate a plan to position itself as an important player. The Defence Procurement Procedure 2013 has also been approved to steer the goals of indigenisation but one in which the Board has to compete with other manufacturers.

Small Arms Factories were facing multiple challenges like declining demand from indentors and quality problems; lacklustre response from clients for its new products; and delays in project for new generation carbines. The traditional weaponry in the high calibre range 81mm Mortar, 105mm LFG is facing a downturn. Besides, delayed indigenisation and continued reliance on imports of certain assemblies posed a challenge to the Factories in meeting the demand. On the other hand, new projects like "Dhanush" and the variants of 155 mm gun, hold promise.

Recommendation 8: *The Board may prepare its Perspective Plan in consultation with all stakeholders, including the Armed Forces, DRDO, DGQA, MHA and private sector partners.*

Recommendation 9: *The Ministry may set up a multi-ministerial body comprising various stakeholders to steer the procurement of weaponry in Armed Forces, the Central Paramilitary Forces and State Police Organisations, in order to maximise indigenisation; to reduce duplication of efforts; and to develop technologies that allow inter-operability and provide economies of scale in manufacture.*

Response of audited entity on recommendations

The Board stated that they were proactively interacting with the MHA and the State Police Organisations to ascertain their long-term requirement. The fair and balanced observations made by Audit were well taken and many points noted for implementation and corrective action.

7.3 Performance of Chemical Manufacturing Factories

Executive Summary

Ordnance Factories are classified into five product-based Operating Groups. The Chemical Group of Factories is a sub-group under the operating group: Ammunition & Explosives (A &E). This group accounted for 35 *per cent* of the total value of production during 2011-12 to 2013-14. The four chemical producing factories *viz.* Ordnance Factory Bhandara (OFBa), Cordite Factory Aruvankadu (CFA), Ordnance Factory Itarsi (OFI) and High Explosives Factory Kirkee (HEF) with an average annual cost of production of ₹755 crore during 2011-12 to 2013-14 contributed to around five *per cent* of the cost of the production of the Board.

The propellant and explosives manufactured by these factories primarily cater to the needs of the sister factories (hence called Inter Factory Demand factories) for supply of fully formed ammunition to the indentors as also for direct issue to the Armed Forces and Ministry of Home Affairs (MHA) *etc.*

Key findings

Army's roll on indent indicating five year requirement helped the Board in planning. Changes in requirements, mainly downward revisions, did not affect the production targets already given by the Board to the Chemical Factories.

Revisions by the Board in the annual targets to Factories, mid- year covering majority of products with greater bias to increasing the target did not in most cases result in target achievement as the factories were unable to meet even the original targets.

The Chemical Group of Factories are required to meet the production targets by January each year, a commitment the Factories were unable to meet which impacted the production schedules of the ammunition filling factories. The practice of advance vouchers without actual physical issue continued in three Factories. The internal controls in the Board to monitor production against targets have become routine and hence their effectiveness diminished.

The Factories could not achieve compliance with the timeframe prescribed by the Board on placing supply orders in one-third of the procurements. Further, if the lead time for delivery of stores were to be factored, procurement would consume most of the production year. Due to the delays in procurement, the factories could not maintain even flow of production, with production peaking in the fag end of the year. The labour productivity reported by the Factories was high and did not correlate with the performance against targets.

There were rejections in quality control and inordinate time taken in proof establishment, causing cascading effect on achievement against targets. The Factories faced shortage of technical staff and inadequate co-ordination between the Factory and SQAE were noticed. Absence of dedicated proof range at Factories caused delay in conduct of dynamic proof; a project

sanctioned in December 2008 was abandoned and alternatives have not come to fruition.

Delays in procurement of plant and machinery led to non-utilisation of capital budget in the Chemical group of factories. The Factories run on high overheads that inflated the cost of production. The practice of fixing issue price for products in the beginning of the year based on the trends in the past three years could have worked in a set-up in which cost control was effective to closely monitor abnormal fluctuations in cost. This was not, however, the case in the Factories with the two controls: the Shop Budget Committee and the Quarterly Financial Review, being inadequate interventions suffering from structural deficiencies. As a result, the issue price of a product in a year did not bear close correlation to its cost of production, leading to wide fluctuations in profit/loss.

Ordnance Factories being sole production unit for the armed forces are generally focused on meeting the demand placed on them without due regard for the considerations of cost control and reduction.

The Factories have prepared an Environment Management Manual in compliance to Environment Management System certification ISO: 14001:2004 which all the sampled factories have received. But the Factories did not identify the specific environmental risks or prepare a perspective plan for progressive risk mitigation measures. The investment of funds on environmental measures is low in all the Factories. Recycling, safe disposal and reusing of waste are areas which require attention from the factories especially with respect to disposal of explosive wastes.

The general trend of the accidents, especially in Ordnance Factory, Itarsi indicates a gap in safety training of the staff. The Factories have taken initiative for energy conservation and reported energy savings. However, the large number of pending recommendations in energy audit also indicates the future potential savings that will require investment of funds.

7.3.1 Introduction

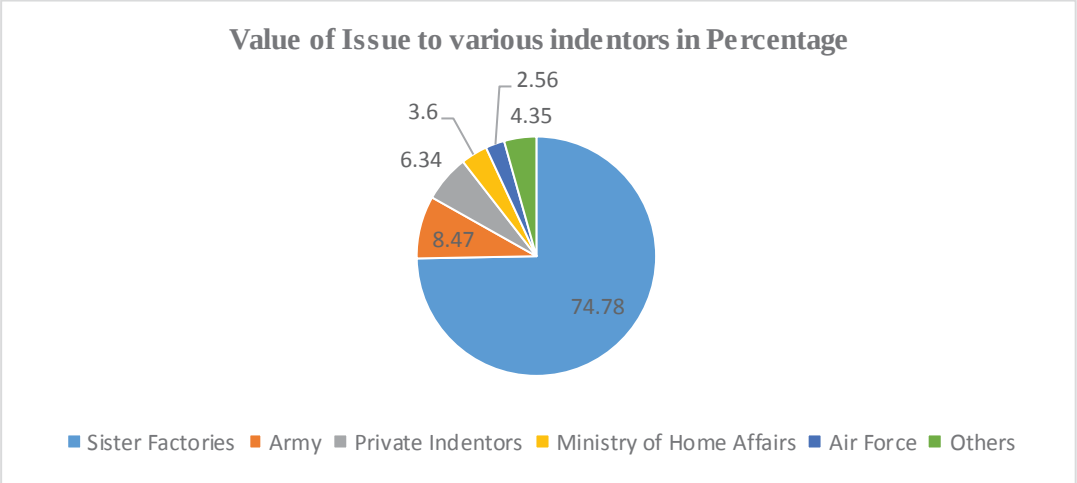
7.3.1.1 The operating group

Ordnance Factories are classified into five product-based Operating Groups. The Chemical Group of Factories is a sub-group under the operating group: Ammunition & Explosives (A &E). This group accounted for 35 *per cent* of the total cost of production during 2011-12 to 2013-14. The four chemical producing factories *viz* Ordnance Factory Bhandara (OFBa), Cordite Factory Aruvankadu (CFA), Ordnance Factory Itarsi (OFI) and High Explosives Factory Kirkee (HEF) with an average annual cost of production of ₹755 crore during 2011-12 to 2013-14 contributed to around five *per cent* of the cost of the production of the Board.

The propellant and explosives manufactured by these factories primarily cater to the needs of the sister factories (hence called Inter Factory Demand factories) for supply of fully formed ammunition to the indentors as also for

direct issue to the Armed Forces and Ministry of Home Affairs (MHA) *etc*. The value of issues of four chemical producing factories aggregated to ₹2174 crore during 2011-14; the annual issue averaging to ₹725 crore. Indentor-wise distribution of issues by the chemical factories is depicted in **Chart-19.**

Chart-19



7.3.1.2 Organisational structure

The Member (Ammunition and Explosive) in the Board is responsible for policy formulation, planning and supervision of this operating group. The Factories are headed by General Managers. Internal quality control in the Factories is looked after by the Quality Control Section headed by Additional/Joint General Managers of the Factories.

Directorate General of Quality Assurance (DGQA), independent of the Board, provides quality assurance of the products. It discharges this function through its representatives at the factories. The Principal Controller of Accounts (Factories) Kolkata is responsible for compilation of consolidated accounts, cost control along with an advisory role on finance. The Principal Controller of Accounts (Factories) performs its functions through the Local Accounts Offices attached with every factory.

7.3.1.3 Why did we take up this audit?

The IFD stores account for 76 *per cent* of the stores used in filling factories. The performances of the IFD factories have a cascading effect on the performance of the filling factories. Hence in view of the importance of a review of the IFD factories we felt that a comprehensive coverage with focus on the areas of production planning, performance, quality and cost control and environment, would add value to the Management and provide inputs for policy formulation in the Government and in the Parliament.

The audit findings on the Chemical Group of Factories were reported in Chapter III of the Comptroller and Auditor General of India's Performance

Audit Report No 4 of 2008 against which the Ministry of Defence (Ministry) gave the following assurances:

Fixation of Annual Production target

- "A well-structured mechanism for target fixation commensurate with optimum utilisation of production capacity of ammunition and explosives manufacturing factories is in place. Capacity in the Chemical Group of factories is product specific. In general, alternate use is limited."

Utilisation of machinery to meet the targets

- "Roll on indent for ammunition stores have been placed, which indicates the long-term requirement of items. It will aid planning towards optimum utilisation of plant and machinery."

Cost control and pricing

- "Factories have been advised to adhere to the overall overheads, decided during price finalisation and further, lower them. Efforts will be made to keep the price of chemical group of factories at a level to ensure recovery of the cost during the year."

Compliance with environment and safety norms

- "All the factories have been advised to ensure providing facility for periodical safety inspection by Centre for Fire, Explosive and Environment Safety (CFEES), New Delhi and Regional Controller of Safety (RCS), Pune to ensure factories' compliance. However, in exceptional cases, where deviations take place, the Board takes immediate action as and when required and avoid recurrence of incidents. There is separate office with experts working under Controller of Safety looking after all such issues at factory level".

We decided to carry out a review of the impact of the measures assured by the Ministry to the Parliament.

7.3.1.4 Scope of audit and sample audited

Our audit covered the performance of four factories for three years: 2011-12 to 2013-14. The audit findings were arrived at after test check of the records at the Board and four[112] factories, Controllerate of Quality Assurance (Military Explosive) Pune, Senior Quality Assurance Establishments stationed at Kirkee, Bhandara, Itarsi and Aruvankadu.

We selected 52 chemical/propellant items with the cost of production of ₹1729 crore that together accounted for 76 *per cent* of the total cost of production (₹2266 crore) of 2011-12 to 2013-14 at the four factories. The selection was

[112] Cordite Factory Aruvankadu, High Explosive Factory Kirkee, Ordnance Factory Bhandara and Ordnance Factory Itarsi

based on strategic use of the items required by the indentors mainly the sister factories and the cost of production. The details of the sample selected for examination are at **Annexure-XXVII**.

7.3.1.5 Audit objectives

The aim of the audit was to provide an opinion on the Board's ability to meet the quality products on time to its clients. The broad objectives of the audit, framed to address this audit aim, were to seek an assurance that:

- ***The Board fixed annual production targets for the factories based on indentors' needs, the capacity of the Factories and the targets were met by the Factories on time ;***
- ***The Factories were able to marshal their resources to implement the production plan;***
- ***Strong quality control measures ensured timely issue of quality explosives/propellants to indentors;***
- ***The Factories exercised due diligence on utilisation of funds as well as cost controls on production; and***
- ***The Factories implemented sound practices and procedures of the Board's sound environmental policy, based on a risk assessment.***

7.3.1.6 Audit Criteria

The following sources to adopt the audit criteria for assurance on the audit objectives were identified:

- Procurement Manual 2010, Material Management and Procurement Manual 2005, Ordnance Factory Board's Standard Operating Procedure;
- Air (Prevention and Control of Pollution) Act 1981 and Water (Prevention and Control of Pollution) Act 1974;
- ISO 14001:2004 'Environment Management Systems – Requirements with guidance for use' adopted by the Bureau of Indian Standards; and
- Assurances given to the Parliament in Action Taken Note on the Comptroller and Auditor General of India's Performance Audit Report No 4 of 2008.

7.3.1.7 Audit Methodology

The audit objectives and methodology were discussed with the Board during an 'Entry Conference' held in August 2014 and audit criteria agreed upon. Detailed audit was carried out in the units selected for coverage as indicated in **Paragraph 7.3.1.4** above during the period from August - October 2014 to evaluate the performance against the audit criteria. Field audit included examination of records, collection of information through issue of audit memos and questionnaires. Audit also analysed the data extracted from the computerised packages used in the factories.

The draft report was issued to the Ministry and the Board in December 2014 and discussed in the Exit Conference held with the Board in June 2015. While the Board had furnished their response in June 2015, the same from the Ministry was awaited (September 2015) even after the lapse of the stipulated time frame of six weeks for the reply. Response of the Board and deliberations during Exit Conference have been considered while finalising this report. Wherever possible the best practices in the Board and the Factories have been highlighted.

7.3.1.8 Acknowledgement

We acknowledge the co-operation received from the Chairman of the Board, Member of the Ammunition and Explosive Division of the Board, Senior General Managers/General Managers and the Accounts officers of the factories and Senior Quality Assurance Establishments stationed at the four chemical manufacturing factories. Their inputs helped us plan and implement our audit leading to recommendation which we hope will be an aid to the Management at the Board and the Ministry of Defence.

A list of abbreviations and glossary of terms used in this Report are given in **Appendix-III** and **Appendix-IV** respectively.

7.3.2 Towards meeting the requirements of Indentors

Audit objective 1: *The Board fixed annual production targets for the Factories based on indentors' needs, the capacity of the Factories and the targets were met by the Factories on time;*

7.3.2.1 Target Fixation with reference to the client needs

The Board requires firm indents prior to the commencement of the year, based on which targets are assigned to the chemical factories with a view to providing adequate lead time for production at the factories. In the Action Taken Note (ATN) on Paragraph 3.7.1 of the Chapter III of Audit Report No PA 4 of 2008, the Ministry had assured the Parliament that "a well-structured mechanism for target fixation commensurate with optimum utilisation of production capacity of explosives manufacturing factories was in place." This assurance formed the criterion for our audit against Audit Objective.

The Army is the main indentor for the ammunition for which the chemical groups of factories are the feeders. The concept of a 'five year roll-on-procurement indent' (2009-2010 to 2013-2014) was introduced in January 2010 which projected the multi-year requirement[113] of the Army. The Army provided such a firm multi-year commitment to the Board only in respect of ammunition.

The targets for MHA which procures ammunition and explosives for the paramilitary forces are fixed through an annual target fixation meeting held in November/December of the previous year. A roll on plan was received for the

[113] The plan indicates the minimum essential requirement based on trends in wastage

first time by the Board in April 2010 which is, however, only an indicative wish list. Air Force, whose requirement forms a meagre part of production line[114], communicates its requirements through an annual indent only.

7.3.2.2 Revisions in client requirements: Annual vis-à-vis Multi-year projections/demand

It was observed that the Army largely adhered to its requirements as reflected in the Roll on Indent placed in January 2010 except during 2013-14. As a result, the Board had an assured demand from the Army for the years 2011-2012 to 2012-2013. In 2013-14 the Army revised its requirements, mostly to reduce the demand. But the target already given to the Factories by the Board were not revised due to the revisions by the Army in 2013-14.

This was not the case with MHA which significantly changed its annual requirements with reference to its Roll on Plan of April 2010. But the revised annual requirements were communicated to the Board on schedule and as a result, were not disruptive to the production schedules.

7.3.2.3 Target fixation with reference to capacity

In addition to the indentors' demands, the Board is required[115] to factor the available capacity in the factories and constraints related to production, while fixing targets. Audit found that the Factories did assess[116] the product-wise capacity for production, although these were not being communicated to the Board on a periodical basis. **Table-42** correlates the targets with the reported capacity at three Factories in respect of the sampled products (except Cordite Factory, Aruvankadu which had not disaggregated capacity between products).

Table-42: Targets in correlation with capacity

Year	Target as percentage of capacity Number of instances[117]					
	< 20	**21-50**	**51- 80**	**81-100**	**>100**	**Total**
2011-12	4	5	3	2	5	19
2012-13	4	4	3	2	6	19
2013-14	2	10	3	0	4	19
Total	**10**	**19**	**9**	**4**	**15**	57
Instances of 100 *per cent* achievement of targets by March	4	7	2	1	3	

Source: (i) Available plant capacity extracted from records of OFI, OFBa and HEF and (ii) Monthly Achievement Report of March

[114] Three per cent of the total value of issues by chemical factories during 2011-14
[115] Paragraph 3.7.3 of Board's Material Management and Procurement Manual, 2005 (MMPM)
[116] A seven person committee was formed (April 2010) under the chairmanship Shri B.N.Singh, Senior General Manager, Ammunition Factory Kirkee to analyse the requirement (future) vis-à-vis the existing capacities for both ammunition and explosive factories. The report which was submitted to the Board in December 2010, recommended augmentation in certain products. The report is yet to be acted upon.
[117] A machine could be used for more than one products. Hence the table measures number of instances and not number of items

For 51 *per cent* of the items, the targets were fixed below 50 *per cent* of the capacity. However, achievement of targets did not bear a close correlation with whether the targets were commensurate with capacity. Even in instances where targets were fixed in excess of capacity, the achievement against these targets followed a similar pattern as in other categories where targets were fixed lower in comparison to capacity (**Table -42**).

In reply the Board stated that a 1:1 correlation between capacity of a plant and capacity for production of items cannot be established since many propellants had similar processes resulting in same set of infrastructure being used for manufacture of multiple products. Hence the capacity for production of one item is affected by volume of production of other similar products.

The Board's reply confirms the audit observation of absence of correlation between targets and available capacity. In the Exit Conference (June 2015), the Board agreed that the chemical factories were not limited by capacity of plant & machinery; achievements of targets depended more critically on pre-positioning material for manufacture.

7.3.2.4 Communication of targets to Factories: annual targets and revisions

According to Paragraph 5.5.2 read with Annexure-I of Board's Procurement Manual 2010, the targets are required to be communicated to the Factories six months in advance of the production schedule[118]. Unlike other operating groups which meet the targets by March end, the chemical groups of factories are required to meet their targets by January of each year. This is done to ensure that the filling factories (where the ammunition is assembled) get two months to meet the requirements of the Army/other indentors by March.

The Board communicated the annual yearly targets to the Factories in January of the preceding financial year; these targets were, however, revised during the currency of the production year. For instance, the original target for April 2011-March 2012 was communicated in January 2011 (*i.e.*, before the beginning of the year) to be revised in May 2011. In 2012-13, the revision took place in May 2012. The Board's target communication in 2013-14 was three months earlier as compared to the earlier years *i.e*., in October 2012, though the targets were later revised in May 2013. As stability in demand is a key factor in the Board's consistency in meeting targets, mid-year revisions disrupt the process of provisioning of stores and consequently the production.

[118] In addition to the targets fixed by the Board, the chemical group of factories also receive IFD requirements from the ammunition filling factories. High Explosives Factory, Kirkee informed audit that they received a two-year requirement from the filling factories. It was found that the targets given by the Board did not match with the requirements communicated by the ammunition filling factories. Production of TNT in High Explosives Factory, Kirkee was an example. In 2012-13, the Factory reported to the Board that the filling factories had sufficient stocks of TNT and were not lifting the material as a result of which the holding of TNT in HEF exceeded the explosive limit of storage magazines i.e., the limit of holding prescribed by the Board. The Board replied that in general the target of TNT to HEF was calculated based on the ammunition targets projected by the indentors, which was reviewed after the filling factories intimate the carry forward stock of TNT in April of next financial year. Hence there is a need to factor the projected closing stock in filling factories during target fixation for the chemical group of factories. For this, the targets must be fixed in consultation with the ammunition factories.

The revisions covered on an average, 66 *per cent* of the sampled product range each year (**Table-43**). During 2011-12 to 2013-14, the targets were revised upwards in 62 instances (43 *per cent*), downward in 33 instances (23 *per cent*), while status quo was maintained in respect of remaining 50 instances (34 *per cent*). Out of 62 instances of upward revision, the Factories could not meet the targeted quantity in respect of 44 instances; in 17 instances, factories could not even meet the original targets (**Annexure-XXVIII)**. The factories met the downwards revised targets in 23 instances but there were 12 other instances where the factories could not achieve the targets despite the reduction.

Table 43: Comparison of original with revised targets in a year

Year	*Nature of revision*	*OFBa*	*OFI*	*HEF*[119]	*CFA*	*Total*
2011-12	Increase in target (nos)	14	7	3	8	32
	Decrease in target (nos)	1	1	1	0	3
	Status quo (nos)	4	4	4	1	13
	Total	**19**	**12**	**8**	**9**	**48**
2012-13	Increase in target (nos)	0	4	3	5	12
	Decrease in target (nos)	5	2	0	2	9
	Status quo (nos)	14	7	5	2	28
	Total	**19**	**13**	**8**	**9**	**49**[120]
2013-14	Increase in target (nos)	9	4	3	2	18
	Decrease in target (nos)	7	5	3	6	21
	Status quo (nos)	3	3	2	1	9
	Total	**19**	**12**	**8**	**9**	**48**

Source: Extracted from the Ordnance Factory Board's intimation of targets to Ordnance Factories during 2011-12 to 2013-14.

The revisions in the original targets during 2011-12 to 2013-14 were attributed to (i) review of actual stock position of explosive and propellants from all the concerned factories in April 2011 and revised ammunition programme during 2011-12 and (ii) restricted availability of components at filling factories during 2013-14. No reasons were recorded for revision of original targets during 2012-13.

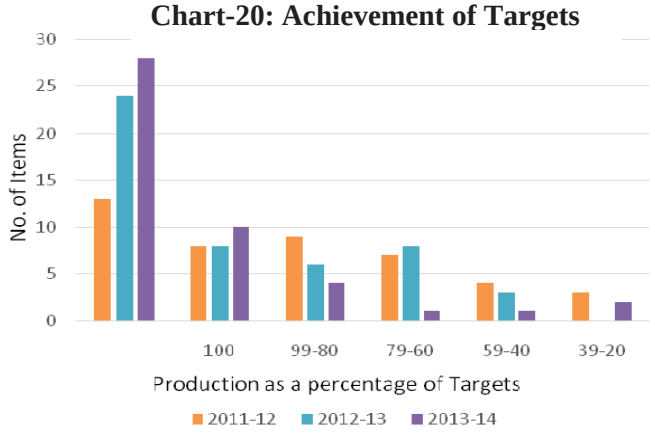
The Board stated that such revisions were necessary due to revisions made by the indentors. However, this assertion was not supported by the reasons earlier stated by the Board. The incidence of revisions in the Board was high. These revisions did not bear a correlation with the revisions in requirements by the Army. There was a greater bias towards increasing the target during the yearly revision in the Board and in many cases the Factories could not meet even the original targets given for the year. However, during the Exit Conference the Board accepted the Audit observation that the upward/downward revision in the target midway adversely impacts the provisioning of stores.

[119] In addition, there were 6 items, initiators, for which the HEF did not receive targets from the Board but from the Ammunition Factory, Kirkee. These items are excluded from the Table
[120] In 2012-13, an additional item was added to OF, Itarsi

7.3.2.5 Achievement of targets

In 2013-14, 83 *per cent* of the products met 80 *per cent* and above of the targets by March-end, as compared to 48 *per cent* in 2011-12. In all, 10 items moved from the bottom range into the range of 60 *per cent* and above achievement rate of targets over 2011-12 to 2013-14 (**Chart-20)**.

Chart-20: Achievement of Targets



But the chemical group of factories is required to meet their production targets by January in order to enable the ammunition filling factories to meet their targets by March. While communicating the targets each year, the Board reaffirmed the January deadline.

The performance of factories in target achievement was compared on some key products taking January & March as the deadlines, to assess the impact, results of which are in **Table 44** (further details are in **Annexure XXVIII**.)

Table 44: Achievements of targets in percentage by January and March

Item	Percentage Achievement of targets in					
	2011-2012		2012-2013		2013-2014	
	Jan 2012	Mar 2012	Jan 2013	Mar 2013	Jan 2014	Mar 2014
Ordnance Factory, Bhandara						
NGB 204	100	100	36	85	77	100
NGB 221	53	60	51	59	95	100
NGB 241	42	60	61	100	91	100
RDX/TNT 60:40 A	17	24	33	47	57	100
RDX/TNT 60:40 B	22	31	37	50	46	89
RDX/WAX 88:12	41	54	40	51	71	91
RDX/WAX 95:5	0	0	34	39	58	86
Ordnance Factory Itarsi						
Pinaka	74	94	47	71	46	78
Ball Powder 5.56mm	72	94	63	86	83	100
Ball Powder 7.62mm	58	80	51	74	69	100
High Explosive Factory Kirkee						
TNT	69	92	45	66	96	100
Cordite Factory Aruvankadu						
130mm RVC	61	100	69	100	74	83
105mm IFG NC	80	100	61	78	68	99

***(Source:** Achievement Report of factories for the month of January and March)*

Table-44 shows that the factories fell far short of targets by January each year. The following were also cited as bottlenecks for shortfalls in target achievement by the Factories:

- When new products are introduced, they take time for development for *e.g.;* Akash propellant: Ordnance Factory, Itarsi and augmented charges for 81mm and 120mm ammunition High Explosive Factory, Kirkee

- Time taken for inspection in quality clearance from the Quality Assurance Establishments attached to each factory, representing the Directorate General of Quality Assurance Establishment (DGQAE)

- Delays in proof testing of propellants

The long lead times taken in procurement and in proof-testing are discussed in the succeeding **Paragraphs 7.3.3, 7.3.4** and **7.3.5.** With regard to bottlenecks on new products the factories are given targets only after the pilot lots of products are cleared in proof before according bulk production clearance. Hence development time cannot be a factor in shortfalls.

7.3.2.6 Impact of shortfalls

The impact of shortfalls on the ability of the filling factories in meeting the Army's indent was assessed. A direct correlation of the impact of shortfall in issue of the chemicals to the filling factories is difficult to establish since ammunition has many components, of which propellant is a part, even if an important one. However, on certain items such a direct link was established by the filling factories. For instance, references were found from Ordnance Factory Chanda and Ordnance Factory Badmal informing Cordite Factory, Aruvankadu that production had been stopped for want of timely supply of propellants. The inability of the chemical group of factories to complete the delivery by January each year did have a cascading impact on the Board's ability to meet the ammunition indents[121] (**Table-45**).

Table-45: Slippages in production impacting filling factories

Chemical Item	Year	Factory	Shortfall in production of chemical factory	Link to ammunition	Filling Factory	Shortfall in ammunition issue
Prop40mm PFFC	2012-13	OFBa	73 *per cent*	Cartg 40mm PFFC	OFK	51 *per cent*
RDX/TNT 60:40 A & B	2012-13	OFBa	64 *per cent*	125mm HE	OFBL	81 *per cent*
Pinaka Propellant	2012-13	OFI	53 *per cent*	Pinaka (PF)	OFCH	57 *per cent*

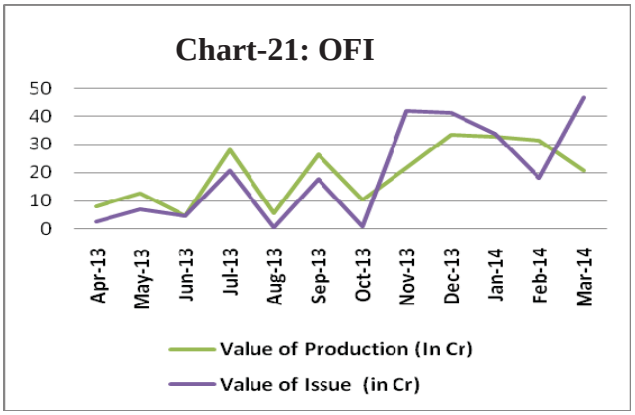
*(**Source**: - Achievement report of OFBa, OFI, OFK, OFBL and OFCh for 2012-13)*

In reply, the Board stated (June 2015) that the targets are given to factories for completion over a period of 12 months of the ensuing year and it was not possible to compress the supply of propellants in 10 months in order to deliver by January each year. During the Exit Conference, the Factories accepted the view that if the production year were to be reckoned from January-December for the chemical factories, this problem could be avoided.

[121] A 1:1 correlation is difficult to establish since ammunition has many components, of which propellant is a part, even if an important one

The present schedule has an adverse impact on the performance of the Filling factories and hence must be advanced for the Chemical Group of Factories so as to enable them to follow a twelve monthly schedule ending in January. During the Exit Conference audit suggested that these factories may be given a two-year target. A long-term requirement from the Army (2014-15 to 2018-19) aids this re-scheduling. The Board accepted these proposals.

7.3.2.7 Production peaks in last quarter



The trends in production show that production peaks in the factories only in the last quarter: January-March each year. Hence, the factories are not able to meet the targets by January as required. **Chart-21** illustrates the trends in Ordnance Factory Itarsi in 2013-14[122]. The Ministry of Defence had observed (July 2012) that the tendency to push production to the last quarter, was not desirable. Further, the Ministry directed that "the value of production should be, as far as possible, be evenly spread over the four quarters."

The Board accepted that the issue of finished products peaks in the last quarter and stated that conscious efforts have been made to improve performance in this area.

7.3.2.8 Reliability of Production data

According to Paragraph 668 and 670 of the Defence Accounts Department Office Manual Part-VI (DADOM), the manufactured items accepted in inspection, are issued to the indentors through production issue vouchers and the total value of issue is debited to the relevant Services' head.[123]

However it was observed that the Factories prepared "advance issue vouchers" whereby they raised demands for payment from the Army without physical issue of the stores. Taking cognizance of the risks of accounting irregularities[124] and distortion of production figures, the Controller General of Defence Accounts (CGDA), New Delhi instructed all Controllers of Finance and Accounts (Factories)[125] in October 2007, not to accept advance issue vouchers without despatch particulars.

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[122] The choice of 2013-14 for illustrating production trends is conservative. This was the best year of production in Ordnance Factory, Itarsi during the audited period: 2011-12 to 2013-14.
[123] The Board debits all its revenue expenditure to the Account 2079. At the time of issue to the Defence establishment, there is (-) Debit to the Account and simultaneously, the Services' Head, 2076.
[124] Depiction of unrealistic profit in the accounts, distortion of cost of production and works-in-progress, disparity between value of issue and actual expenditure booked under manufacturing head etc
[125] Controller of Finance and Accounts (Factories) functions under the PCA (Factories) Kolkata for a group of factories on regional basis

We had commented on this issue in Paragraph 6.1.4.1 of Compliance Audit Report No 30 of 2013. Ministry, in their Action Taken Note, stated (March 2015) that close monitoring of production and issue *vis-a-vis* the plans was ensured to avoid recurrence of such incidence. Despite this, it was found that such practice continued in three out four factories checked for the selected items. During 2011-14, advance vouchers of ₹141 crore were prepared representing on an average eight *per cent* of the total issues (**Table -46**)

Table 46: Factory-wise value of advance vouchers

Factory	Value of advance vouchers (₹ in crore)			
	2011-12	**2012-13**	**2013-14**	**Total**
OFI	3.3	12.6	59.9	75.8
OFBa	17.7	19.4	15.4	52.5
HEF	4.1	2.6	5.8	12.5
Total	25.1	34.6	81.1	**140.8**
Total value of issues	**573.7**	**531.0**	**621.3**	**1726.1**
Percentage of value of advance vouchers to total issues	4.4	6.5	13.1	8.2

*(**Source**: Issue vouchers of OFI, OFBa and HEF)*

The incidence of advance vouchers was highest in Ordnance Factory, Itarsi in 2013-14 when the figures were almost 4.8 times the level in 2012-13. **Table-47** shows the trend in this Factory over 2011-14. The Factory reported a significant improvement in production in 2013-14, but more than 25 *per cent* of the achievements represented an inflation of figures as seen in the **Table 47**.

Table-47 : Details of spill over items as a percentage of total issues

Year	Value of advance vouchers	Total issue	Advance vouchers as percentage of total issue
2011-12	3.3	234.1	1.4
2012-13	12.6	226.4	5.6
2013-14	60	235.0	25.5

The Board stated that this was done keeping in mind the delays in transportation and the need for documentation at various levels. The Issue voucher document is therefore processed taking into account the likely delay. However in cognizance of the risks involved in the practice of issue of advance vouchers it is stressed that the applicable CGDA instructions may be complied with.

7.3.2.9 Internal control on achievement of targets

The Planning Section in the Factory prepares the production plan and is required to monitor the pace of production. The Section collects the data on issues of products on daily basis and the factory sends monthly production performance report to the Board. Monthly Production Review Meeting in the Factory is another tier of control. This meeting is attended by the General Manager and the heads of production shops as well as the planning section.

Paragraph 4032 of the Board's procedure Manual stipulates that the Factories should report to the Board the reasons for delayed production and issue of the products to indentors and the action taken by the factory to obviate causes of delay. We found that the meetings are conducted; the monthly reports are also being prepared and sent to the Board. But Factories did not report specific bottlenecks in production to the Board and instead, merely communicated the data for status on production and issue of items.

As per Ministry's order of February 1979, the Board is responsible for overall planning, monitoring and implementation of the production programme through the respective operating groups and at the Board level, through monthly Board Meeting. Paragraph 4039 of the Board's Procedure Manual also stipulates that the Board is required to examine monthly progress reports of the Factories for suitable action taken in all cases where delivery schedule has not been maintained or is not likely to be maintained. Audit however found that the Board in a routine manner wrote monthly letters to the General Managers of Factories, on the basis of monthly production reports, by following a set pattern which did not contain any specific directives to the Factories to step-up production. The periodicity of the letter (monthly) would dilute its impact unless if it were to contain Factory-specific interventions. In its present form, it runs the risk of being routine in nature, by virtue of which, a weak internal control. Even, the minutes of the quarterly Board meetings, did not indicate a threadbare discussion on the hold-outs in production. The continuance of advance issue vouchers was also an indication on the inadequacies in the Board's monitoring of the production performance of factories

Conclusion

Army's roll on indent indicating five year requirement helped the Board in planning. Changes in requirements, mainly downward revisions, did not affect the production targets already given by the Board to the Chemical Factories. Revisions by the Board in the annual targets to Factories, mid- year covering majority of products with greater bias to increasing the target did not in most cases result in target achievement as the factories were unable to meet even the original targets.

The Chemical Group of Factories are required to meet the production targets by January each year, a commitment the Factories were unable to meet which impacted the production schedules of the ammunition filling factories. The practice of advance vouchers without actual physical issue continued in three Factories. The internal controls in the Board to monitor production against targets have become routine and hence their effectiveness diminished.

Recommendation 1: *The Board may re-visit the practice of revising the targets across the Board in May/June each year and replace it with a strategy in fixing targets that is reasonable and hence will have a greater chance of being achieved by the Factories.*

Recommendation 2: *The monthly report from the Factory may be in the form of exception reporting highlighting the bottlenecks. The periodicity of the letter to the General Managers from the Director General, Ordnance Factories may be reviewed and may be made more effective by addressing only the specific bottlenecks reported by the Factories.*

7.3.3 Marshalling resources for production

Audit Objective 2: *The Factories were able to marshal their resources to implement the production plan*

7.3.3.1 General

On receipt of targets from the Board, each Factory formulates the production plan. It is important that the stores of the specified quality are procured on time and the labour and machines are utilised optimally.

7.3.3.2 Timeliness in procurement of stores

The guidelines containing the time limit for procurement of stores and flow chart of process of procurement are similar to that applicable for Weapon group of Factories as discussed in **Paragraphs 7.2.3.1 and 7.2.3.2**.

We examined the timeliness in procurement during 2011-12 to 2013-14 in the sampled Factories, against the above benchmarks. The results are as follows:

Issue of Tender Enquiry

- The tender enquiries were issued within one month only in respect of 14 *per cent* of the instances. It took 1-2 months in 42 *per cent* of the instances*;* 3-5 months in respect of 21 *per cent a*nd more than six months in respect of 566 instances which formed 13 *per cent* of the instances. **Annexure- XXIX** gives the details.

Placement of the Supply Order

- The Factories exceeded 26 weeks (182 days) in respect of 35 *per cent* of the instances. It took less than 180 days in respect of 65 *per cent* of the instances; 181- 240 days in respect of 20 *per cent* of the cases; beyond 241 days in respect of 15 *per cent* of the instances 2011-14. **Annexure-XXX** gives the details. In Ordnance Factory, Bhandara, the placement of supply orders took more than six months in 55 *per cent* of the cases in 2013-14.

The Factories stated that delays were because of the procedural requirements, which were time-consuming and occurred particularly in instances where the participation of vendors in the tender was poor, or where there were delays in negotiation with firms and in getting approvals *etc*.

The delays disrupted the production schedule and the Board must insist on timely completion of the prescribed procedures, supported by a review of the procedures to identify the choking points.

Inspection of input materials

- The Factories reported compliance with the limit of 15 days in 87 *per cent* of the instances (**Annexure XXXI**). In another 10 *per cent* of the instances, the time taken was in the range of 16-30 days *i.e.*, within one month, but one *per cent* of the instances the time taken for clearance of stores took more than two months.

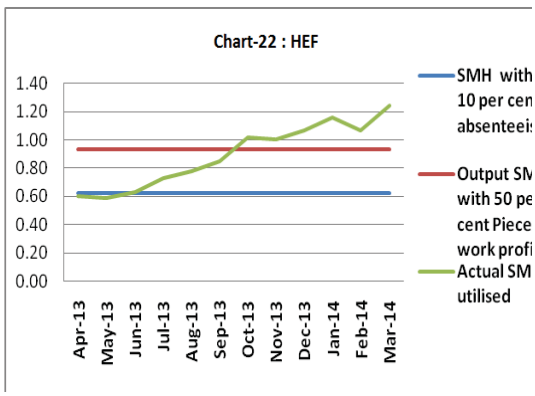
Audit analysis showed that on an average; processes in placement of supply order took around 6.5 months in two-thirds of the procurements. The actual receipt of items would depend on the delivery schedule which would vary depending on the nature of the item and the quantum of the supply order.

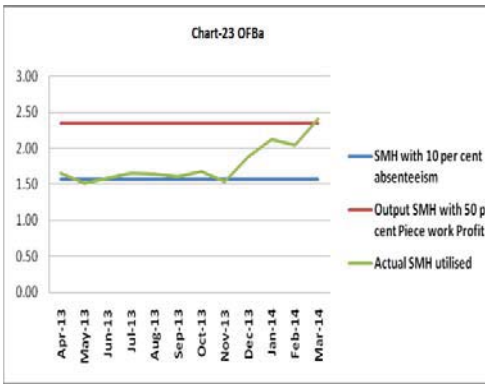
7.3.3.3 Manpower utilisation

Optimum and effective utilisation of manpower and machinery is essential to ensure the productivity in Factories so as to meet the production targets and minimise the cost for timely delivery of quality products to indentors. Direct Industrial Employees [126] (IEs) are engaged in production based on the workload in each production shop. The available Standard Man-hours (SMH) for each month are worked out based on number of direct IEs engaged in production for eight hours a day for 25 days in a month. The output SMH is determined based on the total quantity of each item manufactured during the month and SMH required for all the items as per labour estimates. The Piece Workers are given piece work profit as an incentive, based on their actual output SMH compared to the input SMH. Piece work profit is calculated[127] as a percentage of excess output SMH over the input SMH.

We examined as to how effectively the Factories marshalled their direct IEs for production activities for a sample period of 2013-14 at the selected Factories based on available SMH and output SMH data furnished by the Board. Accordingly, we plotted Factory-wise and month-wise actual output SMH (**Chart-22 to 23 and Annexure-XXXII**) against the following two standards adopted by the Board for assessment of requirement of direct IEs:

- man-hours available with 10 *per cent* absenteeism
- man-hours available with 10 *per cent* absenteeism and 50 *per cent* piece work profit





[126] Labourers directly engaged in production process involving machines and materials
[127] Piece work profit percentage = {(output SMH- input SMH)/Input SMH}*100

We found that all the four factories except OFBa to some extent, reported high productivity of IEs. It exceeded 100 *per cent* in all months (except two months in OFI) while HEF reported 200 *per cent* efficiency in March 2014. The trends were shown in **Table-48** below:

Table-48: Productivity of Direct Labour in 2013-14

Performance in 2013-14	HEF	CFA	OFI	OFBa
No of months where productivity was 150 *per cent* or more	6	7	3	1
Percentage of products where production by March was				
100 *per cent* of the target	88	78	70	42
99-60 *per cent* of the target	12	22	20	42
below 60 *per cent* of the target	-	-	10	16
Cost of production (₹ in crores)	161	158	253	257
Number of direct labour	345	980	648	871

***(Source** - Piece work Profit statement, Annual Production Account and Direct Labour details of the factories for the year 2013-14)*

The two factories with the lowest volume of production, HEF and CFA reported 150 *per cent* and more productivity during half the year and between 100-150 *per cent* productivity in the remaining half of the year, to meet 100 *per cent* in seven-eighth and three-fourth of the targets respectively. This means that with each labour producing 1.5 times his capacity, the Factory is not able to meet 100 *per cent* targets. These are the two Factories with the lowest production among the four Factories.

There was little correlation between the cost of production, the number of direct labour and the efficiencies reported. CFA reported around 150 *per cent* productivity for seven months of the year with the highest labour force (2.8 times that of HEF with nearly the same value of production) among the four factories to achieve 78 *per cent* of production targets. Subsequent analysis (**Paragraph 7.3.3.4**) shows that this achievement was with 60 *per cent* utilisation of machines in 2013-14, a 40 *per cent* fall from 100 *per cent* utilisation of machines reported by CFA in 2011-13. This goes to show that the labour estimates in production are not realistic[128] which allows space for high piece work profit payments.

The Board replied that SMH varied depending on the overtime pattern prevalent in the factory which in turn was decided based on the target for the factory for the particular year and did not agree with the figures stated above. However the Board did not provide data specific to the above instances in order to support its contention.

[128] For *e.g*; if 100 hours are actually required for 150 units and the estimates are inflated to 200 hours for 150 units. When the actual production of 150 units is completed in 100 hours, the balance 100 hours (200-100) are calculated as piece work profit.

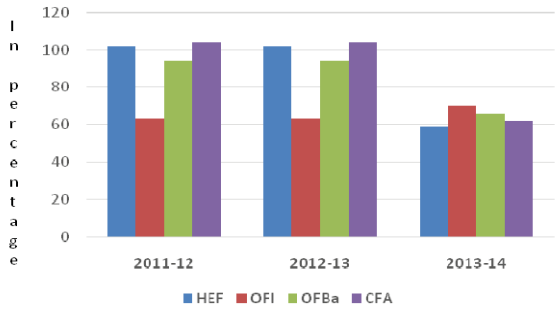
7.3.3.4 Utilisation of machines

In response to Audit Paragraph 3.7.8.1 of the Chapter III of Report No PA 4 of 2008 regarding under-utilisation of plant and machinery, the Ministry of Defence in its Action Taken Note had assured the Parliament that the long-term planning facilitated by roll-on indent for ammunition would help in proper and optimum utilisation of Plant and Machinery.

As per Ministry's order of February 1979, Ordnance Factories are required to utilise at least 80 *per cent* of their installed capacity. However, the Board revised (August 2013) the Manual for procurement of Plant and Machinery without the approval of the Ministry. Paragraph 3.2 of the Manual stipulates calculation of capacity based on 80 *per cent* efficiency each of machine and manpower *i.e.* overall 64 *per cent* efficiency[129].

The machine hour utilisation against availability of total machine hours at four chemical manufacturing factories during 2011-12 to 2013-14 is given in the **Chart-24**. The machine hour utilisation for the two years 2011-12 to 2012-13 remained static in all the four factories to come down in 2013-14. HEF and CFA reported 102 and 104 *per cent* utilisation respectively in 2011-12 to 2012-13 to 59 to 62 *per cent* in 2013-14, whereas at OFBa it reduced from 94 *per cent* in 2011-13 to 66 *per cent* in 2013-14. The machine hour utilisation at OFI more or less remained static in the range of 63-70 *per cent*.

Chart-24: Utilisation of Machine



Conclusion

The Factories could not achieve compliance with the timeframe prescribed by the Board on placing supply orders in one-third of the procurements. Further, if the lead time for delivery of stores were to be factored, procurement would consume most of the production year. Due to the delays in procurement, the factories could not maintain even flow of production, with production peaking in the fag end of the year. The labour productivity reported by the Factories was high and did not correlate with the performance against targets.

7.3.4 Quality Control and Quality Assurance

Audit Objective 3: *Strong Quality control measures ensured timely issue of quality explosives/propellants to indentors.*

[129] 64 *per cent* is arrived at 80 per cent efficiency each of manpower and machines = 80%*80%=64 *per cent*

7.3.4.1 Quality Control and Quality Assurance

Quality of explosives/propellants is paramount as it ensures effectiveness of ammunition while hitting the intended target. The system of multi-layer quality control of the factory and the quality assurance by the Directorate General of Quality Assurance (DGQA) is similar to that applicable for Weapon group of Factories as discussed in **Paragraph 7.2.4.1**.

Audit examined the quality control mechanism in respect of two sampled items (TNT and NC-1066) at two Factories (HEF and OFBa) for the selected three months and found no deviation from the procedures prescribed in Standard Operating Procedures (SOP).

7.3.4.2 Coordination between QC and QA

Coordination between the factory and the SQA establishments is essential to ensure manufacture and issue of defect-free products to the Indentors. We found that Ordnance Factory Bhandara did not hold monthly meetings as mandated with SQAE for 14 months during 2011-12 to 2013-14. Further, we observed that propellants worth ₹ 12.70 crore manufactured by Ordnance Factory Bhandara during 2011-12 to 2013-14 were rejected by the DGQA in Climatic Hut Test **(Annexure-XXXIII)**. The Factory management intimated Audit that Climatic Hut Test was unilaterally decided by DGQA without consulting them and added that necessary actions were being taken for disposal of rejected lots. This indicated lack of synchronization and sharing of information between the DGQA and Factory about the modalities for proof test.

Board stated (June 2015) that as per the records available with the Factory, meetings had been held regularly during 2011-12 to 2013-14. They added that Climatic Hut Test was insisted on by CQA and not by local SQAE.

The reply is not acceptable because as per the records furnished to Audit, no meeting was held for 14 months during 2011-12 to 2013-14. Further, the decision of CQA- being the Authority Holding Sealed Particulars- is final in so far as framing of tests to be carried out during proof.

7.3.4.4 Lead time in quality inspections

The Board did not prescribe time limits for quality inspection by the Factory. Data provided by the Factory on quality control showed that on an average, time taken for quality inspections at the Factory was around 15-30 days.

The SQAE takes an additional 15-30 days for clearance. We found odd instances of delays at SQAE which exceeded 45 days: for *e.g.*: clearance of four lots of Hexolite-B manufactured in OFBa in 2013-14 by SQAE took 61-90 days.

The Board stated that integration of functions of Quality under single agency will help in reducing delays. There was diffused responsibility in the current structure where different agencies are not under the administrative control of

single authority. It stated that SQAEs at various units are also working with shortages of manpower which at times leads to delay.

We also found that delays at proof establishments were considerable. **Annexure XXXIV** illustrates the delays faced by OFBa in 2011-14 on select propellants. 54 *per cent* of the lots for NGB 204 produced by the Factory took more than 60 days in proof.

In order to ensure timely completion of quality inspection, a project for establishment of a dedicated Proof Range for the Ordnance Factories at Betul was approved in December 2008 at a cost of ₹ 85 crore. Once established, the delays in proof establishment can be curtailed to acceptable limits. However, the dedicated Proof Range had not been set up so far due to non-availability of land at Betul.

In the Exit Conference, the Board stated that Factories require a dedicated proof establishment for dynamic testing for which the requirement of land was considerable. It added that in order to ensure timely completion of quality inspections at the existing proof ranges (PXE Balasore and CPE Itarsi), the Board may have administrative control of one of the proof ranges or at least participate as an important stakeholder.

7.3.4.5 Rejection

We observed that HEF did not face any rejections during 2011-12 to 2013-14 while the incidence of rejections at CFA was within the deviation limits. OFI (**Annexure XXXV**) faced six instances of rejections, of which one involving 105 mm IFG NC (a single-based propellant based on nitro-cellulose used in field gun) in 2012-13, was substantial accounting for more than 40 *per cent* of the propellant produced during the year. These instances are illustrated in the **Annexure-XXXV**. These items, except Pinaka propellant, have been a part of the product profile of the Factory for a long time (hence, are not new products) and they are used in ammunition much in demand in the Army. OFI's poor performance on rejections as well as in accidents (**Paragraph 7.6.3**) indicates possible gaps in skills in labour which must be addressed by the Board.

The Board in the Exit Conference (June 2015) stated that those products which were rejected at OFI were ultimately reprocessed, cleared in inspection and duly issued to the indentors after its clearance in QA inspection by SQAE. However, the rejections disrupt schedule for issue of products and ties up the manpower which could have been gainfully used for current production.

Conclusion

There were rejections in quality control and inordinate time taken in proof establishment, causing cascading effect on achievement against targets.

Absence of dedicated proof range at Factories caused delay in conduct of dynamic proof; a project sanctioned in December 2008 was abandoned and alternatives have not come to fruition.

Recommendation 3: *The project for establishment of a dedicated Proof Range for the Ordnance Factories may be expedited with firm deadlines and greater stakeholder status may be accorded to the Board in other existing ranges.*

7.3.5 Financial management

Audit Objective 4: *The Factories exercised due diligence on utilisation of funds as well as cost controls on production***.**

In the Action Taken Note (ATN) on Paragraph 3.7.1 of the Chapter III of Audit Report No PA 4 of 2008, the Ministry had assured the Parliament that "Factories have been advised to adhere to the overall overheads, decided during price finalisation and further, lower them. Efforts will be made to keep the price of chemical group of factories at a level to ensure recovery of the cost during the year." Our analysis on this audit objective was with this assurance as the criterion.

7.3.5.1 Utilisation of budgeted funds

The Accounts are prepared by the Principal Controller of Accounts (Factories), Kolkata. Local Accounts Office (LAO) of each Factory compiles the monthly accounts which are sent directly to the Principal Controller of Accounts (Factories) for consolidation. These accounts are integrated into the Appropriation accounts on the utilisation of the budget allocations from the Consolidated Fund of India.

The Board receives budgetary grant to meet its running expenses *i.e.*, the revenue expenditure. Receipts, including those from sale of products to Defence Establishment[130] booked as credit. The Board is allowed to recover its cost from the sale of products to the Indentors. There was net surplus in the Account from the operations of the Chemical manufacturing Factories (**Table-49**) except in 2013-14.

Table -49: Budget estimates and actual expenditure/income

(₹ in crore)

Year	Expenditure			Income			Net budget support (Actual)
	Budget Estimate	Actual	Variation (*per cent*)	Budget Estimate	Actual	Variation (*per cent*)	
1	2	3	4	5	6	7	8 (3-6)
2011-12	629	698	(+) 11	777	733	(-) 06	(-) 35
2012-13	736	688	(-) 07	750	701	(-) 07	(-) 13
2013-14	781	784	(+).03	803	781	(-) 03	(+) 03
Total	**2146**	**2169**	**(+)1**	**2331**	**2215**	**(-) 05**	**(-) 46**

(Source: Statement of Budget Utilisation as furnished by Budget Section of Board)

[130] Another Account (2) head 0079 records the receipts against sale of products to non-defence establishments (state police), in the open market or exports.

As can be seen from the **Table-49** that the Board was fairly realistic in budget estimation of expenditure with the variation between actual and the estimates being within 10 *per cent*. At the factory level, we noticed variations indicating that timely re-appropriation between factories helped the Board to keep its expenditure close to the budgeted estimates. Further, if advance issue vouchers as discussed in **Para 7.3.2.8** were to be taken into account, the actual income would be reduced by ₹141 crore during 2011-12 to 2013-14. Consequently, the variation between actual and estimated income would be between nine *per cent* and 13 *per cent* during the same period.

The Board also receives budgetary support for capital expenditure, which meets the expenditure on new projects including procurement of plant and machinery. We observed that budgetary grants sought for and received against Capital projects were not utilised. An example was the case at HEF, where the production targets of TNT (Tri-Nitro Toluene) was not met during 2011-14. But the funds sought for the Tri Nitro Toluene/Denitration and Sulphuric Acid Concentration Plant, meant for the manufacture of TNT, was not drawn each year during 2011-12 to 2013-14. Cumulatively, the Factory received ₹9.5 crore against its requirement of ₹119 crore[131]. **Annexure-XXXVI** details the delays in procurement which led to non-utilisation of funds. Similarly, only a small part (₹15 crore) of ₹266 crore of funds received against projected requirements for new Plants for Nitro Cellulose, Nitro Glycerine and de-silting plants in CFA was allotted by the Board to the Factory during 2011-14.

The Board replied that non-utilisation of projected requirement of fund for procurement of plant and machinery was mainly due to limited number of global suppliers for plant and machinery required for explosive projects which was further compounded by the reluctance of vendors to share these technologies. The fact, however, remains that the Board should take measures to ensure effective utilisation of funds.

7.3.5.2 Analysis of profit and loss

In addition to the Appropriation Accounts, the Board also prepares the Consolidated Annual Accounts which are cost accounts that guide the costing and pricing of products across the factories. The Factories are expected to recover the cost of production from its sales to the Indentors.

As per pricing policy of the Board, the prices are fixed on the basis of actual cost of production for the past three years and the trend in material, labour and overhead for the current year. The Ministry allowed (March 1994) the Board to limit the annual price increase up to eight *per cent* on overall basis with emphasis to keep this to a minimum. The issue price for the products is fixed in the beginning of the year by the Price Fixation Committee. [132]The Price list is issued after the approval of the Board in its meeting in the presence of the representative from the Army who is an invitee of the Board's meeting. Since

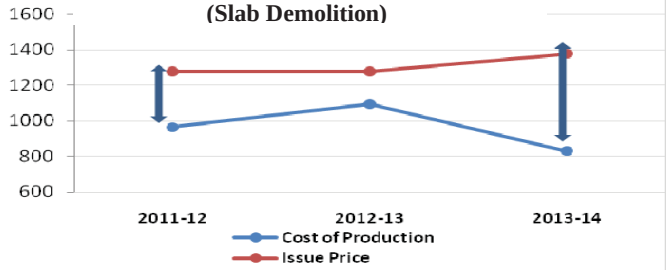
[131] Cumulative allotment figures under R&R, P&M and Capital Works heads

[132] The committee consists of the Controller of Finance, Director of the Operating Division, Nominee of the General Manager of the Factory, Local Accounts Office of the Factory and the Joint Controller of Finance.

the issue price is fixed before commencement of production, it may be higher or lower than the actual cost, resulting in profit or loss respectively, as discussed in the succeeding paragraphs.

Audit observed that the Factories were incurring losses on IFD issues and items issued directly to indentors earned profits. From a profit of ₹7 crore during 2011-12 (sampled items), IFD issues have gone into losses: the losses being ₹34 crore and ₹23 crore during 2012-13 and 2013-14 respectively. On the other hand, issues to Direct Indentors earned a profit all the years 2011-12 to 2013-14. An example is Slab Demolition is a product issued directly to the MHA by HEF, Kirkee where issue price was increased steadily over 2011-12 to 2013-14 regardless of the decrease in production in 2013-14 **(Chart-25)**.

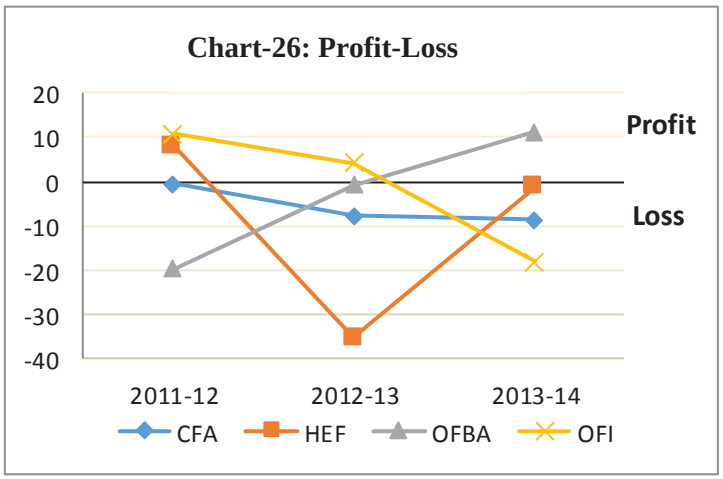
Chart-25: Cost of production/Issue Price (Slab Demolition)



7.3.5.3 Trends in cost of production

We analysed the trends in production, cost of production as well as issue prices of the selected products in four Factories. On the whole four Factories suffered **(149)** losses[133] each year, with the cumulative loss over 2011-14 being ₹58 crore. **Chart-26** illustrates the trends in losses/profits in the four factories, illustrating the wide fluctuations in profit/loss over the three years. **Annexure-XXXVII** gives the details.

Chart-26: Profit-Loss



The Factories faced stagnation over the three year period 2011-12 to 2013-14; the exceptions being OFBa (24 *per cent* increase in cost of production in 2013-14) and OFI (16 *per cent* increase in 2013-14). If indexed to inflation, the increase in production at OFBa and OFI would be 13 *per cent* and seven *per cent* respectively in 2013-14. HEF faced a downturn with a dip in production of their main product line, TNT. With decreased production, the Fixed Overheads as a percentage of Cost of production had increased. In all

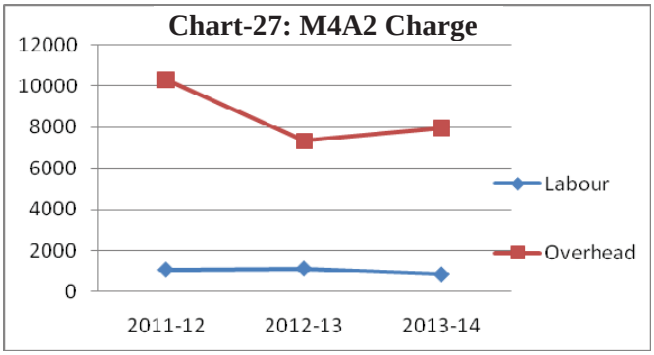
[133] There was loss in the Factories in the Cost Accounts, although they registered a surplus in the Appropriation Accounts, because the cost accounts are prepared on accrual basis and contain non-cash items like advance receipts against issues and advance paid for stores. The two accounts are reconciled by the Principal Controller of Accounts/Factories at the end of the year.

the factories, overheads accounted for around 50 *per cent* of cost of production, which was high. The only exception was OFBa which reduced the overheads from 73 *per cent* of cost of production in 2011-12 to 53 *per cent* in 2013-14.

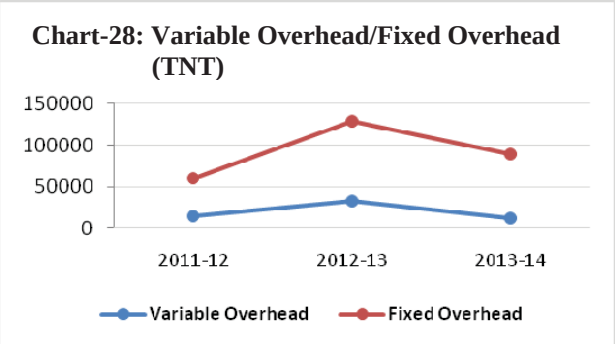
7.3.5.4 Trends in overheads

Our analysis of the major elements of overhead revealed the following:

- As per Paragraphs 541 to 549 of the DADOM Part-VI, total overheads in a factory are distributed across products as a percentage of the direct labour costs incurred on the product. But we found that there was no correlation between direct labour and the overheads. **Chart-27** on labour and overhead costs in production of M4A2 charge in OFBa in 2013-14 illustrates this anomaly, raising doubts on the integrity of the process for recording costs.



- The abnormal trends in cost of production and overheads led to losses in issue of products. For instance, HEF incurred huge losses in production of TNT (Normal) each year: ₹8 crore in 2011-12, ₹27 crore in 2012-13 and ₹10 crore in 2013-14 **(Chart-28).** The increase in cost of production due to inefficiencies in the system as well as less elbow room to increase issue price for a product that is the base for a wide range of explosives, led to the losses in production of TNT.



The Board stated during the Exit Conference that the abnormal and high overheads could be partly attributed to apportioning of expenditure on social costs such as on estate/hospitals/schools even though such expenditure is unrelated to production. However, the reply was silent on action taken to curve the high incidence of overheads.

7.3.5.5 Internal Controls

The Local Accounts Office (LAO) under the overall supervision of the Principal Controller of Accounts (Factories) is responsible for review of production cost to help the Factory Management to take corrective steps for cost reduction. As per Paragraphs 635 and 637 of DAODM Part-VI, LAO is

required to conduct quarterly concurrent review of production cost to identify cases of substantial variation between estimate cost and actual expenditure booked in a running manufacture warrant[134] and to bring it to the notice of Factory management for remedial measures. Apart from concurrent review of production cost and production activities, Paragraph 1026 of DADOM Part-VI stipulates LAO to prepare Quarterly Financial Review (QFR) report on value of issues, progressive expenditure, element-wise cost of production, analysis of expenditure *etc.* amongst other inputs with comparative figures for the last quarter and corresponding period of the previous year. Principal Controller of Accounts (Factories) is required to scrutinise, analyse and consolidate the report of all the Factories for submission to the Board and Controller General of Defence Accounts (CGDA) for appraisal.

The procedures suffer from many constraints in actual practice, as discussed below:

- The Shop Budget Committee and its review are procedures which are either not practiced or are ineffective in exercising close watch on cost of production.

- The quarterly Concurrent Review of Production Costs and Production Activities by the LAO was in the nature of an internal audit with seven objectives covering several aspects of production, of which identification of "cases of substantial variation between actual and estimates as revealed by the expenditure in a warrant that is running", was only one of the seven objectives.

- The Quarterly Financial Reviews do not identify abnormal trends for variation of costs from estimates and the underlying reasons for fluctuations, if any. As a result, it does not constitute an effective control on costs. The Reviews were not submitted to the Board's General Body Meeting; nor did the Board's General Body direct their placement. Consequently, the Quarterly Financial Reviews did not get the attention it deserved to control the costs.

- The wide variations in overheads raises doubts on the integrity of recording costs and the assurance that can be drawn on the accounts to form the basis for reliability of cost or pricing controls.

- Ordnance Factories being sole production unit for the armed forces are generally focused on meeting the demand placed on them without due regard for the considerations of cost control and reduction.

The Board replied that it has a well laid out process for assessing the cost prior to the commencement of the production year based on the past three years actual cost of production and the estimated cost of the production of the year in which review are being undertaken. The variations take place due to various factors, such as source, market trends, quantities on order *etc*. Over a period,

[134] Warrant is the authority of the General Manager of the Factory to the production shop for manufacture of a product.

the variations are evened out and the issue price is fixed so as to only cover costs. Increase in issue prices is generally restricted to eight *per cent* to take inflation into account. The Board also pointed out that Issue prices were fixed in advance mainly to enable budget formulation for the services and planning of demands. The pre-determined cost cannot match the manufacturing cost. Concurrent review by LAO provides independent inputs on production and for midway correction.

The Board's reply does not address the core issue of cost control and reduction. Estimating cost of production based on previous years without adequate cost control measures would inevitably result in perpetually rising costs. It is stressed that the fluctuation between the issue price and cost of production must not be abnormal. The concurrent review by the Local Accounts Office was inadequate and the many constraints pointed out in Audit limit the potential of the Accounts Wing to meaningfully engage with the Factory management on issues of cost control.

Conclusion

The Factories run on high overheads that inflated the cost of production. The practice of fixing issue price for products in the beginning of the year based on the trends in the past three years could have worked in a set-up in which cost control was effective to closely monitor abnormal fluctuations in cost. This was not however the case in the Factories with the two controls: the Shop Budget Committee and the Quarterly Financial Review, being inadequate interventions suffering from structural deficiencies.

Ordnance Factories being sole production unit for the armed forces are generally focused on meeting the demand placed on them without due regard for the considerations of cost control and reduction.

Recommendation 4: *The Shop Budget Committee may be revitalised so that it may serve to exercise a close watch on the cost of production.*

7.3.6 Environmental Issues

Audit Objective 5: *The factories instituted sound practices and procedures of the Board's sound environmental policy, based on a risk assessment.*

7.3.6.1 General

The chemical factories handle various chemicals and explosive materials both as input and output of different manufacturing process. The factories also generate hazardous wastes, effluents and noxious gases which could have a detrimental impact on three main elements of environment: air, water and soil. To mitigate pollution and maintain safe handling and storage of chemicals and explosives, the factories are required to strictly follow the norms of the State/Central Pollution Control Boards and also comply with the statutory rules and regulations on safety.

In the Action Taken Note (ATN) on Paragraph 3.7.1 of the Chapter III of Audit Report No PA 4 of 2008, the Ministry had assured the Parliament that "all the factories have been advised to ensure providing facility for periodical safety inspection by Centre for Fire, Explosive and Environment Safety (CFEES), New Delhi and Regional Controller of Safety (RCS), Pune to ensure factories' compliance. However, in exceptional cases, where deviations take place, the Board takes immediate action as and when required and avoids recurrence of incidents. There is separate office with experts working under Controller of Safety looking after all such issues at factory level". This assurance formed the criterion for our examination against this audit objective.

7.3.6.2 Environmental measures: planning & implementation

Planning

The Controller of Safety in the Headquarters at Kolkata is the nodal office for environment issues in the Board. The Board did not prepare an environment policy which could guide an environment plan. However, the Factories had prepared an Environment Management Manual in compliance towards Environment Management System certification ISO: 14001:2004 which all of the sampled factories had received. But, they did not identify the specific risks or a perspective plan for progressive risk mitigation measures. We further observed the following shortcomings:

- Although the Factories complied with Pollution Control Board's guidelines, the Manuals did not comprehensively map all the applicable legal requirements (**Annexure XXXVIII**)

- Factories did not lay down a multi-year or an annual plan [135]for achieving the environment objectives and targets. The environment related measures undertaken by the Factories were on a piecemeal basis not guided by identified targets or a perspective plan.

Implementation

The Factories had taken several measures for mitigation of environmental risks. However, there were shortcomings, which are summarised below:

- No Electrostatic Scrubbers Precipitators, Bag filter have been installed at High Explosives Factory, Kirkee

- The treated effluent from the plants is tested and then discharged into open nullahs/drains except in High Explosive Factory, Kirkee. The discharge of water effluent outside the factory premises is a violation of the State Pollution Control Board's consent. The Factories have not found ways to recycle the treated water and instead, spent ₹3.20 crore for buying potable water for use in the gardening and fire brigade purpose during 2011-12 to 2013-14.

[135] Includes (i) designation of responsibility for achieving objectives and targets at relevant functions and levels of the organization and (ii) means and time-frame by which they are to be achieved.

- The factories have entered into contracts with various vendors for disposal of solid wastes and hazardous wastes. However the actual method of disposal by the contractors to ensure that there is no risk to environment is not known.

During the exit conference the Board agreed to comply with the audit recommendation on identifying the specific environmental risks applicable to each chemical factory and to prepare a perspective plan for progressive risk mitigation measures. But no specific time frame for such compliance was communicated to Audit.

It was further observed that HEF, OFBa and CFA could not avail the rebate (₹19.74 lakh) provided by the SPBs to those units installing plant for the treatment of sewage/trade effluent due to non-submission of analytical reports of Industrial and Domestic effluents to the SPCBs in terms of Section 7 of the Water (Prevention and Control of Pollution) Cess Act 1977 even though they had installed mitigation measures like installation of plant for treatment of sewage/trade effluent.

7.3.6.3 Implementation of Safety measures in operations by Factories

The Factories reported 71 accidents (all Major accidents except one at HEF) (**Table-50**) during the calendar years 2011 to 2013. Most of the major accidents[136] were attributable to defective plant and machinery and unsafe condition (28 accidents accounting for 39 *per cent* of the accidents). Board of Enquiries constituted by all the factories did not assess the impact of accidents on environment. The accidents were also not reported to the State Pollution Control Boards except by CFA.

Table-50: Number of accidents at Ordnance Factories

Factory	No of accidents
CFA	2
OFI	35
OFBa	32
HEF	2
Total	71

***Source**: Environmental Audit Statement rendered by Factories to OFB*

7.3.6.4 Internal controls on environment issues

The internal controls on environment issues at Factories are carried out at six levels. They are (I) Monthly safety audit carried out by the Factory (II) Half-yearly safety audit carried out by the Sister Factory (III) Annual safety audit carried out by the Regional Controller of Safety (IV)) Half yearly electrical safety audit by the Regional Electrical Inspector (V) Monthly safety and surveillance audit by SQAE and (VI) Annual fire, environment and explosive safety audit by CFFEES. The Factories also submitted a detailed Monthly Safety Report to the Controller of Safety at Kolkata. Copies are also sent to the RCS[137] and the SPCB. The Report focussed mainly on safety requirements with elements of environment also forming a part of the Report.

[136] 12 other accidents accounting for 17 *per cent* of the accidents, were road accidents
[137] Four Regional Controllers of Safety at Chennai, Kanpur, Pune and Ambajhari.

We found that Level I to III and VI audits were carried out at the Factories during 2011-14, Level IV was carried out only in 2012 and 2013 at all Factories except HEF. Level V audit was not carried out at all factories in 2011 but was carried out in 2012 and 2013 except at OFBa.

7.3.6.5 Energy conservation

In tune with the Ministry's instruction (February 2006), Board issued guidelines to chemical factories in May 2007 to undertake two-tier energy audit for exercising economy in use of electrical energy. The two-tier energy audit involved audit through Internal Resources annually and external accredited energy audit by an accredited energy auditor once in five years. Ordnance Factory Bhandara and Ordnance Factory Itarsi carried out external accredited energy audit against supply order of March 2010 and May 2010/May 2013 respectively, they did not carry out the Tier-I audit through internal sources in 2011-14.

The Factories have shown initiative in implementing measures towards energy savings, guided by the recommendations flowing from the Energy Audits. The Factories reported substantial savings by taking small measures. OFBa had taken measures[138] to make saving in water and energy consumption. Similarly, HEF reported a savings of ₹715 lakh in fuel consumption in 2013-14. However, the Factories had high pendency of implementation of the recommendations of audit as shown in **Table-51** the pending recommendations indicating the future potential savings that will require investment.

Table- 51 : No of recommendation of energy audit

Factory	Number of Recommendations			Total cost (` in lakh)
	Total	implemented	pending	
OFBa	11	4	7	83
HEF	4	2	2	52
OFI	37	9	28	Not available

*(**Source**: Energy Audit Report submitted by Energy Auditor)*

7.3.6.6 Investment by Factories in environment measures

The factories spent ₹11 crore in 2011-12 to 2013-14 on environment which was only 0.6 *per cent* of the total expenditure. HEF spent ₹14 lakh in 2011-12 and thereafter there was no investment in 2012-14. The energy savings in

Table-52: Expenditure on Environment control to total expenditure

Factory	Expenditure in 2011-14 (` in crore)		
	Total (i)	On environment (ii)	(ii) as a per centage of (i)
CFA	461	6.3	1.4
HEF	429	0.1	-
OFBa	609	4.4	0.7
OFI	670	0	0
Total	**2169**	**11**	**0.5**

(*Source :- Summary of Overhead Expenditure during 2011-14*)

[138] Shut down of underutilized 660 TR (Ton of Refrigeration) Chilling unit of old RX plant, Installation of Light Emitting Diode street lightening in the factory and reduction of leakages etc.

the recent past have come from tapping the low-hanging fruits and significant investments have not happened in the area of environment (**Table-52**). The Effluent Treatment Plants in the Factories are over a decade old, though functional. Some of the environmental measures, for instance, those related to air pollution are integral parts of the plant and machinery. The low investment in environment measures should be viewed with the fact that the product profile has undergone a change, there are several pending recommendations emerging from energy audit and attention to environmental aspects could yield potential areas of improvement that would necessitate a more sustained investment.

Board stated that the Chemical group of factories is making continuous efforts in the field of energy conservation. The conventional filament-based bulbs have been largely replaced by CFLs to reduce the impact on the environment and savings have been made in the field of furnace oil, steam, power factor etc. Measures are already in place to optimise consumption of electricity. The efforts are underway to harness solar power. The Board stated during the exit conference that the investment in certain plant and machinery includes environment friendly technology. Despite these measures the need to invest more significantly in environment protection is stressed upon.

During the exit conference (June 2015), the Board stated investments on environmental measures are not visible since it was integrated with procurement of plant and machineries. However audit's contention was the need for a medium-term/long-term strategy supported by continuous investment of funds which needs to be addressed.

Conclusion

The Factories have prepared an Environment Management Manual in compliance to Environment Management System certification ISO: 14001:2004 which all the sampled factories have received. But the Factories did not identify the specific environmental risks or prepare a perspective plan for progressive risk mitigation measures. The investment of funds on environmental measures is low in all the Factories. Recycling, safe disposal and reusing of waste are areas which require attention from the factories especially with respect to disposal of explosive wastes.

The general trend of the accidents, especially in Ordnance Factory, Itarsi indicates a gap in safety training of the staff. The Factories have taken initiative for energy conservation and reported energy savings. However, the large number of pending recommendations in energy audit also indicates the future potential savings that will require investment of funds.

Recommendation 5: *An integrated and planned approach to environmental management may be prepared in the Factories identifying the funds required for its implementation, to enable the Board to step up its investment in the area of environment.*

Planning

7.4 Loss of ₹1.37 crore due to non-fulfillment of contractual obligation against export orders

Ordnance Factory Board delayed the delivery of the Kavach system against an export order due to slippages in development of the Kavach system and non-supply of Fire Control System (part of the Kavach) by an Indian firm. Consequently, the foreign Firm deducted penalty of ₹1.37 crore from the bills of the Board.

In order to acquire two Fleet Tankers for the Indian Navy, Ministry of Defence (MoD) concluded two contracts in April 2008 and March 2009 with M/s Fincantieri (Firm) Italy with an offset[139] clause. Under the offset clause, the Firm was to purchase AK-630M Guns (Gun) and Kavach Mod-II Systems[140] (Kavach) from the Ordnance Factory Board (Board), to be fitted on the Fleet Tankers by the Firm and supplied to the Indian Navy.

The Firm placed two orders for eight Guns and two sets of Kavach on the Board in October and November 2009 respectively. One Kavach system was required to be delivered by 21 June 2010, extended to 26 February 2011 and another by April 2011. The contract stipulated a penalty[141] for delays in delivery of Kavach by the Board; there was no such condition in the contract for supply of Guns.

To execute the order received under offset clause, the Board assigned Gun and Shell Factory Cossipore (GSF) to manufacture and supply the Gun. While Machine Tool Prototype Factory Ambarnath (MPF) was tasked to manufacture and supply the Kavach to the Firm. Kavach has three sub-systems viz (i) Launcher to be manufactured by MPF (ii) Electrical sub-system to be sourced from M/s Kirloskar Electric, Bengaluru and (iii) Fire Control System (FCS) to be procured from M/s SAMEER,[142] Chennai. These three sub-systems were required to be assembled at MPF for manufacture and supply of complete Kavach.

In this connection, Audit observed that:

- Kavach being a new item for MPF, it was yet to establish manufacturing process for assembly of three sub-systems when the Firm placed orders. However, the order was accepted by the Board to keep the export volume growing as indicated in their note of 25 February 2009 and approved by the Chairman, OFB.

[139] In case of outright foreign purchase of ₹300 crore and above, foreign suppliers are required to procure products of at least 30 *per cent* of contract value from the Indian firms.
[140] Kavach system is a part of armament on board of the Fleet Tanker, which helps in defending the Tanker against incoming shells and missiles thereby adding teeth to the defensive cover of the tanker.
[141] The penalty was to be calculated @ 0.5 *per cent* per week subject to a maximum of five *per cent* of the whole amount of order.
[142] Society of Applied Microwave Electronics & Engineering Research, a Research & Development Organisation under the Ministry of Communications and Information Technology.

- The Firm expressed (February 2009) its unwillingness to place order on the Board because the Board had not provided the technical specification detailing the scope of supply.

- MPF and Board together took about eight months, reckoned from the date of receipt of order (October 2009), to finalise and place Supply Order (June 2010) on SAMEER for procurement of FCS on Single Tender basis being a Proprietary Article Certificate item.

- As per order, SAMEER was to deliver FCS by 15 May 2011. However, SAMEER could not adhere to the delivery schedule and after a lapse of one year from the scheduled delivery date, it expressed (June 2012) its inability to meet the commitment due to production limitation.

- Consequently, the Board delivered (March 2013) only one Kavach system without FCS to the Indian Navy. It was after two years, the Board received (March 2015) FCS from SAMEER.

As a result of failure of Board to meet the delivery schedule for Kavach sets, the Firm deducted penalty of ₹ 1.37 crore from the payments due to the Board against supply of Guns.

While accepting the audit observation on delayed delivery and consequent deduction of penalty the Board stated (April 2015) that when the Firm placed orders, the manufacturing process for Kavach system was fully established at MPF and sources for supply of trade components/sub assemblies were also established. It attributed the delayed delivery of Kavach mainly to considerable time taken in inspection of raw materials to end product and the manpower constraints faced by SAMEER leading to delay in development of FCS.

Board's contention is not acceptable because (i) both the Board and MPF admitted (June and September 2012) that MPF had not developed the Kavach at the time of accepting the order from the Firm. However, the Board accepted the order from the Firm to keep their export volume growing even though the Firm expressed (February 2009) its unwillingness to place the order due to non-availability of technical specification from the Board; (ii) MPF and the Board together took about eight months to place the order on SAMEER on Single tender basis for supply of FCS.

Thus, the acceptance of the order for Kavach system without establishing the manufacturing process for Launcher and its assembly with other two sub-systems at MPF as well as delay in placement of order for FCS on SAMEER coupled with slippages in delivery of FCS to MPF led to delayed delivery of Kavach to the Firm that too without FCS and consequent loss of ₹1.37crore.

The matter was referred to the Ministry in March 2015; their reply was awaited (September 2015).

Procurement of Machinery/Stores

7.5 Unjustified procurement of storage tanks

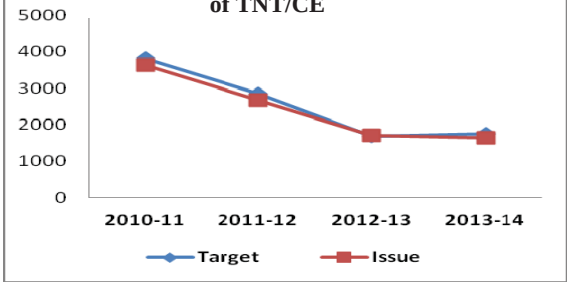
Procurement of four storage tanks at a total cost of ₹1.08 crore by High Explosives Factory Kirkee was unjustified since the factory already had sufficient capacity.

High Explosive Factory Kirkee (Factory) manufactures Tri Nitro Toluene (TNT) and Composite Explosives (CE), for which Strong Nitric Acid is a raw material. The Acid is stored in aluminium tanks. In 2012, the Factory held eleven[143] tanks with a usable capacity of 70 tonne[144] each, of which four required replacement. In all, the Factory could store upto 490 tonnes[145] of acid on any given day.

In June 2012, Ordnance Factory Board (Board) approved the Factory's proposal to purchase four storage tanks to replace the four old storage plants. The supply of the pre-fabrication material for the tanks was received by September 2013 at a total cost of ₹1.08 crore; these were under fabrication/ final commissioning as of March 2015.

We observed (September 2014) that the production and issue of Tri Nitro Toluene and Composite Explosive in the Factory showed a persistently low trend. The issue of Tri Nitro Toluene reduced by 55 *per cent* during five years: 2010-14 while that of Composite Explosive by 54 *per cent* during the same period. Even during the peak production targets of 2010-11, the requirement of storage capacity for Strong Nitric Acid did not exceed 345 tonnes. The seven existing tanks had a composite capacity for 490 tonnes which was adequate to meet the production levels. In fact, the Factory's procurement with the vendor envisaged staggered supply of only 400 tonnes of Strong Nitric Acid each month. The actual supply of Strong Nitric acid was far less, with the monthly supply touching 350 tonnes only on five occasions out of the 24 months of 2012-14. On an average, the monthly aggregate holding in the Factory was 145 tonnes in 2013-14, substantially reduced from 250 tonne in 2011-12. Further, scrutiny of Bin Cards of Strong Nitric Acid revealed that the vendor supplied the acid on a day-to-day basis and the acid supplied was being immediately drawn for consumption in manufacture within a few days.

Chart-29: Production Target and issue of TNT/CE



[143] In the first phase 3 tanks were replaced in 2008, second phase four tanks were replaced in 2012 and for remaining four tanks, the present Audit paragraph relates to.
[144] Each storage tank is capable of storing 50 cubic metres of Strong Nitric Acid with the filling height up to 400 cms. The tanks are filled up only up to the height of 375 cms to avoid overflowing of chemicals. Thus, each storage tank can store 70 tonne of Strong Nitric Acid.
[145] 7 tanks with 70 tonnes capacity, hence 7*70= 490 tonnes

We concluded that the purchase of four tanks for replacement of the remaining four tanks at a cost of ₹1.08 crore was unjustified.

In reply, the Board justified procurement of four storage tanks by stating (March 2015) the following:

- Under renewal and replacement plan, eleven tanks were created for storage capacity of 70.5 tonne each of 39 days continuous production from the safety and war capacity point of view.

- The factory had been producing Tri Nitro Toluene at 60 *per cent* plant capacity based on Board's target with the balance 40 *per cent* capacity meant to meet war situation. Hence, 11 serviceable tanks were to be maintained to achieve full capacity of TNT plant.

- Strong Nitric Acid was being procured from trade and the TNT plant was running continuously for 24 hours a day and uninterrupted supply of all input material were required to be maintained to avoid loss in production.

- Considering the target of production of TNT and CE for the year 2011-12, the replacement of four condemned tanks was essential.

The Ministry endorsed (July 2015) the views of the Board.

The justification of the Board/Ministry for replacement of four storage tanks was not acceptable since Paragraph 2.3.1 of Board's Manual for procurement of plant and machinery clearly stipulates that a factory should finalise its perspective plans on the basis of (a) projection of users requirement in case of end product factories and (b) inter factory demands in case of component manufacturing factories. Based on the perspective production load, the factory would prepare annual Renewal and Replacement plan. Considering an annual production target of TNT and CE assigned to the factory during 2010-16 ranging between 2586.40 tonne (2014-15) and 3813.95 tonne (2010-11), the requirement of strong nitric acid ranged between 223 tonne and 333 tonne per month respectively.

Therefore, seven tanks available at the factory at the time of initiating procurement action of four more tanks was more than sufficient to meet the monthly/annual production target for the financial years 2010-11 to 2015-16. Even after considering the peak levels of targets for production in 2010-11 at 333 tonne Strong Nitric Acid per month, the existing seven tanks were more than adequate to store the Strong Nitric Acid.

Thus, procurement of four storage tanks at a total cost of ₹1.08 crore by the Factory, despite adequate storage capacity and a declining demand for Strong Nitric Acid in production, was not justified even though it was for replacement.

7.6 Non- utilization of feeder system

A new substation installed by Rifle Factory Ishapore (RFI) at a cost of ₹4.09 crore in June 2006 remained unproductive owing to RFI's failure to procure and install switch gears (April 2015).

Rifle Factory Ishapore (Factory) meets its power needs primarily from the 6 KV through five feeders from Metal and Steel Factory Ishapore (MSF). In addition, it draws through a 33 KV Radial[146] Type Distribution System from substation of the power distribution company, Calcutta Electric Supply Corporation Limited Kolkata (CESC).

In view of the abnormal voltage fluctuations of power received from MSF, impacting adversely on the production, the Factory proposed (May 2002) a new distribution system with the following components:

- A new sub-station with a Ring Main feeding system[147],
- Equipped with Low Tension[148] and High Tension[149] Switch gear to develop a 33 KV Ring Main System in order to ensure uninterrupted, spike free electrical power for all the shops namely for high tech machining centres and Computerised Numerically Controlled cold swaging machine and;
- A digital SCADA[150] control system for the power received directly from CESC.

Ministry of Defence sanctioned (August 2003) the project for new 33 KV sub-station, scheduled to be completed by June 2004. The Factory procured the 33 KV sub-station from CESC at a total cost of ₹4.09 crore which was energized in April 2006.

We observed that the sub-station was energized but the Factory could not finalise the procurement of the switch gears required to make the new Ring System operational for nine years thereafter. The Factory was unable to decide if the SCADA system was required or not. The inability to finalise the tender offers within the validity period led to repeated tendering in September 2004, June 2005, December 2006 and November 2007.

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[146] A power distribution system whereby different feeders come out radially from the substation and connected to the primary distribution transformer directly. This has one major drawback in that in case of any feeder failure, the associated consumers would not get any power as there is no alternative path to feed the transformer. In case of transformer failure also, the power supply is interrupted until the feeder or transformer is rectified.

[147] Alternative to overcome the defects of the radial power distribution system. Under this system, one ring network of distributors is fed by more than one feeder. If one feeder is under fault or maintenance, the ring distributor is still energized by other feeders connected to it. Thus, the supply to the consumers is not affected even when any feeder becomes out of service.

[148] Consisting of underground Low Tension cable for eight kms, capacitor bank and Power panels.

[149] Consisting of underground High Tension cable for two kms, circuit breaker, battery bank, transformers, substation earthing, lightning arrestor, *etc*., as per Indian Electricity rules

[150] Supervisory Control and Data Acquisition system is a system, operating with coded signals over communication channels so as to provide control of remote equipment (using typically one communication channel per remote station).

Ultimately, the Factory decided (January 2012) to opt for procurement of switch gears without SCADA on the ground that modem system will not match with the existing 33 KV system (feeder from the CESC sub-station). The Factory received (November 2012) sanction for this proposal from the Ordnance Factory Board (Board). Six months later, the Factory floated a tender enquiry (March 2013). However, the purchase order was not placed as of April 2015.

As a result, the new 33 KV Ring Main System procured in June 2006 to mitigate the problems in manufacturing of weapons due to supply fluctuations, remained unproductive at RFI for want of switch gear.

While accepting the facts, the Board stated (April 2015) the following:

- An independent 33 KV substation to receive power directly from CESC substation was proposed in addition to existing 33 KV feeder to develop a Ring Main System to ensure uninterrupted power supply for the factory in case of failure of the existing 33 KV supply source besides making RFI independent of MSF supplies.

- At the time of breakdown of existing 33 KV feeder on CESC HT side at RFI on 19 October 2013, CESC restored power supply to RFI from newly installed 33KV HT feeder using bus coupler[151] for four days which prevented production loss.

- With the use of 33 KV Ring Main System, the Factory was able to obtain an annual rebate of ₹1.86 crore in the form of Load factor, Power factor and Max Demand etc from CESC.

- Tender enquiry to procure and install switch gear for 33 KV Ring Main System had been opened and RFI was going to complete the process of procurement and its installation on a fast track basis.

The reply was not acceptable for the following reasons:

- Factory justified (May 2002) installation of new 33 KV ring main system, in addition to existing 33 KV radial type system, to develop a Ring Main System in order to ensure uninterrupted, spike free power to vital installations with a view to avoiding receipt of current, having abnormal voltage fluctuations, from the primary feeder of MSF.

- It was not possible[152] to restore power supply from the newly installed Ring type substation during the period of breakdown of existing radial type substation since Low and High tension switch gears are required[153]

[151] Bus coupler is a device which is used to couple one bus to the other without any interruption in power supply and without creating hazardous arc.
[152] Since the High Tension and Low Tension switch gears are necessary to step down the electricity received from High Voltage 33 KV substation to Low Voltage of 6 KV.
[153] As stated by the Rifle Factory Ishapore while justifying (May 2002) the necessity for procurement of switch gears.

for receiving uninterrupted and spike free electrical power for all the shops from the newly installed substation.

- Since no billing for the new 33 KV substation existed as intimated to Audit by Factory (April 2015), there was no possibility of obtaining rebate on consumption of electricity as contended by OFB.

Thus, a new substation installed by Rifle Factory Ishapore at a cost of ₹4.09 crore in June 2006 remained unproductive owing to RFI's failure to procure and install switch gears (April 2015).

The matter was referred to the Ministry in February 2015; their reply was awaited (September 2015).

7.7 Idling of testing equipment

Test stand procured at a cost of ₹9.21 crore by Heavy Vehicle Factory Avadi was lying idle since its receipt in December 2010.

Ministry of Defence (Ministry) entered into a Transfer of Technology (ToT) agreement (February 2001) with M/s. Rosoboronexport, Russia (ROE) for indigenous manufacture of T-90 tanks at Heavy Vehicles Factory Avadi (HVF), T-90 engines at Engine Factory Avadi and Sighting Instruments for fitment in T-90 tanks at Opto Electronics Factory Dehra Dun (OLF).

Ministry instructed (May 2006) that the procurement of TI-ESSA[154] Sights was to be done directly from M/s Bel- Tech Export, Belarus and not through M/s Rosoboronexport, Russia who were not the Original Equipment Manufacturer. Ministry also stipulated (December 2006) that Ordnance Factory Board (OFB)/General Manager/Senior General Manager was authorized to conclude Supplementary Agreements in respect of procurement cases from ROE with full powers.

We observed that instead of approaching Belarus based firm for ToT of Sights, OFB took up the matter with ROE through a series of meetings, which assured to supply the ToT for the sights in May 2008, seven years after signing of the ToT. Accordingly, HVF signed a Draft Supplementary Agreement (February 2009) for supply of technical documentation in the Russian Language (USD 5.50 lakh) and equipment (comprising of 17 items including Test Stand [155]at USD 20.53 lakh, required for testing of Sights after integration with the T-90 tanks on the basis of Ministry's instructions stipulated in December 2006 order.

[154] A night vision device used in the T-90 Gunner and Command Version tanks working on the principle of thermal imaging to detect targets during day and night under normal and adverse conditions.
[155] Test Stand means the equipment required for defect investigation in case of any defect after integration of TIESSA sights.

We further observed that HVF received the ToT documents in July 2010 at a cost of ₹2.55 crore and incurred ₹5.10 lakh to get it translated to English in October 2010. HVF received equipment (comprising 17 items including Test Stand) in December 2010 along with ToT at a total cost of ₹9.29 crore.

While 16 types of equipment were taken on charge in December 2011, the Test Stand costing ₹9.21 crore was taken on charge in March 2012. The Test Stand, however, could not be commissioned so far as the drawings received from ROE were reported to be 'under- study'.

When raised in audit, HVF replied that drawing documents received from ROE were thoroughly studied and the clarifications required were taken up with Russian Specialists during meeting held at HVF between 11 December 2013 to 13 December 2013 and since Russian side had clarified their points, the case was 'under study'.

The fact remains that:

- Contrary to Ministry's specific directions of May 2006, HVF procured the Sights from ROE instead of M/s Bel-Tech Export, Belarus on the basis of Ministry's instructions stipulated in December 2006, which was not correct since December 2006 instructions were general instructions to delegate powers for procurement.

- Moreover, though Test Stand was received in March 2010, it was taken on charge in March 2012. Regarding the time taken, HVF replied that the delay was attributed to non-acceptance of the Draft Supplementary Agreement by the computer system resulting in creation of 'dummy supply order' and 'dummy receipt voucher' in February 2011. The reasons for delay from February 2011 to February 2012 were not, however, intimated to Audit by HVF.

- The Test Stand procured at a cost of ₹9.21 crore was still lying idle at HVF as it had not been commissioned.

The matter was referred to the Ministry and the Board in March 2015. In its reply, the Board stated (May 2015) that the complete drawings received from ROE were being studied by HVF to ascertain the tools, resources and technical guidance required for erection and commissioning of Test Stand and after completion of the study the commissioning work would be taken up. The Board did not, however, communicate any specific time schedule for completion of the study of the drawings to commission the Test Stand.

Thus, contrary to Ministry's direction, HVF procured a Test Stand at a cost ₹9.21 crore from a Russian Firm which was lying idle since its receipt in December 2010 as the factory did not take charge of Test Stand for more than one year coupled with the fact that the factory failed to complete the study of the drawings received from the foreign firm for more than four years to commission the Test Stand.

The matter was referred to the Ministry in March 2015; their reply was awaited (September 2015).

7.8 Extra Expenditure due to non-insertion of option clause in the tender enquiry/supply order

Failure of Opto Electronics Factory Dehra Dun to incorporate option clause in the Tender Enquiry/Supply order in violation of existing provision of procurement manual had resulted in subsequent procurement of image intensifier tubes at an extra expenditure of ₹1.33 crore.

Paragraph 9.15 of the Material Management and Procurement Manual (Manual) of Ordnance Factory Board (OFB), 2005 stipulates that ordnance factories should decide at the tendering stage itself as to whether any option clause for quantity enhancement will be included in the supply order to be finalized against the tender. Manual further provided that (i) even if mention about option clause was missing, the right to order an additional quantity up to 25 *per cent* was catered for in the special instructions to tender (ii) where it is decided to include such option clause, the matter should be indicated in the tender enquiry itself as well as give consent for up to 100 *per cent* enhanced quantities against option clause to be operated within the currency of the initial supply order and the Tender Purchase Committee would decide on the inclusion of the option clause and the option quantity on the basis of the quotations received.

In order to meet the production requirement for the 2007-08, Opto Electronics Factory Dehra Dun (OLF)[156] issued (May 2007) a global tender enquiry (GTE) for procurement of 4944 numbers of High Performance Supergen Image Intensifier Tubes[157] (tubes) against a projected deficient quantity of 9592 numbers. We observed that the GTE, in violation of Manual, did not incorporate any option clause for quantity enhancement.

OLF, based on offers received from potential vendors, evaluated technical bid (August 2007-March 2008) and commercial bid (April 2008) and approached OFB for procurement of tubes from M/s. Photonis-Dep, France at a unit cost of Euro 1975. OFB, however, directed (June 2008) OLF to procure 4248 tubes from M/s. BELOP[158], Pune at a unit cost of Euro 1935 and initiate source development for 20 *per cent* quantity of annual requirement to increase the vendor base.

[156] A factory functioning under the Administrative control of Armoured Vehicles Division of Ordnance Factory Board whose Headquarter viz. Armoured Vehicles Headquarters is based in Avadi, Chennai. The Armoured Vehicles Headquarter in turn functions under the administrative control of Ordnance Factory Board based in Kolkata.
[157] Required for manufacture of Driver Passive Night Vision Devices.
[158] Joint Venture between M/s Bharat Electronics Limited and M/s Photonis- Dep, France

OLF accordingly placed order (June 2008) and received 4248 tubes (October 2008 to January 2010) from M/s. BELOP at unit rate of Euro 1935. In the meantime, considering huge lead time involved in procurement process of tubes, OLF issued a Tender Enquiry (January 2009) for procurement of another 2400 tubes for meeting the production requirement for the year 2010-11 with quantity enhancement clause for 25 *per cent* of the indented quantity and received offer from M/s. BELOP- being L-1 offer- to supply at unit rate of Euro 2075.

We observed that both OLF (March 2009) and Armoured Vehicles Headquarter Avadi (AVHQ) (May 2009) desired to exercise option clause for 25 *per cent* of the ordered quantity *viz.* 1062 tubes against the supply order of June 2008 at the same unit rate of Euro 1935. M/s. BELOP, however, refused (May 2009) to entertain it as the option clause was neither incorporated in tender enquiry of May 2007 nor was it specified in the supply order of June 2008. M/s. BELOP, nevertheless, agreed (June 2009) to supply 1062 tubes at unit rate of Euro 1935 subject to release of 15 *per cent* of the order value in advance to meet their working capital requirement.

We further observed that even though AVHQ acceded to M/s. BELOP's request and recommended (June 2009) to accord their approval to procure 1062 tubes at unit rate of Euro 1935 and remaining tubes at unit rate of Euro 2075 with release of 15 *per cent* of the order value as advance payment. OFB, however, did not agree (August 2009) with the proposal because non-inclusion of option clause either in the GTE of May 2007 or order of June 2008 and release of 15 *per cent* as advance payment in deviation of the tendering terms (January 2009) would jeopardize the transparency of procurement and attract vigilance angle against post tender amendment.

OLF therefore procured 2400 tubes (February 2010 to February 2011) from M/s. BELOP against its order (September 2009) at unit rate of Euro 2025. As a result, OLF had to procure 2400 tubes against its order of September 2009 at higher unit rate of Euro 90 involving an additional expenditure of ₹1.33 crore, which could have been avoided had the clause relating to quote for quantities mentioned in the tender as well as give consent for up to 100 *per cent* enhanced quantities against option clause to be operated within the currency of the initial supply order was provided in the GTE of May 2007.

In reply, Ordnance Factory Board stated (April 2015) that (i) the total deficient quantity of tubes as noted on Material Planning Sheet was 7463 and not 9592 numbers as contended by Audit (ii) as per 4.1 (D), annexure of material management and procurement manual of Ordnance Factory Version 2005, the option clause to be incorporated in cases where 80 *per cent* of the annual requirement is covered through Limited Tender Enquiry on established sources. It further added that the supply order in the present case was placed through GTE covering the requirement and hence option clause was not incorporated in the supply order.

The contention of OFB is not acceptable since (i) even though the total deficient quantity of tubes noted on Material Planning Sheet of 19 April 2007

to meet the target of 2007-08 was indicated at 7463 and proposed procurement of 4944 tubes with dues in quantity of 2032 tubes, yet in the tender Purchase Committee meeting held on 20 April 2007, General Manager, Opto Electronics Factory Dehra Dun approved procurement of 4944 tubes against the deficient quantity of 9592[159] through global tender route; and (ii) there is no provision in the Manual which prevented the OLF from incorporating the option clause in case of procurement through GTE. Besides, Para 6.6 (j) of the OFB's Manual indicated check points for preparation of tender enquiry which inter alia called for an assurance from Ordnance Factories regarding incorporation of the option clause in tender enquiry relating to "coverage of additional quantity up to 100 *per cent* if demand for the store was of repetitive nature". Moreover, incorporation of option clause in the GTE is only an assurance to procure the additional quantity at the same terms and conditions within the pendency of proposed supply order, in case there was no downward trend in the price of the stores, and that too at the option of the factory. In the present case, further requirement of tubes existed because total deficient quantity as approved by General Manager, OLF was 9592 tubes as against the proposed quantity of 4944 tubes to be procured.

Thus, failure of OLF to incorporate the requisite option clause in the GTE/Supply order in violation of procurement manual had resulted in subsequent procurement of tubes at an extra expenditure of ₹1.33 crore.

We recommend that OFB should issue instruction to Ordnance Factories to ensure incorporation of option clause in the tender enquiries irrespective of whether the entire requirement for the year is fully covered or not.

The matter was referred to the Ministry of Defence in February 2015; their reply was awaited (September 2015).

Miscellaneous

7.9 Loss due to under-recovery of brass rods in conversion orders

Provision of lower product yield and higher process loss by Metal and Steel Factory Ishapore in their orders on trade firms for conversion of brass billets to brass rods, inspite of the fact that one of the trade firms offered higher product yield and less process loss, had resulted in low recovery of brass rods by ₹3.32 crore and extended undue benefit to the trade firms who had executed the conversion order to the same extent.

Metal and Steel Factory Ishapore (MSF) is engaged in production of finished brass rods of different sizes for supply to sister factories[160]. In order to meet this requirement, MSF draws 175mm dia brass billets made by its Melting

[159] Total deficiency of 9592 worked out based on the total requirement of 13234 less Received quantity till date 1610 tubes + dues in quantity of 2032 tubes).
[160] Gun & Shell Factory Cossipore, Ordnance Factory Dum Dum, Ordnance Factory Ambajhari and Ordnance Factory Khamaria.

Platform section and sends the same to a State owned undertaking, M/s Neo Pipes and Tubes Corporation Limited (NPTCL) for extruding the brass billets into brass rods.

In view of M/s. NPTCL's failure to meet the delivery schedule, MSF felt (August 2010) the need to develop new sources. Accordingly, MSF placed (August 2010) a development order on M/s. Senor Metals, Jamnagar (SM) for conversion of 175mm dia brass billets into 13720 Kgs of brass rods of various sizes with a minimum yield of 80 *per cent and* maximum process loss of three *per cent.* However, SM delivered (September 2010) 13720 Kgs brass rods of various sizes against 15875 Kgs of 175mm dia brass billets from MSF at a product yield of 86.43 *per cent* and process rejection loss of three *per cent*.

Audit observed that MSF subsequently placed seven purchase orders between December 2010 and August 2012 for conversion of brass billets to 1609 tonne brass rods on NPTCL and SM. These purchase orders stipulated product yield of minimum 70 *per cent* and process loss at four *per cent*, even though yield of 86 *per cent* and process loss at three per cent were achieved by SM against an earlier order of August 2010. Moreover, it was observed that against Tender enquiries of November 2010 and April 2011, SM had offered to convert brass billets into brass rod with product yield of minimum 80 *per cent* and process rejection of three *per cent*, but MSF did not take cognizance of this product yield rate and process rejection loss while placing purchase orders.

MSF issued (December 2010 and April 2013) 2081.116 tonne of 175mm dia brass billets and received 1584.66 tonne brass rods of various sizes (April 2011 to May 2013) from SM and NPTCL. Of these, MSF accepted 1556.557 [161]tonne brass rods and thus average product yield of 75 *per cent* was achieved by SM and NPTCL with four per cent process loss.

Thus, provision of lower product yield of 70 per cent and high process loss of four per cent in the seven purchase orders (December 2010 to August 2012) by MSF for conversion of brass billets to brass rods had resulted in low recovery of brasss rods of ₹3.32 crore and it also resulted in undue benefit to NPTCL and SM.

On this being pointed in Audit, the Board (OFB) stated (April 2015) during Hot Extrusion, the brass billets are heated to a temperature close to melting point, which could result in oxidation of the outer layer of the brass billets when exposed to open air. The yield beyond 70 *per cent* was contingent on several parameters including the thickness of oxidation layer. The burning loss would also depend on the amount of impurities embedded upon the billet

[161] The difference between received quantity of 1584.66 tonne and accepted quantity of 1556.56 tonne represents 28.10 tonne brass rods which were rejected as the same were not of requisite specification.

surface which were removed during the heating process and an additional two to three *per cent* normal rejection loss was provided in the estimate besides process loss of three *per cent*. The payments were made on the actual yield achieved during the conversion, hence there was no loss.

The reply is not acceptable since cost of finished brass rods was much more than the cost of process loss and process scrap. Hence, the contention regarding no loss because of payments were made on actual yield was not acceptable.

Thus, provision of lower product yield and higher process loss by MSF in their supply orders on trade firms for conversion of brass billets to brass rods in spite of the fact that one of the trade firms offered higher yield and less process loss in their offer, had resulted in loss of ₹3.32 crore and extension of undue benefit to the trade firms who had executed the conversion orders.

The matter was referred to the Ministry in March 2015; their reply was awaited (September 2015).

7.10 Recoveries at the instance of Audit

On pointing out the omission to recover interest on security deposit, liquidated damage and to avail of rebate on excess consumption over the maximum demand of electricity as well as releasing of payment under price variation clause even for delayed supplies, Ordnance Factory Muradnagar, Ordnance Factory Kanpur and High Explosive Factory Kirkee recovered ₹1.68 crore from the respective electric supply agencies and the firm.

Three Ordnance Factories recovered ₹1.68 crore at the instance of Audit on account of interest on security deposit, rebate on electricity consumption, liquidated damage and price variation clause.

Case – I: Ordnance Factory Muradnagar

Between 1994 and 2010, Ordnance Factory Muradnagar (OFM) deposited security deposit of ₹3.20 crore to Paschimanchal Vidyut Vitran Nigam Ltd (PVVNL) on which PVVNL was liable to pay interest at the rate of six *per cent* per annum. OFM did not avail interest on security deposit after 2011-12 *i.e.* for the year 2012-13 and 2013-14. On this being pointed out by us (March 2014), OFM adjusted the interest of ₹45.79 lakh from the electricity bill (May 2014) of PVVNL.

Case – II: Ordnance Factory Kanpur

Uttar Pradesh Electricity Regulatory Commission (UPERC) introduced a load factor rebate of 7.5 to 20 *per cent* in tariff schedule in October 2012. The rebate was admissible to the consumers whose consumption was in excess of (i) over 396 kVAh per kVA up to 432 kVAh per kVA per month with rebate of 7.5 *per cent* (ii) over 432 kVAh per kVA up to 504 kVAh per kVA per month with rebate of 10 *per cent* and (iii) in excess of 504 kVAh per kVA per month with rebate of 20 *per cent*.

We examined the electricity bills and observed that Ordnance Factory Kanpur (OFK) did not avail rebate aggregating ₹43.09 lakh from Kanpur Electricity Supply Company Ltd. (KESCO) for consuming electricity in excess of 396 kVAh per kVA during[162] October 2009 to April 2012. OFK referred (February 2013) the matter to KESCO for refund of rebate after this being pointed out by us (January 2013). Rebate of ₹27.83 lakh was adjusted in the monthly bill of May 2013 and recovery of the remaining amount was in process.

Case – III: High Explosive Factory Kirkee

High Explosive Factory Kirkee placed (September 2011) a supply order on M/s. Deepak Nitrate Limited Mumbai (Firm) for supply of 4094 tonne Ortho Nitro Toluene (ONT) to be delivered in a staggered monthly schedule and completed by 31 December 2012 at a total cost of ₹23.62 crore under a price variation and option clause. The ordered quantity was enhanced by 1150 tonne in December 2012 under option clause with the stipulation to supply the ordered quantity by March 2015.

We observed that against the scheduled delivery of 1050 tonne ONT during October 2013 to December 2013, the firm actually supplied only 435.44 tonne and the remaining 614.56 tonne ONT was supplied during the subsequent months. However, HEF did not recover liquidated damages of ₹50.68 lakh for delayed supply of 614.56 tonne ONT. Further, HEF accorded undue benefit of ₹43.20 lakh to the firm by way of releasing payment to the firm at higher rates under Price Variation Clause for the delayed supplies during August 2013, November 2013 and May 2014 in gross violation of Paragraph 7.5.1 (g)[163] of the Ordnance Factory Board's (Board) Procurement Manual 2010.

On this being pointed out in Audit, Board stated in July 2015 that liquidated damages of ₹50.68 lakh and irregular payment of ₹43.20 lakh under price variation clause were being recovered from the pending bills of the firm.

[162] October 2009, November 2009, March 2010, November 2010, December 2010, January 2011, April 2011, January 2012 and April 2012.

[163] If the supplier fails to supply the store within the delivery schedule, the purchaser has the option of extending delivery period with liquidated damages. However, no price variation clause would be admissible to the supplier if the delivery period is extended owing to suppliers default and in case of downward trend in the price during the extended period, the benefit thereof shall pass onto the purchaser.

Further examination revealed that HEF had recovered (June 2015) ₹93.88 lakh from the firm.

Thus, at the instance of Audit, HEF recovered liquidated damages of ₹50.68 lakh for the delayed supply of a chemical and irregular payment of ₹43.20 lakh under price variation clause from a firm.

In reply to Audit query, OFB confirmed (February/September 2015) that the recoveries of ₹1.68 crore been effected at the instance of Audit in respect of above three cases.

The matter was referred to the Ministry in March 2015; their reply was awaited (September 2015).