DEPARTMENT OF DEFENCE PRODUCTION AND SUPPLIES

CHAPTER : VI

Bharat Electronics Limited

Project Implementation, Production Planning, Marketing Activities and Internal Controls

Highlights

The investment of Rs.27.40 crore in seven projects was largely idle/unproductive due to preparation of unrealistic feasibility reports, under utilisation of capacity due to unwarranted expansion, non-receipt of anticipated orders, inability to capture market and non safeguarding of its interests.

(Para 6.3)

Slow-moving and non-moving inventories amounting to Rs.155.37 crore as on 31 March 2004 were 15 per cent of the total inventories.

(Para 6.4.4)

The Company could not achieve its objective of self-reliance through indigenisation as it continued to import 73 per cent of the raw materials and components.

(Para 6.4.6)

The percentage of non-Defence sector sales where the Company faced competition decreased from 26.06 per cent in 1999-2000 to 22.85 per cent in 2003-04.

(Para 6.5.2)

The Company incurred loss of Rs.8.57 crore in taking up four products meant for civilian sector.

(Para 6.5.3)

The Company could not import raw materials with in the cut-off date prescribed by the customers. As such the customers did not reimburse foreign exchange variation claims of Rs.5.64 crore. In addition the Company also suffered loss of interest of Rs.7.95 crore due to delay in raising foreign exchange variation claims on the customers.

(Para 6.5.5)

No norms had been fixed for losses/wastages of raw materials for manufacture of major products and materials in stores/transit.

(Para 6.6.4)

There was delay in raising sales invoices from 12 to 424 days resulting in loss of interest of Rs.3.93 crore

(Para 6.6.5)

The Company's existing internal control procedures were not adequate and dynamic to keep pace with increasing business activities and change in technology.

(Para 6.6.5)

6.1 Introduction

6.1.1 The Bharat Electronics Limited (Company) was incorporated in April 1954 as a fully owned Government of India undertaking under the administrative control of the Ministry of Defence. As on 31 March 2004 its paid up capital was Rs.80 crore and the shareholding of the Government of India was Rs.60.69 crore (75.86 per cent) with the balance being held by Indian financial institutions, banks, mutual funds and the public (24.14 per cent). The Company is managed by a Board of Directors headed by the Chairman & Managing Director, and consisting of 14 Directors, of whom six are full-time Directors and the remaining are part-time Directors representing the Ministry of Defence and the customers. The corporate Head Office of the Company is at Bangalore.

6.1.2 The Company designs, develops and manufactures electronic equipment like radars, communication systems, broadcasting and telecommunication equipment and electronic components. It has nine production units at Bangalore, Chennai, Hyderabad, Machilipatnam, Pune, Taloja, Ghaziabad, Panchkula and Kotdwara. It has six Regional Offices and Marketing Centres to assist in marketing and followup of realisation of sale proceeds. In addition it has two overseas Offices at New York and Singapore which assist in procurement of material from overseas market.

6.1.3 The major customers of the Company are the three Defence Services, Department of Telecommunications, All India Radio & Doordarshan and Indian Space Research Organisation. Supplies to Defence and non-Defence customers were 77 per cent and 23 per cent respectively during 2003-04.

6.2 Scope

The review seeks to evaluate the performance of the Company in the fields of project implementation, production planning, sales and marketing and internal control during the period 1999-00 to 2003-04 (earlier years too have been considered wherever deemed necessary).

Results and recommendations of Audit are featured in the succeeding paragraphs.

6.3 Project Implementation

During the period from 1999-00 to 2003-04, the Company executed six projects involving an outlay of Rs.31.69 crore. In addition, 12 projects involving an outlay of Rs.59.21 crore were completed prior to April 1999 and were under payback period. Execution of seven projects involving Rs.42.36 crore was yet to be completed (October 2004).

Important findings in respect of some of these projects are as under:-

6.3.1 Solar Photo Voltaic Cell

The project to manufacture 22.50 lakh solar photo voltaic cells per annum was taken up (March 1994) by entering into an agreement with M/s. Rexor Corporation, USA (supplier), on the understanding that the latter would supply monocrystalline silicon wafers, important raw material for production of solar photo voltaic cells. The agreement also provided that the entire production of cells would be exported to the supplier. However, the supplier did not provide silicon wafers required for manufacture of cells. The Company did not refer the matter of non-supply of silicon wafers by the supplier to Arbitration as per terms of the agreement and instead, procured these wafers locally and

produced the cells. The production of cells ranged from 0.56 lakh (1999-00) to 11.98 lakh (2001-02) and sales within country ranged from 0.26 lakh (1999-00) to 12.26 lakh (2001-02) during the past five years ending 2003-04. Thus, the facilities created were underutilised. The project incurred loss amounting to Rs.9.74 crore during 1999-2000 to 2003- 04.

The Management stated (May 2004) that the solar cells could not be exported as envisaged due to constraint of availability of raw material. The reply is not acceptable as the Company had worked out the viability of the project without considering any constraint in availability or increase in price of raw materials due to exchange rate variation or import restrictions, reduction in market price etc., leading to an un-realistic estimate regarding cost and profitability of the project. Thus, the investment of Rs.6.44 crore on the project did not yield any return.

Despite this, the Company approved (October 2003) diversification plan at an outlay of Rs.27.19 crore for setting up of facilities for manufacture of multi-crystal cells for moduling solar photo-voltaic cells, again under 50 per cent buy-back agreement with another US firm. The Company had not incurred any expenditure on the diversification plan as of March 2004.

6.3.2 IC Voltage Regulator

The project to manufacture one crore units of integrated circuits (ICs) per annum required for TV, Audio System, Telecom Switches, Computers and industrial applications completed (January 1998) at a cost of Rs.1.66 crore against the estimated cost of Rs.1.41 crore was taken up based on a projected demand of two crore units per annum, of which the Company was expected to capture 50 per cent market share. However, the Company never achieved the installed capacity of one crore ICs. The highest production achieved was only 4.30 lakh units in 2000-01.

The Management stated (June 2003) that there was a slump in the market, the project was still in the initial stages and the demand was growing. The reply is not tenable in view of the fact that BSNL[♣] had provided 2.41 crore lines based on C-DOT technology requiring these ICs, as on 31 March 2002. Evidently the market had not slumped, but the Company had not been able to exploit the same. Moreover, during the last four years ending March 2004 the Company failed to recover its costs as unit cost of production increased from Rs.8.06 per IC to Rs.15.27 per IC, whereas sale value showed decreasing trend from Rs.5.88 per IC to Rs.5.82 per IC resulting in a loss of Rs.46.57 lakh during the above period. Thus, failure of the Company to control the cost of production led to investment of Rs.1.66 crore on the project remaining largely underutilised and not yielding any return.

6.3.3 Surface Mount Devices Project – SOT 23

The project to manufacture 1.80 crore units of Surface Mount Devices – SOT 23 per annum was completed in April 1995 at a cost of Rs.2.66 crore. The project was taken up based on an anticipated demand of three crore devices in the country. The Company envisaged (January 1994) internal rate of return of 14.76 per cent for a period of seven years and also generation of net profit from the second year of operation. However, before commencing the production, the Company entered into an agreement (February

♣ ***Bharat Sanchar Nigam Limited***

1995) with M/s. Temic, Singapore/Austria which envisaged dedication of entire production facilities to them for a period of three years in the first instance and extended subsequently upto 2002-03. As per the terms of the agreement, the Company, on supply of required wafers / dice by M/s. Temic, was to assemble them by providing other necessary materials. The Company, while working out the feasibility of the project, had considered the national requirement but subsequently dedicated the plant to M/s. Temic without working out the viability and incurred a loss of Rs.51.02 lakh during the period 1999-00 to 2001-02. Thus, the very objective of setting up the project was defeated. Further, due to withdrawal of its products worldwide, M/s. Temic prematurely cancelled the agreement in December 2001 and the Company stopped production IN April 2002 for export. The Company was also not able to compete in the local market due to uncompetitive prices. Thus, the investment of Rs.2.66 crore did not yield the expected return.

The Management stated (May 2004) that it was able to sell production by recovering the direct cost. The reply is not tenable as direct material cost and labour cost only had been considered without taking into account the other direct expenditure viz, depreciation, interest on investment etc., while fixing the price.

6.3.4 Small Signal Devices Diffusion

The project to expand the capacity to manufacture small signal devices diffusion, used in the production of Transistor Outline (TO)-92 assembly, from the existing 15 crore units to 21 crore units per annum was completed at a capital expenditure of Rs.3.60 crore and production started in June 1991. The expansion project was taken up without any market survey but was based on the projections (November 1986) by the Department of Electronics (DOE). The profitability of the project was not analysed by the Company on the ground that the item was meant for in-house consumption for the production of TO-92 assembly. It was noticed that production of the item had never exceeded the original capacity of 15 crore units. The production came down from 14.80 crore units in 1996-97 to 3.39 crore units in 2003-04.

The Management stated (May 2004) that 3" wafers which were being manufactured by the Company had become obsolete and hence they had to be changed to 4" wafers and the project was taken up for this purpose, apart from expansion of the capacity. The reply is not tenable as the Company in its first phase of expansion (March 1988) of diffusion capacity from 10 crore to 15 crore units involving an investment of Rs.2.98 crore had already installed machinery to handle 3" to 5" wafers. Further, the Company in its project report for expansion of capacity from 15 crore to 21 crore units did not make any mention about the obsolescence of 3" wafers and these wafers were still being used. Thus, expansion of the capacity to 21 crore at a cost of Rs.3.60 crore was not warranted.

6.3.5 Crystal Project

The Company expanded (March 1990) its capacity to produce crystals from 10 lakh to 20 lakh units at a cost of Rs.72.18 lakh. Even before this project was completed, it was decided (November 1989) to expand the capacity to 32 lakh crystals at an estimated cost of Rs.2.90 crore which was subsequently revised (July 1992) to Rs.5.47 crore due to exchange rate variation and changed requirement of equipment. The project was, however, short-closed (December 1995) after incurring an expenditure of Rs.2.55 crore on the ground of uncertainty in the market. It was noticed that production of crystals by

the Company had come down from 13.05 lakh units (1992-93) to 4.31 lakh units (2003-04) and had never reached the already expanded capacity of 20 lakh crystals. The sales of crystals had also come down from 11.77 lakh units (1992-93) to 4.23 lakh units (2003-04). Hence, expansion of the capacity to 32 lakh crystals was not warranted.

The Management stated (June 2003) that the expansion was planned to capture the market for crystals required for colour televisions and electronic push button telephones but this could not be achieved due to changes in Government policies on imports, duties and liberalisation. The reply is not tenable as the liberalisation policy of the Government was started as early as in 1992 when the Company decided to go in for further expansion of capacity from 20 lakh to 32 lakh. The Company, instead of restricting the expansion of capacity to the originally envisaged capacity of 20 lakh units, further expanded the same and short-closed it only in December 1995. Thus, in spite of clear indication regarding liberalisation policy, the Company went ahead with its expansion programme which resulted in wasteful expenditure of Rs.2.55 crore. Evidently investment on additional capacity was an injudicious decision.

6.3.6 Coupled Cavity Travelling Wave Tube

The Ministry of Defence requested (April 1992) the Company to produce coupled cavity travelling wave tubes indigenously. In September 1994, the Ministry placed an order on the Company for supply of 10 tubes at a firm price of Rs.90.72 lakh each. The Company entered into an agreement with M/s. Thomson Tubes Electroniques, France (August 1995) for supply of the equipment, know how, training etc. for manufacture of five coupled cavity travelling wave tubes per annum and paid Rs.6.24 crore between December 1995 and October 1999 to the supplier. Meanwhile, 10 tubes were imported from M/s. Thomson Tubes Electroniques, France, at a cost of Rs.7.32 crore and supplied (March 1996 to June 1998) to the Ministry at Rs.9.40 crore. The Company received (December 1999) orders from the Ministry for five tubes and the same were supplied during April 2001 to March 2003 by manufacturing in the Company's works. No further orders were received from the Ministry.

The Management stated (May 2004) that as a cost reduction measure, Indian Air Force (end user) had reduced operational hours and hence requirement of tubes was reduced. The reply is not tenable as the Company should have created the facilities for manufacture of these tubes only after getting firm commitment from the Ministry. Thus, creation of facilities for manufacture of five tubes per annum without getting firm commitment resulted in underutilisation of the capacity created at a cost of Rs.6.24 crore.

6.3.7 Ongoing project

Smart Cards Project

The Company entered into an agreement with M/s. Unival SARL, France, in March 2002 for transfer of technology for setting up of manufacturing facilities for 2.40 crore plastic cards per annum under 100 per cent buy back agreement for a period of five years from September 2002 to August 2007. The total investment envisaged on the project was US$ 15,77,600 (capital cost US$ 13,36,400 training, raw materials etc. US$ 2,41,200). The capital cost was to be shared by M/s. Unival and the Company in the ratio 56:44 (Unival US$ 7,42,500 and BEL - US$ 5,93,900). Without insisting on/ensuring M/s. Unival's share, the Company placed (April 2002) purchase orders on them for its share of the capital equipment/raw materials and these were received in the Company between June

2002 and August 2002. But M/s. Unival failed to give their share of capital equipment and the technical know-how transfer as envisaged in the agreement. As a result the Company could not start the manufacturing facility, resulting in idle investment of Rs.4.25 crore.

The following prima facie deficiencies were noticed in implementation of the project.

(i) The equipment were to be inspected by the Company before dispatch. The Company, however, waived the inspection clause and equipment were received without inspection resulting in wrong shipment. These were pending replacement (August 2004).

(ii) Though the project was initiated as an expansion plan of M/s. Unival SARL, France, the Company never insisted on investment of the collaborator's share first.

(iii) Since M/s. Unival failed to meet their commitment, the matter was pending before arbitration since September 2003.

The Management accepted (June 2004) that the matter was pending before arbitration due to failure on the part of M/s. Unival to meet their commitment.

6.4 Production Planning

6.4.1 Capacity Determination

The Committee on Public Undertakings (COPU) in its 13th Report (1986-87) recommended that the Government should appoint suitable consultants or expert authority to determine a yardstick for assessing capacity utilisation on scientific basis. The Company appointed the National Institute for Training in Industrial Engineering (NITIE) as a consultant to undertake a study of capacity determination and labour productivity of manufacturing facilities. Based on the recommendations of NITIE, the Board adopted (September 1987) SMH♣ at 106.8 hours/month/direct worker (1282 hours/year/direct worker) where there was 10 per cent overmanning and 90 per cent performance. The availability of capacity in terms of SMH and its utilisation during the period from 1999-2000 to 2003-2004 are indicated in Annexure-3.

It could be seen from the Annexure that SMH output of direct labour/year improved from 1012 in 1999-2000 to 1505 in 2003-04. This should be viewed in the light of the fact that after fixation of norms in 1987, no further exercise was done to review the SMH norms even though there were changes in production facilities like automation, computerisation and modernisation. NITIE's recommendations (1987) were based on data pertaining to the period from 1981-82 to 1985-86. There was threefold increase in value of production during 1992-93 to 2003-04 despite decrease in number of employees from 18840 to 13038 during the same period.

The Management stated that considering NITIE's recommendations, the adoption of 106.8 hours by the Board was realistic. The reply is not tenable as the norm for capacity determination (106.8 hours/month/direct worker) fixed in 1987 should have been reviewed and reworked taking into account the changes mentioned above.

♣ ***Standard Man Hour***

6.4.2 Idle Hours in Machine Utilisation

A review of data on hours of utilisation of key machines in Bangalore Complex for a period of five years ending 2003-2004 revealed that the percentage of idle hours to total available hours ranged from 24 per cent to 29 per cent. Also, an analysis of reasons for idle hours for the year 2003-2004 revealed that the idle hours booked for want of material/work etc., accounted for 82 per cent.

There is no system to report the machine utilisation and analysis of idle hours periodically to higher management so as to monitor and exercise control over avoidable idle hours. This also amounts to non-adherence to COPU recommendation, which required that the data regarding idle hours be placed before the Board every six months. Had the idle hours been reduced by proper monitoring it would have contributed to increased productivity.

The Company did not furnish any reason for non-compliance to COPU's recommendations.

6.4.3 Rejections

A special committee constituted by the Government of India in 1984 recommended fixation of norms for rejections in both Equipment and Components Divisions and any deviations from these norms were to be examined for taking remedial action. However, no norms were fixed in respect of Equipment and Components Divisions.

The Management stated that rejections could not have norms. This reply is not acceptable as norms need to be fixed for rejections as a control mechanism in any production activity.

An analysis of rejections in Component Division of Bangalore Complex revealed that rejection ranged from 1.13 per cent to 26.43 per cent during the years 1999-00 to 2003-2004. An expenditure of Rs.16.99 crore was incurred by the Equipment Division of Bangalore Complex of the Company during this period towards rework based on the complaints from the customers. The reasonableness of the rejection/rework expenditure could not be ensured in Audit as no norms were fixed for rejections.

6.4.4 Inventory level

As against the norm fixed for holding of inventory of raw materials and components in terms of months' consumption (four months), the actual inventory held for the last five years ending 2003-04 is given below:

Year	**Raw materials and Components (in terms of months' consumption)**
1999-00	8.3
2000-01	8.8
2001-02	7.4
2002-03	4.9
2003-04	5.5

It could be seen from the above that the inventory holding exceeded the norm in respect of raw materials and components during all the years and it was substantially high prior

to 2002-03. Considering the fact that the Company's major production programme was based on firm orders and its major area of sales (strategic electronics) was not linked to vagaries of market demand, holding of inventory of raw materials much in excess of the norm was not justifiable.

Slow-moving and non-moving inventory as percentage to total inventory at the end of each year during 1999-2000 to 2003-04 is indicated in Annexure-4. A review of the non-moving and slow-moving inventory revealed that the percentage of slow and non-moving inventory to total inventory of the Company ranged from 11 to 18. As at the end of March 2004, the Company held non-moving and slow-moving inventory valued at Rs.155.37 crore constituting 15 per cent of the total inventory of Rs.1015.40 crore. Out of Rs.155.37 crore, Rs.64.46 crore worth of material remained non-moving for more than five years. In the electronics industry, with rapid obsolescence of technology, five years could be inordinately long. Thus, the Company had been holding a very high proportion of slow and non moving inventory even after writing off such inventory to the extent of Rs.31.41 crore between 1999-2000 and 2003-04.

The Management stated that the position of non-moving inventory was reviewed annually and obsolete/discarded items were written off from time to time. The fact, however, remains that the inventory of raw materials and components was much too high as compared to the norm fixed by the Company.

6.4.5 Advances to suppliers

A review of advances to suppliers revealed that out of Rs.323.90 crore outstanding as at the end of March 2004, Rs.12.97 crore was lying for more than five years. Out of Rs.12.97 crore, Rs.7.22 crore were backed by bank guarantees and the remaining Rs.5.75 crore were doubtful of recovery. The Company made provision of Rs.4.61 crore during 2003-04.

6.4.6 Efforts towards self-reliance

Towards achieving the objective of self-reliance and also to reduce cost, the Company started its indigenisation activity in the year 1989-90 by increasing the indigenous content of raw materials, components and sub-assemblies in its products. In order to give a thrust to and focus on the indigenisation programme, and to streamline the activities, a separate indigenisation task group represented by the production, standards and design, and engineering divisions was set up by the Management and guidelines were issued during 1993. However, there were no directions from the Ministry of Defence regarding the areas of indigenisation that the Company should pursue, considering the nation's strategic policy.

A review of consumption of raw materials, stores and spares and finished goods during the period 1999-2000 to 2003-04 revealed that the Company could not achieve its objective of self-reliance through indigenisation as it continued to import on an average 73 per cent of the inventory consumption and the indigenous content of the materials constituted merely 27 per cent, reflecting poor effort on the part of the Company.

The Management stated that raw materials, stores and spares and finished goods should be compared to the turnover and that there was gradual reduction in their imported cost.

The reply is not acceptable as the total imported cost is to be compared to total cost of consumption of materials and components only and not to turnover value as the turnover includes profit/NMOH[♣] and other elements which are not comparable parameters.

In order to avoid over-dependence on collaborators on a continuous basis, the Company identified and tried to indigenise major equipment such as USFM[♠] Radars, Flycatcher Radars, Reporter Radars, UHF[♦] radio relay RL432 and Laser Range Finder LH30, which constituted 16 per cent to 25 per cent of the Company's turnover and claimed that the percentage of utilisation of indigenous material in each of these ranged from 56 per cent to 75 per cent.

However, this was also not fruitful as indigenous content in these products even during the year ending 2003-04 ranged only between 17 per cent and 46 per cent. Thus, the indigenisation efforts of the Company even in respect of the major equipment identified for indigenisation were not satisfactory. Hence, it is important for the Company to indigenise at least critical components in order to shield itself against any geo-political fallout like the US sanctions (1998-99) and to provide long-term product support to the customers even after the original collaborator stopped the product line.

Further, it was observed that targets fixed for indigenisation in respect of Bangalore complex were very low when compared to the volume of consumption of materials and components and achievement was also very low which ranged between 1.71 per cent (2001-02) and 9.08 per cent (1999-00). This is evidently meagre and hence fixation of target for indigenisation needed review.

The Management stated that the targets for indigenisation were fixed based on products available to be manufactured, the scope of indigenisation and indigenisation already done and hence targets would vary from year to year.

It is pertinent to note that during the year 1998-99 the Company suffered set-back in achievement of turnover targets on account of non-availability of raw materials and components due to US sanctions.

6.5 Sales and Marketing activities

The Sales and Marketing function of the Company is headed by Director (Commercial and Management Services). Sales activities are supported by the respective business unit's marketing centres and distributors. The Company has an international marketing division (IMD) for export business.

The products of the Company are classified as equipment, spares and components. Equipment are manufactured with reference to customer orders and against anticipated indents from the customers. Components and spares are manufactured for stock with reference to anticipated demand.

6.5.1 Sales Performance

The Company prepares roll-on-plan (ROP) covering, *inter alia*, despatch plan for five years besides annual budget estimates (BE). Every year the Company enters into a memorandum of understanding (MOU) with the Government of India. The sales

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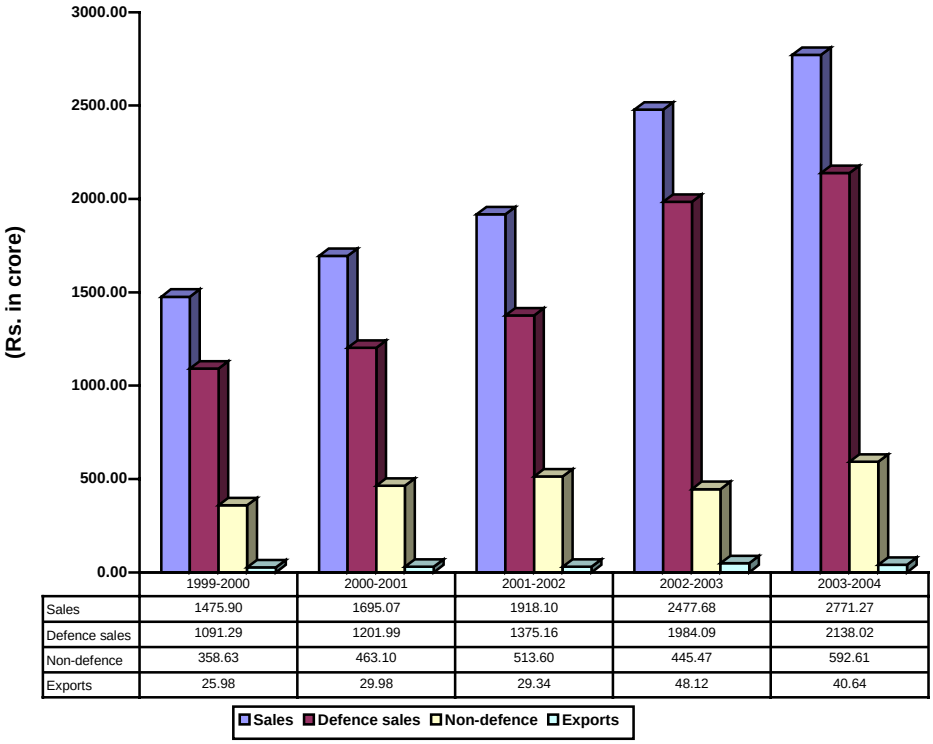
♣ ***Non-manufacturing Overheads***
♠ ***Updated Superfledmaus Radar***
♦ ***Ultra High Frequency***

performance of the Company mainly depended on the performance of Bangalore and Ghaziabad units. The Company was able to obtain 'excellent' ratings during the period under review (1999-00 to 2003-04)

6.5.2 Market share

The graph below gives the details of Defence Sales, non-defence sales and exports for the last five years ending 2003-04:-



	1999-2000	2000-2001	2001-2002	2002-2003	2003-2004
Sales	1475.90	1695.07	1918.10	2477.68	2771.27
Defence sales	1091.29	1201.99	1375.16	1984.09	2138.02
Non-defence	358.63	463.10	513.60	445.47	592.61
Exports	25.98	29.98	29.34	48.12	40.64

From the above it could be seen that the Defence sector plays a crucial role in the activities of the Company and this has been increasing every year. The percentage of non-defence sector sales, where the Company faced competition, decreased from 26.06 per cent in 1999-2000 to 22.85 per cent in 2003-04. The position is alarming in view of the indications given by the Ministry of Defence during the performance review meeting (October 2000) that the Company could not afford to depend on Government (Defence) alone for getting orders and had to prepare itself for an era of free trade. Further the Company's efforts to promote export sales in line with its objective was yet to yield results as it could not progressively increase the overseas sales. The targets fixed in this regard were also very low when compared to its total sales. The targets came down from 2.76 per cent in 1999-00 to 1.69 per cent in 2003-04 and achievements with reference to sales ranged from 1.48 per cent in 2000-01 to 1.92 per cent in 2002-03.

The Management stated that the export performance was affected by factors such as changes in the global Defence scenario, depleting global Defence market and availability of suitable products for overseas customers.

The fact, however, remains that there was failure on the part of the Company to progressively increase overseas sales.

6.5.3 Market for Company's Products in non-Defence Sector

The Company had taken up various products in the civilian sector. Important observations in respect of the products test checked in audit are as under:

(i) Motherboards

In order to enter into entry-level personal computer market in India, the Company started manufacturing motherboards with Cyrix chips during the second half of 1998. Due to changed market conditions, the Company switched over (November 1999) to Intel-based motherboards (810 C and 810 E). However, due to failure to switch over to new versions in accordance with their business plan, the Company could not stay in the market. Out of 21,361 motherboards manufactured during 2000-01 to 2002-03 with Intel chips, the Company could sell 19,994 motherboards at a loss of Rs.56.51 lakh. In addition the Company also reduced during 2000-01 to 2002-03 the value of 1367 motherboards lying in stock by Rs.2.20 crore to match it with the market price. Meanwhile the Company decided (February 2002) to launch Intel 845 chip set based motherboards and produced 1877 of these during 2002-03. Out of these, the Company could sell 288 motherboards only due to limited resources to aggressively market the same and incurred a loss of Rs.12.82 lakh. In addition the Company also reduced during 2002-03 the value of 1589 motherboards lying in stock by Rs.70.78 lakh to match it with the market price.

(ii) Ophthalmic Laser System – Drishti - 1064

The Company took up (February 1998) production of Ophthalmic Laser System – Drishti – 1064 anticipating demand from Government/Private hospitals. Even before stabilisation, the Company undertook commercial production of 30 systems at a cost of Rs.1.58 crore upto 2002-03. The Company was able to sell only five systems from April 2000 to March 2004 and realised Rs.25.90 lakh only resulting in loss of Rs.1.32 crore.

The Management attributed (March 2004) the entry of better products from imported sources for the dismal sale of the product. Thus, inability of the Company to face competition both technically and commercially from its competitors resulted in a loss of Rs.1.32 crore and forced the Company out of the market for the product.

(iii) Fish Finders

The Company, by acquiring technology from Electronic Research and Development Centre of India, took up (1997-98) the manufacture of 400 Integrated Fish Finder and Navigation Guidance System used to locate potential fishing zones and incurred expenditure of Rs.3.57 crore upto March 2004. It had anticipated market for 7000 fish finders. It was able to sell only 199 at Rs.1.15 crore. Thus, it suffered a loss of Rs.1.78 crore in the project. Apart from this, Rs.64 lakh was lying in work-in-progress as at the end of March 2004.

The Management stated (April 2004) that the product was launched only after market survey and all efforts were being made to sell existing inventory. However, the fact remains that the Company could sell only 199 out of 400 manufactured against projected market demand for 7000 Nos.

(iv) Brushless Motors

The Company entered into an agreement (August 1998) with M/s. Carson Technologies Inc., USA (CTI) for manufacture and supply of its products (Brushless motors and spare

parts) on 100 per cent buyback basis. Against the order of CTI, the Company could supply certain spares and in the meantime CTI was taken over (July 1999) by another Company (M/s. Pittman, USA). M/s. Pittman refused to take the motors/spare parts manufactured by the Company on quality grounds. The project was shortclosed by the Company and the inventories of spare parts manufactured valuing Rs.1.86 core were written off in 2003-04.

The Management stated (January 2004) that the possibility of liquidating the inventories was being explored. The fact, however, remains that instead of liquidating the inventories in a fruitful way the Company wrote off these in the year 2003-04.

6.5.4 Sundry Debtors

The table below indicates the position of outstanding debtors for the last three years ending 2003-04:

(Rs. in crore)

Particulars	**Government Departments**			**Government Companies**		
Outstanding:	31.3.02	31.3.03	31.3.04	31.3.02	31.3.03	31.3.04
(i) Upto 1year	347.73	445.69	476.54	71.54	39.55	44.62
(ii) More than 1 year but less than 2 years	76.85	92.47	54.11	10.26	4.11	10.26
(iii) More than 2 years but less than 3 years	48.06	35.69	35.75	4.23	6.90	1.67
(iv) More than 3 years	99.19	116.98	112.88	18.85	18.17	23.65
TOTAL	**571.83**	**690.83**	**679.28**	**104.88**	**68.73**	**80.20**

Particulars	**Private Customers**			**Total**		
Outstanding:	31.3.02	31.3.03	31.3.04	31.3.02	31.3.03	31.3.04
(i) Upto1year	22.16	33.91	28.67	441.43	519.15	549.83
(ii) More than 1 year but less than 2 years	6.59	6.12	2.46	93.70	102.70	66.83
(iii) More than 2 years but less than 3 years	2.46	1.10	2.63	54.75	43.69	40.05
(iv) More than 3 years	5.09	6.41	8.55	123.13	141.56	145.08
TOTAL	**36.30**	**47.54**	**42.31**	**713.01**	**807.10**	**801.79**

Though at the end of 2003-04, 95 per cent of the total sundry debtors were outstanding from Government Departments and Government Companies, the position was alarming as most of the debts were unreconciled and unconfirmed.

Debtors outstanding as on 31 March 2004 included Rs.144.65 crore, representing 5 per cent/ 10 per cent balance payments due against supplies made but remaining unbilled which constituted 21.29 per cent of total debts due from Government Departments. Out of this an amount of Rs.35.85 crore remained unbilled for more than one year.

The Management stated that terms of payment regarding balance 5 per cent/10 per cent was linked to certification by the customers on receipt and acceptance of the goods at site. The reply is not tenable since according to the general terms and conditions of

supply of stores, certification of receipt of goods or discrepancies regarding supplies is to be made not later than 60 days of receipt of goods by the customers and in the absence of this the Company could prefer the bills and the customer has to make payment. The fact that the Company did not raise the bills beyond 60 days indicated that the discrepancies raised by customers were not set right, resulting in unbilled debtors.

6.5.5 Foreign Exchange Variation

The purchase orders placed by the customers of the Company allowed it to claim any exchange rate variation between the exchange rate considered for fixation of price and actual exchange rate incurred upto a cut-off date. A test check of the cases of imports by the Company revealed that it was not adhering to cut-off dates prescribed by the customers for importing materials required for execution of the orders in spite of receipt of initial advance/progressive advances and consequently, any exchange rate variation beyond the cut-off date had to be borne by the Company. Non-adherence to cut-off dates prescribed by the customers for importing material required for execution of the order and consequent variation in the exchange rate beyond cut-off date, which was not reimbursed by the customers amounted to Rs.5.64 crore (8 cases) between January 1998 and February 2002. Further, delay in preferring claims towards exchange rate variation with the customers resulted in loss of interest of Rs.7.95 crore.

The Management stated that where there were technical and commercial uncertainties and where material procurement involved concurrent engineering and had long gestation period, the procurement action went beyond the cut-off dates and was not on account of operational inefficiencies in procurement of materials.

The reply of the Management is not tenable as they could have taken up the matter with the customer, explaining the unavoidable circumstances causing delay in procurement and sought extension of cut-off dates and amendment to the purchase orders. Moreover, delay in preferring claims was solely attributable to the Company and calls for better Managerial and Financial control.

6.6 Internal Controls

Designing, installing and operating systems for proper control is being carried out by the respective departments. The review of systems, procedures, adequacy and effectiveness of internal control is assigned to the Internal Audit Department in the Company.

The Internal Audit Department is presently headed by Additional General Manager (IA) who reports directly to the Director (Finance).

As a measure of internal control, the Company has manualised its various business operations and has issued 13 manuals/procedures. A review of internal controls as existing in the Bangalore Complex of the Company revealed the following:

6.6.1 Manuals

The Company had computerised many areas of its business transactions and consequently a number of changes had taken place necessitating quantitative as well as qualitative changes in control measures, but the manuals and quantum of checks were not updated taking into account this aspect to make internal control system effective.

The Management stated (November 2003) that the manuals were constantly under review and, wherever felt necessary, action was being initiated to update the respective manuals.

The reply is not tenable as there was no revision in respect of nine manuals and in respect of other manuals/procedures the last revision was made only upto 1997.

6.6.2 Information Technology

The Company had not established IT security policies and procedures. Even the consultants M/s. TCS opined (June 2002) that IT securities implemented by the Company were in pockets and not adequate which constituted security risk. As most of the Management Information System (MIS) reports including financial and accounting information, emanated from computerised environment, any inadequacy in internal controls in place could adversely affect not only the quality of decision-making but also correctness and reliability of financial and accounting reports.

6.6.3 Cash Management

Employees have been authorised to issue bus passes, bus tickets, canteen coupons etc., by collecting the value in cash without any surety.

No limits had been prescribed for authorisation of payments by Officers above Accounts Officer level and this was a serious lacuna in the internal control system with regard to delegation of powers.

Regional offices were not maintaining cheque receipt register to record the date of receipt of cheques from the customers and depositing them in the Bank. In its absence, the delay in obtaining the cheques from the customers as well as in depositing in the bank could not be ascertained in Audit.

The Management stated (November 2003) that there was no delay in depositing the cheques in the banks. The fact, however, remains that there was no record to show that there was no delay.

6.6.4 Inventory Management

No norms have been fixed for losses / wastages of raw materials for manufacture of major products and materials in stores / transit. Though this lapse had been consistently commented upon by the Statutory Auditors, the Company had not taken any corrective action to avoid excess wastage/loss.

The Management stated (November 2003) that it was not possible to prescribe any norms for production losses / wastages. The reply is not tenable as in the absence of norms it is not possible to take effective measures to control such losses.

A test check of the procedure followed in the Bangalore Complex revealed that the rejected materials were not brought to books though there was a separate account code to incorporate such transactions. The Divisions were taking up the matter directly with the suppliers with the result that there was no control record to monitor the replacement of rejected material. Based on Audit observation (August 2002), detailed guidelines to be followed in respect of such rejections were issued only in March 2003.

The Management stated (November 2003) that guidelines were issued only to ensure the compliance by divisions/units. From the reply it is evident that prior to Audit observation, the existing procedures were not properly followed.

The Sub-Contract Procedure introduced in 1996 stipulated that sub-contract department should obtain a certificate every six months from each sub-contractor acknowledging the

extent of material lying with him. It was observed that this procedure was not followed scrupulously, resulting in continuance of huge un-confirmed balances with the sub-contractors. An amount of Rs.4.26 crore was shown as value of materials with sub-contractors as on 31 March 2004 which were not confirmed. Age-wise analysis of materials with sub-contractors was also not maintained.

The Management assured (November 2003) that efforts were being made to reconcile the amount of materials issued to sub-contractors and issued on loan.

6.6.5 Sales

Reconciliations are a critical control mechanism to ensure the accuracy and completeness of transactions. However, it was noticed that the balances with customers under sundry debtors and advances remained unreconciled and unconfirmed for many years and there was no improvement in this regard. On an independent verification done by Audit from five customers of the Company, it was found that there was a difference of Rs.171.53 crore as of March 2003 with the balances in the Company's books. The Company assured (August 2003) to take special measures to reconcile the balances with the customers. The process of reconciliation was in progress (June 2004). This nevertheless shows that internal controls were weak in this area.

There was inordinate delay in forwarding the invoices (even for 90 per cent/95 per cent claims) to the customers for realisation of sale proceeds. On a test check of 200 invoices in July 2003, it was seen that in respect of 105 cases, such delay ranged from 12 days to 424 days and loss in terms of cash credit interest attributable to such delay amounted to Rs.3.93 crore.

The Management stated (November 2003) that the procedural requirements such as obtaining provisional receipt from the consignee, specimen signatures of the consignee / attestation of overwriting by the consignee etc. were the causes of delay. The reply is not tenable as the cases test checked in Audit did not involve requirement of provisional receipt for claim of 90 per cent/95 per cent value of the supplies. Further, obtaining specimen signatures, avoiding overwriting etc., were administrative in nature and were controllable with proper follow-up system.

Thus, the Company's existing internal control procedures were not adequate to keep pace with increasing business activities and change in technology. This also adversely affected coverage by internal audit in quantitative as well as qualitative terms.

6.7 Conclusions

(i) Due to preparation of unrealistic feasibility report, underutilisation of capacities, non-receipt of anticipated orders etc. the investment made in seven projects was idle/unproductive.

(ii) Despite changes in production facilities the method of capacity determination adopted in 1987 was not reviewed.

(iii) Inadequate monitoring of inventory holding resulted in accumulation of slow-moving/non-moving inventory.

(iv) Decline in the sales to non-defence sector was a cause for concern in the context of Government advice (October 2000) to the Company to prepare itself for an era of free trade.

(v) The Company's existing internal control procedures were not adequate to keep pace with increasing business activities and change in technology.

6.8 Recommendations

(a) The projects should be reviewed during their currency with reference to the parameters fixed in the feasilility reports.

(b) The method of determination of capacities should be reviewed to assess them correctly.

(c) Inventories should be monitored closely to avoid accumulation and loss due to obsolescence.

(d) The Company should explore the non-defence sector more vigorously.

(e) Internal control mechanism should be strengthened.

The review was issued to the Ministry in December 2004; its reply was awaited (January 2005).

CHAPTER : VII

Bharat Electronics Limited

Information Technology Audit on the computerisation of inventory management at Bangalore Complex

Highlights

The primary objective of implementation of Integrated Information System with particular emphasis on scalability and upgradeability was not achieved.

(Para 7.4.1 and 7.4.2)

The Company has not formulated and followed proper change management procedure for modifications to the system.

(Para 7.4.3)

Procedures for integration, processing data and controls built in the system to validate the data processed were not available. Discrepancies to the tune of Rs.67.75 crore existed in the comparable data between Manufacturing Resource Planning System-II (MRP-II) and Integrated Finance Accounting System (IFAS); 350 Nos. of items valued at Rs.26.07 crore appearing in IFAS did not appear in MRP-II.

(Para 7.5.1)

Alteration of financial data in IFAS for reversal of sale of Rs.29.78 crore was done but no alterations took place with stock position.

(Para 7.5.2)

The system did not help in purchase decisions and allowed drawal of material for the work order in excess of quantity prescribed in the Bill of Material.

(Para 7.5.3)

The criterion adopted by the system for fast, slow and non moving inventories analysis was flawed and consequently material worth Rs.2.16 crore which had not moved for one to two years was identified as fast-moving in one of the divisions.

(Para 7.5.6)

Rights of access had been given to employees without analysis of minimum access requirement.

(Para 7.6.1)

There is no evidence to show that system audit envisaged in the Internal Audit Manual had been conducted.

(Para 7.6.3)

The Company did not have a proper institutionalised business continuity plan.

(Para 7 6.4)

7.1 Introduction

The Bharat Electronics Limited (BEL) was incorporated in April 1954 as a Company fully owned by the Government of India under the administrative control of the Ministry

of Defence. The Company designs, develops and manufactures electronic equipment like Radars, Communication Systems, Broadcasting and Telecommunication equipment. The major production unit at Bangalore Complex is further restructured into seven Strategic Business Units (SBU).

7.2 Computerisation in BEL, BG Complex

Though the computerisation activity commenced in 1975, the Company implemented Integrated Information System (IIS) in 1998-99. IIS mainly consists of Manufacturing Resource Planning System-II (MRP-II) supporting manufacturing functions including inventory management and Integrated Finance Accounting System (IFAS) supporting financial functions.

The Information System (IS) Department takes care of all developmental activities, troubleshooting, overall management of IS resources, expansion and IFAS data processing. Apart from this, Computer (EDP) Section at each SBU takes care of MRP-II application, data processing on this application, daily back up and access rights.

7.3 Scope of Audit and Methodology

Audit of General and Application Controls with specific emphasis on Inventory Management and related modules of MRP-II and IFAS was conducted in 2003-04 mainly to examine:

(i) whether planning and execution of the IIS project was effective and efficient,

(ii) whether Information Technology (IT) systems helped in efficient and effective Inventory Management and Control and

(iii) whether data and integrity of data entry were reliable and adequate.

The methodology adopted for audit included collection of information through questionnaire, test check of the system by examining the data entry with reference to source documents, personal interviews with officers of the EDP Wing and analysis of data through Computer Assisted Auditing Techniques namely, SQL♣ and IDEA♦.

7.4 Implementation of Integrated Information System (IIS)

7.4.1 The Company implemented IIS at a total cost of Rs.13 crore with emphasis on scalability and upgradeability, to meet the business challenges faced and provide a competitive edge to the operations. The major areas covered were production planning, material control, shopfloor scheduling and real time control, design development and commercial and sales management.

7.4.2 M/s. Mascon Technical Services (P) Limited, Chennai (MTS) completed in October 1994 the software relating to MRP-II. M/s. Tata Consultancy Services (TCS) completed in March 1995 the software work relating to IFAS with time overrun of 18 months. These softwares were put to use progressively upto 1998-99, due to delay in procurement of hardware and inadequate project monitoring. During development of IIS, even though data porting♣ was the primary responsibility of MTS it was jointly done by MTS and the Company. Further, the Company failed to achieve objectives viz. integrity

♣ ***Structured Query Language***
♦ ***Interactive Data Extraction and Analysis***
♣ ***transferring of data to new system***

of data and upgradeability due to deficiencies in the system. Manpower problem also contributed towards delay in implementing the IIS project. Core group members were changed frequently due to resignation / transfer of the personnel during the design, development and implementation stage of IIS project. There was no specific IT recruitment policy in the Company.

7.4.3 The Company carried out many modifications and added new features to these softwares (IFAS and MRP-II) since commissioning of the system. However, the Company neither maintained any documentation of modifications nor formulated change management procedures. In the absence of proper change management procedure, the objective of scalability and upgradeability of software was defeated and Audit could not verify/assess the accuracy of the data migrated and modifications made to the softwares from time to time. The Company neither documented the testing procedures nor maintained documents to prove the accuracy of the data migrated from legacy system to IIS. Further, neither testing strategy nor documents like test reports were furnished to audit.

The Company stated that (February/June 2004)

(i) the problems faced in porting of the data were incomplete data, duplicate data and data integrity problems.

(ii) the integrity of data was ensured within the applications and the Company added many features/modules on account of the system's amenability to extension and improvement and was able to upgrade the hardware by adding disc space and memory. It further stated that top management did review the project regularly by constituting a Committee of Directors to oversee the implementation. The objective of scalability and upgradeability had been taken care of in the systems and in the process of change-over to the new system, the change management control problems would be addressed.

(iii) it did not find any need to have separate formal IT recruitment policy. However, it added that it had asked M/s. TCS (whom the Company had appointed as consultant for the augmentation program of computerisation) to study and advise on the need for such policy.

The reply of the Company is not acceptable as

(i) The methodology adopted by the Company in resolving the issues of porting could not be analysed in Audit in the absence of documentation.

(ii) As could be seen from the Annexure-5, there was difference between IFAS and MRP-II data as on 31 March 2003. Poor documentation, change management practices followed and deficiency in Application controls in the system resulted in data available in the system being low on realiability and the system lacking upgradeability/scalability in the long run.

(iii) To overcome the shortcomings in the existing system, the Management appointed TCS to identify the gap within three years after implementation of IIS. Further, while clarifying to the Board's Sub-Committee, TCS stated (July 2003) that the current MRP systems were developed at various points of time and hence they could not talk to each other due to which consolidation of data had to be done manually, (i.e., manual intervention still existed). The application software only

met partial requirements of the transactions and did not support process control and decision-making. Therefore, the consultant recommended implementation of Enterprise Resource Planning (ERP) at an estimated cash outflow of Rs.56.92 crore over five years. The selection of the ERP package and vendor was in progress (August 2004).

7.5 Application Controls

Audit of Application Controls in the system with specific emphasis on Inventory Management revealed a number of demerits in the Inventory System. The Company's MRP-II application caters to online maintenance of stock data, follow up, control and generation of documents relating to inventory. IFAS receives input from MRP-II and generates financial, material and cost accounting statements. Points observed in Audit on analysis of inventory data under MRP-II/IFAS are commented upon in succeeding paragraphs:

7.5.1 Discrepancies in comparable stock data between MRP-II and IFAS

The data relating to Purchase Orders, Sub-Contract Orders, Service Orders, Store Receipt Control, Sale Orders and Invoice, transaction-wise, are transferred from MRP-II to IFAS in respect of the previous month as database dump to IFAS system in batch mode.

The checks and validation required for IFAS like total number of transactions being transmitted, date of transactions, validity of transactions, and key field entries to IFAS are being carried out at entry stage in MRP-II. However, the controls built in the system to validate the transferred data processed in IFAS are not available. It was also observed that the system generated the error-list of data transferred from MRP-II to IFAS at the time of monthly processing. It was clarified to Audit that the error-list generated during the process of data transfer from MRP-II to IFAS was being corrected. However, no documentation was maintained to check the accuracy of data corrected and number of errors detected over a period of time. In view of the above, discrepancies existed in the comparable data between the two systems identified by the Company, as detailed below:

Division	**Total items in MRP-II**	**Total items in IFAS**	**Items in MRP but not in IFAS**	**Items in IFAS but not in MRP-II**	**No. of Cases where IFAS stock is less than MRP-II**	**No of Cases where MRP-II stock is less than IFAS**	**Unit discre-pancies**
Digital Communication Systems	13028	12536	55	20	141	110	5
High Frequency	17697	15187	16	12	63	46	4
Low Power Equipment	38888	19655	134	40	262	112	5

In order to examine the discrepancies, Audit carried out a test-check of comparable data of inventory of raw material and finished goods available in MRP-II and IFAS as on 31

March 2003. The test check revealed that (i) raw material stock valued at Rs.64.47 crore and finished stock valued at Rs.3.28 crore figuring in MRP-II, did not find place in IFAS and (ii) 350 items of raw material valued at Rs.26.07 crore figuring in IFAS did not find place in MRP-II. Thus, the reliability of data was low and non-reconciliation of data between MRP-II and IFAS vitiated the accuracy of financial statements.

The Company stated (June 2004) that MRP-II assisted in planning, procurement, issue of material etc. on on-line basis. The data relating to quantity of inventory of MRP-II was transferred to IFAS and processed for preparation of material ledger, age-wise analysis etc. in batch mode. Hence they were on different modes and not comparable at value level. All the entries including adjustment values were recorded only in IFAS. However, the Management also stated that efforts were on to reconcile MRP-II and IFAS balances at quantity level on continuous basis. The Company agreed to address these issues in the new system (ERP), for avoiding such data discrepancies.

The absence of reconciliation and necessary adjustments in MRP-II posed a serious risk to the planning and procurement decisions based on the unadjusted MRP-II data.

7.5.2 Non-adjustment of finished Goods (FG) stock in the event of reversal of sale

The Company was effecting sales by entering the transaction in the system with documents such as Invoices, Goods Consignment Notes, Material Gate Pass etc. These were simultaneous actions based on which the sale action was completed and the property passed on to the customer. When the sale was effected, the system generated Stores Issue Voucher (SIV or Invoice) which formed the basis for decreasing the quantity in FG stock by the system.

Audit observed (April 2004) that during 2002-03, in respect of 306 items valued at Rs.29.78 crore, the system had entries of SIV, Goods Carrier (GC) Note, and accordingly the system recognised the sale and the FG stock in the system was reduced. However, the Company reversed the sales in June 2003 by altering the invoice date and value in the IFAS; the quantity of those items in IFAS and MRP-II remained unaltered. Thus, the system was allowing alteration of the date of invoice and value without correspondingly updating the stock position.

The Management stated (June 2004) that because of the announcement of Truckers' strike, the consignment was not lifted by the transporters before 31 March 2003; hence reversal entry was made in the books. It also stated that same SIVs were used to account for the subsequent sale because it would facilitate clearance with excise/sales tax authorities. It added that necessary improvements, if any, would be considered while introducing the new system.

The Management, thus, accepted that before 31 March 2003 the consignment in question was not despatched which showed that the validation checks exercised for sales transaction like entering correct GC Note, etc. were not adequate.

7.5.3 Drawal of material in excess of Bill of Material (BOM) quantities

The BOM Module is used for drawing material for production of an item. On a test-check, it was found that the application allowed drawal of material for the work order in excess of quantity prescribed in the BOM as illustrated below:

Part No.	Work order No.	Required Qty. as per BOM	Actual Qty. issued to work order	Excess quantity
2124 322 201 36	960146	24	28	4
2124 480 201 75	960146	24	28	4
2124 364 901 73	960151	13	36	23

The Management stated (June 2004) that as the lead time required to manufacture these items was two to three months, a few extra were launched to cope with shop floor rejections. The reply is not acceptable as drawal of material in excess of quantity indicated in BOM amounts to lack of proper validation checks. Further, in case of necessity of excess quantity on account of genuine reasons, the procedure as laid down in the Purchase Manual (i.e., drawal through Pink Stores Requisition) was required to be followed to regulate the transaction through the system.

7.5.4 Non-netting of quantities while processing Purchase Requisition (PR)

In the process of generation of PR, the system was not able to identify whether the items included in the PR were available with other SBU or not. Hence the SBU had to resort to oral confirmation. Thus, the system did not help in purchase decisions.

The Management stated (June 2004) that the common items were held in Common Material Control (CMC) division and items held in a division were unique to its requirement. The reply is not acceptable as there were many internal transfers of items other than CMC-held items between divisions. However, in its reply, the Company conceded that netting across the SBUs would be taken care of in the proposed new system.

7.5.5 Non-closure of work orders after completion

It was observed that majority of work orders were not closed in the system even though work was completed. It may be noticed from the table below, based on a report generated by Audit from the system, that the work orders opened during a year were always more than the work orders closed during the year.

Year	**1999-00**		**2000-01**		**2001-02**		**2002-03**	
SBU	**No. of Work orders opened**	**No. of Work orders closed**	**No. of Work orders opened**	**No. of Work orders closed**	**No. of Work orders opened**	**No. of Work orders closed**	**No .of Work orders opened**	**No. of Work orders closed**
Naval	420	152	143	21	196	15	42	0
Low Power Equipment	352	11	174	7	108	1	69	0
Broadcast and Television	228	0	111	0	124	1	152	6
Radar	656	97	99	23	66	5	107	0

Components	54	0	698	0	1627	2	1376	0
High Frequency	243	0	119	0	37	1	60	0

On this being pointed out in Audit, the Management took action to close 103 work orders in August 2003 and initiated action to review the position of closing of work orders. However, the Company did not elaborate (June 2004) on how it planned to consider automation of closure of work orders immediately after work order activity was closed so as to eliminate scope for drawal/adjustment of material through closed work orders.

7.5.6 Wrong programme logic in analysis of Fast, Slow and Non-Moving (FSN) Inventory

An analysis of inventory held on 31 March is carried out every year to identify slow-moving and non-moving items. The objective of FSN analysis is to identify items which have not moved for many years and analyse the same for their utility. Based on the FSN reports, review of items which have not moved for more than five years is carried out by internal committees to recommend write-off and disposal. For the purpose of analysis, the system classifies items not moved for more than two years as non-moving inventory and items whose movement is less than 10 per cent of the opening balance of a particular year as slow-moving inventory. The inter-departmental transfer of items is not considered as consumption for the year. The remaining items are classified as fast moving inventory.

On a check of data relating to FSN, following flaw in the programme logic was noticed.

(i) Items valued at Rs.2.16 crore, which have not moved for more than one year but less than two years, were classified as fast-moving inventory.

(ii) Out of the inventory of Rs.2.13 crore pertaining to Central (D&E) Division, inventory valued at Rs.2.11 crore was classified as fast-moving and Rs.2 lakh was classified as slow-moving. On verification, it was found that almost all the inventory held by the Division had been transferred from Common D&E Division during July 2001 and was more than five years old.

The Company stated (October 2003) that the system would be reviewed to classify the items, which had not moved between one and two years also as slow moving inventory. It was also stated that the transfer of materials from one store to another during July 2001 was inadvertently accepted as fresh receipt and the mistake had since being rectified.

7.6 Deficiencies in General Controls

7.6.1 As per instructions (July 2001) regarding access controls, the computer centre should compile the list of Forms (for insert/update/delete/report access right) for each employee in consultation with Departmental Heads and obtain written approval. However, it was observed that:

(i) In HF Division - Computer Centre, no written approvals for providing access to the staff were available.

(ii) In Central Material Management Department, general authorisation was given to 68 employees without making proper analysis of minimum access requirement to discharge their duties.

(iii) Report and Query rights (read only) associated with the module were provided generally to all the employees, working in the respective module, without making analysis of need to know/need to work.

(iv) Based on the Audit observations, the Company issued instructions to all Departmental Heads to review and confirm permission already given to each user and to advise the Computer Centre in writing about changes, if any.

7.6.2 The Company has not acted upon the important suggestion made in the Security Manual relating to IT system to have a separate security server administering all terminals. TCS also had opined that IT securities implemented by the Company were in pockets and were not adequate, constituting security risk.

The Management stated (June 2004) that the security needs as relevant in 1990 were addressed. They agreed to formulate a security policy and procedure.

Further, the Ministry of Defence (MOD) in June 2001, had issued certain computer security guidelines and had instructed all Defence PSUs to follow them. Following guidelines were not complied with by the Company.

(i) The Company had not assessed the exact requirement of software licences and had not procured the required software wherever necessary.

(ii) Passwords were changed monthly instead of fortnightly and special characters were not enforced.

(iii) Audit trails and Audit Logs, though enabled, were not periodically reviewed.

On this being pointed out by Audit, the Management took necessary action to comply with the above guidelines.

7.6.3 The Internal Audit Manual stipulates that Information and System (IS) Audit is to be carried out by Internal Audit Department covering check of operating logs, control over backup data, input and processing controls, data security etc. A review of Internal Audit Reports did not evidence any such IS Audit conducted in line with manual instructions.

The Management stated (June 2004) that Audit was conducted covering various reports generated through computers on the related areas, viz., payrolls, purchases, stores, sales, assets verification etc., and exception reports were audited. The reply is not acceptable as data extraction is only a part of IS Audit. The main purpose of IS Audit is to assess the adequacy of controls in IT environment to ensure data accuracy, reliability and confidentiality.

7.6.4 It was observed that though the Company took backup of data on daily, weekly and monthly basis, in the of absence of version control number for backups, it was not able to furnish the Inventory data of earlier years as per financial statements. Hence, Audit was not able to assess the accuracy of data available in the system. Based on the Audit observation, the Company took action to take system level backup and also agreed to formulate, prepare and implement suitable institutionalised business continuity plan.

7.7 Conclusions

(i) The primary objective of implementation of IIS with particular emphasis on scalability and upgradeability was not achieved as the planning and execution of the IIS project was not effective.

(ii) The software that had been developed was primarily a transactional system with little support for online analysis or decision-making.

(iii) System documentation was lacking and consequently the upgradeability was low.

(iv) General and Application Controls operated in the IT environment in Bangalore Complex were not effective.

(v) There was high volume of manual intervention of data adjustments resulting in human errors.

(vi) Non-reconciliation and existence of discrepancies in data between MRP-II and IFAS existed which did not help in decision-making.

7.8 Recommendations

The Company should consider the introduction of ERP system which will take care of deficiencies mentioned above. The control environment needs to be made stronger including access and processing controls to ensure data integrity and security. The Company needs to formulate a proper institutionalised business continuity plan.

The review was issued to the Ministry in November 2004; its reply was awaited (March 2005).

CHAPTER : VIII

Garden Reach Shipbuilders & Engineers Limited (GRSE)

Shipbuilding activities

Highlights

The actual utilization of the shipyard as a whole was not determinable, as the company did not assess the capacity of the yard in terms of a single parameter like 'Standard Ship units', as prevalent in the shipbuilding industry. Also the target fixed for its hull construction shops was not realistic.

(Para 8.4.1)

The Company has always fixed the targets lower than the assessed capacity. The installed/assessed capacity fixed in the year 1982 measured as Hull construction capacity in terms of tonnage of steel fabricated has not been reviewed since then.

(Para 8.4.2)

The capacity of shipbuilding facilities namely Building Dock, Building Berth, Slip Ways, Wet Basin and Fitting out Jetty has been assessed in terms of period of occupation of these facilities.

(*Para 8.4.3*)

Though the Company consistently earned profits during the period of report, the same may, however, be viewed in the light of the advantage of cost plus nature of the contracts. Further, actual profits always remained lower than the planned profits.

(Para 8.4.4)

There was delay ranging from one month to 125 months in delivery of vessels during last six years resulting in imposition of penalty by customer amounting to Rs.7.35 crore.

(Para 8.4.5)

There was a cost overrun of Rs. 1669.88 crore in the construction of 15 vessels constructed/delivered from January 1997 to March 2002.

(Para 8.4.5)

Due to ill planning and poor productivity of manpower, Company incurred an unproductive expenditure of Rs.14.28 crore on idle labour whereas on the other hand it incurred Rs. 52.27 crore on overtime during the period of report.

(Para 8.5.1)

The company did not maintain appropriate records for vessel wise consumption of vital input material like steel.

(Para 8.6)

8.1 Introduction

Garden Reach Shipbuilders & Engineers Limited (GRSE/Company) is a wholly owned Government Enterprise under the administrative control of the Department of Defence Production and Supplies in the Ministry of Defence. The Government of India acquired

the erstwhile Joint Stock Company under the name and style of Garden Reach Workshop Limited in April 1960 to cater to the defence requirements for shipbuilding and ship repair. Presently, the Company carries out shipbuilding and ship repair through its Ship Division, construction of bailey bridge, deck machinery items, deep well turbine and submersible pump through Engineering Division and construction of Diesel/Gas engine through Engine Division. Of these, shipbuilding is the main activity in terms of revenue earnings, resource allocation etc.

8.2. Objectives and scope of audit

The present review covers the performance of shipbuilding activities for the period from 1998-99 to 2003-04. The objective of audit was to assess the economy, efficiency and effectiveness of the shipbuilding activities undertaken by the Company, which contribute on an average about 85 percent of its total turnover. For this purpose the records of Ship division were reviewed during the period from December 2003 to April 2004. The records pertaining to Planning, Design and Estimation could not be verified as these were claimed by the Management to have been destroyed in a fire, which occurred on 5 November 2002.

8.3. Organisational set up

The Ship Division is headed by Director (Shipbuilding), who reports to the Chairman & Managing Director (CMD). He is assisted by two Chief General Managers, one each for Main Works (MW) and Fitting Out Jetty (FOJ), two General Managers, one for Materials and the other for Design and three Deputy General Managers, one each for Finance, Industrial Engineering & Production (IE&P) and Production Planning & Control (PP&C).

8.4 Production Performance

On production, capacity fixation and the performance of the Company, the points observed are detailed in succeeding paragraphs.

8.4.1. Non fixation of Ship Production Capacity

Shipbuilding is essentially a manufacturing-cum-assembly industry encompassing activities such as main steel fabrication, manufacturing of steel parts, assembly of sub-units and main units and sequential erection of the units to form a complete steel structure, out-fitting activities after launching, testing and trial of equipment and systems, Basin Trials, Sea Trials and Commissioning of the Ship. As such the capacity of the yard should be judged after accounting for all the stages of activity for various types/sizes of ships, which differ vastly in terms of quantum of work, construction complexities and sophistication. This required convergence of all aspects of ship construction into a single parameter for measuring production in physical terms like “Standard Ship Units” (SSU) as is prevalent in the ship construction industry.

It was observed that the Company had not measured its production in terms of standard ship unit (SSU) in line with other shipyards like Mazagaon Dock Limited and Goa Shipyard Limited working under the Ministry of Defence. In the absence of any such yardstick capacity utilisation of the yard as a whole was not determinable in terms of number/types and sizes of ships.

The Management stated (July 2004) that assessment of capacity in terms of SSU was attempted but considering the conditions that prevailed in the Company and the nature of

products, it was considered not applicable. The reply of the Management is not tenable, as other shipyards of the same Ministry had assessed their capacity in terms of SSU.

8.4.2 Capacity Utilisation of Hull Shop

The installed/assessed capacity of the Ship Division fixed in the year 1982 was expressed by the Management in terms of Hull Construction Capacity, which is equal to tonnage of steel fabricated. The Company has not reviewed its assessed capacity since then. The table below indicates the annual capacity with target of the Hull Shop for steel processing and actual tonnage of steel fabricated for the years 1998-99 to 2003-04:

Year	Assessed Capacity (MT)	Production Target		Actual Production (MT)	Percentage of actual production to	
		In MT	As percentage of Assessed Capacity		Production Target	Assessed Capacity
1998-99	5400	3200	59.26	3473	108.53	64.31
1999-2k	5400	1750	32.41	3181	181.77	58.91
2000-01	5400	702	13.00	1874	266.95	34.70
2001-02	5400	1080	20.00	1571	145.46	29.09
2002-03	5400	1620	30.00	2066	127.53	38.26
2003-04	5400	2750	50.92	3043	110.65	56.35

It may be seen from the above that the Company had always fixed the target substantially lower than the assessed capacity, the reasons for which were not on record.

The Management stated (July 2004) that the production target was fixed on the basis of available orders. The reply may, however, be viewed in the light of actual production which remained in the range of 108.53 to 266.95 per cent of the targets. In this context the Management contended that the structural jobs of Bailey Bridge and Material Handling Project were included which helped in surpassing the production targets. This contention is also not tenable, as the Company started doing fabrication job for other works in shipbuilding from the year 2001-02 only. Further, it covered only 16.67 per cent and 14.69 percent of targets during the years 2001-02 and 2002-03 respectively, as against the increase of actual production by 45.46 per cent and 27.53 per cent over the targets during the above years. As such there was no significant impact of undertaking fabrication of other works on the production targets.

8.4.3 Capacity Utilisation of Other Facilities

In addition to the hull construction facilities the Company, for the construction of its vessels, also has five other facilities namely (i) one Building Dock, (ii) one Building Berth, (iii) two Slip Ways, (iv) one Wet Basin and (v) Fitting Out Jetty. The capacity utilisation in terms of period of occupation of these facilities for the last six years ending March 2004 is indicated in the following table.

Facility	Percentage of Capacity Utilisation						
	1998-99	1999-2000	2000-01	2001-02	2002-03	2003-04	Average
Building Dock (primarily used for ship repairing)	50	58	92	83	100	33	69.3

Building Berth (used for pre-launching activities)	92	100	67	Nil	33	100	65.3
Slipway (used for pre-launching activities)	92	92	50	61	14	31	56.7
Wet Basin (mainly used for post-launch fitting-out jobs of small ships like FAC)	25	81	100	36	Nil	Nil	40.3
Fitting Out Jetty	100	100	100	100	100	100	100

From the above, it is evident that there was low and decreasing average utilisation of the available facilities relating to Building Dock/Berth, Wet Basin and Slipways.

It was further observed that the annual capacity of the above facilities in terms of particular mix of vessels or type of vessels had not been assessed separately. The Company has ascertained the utilisation of facilities in terms of their period of occupancy, which, however, did not indicate the norms for which these facilities should have been utilized for the particular job.

The Management while accepting the facts (July 2004) explained that most of the ships under construction were in fitting-out stage and consequently, Building Dock/Berth /Slipways could not be sufficiently utilised for pre-launching activities.

8.4.4 Production vis-à-vis Profitability

The entire production of the Company was meant for ships for the Indian Navy and Coastguard. Naval Shipbuilding in India is normally undertaken in the Defence Public Sector shipyards through two types of contracts known as “Cost Plus” and “Fixed Price” contracts. In the case of the former, the shipyard is required to be paid for all cost incurred (direct cost plus overheads) as well as fixed percentage of these costs as profit. In the case of Fixed Price contracts the shipyard agrees to build the vessel at a fixed price subject to escalation on different components of cost.

The value of actual production, planned production vis a vis profit with reference to the actual and planned production of the Ship Division for the last six years ending March 2004 was as follows:

(Rs. in crore)

Year	**Value of Production (VOP)**		**Profit**	**Percentage of profit on VOP**
1998-99	Planned	285.82	23.68	8.28
	Actual	303.49	16.53	5.45
1999-2000	Planned	340.96	33.68	9.88
	Actual	359.34	7.34	2.04
2000-01	Planned	433.32	33.74	7.79
	Actual	442.41	0.07	0.02

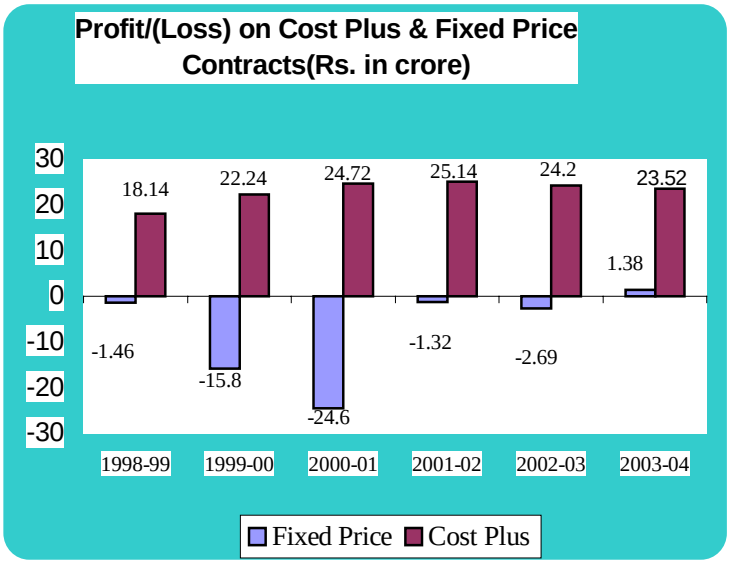
2001-02	Planned	327.30	25.55	7.81
	Actual	420.25	24.03	5.72
2002-03	Planned	440.39	29.16	6.62
	Actual	433.01	22.17	5.12
2003-04	Planned	390.36	28.77	7.37
	Actual	415.19	24.92	6.00

Although the Company consistently earned profits, it may be seen that the actual profit always remained lower than the planned profits during the period of report.

It was further observed that during the period of review, of the 15 vessels delivered, 11 were on 'fixed price' and four on 'cost plus' contract basis. The profit/loss on each vessel and dates of laying keels, launching and delivery are detailed in Annexure-6. It would be seen therefrom that the 'cost plus' contracts, though small in number, formed the bulk of the Company's production and turnover on account of their high value while the fixed price contracts were of smaller value.

Graph-1

The profitability of fixed price vis-à-vis cost plus contracts for the last six years ending 2003-04 is depicted in graph-1.



It may be seen from the graph that in all the years the Company earned profit in cost plus contracts while it suffered loss in fixed price contracts except during 2003-04. This is due to the fact that 'cost-plus' by definition assures a profit while efficient and cost effective working is required for fixed price contracts, which was not witnessed in the Company. Thus, the profit of the Company may be viewed in the light of advantage of cost plus contracts.

8.4.5. Time/Cost Overrun and Liquidated Damages

Of the vessels delivered by the Company in the last six years, nine were built for Indian Navy and six for the Coast Guard. The Company could not deliver a single vessel within the scheduled delivery date. The delay in delivery of vessels ranged from one to 125 months as would be evident from Annexure-6. These delays were attributable to (i) non-availability of vital imported and major equipment in time, (ii) delay in approval of drawings, (iii) delay in finalisation of contracts and (iv) delay caused by sub-contractors. The inability of the Company to deliver ships on time led to customers claiming Liquidated Damages (LD) amounting to Rs.14.91 crore during the years 1998-99 to 2002-03. Of this, Rs.7.56 crore was later refunded/recommended for refund and the

balance amount of Rs.7.35 crore was a loss to the Company. A few instances detailing time and cost overrun and deduction of LD are given in the table below:

Sl. No.	Name of the vessel	Scheduled date of completion/ initial awarded cost	Actual date of completion/ actual cost	Time Overrun	Cost Overrun (Rs. in crore)	Liquidated damage (Rs. in crore)
1	Landing Ship Tank Large	December 1991/ Rs. 46.48 crore	January 1997/ Rs. 127.42 crore	5 years	80.94	4.85
2	Fast Attack Crafts (four)	November 1997 to May 1999/ Rs. 153.60 crore	September 2000 to January 2002/ Rs. 161.19 crore	32 to 34 months	7.59	0.42
3	Hovercraft (six)	August 2000 to February 2002/ Rs. 49.17 crore	August 2000 to March 2002/ Rs. 50.90 crore	One to six months	1.73	0.32
4	Fleet Tanker	December 1991/ Rs.68.47 crore	March 2000/ Rs.271.30 crore	Eight years	202.83	
5	Frigates (three)	December 1995 to December 1999/ Rs. 360 crore	one Frigate- March 2000 Two Frigates not yet delivered/ Rs. 1736.79 crore	Four years in one frigate to be delivered in December 1995	1376.79	

In addition to the liquidated damages imposed in the case of vessels mentioned at Sl. No.1-3 above, the Company also suffered a loss of (i) Rs. 6.22 crore due to acceptance of Rs. 121.20 crore only by the Navy against the cost of Rs. 127.42 crore in case of Sl No. 1, (ii) Rs. 3.85 crore due to failure of two gear boxes purchased from Kirloskar Penumatic Company Limited which was neither re-imbursed by the party nor by the Navy in the case of Sl No. 2, (iii) Rs. 1.59 crore due to higher sea freight not envisaged in the original estimates in the case of Sl No. 3 and (iv) Rs. 26.30 crore as the Navy converted the contract in the case of vessel at Sl. No.4 from 'cost plus' to 'fixed price' contract at Rs.245 crore due to which the Company also lost profit margin at the rate of 7.5 percent amounting to Rs. 20.35 crore.

The Management stated (July 2004) that:

(i) in case of vessel at Sl. No.1, monthly progress report was given to Naval Headquarters (NHQ).

(ii) in the case of Sl. No.2, the reimbursement of extra expenditure on account of failure of two Gear Boxes was under active consideration of Naval Headquarters.

(iii) in the case of vessels indicated at Sl. No.3, the delay was due to unforeseen modifications necessary on the British design to suit Indian conditions.

(iv) in the case of vessels at Sl. No.4, non-payment of labour overhead was in excess of contract value of Rs. 245 crore.

(v) in the case of vessel at Sl. No.5, the cost overrun was due to involvement of more labour on account of modifications/changes for the vessels.

The reply of the Management is not tenable in view of the fact that:

(i) in case of vessel at Sl. No.1, Navy had observed in October 1994 that no plan existed with the yard for weekly production monitoring resulting in continued accumulation of work.

(ii) in the case of vessels at Sl. No.2, the Navy expressed its inability in August 2003 to reimburse the extra expenditure of Rs. 3.85 crore due to non existence of any provision in the contract.

(iii) in the case of vessels at Sl. No.3, these were the inherent problems for which the Company should have take preemptive measures to deliver the crafts within the scheduled time.

(iv) in the case of vessel at Sl. No. 4, the final contract price was fixed which included 110 lakh man-hours (LMH) as against the original estimate of 70 LMH. Against this the Company actually consumed 117.46 LMH; and

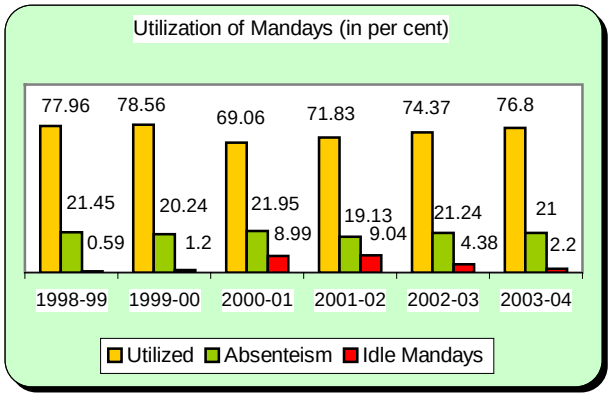
(v) additional labour was used in transportation alignment, erection and fabrication of smaller block units with regard to vessels at Sl. No.5 rather than in modification/changes in design as contended by the Management.

8.5. Manpower Utilisation

Shipbuilding activity, being a labour intensive industry, calls for effective and efficient utilisation of available manpower. The following table indicates the total available vis-a-vis idle man-days and the cost of idle man-days during the six years upto 2003-04.

Particulars	**1998-99**	**1999-00**	**2000-01**	**2001-02**	**2002-03**	**2003-04**
Number of workers	4438	4369	4182	3946	3674	3311
Total Man days available	1300334	1280117	1225326	1156178	1076482	970123
Actual Man Days utilized	1013839	1005747	846230	830442	800614	745076
(a) for Production Jobs	773412	820774	687394	648231	607042	648052
(b) for Non-Production Jobs	240427	184973	158836	182211	193572	97024
Un-utilized man days						
Absenteeism	278862	259060	268944	221173	228688	203726
Idle Man days	7633	15310	110152	104563	47180	21321
Cost of Idle man-days (Rs. in crore)	0.28	0.62	4.74	4.99	2.38	1.27

Graph-2



The unutilized man-days during the period under review varied between 2.25 and 2.86 lakh man-days i.e. between 22 per cent and 23 per cent of available man-days during the period of report. It would be seen that the unutilized man-days were due to heavy absenteeism and idle manpower. Absenteeism during the period remained above 20 per cent of the available man-days indicating the Management's failure to effect internal control. Moreover, the idle man-days also showed a substantial increase during the years 2000-01 and 2001-02. It increased from 0.59 per cent in the year 1998-99 to 9.04 per cent in the year 2001-02 as is evident in Graph-2. The wasteful expenditure on idle manpower during the last six years was Rs. 14.28 crore.

The following table depicts the reason-wise categorization of idle man-days for the last six years ending 2003-04:

Reasons	**Man days lost due to idleness**						
	1998-99	**1999-00**	**2000-01**	**2001-02**	**2002-03**	**2003-04**	**Total [Percentage to total idle man days]**
Lack of work	2446	5862	91262	98888	37671	13007	249136[81.38]
Lack of Material	388	537	2349	2388	1825	1659	9146 [2.99]
Breakdown	107	311	1065	713	318	639	3153 [1.02]
Power failure	709	227	1042	3	460	403	2844 [0.93]
Other misc. reasons	3983	8373	14434	2571	6906	5613	41880 [13.68]
Total	7633	15310	110152	104563	47180	21321	306159 [100]

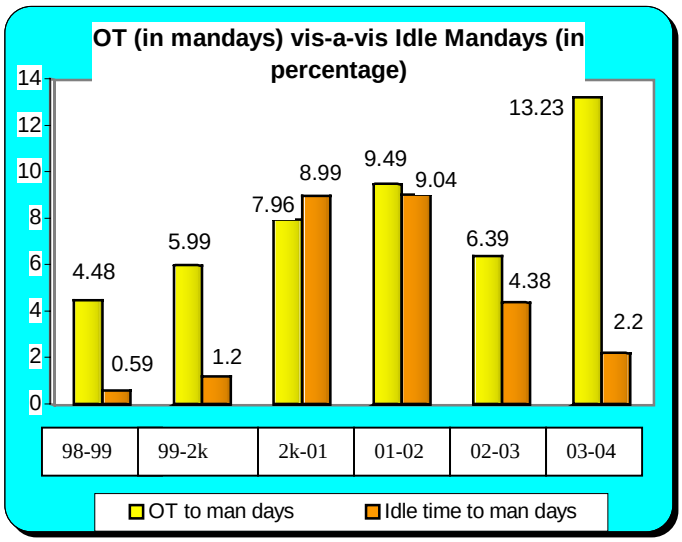
It may be seen that 81.38 per cent of idle man-days were due to lack of work and remaining 18.62 per cent were due to reasons such as want of material, machine/power breakdown and other miscellaneous reasons during the entire period of report. The Management did not plan the work schedule in such a manner as to engage all shops in work with proper integration among different shops to utilize the workforce effectively. Further, proper material procurement plans would have helped the Management to avoid the idle man-days due to lack of material (2.99 per cent). Idle man days on account of miscellaneous reasons were 13.68 per cent.

While contending that orders were not given due to delayed deliveries, the Management stated (July 2004) that the Indian Navy placed orders based on their acquisition budget and the shipbuilders' capabilities. This indicated that the Company failed to synchronize its various activities in order to utilize its workforce more effectively and efficiently.

8.5.1 Overtime vis-à-vis Idle Man-days

Graph-3

The Company incurred a total expenditure of Rs. 52.27 crore on overtime to its employees during the last six years ending 31 March 2004. Year-wise analysis of the overtime expenditure showed an increasing trend from Rs.4.29 crore (1998-99) to Rs.15.34 crore (2003-04). The percentage of overtime in man-days to total available man-days also showed an increasing trend from 4.48 per cent to 13.23 per cent during 1998-99 to 2003-04. Thus, while the Management failed to utilise the available man-days resulting in idleness on the one hand, it continued to allow considerable overtime on the other, as is evident from Graph 3. The Company could have at least reduced its overtime expenditure by Rs. 14.28 crore (the cost of idle man days) had it utilised its man-days effectively and efficiently. Despite huge expenditure on overtime, the Company could not deliver even a single vessel within the scheduled delivery period.

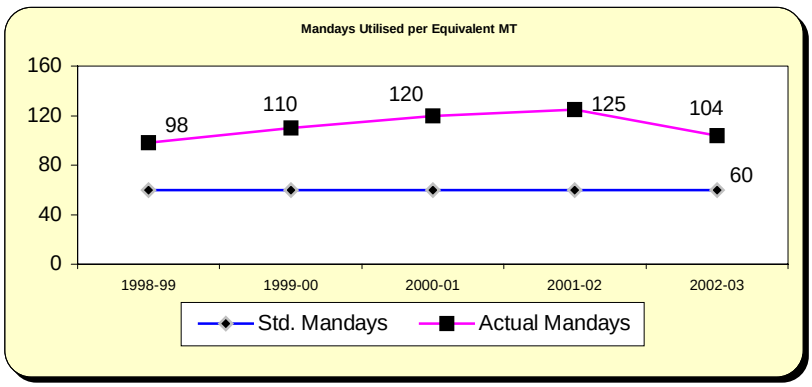


The Management stated (July 2004) that there was no workload in the Main Unit and hence idle manpower had to be redeployed at Fitting Out Jetty for gainful utilisation. The Management's efforts, however, did not reduce expenditure on account of overtime. Moreover, evidence regarding efforts for gainful utilisation of idle manpower was not found on record.

8.5.2 Failure to comply with Standards

Graph-4

The Company in agreement with Unions (January 2000), had been measuring the efficiency level by taking 60 man-days per equivalent tonne of steel fabrication. In the absence of any scientifically evolved norm, this can be taken as standard.



However, from Graph 4 it may be seen that actual man days spent per equivalent tonne of steel fabrication varied from 98 man days in the year 1998-99 to 125 man days in the year 2001-02 against the standard of 60 man days. This factor alone contributed an

element of additional expenditure of Rs. 25.68 crore during the period from 1998-99 to 2002-03 on account of wage/overtime bills of the employees.

The Management stated (July 2004) that there were disincentive provisions to enforce the achievement of targets. This was, however, not supported by any recovery on this account.

8.6 Steel Consumption Analysis

The Company did not maintain vessel wise actual quantity of steel consumed vis-à-vis estimated quantity and scrap generated indicating absence of control over the consumption of vital inputs like steel. Records produced by the Management could not be co-related to assess the effectiveness of internal control over consumption of steel.

The Management's claim (July 2004) that yard-wise steel consumption could be generated is not tenable, as it could not furnish the data regarding the estimated vis-à-vis actual steel consumption as asked for.

8.7 Conclusions/Recommendations

During the period under review none of the vessels was delivered within the stipulated time schedule. Despite poor capacity utilization, low productivity of labour, slippage in scheduled and cardinal dates, and consequent cost overrun, the Company was earning profit in all the years under review mainly because of 'cost plus' nature of contracts. The profit thus earned, did not reflect the actual performance of the Company.

The Company should work out and fix the Standard Ship Unit as is prevalent in the ship construction industry. In addition, the assessed capacity in terms of tonnage of steel fabricated in the Hull Shop was fixed as far back as in the year 1982 based on the then available facilities. This should now be addressed in terms of number of ships/vessels of various shapes and sizes that could be constructed annually with the existing facilities. In view of the time and cost overrun observed in shipbuilding activities of the Company, there is need for it to address its project implementation abilities. Further, the Company should implement normative costing system in its shipbuilding activities.

CHAPTER : IX

Hindustan Aeronautics Limited

Information Technology Audit on computerisation of integrated material management system

Highlights

The Company completed, *inter alia*, the networking in material management in March 2003 at a cost of Rs.13.29 crore. Due to non-compatibility between the Central and the Local Area Network (LAN)/Wide Area Network (WAN) Server Systems, only 322 computers had been connected to LAN/WAN (March 2004) as against 832 envisaged. Consequently, the LAN/WAN network established in these Divisions at a cost of Rs.2.53 crore is not being utilised optimally.

(Para 9.5.2)

There was no standardisation or documentation in the development of the software and the systems were not integrated with other functional areas.

(Para 9.5.3)

Procurement of IT assets was not centralised and the Divisional IT departments in Helicopter Division (HCD), Aero Engine Division (AED) and Overhaul Division (OHD) did not have control over the IT assets worth Rs.3.07 crore procured/positioned in the different Functional Departments as the details of configuration/location were not being maintained by them.

(Para 9.5.4)

The Company had not formulated any IT Policy.

(Para 9.6.1)

The absence of a well laid down password policy and logical access control mechanism rendered the system vulnerable for abuse besides making it difficult to fix responsibility in case of manipulation/corruption of the database.

(Para 9.7.2)

Various instances of deficiencies in application control resulting in incomplete, inaccurate and unreliable data were observed for want of required level of input controls, absence of validation checks/constraints at data entry level, duplication of work without compensating controls, duplicate material codes, duplicate part numbers, error in programme logic, non-inclusion of key fields, numerous manual interventions and non-devising of monitoring system.

(Para 9.8)

HCD charged of the sum of Rs.22.64 crore to consumption and cost of sales on an adhoc basis through a dummy work order.

(Para 9.8.1)

There were negative balances in the material ledger due to deficiencies in system logic/applications. Resultant adjustments that had to be carried out aggregated to Rs.51.38 crore during the year 2002-03 and Rs.67.47 crore during 2003-04.

(Para 9.10.1)

System deficiency resulted in creating 100 per cent redundancy provision even on those materials which were not falling within five year criteria.

(Para 9.10.2)

System deficiency led to erroneous computation of Weighted Average Rates due to non-linking of the repair charges to the original value. Erroneous consideration of the weighted average rate also vitiated the value of inventory.

(Para 9.10.3)

9.1 Introduction

Hindustan Aeronautics Limited (HAL) has 14 Production Divisions, seven at Bangalore and one each at Nasik, Kanpur, Koraput, Korwa, Hyderabad, Barrackpore and Lucknow.

9.2 Computerisation in the Company

The Company established LAN♣/WAN♠ as a part of IT plan only in March 2003 though computerisation activity was commenced in the 1960s. The Application Software was developed in-house for Material Management, Manufacturing, Marketing and Customer Support, Human Resource Development and Finance functions.

9.3 Organisation

A Chief Information Officer (CIO) in the rank of Additional General Manager, who reports to the Director in charge of IT, was positioned (October 2001) at the Corporate Office in order to focus on IT Management. Chief Managers/Deputy General Managers head divisional IT Groups and they generally report to the head of the division.

9.4 Audit Objectives

The broad objectives of audit were to:

(i) Undertake a general review of the implementation of the Corporate Information Technology (IT) Plan and the General Controls prevalent in the IT environment for Material Management;

(ii) Obtain reasonable assurance that Integrated Material Management (IMM) System for accounting, data entry, processing and outputs was reliable; and

(iii) Verify whether inventory data processed through application systems were reliable.

9.4.1 Audit Scope and Methodology

A review of efficacy of the IT systems and controls was undertaken in Audit in three selected Divisions of the Company engaged in manufacture, repair and overhaul activities viz., Helicopter (HCD), Overhaul (OHD) and Aero Engine Divisions (AED) in

♣ ***Local Area Network***
♠ ***Wide Area Network***

Bangalore. The audit methodology adopted included collection of information through questionnaire, test check of the system at the data entry level and personal interviews with the officers of the IT/User Departments. The Stock Master and Purchase Order Progressing System (POPS) Module data pertaining to the period 2002-03 was analysed for ascertaining the existence, availability and completeness of data.

9.5 IT Resources

9.5.1 Hardware

There were 16 servers of HP 9000 make, using oracle software, located at Divisions and Corporate Office.

9.5.2 Networking

The Company completed the networking of its various Divisions/Offices/Bases with LAN/WAN at a cost of Rs.13.29 crore. Though the networking, completed in March 2003, provided for 5161 intranet and 609 internet nodes in 40 locations, only 1777 intranet and 298 internet nodes were populated. On the creation of excess network capacity by 65.57 per cent in intranet and 51.07 per cent in internet nodes, the Company stated (August 2004) that 5161 intranet nodes had been installed considering anticipated expansion and implementation of Enterprise Resource Planning (ERP) system. However, documented justification for estimation of 5161 nodes was not made available to audit. It was seen from the details of the LAN/WAN network available in the Divisions that due to non-compatibility between the Central and the LAN/WAN Server Systems, only 322 PCs had been connected to LAN/WAN in the Overhaul, Helicopter and Engine Divisions as of March 2004, against 832 envisaged, resulting in system capacity utilisation of only 39 per cent. Thus, the LAN/WAN networks established in these Divisions at a cost of Rs.2.53 crore had not been utilised optimally.

9.5.3 Application Software

Application software for various functions had been developed in-house, using different language tools (COBOL, C ++, Fox Pro, Oracle, etc). It was observed that:

(i) there was no standardisation or documentation in the development of the software;

(ii) systems were not integrated with other functional areas and

(iii) due to lack of interfacing of the Oracle and COBOL programmes, data available in the online Modules had to be keyed in again for batch mode processing every month in OHD resulting in non-standardisation of repetitive information and duplication of efforts, thereby increasing the risk of errors.

9.5.4 Control of IT Assets/infrastructure

The Company was adopting a mixed approach of centralised and decentralised procurement of IT assets. Notwithstanding the Company's reply (October 2004) that only the specific requirements of the divisions had been procured at divisional level while the procurement of the major IT resources was handled centrally, it would be advisable for the Company to co-ordinate centrally the specific requirements of the divisions for ensuring completeness in standardisation. Though the IT assets valued at Rs.3.07 crore in OHD, AED and HCD (31 March 2004) had been covered under the fixed assets registers, the I T Departments of the Divisions were not having any control over the

configuration/location of the various IT assets procured/positioned in different Functional Departments. As a consequence, monitoring, up-gradation and prevention of obsolescence was not possible.

The Company stated (August/October 2004) that a structured monitoring mechanism would be devised and divisions advised to use authorised software.

9.6 IT Vision and IT Plan

9.6.1 Lack of I T Strategy and policies

The Company in its IT Vision envisaged Information Technology as a business enabler to achieve enterprise-wide integration, seamless global communication, speed and agility, management of information resources, creation of knowledge database and achievement of cost effectiveness by streaming of business processes. Accordingly, IT plan was drawn up for various steps for implementation by February 2002 to achieve the objectives. However, IT policies were yet to be formulated and the internal audit of IT systems was yet to be conducted (October 2004).

The Company stated (October 2004) that the IT policy had been under formulation and that the internal audit of IT systems would be carried out.

9.6.2 IT Steering Committee

The IT Steering Committee, under the chairmanship of the Chairman, HAL and all the wholetime Directors, was formed in September 2001. The main functions of the Committee were to determine the overall objectives of the Company and define IT strategy; to build a bridge between strategic business planning and IT systems development; to formulate the IT plan; to decide on investments required for the execution of the IT plan and to monitor the implementation of the IT plan. Though the Committee was to meet every quarter in a year, it formally met only once in 2002-03 and twice in 2003-04. The Company contended that though IT Steering Committee meetings were not held, the IT-related matters were discussed in the monthly meeting of the wholetime Directors. This, however, diluted the mandate given by the Board to the IT Steering Committee viz. to focus specifically on IT-related issues.

9.7 General Controls

9.7.1 Physical Access Controls

The Divisions put in place various physical controls to protect the IT facilities from damage due to fire, power failure, etc. A review of the controls revealed the following:

(i) Server room of some of the divisions had either not been provided with fire extinguisher or, if installed, had not been revalidated on due dates.

(ii) Some of the automatic smoke detection/fire alarm devices, though installed in OHD, were not working.

(iii) The department was neither maintaining any documentation on fire extinguisher devices installed, dates of their calibration nor checking working condition of those devices.

(iv) In HCD computer stationery, waste cartons, etc., had been stored inside the main server room, exposing the IT Assets to the risk of physical safety and security.

(v) Though Divisions stated that their IT assets had been insured against fire risks in line with the Corporate Office circular of March 1979, there was no insurance coverage for IT assets in OHD/AED for the period 2004-05. Lack of proper physical safety measures exposed IT assets valued at Rs.2.14 crore to risk of physical safety and security.

The Company stated (October 2004) that fire extinguishers had since been provided in LAN/WAN system rooms and were getting revalidated once in six months; Capital budget proposals were made by OHD to replace the existing defective automatic smoke detection systems; the computer stationery/waste cartons etc., had since been removed from the main server room in HCD and insurance coverage of the IT assets had since been ensured in HCD, OHD and AED. The reply regarding provision of insurance coverage to IT assets in OHD/AED could not be verified in Audit for want of documentary support.

9.7.2 Logical Access Control

The access to the Main Server was enabled through user ID and password. The Head of IT Department and nominated officials were authorised to boot and shutdown the system on all working days and on some holidays when officials were required to work. On a review of the controls, following observations were made:

(i) the passwords were not getting changed at regular intervals.

(ii) in OHD and HCD the programmers were provided access to live data system, against acceptable system safety, through group user passwords and a single user ID/password which would enable all the users in a Module to access the database. This could result in unauthorised changes to the database, which would be difficult to locate for rectification.

The absence of a comprehensive password policy and logical access control mechanism rendered the system vulnerable to abuse besides making it difficult to fix responsibility in case of any manipulation/corruption of the database.

The Company stated (October 2004) that the users would be advised to change passwords regularly. It further stated that the issue would be covered in detail in the IT policy. However, IT policy was yet to be formulated (October 2004).

9.7.3 Unauthorised Access to Source Codes

IT department officials in OHD had free access to the source codes and the application programmes were modified based on the User Department's oral request and in some cases functional heads/programmers themselves were carrying out small changes on interaction with users. The modifications had neither been documented nor had a proper procedure for change management control been formulated. In the absence of proper change management control, the accuracy of change carried out and accountability for changes could not be ensured in audit.

The Company stated (August/October 2004) that the documentation requirement would be addressed during ERP Implementation. However, no mention was made of the risk of access to source codes.

9.7.4 Security policies

The Company was yet to formulate a well-defined security policy identifying the threat perceptions and safety measures. Even the Computer Security guidelines on the use of pirated software, periodical change of passwords, storage of top secret information in the computers, maintenance of audit trail, etc., issued by the Ministry of Defence in June 2001, for adherence by all Defence PSUs, were circulated by the CIO to the Divisions only in March 2004 at the instance of Audit. The Divisions were yet to implement the security guidelines, the fact of which was accepted by the Company (October 2004).

Desk-top servers for firewall/ antivirus, associated operating systems and antivirus package in the LAN/WAN servers were installed at 26 Divisions/locations through M/s. CMC Limited, Bangalore, at a total cost of Rs.99.27 lakh to protect the network database from external access. Separate connections had been provided for the Intranet and Internet users to ensure physical and logical isolation of the internal network (December 2003). It was, however, observed that in 13 out of these 26 Divisions/ locations, firewall was not working due to bug problem viz., system hanging or inconsistency in system operation.

The Company stated (August/October 2004) that the firewall had since been debugged and was under observation and that no adverse impact was noticed on the LAN/WAN systems during the period the software was being debugged.

9.8 Application Controls

The IT Modules for Integrated Material Management (IMM) functions were developed in-house in ORACLE RDBMS and were being used for online data capture, since 1997-98. IMM module comprised three sub-modules viz., Material Provisioning, Accounting and Control (MPAC), Purchase Order Progression System (POPS) and Stores Accounting and Control (STAC). Material Planning, Purchase and Stores Departments were using these modules. The Module-wise deficiencies in controls are discussed in the succeeding paragraphs.

9.8.1 Input Controls

Material Provisioning, Accounting and Control Module

(i) In Helicopter Division

(a) certain essential details viz. material code, name, procurement lead time etc. were not made compulsory while entering data for the preparation of Material Purchase Request (MPR) resulting in incomplete data base;

(b) based on the oral advice of the Purchase Department, MPRs were being deleted by Data Entry Operators, the authority for which should normally vest with Departmental Managers;

(c) the facility in the system to ascertain the details of materials due to be received was not being used. This could result in improper purchase decisions.

(ii) In Overhaul Division, though following facilities were available in the system these were carried out manually, resulting in their non-utilisation for decision-making.

(a) computation of probability factor ('P' factor) and net requirement of spares, (b) maintenance of materials stock cards (except for new projects like Mirage and Jaguar),

(c) preparation of procurement review forms and (d) monitoring the status of conversion of MPR to Purchase Order.

(iii) In Aero Engines Division

(a) the system was not designed with inbuilt checks to facilitate effective material planning in respect of shelf life items and critical spares;

(b) adequacy exercise in respect of Bought Out Finished goods, castings, forgings, raw materials for various projects and the preparation of procurement review forms were done manually and on stand- alone computers and not online.

(iv) In Helicopter and Aero Engine Divisions, there were no inbuilt checks in the process of generating MPRs, in order to avoid the import of items available in India. Though the Aero Engine Division had been exercising manual checks since 2002-03, the extent/effectiveness of the same could not be assessed in audit due to non-availability of required data in the system;

(v) The Bill of Materials (BOM) consisted of duplicate part numbers, duplicate material code and duplicate strip part numbers. Normally the quantity per unit was fixed projectwise and should not vary in the BOM. However, it was observed that against the duplicate part numbers, the customer-wise and project-wise quantity of net requirement was varying. For example, part No.122353 was duplicated five times in the BOM and net requirement/quantity indicated against duplication of part number was varying customer-wise and project-wise, indicating lack of integrity and reliability.

The Company stated (October 2004) that

(i) suitable locks would be introduced as a modification in the module to avoid any freak MPRs with incomplete data;

(ii) necessary documentation would be introduced for MPR cancellation/deletion and Integrated Material Management personnel had been advised to use the 'dues-in' screens in MPRs also; and

(iii) The facility for manual intervention in the areas of 'P' factor/net requirement computation, preparation of procurement review forms etc., was necessitated by the changing requirements of the customer.

The reply is not acceptable as manual interventions would result in non-utilisation of available facility in the module and cropping up of errors/delays.

Purchase Order Progression System Module

(i) Comparative statements were prepared manually as their preparation was not possible in the module in Helicopter Division.

(ii) In Overhaul and Aero Engine Divisions the payment data, already entered by the Finance Department on a stand-alone computer, was entered again by the Purchase Department in their system. This resulted in duplication of work.

(iii) Due to lack of validation check at the time of data input, vendor names and addresses were duplicated in the vendor master data with different vendor codes;

(iv) The system generated Purchase Orders without quantities due to non-incorporation of validation checks for quantities.

The Company stated (October 2004) that the module was being utilised for generating comparative statements on trial basis and that the instances of errors in the vendor code would be corrected by carrying out a review.

Stores Accounting and Control Module

(i) Store numbers 18 and 28 of the Helicopter Division were not using the facility available in the system to ascertain the missing vouchers. These stores keyed in the missing vouchers only on receipt of the monthly missing voucher statement from the Information Technology (IT) Department. Further, a review of the missing voucher statement revealed that missing vouchers for April 2003 (212 Nos.) and May 2003 (199 Nos.) were communicated by the IT Department only in July and August 2003 respectively. Out of the above, five Nos. (April 2003) and 23 Nos. (May 2003) were not keyed in at holding stores. Due to this, the database remained incomplete and the output generated lacked accuracy;

(ii) In Helicopter Division, though there was an inbuilt system check for the material code field through check digits, in the absence of proper validation checks for the purchase order number and voucher number fields, the system accepted seven digit and six digit numbers for these fields respectively.

(iii) In Helicopter Division, Inter Divisional Transfer Order (IDTO) had been placed on Aircraft Research and Design Centre (ARDC) for manufacture and supply of composite items and the IDTO covered only the labour component. It was observed that the physical receipts/issues/consumption of the composite material was being controlled by ARDC, which had been entrusted with the responsibility of fabricating and supplying the composite parts/structures to the Helicopter Division. During the year 2003-04, the Division charged off a sum of Rs.22.64 crore to consumption and cost of sales on an adhoc basis through a dummy work order based on the statistical information and Stock-in-Transit/Inter-Divisional Transfer Order (SIT/IDTO) bifurcation furnished by ARDC.

The Company stated (October 2004) that instructions had been issued to the concerned stores in Helicopter Division to use the missing vouchers query screen so as to avoid the incomplete data. It also assured that the system of receipts, acceptance and issue of composite material received from ARDC would be strengthened in 2004-05.

9.8.2 Process Controls

Material Provisioning, Accounting and Control Module

(i) In Helicopter Division, there was no MPR amendment screen. The corrections were carried out on the MPR screen itself and the system accepted modifications to an MPR already released;

(ii) In Aero Engine Division, proper checks were not available in the system to indicate the availability of common parts/material in the various project stores for arriving at the net requirement/ generating MPR and to avoid purchase of excess/unnecessary items. Though the system provided the

facility for ascertaining the details of common parts, the extent to which this facility was used by the user departments was not assessable;

(iii) In Aero Engine Division, a separate module to facilitate the computation of the net requirement for given tasks and to plan the procurement action had not been designed and put in place. Due to this, project-wise Bill of Materials, the details of previous consumption which facilitated probability factor calculations, the project-wise/ customer-wise task data in respect of repair/overhaul activity, Aircraft on ground orders, defect investigation, customer complaints and actual deliveries, which were important for material planning, were not captured/maintained on line.

The Company stated (October 2004) that the MPR amendment screens had since been introduced. As regards the non-utilisation of the common parts query screen the Company stated that the common parts were negligible and C class in nature. The reply is not acceptable as the system ought to have provided inbuilt checks to indicate the availability of common parts and the common parts query screen needed to be utilised to ensure proper material planning.

Purchase Order Progression System Module

An analysis of the data on Purchase orders (PO) made available to audit, revealed that:

(i) In Helicopter Division, the PO and MPR date fields were blank in 8,632 and 2,700 cases respectively as the date fields were not devised as mandatory data entry fields. In 4,994 out of 11,660 cases, delay in converting MPRs into POs ranged from one day to 1,511 days over and above the 90 days time allowed ;

(ii) A review of the POs closed during 2002-03 revealed that 5,489 POs valued at Rs.217.67 crore were pending from 1998 and onwards. As the delivery had fallen overdue in many of these POs, action was required to be taken either to obtain the deliveries or to cancel these POs;

The Company stated (October 2004) that the audit observations were noted for review and remedial action.

Stores Accounting and Control Module

(i) In Overhaul Division the data relating to Receiving Report number (RR No.) and date, purchase order number, quantity received and material code, which were entered initially by the Receiving stores, were keyed in again by Holding stores and by Bills Payable Section. The data already available in the module were also keyed in again every month for batch processing by the Information Technology Department, resulting in duplication of work, waste of resources and errors due to lack of compensating controls/checks;

(ii) In Helicopter Division, assigning a single material code for both the 2B1 and 2B2 models of the Turbomeca Engine resulted in non-inclusion of inventory value of five Numbers of 2B1 engines lying in the shop floor. This resulted in overstatement of consumption and understatement of inventory to the extent of Rs.4.87 crore during the year 2001-02 which was adjusted subsequently (September 2003). This is indicative of the absence of proper controls in the

matter of analysing and authorising the adjustment of negative balances highlighted by the system.

The Company stated (October 2004) that the audit observation regarding analysing and authorising the adjustment of negative balances had been noted for review and necessary action.

9.8.3 Output Controls

Material Provisioning, Accounting and Control Module

In Helicopter Division, the periodicity for review and updation in respect of output generated through the module was not documented. The existing recommendations were updated in October 2000. However, taking into account the wide differences in the existing Ten-off list (the list of spares specifying probability factor in respect of spares used for Helicopter overhaul) and the recommended Ten-off list in respect of certain parts, the recommendations were required to be updated every year.

The Company stated (October 2004) that it proposed to update the Ten-off list, which was being updated once in five years, during 2005. It was, however, observed that the Company did not have a laid down policy stipulating five year duration for updation of the Ten-off list. Considering the wide variations between the existing Ten-off list and the recommended Ten-off list, it is imperative that such an exercise is done annually so as to enable proper procurement planning.

Purchase Order Progression System Module

(i) In Aero Engine Division, though a Monthly Summary Report of time taken for conversion of Material Purchase Request into purchase orders was generated, it was seen that delays of more than 90 days continued;

(ii) In Aero Engine Division, the soft copies (in compact discs/floppies) of data and other information were being routed by the IT Department through Functional/Finance Departments which, besides entailing unwarranted delays, prevented audit from obtaining a reasonable assurance on the ability of the system to provide complete, accurate and reliable data at any point of time. However, the fact that the Purchase Department had sent back the Module data to the IT department for error correction/updation indicated that the system had not been tuned to provide reliable, accurate and complete data at any given point of time.

The Company stated (October 2004) that the observations were noted for improvement.

Stores Accounting and Control Module

(i) In Helicopter Division, as the Module did not provide for online generation of Part Disposition Orders and Lab Test Request forms, these were prepared manually by Inspection Group.

(ii) The cut-off date fixed for generating outputs under the module by the Information Technology Department to be given to Material Accounts Section was stated to be the 20th of every month for Helicopter Division and the sixth of every month for Overhaul Division. Though Aero Engine Division had not indicated any cut-off date, the date fixed by Overhaul

Division was reckoned for this Division also. Though there was no documentation in any of these Divisions to monitor the movement of the output, a test check revealed that there were delays in making the output available to Material Accounts Section in all the three Divisions. Consequently the closing inventory furnished to the Divisional Committee of Management during their monthly meetings was at variance with the actual inventory as per stock master data.

The Company assured (October 2004) that (a) the online generation of Part Disposition Orders and Lab Test Request would be facilitated in the module (b) the strict adherence of the existing cut-off date would be ensured among all the divisions and (c) action for data cleansing would be taken up.

9.9 Lack of adequate disaster recovery and business continuity planning

Though backup of data was taken on weekly basis, except in AED, they were stored in the same site where the computer system was available. In the absence of a disaster recovery plan in the Divisions, any significant disaster impacting the data volume covering 34 GB (approximately) would paralyse automated operations of the Divisions.

The Company stated (August 2004) that the disaster recovery plans would be covered as a part of IT policy, which was yet to be formulated.

9.10 Material Accounts

An analysis of inventory data revealed the following:

9.10.1 Negative Balances in the Material Ledger

The material ledger, which was processed and printed once a month**,** was found to contain negative balances against several material codes. The reasons for negative balances and system control check deficiencies are given below:

(i) Where the quantity issued was more than the quantity at stock, instead of rejecting the input the system was accepting the entry, which had to be corrected manually by comparison with bin card statement.

(ii) The negative balances in the value suspense would be reversed if it was proved that where the quantity issued should not have been priced was priced, due to programme logic and thereby wrong process;

(iii) Any negative quantity appearing in the ledger would be removed without analysing reasons therefor, where the value was less than Rs.50,000.

(iv) Where Material Requisition (MR) was accounted prior to RR and MR was more than the stock, instead of rejecting the input, the entry system accepted it.

(v) An illustrative case showed that adoption of divergent practices in passing adjustment entries treating non-priced quantity as priced, resulted in carrying of inventory with value which had simultaneous impact on valuation of Work in Progress and transfers to Cost of Sales.

A comparison of the negative balances as per monthly Debit/Credit Balance Ledger and the Value Suspense as per monthly Stock Master (cumulative) for the year 2002-03, in HCD, revealed differences of around Rs.10 crore every month, which represented the

unadjusted balances pertaining to the previous months. This indicated that all the negative balances were not reviewed and adjusted in the next month. The total value of the transactions passed through code No.575 and 626 for adjusting the negative balances, during the years 2002-03 and 2003-04 amounted to Rs.51.38 crore and Rs.67.47 crore respectively.

The Company stated (October 2004) that the entire negative balances appearing during 2002-03 had been reviewed and corrected and that review and rectification of value suspense on a monthly basis would be undertaken as suggested. However, the Company's reply was silent about removal of negative balance below Rs.50,000. The accuracy of adjustments to correct negative balance could not be verified in Audit in the absence of documented analysis.

9.10.2 Non-moving Inventory – System deficiency in classification

As per the prevalent system**,** the division prepares list of non-moving and slow-moving items for the purpose of monitoring movement of inventory and for analysing the reasons for their non/slow movement. The Company provided for 100 per cent value of the non-moving inventory aged more than five years in the accounts. A specific field was available in the data table for storing the last issue date. The system had been programmed to identify non-moving item, wherever the last issue date of that material code was more than five years.

An analysis of the data on non-moving items as on 31 March 2004 revealed that the system had been programmed to compare the date of last issue only, ignoring the date of receipts. This resulted in system identifying inventories aged less than five years also as non-moving items. This deficiency resulted in creating 100 per cent redundancy provision even on new procurements not falling within the five year criteria. On test check of a few such items, the 100 per cent redundancy provision made, amounted to Rs.25.41 lakh (2002-03), Rs.16.65 lakh (2003-04) in HCD and Rs.34.84 lakh (2002-03) in OHD.

The Company (October 2004) agreed with the facts and stated that the system would be reviewed for proper accounting.

9.10.3 Erroneous computation of Weighted Average Rates

In Helicopter Division, items found to be defective, after acceptance and issue for assembly, were being sent to the suppliers for repair. However, the value of these items which were already charged off to consumption, continued to remain under work-in-progress. The suppliers carried out the repair free of charge, if the items were within the warranty period or on chargeable basis, if the warranty period had expired. On receipt of the repaired item from the supplier, the Division prepared a fresh Receiving Report (RR) and the item was valued either at 'Nil' value or with the repair charges incurred. The system picked up the repaired item along with the repair charges as a fresh addition and computed the Weighted Average Rate of the entire quantity lying in inventory. This distorted the unit rate adopted for the subsequent issues.

For instance, TM 333 2B2 Engine No.1054, was found to be defective (March 2003). after issue (December 2002) against an Advanced Light Helicopter work order. The engine was sent to the supplier for repair even while the original value of Rs.2.03 crore was lying in work-in-progress (February 2003). When the engine was received after

repair (November 2003), it was accounted as a fresh receipt with the value of Rs.37.17 lakh in the material ledger, without any link to its original value viz. Rs.2.03 crore.

This system deficiency is required to be corrected, so as to ensure that the value of the material items sent back to the vendor for repair is brought to inventory through store credits and kept under a distinct material code so that proper linkage of the repair cost to the original value of the material is ensured in the Stock Master data.

Further, though shelf life-expired items were physically segregated immediately on the basis of Part Disposition Orders raised by the Inspection Department, it was observed in Overhaul, Helicopter and Aero Engine Divisions that the value was removed from the material ledger only when the disposal orders were issued by the Inspection Department to salvage stores. Delay in the removal of the value of the shelf life expired items from the material ledger affected the weighted average rate of the material issued during the intervening period.

The Company accepted the facts and stated (October 2004) that corrective action had been ensured.

9.10.4 Stock Masters – Absence of system review and cleansing

Analysis of the Stock Masters of Overhaul Division, Helicopter Division and Aero Engine Division revealed that:

(i) though the Divisions used a 12 digit Rationalised Code for material, the same had not been implemented in the computerised environment, as codification of all the materials was not complete. Wherever the new 12 digit material code was not provided, old code had been used. In many cases the system accepted the material codes which were less than 12 digits;

(ii) in the case of common materials, though the part number and part name were the same, different material codes had been assigned in different stores/projects (AED); and

(iii) in the case of 8,484 material codes where non-priced quantity was '0', there was a difference between the quantity priced in the Stock Master and the Bin Balance. The value of such excesses and shortages in the Stock Master as compared to the Bin Balance worked out to Rs.13 crore and Rs.12.83 crore respectively, resulting in a net excess inventory of Rs.17 lakh. Though in the case of inventory items individually valuing more than Rs.50,000, differences between Bin Balance and Stock Master were analysed and adjustments carried out, in 643 cases of inventory (value higher than Rs.50,000) the differences between Bin Balance and Stock Master still persisted (AED).

In the absence of cleansing of Stock Master for deletion, proper/complete codification of materials**,** Audit could not vouchsafe the completeness, accuracy and reliability of the database.

The Company accepted the facts and stated (October 2004) that the point had been noted for necessary action.

9.10.5 Common Materials – system deficiency in inventory control and accounting

The common materials used in different projects /stores were separately maintained in the Stock Master, though the material and the material code was the same. The discrepancies

noticed in HCD and AED consequent on keeping materials having same code/nomenclature in different stores and under different projects, are detailed below:

(i) As the weighted average rate of a material code had been calculated project/store-wise, different weighted average rates were assigned to the same material available in different projects / stores.

(ii) As the non-moving inventory was also calculated based on 18 digit code, it would result in a situation where an identical material moving in one store might be classified as non- moving in another store. This would, consequently, result in excess provisioning for non-moving inventory. A test-check revealed that items valued at Rs.81 lakh were exhibited as lying under non-moving inventory though these items were moving in other projects/stores, as on 31 March 2003 in HCD.

This system deficiency needed to be corrected to ensure proper valuation of inventory and to obviate the possibility of procurement of a common material that might be available and non-moving in other projects/stores and the consequent blocking of inventory.

The Company accepted the facts and stated (October 2004) that the point was noted for necessary action.

9.11 Implementation of Enterprise Resource Planning (ERP) System

9.11.1 The IT Plan envisaged (September 2001) the implementation of the Pilot Project of ERP (HCD and Corporate Office) by December 2003 and Company-wide implementation of ERP by June 2004, at an estimated cost of Rs.22.30 crore. An IT core group was formed (July 2002) with the IT Consultant as a co-opted member to study various ERP packages available and to submit a report for selection of suitable ERP package by August 2002 to the Committee of Directors (CoD) for selecting and implementing suitable package. After short-listing ERP package and taking into consideration the report submitted by IT Core Group, Industrial Financial System – Enterprise Resource Planning (IFS-ERP) package was selected (March 2003) for implementation only in June 2004. As per the IT Plan, the implementation should have been completed by June 2004. M/s. BAeHAL was awarded (June 2004) the order for Rs.8.93 crore for implementation of ERP in three pilot sites initially and in 14 roll-out sites subject to successful completion/implementation of IFS-ERP packages at all three pilot sites.

The Company stated (August/October 2004) that the selection of ERP package involved study of available packages, their merits/demerits, suitability for the organisation's business processes etc. The Company, therefore, contended that the time taken was considered reasonable. However, the Company should have given due weightage to all the factors at the time of planning.

9.11.2 The Management agreed to take corrective steps during implementation of ERP in respect of the following deficiencies pointed out by Audit in the existing system.

(i) Non-utilisation of LAN/WAN networks to the full extent. (para 9.5.2)

(ii) No standardisation or documentation in the development of the software, non-integration of systems with other functional areas and lack of interfacing of the Oracle and COBOL programmes. (para 9.5.3)

(iii) Programmers were provided access to live data system through group user passwords. (para 9.7.2 and 9.7.3)

(iv) No inbuilt checks were available in the process of generating MPRs, to obviate/restrict the import of indigenised/ fabricated items. (para 9.8.1- MPAC (iv))

(v) BOM consisted of duplicate part number, material code and strip parts. (para 9.8.1 MPAC(v))

(vi) Duplication of vendor names and addresses figured in the vendor master. (para 9.8.1-POPS (iii))

(vii) Non-integration of the data resulting in wrong computation of net requirement. (para 9.8.2-MPAC)

(viii) Duplication of data entry due to lack of compensating controls. (para 9.8.2-STAC)

(ix) Implementation of required controls. (para 9.8.3 -STAC)

(x) Negative balances in the material ledger due to deficiency in program logic. (para 9.10.1)

9.12 Conclusions

(i) The Company was yet to formulate its IT Policy.

(ii) The IT Steering Committee meetings were not held**,** as prescribed.

(iii) The IT infrastructure monitoring and control were not vested with the IT department and the audit of the IT systems/functions by internal audit/ system audit had not been ensured.

(iv) The application software were not standardised. Integration of various functional applications and proper interfacing of ORACLE and COBOL applications had not been ensured.

(v) There was absence of a well laid-down password policy and logical access control mechanism, rendering the system vulnerable to abuse besides making it difficult to fix responsibility in case of any change in and manipulation/corruption of the database.

(vi) The Company had been using IT resources only for transaction processing. The resources were not being utilised for decision-making and monitoring purpose. Unless a better integrity level of data is established and the general and application controls are toned up, the correctness and completeness of data capture/updation and availability, accuracy and integrity of the database cannot be ensured.

(vii) The IT system had not served the purpose of fulfilling the objective of IMM due to various deficiencies in various modules as well as practices followed.

9.13 Recommendations

(a) IT policy should be formulated immediately and internal audit of the IT Systems carried out.

(b) Well-defined security policy identifying the threat perceptions and safety measures should be formulated.

(c) Free access to the source codes should be avoided.

(d) There should be comprehensive password policy.

(e) The Company should have adequate disaster recovery plan in place to protect the data.

(f) An Enterprise Resource Planning system, which can take care of problems and deficiencies in the existing system, needs to be implemented expeditiously.

The review was issued to the Ministry in November 2004; its reply was awaited (March 2005).