

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)

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- (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).