MINISTRY OF DEFENCE

CHAPTER: II

Garden Reach Shipbuilders and Engineers Limited

Material Management in the ERP system

Highlights

All the modules of the ERP system had not been implemented and legacy system was still being used.

(Para 2.8.1)

Logical access controls were inadequate exposing the system to the risk of unauthorised access.

(Para 2.8.3)

Lack of proper input and validation controls resulted in duplication of material codes, different units of measurement being used for the same material, release of Purchase Orders without material codes, etc.

(Para 2.8.4)

2.1 Introduction

Garden Reach Shipbuilders & Engineers Limited (GRSE) was incorporated on 1 April 1960 as a wholly owned Government of India enterprise under the administrative control of the Ministry of Defence. It is engaged in shipbuilding and repair for defence purposes. It has its own Engineering and Engine manufacturing divisions and operates primarily through three locations at Kolkata, i.e. Hull manufacturing unit, Fitting out jetty and the Design department.

2.2. Objectives of introducing ERP system

Computerisation in GRSE was initiated in 1995 with the introduction of Computer Aided Design/Computer Aided Manufacturing facilities in the Design Office. The computers installed were working in stand-alone mode. With a view to maximising the benefits of computerisation in an integrated manner and for speedy completion of naval projects, the Board of Directors decided (December 1998) to introduce ERP system. The objectives of introducing ERP system were as follows:

(i)   Faster verification of material availability and material requirement planning

(ii)   Reduction in the order placement time.

(iii)   Faster follow-up on order status to ensure availability of material on time.

(iv)   Better management and utilisation of inventory.

(v)   Auto generation of MIS reports.

2.3   ERP system in GRSE

The ERP system is installed on two IBM RS 6000 Servers with 149 terminals and loaded with SAP R/3 4.6C application on an IBM AIX OS (Version 4.3.3) and Oracle RDBMS (Version 8.1.7). A total of 71 SAP R/3 licenses had been procured for 71 users. The ERP system was to be implemented in two phases. In Phase I, the Material Management Module along with related areas of Finance, Planning and Production and Project System Modules were to be implemented. In Phase II the ERP system was to be extended to functional areas like finance, human resource, networking, e-security, etc. Against the scheduled commencement of Phase-I by April 2002, the live run of the ERP system was done in June 2002. The amount expended till the implementation of Phase-I (June 2007) was Rs.3.76 crore as against the sanctioned amount of Rs.3.83 crore. The implementation of Phase-II commenced from July 2007 and the URS was to be prepared by January 2008.

2.4.   Scope of Audit

Audit assessed the controls and security of the system and the implementation and usage of the Material Management module.

2.5   Audit objectives

The main objectives of Audit were:

(i)   To assess the efficiency and effectiveness of the security controls in the system; and

(ii)   To assess achievement of the objectives of implementing the Material Management module.

2.6.   Audit criteria

The criteria used for audit were:

(i)   SAP standard literature.

(ii)   SAP R3 Material Management auditing manual and SAP R3 auditing manual.

(iii)   Company's purchase manual and accounting policies.

2.7.   Audit methodology and acknowledgement

2.7.1 Audit involved detailed study and analysis of relevant records, the available features of the Material Management module, discussions and interaction with departmental functionaries, collection of data through questionnaires and requisitions, data extraction using the standard in-house reports and analysis of data using CAATs.

2.7.2 Audit acknowledges with thanks the co-operation and assistance extended by different levels of the Management at various stages of this audit.

2.8   Audit findings

2.8.1   Under utilisation of ERP system

To maximise the benefits of the ERP system, all the modules of the system should be implemented simultaneously in predetermined sequential manner. In Phase-I, it was observed that the Material Management module along with related areas of Finance, Planning & Production and Project System modules had been implemented. However, in

the Material Management module, only transactions such as purchase requisition, purchase order, goods receipt and issue were computerised whereas other important aspects such as billing, payments, priced stores ledger etc. were still being processed through the legacy* system. The Company was thus, not utilising the system to the full extent.

The Management stated that legacy system was for the old ships and the procurement for the new ships are routed through ERP system and that demarcation was done to avoid hybrid system for ongoing projects. The reply of the Management was not tenable in view of the fact that the hybrid system was in use for the ongoing projects.

2.8.2   Shortcomings in customisation

2.8.2.1 Missing description of programs

SAP has a standard system for processing business transactions. Before the system can be used, it has to be customised to the specific requirements of the user entity. Customisation was done through the development of partial programs based on the programming language* provided by SAP. Every program listed in the system should have a sufficient description so as to amply indicate the purpose for which the program was developed. It was noticed that out of 394 customised programs, 11 did not have any description. Since descriptions indicate the purpose of the program and the possible outputs, non-existence of the same may lead to non-utilisation or mis-utilisation of the program.

While accepting the observation, the Management stated (July 2007) that relevant non-live descriptions are awaiting deletion.

2.8.2.2 Duplication of programs

Programs are a set of instructions arranged sequentially in order to process information or business transactions. Existence of duplicate programs is established by the nomenclature and description of such programs. Programs should first be developed in the test server and then migrated to the production server to ensure all user requirements have been met. It was noticed in audit that 36 duplicate programs with different program names exist in the system. The usage of these programs, however, could not be ascertained from the system.

 The Management stated (July 2007) that duplicate programs had been developed to meet change/additional requirement later on. The Management's reply indicates that user requirements were not clearly defined.

2.8.3   Deficiencies in logical access control

Logical access control ensures that only authorised users can log on to the system. This control is secured by having a password policy, limitation in number of logon attempts, etc. Scrutiny, however, revealed the following deficiencies:

---

* *Old computerised system*
* *ABAP- Advanced Business Application Programming Language*

2.8.3.1 Password policy

The Company had not framed any password policy. In absence of the same, the required controls that could have been exercised through appropriate system settings were found lacking as noted below:

(i) The length of the password can be checked through a system setting. Against the recommended minimum password length of five characters, the Company set a minimum length of only three characters.

(ii) Recommended change of users passwords is within 30 days. It was noticed in audit that 63 users of 71 users did not change their passwords for a period ranging from 7 months to 48 months.

(iii) To ensure that easy-to-guess passwords are not used by the users, the list of prohibited passwords which exists in the system has to be populated. Scrutiny, however, revealed that this had not been done. As a result, there was a possibility of some of the users creating easy-to-guess[*] password thereby putting the system at a risk of unauthorised access.

2.8.3.2 Logon activity

(i) To ensure that other users do not access the system during the authorized user's absence, a time limit can be set on the period of inactivity before the system logs the user out of SAP. The Company has set this parameter at 5400 seconds (90 minutes) which was high.

(ii) Users IDs and passwords should not be shared as it would be difficult to identify the user who is responsible for security breach, if any. It was observed, however, that several users were using one user ID on different terminals simultaneously. This indicated that the user IDs and passwords were known by more than one user or the user allowed unauthorised access to the system, thereby compromising the security of the system.

Non-adherence to the security requirements as brought out in paras 2.8.3.1 and 2.8.3.2 compromised the necessary logical access controls and exposed the system to the risk of unauthorised access

On these being pointed out the Management stated that necessary corrections will be incorporated in Phase-II of ERP implementation. However, the fact remains that these lacunae exist in the system and should be established/installed in Phase-I itself.

2.8.3.3 User authorisations

Authorisation to access critical areas of the system such as operating system commands, updation of company codes, etc. should be limited only to the system/ database administrator. This prevents other users from modifying the system. Analysis, however, revealed that users[*], other than the system/ database administrator were given authorisations to do background jobs[*]; profile maintenance, user maintenance and were

---

[*] *Like 123, ABC, XYZ etc.*
[*] *The user IDs were CFI01, CFI02, DES03, DES04, SDF01 and DEV02*
[*] *A batch job is referred to as a background job. This job runs independently of a user being logged on.*

given development rights in respect of program and data dictionary maintenance. Such authorisations increase the risk of unwanted amendments.

While accepting the observation, the Management stated that the matter would be reviewed during Phase II of ERP implementation.

2.8.3.4 Standard user protection

When SAP is installed, certain standard users are automatically created with default passwords which are commonly known. To prevent unauthorised use of such users, the default passwords should be changed. These users should then be de-activated by activating a system parameter setting. It was noticed in audit that these users had not been deactivated. This resulted in the system being exposed to the risk of unauthorised access. In a test check, Audit could access the system by using one such user ID with its default password.

While accepting the above observations, the Management stated (July 2007) that these deficiencies would be taken care of at the time of implementation of Phase-II. However, the fact remains that the problem exists and should be controlled and resolved urgently.

2.8.4 Observations on material management module

Input and validation controls

Input controls ensure that the data received for processing is genuine, complete, accurate, properly authorised and entered in time and without duplication. Validation checks ensure that the data conforms to the business rules. Therefore, input controls and validation checks together ensure the correctness and completeness of data. Review of the database of the Material Management module, however, revealed the following shortcomings:

2.8.4.1 Inconsistent codes and duplicate description in the material master

For the purpose of easier identification of the materials, the material code in the material master should have a defined coding convention[*]. Analysis of the data, however, revealed that out of 241909 records in the material master 127211 records had alphanumeric codes while 114698 records had numeric codes. Presence of both alphanumeric and numeric codes in the same field led to inconsistencies in the database.

Further analysis of the numeric codes revealed that there were 408 codes for 819 items of materials, implying that different materials were allotted the same code. It was also revealed that the description and code for 60 items of material appeared more than once.

Similarly, analysis of the alphanumeric codes revealed that 22692 material descriptions were allotted 84669 codes. It was, therefore, evident that for the same material more than one code was allotted. It was also noticed that same material with same part number was recorded in the Material Master more than once although in a different way. (**Appendix-XI**)

It was thus, evident that a consistent pattern of coding of materials was not followed which had consequent impact on input and validation controls.

---

[*] ***Methodology***

The Management stated that there have been some errors on the part of data entry operators and steps are being taken for rectification of errors. The Management's reply indicated that awareness about system requirement was lacking amongst the users.

2.8.4.2 Updation of master data

Changes in the material master should normally be done through a prescribed procedure and approved by competent authority. Further, the right to make changes should be restricted to a limited and designated users. Scrutiny, however, revealed that 202517 records in the material master have been changed by 25 users which is 35 *per cent* of the total number of users.

The Management stated that completing a record in material master is done in sequence by design group, by procurement group, planning department and so on. However, the fact remained that many users had access to the master data which increased the risk of non identification of the users making changes in view of the fact that the user IDs and passwords were shared with other users as pointed out in Para 2.8.3.2 supra.

2.8.4.3 Different units of measurement for same material

The unit of measurement is an important key for proper inventory control of stores. As such, the uniformity of the unit of measurement for an item should be maintained throughout the system. Analysis of the material master, however, revealed that 13 items had different units of measurement. Further, test-check of the purchase orders of 2006-07 revealed that unit of measurement in respect of 47 items of material were different from the unit of measurement shown in the material master. There was also an instance where the unit of measurement in purchase order and issue of material were different. This indicated poor validation controls which affect data integrity.

The Management stated that alternative purchasing unit/storage unit had been used with necessary conversion factor in the master. The contention of the Management was not correct as no conversion factors were found to exist in the master file.

2.8.4.4 Duplicate vendor codes

The vendors from whom materials are procured are to be coded by a unique number. Creation of two or more vendor codes for the same vendor increases the risk of placing order on a vendor more than its delivery capacity, double payment to a vendor, ineffective control over the follow-up sale procedure, and generation of incorrect MIS reports.

Analysis of the vendor data revealed that in case of 96 vendors, two or more vendor codes were created. Further, most of these codes were created on the same day and by the same user. Presence of two or more vendor code for a single vendor reveals that proper input controls were not present in the system. Existence of duplicate vendor codes impacted the placement of purchase orders since test check of the purchase orders revealed that 35 such vendors were issued orders under different vendor codes.

The Management stated that initially a new vendor is allotted a temporary code and once registration is completed, permanent code is allotted. The temporary code is then flagged for deletion.

The Management's contention was not tenable since the duplicate codes of only 4 of the 96 vendors were flagged for deletion.

2.8.4.5 Inconsistencies in delivery and purchase order dates

Analysis revealed that during 2006-07 there were 870 cases where the delivery date in the purchase order was prior to the purchase order date. Further, there were 126 cases where the purchase order date was even before the requisition date. This indicated that proper input and validation controls were not in place. Consequently, MIS data on procurement of material and execution of purchase order may not be correctly generated.

The Management stated that during the transition[*] period, some purchase orders were created in ERP system to regularise payment for orders already created manually. As a control measure, the Management took a decision that payment will be effected only against purchase orders generated through SAP system. The Management's contention was not tenable since incidence of delivery date prior to purchase order occurred also in 2006-07 when the system had been running for more than four years.

It was further observed that the date of actual delivery was not captured in the system. This resulted in the purchase order remaining open even though delivery had been made thus defeating the purpose of co-relating the orders placed and actual receipt of the ordered goods/services.

2.8.4.6 Inconsistencies in purchase requisition release date and purchase order date

When a requisition is approved by the relevant competent authority (shown in the purchase requisition document as release date) it is sent to the purchase department for necessary procurement action. It was observed that during 2006-07, in 1474 cases out of a total of 2780 purchase orders, the release date field in the purchase requisitions was one or two days prior to the date of delivery. Since release date is the date when competent authority approves the purchase requisition, the release date logically cannot be one or two days prior to the scheduled delivery date. This indicated that the data had not been correctly fed into the system.

The Management stated that such inconsistencies do not involve any risk, except generation of some wrong statistical information. It further stated that necessary care has been taken and that rectification will be taken up in ERP Phase-II when the entire system will be reviewed. The Management's contention is not tenable as generation of wrong statistical information in the MIS may vitiate the whole process of managerial decision.

2.8.4.7 Purchase documents without material code

The materials required for the construction of ships are to be coded by a unique number before any documentation relating to the materials (purchase orders, goods receipt/inspection report etc) is entered into the system. The purpose of codification of the materials was to have a standardisation of materials as well as proper control over the identification, procurement, receipt and issue of the same thereby optimising the inventory system.

Audit Analysis revealed that during 2006-07, there were 614 cases where purchase orders were created without any material code. In the absence of material codes, tracking of material received and issued and its control and identification was difficult. Further, tracking of payment of un-coded items vis-à-vis booking its cost to jobs was not possible

---

[*] *From legacy system to ERP system*

in the system thereby increasing the possibility of generation of incorrect and incomplete MIS reports relating to inventory system.

While accepting the observation the Management stated (July 2007) that purchase documents were prepared as a whole and the details were not entered in the system.

2.8.4.8 Valuation of stock as per accounting policy

The valuation of stock of inventory is done partially in the legacy system and partially in the ERP system. The values generated from the ERP system are integrated with the valuation done in the legacy system. As per the Accounting Policy of the Company, raw material, stores and spares are valued at weighted average rates. Analysis of the stores data for the year 2006-07 in the ERP system, however, revealed that the same material (material code being same) had been valued at two different rates. This indicated that weighted average method had not been adopted in the ERP system.

Management stated that pricing could be at different rates where new arrivals took place after complete issue of earlier stock. The contention of the Management was not tenable since if earlier stock is completely issued, the value of the stock would be 'NIL'. Moreover, the analysis showed that material was being valued at two different rates in the stock to which the Management had no reply. Subsequent procurement will appear in the stock statement valued at the new procurement rate or weighted average rate. Thus, there will be only one rate in the stock statement.

2.8.4.9 Scrap/off-cut material being processed manually

Some portions of the ship building works are executed through sub-contractors. The materials required for such works are being supplied by the company through the issue of purchase orders. The final payments to the subcontractors are generally made after reconciliation of material balances with the contractor.

It was observed in audit that although materials supplied to the sub-contractor were entered into the system through purchase orders, the treatment of scrap/off-cuts, excess, retention, etc., were done manually. It was also revealed that in some instances, even though the sub-contracted work has been completed and the Management had taken delivery of the work, the relevant purchase orders of the materials issued to the sub-contractor were not closed. Since one of the purposes of material management module is to streamline the procedure relating to sub-contract job including materials issued to the sub-contractors, non closing of the purchase orders and manual treatment of scrap/off-cuts, excess and retention resulted in the above objective not being met.

While accepting the comments of audit, the Management stated that the modifications/ corrections will be incorporated in Phase-II implementation of the SAP system.

2.8.5   Business continuity planning

Business continuity planning is about planning to recover key business processes following a disaster. The objective is to reduce downtime and hence loss to the business to a minimum. The components of business continuity planning include taking of regular backups, storage of backups in a separate location, and periodical recovery exercise to ensure that backups taken are recoverable. The data and disaster management note of the Company, detailed the procedure for backup as follows: (i) On-line backup of important applications before lunch everyday; (ii) Off-line backup of all users after 5 PM every day; (ii) Weekly system backup after 1 PM every Saturday; (iv) All users in ERP Department

have been made responsible for taking back-ups from PC clients as and when felt necessary.

An analysis of the database backups for the period February 2007 to July 2007, however, revealed that database backups were taken only on a weekly basis on Fridays. Further, backups on two occasions were deferred to the next Monday and on two occasions the backups were not taken at all. Also, the backups were not checked to verify whether the backup taken was successful. No recovery exercise was undertaken. In absence of a recovery exercise, recovery of the data cannot be guaranteed thereby putting the entire database under risk in the event of a hardware crash.

The Management stated that comprehensive disaster management is being considered in ERP Phase-II.

2.9   Conclusion

The objective of faster verification of material availability, material requirement planning, reduction in the order placement time, etc could not be met as there were deficiencies in the customisation of the system and there were instances of inadequate input and validation controls which inhibited accurate and timely capture of data. There were deficiencies in security settings which exposed the system to the risk of unauthorised access and manipulation. The system could not carry out the function of inventory valuation in accordance with the accounting policy of the Company. Thus the system was not being utilised to its fullest extent.

2.10   Recommendations

∗   A comprehensive password policy may be formulated.

∗   Input controls and validation checks should be incorporated within the system to prevent entry of duplicate data e.g. the master data may be reviewed to eliminate duplicate codes, incorrect descriptions and incomplete entries; Specific validation checks to avoid inconsistencies in dates may be introduced.

∗   Data integrity should be periodically checked.

∗   The system should be configured to conform to the business needs and manual interventions should be avoided.

∗   Redundant and duplicate programs may be removed.

∗   A disaster recovery plan and business continuity plan should be put in place.

The matter was reported to the Ministry (November 2007), its reply was awaited.