Analysis of Integrated Inventory Management System

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1.***ABSTRACT*** **-** Where ever you go, whichever place you visit, you can feel the change in the information technology. Day by day, new technology is coming up. All the fields are using the information technology to gain the maximum advantage. By closing the eyes towards IT will only bring losses to the companies. The study is based on the information technology that is used in the Karnataka Power Corporation Ltd.

2.INTRODUCTION

KPCL as a pioneer of power-producing Corporation, required bulk equipment spares for their routine construction and maintenance of Generating stations. Also other material such as steel, electrical, oil and lubricants, stationery, uniforms, tools etc., for routine activities. Hitherto, all these spare / materials purchase, stores and accounting activities were carried out by manual means. Process right from Purchase indent, calling quotations, comparing rates, raising Purchase Order's , accounting at Stores and Accounts, Material Indent, Gate pass etc, were being prepared manually in prescribed formats. For which considerable man-hour, time, interoffice correspondence were required.

To achieve optimum results and to utilize the existing information technology, the management has evolved an idea of computerizing of Purchase, stores, Accounts and Indentor's activities. Under which now all these departments are provided computers and interconnected among all the divisions through LAN. Further all project locations and Head Office are interconnected through WAN. The systematic integration of all these departments , projects and Head office for achieving effective Inventory management, by using computers through LAN/WAN is nomenclature as INTEGRATED INVENTORY MANAGEMENT SYSTEM. Generally called as I I M S.

In consultation with concerned Indentor, Purchase, Stores an Accounts sections, and by studying the prevailing procedures of KPCL , the IIMS package has been developed by KPCL, using ORACLE RDBMS AND DEVELOPER /2000. Package has 70 numbers of forms, 14 numbers of batch programs and 100 numbers of reports. The package is designed on User friendly concept. A person with minimum basic computer knowledge may easily access and work on it.

3.METHODOLOGY :

1. About the software used(oracle)
2. Sources of data

1. **About the software used(oracle):**

1.1 Physical Structure

1.2 Logical Structure

1.3 SGA / PGA

1.4 Background Processes

1.5 Backup Methods

1.6 Computer Science Database

1.7 Administrative Tasks

1.1 Physical Structures:

- **Datafiles :** It contains all the database data.
- **Control Files:** A control file contains entries.
- **Redo Log Files:** The primary function is to record all changes made to data.
- **Archive Log Files:** Oracle automatically archives log files.
- **Parameter Files:** It contain a list of configuration parameters.
- **Alert and Trace Log Files:** Each server and background process can write to an associated trace file.

1.2 Logical Structures:

- **Tablespaces :** A database is divided into logical storage units called tablespaces.
- **Oracle Data Blocks:** Oracle database data is stored in data blocks.
- **Extents:** An extent is a specific number of contiguous data blocks.

- **Segments:** A segment is a set of extents allocated for a certain logical structure.

The different types of segments are :

- Data segment – stores table data
- Index segment – stores index data
- Temporary segment

1.3 SGA/PGA

1.3.a) System Global Area (SGA):

The System Global Area (SGA) is a shared memory region that contains data and control information for one Oracle instance.

The SGA contains the following memory structures :

- Database Buffer Cache
- Redo Log Buffer
- Shared Pool

1.3.b) Program Global Area (PGA)

PGA is a memory buffer that contains data and control information for a server process.

1.4 Oracle Background Processes

An Oracle database uses memory structures and processes to manage and access the database.

The most common background processes are :

- System Monitor – SMON
- Process Monitor - PMON
- Database Writer - DBWR
- Log Writer - LGWR
- Archiver - ARCH
- Checkpoint - CKPT
- Recover - RECO
- Job Queue Processes

1.5 Backup Methods

Cold Backup

- The only way to make a consistent whole database backup is to shut down.

Hot Backup

- If the database must be up and running database in ARCHIVELOG mode.

Logical backup

- Logical backups are exports of schema objects.

1.6 Computer Science Database

Server Information

- Sun e4500
- 8GB Ram
- 8 x 400mhz CPU
- 32GB Disk for Oracle
- 4mm DAT DDS3 Tape Backup

1.7 Administrative Tasks

- Daily Checks
- Weekly Tasks
- Others

2 **Sources of Data:** The sources of data used for the project purpose broadly falls into two category. One is primary data. It includes the interview conducted with the employees of different departments like Purchase, Stores, Accounts, Systems, User departments etc. The secondary data includes the data collected from manuals, library, internet, journals etc.

The interdependence among these companies in the electricity sector can be measured from the fact that their performances are closely linked. The industry value-chain is captured by Chart-1 below.

Chart - 1

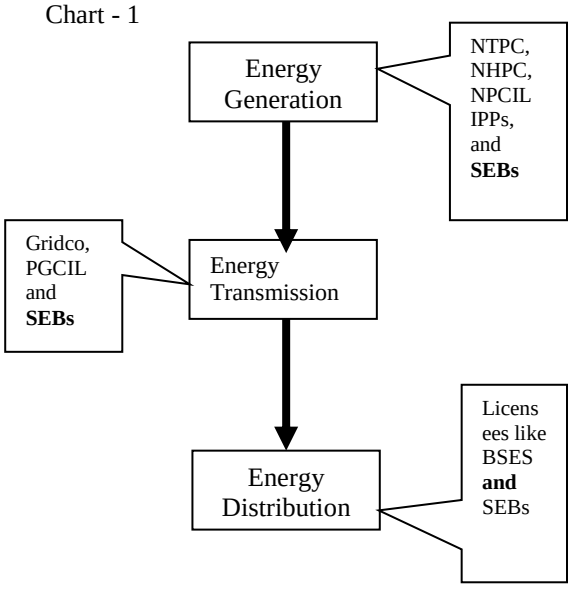

Fig:- The industry value-chain

Why Reforms?

The power sector in India has gone through zigzag changes in ownership structure over the years. which was given the task of developing the regional grid as well as national grid to connect interstate for more flexibility.

The Generating power/Energy more efficiently means that the cost of generation is maintained at minimum possible level. Presently, many factors are considered for calculation of cost of energy generation and it has not been possible to bring all factors to common base in all power stations.

The following factors are considered to calculate the generation cost.

1) Fixed Cost:

Depreciation 7.5 %

Interest Charges 12.5 %

Establishment, operation & maintenance charges 2.5 %

Return on equity 10.0 %

Return on net fixed asset 0.3 %

Provision for general reserves 0.5 %

Provision for interest on working capital 17.0 %

2) Variable Cost:

Fuel Charges viz., cost of coal and oil.

Total Cost = Fixed cost + Variable cost

The power supply industry has developed so far mainly due to investments made in central and state sectors with private utility companies contributing to small extend to the developments. Another area contributing to power problems is transmission and distribution losses in terms of total power sector out lay at all India level is 27.6 %.

Capital structure of SEBs is built with loans from state governments, financial institutions and market borrowings. Over and above this, they are expected to generate internal resources from their statutory earning after meeting liabilities of operating expenditures, interest payments, capital cost and deprecation.

The general pattern of investments in SEBs is shown below:

Market borrowings…… 13%

Institutional borrowings… 43%

Internal resources……. 32%

State Govt. loans…….. 76%

State power has to provide cheap power to particular sections of society or selected categories of consumers at an imposed tariff structure which the power sector cannot afford to alter unless adequately compensated if it is to remain financially healthy. While state Govt. themselves have to work under severe financial constraints, the power sector can hardly expect adequate compensate or subsidy to the extend required even in near future.

4.MONITORING OF PURCHASE ACTIVITIES:

Purchase Indents: A purchase indent can be queried to see its details and its status. On line ad-hoc inquiries are proposed to be provided regarding purchase indents for ready reference.

Purchase Order: Outstanding purchase orders shall be found by matching purchase order against receipt i.e. quantity accepted. The purchase order status will be different for the closing of incomplete purchase order.

Processing of Stores Transactions: The system will capture and validate store transactions. (receipts, issues, returns, transfers, etc.,) on-line and update them instantaneously. The following procedures will be adopted for different types of transactions:

Receipts of spare parts: Receipt of items at the stores is handled in two ways by the system viz., receipt with PO and receipt without PO (loaned items, repaired items.). In case of cash purchases, a receipt can first be created and then a regulatory PO can be entered into the system.

Issue of spare parts: After receiving the material indent from the user departments, Stores will enter the details of the sp9are parts requested and issued. Gate pass is generated for every issue through the system.

Return of spare parts: Return of excess spare parts will be entered into the system. The value of the returned spare part will be the current weighted average rate of the spare part of the quantity returned. In case of scrap receipt, the value of receipt is the value entered by the Store-keeper, failing which the last entered value is taken.

Transfer of Spare part: Spare part transfer from /to any department will be entered in the system.

5.MATERIAL FLOW AND ACCOUNTABILITY:

If the purchase indent of any department is more than 5 lakhs, it is sent to the screening committee consisting of a chief engineers of civil, FM and O&M. After being approved by the screening committtee the PI is sent to the purchase department, which then places an order with the supplier. This department mainly deals with the purchasing of only those materials, which are used for the maintenance of plant. The supplier supplies the required materials to the stores department.

Purchase Process Chart: -

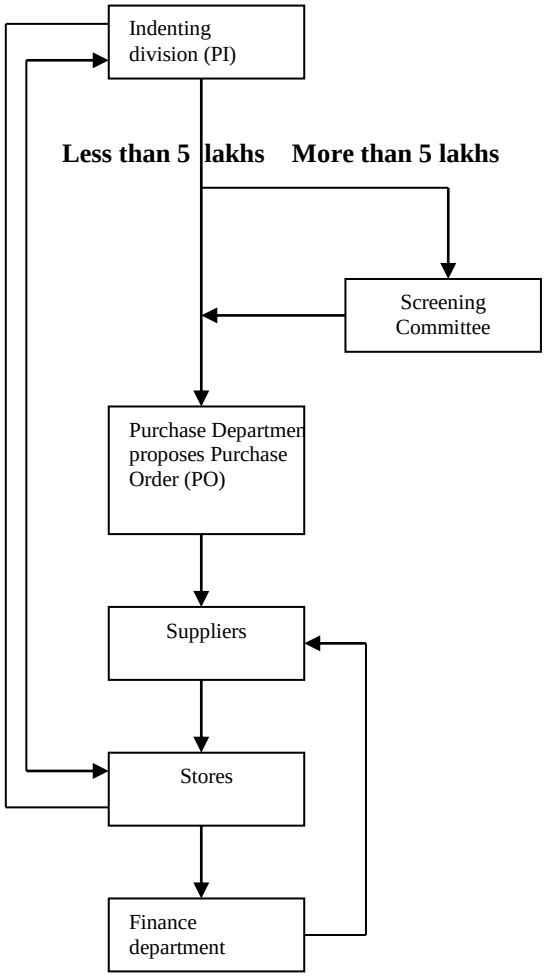

Fig:- Purchase Process Chart

6.STORES DEPARTMENT**:**

The term "Stores" is synonymous to materials/ stores it includes the following such as Plant and Machine Wheels, Furniture, Fixtures, Office Equipment, Building Materials, Petrol, Oil, Lubricant, Laboratory, Workshop Equipment's, Explosive, Spare Parts, Hardware and other tools, General Mechanical Spares, Types, Tubes, Batteries, Turbine Spare, Generator and its Spares Transformer and Auxiliaries Switch Gear and Allied Equipment's, General Electrical Spare etc.

The materials form the stores departments are issued for the following purposes.

1. For use on works directly.
2. Issue to contractors for use on works.
3. Dispatch / transfer to other division/ departments.
4. Sale of materials to contractor employees or outsides.

7.MONITORING OF INVENTORY ACTIVITIES:

Receipts: On-line queries are provided for effective monitoring of activities pertaining to the receipt of goods. Reminder letters are generated automatically for follow-up of rejected items. Receipt of replacements against earlier rejections can also be kept track of.

Issues: Flexibility has been built into the system to handle issue of items in parts. Gate passes are automatically generated for security purpose. In case of returnable like loans and empty cylinders , the system keeps track of their return dates and generates reminder letters in the name of the user department concerned.

Supplier Details: The system will maintain a database of suppliers having a list of all the suppliers for different spare parts. The items are grouped base on their suppliers. Besides that, data will be captured from the receipts of spare parts and inspection report pertaining to a supplier.

Spare part Details: The system will maintain an exhaustive spare parts database. The system will also maintain an identification of substitutable spare parts. The system will also store some other parameters, some of which are defined below:

Internal Lead Time: This is the difference between the purchase indent date and purchase order date and will be maintained in the system. Initially, this will be as per the past experience.

Maximum stock limit: This is the limit beyond which the stocking is not desirable at any point of time i.e. if stock becomes equal or greater than this level, the fresh deliveries should be postponed or cancelled.

Minimum stock limit: It is the level at which an order should be placed immediately.

8.MAJOR OBJECTIVES:

- To maintain up to date and accurate data to the management for decision making.
- To provide single point data capture for all input to avoid data duplication.
- To reduce manual book keeping efforts and to provide information for better follow up actions.
- To monitor on regular and continuous basis, outstanding purchase indents in process, outstanding purchase orders in process , supplier performance based on delivery schedules, rejected items, etc.,
- To provide defined ad hoc queries for various levels of management regarding spare parts, suppliers, purchase indents, purchase orders, purchase order amendments etc.,
- To ensure timely and accurate processing of store transactions (receipts, issues, returns, transfers etc.) and retention of such information for later reference.

- To evaluate spare parts receipts, issues and closing stock and to maintain price trends for spare parts.
- To optimize operating costs and tied up capital in the stores.
- To ensure a better control of flows of spares into the plant and out to wear departments.

9.ADVANTAGES OF IIMS:

- Stores and Accounts wings would function as banking system. Items as and when received / issued at Stores, their respective quantities along with values (on weighted average basis) gets up dated. A day's opening balance quantity and value can easily be reconciled and finalized with the closing balances at the end of the day.
- There will be no confusion in respect of Item name, Unit , Quantity, Specification and human / oversight errors etc., to carry out transactions from Purchase Indent Stage to procurement, MRN, I R Indent and Gate pass stage. Lengthy process of periodical reconciliation work of stores and accounts department is avoided.
- Standardization may easily be achieved in respect of procurement and maintenance of Item names, Units, Specification, Receipt Storage issues and compilation etc., can be achieved.
- Any type of information , queries, reports, ABC/ SFN/ VED analysis reports and stock schedules can easily be obtained as and when required on finger tip basis at various levels, instantaneously.
- Up to date inventory holdings with all necessary details in stores can easily be accessed from all Divisions / Offices, which is helpful to , make use of items from user departments.
- Other Network existing web site facilities viz. , e-mail, fax, LAN/ WAN , Telex etc., can better be utilized and procurement may be effected at faster rate.
- Maintenance of two stage records and elaborate correspondence/ clerical work will be substantially reduced ; both at stores and accounts departments.

Processing of Purchase Transactions: The system will capture information about various purchase activities, i.e., purchase indents, inquires, quotations, purchase orders and amendments to purchase orders. Etc.,

Purchase Indents: Purchase indents may be entered into the system using input documents. Purchase indents may also be raised automatically by the system for items with a flag set for indenting. The flag is set by the system when the stock level comes below reorder level. In such a case, indented quantity is computed using the formula (Max. stock level – Current stock Level).

Quotations: Quotations received may be entered into the system using input documents. The comparative statement is then generated with total landing cost computed. Based on this, suitable quotations may be selected.

Purchase Order: Basic information for a purchase order is captured by the system. If a quotation reference is entered, the system transfers quotations details into the purchase order to aid in purchase order preparation. This may be modified suitably before approval. A unique Purchase Order number is generated by the system. The PO number will consist of two parts viz., reference characters and a serial number. The reference characters are to be entered by the users and serial number is system generated.

10. CONCLUSIONS

For the past three years, ADPH has been implemented in almost all the departments. IIMS software which has got lot of advantages. If the employees can utilize it to most, then they will save lot of time, effort. Also there work efficiency can be increased and as a result , the productivity can also be increased.

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