

Material Management By Using Sap Mm In Construction Sector

Pramod Ramchandra Khairnar¹, Pro.Gaurav Desai²

¹Dept of Civil Engineering

²Proffesor, Dept of Civil Engineering

^{1,2}Sandip University, Nashik, India

Abstract- Construction industry is very big and is divided into many areas such as building, bridges, roads and highways, railways, tunnels, dams etc. Every project is unique and every management related to control on expenses is unique too. Construction material normally constitute a major portion of the total cost in construction project so material management plays a vital role in every construction industry. Research has shown that construction material may constitute more than 60% of the total cost of construction project so effective construction material management process is the key to success of a construction project. Material management is concerned with planning, purchasing, inventory planning, storage, material supply and distribution of material. Systems Applications and Products in data processing (SAP) help organization to reduce operating costs, forms more accurate forecasts of material. This research paper is to find out the different methods of material management used by the different construction companies and also compare that methods with SAP material management method.

Keywords- Construction industry, Material Management, SAP MM Technology.

I. INTRODUCTION

Construction industry is very big and old industry. It mainly divided into many areas such as building, bridges, roads and highways, railways, tunnels, dams etc. Every project is unique and every management related to control on expenses is unique too. Construction material normally constitute a major portion of the total cost in construction project so material management plays a vital role in every construction industry. Research has shown that construction material may constitute more than 60% of the total cost of construction project so effective construction material management process is the key to success of a construction project. Material management is not limited to control waste but it started from vendor's selection to quality of material, its price, requirement as well as availability, planning, identification, procuring, storage, receiving and distribution of material. The material management assure that the right material are in the right place, in the right quantity and in right

time when needed. Proper material management increase the overall profit of the company as well as productivity and cost efficiency of the project and help to ensure its timely completion. Normal material management process is fails because they are labour intensive, inaccurate and error prone. Manual error, more paper work, details cannot found easily, punctuality is less, difficult to take on site decision, easy updating is not possible, exact location of material cannot be found, lengthy procedure, communication problem, papers are missing, requires more time these are the problems of material management. SAP ERP (Enterprise Resource Planning) is commercial software that will give all information together in a single software considering various factors like time and cost. SAP MM is the functional module of SAP ERP system which only deals with external procurement of material and service. Systems Applications and Products in data processing (SAP) help organization to reduce operating costs, forms more accurate forecasts of material. SAP MM contains mainly four process i.e. Planning, Procurement, Inventory and Invoice verification.

1.1 Material Management Problem

- 1.Human or Manual error
- 2.Lengthy procedure to maintain stock registers.
- 3.Accuracy is less.
- 4.Difficult to take record of stock
- 5.Updating is not easily possible
- 6.Required more time
- 7.More paper work

1.2 Objectives of Material Management

- 1.Effective material planning and requirement
- 2.Purchasing
- 3.Procuring
- 4.Receiving
- 5.Inventory control
- 6.Maintain good customer relationship
- 7.Quality assurance

1.3 Objectives

1. To examine how many construction industries use SAP system for material management.
2. Apply & analyze the effect of SAP System on Material Management.
3. To compare conventional and SAP System applied for material management process.
4. To survey different residential construction companies for studying and analyzing the present practices of material management.

1.4 Literature Review

Paper 1 : Comparative Study of Conventional Material Management with Advanced SAP Technique

Author:- Ganesh Ashok Patare, Pravin.R.Minde

In this research paper author explaining Comparative Study of Conventional Material Management with Advanced SAP Technique. Author introduced about how to achieve the material management objectives of buying, storage, and movement of material, efficient material management. Effective and proper material management is very cost effective. Material management is deals with the planning, identification, procuring, storage, receiving and distribution of materials. The motive of material management is to assure that the right materials are in the right place, in the right quantities when needed. Author state the proper material management process i.e. planning, Procurement, Logistic and Inventory. Further author explain about the material management problems and objectives of material management. In methodology author takes Survey of Different Construction Companies, Selection of Site & Analyze the Current Material Management Process, Apply SAP Technique on Site and Analyze the Performance and To Compare Conventional Material Management Process with SAP. Author explain the SAP structure, SAP procurement cycle, transaction code, movement type and conventional material management cycle.

After that author states the advantage of material management by SAP, Disadvantages of material management by SAP, Advantages of Conventional material management process, Disadvantages of Conventional material management process. In further author gives the comparison between conventional material management and SAP process.

They give the conclusion that every construction company carries material management. Many of construction firms were using regular material management method. But by implementing SAP Technique in material management we can effectively minimize human errors. And to achieve a profit, there is need to change process of material management from conventional to Advanced Techniques. SAP saves

approximately upto 65 % cost on manpower resources & reduces 80 % Time with respect to material management.

Paper 2 : Material Management By Using Sap In Real Estate Construction Sector

Author :- Ganesh Ashok Patare, PravinMinde, Ashish Pawar

In this research paper author explaining about the material management by using SAP in real estate construction sector. Author introduced about the proper material management process i.e. planning, Procurement, Logistic and Inventory. Material management plays a valuable role in construction real estate industry. Material an only single component constitute a major cost of project. Material may compose more the 60% cost of the total project cost. System Application and Product (SAP) can help organization to reduce operating costs, form accurate forecasts of material, manage and maintain the inventories of material, accelerate procurement, and enhance the delivery-storage-consumption of material at right time. SAP streamlines all the business functionalities and gives desired result in one click and in one system. SAP is user friendly i.e. information will be obtained as and when required. By using SAP (Materials Management-Module) for real estate construction industry, the product can be obtained within safety period. This Paper explain a detail study of Material Management module implemented by a Kalpataru Ltd. A real estate company from pune. By using SAP a 100 % data related to material management is centrally stored on the server.

Author explaining the objectives and function of material management. They extending the explanation by features of SAP MM and structure of SAP MM. After that they explain the procurement cycles by using SAP MM. In procurement cycle they explain the different terms like purchase requisition, purchase order, gate entry, and goods receipt number. Material issued to and reversed from contractor, material issue slip, material withdrawal etc. They gives the advantages and disadvantages of material management by using SAP MM.

They give the conclusion that by using SAP technique, exact consumption of material, stocked material, and location of material can be obtained. The consumption of material is correctly identified to keep control on wastage and prepare a Material Requirement Planning.

Paper 3 : Comparative Study of Traditional Material Management and Material Management with ICT Application

Author:-NawajKalimHannure, SushmaShekhar Kulkarni

In this research paper author explaining Comparative Study of Traditional Material Management with ICT application. Author state that one of the major problems in delaying construction projects is poor material management. The material management system try to insure that the right quality and quantity of materials are appropriately selected, purchased, delivered and handled on site in a timely manner and at a reasonable cost. This paper contains the various methods used by the construction companies and also describes the main results of survey carried out in Pune in different construction companies for their recent material management process. In construction projects, material management is execute to minimize wastage of material, shortage of material, damage of material, lack of storage space, and delay in supply.

Further author explaining that what is mean by material management?, material management problems, objectives of material management and function of material management. Author analyse the survey of different construction companies for material management. In this survey they focus on the type of project, cost of project, is MM carried out or not?, method adopted for MM process, benefits of current MM, problem facing in current MM process etc. After completion of survey they states that benefits of manual material management process, Disadvantages of manual material management process, Benefits of ICT technique in construction, Barriers of implementing ICT technique in construction, Different ICT tools used in planning stage, Different ICT tools used in procurement stage, Different ICT tools used in logistic stage, Different ICT tools used in inventory stage.

They give the conclusion that generally material management is carried out manually in construction companies. But to achieve a profit, and reduce loss there is need to change process of material management. By using ICT technique, exact consumption of material, stocked material, and location of material can be realized. It reduces manual errors and it is easy to communicate. The profitability index is more than one and net present value of ICT tool is positive so it can be accepted.

Paper 4 : A Review Paper on Onsite Material Management for Construction Projects

Author:-Ms.Priyadarshani N. Mane, Dr. A. K. Gupta &Prof. D. B. Desai

This is the Review Paper on Onsite Material Management for Construction Projects. In which author explaining the previous literature reviews. Effective construction resources management process is the key to

success of a construction project. Nowadays, successful material management of construction has to be based on an updated information. One of the main advisement of this research is to encourage local contracting companies to have material management techniques and use it in determining the required quantities of construction materials in order to get resources in time and required quantities save time and minimize the errors.

Author explaining the research paper by pande and sabihuddin on study of material management of techniques on construction project. Another paper by patil and pataskar on material management techniques on construction project. They also explain the paper of hall marks in construction material management by georgekutty and georgemathew. Paper of Inventory Management and Cost Analysis by Deepak and Kumar. And also explain paper of Material Management in Construction – A Case Study by Madhavi and Mathew. Further that author states the scope and methodology and pupose of dissertation.

Paper 5 : The Best Performance Practices in Project Management of SAP ERP Accomplishment

Author:-Durga Prasad Sharma, Arvind Kumar Sharma, and Narpat Singh Shekhawat

In this research paper author explaining about SAP Implementation strategies describes whether a company chooses a “Big Bang” or a step-by-step approach, the strategy must reflect business-specific constraints and objectives. How SAP system allows a company to share common data and practices across the enterprise and produce and access information in a real-time environment. They Study reviews an existing enterprise resource planning (SAP ERP) literature and provides the inter-organizational best practice of SAP ERP system implementation. The study suggests researchers re-examine the following SAP ERP issues at the inter-organizational level, selection of SAP ERP packages, integration of business processes, knowledge, and applications, implementation approaches, training as well as organizational transformation and software migration. SAP ERP projects gather customer needs and organizational information, which can facilitate better business and Information System (IS) planning.

Author explaining the recent ERP trends, SAP ERP selection. In SAP implementation flow author give the steps i.e. Mission and objective of SAP project, Project Initiation and Planning, Critical Success Factors, Implementation Strategy, Project Bill of Resources, Implementation Environment, SAP Implementation Methodologies, Project Management and SAP Implementation. Further in SAP

implementation methodology author explaining 5 phases i.e. Phase 1- Project preparation, Phase 2 - Business Blueprint, Phase 3 – Realization Phase, 4 - Final Preparation and Phase 5 - Go-Live & Support.

II. MATERIAL MANAGEMENT MODULE OF SAP

1. SAP - System Application & Products

(SAP) is basically designed to create a common centralized database for all the applications running in all the departments in an organization. The kind of application you can manage includes –

- Logistics & Material Management
- Finances
- Reporting, HR etc

The original name for SAP was Systeme, Anwendungen, Produkte (In German). The system comprises of a number of fully integrated modules, which covers virtually every aspect of the business management. It eliminates the duplication and redundancy in data. Increases productivity, efficiency and better management of resources. Improves Customer Service through better Customer Interaction.

2. Features of SAP MM

The features of a SAP MM system are as follows:-

SAP MM is one of the modules of SAP that deals with material management and inventory management.

Material Management as a process ensures no shortage of materials or any gaps in the supply chain process of the organization. SAP MM speeds up the procurement and material management activities, making the business run smoothly with complete time and cost efficiency.

It deals with managing the materials (products and/or services) and resources of an organization with the aim of accelerating productivity and reducing costs. At the same time, SAP MM is quite versatile to accommodate changes that are frequent in any business environment.

It deals with the Procurement Process, Master Data (Material & Vendor Master), Account Determination & Valuation of Material, Inventory Management, Invoice Verification, Material Requirement Planning, etc.

3. SAP Structure in Materials Management

The Organizational Structure in MM is made up of following Organizational Levels:

- 1) Client: Represents a grouping or combination of legal, organizational, business and or administrative units with a common purpose.
- 2) Company Code: Company Code represents an independent accounting unit within a client. Each company code has its own balance sheet and its own profit and loss statement.
- 3) Plant: Operational unit within a company code.
- 4) Storage Location: This level contains the data specific to a storage location. Stock levels are an example of the data maintained for each storage location.
- 5) Purchasing Organization: An organizational unit responsible for procuring materials or services for one or more plants and for negotiating general conditions of purchase with vendors. The purchasing organization assumes legal responsibility for all external purchase transactions.
- 6) Purchasing Group: The purchasing organization is further subdivided into purchasing groups (buyer groups), which are responsible for day-to-day buying activities. A purchasing group can also act for several purchasing organizations.

4. Conventional Material Management Cycle

- Purchase Requisition (PR).
- Purchase Order (PO).
- Goods Receipt (GRN).
- Store Stock.
- Material Issue Slips (GI).
- Inventory Stock.

5. SAP MM Cycle

- Purchase Requisition (PR)
- Purchase Order (PO)
- Goods Receipt (GRN)
- Store Stock
- Material Issue Slips (GI)
- Inventory Stock

III. RESULT AND DISCUSSION

After completion of questionnaire survey, following outcomes commemorated regarding material management system from the various construction companies.

1. Advantages of Conventional material management process.

- For small site it is beneficial.
- In Construction Company if only one project is going on than it is beneficial.
- Unskilled workers or non-technical person can carry out.
- Less cost.
- It is easy to understand.
- It requires less man power

2. Disadvantages of Conventional material management.

- Paper work increases.
- Manually error occurs.
- Difficult to find details.
- Not easy to find updates.
- Missing of papers occurs.
- Requires more Manpower.
- Time required for maintaining register’s is more.

3. Advantages of material management by SAP

- Can easily find out exact consumption of materials
- Can easily get stock of materials and locations of materials.
- Accuracy increases.
- By only one click, one can easily get all details.
- It can be useful in planning and procurement of materials.
- Wastage of materials get reduced.
- Work becomes easy.
- Manual errors get reduced.
- It is easy to communicate or share the information regarding materials
- Time can be reduced for management of materials.

IV. DISADVANTAGES OF MATERIAL MANAGEMENT BY SAP

- High initial cost.
- Need technically skilled workers.
- Estimation department is to be required Strong.
- Not affordable for small construction companies.

4.1 Comparison between Conventional Material Management and SAP Material Management.

Sr. no	Conventional MM	SAP MM
1.	Manually Oriented	System Oriented
2.	Possibilities of Human Error	Operation is Error Free
3.	Process is tedious	Process is fast.
4.	Requires more time for approvals.	Requires less time for approvals.
5.	Computer knowledge illiterate person can work.	Computer Knowledge Literate person required.
6.	Accuracy is less.	Accuracy is high.
7.	Min staff required is 3 No.	One staff required.
8.	Requires more time for finding details.	On a single click details are obtained
9.	Less initial cost.	High initial cost up to 2 Cr.
10.	Affordable for small construction companies whose turnover is below 100 Cr.	Affordable for construction companies whose turnover is above 100 Cr.
11.	Difficult to track inventory	Easy to track inventory.
12.	Wastage of papers.	No wastage of papers.
13.	Data is remotely stored	Data is centralized.
14.	58 % Construction companies adopt CMM.	28 % Construction companies adopt SAP.

V. CONCLUSION

- By using SAP technique, exact consumption of material, stocked material, and location of material can be obtained.
- The requirement of material on the specific site is verified and processed within 24 hours from the manual creation of purchase requisition.
- The consumption of material is exactly identified to keep control on wastage and prepare a Material Requirement Planning.
- By just a single click Data was made available till Higher Management Level.
- Paper work reduced due to system Implementation.
- Tracking of Order was easy.
- It reduces manual errors and it is easy to communicate.
- Reduces Manpower required in stores.
- Inventory record was easily available.

In survey it was found that every construction company carries material management. Many of construction firms were using traditional material management method. When we compare the material management by traditional method and by SAP application, the SAP application saves considerable cost, when we calculate for the whole project. By implementing SAP Technique in material management we can effectively minimize human errors. SAP reduces administrative time considerably and helps for planning of material procurement effectively. Initial cost for setting up SAP Technique for material management is high which may lead to higher material management cost as compared to traditional methods such as maintaining material. SAP technique proved to be simpler than maintaining number of musters. But to achieve a profit, there is need to change process of material management from conventional to Advanced Techniques. By using SAP technique on a single

click exact consumption of material, stocked material, and location of material can be obtained till higher management level. Management can also track the Inventory stock available on site. SAP reduces the manual error and also it does not allow anyone to make any changes in the system as it has different authorizations at different levels. It is easy to communicate.

In Pune, there are rare construction companies which have adopted SAP technique for material management. The main barriers of implementation of SAP are its high initial cost of up to 2 Cr. and lack of agreement amongst all the board of directors. Implementation of SAP is feasible for construction companies whose turnover is above 100 Cr. SAP saves approximately 65 % cost on manpower resources & reduces 80 % Time with respect to material management.

Generally material management is carried out manually in construction companies. But to achieve a profit, there is need to change process of material management. By using SAP technique, exact consumption of material, stocked material, and location of material can be obtained. It reduces manual errors and it is easy to communicate.

REFERENCES

- [1] Er. Ganesh Ashok Patare, Pravin.R.Minde, "Comparative study of conventional material management with advanced SAP technique", IJRITCC, ISSN: 2321-8169. Vol: 4, Issue: 11, pp. 175-179.
- [2] Ganesh Ashok Patare, PravinMinde, Ashish Pawar, "Material management by using sap in real estate construction sector", international confernece on recent trends in engineering, science & management, ISBN: 978-93-86171-12-2, pp. 1012-1023.
- [3] NawajKalimHannure, SushmaShekhar Kulkarni, "Comparative study of traditional material management and material management with ICT application", CTTS, ISSN: 2279-0535. Vol: 3, Issue 4(June-July 2014)
- [4] Ms. Priyadarshani N. Mane, Dr. A. K. Gupta & Prof. D. B. Desai, "A Review Paper on Onsite Material Management for Construction Projects", IJIR, ISSN: 2454-1362, Vol: 3, Issue: 2,pp. 1288-1290, 2017.
- [5] Durga Prasad Sharma, Arvind Kumar Sharma, and Narpat Singh Shekhawat, "The Best Performance Practices in Project Management of SAP ERP Accomplishment", IJIEE, Vol: 2, No.5, pp. 835-839, 2012.