International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 07 Issue: 01 | Jan 2019 www.irjet.net p-ISSN: 2395-0072

Analysis of Material Requirement Planning for Construction Project: Case Study (Residential Building)

Rupesh Hulakant Supe[1], Manish D. Mata[2]

[1]M-TECH(Construction Technology & Management) Student, Dept. of Civil Engineering, Shri Sant Gadgebaba College of Engineering & Technology, Bhusawal, Maharashtra, India,425203.
[2]Assistant Professor , Dept. of Civil Engineering, Shri Sant Gadgebaba College of Engineering & Technology, Bhusawal, Maharashtra, India, 425203.

Abstract – *Materials Requirements and Planning (MRP) is a system of production planning and inventory control, which is used to manage manufacturing processes. Most MRP systems are software-based and are used to ensure that the materials are available for production, that the products are available for delivery to customers, that the lowest possible material and product level is maintained in store, as well as to plan delivery schedules and purchasing activities. Upon completion of scheduling, begins the process of follow-up, which includes the achievement of the project goals in terms of quantity, quality and costs in accordance with deadlines.*

Key Words: **Materials Requirement Planning (MRP), cost, project management, Material Management, scheduling process.**

1. INTRODUCTION

Construction material constitutes a major cost component in any construction project. The total cost of installed material may be 50% or more of the total cost. The goal of material management is to ensure that the materials are available at their point of use when needed hence, efficient procurement of material represents a key role in the successful completion of the work. Materials management is a critical component of the construction industry. As such, organizations need to understand the effects of proper materials management techniques on the effectiveness of project execution. "Material management is defined as the process to provide right material at right place at right time in right quantity so as to minimize the cost of project". Material management is concerned with the planning, identification, procuring, storage, receiving and distribution of material. The responsibility of Material management department for the flow of material from the time the material is ordered, received, and stored until they are used is the basic responsibility of material management. Materials represent a major expense in construction, so minimizing procurement cost improves opportunities for reducing the overall project cost.[1]

The material requirement planning (MRP) is a systematic plan to control inventory. Generally it is a procedure for planning and controlling the raw material in manufacturing a product. Materials Requirement Planning (MRP) refers to production planning, scheduling, and inventory control soft ware systems used to manage manufacturing processes. Namely, it aims to enable the company's management to plan the product parts and control the inflow of these parts to fulfill the service or product within the scheduled time period.

Material Requirements Planning (MRP) is a time phased priority planning technique that calculates material requirements and schedules supply to meet demand across all products and parts in one or more plants. In conventional methods, the project budgeted total cost is determined by the difference, between the actual cost, and planned cost. That means the project manager's focus was on only for planned cost and expenditure cost as actual cost. In modern days many schedule properties and cost parameters only for planned cost and expenditure cost as actual cost. In modern days many schedule properties and cost parameters are considered. Because it is very important in every construction project, losses are due to inadequate construction management and cost performances done by the contracts in the road construction projects. So it is necessary to develop the planning technique to easy the works and risks arises in the projects.

1.1 Objectives

1. To study the concept of MRP
2. To identify the factors affecting MRP
3. To conduct case study for above studies
4. Analysis on the above same

1.2 Scope of the study:

To improve material management in the construction project as well as with proper management of material reduced the tatal cost of the project.

2. STUDY OF MATERIAL REQUIREMENT PLANNING

2.1 Introduction

This chapter deals with the study of material requirement planning at construction site, Basically function of the material requirement planning. It includes Planning, purchasing, transportation, storage, controlling, directing, receiving etc. To reduce duration of the projects it is important to understand the concept of material requirements at site & function of material requirement

planning. These chapters also study the objective of material requirement plan. Purpose of this chapter to understand knowledge of material requirement planning and function of material requirement planning.

2.2 Concept of Material Requirement Planning

Materials Management is related to planning, procuring, storing and providing the appropriate material of right quality, right quantity at right place in right time so as to co-ordinate and schedule the production activity in an integrative way for an industrial undertaking. Effective management of materials can reduce these costs and contribute significantly to the success of the project.

Construction material constitutes a major cost component in any construction project. The total cost of installed material may be 50% or more of the total cost."Material management is defined as the process to provide right material at right place at right time in right quantity so as to minimize the cost of project". [1]

Materials Requirement Planning (MRP) refers to production planning, scheduling, and inventory control soft ware systems used to manage manufacturing processes. Namely, it aims to enable the company's management to plan the product parts and control the inflow of these parts to fulfill the service or product within the scheduled time period.[2]

Material Requirements Planning (MRP) is a time phased priority planning technique that calculates material requirements and schedules supply to meet demand across all products and parts in one or more plants. In a construction project, materials account for more than 40% of the total project cost. A small saving in material cost through efficient management of materials can result to a large saving in the total project cost. One of the root causes of improper material management is that materials are ordered based on the information from project schedule. [5]

3. LITERATURE REVIEW

Aditya A. Pande (2015)

The author said that, Materials management is a critical component of the construction industry. As such, organizations need to understand the effects of proper materials management techniques on the effectiveness of project execution. A properly implemented materials management program can achieve the timely flow of materials and equipment to the jobsite, and thus facilitate improved work face planning, increased labor productivity, better schedules, and lower project costs. Materials management is an important function in order to improve productivity in construction projects. It is defined materials management functions which include planning and material take off, vendor evaluation and selection, purchasing, expenditure, shipping, material receiving, warehousing and inventory, and material distribution.

It suggested that construction material constitutes a major cost component in any construction project. The total cost of material may be 52% of total cost; so that it is important for contractor to consider that timely availability of material is potential cause of successful completion of project. [1]

Abdallah Ali Imetieg (2015)

The author deals with the, Materials Requirements and Planning (MRP) is a system of production planning and inventory control, which is used to manage manufacturing processes. Most MRP systems are software-based and are used to ensure that the materials are available for production, that the products are available for delivery to customers, that the lowest possible material and product level is maintained in store, as well as to plan delivery schedules and purchasing activities. There is a correlation between time and cost of each activity. If the required time is shorter than the scheduled time of the certain activity, it would demand more resources, which further leads to the increase in direct costs of the given activity. Therefore, the output of MRP is important since commands are issued through planning in order to launch the suggested orders with the required quantities and within the limited time period.

The author conclude that the outcome of the propositions, the relationship between the time needed to execute the project and the cost is a linear relationship, so that costs can be changed with every proportional change in the period of implementation of each activity.[2]

Gerhard Plenert (1999)

The author deals with the successes and disappointments of MRP. It studies numerous articles to determine what the key shortcomings of MRP are. Next, it investigates if these failures are correctable, and what the consequences of not correcting these deficiencies means. This article considers alternatives that have been discussed in the current literature. Last of all this article discusses whether the improvements these alternatives suggest are sufficient to make MRP worth salvaging, or whether MRP is a system that needs to be discarded in favor of systems such as JIT (Just-in-Time), Optimized Production Technology (OPT), Theory of Constraints (TOC), and Bottleneck Allocation Methodology (BAM).[3]

Rohit J. Mehendale (2019)

The author said that, Scheduling, material requirement plan (MRP) and cash outflow analysis are some of the major elements which need to work out in a construction project. Generally, different software's are available for each of this task. When there is a delay in the planned schedule, it is time consuming to get MRP and cash outflow plan updated according to the received schedule.
The author conclude that, the use of software's for scheduling ,MRP, cash outflow with interconnecting features

helped updating the schedule on delays and consequent updating of MRP and cash outflow. Breaking a major activity into smaller activities and proper sequencing in the preparation of schedule reduce the construction time significantly. A proper MRP and cash outflow help to avoid delays in construction. [4]

Deepa V, Sahimol Eldhose (2018)

The author said that, in a construction project, materials account for more than 40% of the total project cost. A small saving in material cost through efficient management of materials can result to a large saving in the total project cost. One of the root causes of improper material management is that materials are ordered based on the information from project schedule. Hence the study is conducted to optimize the cost through material requirement planning for District road construction based on site scenario. The study involves mainly three stages, namely factors identification, data collection and its analysis. Data collection on factors which are based on time, cost, quality, quantity and location of various activities were acquired. These were analyzed and optimization of cost is done through MRP. [5]

4. CONCLUSION

A very positive impact is expected in the future about the material requirement planning. The above study provides necessity to determine the impact of MRP on construction projects by considering the concept of MRP on their live case studies and analyzing the collected data.

REFERENCES

1. Aditya A. Pande, S .Sabihuddin: **Study of Material Management Techniques on Construction Project.**
2. **PROJECT SCHEDULING METHOD WITH TIME USING MRP SYSTEM – A CASE STUDY: CONSTRUCTION PROJECT IN LIBYA**

   Abdallah Ali Imeti eg1,*, Miroslav Lutova

3. **Focusing material requirements planning (MRP) towards performance**

   Gerhard Plenert

4. **Scheduling, Material Requirement Plan (MRP) And Cash Outflow Analysis: A Case study** Rohit J. Mehendale[1] and Aniket s. Patil[2]

5. **Optimization of Material Cost through MRP in Road Construction** Deepa V, Sahimol Eldhose