

Importance of Material Management on Construction Sites

^[1] Pratik P. Sarowar, ^[2] Komal S. Surdkar, ^[3] Chetana K. Chaudhari
^{[1][2][3]} Students of Civil Engineering, Government Polytechnic, Aurangabad

Abstract— Materials management is an important element in project planning and control. Materials represent a major expense in construction projects. It is reported that materials and required equipments make 70% of the total project cost. Improper handling and management of material on the site adversely affects the cost of the project. Materials management is an important function in order to improve productivity in construction projects. This makes it necessary to implement material management practices on large projects. India is a developing country and bringing it in the line of developed countries, main focus is paid on infrastructure development. Numerous large projects such as metro rail, tunneling, construction of big malls are in progress. Hence it becomes necessary to study and implement material management practices. A properly implemented materials management program can achieve the timely flow of materials and equipment to the jobsite, and thus facilitate improved planning, increased labor productivity, better schedules, and lower project costs. This paper focuses on different material management practices adopted on sites and discusses their advantages and disadvantages affecting the economy of the project.

Keywords—, Construction, , economy, management, planning.

I. INTRODUCTION

Materials management is an important element in project planning and control. Materials represent a major expense in construction, so minimizing procurement or purchase costs presents important opportunities for reducing costs. The materials management system attempts 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. Poor materials management can also result in large and avoidable costs during construction. Good material management in construction must vigorously pursue the efficient utilization of la material and equipment. Material handling, which includes procurement, inventory, shop fabrication and field servicing, requires special attention for cost reduction. The use of new equipment and innovative methods has made possible wholesale changes in construction technologies in recent decades.

Literature Review

Material management can be defined as a process that coordinates planning, assessing the requirement, sourcing, purchasing, transporting, storing and controlling of materials, minimizing the wastage and optimizing the profitability by reducing cost of

material. Building materials

account for 60 to 70 percent of direct cost of a project or a facility, the remaining 30 to 40 percent being the labour cost.

Components of material management are:

- Material estimation, budgeting, planning and programming.
- Scheduling , purchasing and procurement
- Receiving and inspection.
- Inventory control, storage and warehousing
- Material handling and transport
- Waste management

OBJECTIVES OF MATERIALS MANAGEMENT

- Efficient materials planning
- Buying or Purchasing
- Procuring and receiving
- Storing and inventory control
- Supply and distribution of materials
- Quality assurance
- Good supplier and customer relationship
- Improved departmental efficiency

To fulfill all these objectives, it is necessary to establish harmony and good co-ordination between all the employees of material management department and this department should have good co-ordination with the

other departments of the organization to serve all production centers.

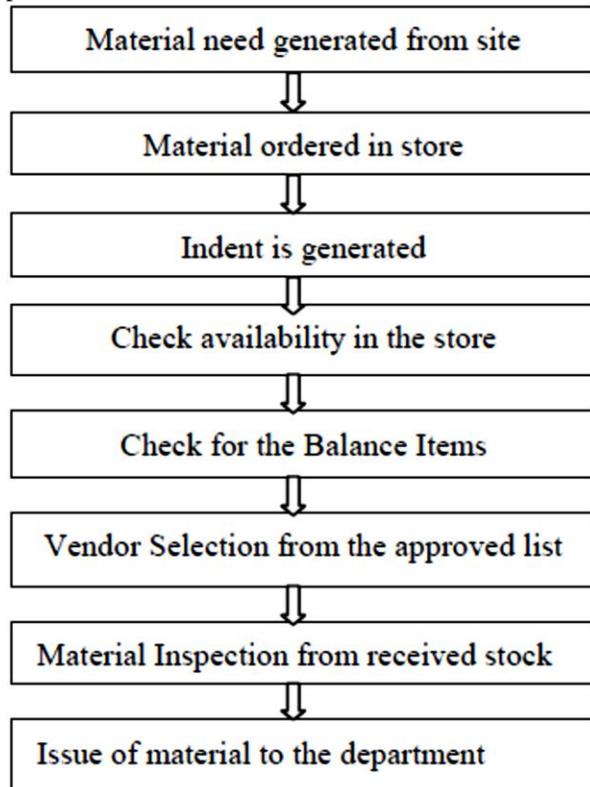


Fig. Process of Material Management

Advantages of Material Management

- Systematic operations
- Reduction in cost of material handling
- Reduction in overall cost of the project
- Increase in productivity of the labors
- Time management
- Quality control
- Better relations with suppliers
- Better relations with customers

Factors affecting material management for:

Large firms:

- Delay due to rejection of materials from quality control team
- Transportation problems
- Seasonal problems

Medium firms:

- Delay due to rejection of materials from quality control team
- Transportation problems
- Seasonal problems
- Labor strikes
- Improper handling of materials

Small firms:

- Delay due to rejection of materials from quality control team
- Transportation problems
- Seasonal problems
- Labor strikes
- Communication problems
- Hike in material prices
- Lack of material management
- Improper material handling

Different costs involved in Material Management

• Purchase Costs

The purchase cost of an item is the unit purchase price from an external source including transportation and freight costs. For construction materials, it is common to receive discounts for bulk purchases, so the unit purchase cost declines as quantity increases. These reductions may reflect manufacturers' marketing policies, economies of scale in the material production, or scale economies in transportation. There are also advantages in having homogeneous materials.

The cost of materials is based on prices obtained through effective bargaining. Unit prices of materials depend on bargaining leverage, quantities and delivery time. Organizations with potential for long-term purchase volume can command better bargaining leverage. While orders in large quantities may result in lower unit prices, they may also increase holding costs and thus cause problems in cash flow. Requirements of short delivery time can also adversely affect unit prices.

• Order Cost

The order cost reflects the administrative expense of issuing a purchase order to an outside supplier. Order costs include expenses of making requisitions, analyzing alternative vendors, writing purchase orders, receiving materials, inspecting materials, checking on orders, and maintaining records of the entire process. Order costs are usually only a small portion of total costs for material management in construction projects, although ordering may require substantial time.

• Holding Costs

The holding costs or carrying costs are primarily the result of capital costs, handling, storage, obsolescence, shrinkage and deterioration. Capital cost results from the opportunity cost or financial expense of capital tied up in inventory. Once payment for goods is made, borrowing costs are incurred or capital must be diverted from other productive uses. Handling and storage represent the movement and protection charges incurred for materials. Storage costs also include the disruption caused to other project activities by large inventories of materials that get in the way. Obsolescence is the risk that an item will lose value because of changes in specifications. Shrinkage is the decrease in inventory over time due to theft or loss. Deterioration reflects a change in material quality due to age or environmental degradation.

• Unavailability Cost

The unavailability cost is incurred when a desired material is not available at the desired time. In manufacturing industries, this cost is often called the stockout or depletion cost. Shortages may delay work, thereby wasting labor resources or delaying the completion of the entire project. Again, it may be difficult to forecast in advance exactly when an item may be required or when a shipment will be received. While the project schedule gives one estimate, deviations from the schedule may occur during construction. Moreover, the cost associated with a shortage may also be difficult to assess; if the material used for one activity is not available, it may be possible to assign workers to other activities and, depending upon which activities are critical, the project may not be delayed.

II. OBSERVATIONS & DISCUSSION

It was observed from the literature that only large firms use typical protocol & software for material management, hence they faced minimum problems. On the other hand medium & small firms lack behind in material management as they don't use any software or they aren't aware of material management techniques. It was observed that there is no any material management department in small & medium construction firms. It was seen that though the large construction firms are using material management techniques, software, etc. still they are facing problems in the material management process. Lack of material

management ultimately results in delay in work, project cost overruns, decrease in labor productivity and wastage of materials.

Conclusion

- There should be a centralised material management team co-ordination between the site and the organization.
- Proper control, tracking and monitoring of the system is required.
- Awareness and accountability should be created within the organization
- There is a need of an efficient integrating of all aspects of material management.
- Firms employing proper material management system are seen to have increased their overall efficiency.
- Advanced softwares can be used for efficient planning of material management

REFERENCES

1. Chris Hendrickson. (2000), "Project Management for Construction", Prentice Hall
2. Agarwal, Anil. (2001), "Benchmarking wastage control of construction materials", NICMAR Journal of Construction Management, Vol 16, No.1.
3. Buffa, Elwood. (2000) , Production inventory systems: planning and control
4. Chandani, Kansara. (2007), "Identification of material wastage in residential buildings", NICMAR Journal of Construction Management, Vol 13, No.1.
5. G. Kanimozhi and P. Latha. (2014) "Material Management in Construction Industry" Indian Journal of Applied Research. Volume 4, Issue 4, Page no. 1 to 3.
6. Eduardo, L. (2002), "Material waste in building industry: Main causes and prevention" , Journal of Construction Engineering and management, Vol 12, No.4.
7. Shah , K.C.(1993), " Material management" , All India Council of Technical education

ISSN (Online) 2456-1290

**International Journal of Engineering Research in Mechanical and Civil Engineering
(IJERMCE)**

Special Issue

.inSIGHT – 18, 4th National Level Construction Techies Conference

Advances in Infrastructure Development and Transportation Systems in Developing India.

8. Vaid, K.N. (1997), "Waste control of building materials in construction of mass housing projects", NICMAR Journal of Construction Management, Vol 2, No.3.

9. Ward, Wendy. (2006), "Resource management", Concrete construction.

10. N.B. Kasim, C.J. Anumba and A.R.J. Dainty. (2005) "Improving Materials Management Practices on Fast-Track Construction Projects", 21st Annual ARCOM Conference, SOAS, University of London. Association of Researchers in Construction Management, Vol. 2, pp. 793-802.