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ON-SITE MATERIAL MANAGEMENT

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ABSTRACT

Site material management is a process for controlling field and office activities on construction site related to the materials. The site material management system attempts to insure that the right quality and quantity of materials are appropriately delivered and handled onsite in a timely manner. Planning and controlling all of the efforts necessary to ensure that the correct quality and quantity of materials are properly specified in a timely manner and most importantly are available at the point of use when required. Materials management is the system which represents a major expense in construction, so improving site material management improves opportunities for reducing the overall project costs. Poor management can result in increased costs during construction. Efficient management of materials can result in substantial savings in project costs. This project is about on-site material control and the aim is to minimize delays, wastage of material and indirectly the cost. The project's focus is on material quality control, proper storage facility, material accounting on site of Amanora future towers. The project concentrated on the products that contribute the most to construction organization revenue. Study will be done to understand and analyze the above practices on the construction project of Amanora future towers.

KEYWORDS: Site material management, codification, stores management, material logistic.

INTRODUCTION

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.

Too often, construction projects suffer from delays, budget overruns, and claims. 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. A proper material logistics implementation on the site will minimize the probable delays, material damages, waste produced on site, etc.

Now or project focuses on management of materials incoming on site. Managing the materials on site is a key process for project success. For many years it has evolved and changes with respect to the ever growing complexity of projects. It is very important to understand the management of site material and how these procedures differ from those of other industries. Site Materials management is a process of ever-growing responsibilities and functions.

SCOPE OF WORK

This project is about on-site material control and the aim is to minimize delays, wastage of material and indirectly the cost. The project's focus is on material quality control, proper storage facility, material accounting on site of Amanora future towers. The project concentrated on the products that contribute the most to construction organization revenue.

In this project we will focus on right incoming material quality, proper store house facilities, and proper material related field activities. Study will be done to understand and analyze the above practices on the construction project of Amanora future towers.

PROBLEM STAEMENT

Materials costs money in terms of storage space, equipment, personnel, insurance, deterioration, obsolescence and, above all, the cost of the capital required in financing stocks. On the other hand, it costs money to run out of stocks-idle wages, loss of production, loss of profit and expediting to overcome the disorganization following a shortage.

The organization has maximum % of its capital tied up in stock. There are also expenses related to financing and maintaining inventories. The monthly expenses of raw materials add up to 80% of the company's total monthly expenses.

This illustrates the importance of materials and site material management and raises the following questions among the top management of the company. Is the inventory managed with the aim to obtain the optimal inventory level? Are effective and efficient inventory policies in place?

We are going to discuss the aspects as applicable to the construction project as major expenditure incurs in raw materials, consumables, spare parts of equipment, wastages and if they are properly checked from time to time the expenses can be reduced substantially. Thus material management on construction site is of at most importance.

RESEARCH OBJECTVE

In this seminar we are keeping following inventory management objectives which are necessary on the construction site.

a) Storing and inventory control.
b) Reduce wastage.

LITERATURE REVIEW

From the various paper studied it can be seen that improvement in management for materials on site is required to be maintained on major projects sites. It helps in overall economy and cost saving of various materials which are used for execution of project.
We are going to keep this approach in present project work.

THEORETICAL APPROACH

The materials on the site are to be controlled right from their arrival on the site to their consumption on the site. Hence throughout their journey on the site materials are to be properly handled for having efficient material management on the site.

CODIFICATION

Process of codification

Codification is the process of representing each item by a number, the digit of which indicates the group, the subgroup, the type and the dimension of the item. Many organizations in the public and private sectors and railways have their own system of codification, varying from eight to thirteen digits. The first two digits normally represent the major groups, such as raw materials, spare parts, sub-contracted items, items, hardware items, packing material, tools, oils, stationery, etc. the next two digits indicate the sub-groups, such as ferrous, non-ferrous, etc. dimensional characteristic of length, width, head diameter usually constitute the further three digits and the last digit is reserved for minor variations.

Systems of codification

Following are the systems of codification commonly found:

1) Alphabetical system
2) Numerical system
3) Alpha-numerical system
4) Brisch system
5) Kodak system

Alphabetical system
Under this system, alphabets become the basis and codes are allotted to each item in alphabetical order. Each item is grouped according to its nature, use, etc. and the first alphabet of the name of the material is the starting point of codification. Subsequent sub-alphabet are used depending upon other characteristics of the material in question

Numerical system
Against alphabet system, the numerical system is based on numbers; simple numbers block numbers or dash/stroke number.

Alpha-numerical system
This system, as the name suggest is the combination of both the alphabetical and the numerical system, and also to take advantage of the numerical system, the system allows alphabets to be retained to a limited extent and then uses the number codes. The material are first grouped under some main classes and then sub-grouped under the numbering system.

Brisch system
The Brisch system of codification, developed by a British industrial engineer is one of the earliest developed codification system. It is a comprehensive system, consisting of seven digit and is applied in three phases. The seven digits split into groups such that similar items are brought together. The preliminary set of categories of assemblies, subassemblies and bought out items. The classification is done after duly considering materials, sizes, function and uses.

Kodak system
The Kodak system, developed by Eastman Kodak Company of New York consists of ten digits divided into groups of three, four and three. In addition to the classification based on materials, function and use of the item, importance is given to the mode of procurement of the item by the first two digit. When arranging within a group, the numbers used are 00 to 99. If nuts and bolts are to be coded, then bolts can have the number 28 and nuts 29, because b is head of n in the alphabet.

STORES MANAGEMENT

Purpose of stores
Stores play a vital role in the operations of a company. It is in direct touch with the user department in its day-to-day activities. The most important purpose served by the stores is to provide uninterrupted service to the manufacturing divisions. Further, stores are often equated directly with money, as money is locked up on the stores

The Importance of Efficient Stores Management
In an enterprise with a small quantity of stock, one person might be placed in charge of it, if the owner/manager does not look after it himself. Where the volume of stock is too large to be handled on a part-time basis, one or more storekeepers will be required. Enterprises with large quantities of stock must employ trained stores personnel (storekeepers, clerks, etc) under the control of a Store Manager (who might go by the designation of Head or Chief Storekeeper, Stock Controller, Stores Administrator, or a similar title).

It is impossible to state at what stage a Store Manager will be appointed by a particular enterprise, as circumstances and sizes vary so greatly. But whatever its size and the volume of its stocks, the success of the enterprise can depend to a large extent on the efficient management of its Store and stocks.

Stores location and layout
Storage system has to accommodate the inflow of inputs of materials and bought components from outside sources, the in-process inventories and the outflow of finished goods to customers. The system's efficiency may be compared and assessed in terms of unit cost (per volume or weight) of moving goods through storage sites or storage over a given period. It usually takes into account the element of labour, space and equipment needs and cost.

The design, size and location of a store must, therefore, be an integral part of wider system design and management strategy. It must be realized, however, that what happens in a storehouse affects the whole range of other activities.

Material accounting

The primary basis for material accounting is cost. Materials are ordered on a continuous basis and there is no prescribed procedure which can be used in the determination of materials cost for accounting purposes. There are a number of standard procedures with combination and variations, but the major objectives are to clearly reflect the periodic performance. However, the records which are usually kept by the stores department have two broad characteristic 1) only quantities are shown in records, and (2) regular balancing of materials is done.

For this purpose, the following records and documents are kept

i. Bin card
ii. Store ledger
iii. Stock identification card
iv. Materials received note
v. Materials requisition slip
vi. Material return slip
vii. Material transfer note

1. **Bin card**

It as an essential record kept in stores for following purposes:

i. Exact position of material is known as against each receipt and issue
ii. Information with regards to stock levels and the quantity balance on hand is immediately known.
iii. Code number and full description of the material are given on the card
iv. It serves as a check on stock ledger and helps physical verification of stores.

2. **Stores ledger**

It gives the following information as against bun cards:

i. Supplier's name and address, wherever possible
ii. Quantity ordered each time and invoice no. and price.
iii. Expected delivery with due Date in the 'remarks.
iv. Stocks level

3. **Stock identification card**

These cards are kept in the stores against each bin or rack where stocks are actually kept in order to identify the materials. They contain following information:

i. Material code no. and full description.
ii. Respective stores ledger folio and bin card number.

4. **Material received note**

When materials passed are passed on to the stores after proper verification and approval by the inspection authority, the materials and supplies are taken into stocks through a document known as material received note.

They are sent to

i. Inspection department for approval
ii. When approved, it is passed to the appropriate authority for checking and then it is sent to
iii. Accounts department for recording and according and accounting of material

5. **Material requisition slip**

When material passed on to the production department after receipt of a document known as material requisition slip, the quantity is required to be filled inn always by the documents issuing center. Stores department must take proper care as to the following points

i. M.R. slip must be signed by the authorized person.
ii. The material required is up to the mark with the proper code no. and/or description of the material.
iii. Quantity issued is then and there entered and this is signed and checked by the materials receiving center, as no separate issue voucher is raised.
iv. Three copies are prepared one for issuing authority, another for stores record and the other for stock.

6. **Material returned note**
   When materials are not required by the production department, they are returned to the stores with an authorization called materials returned note.

7. **Material transfer note**
   When material are transferred from one department to another department or from one job to another, a materials transfer note is prepared and sent to the stores account department for adequate recording of material issued to that particular department.

Surplus and obsolescent material

Surplus

A surplus item is one stock is likely to last longer than the normal period of consumption.
Items are rendered surplus under the following situations:

i. Over buying
ii. Reduction in production program of a product
iii. Production simplification

Obsolete materials

An obsolete item is one which has been suspended by another item due to change in designs, modification or substitution.

Obsolete materials differ from surplus material as the latter could consumed in near future while former are unlikely to be used.

An item is rendered obsolete under following points:

i. Design change
ii. Product simplification
iii. Sales returns
iv. Wrong purchase
v. Components manufactured against old drawing.
vi. Changes in manufacturing process.

Disposal of surplus and obsolete materials

The disposal of surplus and obsolete material can be affected in various ways, the returns being different from different channels. The reason is very simple and logical. Surplus materials, if sold as scrap to a scrap dealer, are hardly expected to expected to fetch 20 to 30 % of original cost while if the surplus material is returned to the original supplier, it may bring in 90 to 95 % of original cost. Therefore selection of the appropriate channel therefore is important some of them are as follows:

i. Return to original supplier
ii. Sale to the sister companies
iii. Use within the organization
iv. Sale to the vendors
v. Sale to the actual users
vi. Sale as scrap
vii. Disposal of scrap by auction sale.

Logistics Services and Techniques

Logistics services and techniques are very helpful on a construction site for smooth operation of construction. Concerned authority should look into proper implication of such logistics services and techniques on a construction site.

Logistic Services

Dedicated, trained logistics specialists can provide valuable experience and knowledge to a construction project. Logistics specialists can either be employed internally by the client or main contractor or can be hired from specialist

external organizations for either a key task or for the entire duration of the project. Logistic services can generally be grouped into the following services:

- On-site logistics specialist - the on-site team receive all material deliveries and distribute materials, equipment and plant so that operatives handle materials only when assembling or installing. This team may also plan the infrastructure processes needed to deliver the project including site planning, welfare of the workforce, traffic management and health and safety.
- Full supply chain logistics planning – main contractors employ (either directly or indirectly) professionally trained logisticians who can plan across the range of, procurement, storage, distribution and back loading activities.
- 4th party logistics – an overarching service to co-ordinate other logistics providers where there is more than one supply chain.

Logistic Techniques

1) **Just-In-Time Delivery (JIT)**
JIT delivery is a service of frequent deliveries in work packs or task loads, 'pulled' just in time for the trade to perform the next task without incurring any delays. This can be done either through a CCC or individually by suppliers. JIT deliveries reduce or even eliminate the need for on-site storage of materials.

2) **Demand Smoothing**
Demand smoothing enables the peaks and troughs in the demand of materials to be evened out over a period of time or duration of the project. Demand smoothing is a means of looking at the program of project activities in the entire value chain and identifying how the activities can be balanced or 'smoothed' to reduce the amount of transport resources, materials and labour needed to carry out the task or activity.

3) **On-site Marketplaces (MP)**
A MP is a temporary storage area for consumable materials, fixings and small tools that are widely used and shared between a numbers of trade contractors working on-site.. When stocks become low they are replenished by the individual trade contractor or through the store-man who will order on their behalf.

4) **Material Logistics Plan Good Practice Guidance**
The major benefit is the assurance of available materials in a known and secure location when required and removes the need for individual trades to set up their own small materials storage areas and controls on-site. This leads to productivity benefits and cost reduction.

5) **Pre-assembled and offsite fabrication**
It is generally considered good practice that, where possible, materials should be obtained configured as far as possible to their final use. Similar to pre-assembly, offsite fabricated materials are generally preferable to those constructed on-site, since wastage can be more efficiently controlled and transport requirements are usually reduced.

6) **Information and Communication Technology (ICT) Systems**
ICT Systems are used to tag and track materials through manufacture, distribution, assembly and installation. Commonly referred to as Tag systems they help to manage material flows by using various forms of information technology. Suitable IT systems are relatively low cost and are becoming more widespread on construction sites.

7) **Inventory Management Optimization (IMO)**
IMO software systems are proactive planning tools to optimize inventory levels and the utilization of site /warehouse space and transport facilities. IMP software can model demand and supply scenarios, assess areas like lead time variability and undertake this analysis for multiple sites at the same time. IMO is more commonly used in the automotive industry but is becoming increasingly popular within the construction sector

8) **Construction Consolidation Centers**

Construction Consolidation Centers (CCC) are distribution centers used to supply materials in the required quantities to one or more construction projects. They are an effective supply chain management solution enabling the safe and efficient flow of construction materials and equipment from supplier to project. This process maximizes the efficiency of distribution vehicles and leads to a substantial reduction in overall vehicle numbers delivering into a congested environment. The key feature of the center is that goods are delivered not just to a site entrance - but to specify locations as close as is practicable to the workface, by material handling operatives. The main benefits of a CCC are the potential to:

- improve certainty of supply;
- reduce site deliveries;
- reduce site stock holding; and
- Reduce waste and losses.

CONCLUSION

From all the above study for this paper of site material management and the methodology to be adopted the conclusion comes as

a) There should be a centralized inventory management team co-ordination between the site and the organization.
b) Proper control, tracking and monitoring of the system is required.
c) Awareness and accountability should be created within the organization about material.
d) There is a need of an efficient system integrating all aspects of site material management.
e) Firms employing proper material management system are seen to have increased their overall efficiency by 35%.

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