

Material supply & its management for residential construction projects in Nashik city: Risks Effects & Responses

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Abstract

Materials require special attention while creating or planning a project plan, since it forms a large portion of the total cost of a construction project. Materials are essential for the daily progress of a construction project. Current materials management practices in the construction industry are performed on fragmented basis with unstructured communication and no clearly established responsibilities between the parties involved. The highly fragmentation is a result of the separation of design and construction, lack of coordination and integration between various functional disciplines, poor communication, etc. All of these are the important factors causing performance-related problems such as delay in material ordering and receiving, low productivity, cost and time overrun, conflict and disputes.

Keywords: Construction, Material Management, Project Planning and Productivity.

Introduction

Materials constitute a major cost component for any Industry. The total cost of used materials (or Value of Materials) is up to 70% of the total cost. The efficient procurement and handling of material represent a key role in the successful completion of the work. It is important for the contractor to consider that there may be significant difference in the date that the material was requested or date when the purchase order was made and the time at which the material will be delivered. These delays can occur if the contractor needs a large quantity of material that the supplier is not able to produce at that time or by any other factors beyond his control. The contractor should always consider procurement of materials is a potential cause for delay.

Poor planning and control of materials, lack of materials when needed, poor identification of materials, re-handling and inadequate storage cause losses in labor productivity and overall delays that can indirectly increase total project costs. Effective management of materials can reduce these costs and contribute significantly to the success of the project.

These delays can occur if the quantities needed are large and the supplier is not able to produce those materials at that time or by any other factors beyond the control of the company. Unavailability of materials is not the only aspect that can cause problems. Excessive quantities of materials could also create serious problems to managers. Storage of materials can increase the costs of production and the total cost of any project. When there are limited areas available for storage, the managers have to find other alternatives to store the materials until they are needed. Some of these alternatives might require re-handling of materials, which will increase the costs associated with them. Provisions should be taken to handle and store the materials adequately when they are received.

Special attention should be given to the flow of materials once they are procured from suppliers.

Need of study

The costs associated with material management are hidden in other activities or included as overhead costs. Research states that studies from the Construction Industry Cost Effectiveness Project (CICEP) concluded that senior management have not recognized the contribution of material management to cost issues in projects, that personnel involved in material management activities do not receive an adequate training, and that the computer systems used by companies are not good sources of information for materials control.

Traditionally the responsibilities for activities related to materials flow have been divided between different departments. The activities related to material management are divided between different departments in a company. For example, the finance department is in charge of the purchasing activities while the manufacturing department is in charge of the control of materials during production. In addition, this division can make the control and identification of materials extremely difficult.

From the above points this research was under taken by considering the objectives, to study the material management system in small and medium sized construction industry and to investigate the current practices of the CMMSCP in the Nasik construction industry.

Methodology

A questionnaire was developed to survey non ERP users in the construction industry. The questionnaire was focused on qualitative, rather than quantitative aspects of the business processes. Respondents were asked questions regarding any specific business scenarios implemented and type of scenarios that are

targeted toward specificity of acquisition of information of material management.

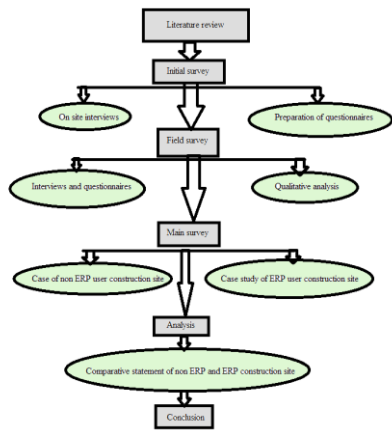


Fig. 3.1. The Research methodology Data collection

The data was collected from the questionnaire circulated to the construction sites. The answers from the questionnaire and the remarks from the site in-charge, etc are given as 1) There should be centralized material management system for project, 2)The documentation should be proper and neat, 3) The tracking of material should be regularly done on site, 4) The PO and indent should be carefully designed, 5) The inventory should be neatly maintained, 6) The use of onsite computerized system need to be used and 7) Use of modern material management technology needs to be done, etc.

The case study from the actual construction project to understand the effect of improper material management was done. And the result was concluded according to the analytical qualitative as well as quantitative data. The study showed the considerable amount of increase in the material consumption because of faulty management. It studied how materials management affected with cost and quality of project.

Analysis of Collected Data

The data obtained from the questionnaire was studied to find out the reasons of effects of improper material management system. The answers from the site in-charge were compiled to study the overall effect of the improper material management. The main reason for the loss of the materials on site was improper management of materials.

The analysis was carried out on the basis of the differentiation between theoretical and actual consumption of the materials.

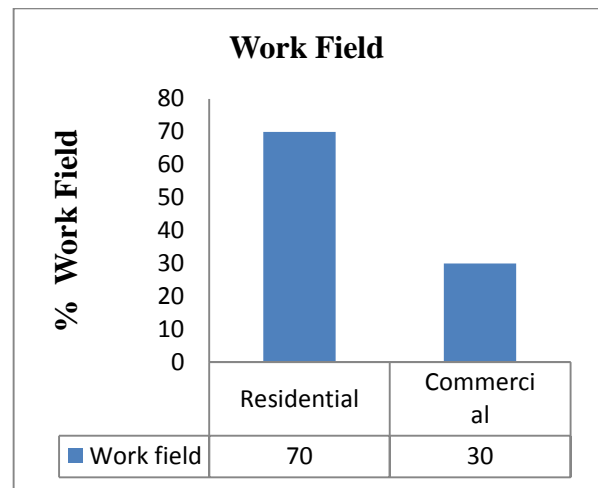


Fig. 4.1 Company Work Field

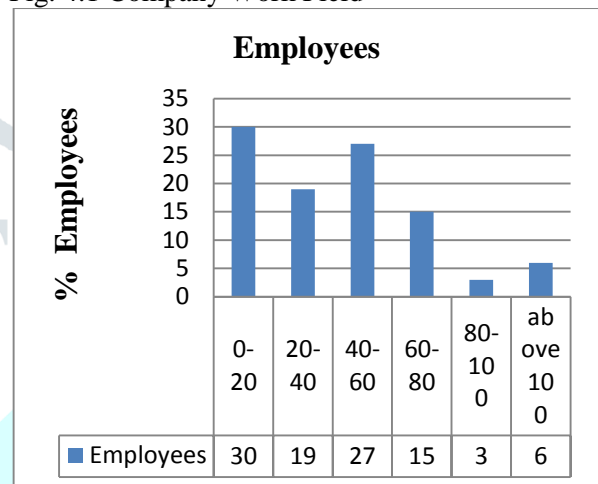


Fig.4.2 Average number employees

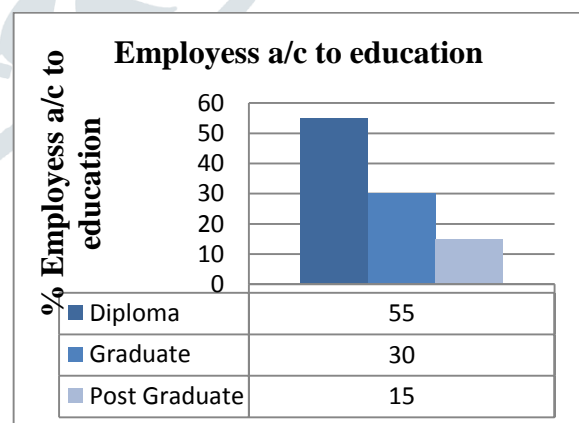


Fig.4.3 Average no. employees A/C education

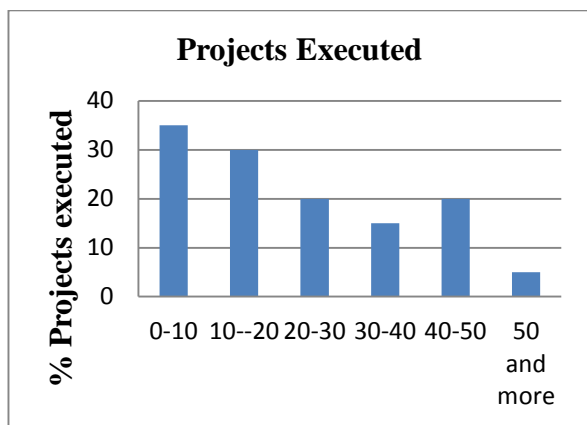


Fig. 4.4 Number projects Executed

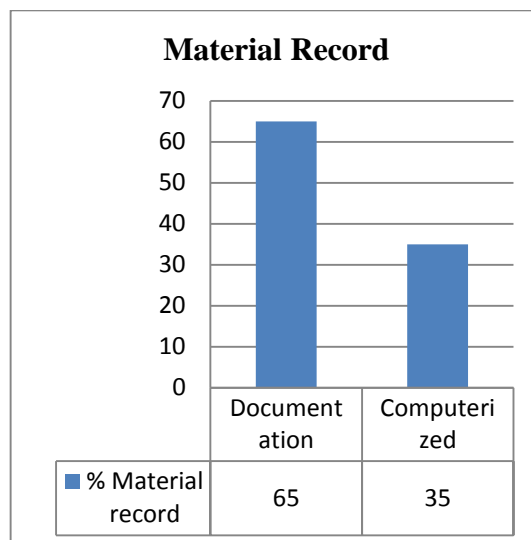


Fig. 4.7 Track of materials

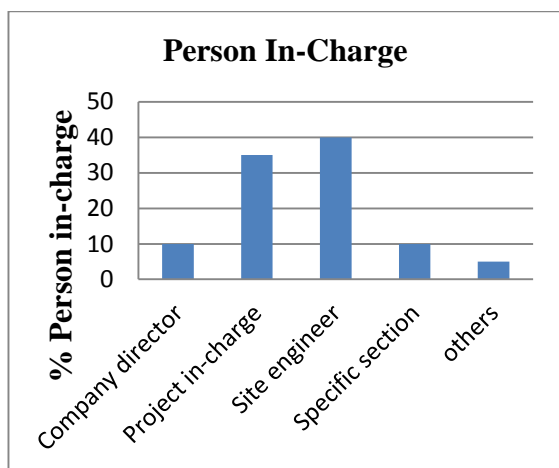


Fig. 4.5 Person in-charge of material

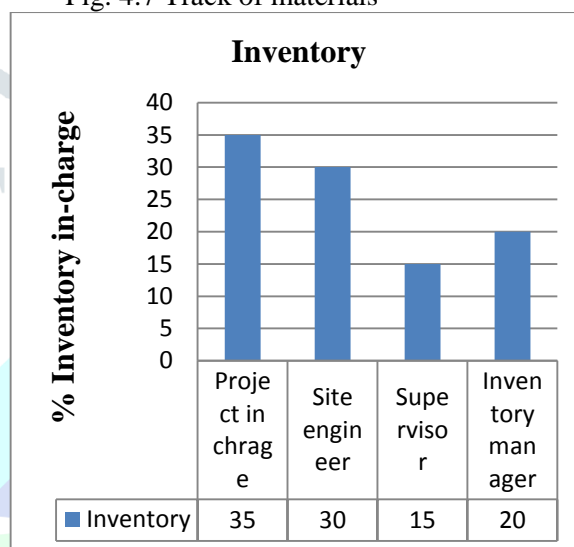


Fig. 4.8 Inventory in-charge

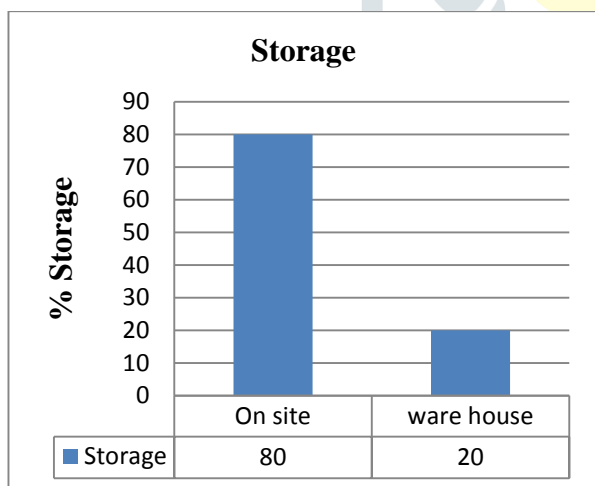


Fig. 4.6 Place of storage of materials handling

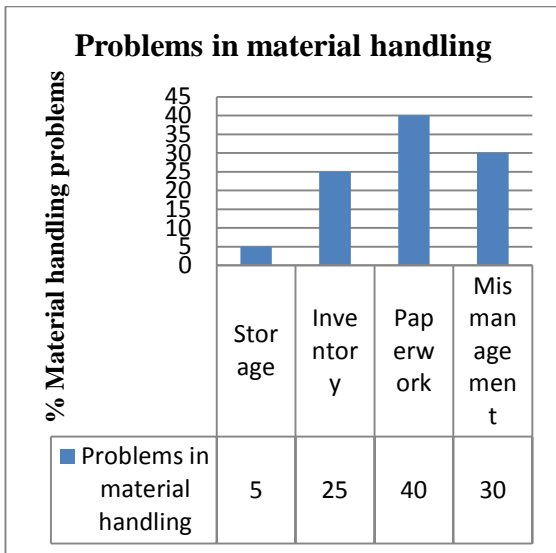


Fig. 4.9 Problems in material handling

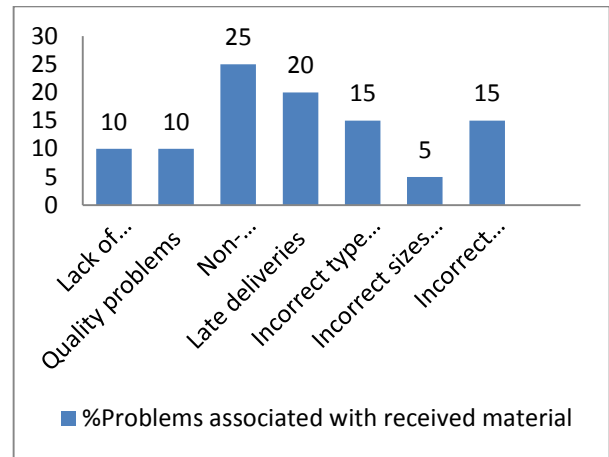


Fig.4.12 Problems associated with received material

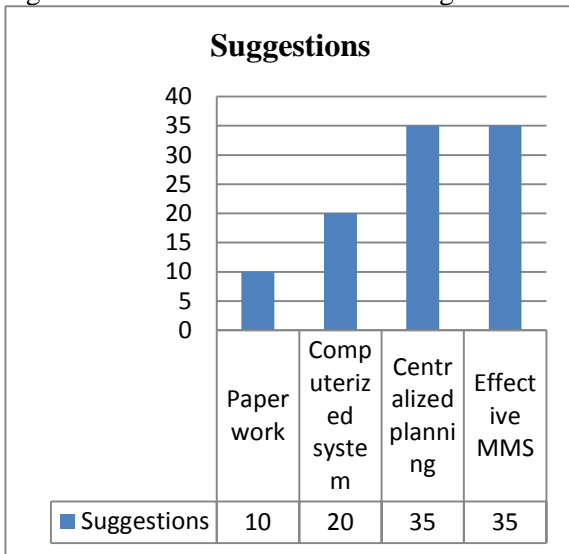


Fig. 4.10 Suggestions for improvement

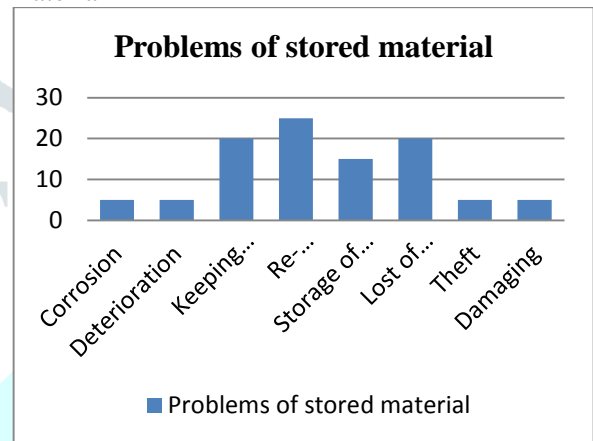


Fig.4.13 Problems associated with stored

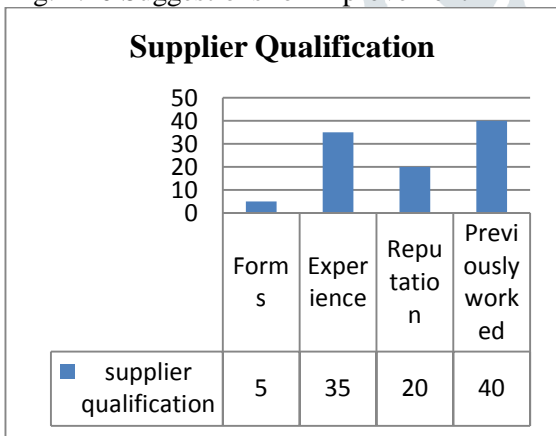


Fig. 4.11 Supplier qualification



Fig. 4.14 Use computer for material materials ordering and tracking

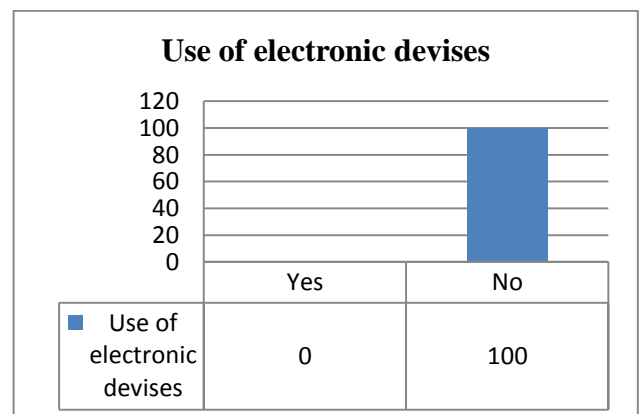


Fig. 4.15 Use electronic devices for material ordering and tracking

Results & Discussion

The questionnaire study gives the suitable explanation for the deficiency in the effective materials management on the site. And the case study proves the impact of faulty material management system on the cost of the project.

Average number of employees in the surveyed construction section as discussed earlier. Which shows employees between 0-20 number of employees amounts 30% of total percentage of companies and 40-60 number of employees number of employees are 25%.

The most employees from the all companies are diploma holder as compared to graduate and post graduates.

Work field in surveyed construction sector is around 70% residential and 30% commercial.

Most of the companies are in their initial phase of the construction and few of them have achieved the double numbers.

Most of the construction companies have site engineer as well as the project in-charge responsible for the person in-charge of material handling.

According to the survey the many of the construction companies have materials managed on their site. Few of the companies having ware house facility and sometime space restrictions store their materials in ware-house.

The survey performed concluded that the companies keeping their track of materials in the documentation form are on much higher side than the computerized materials management track.

Most of the construction companies have site engineer as well as the project in-charge responsible for the person in-charge of inventory management.

The problems faced by the construction sector leads the too much paperwork and miss management that's the faulty material management system.

The overall suggestions in personal interviews and survey conducted are headed by the effective material management system i.e. MMS which includes centralized planning, computerized system, reducing paperwork, etc.

The supplier qualification depends on the factors such as experience, previously worked with them, reputation, forms in descending manner. But this qualification process is too much tedious.

Problems associated with the received material is Non-conformance with requirements resulting in late deliveries, incorrect quantities, etc. which points to faulty ordering process.

According to survey the main problems associated with the stored materials are re-handling, track of materials, lost of materials, etc.

The survey shows use of computer in ordering of materials is more. And the use of computer for the tracking of materials is less.

According to survey none of the company uses electronic devices for the material tracking, etc.

The case study from the actual construction project to understand the effect of improper material management was done. And the result was concluded according to the analytical qualitative as well as quantitative data.

The study showed the 16.47% increase in the material consumption because of faulty management for the site no.1 which didn't used ERP system.

The site no.2 showed 12.48% increase in the material consumption again because of faulty and improper materials management.

The main reason for the lesser increase in actual and theoretical consumption was the effective and proper materials management. The centralized planning system helped out for proper materials management. Also it did help to eliminate the documentation paper by converting it from paper exercise to proper exercise.

Conclusion

There is the need to track and manage materials on all construction projects. Small construction projects do not undertake detailed site activity planning because of lack of people, skills and finance problems. Manufacturers and suppliers schedule their deliveries and cause responsibility once the materials have been delivered on site.

The proper handling, storage and management of the materials received at site is extremely important as in case of the construction sector the materials cost nearly 70% as per the literature study. So any kind of loss and damage of the material may cost severe impact on the construction project.

The use onsite study and literature review showed that there is need for use of modern technologies those are the appropriate and affordable technology to help with the better management of materials through the order process up to placing on site so new technology such as ERP, internet, RFID (radio frequency identification), GPS (global positioning system), tracking technology, extranet are instrumental and affordable in this process.

Good communication and coordination among the participants is a good way to overcome the gap between different parties and achieve the overall goals of these projects. Project collaboration tools allow sharing of documents and files, this factor can be achieved by the modern technologies.

With the literature study and local construction sector study review was taken by comparing the site having modern technology of materials management and the sites those don't. The study showed surprising result of significant reduction in the materials consumption when there was effective implement of materials management by the ERP i.e. Enterprise resource planning system and reducing cost consumption of the materials which ultimately increased the project profit.

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