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Management For Construction Materials And Control Of Construction Waste In Construction Industry

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Abstract — *In recent treads a wide range of building materials is available for the construction of civil engineering structures. The total cost of materials may be up to 60% or more of the total cost incurred in construction project dependent upon the type of project. Effective construction materials management is a key to success for a construction project. Construction waste is another serious problem in construction industry. A large and various types of construction waste with different characteristics are created at all the stages of construction. Construction industries have a larger part in contributing environmental problems. The economic and environmental benefits must be gained from construction waste minimization. This paper presents a review on systematically investigation of the management of construction materials and construction waste, material management techniques, control of construction waste and existing situation of construction management and construction waste in the industry*

Keywords- *Material Management, Construction Waste, Management techniques, Economic relevance, Existing Situation.*

1.INTRODUCTION

Construction industry is largest economic expenditure in India. According to eleventh five year plan, it is the second largest economic activity after agriculture. Materials management is an important element in project management. Effective construction materials management process is a key to success of a construction project. For many years it has evolved and changed with respect to the ever-growing complexity of projects. It is very important to understand the origin of materials management procedures and how these procedures differ from those of other industries. Materials constitute a major cost component for construction Industry. Materials Management is simply the process by which an organization is supplied with the goods and services that it needs to achieve its objectives of buying, storage and movement of materials. Basically, material management is concerned with the planning, identification, procuring, storage, receiving, and distribution of materials. The purpose of material management is to assure that the right materials are in the right place, in the right quantities when needed. The increased economic growth as well as urbanization has led into extensive construction activities that generate large amounts of construction wastes. All round the world construction materials generate million tons of waste annually. Waste is one of the serious problems in construction industry. The term wastage refers to the variance, if any between the estimated and actual consumption of an individual item. Some hazardous materials may not be moved, before the authorities have ascertained that safety guidelines and restrictions have been followed.

II. MANAGEMENT OF CONSTRUCTION MATERIALS

An essential factor adversely affecting the performance of construction projects is the improper management of materials during site activities (N B. Kasim. 2008). Material is the main component in any of the construction projects. Therefore, if the material management in construction projects is not managed properly it will create a major project cost variance. The total cost of the project can be well controlled by taking corrective actions towards the cost variance occur in the project. (T. Phani Madhavi et al. 2013, Alin Veronika et al. 2006). Studies by the Construction Industry Institute (CII) have shown that materials and installed equipment can make up 50–60%of the total project cost and impact 80%of its schedule (C H. Caldas et al. 2014). During the last few years, enormous growth in infrastructure has been found, by wide range of diversity construction organization (S V. Desale et al. 2013). Fundamental Principles of Site Material Management enlightens the factors considered during site layout and planning for efficient material management. Ineffective material management practices are evident on many projects and cause considerable waste in time and money. (H. Randolph et al. 2005, Pauline Jeruto Keitany et al. 2014). For managing a productive and cost efficient site efficient material management is very essential.

III. MATERIAL MANAGEMENT TECHNIQUES

Materials management is categorized to 5 processes these processes are majorly followed on construction site they are namely 1.Planning, 2.Procurement, 3.Logistics, 4.Handling 5.Waste control processes. Materials planning include quantifying, ordering and scheduling. Companies may have two major levels in planning- micro and macro level. Procurement is described as the purchase of materials and services from outside organizations. (N. Kasim. 2011, C H. Caldas et al. 2014). Purchasing procedure can be described as Step 1 – Material Indent, Step 2 – Enquiry to Vendors, Step 3 – Vendor Comparison, Step 4 – Vendor Selection and Negotiations, Step 5 – Purchase Order, Step 6 – Vendor Evaluation. Receipt system can be divided into 1.Receipt from outside suppliers 2.Receipts from internal divisions. Inspection can happen in two ways 1. Pre- dispatch inspection 2. inspection on the site. There are three methods of inspection 1. Visual 2. Tactile 3. Statistical. Logistics is a concept that emphasizes movement of materials. Materials handling encompasses virtually all aspects of all movements of raw materials, work in process, or finished goods within a construction site.

IV. EXISTING SITUATION OF MATERIAL MANAGEMENT

Research has shown that construction materials and equipment may constitute more than 70% of the total cost for a typical construction project (K V. Patel et al. 2011, Pauline Jeruto Keitany et al. 2014). In Indian construction industry currently manual materials management practices and control procedures are unsatisfactory as they are labour intensive, inaccurate and error prone. All these reasons leads to waste and surplus of construction materials, delays in construction projects, decrease in labour productivity and lack of up-to-date and real-time information of the project. An initial assessment of the tools and techniques currently in use in materials management suggests that most of them are under development with a few being used on a commercial basis. (N.B. Kasim et al. 2012). New emerging technologies such as wireless communication system, bar-coding readers and Radio Frequency Identification (RFID) are being adequately used on site to overcome human error and are well integrated with project management systems on construction projects to make the tracking and management of construction materials easier and faster. (T. P. Madhavi et al. 2013, N. Kasim et al. 2013). It has found that scheduling delays occurred in 70%, 40% and 50% of government contracted construction projects in the United Kingdom, India, and United Arab Emirates (UAE) respectively due to improper material management (G.Kanimozhi et al. 2014). Currently all over the globe the main reason in cost variance and problematic management of material are due to overstocked materials because of improper planning, damaged materials due to logistics, handling or in application, loss of materials because of improper supervision, waiting of the materials to arrive in location due to improper tracking systems, frequent moving of materials due to improper site layout, inflation, material changes in buying/purchasing situation starting from the prepared cost estimation, bulk construction material, the shortages and changes of construction materials quantity required, materials inefficiency on site, stealing and loss of construction materials, material shipment, work repairing, delay in updating/posting storage system on site.

V. CONSTRUCTION WASTE MANAGEMENT

Construction waste consists of unwanted material produced directly or incidentally by the construction or industries. Construction and demolition waste is generated whenever any construction/demolition activity takes place (A.Harikumar et al. 2014). Construction wastes in any project are in the form of building debris form demolition process, rubble, earth material, concrete waste, steel waste, timber waste, and mixed site clearance construction materials, arising from different construction activities of project including land excavation or formation on site, civil and building construction materials, site clearance waste, demolition activities waste, roadwork waste, and building renovation waste. The management of construction wastes is a global environmental issue experienced by countries all over the world (L. Y. Shen et al. 2004, C. S. Poon et al. 2013, Siti Akhtar Mahayuddin et al. 2013). Vigorous literature review identified 81 factors for causing construction waste and clustered in 7 groups of factors namely design of project, handling of construction materials and equipment, construction workers, project management, site condition and procurement of materials and external items.

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