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MATERIAL MANAGEMENT IN CONSTRUCTION INDUSTRY: A REVIEW

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ABSTRACT

Success of any construction project is largely dependent on proper material management as material constitutes a significant amount of total project cost. The review paper focusses on importance of material management in construction sector. New approaches of such as SCOR, sustainable material management, RFID-GPS tracking in material management are also discussed.

Keywords: *material management, SCOR, RFID-GPS.*

1 Introduction

Construction industry contributes about 50% of material cost in construction project. Even today many substantial projects material management is dependent upon manual force which is paralyzing effective project cost. High time that the construction project should be dealt with effective material management by qualified management people and innovative technical tools by using latest technology such as ADC technology of data collection with help of new automation technology such as RFID and GPS. It enables to identify material components and equipment's in a very low cost infrastructure easy to implement at the same time leads to locate and trace in three phases such as production site, in-route and construction jobsite thus proving important for material management of any construction project.

2. Importance of Material Management

The construction material constitutes more than 50% project cost but it is still being managed manually on human skills which in turn hampers the cost and efficiency and time factor of any construction project. The disadvantages of traditional data collection which is time and labour intensive, which are prone to error and the unpredictable and unreliable and also the reluctant factor of work force to monitor and record the material presence, [2]. Aditya A Pande et al, [4] analyze the importance of efficient management of the material in project construction. Rightly managed material can be defined as the process to provide right material at right place at right time in right quantity so as to minimize delays and come up with cost effective factor for the project. During this, proper planning, identification, procuring, storage receiving and distribution of material plays an important role in success of any project. K. Boopathi et al, [9] identified the problem due to lack of material management on site due to improper management, the availability of the material, the required material and its inventory and procurement plays an important role for smooth completion of the construction project. Delays in the above factor result in completion time period and also cost factor is hampered thus leading to the claims and other legal matter which contribute to the failure of construction project.

3. Factors Considered In Material Management

F Tunji Olayeri et al, [3] have presented their research in form of data which is been studied and collected and studied from the elicited form 55 construction professional comprising of architects, builders, civil engineers, project managers and quantity surveyors. The data describes logistic management on construction site Abuja Nigeria. It deals with factors affecting material purchase, material accuracy, factor of material delivery on site challenged

during material delivery and also forecasting of material demand on site. The data helps to insight into logistic management on construction site in Nigeria but at the same time this data can be useful to any construction site project. It provides a study of factors to be considered in choosing a material, handling equipment's on construction site. The challenges associated with material logistics on construction site are given in a brief study in a form of graphical representation in material delivery, accuracy in material selection. The study challenges in material logistics on construction sites which deals with,

- Transportation,
- Adequate storage,
- On-site delay in materials and components delivery supply
- Quality of material,
- Coordination among material planning team,
- Ability to forecast activity period with accuracy

4. New Approaches of Material Management

4.1. Supply Chain Operation Reference (SCOR) Model

Key factors of construction material is an integral and important part of any construction activity. The need of material supply chain is that it should be in a orderly manner at the same time there should be less stress on the natural resources. For this most researches aim at the supply chain operation reference (SCOR) model to fulfill overall value at risk as a key performance indicator KP. So that once the KP is more fulfilled by precise order fulfillment the material use will be more completed to support sustainable construction, [1].

4.2. Sustainable Material Management

Mochamod Agung Wibowo, et al, [1] have stressed on the sustainable form of construction in Indonesia and which can be also implemented in developing countries like India. They have studied deeply an example of steel as material for supply chain and presented their study in table format on scale value and category of KP assessment. The importance of sustainable construction deals with simultaneously achieving and striking balance between conserving environment and maintain prosperity in development. The research also conveys the economic challenges in different areas which are dealt as micro economic, in which goals are achieved at individual countries level. Authors explain the importance of supply chain as the key business processes from end user to original supplier which provides products, services and information.

4.3. ADC Techniques in Material Management

Javad Majrouhi Sardroud, et al [2], have come up with the new research methodology regarding the material management process. Modern material management deals with automating task which identifies and simultaneously tracks the construction material which can provide timely and accurate information and material available to the project manager on site, [7]. A new approach for integrating ADC techniques of data collection in construction with the help of new automation technology such as Radio Frequency Identification (RFID), Global Positioning System (GPS) and General Packet Radio System (GPRS) terminology which enables to identify materials, components and equipment's in very low cost importance, easy to implement at same time leads to locate and trace in three phases such as production, site (off-site) in route and construction job site (on-site) thus proving importance for material management of any construction project.

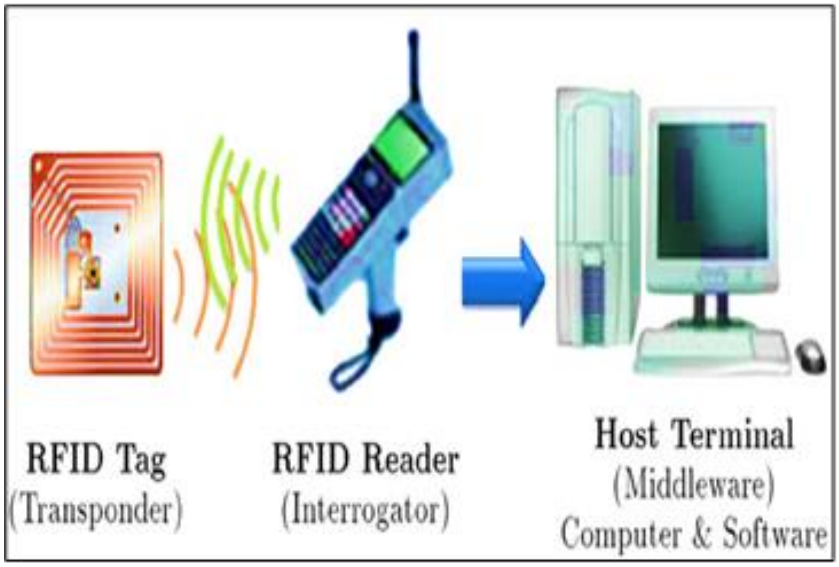

FIG 2: Schematic lavout of RFID

4.4. Material Management Using MSP Software

Other approach is focused on the actual material consumption and planned by using software such as MSP, likewise use of 'S' curve analysis for comparison of planned and actual cost of construction material. Such type of study also focusses on inventory control techniques which includes ABC analysis and EOQ analysis, [5, 8].

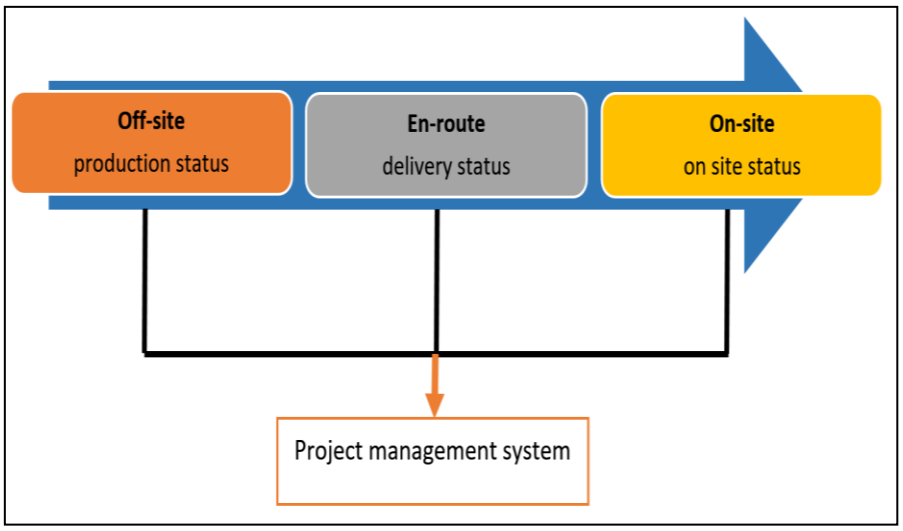

FIG 3: Schematic of material management system

5. Conclusion

Thus the importance of proper material management which contributes about 50% of total cost plays an important role in success of any construction project. From the literature review it can be seen that material management can be made efficient with the use of SCOR technique, and sustainable management approach. Future research can be directed towards implementation of technologies such as RFID, GPS for automation of entire material management process.

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