Causes and Impact of Rework on Residential Construction Project

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Abstract – Time and cost are very important factor for successful and profitable construction project. Any construction project becomes success when it is finished within estimated cost and Time. Schedule and cost overrun are becoming a headache for owner as well as the other parties involved the project. The major contributor for schedule and cost overrun is rework. Rework has negative impact on the quality of work and on the parties involved in the construction project. This paper discusses about the construction rework, its causes and impacts.

Keywords: - Rework, Construction Project, Causes and Impact, Overruns.

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INTRODUCTION

Rework represents the unnecessary effort of redoing a process or activity that is wrongly done for the first time (Peter E.D. love 2004). Rework has negative impact on the financial as well as human workforce of a construction firm. There are varieties of factors which may results in rework but poor communication and improper planning, management plays major role in construction project. Construction project consist of different stages in it, this increases the complexity in the work. Wherever complexity and human is involved there are chances for error. This error leads to rework.

Nowadays due to increasing demands and government rules the construction firms are in immense pressure for completing the work within the due date. So for carrying out the project within the time limits, many instance firms opt fast tracking the activities which may lead to rework in project. many times rework goes unnoticed till it's very late and this me create quality issues in the project so to avoid such situation regular checks should done after finishing milestone activities. The consequences of rework may lead into damaging the status of firm which may affect the future business, profitability of project, quality of work etc so rework should be neglected and one must take possible steps for rectifying the rework after its detection. The paper discuss about the sources, causes and impacts of rework in residential building project.

LITERATURE REVIEW:-

Peter E.D Love (2002): paper highlight the influence of procurement method used in the construction projects. In this author has done a questionnaire study for finding out influence of project type and procurement method on the rework cost. The construction project types used in research by the author are new building and refurbishment building. After conducting questionnaire survey and research author concluded that the conventional procurement method used in Australia is lump sum method which preferred over design and build method. Author found out that cost certainty was the key element for client in choosing the traditional lump sum method.

Mohammad Miri (2015): According to author rework is unessential activity of project which is redone for correction. The effects of rework mentioned by author are additional time for completing the rework, additional workforce required, waste of material in rework etc. Author findings in the paper are rework has adverse effect on cost and schedule of project so it must not neglected, project cost manage always vital role in reducing and managing the rework.

Mehrdad Arashpour (2013) Rework in residential building is topic of research for author in this paper. According to author the performance in residential construction project is measured on hose completion time, and customer service. In this paper author has focused on the modeling of rework. The time frames

for rework call backs mentioned in the modeling of rework are as follows:

- On-time call backs for rework before releasing resource
- Late call-back for rework after releasing resource
- Early call-backs for rework prior to process completion (collaborated hand offs)

Peter E.D. Love (2002a): This paper focuses upon indirect consequences and indirect cost of rework in construction project. Methodology used for research in paper is study of a case and interviews on the site. Interviewing teams of site management, consultant subcontractors and suppliers were taken for data collection process. The findings from the case study were that poor contract documentation and unskilled workmanship results into rework. The direct cost of rework in case study was found out to 3.15 % of contract value. Author concluded that indirect cost of rework can have cost up to 3 to 6 times multiple of actual rectification cost.

SOURCE OF REWORK:-

The sources of rework are classified as follows:-

1. Error
2. Omission
3. Change

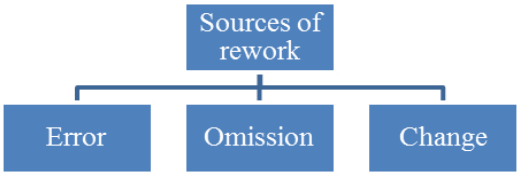

Figure:- Sources of Rework

Error:- Error is as any item or activity is performed incorrectly resulting in a deviation. Rework is result of errors happened during the design process, errors which occur in the process of procurement and construction phase. Errors are not easily identifiable and are mostly found out after a brief period in the system. The quantity of rework to be done depends upon time error has gone unnoticed. . Errors occur as a outcome of a complex range of interactions, and hence attempting to isolate a singular contributory variable is an unseemly strategy to undertake.

Omission:-An Omission error occurs when there is strain or distraction to the mental process of action in work. In simple words omission errors are the outcomes of distraction towards the work which leads to rework. Omission can also be defined as process in which certain activity is left out or forgotten from a system or work consisting fabrication, design and construction resulting variation with original requirement. The study related to rework discovered that the concern reacted to design fees was recognized by respondents in the construction sector as a factor resulting to an omission which causes rework related to design Contractors and subcontractors are also at risk to omission errors, as quality, safety and environmental management system limitation may not be always be strictly followed, as a result, tasks or processes may need to be reworked

Changes: Change is basically an action intended to alter current requirements. Changes can have an effect on the aesthetics and operational aspects of the building, the scope as well as the nature of work,. According to CII (1990), productivity and project performance gets negatively affected when changes are made. During a project many changes can occur. Some changes are attended, some unattended and both can have positive and negative influences on the project. In construction project main Source of rework is due to changes made in design related work. When Client initiates a change to the design of the building and this may result in rework.

FACTOR INFLUENCING OCCURRENCE OF REWORK:-

1. Client related factors
2. Design related factors
3. Contractor related factors

Client related factors:-Client related factors are the factors in which client is responsible for making the changes between the construction phase which leads to rework. The client related factors include lack of knowledge and experience of design & construction process, unavailability of funds during initial site investigation, less involvement of client during project construction phase, insufficient briefing regarding project and not proper preparation of contract documents. Poor communication flow between the client and design team members can outcome into errors in documentation and omissions occurrence. Changes input given by the client during the construction phase may also result in rework.

Design related factor: Lack of co-ordination and unclear flow of information between the design team leads to design Faults and errors which causes of rework. The origin of design-related rework in construction is mostly because of communication

problems. According study, conducted by Love and Li (2000), the study found that poor coordination and integration between design team members hindered the flow of information among them. Lack of professionalism by design professionals due to reduced design fees can further result in inadequate contract documentation being produced.

Contractor Related Factor: The factors related to site and sub-contractors are included in contractor related category. The lack of ability of supervisors to plan work and poor communication between workers and supervisors are the reason which results to rework. The supervision quality on site plays a vital role in total performance and effectiveness of projects. One of the main causation of rework is inadequate supervision towards the work. Therefore for reducing the amount of rework on site appointment of skilled and experienced supervision is needed.

Impact of rework on construction project

The impacts of rework are classified as follows:

- Impact of rework on construction cost
- Rework Delay
- Impact on parties involved in project.

IMPACT OF REWORK ON CONSTRUCTION COST:-

Love (2002) in his Australian based study, where studies of 161 projects was done and founded out that the averages of direct and indirect costs of rework were 6.4% and 5.6% respectively of the value of contract. Most of literatures related to impact of rework on cost suggest that that the value of rework cost is about 10 % of contract value. So it's very important to reduce rework and further steps should be taken for reduction of rework. Cost of rework also changes with respects to type of project. in new building the cost of rework is more than refurbish building. The reason for the difference is that the new building does not the fix design structure through the project, the design may change according to owners demand so this may bring rework into picture.

REWORK DELAY:-

Delay as a situation where both involved parties fails to complete the given work within time limit decided in the contract document. Delay is a postponement of time with respect to the original estimated time mentioned in the contract document. Delay is, costly, and common problems faced by the construction industry. Rework delay is which needed for correcting the error which has been identified. Once the rework is identified the original activity is stopped and work on rework takes place. There are three steps in rework process. Firstly standby, the work is kept on hold till the identification of rework and it is found. In second step rework is done according to solution decided within the time by applying more workforce and materials. Lastly gears up step, in this other arrangements are made with the rework so that the continuation of original work can be done as soon as possible.

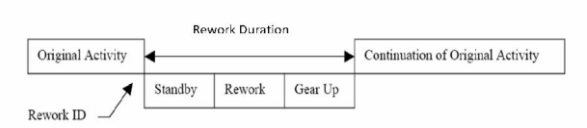

Figure:-Components of rework

(source:-L. O. Oyewobi 2011)

IMPACT OF PARTIES INVOLVED IN PROJECT:-

Construction projects involve numerous stakeholders, and their satisfaction could directly affect the performance of succeeding projects. As result occurrence of rework in projects due to conflict and disputes, this can lead to the disturbance, and may overrun the cost and schedule of project. Rework can also deteriorate the relationship between the parties working together for completion of work. If Issues between the parties are not resolved this may result into legal battle in court which may prove costly for both the parties. To solve these problem special conditions should be made while creating the contract.

CONCLUSION:-

Rework is problem which occurs in the construction project results in cost and schedule overrun. Rework mostly occurs during the initial design, planning and during construction phase. The rework .has negative impact on financial assets and reputation of construction firm. As the rework cost may occur up to10 % of the contract value so rework cannot be neglected. For the reduction of rework regular checks must be applied after completion of certain activity for ensuring that the rework is not occurred. Records of rework occurrences should be maintained and must be used as reference in future projects to avoid same rework.

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