

ABSTRACT

In countries like India, construction industry plays a significant part to develop the economy. But many time this construction industry is blamed for poor quality, delay in completion of work and losses gain during the project period. Construction projects are divided into various stages and these stages includes various task due to this the project becomes complex in nature. Errors, omissions, defects etc are clearly going to happen when complexity is involved. These errors, omissions, and defects result in rework. Rework leads to cost and schedule overrun, material wastage, client dissatisfaction, disagreement between the contractor and client which may result in a legislative dispute. Study on rework shows that the rework cost may increase to 10% of project cost. So rework cannot be ignored in a construction project. Performance of project gets adversely affected by the added cost and tight schedule due to rework

KEYWORDS: Rework causation, quality, supervision, questionnaire.

I. INTRODUCTION

Rework is defined as work procedures that have to be completed more than one occasion. Burati J.L.etal (1992). Rework is major contributor for cost and schedule overrun. It is found that the rework cost can ranges between 5-20% of contract valuation. Neglecting towards errors, omission and poor management may result into quality failure which may result into rework. Rework is no worth adding process which affects the quality and performance of work. Mostly rework occurs when client decides to make changes in design during construction phase. Excess involvement of client may create problem so this problem can be solved by involving client mostly in planning and design phase. Regular checks on rework after completion of major activity or milestone throughout the construction phase are important for early detection of rework. With checks, quality supervision also helps in reduction of insitu rework. Documentation also contributes to rework in construction. Clear language must be used in the documentation so that it can be easily understandable to reduce confusion. Tracking of rework occurrence on the site should be maintained and records of such event should be easily made available for future reference.

II. LITERATURE REVIEW

Anjana anil (2016) in this paper, author underlines the key causes of rework and impact of rework on the project performance. The author also concentrated on finding the effective strategies to reduce the rework during construction project. According to paper rework is a process of redoing work more than one time which leads to time overrun and wastage. The methodology used in the paper for figuring out causes of rework is the questionnaire and their responses. The answers of the questionnaire were given into the scale of four according to severity of causes and impact of rework on construction project. Basically the questionnaire was sub- divided into 4 sections, section A included the basic information of participant such as their age, qualification, experience etc. section B included question regarding causation of rework and section C had questions on impacts of rework.

The paper concluded that the root causes of rework are categorized into diverse groups such client related causes, design related causes, and contractor related causes, site management factors. Poor communication within the involved parties of project may also lead rework. Rework occurrence increases the project cost budget and total time period for completion. The impacts of reworks mentioned in the paper are cost overrun, time overrun, client dissatisfaction and quality degradation.

Maheshkumar Ramesh Shinde, Purva S Kulkarni (2016) the paper concentrates on the significance of supervision in the construction project. Experience supervision plays critical part in minimizing the onsite

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rework. According to the author main reasons for rework occurrence on site are due to unskilled labors, lack of experience supervision, poor communication between parties and wrong assumption about drawing & planning. Quality of supervision depends on the ability, knowledge and experience of supervisor.

The paper reached on the final conclusion the supervision is vital for reducing the insitu rework. For increasing the quality of supervision training is the needed so proper training should be organized with help of institutes. Author highlighted a point that sometimes successful supervision is result of experience supervisors rather than the numbers of supervisor. Some points such as responsibility of supervisors, importance of quality supervision and trainings are mentioned in paper.

L.O. Oyewobi, A.A.oke, B.O. Ganiyu(2011)The objective of paper is to analysis and discussion on the rework cost experienced on case studies in Nigeria. In the paper the construction projects are divided into two type's 1.New building 2. Refurbishment & extension. Author pointed out the most of reworks occurred due to change in design after completion of some work. So there should be measure s taken during planning period so that that design changes should minimum. The defects leading to reworks are design error, deviation in quality, poor workmanship, errors in contract documents etc. the negative impacts of rework mentioned in paper are client dissatisfaction, profitability, and legislation suits between the parties in extreme condition.

The paper conclude that most of projects in Nigeria overruned the initial estimated time and cost. The study suggested that due to rework the time is overrun by 38.26% and cost by 9.88%. According to author recorded rework cost in new building was 5.06% and in refurbished building the percentage was 3.23. The rework cost in refurbished building is less than the new building because refurbished building projects had a base frame of design so the scope for changes were nominal in design part. Finally author concluded that to reduce rework a consensus should be reached for work mechanism for minimizing the changes during construction phase.

Adnan Enshassi (2017) paper discuss about rework problem faced in construction industry of Gaza strip. For identifying the factors contributing to rework extensive literature review was done and with the help of case study data regarding the various defects and deviation leading to rework were found.

After study of literature review and questionnaire results author concluded that total 57 rework factors which were categorized under 7 groups were found out which factors for major contributor for rework are 1.contractors related causes and 2. Human resource related causes. The study also showed important causes that impacted the project performance are as follows:-

1. Attempt to fraud
2. Pressure of competitive market.
3. Ineffective management
4. Pressure of completing work in time.
5. Job insecurity and absence of safety measures.

Ekambaram palaneeswaran (2006) in this paper the main aim of author is to recognizing the important rework items and naming the causes of rework in construction project. Paper also summarizes the rework reducing factors and presents a framework for management of rework. The eight overlapping channel strategies are shown in the form of flowchart for reducing the reworks are as follows:-



Fig: - Flowchart for managing rework in project.

The paper concluded that use of structured system for rework management and creating awareness about the rework helps in reducing the rework in project. Proper tracking and information about rework occurrence should be stored in file or software and should be kept easily accessible for future reference. For reinforcement from future losses some contractual safeguards should be done.

Peter E.D. Love (2010) aim of paper is to gain information and knowledge about the normal predictors of rework in infrastructure project. Questionnaire based methodology is used and regression analysis was undertaken for finding the result.

The paper concluded that 5 significant predictors contribute for 25% deviations in rework cost are given below:-

1. Ineffective use of software's e.g.:- CADD
2. Too much client involvement
3. Undefined working procedures.
4. Changes made at request of client during construction phase
5. Lack of attention towards quality.

Author also found that primary contributor for rework in design stage was the unavailing use of IT by the members of design team. For better result author suggests that proper training of IT should be given, various review checks should be done during design and planning stage and better management of documents and design procedure to diminish rework.

Peter E.D. Love (2016) in paper author highlights the underlying acts of causing rework in civil project. According to author the theoretical studies available about the rework are limited and therefore theoretical concepts related to causation of rework needs to be future research so that this may increase the skill to find the solution of the problems that are arising in construction project. The two innovative theoretical concepts introduced in the paper are 1.cognitive mapping 2.System Dynamics.

The conclusion reached in the paper that the theoretical concepts related to causes of rework need to be future researched for finding better and effective solution for the problems. The researchers are reaching to stagnated stage because of using same method is repeated over the decade.

III. CONCLUSION

From review studied the paper concludes that rework hampers the performance of construction project which results in quality degradation, extension in completion period and increase in project budget. A proper check mechanism should be followed after every activity for checking the rework. Supervision during the onsite construction helps in reducing the rework. For good quality of supervision training programs should be arrange for the supervisors. Percent rework cost for new building was found 5.06% and for the refurbished building was 3.23% this difference occurs between the buildings because there is scope for change in design framework in new building as compare to refurbished building. Creating awareness and use of systematic rework management helps in reducing overall rework.

Theoretical studies related to causation of rework are reached to stagnant stage so future concepts needs to develop for finding better and effective solution for arising new difficulties related to rework in construction industry.

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