

“An Investigation of Factors Causing Rework in Construction Projects at Hadapsar, Pune.”

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Abstract—Rework in construction projects is mainly stated as the repetition of activity or wasting unnecessary efforts for redoing same process or activity, which was incorrectly implemented in first instance. Rework can adversely affect the performance, productivity and ultimately the profit margins. Construction projects are considered as continuous system which needs to be designed produced and delivered within specified time. In this continuous system, the repetition of work or activity causes delay of work and increase in cost.

In proposed study approach included main study targeting purposively selected construction professionals i.e. Consultants, contractors. And also it includes opinion of owners and labors working on construction site in the Hadapsar area of Pune city. First of all questionnaire was designed with the help of guide and experts in respective fields. Then responses are collected and respective objectives are obtained. The study was motivated by several internal and local studies demonstrating lack of concern for root cause of rework. Also my own experience of site majorly motivated me for study.

Keywords: Rework, rework causes, nature of rework.

1. INTRODUCTION

Nowadays, the awareness of people regarding the construction is increasing day by day. The problems faced by construction companies are well known, it may include less production, poor safety, less profit insufficient quality etc. Solutions for these problems are given in many ways.as competition in market is increasing & profit is decreasing many contractors are worried about their business. they are finding many ways to increase the profit & reduce the waste. Numbers of approaches have been developed for that.

Contractors are getting aware about reducing waste. Waste may be in any form. Waste is nothing but the things which are wasted. It may be in the form of man, material, money & time. Rework is referred as unnecessary effort of redoing a process or activity that was incorrectly done in previous attempt. the rework may be occurred due to errors, omissions, failures; changes, poor coordination etc. rework affects on project directly & indirectly as it happens at different stages of project. the direct impact occurs on time, cost, material,

manpower etc. while the indirect impact occurs on profit margin.it may also causes stress, motivation, relationship & reputation.so it is necessary to study the factors causing rework.

1.1 Definition of rework

There are various interpretations and definitions about rework. Terms include: "quality deviations", "nonconformance", "defects" and "quality failures". Rework can be described as unneeded effort of redoing an activity or operation that was enforced in a wrong way from the beginning. (2)

"The process by which an item is made to conform to the original requirement by completion or correction"(1)

1.1 Nature of rework

The construction field plays important role in economic development of any nation especially in expanding economy. Construction industry is connected with many other manufacturing industries.it consumes a huge amount of money, time & energy. Nature of rework can be determined by referring definitions. Similar terms for rework include "quality deviation", nonconformance, defects & quality failures. Rework can be either positive or negative. Its positive when rework becomes necessary when an element of building works fails to meet customer's requirement (Simpeh EK,2012).construction industry is faced significant problems like high cost, late delivery & bad financial performance. Rework has negative impact on performance & productivity. Rework happens as demolishing & rebuilding. Sometimes it happens as requirement of extra work.

1.3 Rework as waste in construction projects

Waste means the thing which is wasted or which is not of any use. Nowadays there are many problems related to construction waste. Since last two decades the amount of waste is increased largely.it is because due to standard of living & increase in population mainly. Many reports and studies have concluded that generated waste leads to negative impact on environment, cost, productivity, time and economy.

These waste generation activities consumes time and it causes loss of money, material and execution of unnecessary work.in rework due to repetition of work there is wastage of man, money, material etc. which are not refundable.so it is necessary to reduce waste due to rework. For that it is necessary to find out the factors causing the rework,Once root causes are found, rework waste reduction becomes easy task.

1.4 Rework impact on construction projects:-

In large construction projects there are many activities like supplying of material, installation etc. takes place simultaneously due to poor communication and co-ordination there is occurrence of errors, omissions and poor management practices which results into rework. There are many direct impacts on construction projects. Rework directly impacts on time schedule, cost etc. the direct impacts are easily identifiable.in addition to the direct impacts there are some indirect impacts which affect the projects. They are like morale level, conflict, absenteeism, fatigue and communication. love studied that rework can seriously affect an individual, an organization and a projects performance indirectly.

2. Methodology

Research design selected for study purpose is descriptive in nature and includes the questionnaire survey. Secondary data is collected by reviewing the past literature of well-known authors.it includes reading and evaluating other people's idea or completed work and analyzed results. Primary data is collected with help of questionnaire survey. The deliberate sampling is used for study purpose. The area selected for study is Hadapsar, pune. Questionnaire is designed with the help of guide of this project study and experts having experience of more than 10 years, in the field of rework. Closed ended type questionnaire is designed. Then the respective questionnaires are distributed among the contractors, consultants/designers, owners and labors. Responses of all respondents are collected in five types i.e. strongly agree, agree, undecided, disagree and strongly disagree. Some questionnaires are collected directly, some are collected by phone and few of them are collected through mails. Then factors of rework are sorted and classified. After classifying the factors the mean and RII of respective factors is calculated. Thus the most causing factors related to owner, contractor, designer and labor are obtained. And objectives of proposed study are obtained. The table displaying summary of results is given below

Table 1: Calculation of most causing factor:-

SR. NO	Causes category	Rework cause	Mean	R.I.I(%)
1.	contract	Communication gap	4.6	91.0
		Machinery issue	2.5	49.8
		Competition issue	1.9	38.3
		Poor leadership	4.4	88.1
		Construction method	2.7	54.6

	or	Motivation to workers	3.5	70.8
2.	consultant	Work burden	3.4	68.1
		Design specification	4.2	83.5
		Communication gap	4.6	91.3
		Design difficulty	3.3	65.5
		Unsuitable drawing	2.8	56.1
3.	owner	Communication gap	2.1	42.0
		Funding issue	3.9	78.0
		Material delivery	2.5	56.3
		Material quality	4.4	87.6
		involvement	2.8	56.3
		Frequent design changes	4.4	88.8
4.	labor	Unskilled labor	4.2	84.0
		Cleaning of site	2.9	58.5
		Insufficient manpower	3.7	74.1
		protection	2.0	40.6
		Communication gap	2.6	51.8
		Proper training	2.5	50.0

3. Summary/conclusion.

The surveyed respondents ranked "communication gap" as the first rework causes related to contractor with RII of 91%, and secondly "poor leadership" with RII of 88.1% that very severe on project performance. The surveyed respondents ranked "communication gap" as the first rework causes related to consultant with RII of 91.3%, and secondly "design specification" with RII of 83.5% that very severe on project performance.

The surveyed respondents ranked "frequent design changes" as the first rework causes related to owner with RII of 88.8%, and secondly "material quality" with RII of 87.6% that very severe on project performance.

The surveyed respondent's ranked "unskilled labors" as the first rework causes related to labor with RII of 84%that very severe on project performance.

Thus it is necessary to develop the framework to reduce the severity of these factors. this will help to reduce the waste due to rework.

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