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ICEIET-2017**A Study On Factor Influencing Quality In Construction**Chitra.E<sup>1</sup>, Banuchandar.J<sup>2</sup>, Kamal Nataraj.D<sup>3</sup>P.G student<sup>1</sup>, Assistant professor<sup>2</sup>, Assistant professor<sup>3</sup>, Department of Civil Engineering,  
Surya Group Of Institutions, Vikiravandi-605652, Tamil Nadu, India.<sup>1</sup>Chithu\_er18@yahoo.com<sup>2</sup>banuchandarsgi@gmail.com<sup>3</sup>kamalnatarajsgi@gmail.com**Abstract**

Construction projects play a vital role in the development of our nation. Quality is one of the important features in all projects. Success parameter in construction greatly depends on the quality performance. In construction projects lack of quality results in delays, cost overrun and unsafe structure. This research mainly focuses on identifying and scrutinizing the factors that affects quality in construction. From literature review the main factors that affect quality of construction is identify. A questionnaire survey is to be carried out in various companies and rank them by Relative Importance Index. Using that data the major factors that affecting the quality have to be identified. Then conduct T-test using SPSS package to analyze the data to find out the significant difference between the ranking of contracting and consulting companies towards the importance of quality factors. Finally from the results suitable suggestions was given to the companies for improving their product quality.

**Keywords**—Quality, factors, Questionnaire survey, Relative important index, Rank

**I. INTRODUCTION**

Quality is one of the important aspects of all projects. The level of success of construction projects greatly depends on the quality performance. Quality in construction cannot exist without a project and a construction project cannot exist without quality. The quality of a product or system can be defined as its ability to ensure complete customer satisfaction in totality, which may include all aspects such as comfort, appearance etc. Cost is vital and important in any project. Cost reduction through eliminating wastages, excess consumption, rejection, substandard, rework has to be achieved in all functional areas. These wastages can be achieved by maintaining quality throughout the project. It has been seen that the quality and customer service offered by an enterprise plays a crucial role in the survival and success of an enterprise under the existing environment. Quality is a key to a nation's economy. It is an essential requirement for any product. The quality of an engineering product can therefore be measured in terms of number of characteristics that contribute to an overall performance which satisfies customer's requirements; this is termed as performance characteristics. The basic aim of the research is to identify the major factors that affect the quality of

the construction projects .The factors were ranked based on relative important index method.

**1.1 OBJECTIVES**

The objectives of the present study are

- 1.To identify various factors affecting the quality performance of construction projects
- 2.To rank them by degree of importance
- 3.To suggest ways to improve the quality performance of construction projects
- 4.To improve products quality
- 5.To minimize the rework
- 6.Helps to meet the customer requirements.

**NEED FOR THE STUDY**

- 1.Generally quality is essential for every product.
- 2.Development in construction projects develops the nation.
- 3.Quality in construction is very essential to increase end user satisfaction.
- 4.To increase end user satisfaction ,study and analyses of the factors influencing quality in construction becomes necessary.

**II. LITERATURE REVIEW**

**Davidkumar.C et al., (2015)** has published a paper entitled as “A Study on Factors Influencing Quality of Construction Projects”. The construction industry plays a vital role in the economy. The construction industry is complex in its nature because it comprises large numbers of parties as owners (clients), contractors, consultants, stakeholders, and regulators. Despite this complexity, the industry plays a major role in the development and achievement of society’s goals.

**Husam. M. Ahmed et al.,( 2016)** ) has published a paper entitled as “ Factors Affecting Quality During The Construction Phase In Iraqi Government Companies” Construction projects play a significant part in the development of any country and quality is one of the important factors in the success of the construction industry.

**V.Priyanga et al.,(2014)** has published a paper entitled as “Study on Factors Influencing Construction Process Performance” Construction industry plays a major role in developing and achieving the goals of Society. Construction is one of the largest industries and contributes to about 10% of the Gross National Product in industrialized countries. The failure of any construction project is mainly related to the problems and failure in performance.

**K. N. JHA et al.,( 2006)** has published a paper entitled as “Critical Factors Affecting Quality Performance in Construction Projects” The reasons for the underperformance of the quality of Indian construction projects were studied to suggest possible remedial measures. A preliminary survey identified 55 attributes responsible to impact quality performance of the projects. Statistical analysis of questionnaire responses on the attributes resulted into two distinct sets of success and failure attributes. Further analyses of individual sets of success attributes and failure attributes separately grouped them into fewer critical success and failure factors.

**III. METHODOLOGY**

Various literatures related to the projects are reviewed. Based on the review, the factors affecting quality are identified which helps to frame a questionnaire. Questionnaire survey is conducted among contractor, consultant and labors of various companies. These survey responses are analyzed using relative important index method. For the mean values, ranks are provided and this analysis gives the most significant factors affecting quality in construction.

**3.1 ASSESSMENT METHOD**

Five point scale

1 – strongly agree , 2 – Agree , 3 – moderate , 4 – disagree , 5 – strongly disagree.

**3.2 ANALYTICAL TOOL**

Relative important index

This method is used to find the contractor , owner and labor perceptions of the relative important of the identified quality factors.

$$RII = \frac{SW}{AN}$$

Where,

RII - Relative Importance Index,

W - weighting given to each factor by the respondents (ranging from 1 to 5)

A - highest weight (i.e. 5)

N - total number of respondents.

**3.3 IDENTIFIED FACTORS**

The identified factors from the literature review are

- 1.Design
- 2.Contractor
- 3.Subcontractor
- 4.Owner
- 5.Material
- 6.Labor
- 7.Equipment
- 8.System
- 9.Co-operation between parties
- 10.Site layout
- 11.Financial issues
- 12.Execution

**IV. RESULT AND DISSCUSSION**

**4.1. RELIABILITY OF DATA**

The reliability of data is done using Cronbach’s Coefficient Alpha Method, in SPSS software which is commonly used to estimate the reliability of data.. The Cronbach’s alpha obtained for respondents is

Reliability Statistics

Cronbach's Alpha	0.791
No of Items	50

Cronbach’s alpha value is 0.791.The value must be in the range of 0.6 to 1.0 if the data has to be reliable. Hence in this analysis the data values are reliable.

**4.2 DATA ANALYSIS**

A ) Questionnaire survey is conducted through post and field survey. From this survey 75 responses were received. These data are analyzed using Relative Important Index method. Ranks are provided for the mean values analyzed using this method.

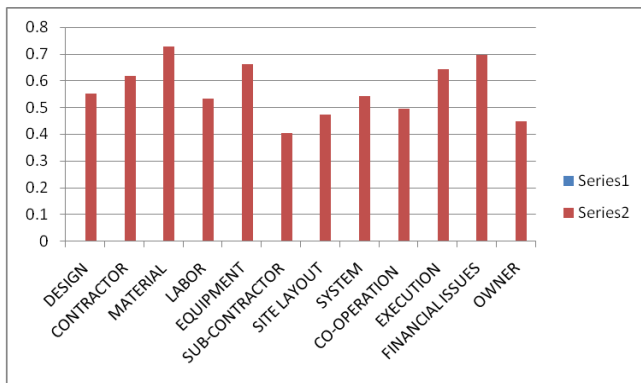
**Table -1** Gives RII, mean values and ranks for the factors

Ratings were given as

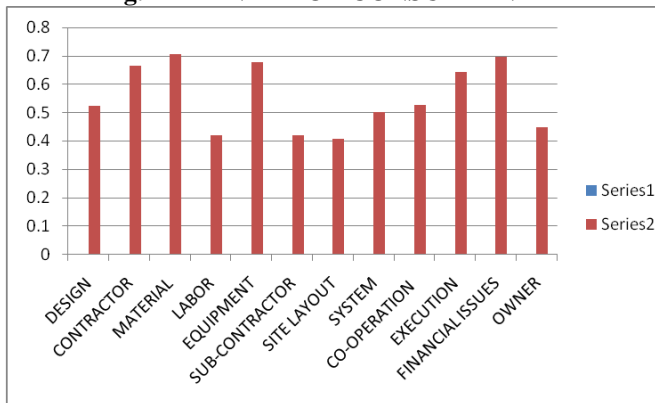
MAJOR FACTOR	SUB- FACTOR	CONTRACTOR			CONSULTANT			OWNER		
		RII	MEAN	RANK	RII	MEAN	RANK	RII	MEAN	RANK
DESIGN	Design codes are not followed in construction	0.48	0.551	6	0.56	0.524	7	0.69	0.492	8
	Changes in design affects construction	0.6			0.67			0.59		
	Design and drawing are not prepared in full detail	0.43			0.37			0.35		
	Plan & schedules are revised frequently	0.51			0.48			0.36		
CONTRACTOR	Improper communication between client and contractor	0.68	0.617	5	0.70	0.665	4	0.71	0.632	5
	No Co-operation between parties involved in contract	0.67			0.71			0.61		
	A contract document is not clearly conditions	0.43			0.45			0.39		
	Skill and experience of contractor's staff	0.69			0.80			0.82		
MATERIAL	Unavailability of good quality materials	0.78	0.728	1	0.74	0.706	1	0.69	0.684	2
	Delay in supply of materials	0.78			0.69			0.71		
	Inventory levels are not checked	0.55			0.59			0.43		
	Co-operation between contractor and material suppliers	0.68			0.71			0.80		
	Improper storage and handling system	0.85			0.80			0.79		
LABOUR	Labor shortage	0.51	0.532	7	0.34	0.42	10	0.51	0.492	9
	Using unexperienced labor	0.67			0.59			0.64		
	Proper payment is not made to labor	0.54			0.38			0.35		
	Inadequate motivational and training systems	0.41			0.37			0.47		
EQUIPMENT	Adequate equipments are not available	0.73	0.66	3	0.76	0.677	3	0.76	0.68	3
	Improper maintenance of equipment	0.75			0.84			0.75		
	Bad utilization of equipment	0.75			0.75			0.81		
	Equipment usage not increases productivity	0.35			0.36			0.40		
SUB-CONTRACTOR	Follow incorrect procedure for selecting subcontractors	0.42	0.402	12	0.37	0.42	11	0.42	0.405	10
	No Co-operation between contractor and subcontractors	0.36			0.38			0.32		
	Using no system to evaluate subcontractors	0.32			0.34			0.31		

<b>SITE LAYOUT</b>	Site layout is large	0.23	0.472	10	0.24	0.407	12	0.19	0.377	11
	Site layout has no storage area for material	0.54			0.25			0.23		
	Access to the site is risk	0.61			0.57			0.56		
	Location of the project is not good	0.51			0.57			0.53		
<b>SYSTEM</b>	System and computer applications are not used	0.60	0.524	8	0.53	0.50	8	0.59	0.528	7
	Quality control and assurance systems are not Implement	0.75			0.72			0.82		
	Not Using cost control system	0.54			0.56			0.53		
	Safety program not followed	0.37			0.38			0.41		
	Not Using time schedule	0.36			0.31			0.29		
<b>CO-OPERATION BETWEEN PARTIES</b>	No Co-operation between supervisor and contractor's staff	0.35	0.495	9	0.37	0.525	6	0.41	0.565	6
	No co-operation between workers	0.5			0.61			0.67		
	Not Understanding of contract administration by supervisor	0.43			0.47			0.45		
	Unskilled and inexperienced supervision staff	0.7			0.65			0.73		
<b>EXECUTION</b>	Not Using integrated project execution system	0.58	0.642	4	0.69	0.657	5	0.53	0.645	4
	No Testing for final products	0.70			0.69			0.69		
	No Clear procedure for accepting performed activities	0.65			0.56			0.64		
	Not Preparing and using shop drawings	0.50			0.69			0.72		
<b>FINANCIAL ISSUES</b>	Financial problems arise during construction	0.54	0.696	2	0.56	0.70	2	0.59	0.723	1
	Delay of payments affect project	0.75			0.78			0.74		
	Construction cost exceeds the estimated cost	0.8			0.76			0.84		
<b>OWNER</b>	Owner's delay response	0.57	0.447	11	0.54	0.422	9	0.42	0.365	12
	Owner's inadequate contribution to design	0.43			0.36			0.32		
	Owner's inadequate emphasis on quality	0.54			0.59			0.47		
	Customer not satisfied with work	0.25			0.20			0.25		

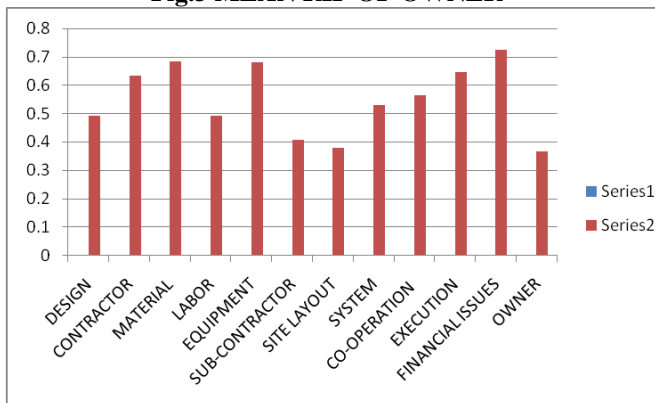
**Fig.1 MEAN RII OF CONTRACTOR**



**Fig.2 MEAN RII OF CONSULTANT**



**Fig.3 MEAN RII OF OWNER**



**B). Independent t-test for response agreement**

It is important to check whether there are differences in the views of respondents or not. So for this reason independent t-test was conducted with the help of SPSS software.

**TABLE-2 INDEPENDENT T-TEST RESULTS**

CATEGORIES	t-test	P-value
Contractor – consultant	1.742	0.321
Contractor – owner	1.681	0.396
Consultant – owner	1.215	0.232

The t-test is insignificant because all values of “P” as shown in Table are less than 0.05, so we conclude that there are no conflicts in ranking of factors among the different respondent’s.

**V. CONCLUSION**

Construction industry requires the involvement of quality to ensure that the construction projects are being in the right path. . Many literatures are reviewed and the major factors affecting the quality of construction is identified. Based on that questionnaire are prepared and distributed to the 35 companies and 25 were successfully received. From that data by using relative important index method RII is identified and ranking were provided to the major factors. From that result we conclude that the major top 5 factors that affect the quality of construction in the view of respondents like contractor, consultant and owner are Materials, Financial problems, Method of execution, Equipment, Problems in contractor side. The respondents observed that the quality of raw materials, conditions and Usage of equipment , Method of execution of work, Financial issues and the contractual problems are the main quality affecting causes .

**5.1 RECOMMENDATION**

The following recommendations are made based on the results and discussions of the study. These recommendations are very helpful to attain the best quality in construction.

1. All the materials procured for the construction should be undergo quality check before made procurement.
2. All the procured materials should be stored properly.
3. Material inventories should be checked periodically to avoid over stocking or deficiency of material.
4. Make timely delivery of material to the site.
5. Equipment should be checked for its correctness before procure.
6. Equipment should be maintained properly and make service periodically.
7. Equipment should be used for its full utilization.
8. Use proper method of execution of work.
9. Make field test before and after the work.
10. Owners should contribute in design.
11. Owners should make the payments at correct time.
12. Avoid financial problems.
13. Make timely payments to the labors.
14. Co-operation between parties is very important.
15. Proper communication between contractors and clients.
16. Maintain the construction cost within the estimated cost.
17. Appoint experienced and skilled labors
18. Proper communication between contractors and labors
19. Avoid frequent change in designs.
20. Maintain the site layout clean.



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