A Study on the Resource Factors Influencing the Scheduling Performance in Construction Industries

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Abstract— A project can be said successful only when it is completed within the scheduled time and cost. In India, construction industry stands next to agriculture in the economic activity. Any problem in the economy of the construction industry would directly affect the country's economy. In order to eliminate this decline in countries economy, the factors influencing the construction industries decline is been studies. Among the various different factors studied, the project purely involves the effect of resources and its effect on the construction projects in India. The main effects of the resource are time-overrun, cost overrun, conflict occurrence. This paper involves the questionnaire survey and thus calculating the frequency index, importance index in order to value the causes of the resource in Indian construction industries. A questionnaire survey is been prepared with fifty seven different causes of time overrun and the causes are circulated among different construction industries for the ranking of the causes. The results thus gathered from the questionnaire are analysed for the time overrun causes using the SPSS(Statistical Package for Social Sciences) software.

Keywords—*economy, time-overrun, cost-overrun, frequency.*

I. INTRODUCTION

Scheduling can be defined as the plan of procedure usually written for a proposed objective especially with the reference to the sequence of time allotted for each item or operation necessary to its completion. Though the use of scheduling software has minimized the inconvenience in scheduling, there are many other factors that influence the scheduling performance in construction. Once a perfect schedule is prepared for the project, the project can be said as half successful one. Among the various other factors that influence the scheduling performance, the resource stand as very viable factors. The construction industry handles many resources such as Money, Men, Machinery, Market, Material ec**t…** These resources when not properly used causes time-overrun, cost overrun, conflict etc.. This research aims at detecting the factors responsible for the delay of construction

due to improper use of the resources. Questionnaire survey method was adopted for the study of the delay factors. The most significant are then identified through the analysis process of the collected data.

A. Obective Of The Study

The main objective of this study includes the following

- To identify and rank the factors influencing the resource in scheduling performance in Indian construction industry
- To identify the causes of time-overrun (delay in construction in India)
- To examine the importance of the causes of delay
- To evaluate the effect of the resource in construction industry

II. PREVIOUS STUDIES

To make a project successful, these three factors must be considered. They are TIME, COST and QUALITY. As this paper deals only with the time factor, papers that served details regarding the above said is chosen and reviewed nationally and internationally.

Sadi Assaf and Sadiq Al-Hejji (2005) evaluated the causes of delays in large construction projects in Saudi Arabia wherein they studied 73 causes of delays. Also Desai Megha and Bhatt Rajiv (2013) conducted delay studies in Indian residential project wherein 59 causes were identified and analyzed. Ranking of the causes is performed by Desai Megha et al., (2013) Olungan et al.,(1996) conducted a study on construction delays in Thailand. They recommended that there should be concerned effort by economy managers and construction industries. A quantitative analysis on construction delays in Jordan was carried out by Ayman H.Al-Homani (2000). The result indicated that the main causes of delay in construction of public projects. . Similarly Odeh and Battaineh also conducted a survey aimed at identifying the most important causes of delays in construction projects. A questionnaire with 26 factors was designed from preliminary investigations conducted in

groundwater drilling projects between 1970 and 1999 in Ghana by Frempong et al., (2003) the result revealed the main causes of delay and cost overrun in construction of groundwater projects. Odeyinka and Yusif (1988) have addressed the causes of delays in building projects in Nigeria. They classified the causes of delay as project participants and extraneous factors. . Chan and kumaraswamy (1996) conducted a survey to determine and evaluate the relative importance of the significant factors causing delays in Hong-Kong construction projects. They analyzed and ranked main reasons for delays.

III. METHODOLOGY

From the previous studies done regarding the delay analysis[2][4][9], questionnaire survey method was adopted for the analysis of the detected causes. About 57 factors affecting scheduling performance due to resource constraints on construction projects are selected. These factors are grouped into 4 groups based on literature review. For the survey a questionnaire was prepared in three parts. The first part contains the requesting letter, the second part comprises the demographic profile of the company or the personnel, the third part consists of 57 factors that were identified from the literature survey. About 120 organizations were contacted out of which 100 responded. Many of the respondents are leading construction, consultancy and government organizations. The responses received are analysed using SPSS software. The frequency and the severity of the caused was calculated and the ranking of the factors was done.

IV. ANALYSIS OF THE CAUSES

A one sample t-test was carried out to determine whether the population considered a specific attribute to be important or otherwise. Furthermore, the mean ranking of each attribute was tabulated to help provide a clearer picture of the consensus reached by the respondents. A summary of the test results is shown in Table I. The significance level was set at 95% in accordance with conventional risk levels. Thus, based on the five-point Likert rating scale, a success criterion was deemed critical or important if it had a mean of 3.5.

TABLE I T-TEST SHOWING ONE-SAMPLE STATISTICS

Factors	N	Max	Min	Mean	S.D	Rank	Sig (1-tailed)
F1	100	1.00	5.00	2.8300	.77921	28	.000
F2	100	1.00	5.00	2.6300	.71992	35	.000
F3	100	1.00	5.00	2.7400	.82413	32	.000
F4	100	1.00	5.00	2.8300	.89955	28	.000
F5	100	1.00	5.00	3.0700	.89052	13	.000
F6	100	1.00	5.00	2.5100	.95869	40	.000
F7	100	1.00	5.00	2.9800	.85257	18	.000
F8	100	1.00	5.00	2.6000	.89893	37	.000
F9	100	1.00	5.00	2.8900	.90893	24	.000
F10	100	1.00	5.00	2.8700	.94980	25	.000
F11	100	1.00	5.00	2.5700	.92392	39	.000
F12	100	1.00	5.00	2.7400	1.0310	32	.000
F13	100	1.00	5.00	2.8000	.91010	30	.000
F14	100	1.00	5.00	2.5900	.90000	38	.000
F15	100	1.00	5.00	2.6300	.96038	35	.000
F16	100	1.00	5.00	2.9200	.96064	21	.000
F17	100	1.00	5.00	2.7200	.84184	33	.000
F18	100	1.00	5.00	2.8000	.86457	30	.000
F19	100	1.00	5.00	2.7700	.86287	31	.000
F20	100	1.00	5.00	2.9000	.77198	23	.000
F21	100	1.00	5.00	2.9400	.86246	19	.000
F22	100	1.00	5.00	2.8100	.84918	29	.000
F23	100	2.00	5.00	2.9300	.96667	20	.000
F24	100	1.00	5.00	2.7100	.75605	34	.000
F25	100	1.00	5.00	2.6100	.89775	36	.000
F26	100	1.00	5.00	2.4900	.93738	41	.000
F27	100	1.00	5.00	3.1900	.89550	5	.001
F28	100	1.00	5.00	3.0500	.99874	14	.000
F29	100	1.00	5.00	3.2400	1.1381	3	.002
F30	100	1.00	5.00	3.3800	.77564	2	.001
F31	100	1.00	5.00	3.1000	1.0100	11	.000
F32	100	1.00	5.00	2.9000	.98985	23	.000
F33	100	1.00	5.00	2.8600	1.1102	26	.000
F34	100	1.00	5.00	2.9100	1.1728	22	.003
F35	100	1.00	5.00	3.2400	.96525	3	.008
F36	100	1.00	5.00	3.1100	.98365	10	.000
F37	100	1.00	5.00	3.0700	1.0565	13	.000
F38	100	1.00	5.00	3.1400	.96421	8	.000
F39	100	1.00	5.00	3.0900	1.1642	12	.003
F40	100	2.00	5.00	3.1800	1.1667	6	.002
F41	100	1.00	5.00	3.1200	1.1035	9	.001
F42	100	1.00	5.00	3.0900	.93306	12	.000
F43	100	1.00	5.00	2.8400	1.2530	27	.000
F44	100	1.00	5.00	3.1200	1.1306	9	.001
F45	100	1.00	5.00	3.0100	.89324	17	.000
F46	100	1.00	5.00	3.0700	.85582	13	.000
F47	100	1.00	5.00	3.0600	.80177	15	.000
F48	100	1.00	5.00	3.1000	1.0588	11	.000
F49	100	1.00	5.00	3.1400	1.1193	8	.002
F50	100	1.00	5.00	3.0400	1.0533	16	.000
F51	100	1.00	5.00	3.4000	.96400	1	.002
F52	100	1.00	5.00	3.2000	1.0444	4	.005

F53	100	1.00	5.00	3.0300	.91514	16	.000
F54	100	1.00	5.00	3.1600	.88443	7	.000
F55	100	1.00	5.00	3.1800	1.1135	6	.005
F56	100	1.00	5.00	3.1100	.82749	10	.000
F57	100	1.00	5.00	3.0300	.99955	16	.000

A. Discussion of the result

The ten most important factors were identified from the T-test based on the mean value obtained from the results in table I. The factors are listed below

- **F51**-Inappropriate construction methods

- **F30**-Unqualified labors

- **F29**-Shortage of labors

- **F52**-Rain effect in construction acticities

- **F27**-Unrealistic contract durations imposed by clients

- **F40**-Imported materials

- **F54**-Effect of social and cultural factors

- **F49**-Accidents during construction

- **F44**-Low productivity and low efficiency of the equipment

- **F56**-Poor transportation

Further the t-test value was found significant P<0.005 therefore it is calculated that all factor considered in this research are the time-overrun factors in Indian construction industries.

V. RECOMMENDATIONS

The recommendations to overcome the major causes of the time-overrun due to resource constraints in the Indian construction industries are complied from the previous studies. These resource factors responsible for the construction delay can be eradicated by proper planning of the resource usage. Majorly the transportation of the resource and the trade off functions during construction influence the delay in the project. Moreover the man power resource should be properly planned to avoid major delay in the construction. Eventhough certain factors such as climatic changes, accidents are unpredictable and it cannot be eliminated by pre-planning of the project.

VI. CONCLUSION

The causes and effect of the resourc in the Indian construction industries are evaluated and the suggestions to overcome those factors are furnished in this paper. From the results derived the manpower resource influences the time overrun factor in the Indian construction industries.

In the further studies the effect of resource in causing the cost overrun and conflict in the construction project will be studied.

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