iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 7 **Issue:** I **Month of publication:** January 2019

DOI: http://doi.org/10.22214/ijraset.2019.1124

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 6.887
Volume 7 Issue I, Jan 2019- Available at www.ijraset.com

Optimization of Factors in the Construction Projects

Manoj Sharma[1], Dr. A.S. Trivedi[2], Bankelal Prajapati[3]
[1]*Associate Professor, Civil IPS CTM Gwalior, RGPV University Bhopal (M.P) / India*
[2]*Professor, Civil IPS CTM Gwalior, RGPV University Bhopal (M.P) / India*
[3]*Research Scholar, M. Tech Civil IPS CTM Gwalior, RGPV University Bhopal (M.P) / India*

Abstract: Delay in Building Construction Project is one among the foremost common issues. Delay is outlined as time overrun or extension of your time to complete the project. Delay is state of affairs once the particular progress of a construction project slower than the planned schedule or late completion of the comes. The causes of delay in Building Construction comes square measure taken from the pass literature review. The literature reviews square measure summarized and also the delay framework is made supported literature review outline.
Keywords*: Delay, Causes of delay, Effect of delay, Relative important index. Time, cost*

I. INTRODUCTION

Construction industries area unit a growing business altogether over world. In India, time and value overruns are known because the most vital factors chargeable for abandonment and contractor's failure Delays and disruptions area unit challenges two-faced by business. The aim of this study is to review past studies on decisive the factors that area unit in charge for delays. In most countries biggest client is government. (Okpala and Aiekwu), to dislike of non-public business, many government project experience delay then exceeds initial time and worth estimates (Odeh sand Bataineh). Indian business has gained way more importance in recent times due to gap of Indian markets and conjointly the arrival of mega comes for infrastructure development the performance of Indian construction comes. Delay is also a state of affairs once the actual progress of a construction works is slower than the planned schedule or late completion of comes. Delay is classed into two types: Non-excusable & Excusable.

Once the contractors area unit in charge for the rationale behind the delay, known as non-excusable delay. Excusable delay is any classified as paid and non- paid delay. the primary objective throughout the event technique is to end the project on time and at intervals the budget, whereas meeting established quality desires and various specifications. However, in some cases, delays throughout the event can turn out vast worth damages and succeeding the project parties taking due process against each other through a construction claims. to measure the performance of comes, the no. of comes achieved their goal and no. of comes that doesn't is analyzed. to spice up the performance of project if we have a tendency to tend to might management the sole most significant issue of normal delay, the value change of magnitude area unit usually ultimately contained .This paper studies performs the continued and completed mega project

II. OBJECTIVES

The main objectives of this study include the following:

A. To establish the causes of delays in construction in India.
B. To minimize the impact of delay in construction project.

III. METHODOLOGY

In this paper, general focus has been created on the time. price factors. the target of this study is to spot the foremost reason behind delay within the construction project and access the relative importance of those causes, from the aspects of construction contractors and consultants. The study was performed on the premise of form, divided into 2 main elements. half one associated with general info for each the corporate and respondent. each contractors and consultants were more requested to answer the queries relating their expertise in industry. half 2 includes the list of your time, price of delay in industry on the premise of form distributed arbitrarily to contractors & consultants operating in construction comes, response were collected .

IV. DATA ANALYSIS

The data analysis will be done by relative importance index technique used to determine the relative importance of the various cause of factors. The same method is going to be adopted in this study. The five-point scale ranged from 1(very low important) to 5 (very high important) will be adopted and will be transformed to relative importance indices (RII) for each factors as follows.

$$RII = \sum W / A*N$$

Where, W is the weighting given to each factor by the respondents (ranging from 1 to 5), A is the highest weight (i.e. 5 in this case), and N is the total number of respondents. The RII value had a range from 0 to 4 (0 not inclusive), higher the value of the RII, more important was the causes of delays. The RII was used to rank the different uncertainty factors that cause delay. These ranking made it possible to cross-compare the relative importance of the uncertainty factors as perceived by the respondents.

V. RESULT AND DISCUSSION

A. *Analysis of Data*

Total forty eight respondents have filled up the questionnaire. Subsequently for analysis of responses following steps are followed:

1) Responses were converted into numerical values based on their rating attributes. A sample is shown in Table
2) After that mean of numerical values of all twenty eight responses is determined
3) Then, Standard deviation and coefficient of variation for each risk factor is determined
4) Afterwards, Index Score for each risk is calculated by using RI Method.

Table 2: Conversion of response into numerical values (Questionnaire 1)

Groups/Factors	Very low important	Low important	Medium Important	High important	Very high important
(1) Cost factors	1	2	3	4	5
Market share of organization		0.4			
Liquidity of organization		0.4			
Cash flow of project				0.8	
Project design cost			0.6		
Material and equipment cost		0.4			
Project labor cost	0.2				
Project overtime cost	0.2				
Cost of rework			0.6		
Cost of variation orders				0.8	
Regular project budget update				0.8	
Cost control system				0.8	
(2) Time factors					
Site preparation time				0.8	
Planned time for project construction				0.8	
Time needed to implement variation orders				0.8	
Time needed to rectify defects				0.8	
Average delay in claim approval		0.4			
Average delay in payment from owner to contractor		0.4			
Availability of resources as planned through project duration				0.8	
Average delay because of closures and materials shortage				0.8	
(3) Quality factors					

Conformance to specification				0.8	
Availability of personals with high experience and qualification				0.8	
Quality of equipments and raw materials in project				0.8	
Participation of managerial levels with decision making				0.8	
Quality assessment system in organization				0.8	
Quality training/meeting				0.8	
(4) Productivity factors					
Project complexity			0.6		
Number of new projects / year					1
Management-labor relationship			0.6		
Absenteeism rate through project				0.8	
Sequencing of work according to schedule				0.8	
(5) Client Satisfaction factors					
Information coordination between owner and project parties				0.8	
Leadership skills for project manager				0.8	
Speed and reliability of service to owner				0.8	
Number of disputes between owner and project parties		0.4			
Number of reworks		0.4			
(6) Regular and community satisfaction factors					
Cost of compliance to regulators requirements			0.6		
Number of non compliance to regulation		0.4			
Quality and availability of regulator documentation				0.8	
Neighbors and site conditions problems			0.6		
(7) Health and Safety factors					
Application of Health and safety factors in organization				0.8	
Easiness to reach to the site (location of project)				0.8	
Reportable accidents rate in project	0.2				
Assurance rate of project					1
Learning from own experience and past history				0.8	
(8) Environment factors					
Air quality			0.6		
Noise level			0.6		
Wastes around the site		0.4			
Climate condition in the site			0.6		

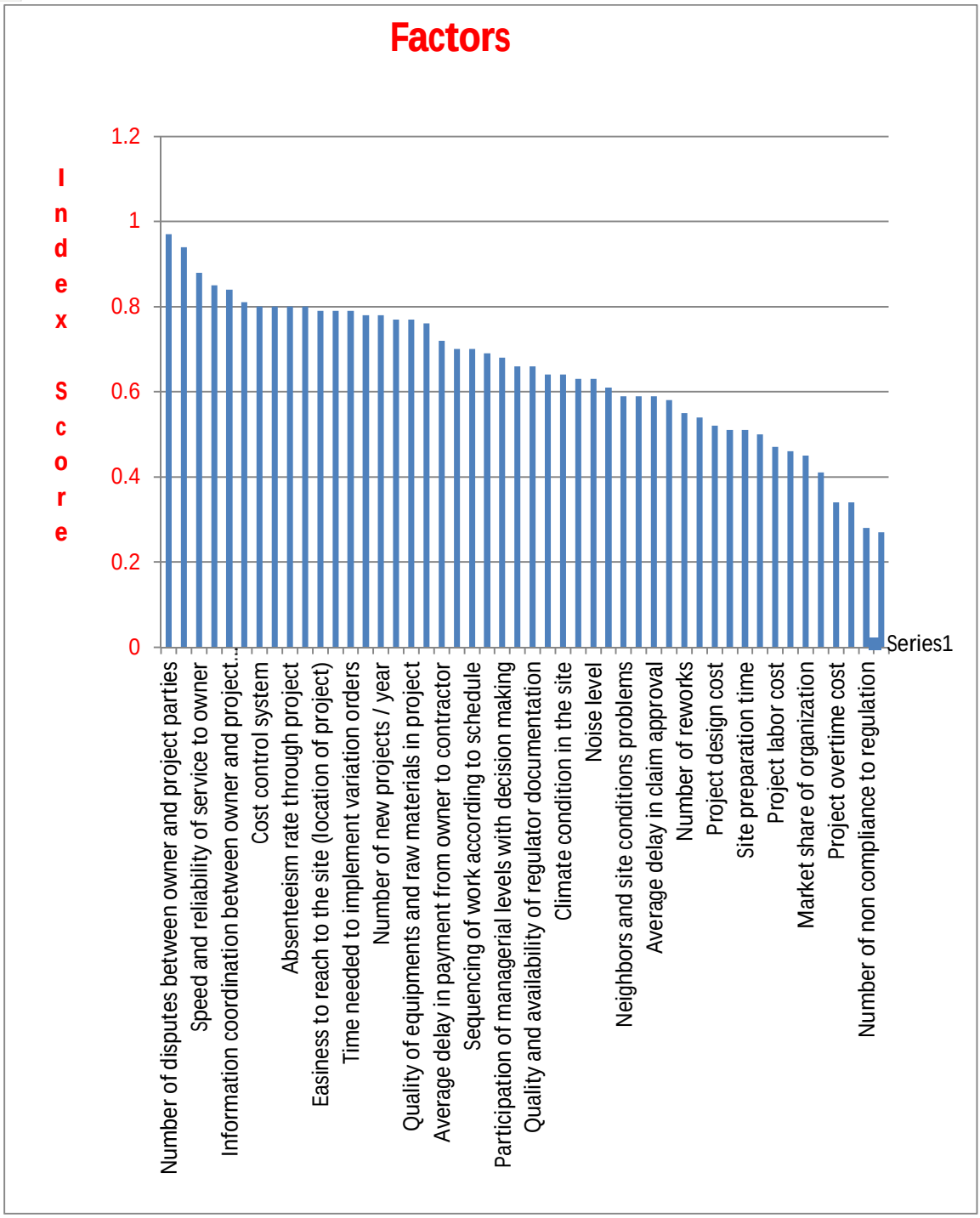
INTERVIEW NO.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total	Mean(m)	SD(s)	C.O.V=(s/m)
Market share of organization	0.4	0.4	0.6	0.6	0.8	0.4	0.6	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	9	0.45	0	0
Liquidity of organization	0.4	0.4	0.2	0.2	0.6	0.4	0.2	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	10.2	0.51	0.1	0.196078431
Cash flow of project	0.8	0.8	0.8	0.8	0.6	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	15.8	0.79	0	0
Project design cost	0.6	0.6	1	1	0.4	0.6	1	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	10.4	0.52	0.1	0.192307692
Material and equipment cost	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	5.4	0.27	0.1	0.37037037
Project labor cost	0.2	0.6	0.8	0.8	0.6	0.6	0.8	0.4	0.4	0.4	0.2	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	9.4	0.47	0.1	0.212765957
Project overtime cost	0.2	0.2	0.8	0.8	0.8	0.2	0.8	0.2	0.2	0.2	0.6	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	6.8	0.34	0	0
Cost of rework	0.6	0.2	1	1	0.6	0.2	1	0.2	0.6	0.2	0.8	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	8.2	0.41	0.2	0.487804878
Cost of variation orders	0.8	0.6	1	1	0.8	0.6	1	0.6	0.8	0.6	0.8	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	14	0.7	0.1	0.142857143
Regular project budget update	0.8	0.8	1	1	0.8	0.8	1	0.8	0.8	0.8	0.4	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	16.2	0.81	0	0
Cost control system	0.8	0.8	1	1	0.6	0.8	1	0.8	0.4	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	16	0.8	0	0
Site preparation time	0.8	0.8	0.6	0.6	0.8	0.8	0.6	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	10.2	0.51	0.2	0.392156863
Planned time for project construction	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	16	0.8	0	0
Time needed to implement variation orders	0.8	0.8	0.8	0.8	0.6	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	15.8	0.79	0	0
Time needed to rectify defects	0.8	0.8	0.6	0.6	0.6	0.8	0.6	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	15.2	0.76	0	0
Average delay in claim approval	0.4	0.4	0.8	0.8	0.4	0.4	0.8	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	11.8	0.59	0.1	0.169491525
Average delay in payment from owner to contractor	0.4	0.4	0.8	0.8	0.4	0.4	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	14.4	0.72	0.2	0.277777778
Availability of resources as planned through project duration	0.8	0.8	0.6	0.6	0.6	0.8	0.6	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	10	0.5	0.2	0.4
Average delay because of closures and materials shortage	0.8	.8.8	0.6	0.6	0.8	0.8	0.6	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	6.8	0.34	0.3	0.882352941
Conformance to specification	0.8	0.8	1	1	0.6	0.8	1	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	13.8	0.69	0.1	0.144927536
Availability of personals with high experience and qualification	0.8	0.8	0.8	0.8	0.4	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	15.6	0.78	0	0
Quality of equipments and raw materials in project	0.8	0.8	0.6	0.6	0.8	0.8	0.6	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	15.4	0.77	0	0
Participation of managerial levels with decision making	0.8	0.8	0.8	0.8	1	0.8	0.8	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	13.6	0.68	0.1	0.147058824
Quality assessment system in	0.8	0.8	0.6	0.6	0.8	0.8	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	12.8	0.64	0.1	0.15625

organization																								
Quality training/meeting	0.8	0.6	0.6	0.6	1	0.8	0.6	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	15.4	0.77	0	0
Project complexity	0.6	1	0.4	0.4	0.6	0.6	0.4	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	11.8	0.59	0	0
Number of new projects / year	1	0.6	0.6	0.6	0.8	1	0.6	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	15.6	0.78	0.1	0.128205128
Management-labor relationship	0.6	0.8	0.4	0.4	1	0.6	0.4	0.6	0.6	0.6	0.8	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	12.2	0.61	0	0
Absenteeism rate through project	0.8	0.8	0.8	0.8	1	0.8	0.8	0.8	0.8	0.8	0.6	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	16	0.8	0	0
Sequencing of work according to schedule	0.8	0.8	1	1	0.8	0.8	1	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	14	0.7	0.1	0.142857143
Information coordination between owner and project parties	0.6	0.8	0.8	0.8	0.4	0.8	0.8	1	1	1	0.8	1	0.8	1	1	1	0.8	0.8	0.8	0.8	16.8	0.84	0.1	0.119047619
Leadership skills for project manager	0.6	0.8	1	1	0.6	0.8	1	0.8	0.6	1	1	0.8	1	1	0.8	1	0.8	0.8	0.8	0.8	17	0.85	0.1	0.117647059
Speed and reliability of service to owner	0.6	0.8	1	1	0.6	0.8	0.6	1	1	0.8	1	1	0.6	1	1	0.8	1	1	1	1	17.6	0.88	0.2	0.227272727
Number of disputes between owner and project parties	0.4	0.4	0.8	0.8	0.8	0.4	0.8	1	1	0.8	1	0.6	4	1	0.8	1	0.8	1	1	1	19.4	0.97	0.3	0.309278351
Number of reworks	0.4	0.4	0.4	0.4	0.8	0.4	0.4	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	11	0.55	0.1	0.181818182
Cost of compliance to regulators requirements	0.6	0.6	0.4	0.4	1	0.6	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	9.2	0.46	0.1	0.217391304
Number of non compliance to regulation	0.4	0.4	0.4	0.4	0.6	0.4	0.4	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	5.6	0.28	0.1	0.357142857
Quality and availability of regulator documentation	0.8	0.8	0.8	0.8	0.6	0.8	0.8	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	13.2	0.66	0.1	0.151515152
Neighbors and site conditions problems	0.6	0.6	0.8	0.8	0.8	0.6	0.8	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.8	0.8	0.8	0.8	11.8	0.59	0.1	0.169491525
Application of Health and safety factors in organization	0.8	0.8	0.8	0.8	0.6	0.8	0.8	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	13.2	0.66	0.1	0.151515152
Easiness to reach to the site (location of project)	0.8	0.8	0.8	0.8	0.6	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	15.8	0.79	0	0
Reportable accidents rate in project	0.2	0.2	0.8	0.8	0.8	0.2	0.8	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	11.6	0.58	0.2	0.344827586
Assurance rate of project	1	1	0.6	0.6	0.8	1	0.6	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	16	0.8	0.1	0.125
Learning from own experience and past history	0.8	0.8	0.8	0.8	1	0.8	0.8	1	1	1	1	1	1	1	1	1	1	1	1	1	18.8	0.94	0.1	0.106382979
Air quality	0.6	0.6	0.8	0.8	0.6	0.6	0.8	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	12.6	0.63	0	0
Noise level	0.6	0.6	1	1	0.8	0.6	1	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.4	0.4	0.4	0.4	12.6	0.63	0.1	0.158730159
Wastes around the site	0.4	0.4	0.4	0.6	0.2	0.4	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	10.8	0.54	0.1	0.185185185
Climate condition in the site	0.6	0.6	0.8	1	1	0.6	1	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.4	0.6	0.4	0.4	12.8	0.64	0.1	0.15625

Table 6.3 Ranking of Factors

S.No	Factors	Index Score	Rank order
1	Number of disputes between owner and project parties	0.97	1
2	Learning from own experience and past history	0.94	2
3	Speed and reliability of service to owner	0.88	3
4	Leadership skills for project manager	0.85	4
5	Information coordination between owner and project parties	0.84	5
6	Regular project budget update	0.81	6
7	Cost control system	0.8	7
8	Planned time for project construction	0.8	7
9	Absenteeism rate through project	0.8	7
10	Assurance rate of project	0.8	7
11	Easiness to reach to the site (location of project)	0.79	8
12	Cash flow of project	0.79	8
13	Time needed to implement variation orders	0.79	8
14	Availability of personals with high experience and qualification	0.78	9
15	Number of new projects / year	0.78	9
16	Quality training/meeting	0.77	10
17	Quality of equipments and raw materials in project	0.77	10
18	Time needed to rectify defects	0.76	11
19	Average delay in payment from owner to contractor	0.72	12
20	Cost of variation orders	0.7	13
21	Sequencing of work according to schedule	0.7	13
22	Conformance to specification	0.69	14
23	Participation of managerial levels with decision making	0.68	15
24	Application of Health and safety factors in organization	0.66	16
25	Quality and availability of regulator documentation	0.66	16
26	Quality assessment system in organization	0.64	17
27	Climate condition in the site	0.64	17
28	Air quality	0.63	18
29	Noise level	0.63	18
30	Management-labor relationship	0.61	19
31	Neighbors and site conditions problems	0.59	20
32	Project complexity	0.59	20
33	Average delay in claim approval	0.59	20
34	Reportable accidents rate in project	0.58	21
35	Number of reworks	0.55	22
36	Wastes around the site	0.54	23
37	Project design cost	0.52	24
38	Liquidity of organization	0.51	25
39	Site preparation time	0.51	25
40	Availability of resources as planned through project duration	0.5	26
41	Project labor cost	0.47	27
42	Cost of compliance to regulators requirements	0.46	28
43	Market share of organization	0.45	29
44	Cost of rework	0.41	30
45	Project overtime cost	0.34	31
46	Average delay because of closures and materials shortage	0.34	31
47	Number of non compliance to regulation	0.28	32
48	Material and equipment cost	0.27	33

ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 6.887
Volume 7 Issue I, Jan 2019- Available at www.ijraset.com

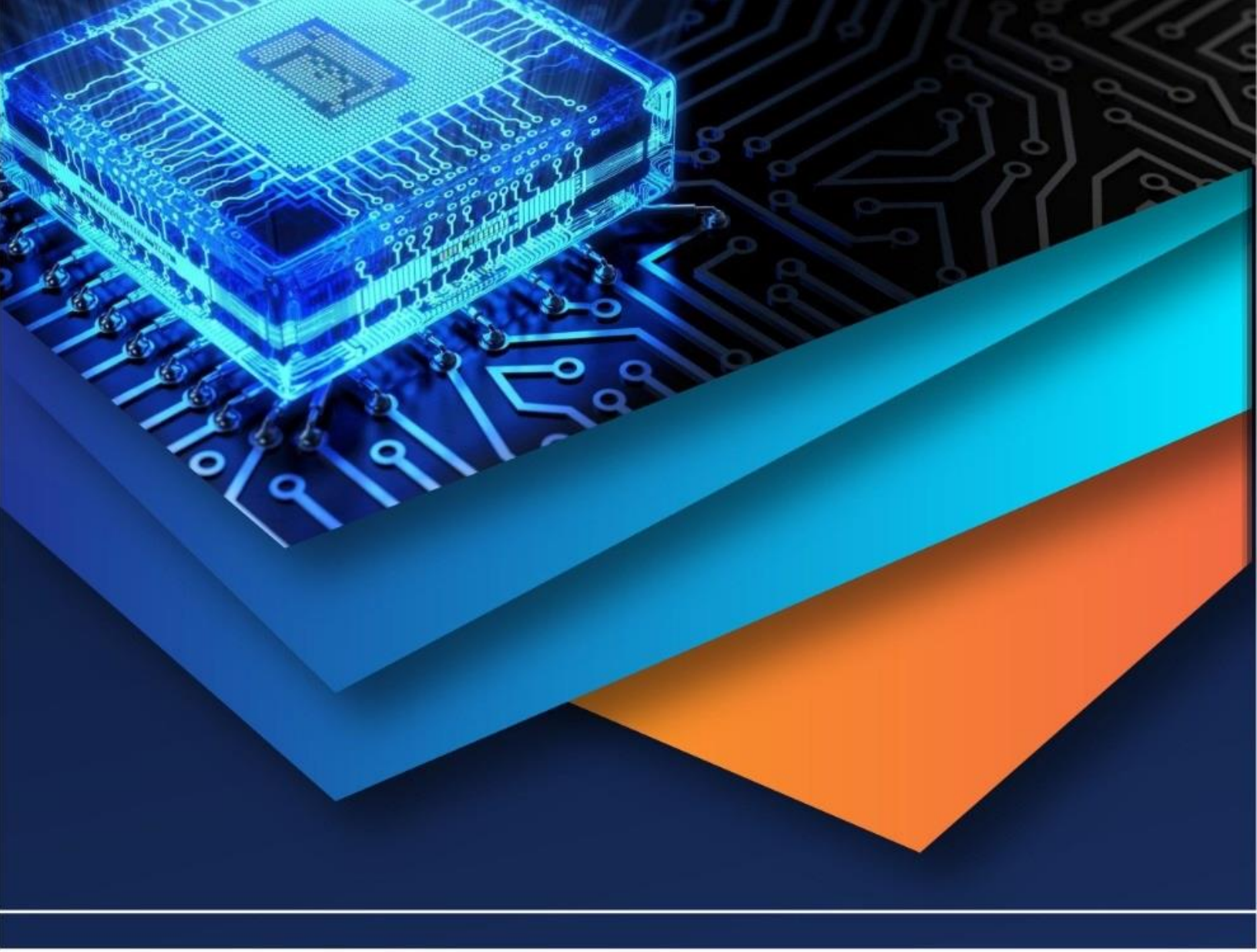


VI. CONCLUSION

The aim of this paper is to spot the vital factor in construction comes as results of delays are thought of to be major problem in the development business. Construction delay may be a vital operate in construction comes. In general, the quantity of time-delay and cost-increase (overrun), exaggerated with a rise within the total price of a residential project. Cost and time overrun (extension of project duration) were the two most frequent effects of delays that considerably affects the development comes. There are loss and expense claims arising from delay and fluctuation claims throughout the delay amount that have important effects on cost. Coming up with and scheduling: they are continued processes throughout construction and match with the resources and time to develop the work to avoid price and disputes.

REFERENCES

[1] Kumaraswamy MM, Chan DW.(1997) A comparative study of causes of time overruns in Hong Kong construction projects. International Journal of Project Management ; Vol 15, Issue (1)
[2] Assaf SA, Al-Khalil, Al-Hazmi. Causes of delays in large building construction projects.(1995) ASCE Journals of management and engineering ;Vol 11 Issue(2)
[3] Baldwin J.R., Mathei J.M.,Rothbart H.,& Harris R.B. (1971)Cause of delay in the Construction Industry. Journal of construction Division, ASCE ; Vol 97, Issue(2)
[4] Al- Barak AA. Causes of contractors failure in Saudi Arabia. Master Thesis, CEM Dept. KFUPM Dhahran, Saudi Arabia, 1993
[5] Noulmanee A, Wachirathamrojn J, Tantichattanant P, Sittivijan P.(1999) Internal causes of delays in highway construction projects in Thailand,
[6] Mezher TM, Tawil W. Causes of delays in th construction industry in Lebanon.(1998) Engineering Construction and Architectural Management Journal.Vol; 5, Issue(3)
[7] Herbsman ZJ, Chen WT, Epstein WC. (1995) Time is money innovative contracting method in highway construction. Journal of Construction Engineering and Management, ASCE Vol 121, Issue(3)
[8] Mansfield N R, Ugwu OO, Doran T (1994) Causes of Delay and cost overruns in Nigerian construction projects. International Journal of project Management Vol 12, Issue(4)
[9] Alaghbari, W., Kadir, M.R.A., Salim, A. and Ernawati (2007) "The Significant Factors causing delay of building construction projects in Malaysia. Engineering", Construction and Architectural Management Journal, Vol14 , Issue(2), pp.192-206.
[10] Doloi H., Sawhney A., Iyer K.C. and Rentala S.(2012) "Analysing factors affecting delays in Indian construction projects", International journel of /project Management, Vol. 30, Issue 4, pp. 479-489.
[11] Ashwini Arun Salunkhe and Rahul S. Patil .(2014) 'Effect Of Construction Delays On Project Time Overrun :Indian Scenerio", International Journal of research in Engineering and Technology, Vol.03, Issue01, pp.544-545.
[12] Murat Gunduz, Ph.d, A.M.ASCE, YaseminNielsen,Ph.d and Mustafa Ozdemir (2013) "Quantification of Delay Factors Using the Relative Importance Index Method for Construction Projects in Turkey " Journal of Management in Engineering, Vol.29, No.2, Page No. 133-139
[13] Peter E.D.Love , Raymond Y.C.Tse, and David J.Edwards (2005) "Time-Cost Relationships in Australian Building Construction Projects " Journal of Construction Engineering and Management, Vol.131, No.2, Page No.187-194.
[14] H. Abdul-Rahaman, M.A.Berawi, A.R.Berawi, O. Mohamed, M.Othman, and I.A.Yahya (2006) "Delay Mitigation in the Malaysian Construction Industry" Journal of Construction Engineering and Management, Vol.132, No.2, Page No. 125-133.
[15] Youngiane Kim, A.M.ASCE, Kyungrai Kim, A.M.ASCE, and Dongwoo Shin (2005) "Delay Analysis Method Using Delay Section" Journal of Construction Engineering and Management, Vol.131, No.11, Page No. 1155-1164.
[16] Cecilia Gravina da Racha and Sergio LuizKemmer (2013) "Method of Implement Delayed product Differentiation in Construction of High-Rise Apartment Building Projects" Journal of Construction Engineering and Management
[17] ThillaiA.Rajan, GovindGopinath and MonalisaBehera (2013) "PPPs and Project Overruns: Evidence from Road Projects in India" Journal of Construction Engineering and Management.
[18] A.A. Aibinu, G.O. Jagboro," The effects of construction delays on project delivery in Nigerian construction industry", International Journal of Project Management 20 (2002) 593– 599.
[19] Desai Madhura .c, Prof. s.v.desale, "Study factors affecting of delay in residential construction projects for Nasik city", International Journal of Latest Trends in Engineering and Technology (IJLTET).
[20] MuraliSambasivan, Yau Wen Soon," Causes and effects of delays in Malaysian construction industry", International Journal of Project Management 25 (2007) 517–526.
[21] Prakash Rao, B. And Joseph CamronCulas Causes of delays in construction projects International Journal of Current Research.



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY