

# Impact of Cost and Time Overrun on Building Construction Projects

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**Abstract** – This dissertation presents a study made on causes, effects and controls of change orders in large building construction in Morena city. To achieve the study objective, the researcher carried a literature review of the subject covering periodicals, dissertations, previous research studies and books written on the subject of change orders. In light of the literature study the researcher developed a survey questionnaire.

Response from 50 consultants and contractors working in the field of large building construction were analyzed. Time and Cost overrun was reported of the original contract duration. The study also concluded that the owner is the major source of changes and that most changes are architectural. Change of plans and material substitution are first causes of change in large buildings. The study also concluded that responses from contractors and consultants agree about the causes, effects and controls of change orders and recommended to include the owner in future studies to verify the reasons behind changes made by the owners.

## **keywords**

Cost Overrun, Time Overrun, Cause, Effect, Time Maintenance Construction Projects, Importance Index (IMPI), Public Construction Sector

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## **I. INTRODUCTION**

Morena city located in the state of Madhya Pradesh in India, experienced in large volume of work in the field of constructions from last thirty years. This is result in same rapid growth and revolutions through that period. The medium living standard of people of Morena have generated many manufacturing and building opportunities .The growth of towns has faster as a result of high population growth. Large and complex projects have been built, attracting contractors and construction companied from all over the India. This situation attached with inexperienced maintained has led to reduced design resulting in many changes to plans, specifications, and contract terms.

Consideration essential be given to these construction wonders from the early stages of the project until contracting. A contract change is added to define the way that consultant and contractors will handle changes. A development must be set to process a change from its theoretical development until it occurred in the field .Given the detail that an adversarial atmosphere commonly exists between the parties in construction manufacture, a change must be managed well in order to decrease its cost, Schedule and significant effects that can lead to enormous cost and time overruns

## **II. OBJECTIVES**

The main objectives of this research study are to:

- To identify the factors affecting project schedule in the residential building.
- To sort the cost and time overrun reasons according to groups.
- To identify calculation of IMPI of cost causes and show the position.
- To identify the various causes in red, yellow and green zone.
- To identify cost and time overrun makes recommendation and conclusion of the situation.

### III. LITERATURE REVIEW

A new type of construction projects has not escaped the overwhelming ghost of overruns. Environmentally aware construction has developed a subject of research during the last periods. Suppliers of construction materials has yet suffered from the draw of delays and cost, and multiple efforts to create a numerical model to help adjust the floats and budgets of the planning schedule have been conducted in current studies, only to highlight the effect overruns has on each angle of the construction project process. [1].

In a study conducted by [2] comparing Thailand as a fast-growing budget country with other economies, 12 skyscrapers construction projects showed that the highest reason of delays was resource supply great effort in the boom-years of the construction sector. Shortage of supply of materials mainly cements [www.ccsenet.org/ijbm](http://www.ccsenet.org/ijbm) International Journal of Business and Management was the cause why projects were reserved behind schedule [3].

### IV. RESEARCH METHODOLOGY

The research methodology for their study contains two phases. The first phase included a literature search and interviews. Data was collected from literature reviews from books, journals, articles, papers, seminar, conferences, and websites which emphasize building construction's labour productivity. A survey was given to employees from different trades involved with the construction project. As the result of this phase, 25 causes of Cost and time overrun for residential construction projects were identified. These causes were categorising in two main groups as: Contractor related, Consultant related depending on their nature and mode of occurrence. The second phase include preparation of two type of questionnaire created used for giving ranking to causes of Cost and time overrun of residential construction projects. Current study suggests technique Importance index is calculated as a purpose of frequency index and severity index. A survey was given to workers from different trades involved with the construction project.

### V. SURVEY PLANNING

For the research study, site to site survey method was used to fill the survey questionnaire. Collecting general information on given causes of cost and time overrun in building construction all over Morena region was the basic objective of the survey.

### VI. DATA ANALYSIS & INTERPRETATION

#### Importance Index Technique:

In this method, for each cause and factor two questions were asked: What is the frequency of existence for this cause? And what is the degree of severity of this cause on project Cost and time overrun? Both frequency of existence and severity were categorized on a five-point scale.

**1) Frequency index:** A formula is used to rank causes of Time and cost overrun based on frequency of occurrence as identified by the participants.

$$\text{Frequency Index (F.I.) (\%)} = \sum w (n/N) * 100/5 \quad (\dots 1)$$

Where,

w is the constant expressing weighting given to each response (ranges from 1 for No happen up to 5 for always happen),

n is the frequency of the responses, and

N is total number of responses.

**2) Severity index:** A formula is used to rank causes of Time overrun based on severity as indicated by the participants.

$$\text{Severity Index (S.I.) (\%)} = \sum w (n/N) * 100/5 \quad (\dots 2)$$

Where,

w is the constant expressing weighting given to each response (ranges from I extreme up to 5 for no significance),

n is the frequency of the responses.

N is total number of responses.

**3) Importance index:** The importance index of each cause is calculated as a function of both frequency and severity indices, as follows:

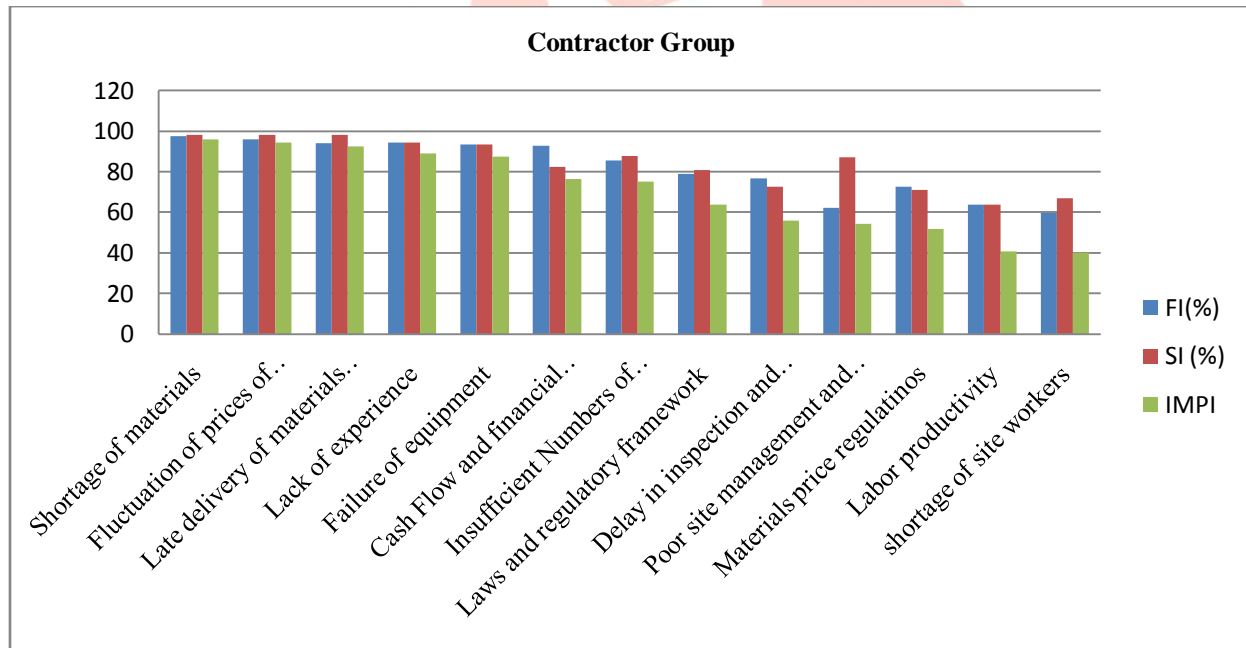
$$\text{Importance Index (IMP.I.) (\%)} = [\text{F.I. (\%)} * \text{S.I. (\%)}] / 100 \quad (\dots 3)$$

**VII. RESULTS AND FINDINGS**

**Table-6.1 Causes of Cost and time overrun Factors IMPI (Contractors Group)**

Causes of Cost & Time Overrun	FI (%)	SI (%)	IMPI	Groups	rank	Specified
Shortage of materials	97.60	98.40	96.04	Contractors	1	<b>RED ZONE</b>
Fluctuation of prices of materials	96.00	98.40	94.46		2	
Late delivery of materials and equipment	94.08	98.40	92.57		3	
Lack of experience	94.40	94.40	89.11		4	
Failure of equipment	93.60	93.60	87.61		5	
Cash Flow and financial difficulties faced by contractors	92.80	82.40	76.47		6	<b>YELLOW ZONE</b>
Insufficient Numbers of equipment	85.60	88.00	75.33		7	
Laws and regulatory framework	79.20	80.80	63.99		8	
Delay in inspection and approval of completed works	76.80	72.80	55.91		9	<b>GREEN ZONE</b>
Poor site management and supervision	62.40	87.20	54.41		10	
Materials price regulations	72.80	71.20	51.83		11	
Labour productivity	64.00	64.00	40.96		12	
shortage of site workers	60.00	67.20	40.32		13	

**Figure-6.1 Causes of Cost and time overrun Factors IMPI (Contractors Group)**

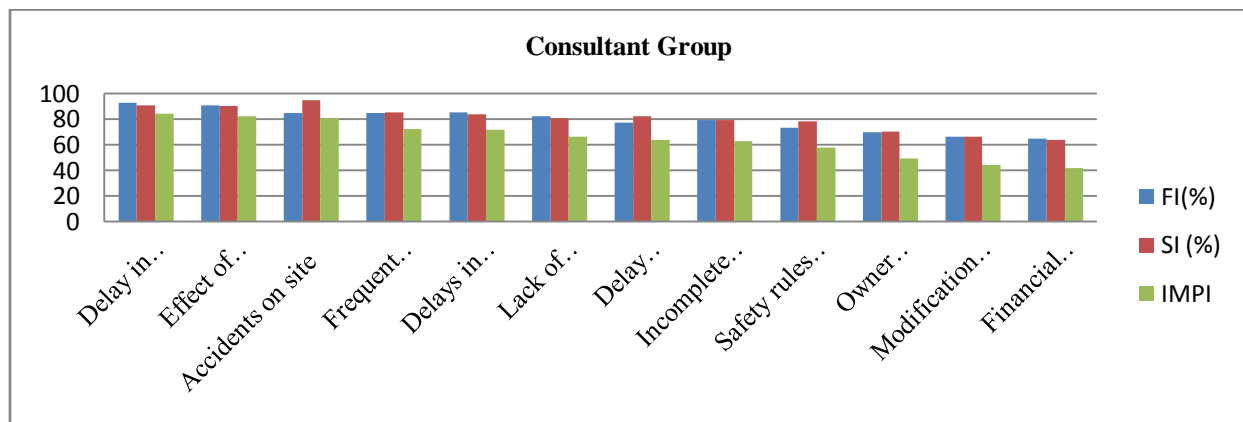


**Table-6.2 Causes of Cost and time overrun Factors IMPI (Consultants Group)**

Causes of Cost & Time Overrun	FI (%)	SI (%)	IMPI	Groups	rank	Specified
Delay in progress payment by owner	92.80	91.20	84.63	Consultants	1	<b>RED ZONE</b>
Effect of weather	91.20	90.40	82.44		2	

Accidents on site	84.80	95.20	80.73	3	<b>YELLOW ZONE</b>	
Frequent design changes	84.80	85.60	72.59	4		
Delays in decisions making	85.60	84.00	71.90	5		
Lack of coordination between parties	82.40	80.80	66.58	6		
Delay Preparation and approval of drawings	77.60	82.40	63.94	7		
Incomplete design at the time of tender	79.20	79.20	62.73	8		
Safety rules and regulations are not followed within the contractors regulations	73.60	78.40	57.70	9		<b>GREEN ZONE</b>
Owner interference	69.60	70.40	49.00	10		
Modification in material specifications	66.40	66.40	44.09	11		
Financial difficulties of owner	64.80	64.00	41.47	12		

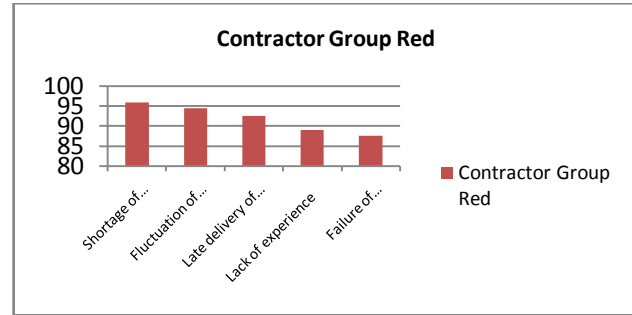
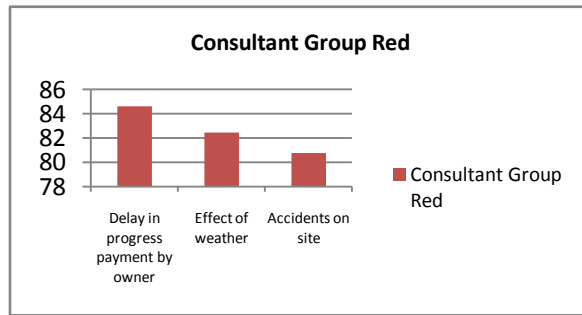
**Figure-6.2 Causes of Cost and time overrun Factors IMPI (Consultant Group)**



**Table-6.3 Contractor and Consultant Compare Zone**

Consultant Group			Contractor Group		
S.No.	Causes	Red	S.No.	Causes	Red
1	Delay in progress payment by owner	84.63	1	Shortage of materials	96.04
2	Effect of weather	82.44	2	Fluctuation of prices of materials	94.46
3	Accidents on site	80.73	3	Late delivery of materials and equipment	92.57
			4	Lack of experience	89.11
			5	Failure of equipment	87.61

**Figure-6.3 Contractors and Consultant Compare Zone**



## VIII. FINDINGS OF THE RESEARCH –

### Zone analysis contractor's factors

Table 6.1 and Figure 6.1 demonstrate the risk map for cost estimating factors. 13 factors are careful under this group. The results indicate that 5 factors are situated in the red zone, 3 factors are situated in the yellow zone and 5 factors are situated in the green zone.

### Zone analysis consultant's factors

Table 6.2 and Figure 6.2 demonstrate the risk map for factors related to structure items. 12 factors are identified under this group. The results indicate that 3 factors are situated in the red zone and 5 factors are situated in the yellow zone. The table shows that there is 4 factors under this group are situated in the green zone.

### Top affecting factors

Table 6.3 shows the top priority factors that moving cost overrun in building structure projects and their related groups in rising order. All of these factors are located in the red zone of the risk map. In order to rank them according to their degree of importance from consultants and contractors perspective, the importance index for each factor is calculated as a function of frequency and severity indexes, as follows:

The results indicate that there are 8 factors located in the critical zone of the risk map. Their distribution among the groups is as follow:

- 5 factors are related to contractor group.
- 3 factors are related to consultant group.

## IX. CONCLUSION OF RESEARCH

This study is conducted to consider the cost and time overrun in residential building construction projects from consultants and contractors point of view through a sample review. The investigation of the members' reactions uncovers that the cost invade in building development ventures is a serious issue. 83.33% of the respondents demonstrated that the normal cost overpower that they have encountered is between midpoints of the venture's evaluated cost. The concentrate likewise perceived the hazard delineate 8 cost overrun elements. 3 factors were concluded as critical factors in consultant group, and 5 factors were contractors group.

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