

Analysis of delays, cost overrun in real estate construction projects- A Study in India

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Abstract—Unwanted delays in construction projects impose excessive costs and precipitate lengthy durations. The researcher focuses on the reasons for construction project delays and cost overruns. The researcher has conducted several interviews with contractors, consultants, owners, industry experts, and regulatory bodies to accurately specify delay factors. Based on the results of our construction industry surveys, a statistical model can be developed to quantitatively determine delay factors' contribution in failure of construction project management. The proposed model will categorize the delay factors under five major classes and determine the most significant delay factors under each class: owner delays; contractor delays; consultant delays, by-laws and external factors and resources delays. Proper planning and scheduling is very important in real estate construction projects for reducing and controlling delays and cost overruns of the project. Significant amounts of time, money, resources are wasted every year in a construction industry due to improper planning and scheduling. A warning system or mechanism must be present which can alert the organization about its success and failures throughout the project. This research does not consider all types of construction projects in India; the scope is limited to certain types of private and publicly funded projects which is a part of real estate, as will be described. The data for the research work has been collected through a detailed questionnaire survey which was given to construction industry experts.

Keywords— statistical, quantitatively; mechanism; questionnaire.

I. INTRODUCTION

Time delays and costs overruns are unavoidable on construction projects, primarily because every project has unique features and limited resources like time and money that can be spent on planning, executing and delivering the project. Construction projects have long been identified as particularly cost, time and risk loaded. Few of the delays and cost overruns associated with the construction process are reasonably predictable or identifiable, others may be totally unforeseen. A successful project means meeting goals and objectives as prescribed in the project plan. Time and cost factors are deep rooted in all of project construction's contacts. A successful project indicates that the project has accomplished its goals like technical performance, schedule, and remained within budgetary costs. Project management tools and techniques play a chief role in the effective management of a project. Therefore, a good project management lies in the management mechanism and techniques used to manage the project. Assessing both construction projects' cost and time is critical in today's market-driven economy. The dynamic and emerging contracts place an increasing pressure on decision makers in the construction industry to search for an optimal or near-optimal resource utilization plan that minimizes construction cost and time while maximizing its quality.

II METHODOLOGY

Specific areas covered are the research design, population, sample and sampling procedure and the procedure for analyzing the data. The researcher has administered the questionnaire. Respondents were allowed sufficient time of six working days to complete the questionnaire. The questionnaires were series of structured questions which were related to the research work and directed to respondents with the aim of gaining firsthand

information. The questionnaire consisted of open-ended questions. Thus, in all cases, respondents were allowed to select the option that best suits the situation. Respondents were required to respond to a number of questions. The researcher examines and analyzes the data gathered from the questionnaire administered through personal interviews conducted from a Professional team of nine members of different construction companies. The main purpose of the procedure used in analyzing the results was to establish the relative importance of the assessment of cost and time impacts of the real estate construction projects with various factors responsible for project delay and cost overruns. The results from the data in the displays, graphs, charts and tables are analyzed and interpreted in order to find answers to the research problems. The numbers are summarized and interpreted by using statistics. The statistics provide a means through which numerical data can be made more significant.

An analysis of the research summary result is done in order to make meaningful conclusions and recommendations. Tables, charts and have been employed to illustrate data collected from the field to make the research findings easily understandable. The following analysis shows the responses received from a Professional team of nine members of different construction companies.

III FINDINGS FROM CONSTRUCTION INDUSTRY EXPERTS

A total number of nine (9) professional members were selected out of which four (4) members are directors of construction company, two (2) members are Project Managers, two (2) members are Planning Engineers and a (1) site Manager were asked to provide answers to the structured questionnaire. The selected members are highly experienced experts in construction industry and were

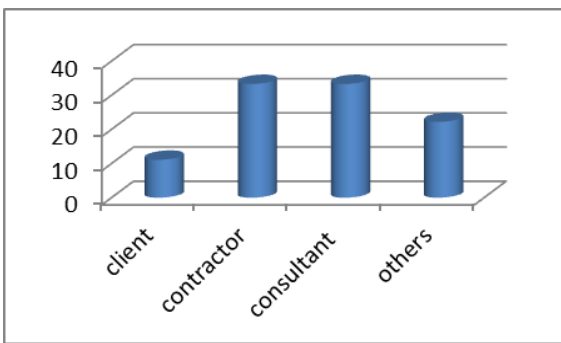
expected to provide reasons for their choice of an answer. Below Tables and figures gives the responses obtained from the selected professionals as shown below.

SURVEY RESULTS

SECTION-A

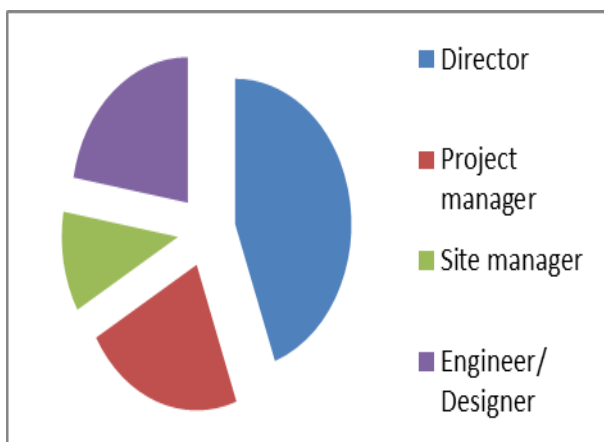
State respondent organization /company type

Organization / company	Frequency	Percentage (%)
Client	1	11.11
Contractor	3	33.33
Consultant	3	33.33
Others	2	22.23
Total	9	100



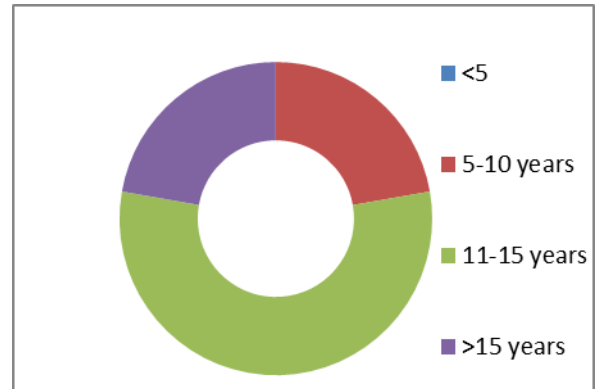
State respondent position in the organization / company

Respondent position	Frequency	Percentage (%)
Director	4	44.44
Project manager	2	22.22
Site Manager	1	11.12
Planning Engineer / Designer	2	22.22
Total	9	100



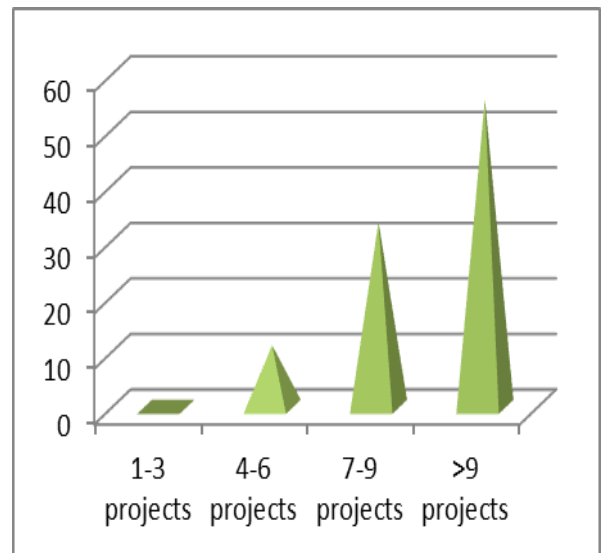
State the number of years the respondent has experienced in construction industry

Respondent years of experience	Frequency	Percentage (%)
<5	0	0
5-10	2	22.23
11-15	5	55.55
>15	2	22.22
Total	9	100



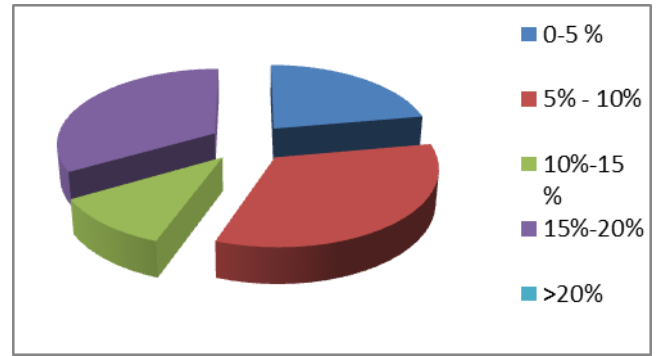
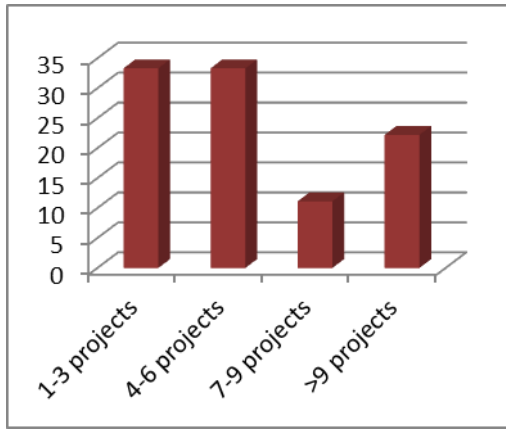
State the number of construction projects involved by respondent

No of construction Projects	Frequency	Percentage (%)
1-3 projects	0	0
4-6 projects	1	11.11
7-9 projects	3	33.34
>9 projects	5	55.55
Total	9	100



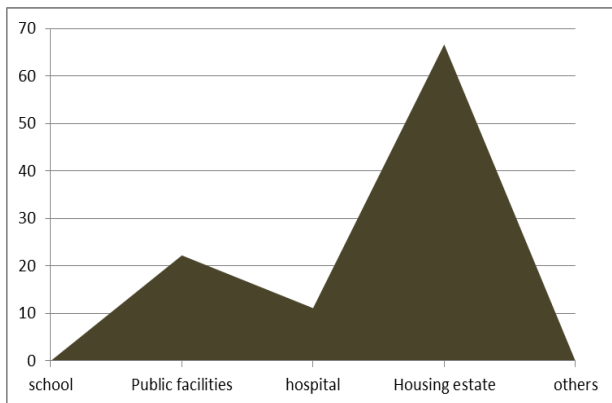
State the number of project delays faced by respondent

No. of project delays	Frequency	Percentage (%)
1-3	3	33.33
4-6	3	33.33
7-9	1	11.12
>9	2	22.22
Total	9	100



State the type of building which involved the most frequent for delay

Type of building	Frequency	Percentage (%)
School	0	0
Public facilities	2	22.22
Hospital	1	11.12
Housing Estate	6	66.66
Others	0	0
Total	9	100

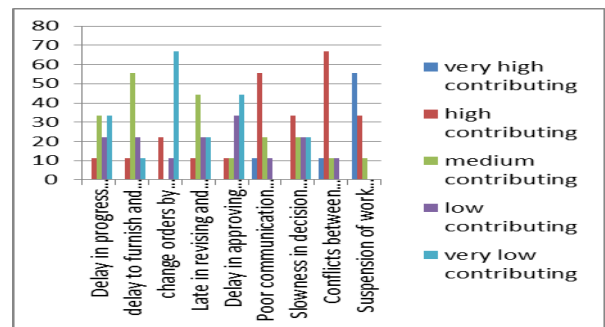


State the percentage of delay from estimated project duration .

Percentage of delay	Frequency	Percentage (%)
0-5 %	2	22.22
5-10%	3	33.33
10-15%	1	11.12
15-20%	3	33.33
>20%	0	0
Total	9	100

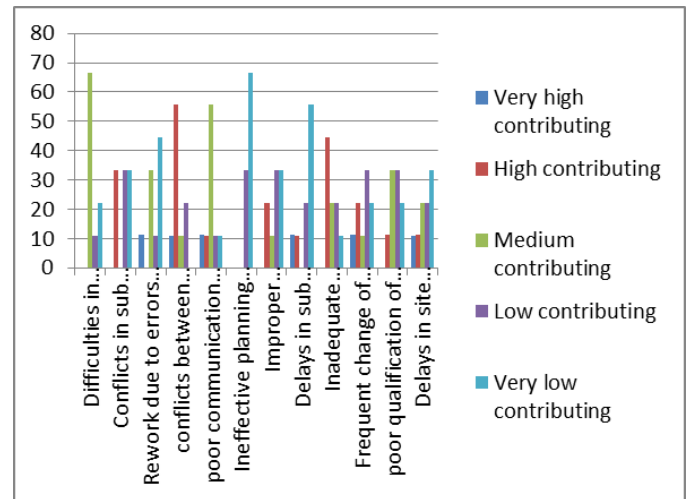
SECTION-B
 Different types of owner related causes of delays and cost overruns
 Select the contributing factor as very high, High, Medium, Low, Very low

Causes of Delay and cost overrun	very high contributing	high contributing	medium contributing	low contributing	very low contributing
Delay in progress payments	0	11.11	33.33	22.23	33.33
delay to furnish and deliver the site	0	11.12	55.55	22.22	11.11
change orders by owner during construction	0	22.23	0	11.11	66.66
Late in revising and approving design documents	0	11.11	44.45	22.22	22.22
Delay in approving shop drawings and sample materials		11.12	11.11	33.34	44.44
Poor communication and coordination	11.12	55.55	22.22	11.11	0
Slowness in decision making process	0	33.34	22.22	22.22	22.22
Conflicts between joint ownership of the project	11.12	66.67	11.11	11.11	0
Suspension of work by owner	55.56	33.33	11.11	0	0



Different types of contractor related causes of delays and cost overruns

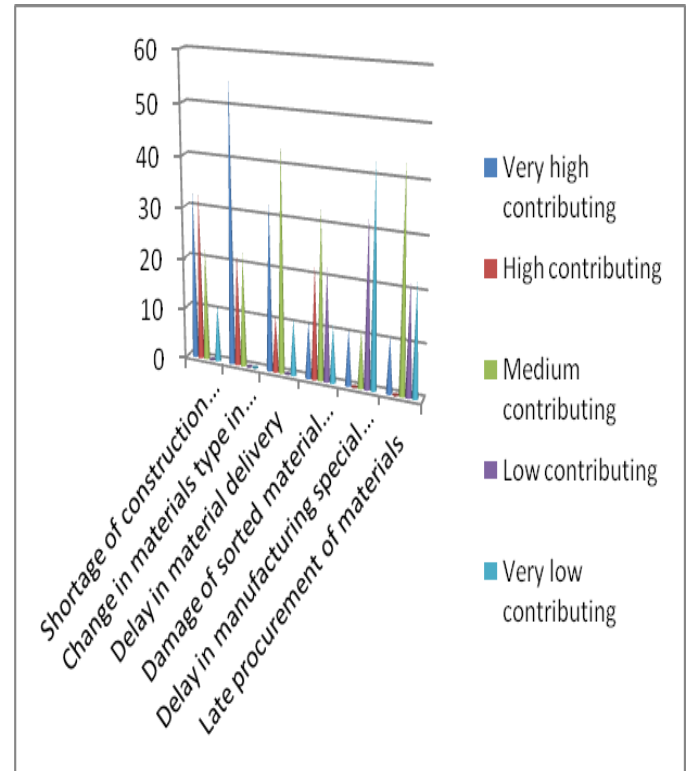
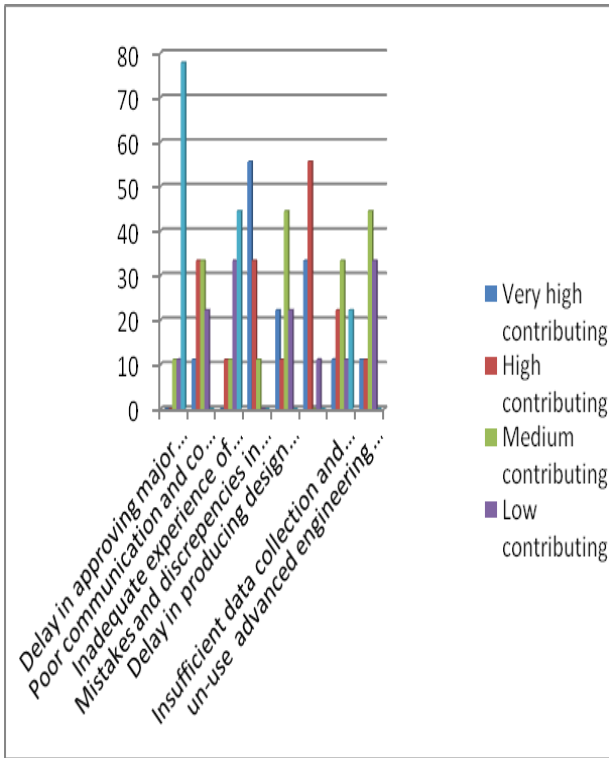
Causes of Delay and cost overrun	very high contributing	high contributing	medium contributing	low contributing	very low contributing
Difficulties in financing project	0	0	66.67	11.11	22.22
Conflicts in sub contractors schedule in execution of project	0	33.33	0	33.34	33.33
Rework due to errors during construction	11.12	0	33.33	11.11	44.44
conflicts between contractors and other parties	11.11	55.56	11.11	22.22	0
poor communication and coordination	11.12	11.11	55.55	11.11	11.11
Ineffective planning and scheduling of project	0	0	0	33.34	66.66
Improper construction methods implement	0	22.23	11.11	33.33	33.33
Delays in sub contractors work	11.12	11.11	0	22.22	55.55
Inadequate contractors work	0	44.45	22.22	22.22	11.11
Frequent change of sub contractors	11.12	22.22	11.11	33.33	22.22
poor qualification of the contractors technical staff	0	11.12	33.33	33.33	22.22
Delays in site mobilization	11.11	11.12	22.22	22.22	33.33



Different types of consultant related causes of delays and cost overruns

Select the contributing factor as very high, High, Medium, Low, Very low

Causes of Delay and cost overrun	very high contributing	high contributing	medium contributing	low contributing	very low contributing
Delay in approving major changes in the scope of work	0	0	11.11	11.12	77.77
Poor communication and coordination	11.11	33.34	33.33	22.22	0
Inadequate experience of consultant	0	11.11	11.11	33.34	44.44
Mistakes and discrepancies in design documents	55.56	33.33	11.11	0	0
Delay in producing design documents	22.23	11.11	44.44	22.22	0
unclear and inadequate details in drawing	33.33	55.55	0	11.12	0
Insufficient data collection and survey before drawing	11.12	22.22	33.33	11.11	22.22
un-use of advanced engineering software	11.11	11.11	44.45	33.33	0



Different types of material related causes of delays and cost overruns

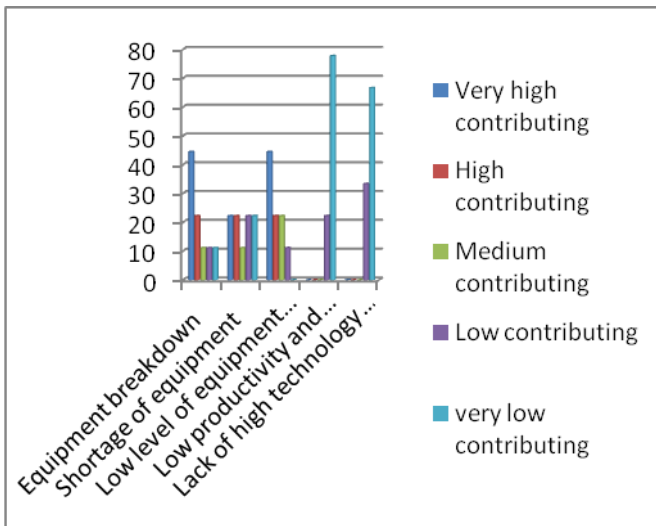
Select the contributing factor as very high, High ,Medium, Low ,Very low

<i>Causes of Delay and cost overrun</i>	<i>very high contributing</i>	<i>high contributing</i>	<i>medium contributing</i>	<i>low contributing</i>	<i>very low contributing</i>
Shortage of construction materials in market	33.34	33.33	22.22	0	11.11
Change in materials type in construction	55.56	22.22	22.22	0	0
Delay in material delivery	33.33	11.12	44.44	0	11.11
Damage of sorted material while they are need urgently	11.11	22.22	33.33	22.23	11.11
Delay in manufacturing special building materials	11.11	0	11.12	33.33	44.44
Late procurement of materials	11.12	0	44.44	22.22	22.22

Different types of Equipment related causes of delays and cost overruns

Select the contributing factor as very high, High ,Medium, Low ,Very low

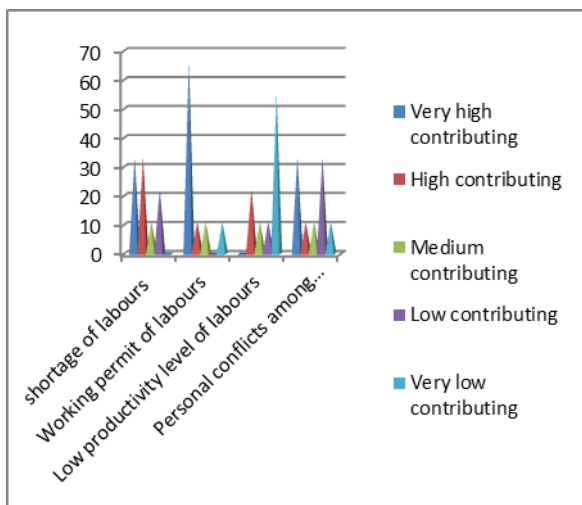
Causes of Delay and cost overrun	very high contributing	high contributing	medium contributing	low contributing	very low contributing
Equipment breakdown	44.44	22.22	11.11	11.11	11.12
Shortage of equipment	22.22	22.22	11.11	22.22	22.23
Low level of equipment operator skill	44.44	22.22	22.22	11.12	0
Low productivity and efficiency of Equipment	0	0	0	22.23	77.77
Lack of high technology mechanical equipment	0	0	0	33.34	66.66



Different types of Labor related causes of delays and cost overruns

Select the contributing factor as very high, High ,Medium, Low ,Very low

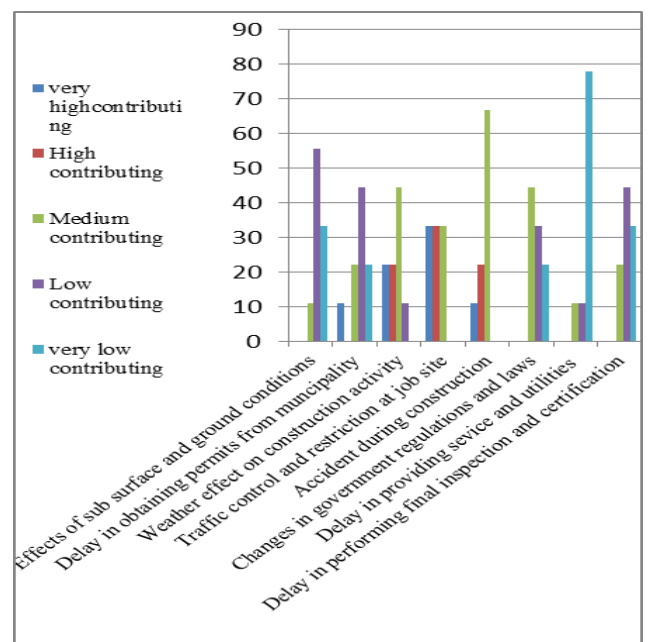
Causes of Delay and cost overrun	very high contributing	high contributing	medium contributing	low contributing	very low contributing
shortage of labors	33.34	33.33	11.11	22.22	0
Working permit of labors	66.67	11.11	11.11	0	11.11
Low productivity level of labors	0	22.23	11.11	11.11	55.55
Personal conflicts among labors	33.34	11.11	11.11	33.33	11.11



Different types of external factors for delays and cost overrun

Select the contributing factor as very high, High ,Medium, Low ,Very low

Causes of Delay and cost overrun	very high contributing	high contributing	medium contributing	low contributing	very low contributing
Effects of sub surface and ground conditions	0	0	11.11	55.56	33.33
Delay in obtaining permits from municipality	11.12	0	22.22	44.44	22.22
Weather effect on construction activity	22.22	22.23	44.44	11.11	0
Traffic control and restriction at job site	33.33	33.33	33.34	0	0
Accident during construction	11.12	22.22	66.66	0	0
Changes in government regulations and laws	0	0	44.45	33.33	22.22
Delay in providing sevice and utilities	0	0	11.12	11.11	77.77
Delay in performing final inspection and certification	0	0	22.22	44.45	33.33

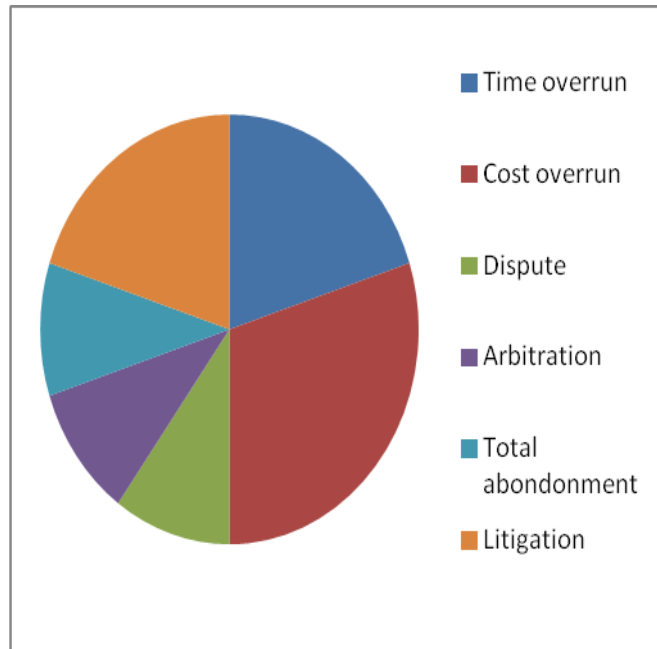


SECTION –C

What are the effects of delays and cost overruns .

Select the contributing factor as very high, High ,Medium, Low ,Very low.

Causes of Delay and cost overrun	very high contributing	high contributing	medium contributing	low contributing	very low contributing
Time overrun	22.22	77.78	0	0	0
Cost overrun	33.34	44.44	22.22	0	0
Dispute	11.12	22.22	66.66	0	0
Arbitration	11.11	22.22	66.67	0	0
Total abandonment	0	66.67	22.22	11.11	0
Litigation	66.67	11.11	22.22	0	0

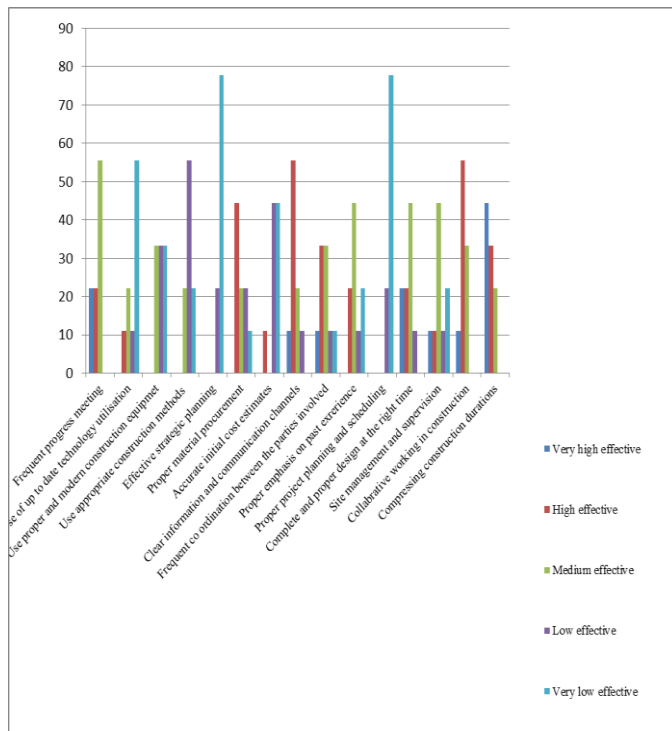


SECTION-D

Which of the following methods will minimize the construction delays and cost overruns

Select the contributing factor as very high, High ,Medium, Low ,Very low

Causes of Delay and cost overrun	very high contributing	high contributing	medium contributing	low contributing	very low contributing
Frequent progress meeting	22.23	22.22	55.55	0	0
Use of up to date technology utilization	0	11.11	22.23	11.11	55.55
Use proper and modern construction equipment	0	0	33.33	33.33	33.34
Use appropriate construction methods	0	0	22.23	55.55	22.22
Effective strategic planning	0	0	0	22.22	77.78
Proper material procurement	0	44.44	22.22	22.22	11.12
Accurate initial cost estimates	0	11.12	0	44.44	44.44
Clear information and communication channels	11.12	55.55	22.22	11.11	0
Frequent coordination between the parties involved	11.12	33.33	33.33	11.11	11.11
Proper emphasis on past experience	0	22.23	44.44	11.11	22.22
Proper project planning and scheduling	0	0	0	22.22	77.78
Complete and proper design at the right time	22.23	22.22	44.44	11.11	0
Site management and supervision	11.12	11.11	44.44	11.11	22.22
Collaborative working in construction	11.12	55.55	33.33	0	0
Compressing construction durations	44.44	33.34	22.22	0	0



IV.CONCLUSIONS

The result shows that many of the problems in the construction of projects are originated from poor resources management (human, technical and material).The overall results indicates that construction company directors felt that the cost and time should be prepared jointly by the contractor and consultant and be accepted as the baseline program and other causes are monthly payment difficulties from agencies, late material procurement, poor machine and technical performances, escalation in prices of material according to their degree of influence. Project managers feels that appropriate funding levels should always be determined at the planning stage of the project so that regular payment should be given to contractors for works done , while owners ranked poor contractor management as the most important factor. Planning Engineers believe that employers or owners of projects should allow more time and funds for the study phases of projects and site managers believe that poor co-ordination among labors or engineers because of improper planning and scheduling may result in claims and disputes in organizational structure and thus will result in projects delays and cost overrun.

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