

Diagnostic Study of Construction Contracts Clauses for Cost and Schedule Overrun in Infrastructure Projects in India

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ABSTRACT: Construction contract types and general conditions of clauses have a major influence on cost and schedule overrun of the infrastructure projects. A diagnostic study was conducted on 14 infrastructure projects ongoing completed and projects within past 3 years to access impact of cost and schedule overrun. Results of diagnostic study were used to determine the factors influencing cost and schedule overrun. Many factors such as change in scope of work, design creep, contractual disputes, poor framing of contract documents, supporting documents, coordination issues etc. were found as influencing factors for cost and schedule overrun. Then factors which are causing cost and schedule overrun correlates with general conditions of contract. As general conditions clauses play important role in projects progress, clauses which bearing most weightage on project performance are identified, and these clauses are discussed in details for successful delivery of projects.

KEYWORDS: Infrastructure projects, cost overrun, schedule overrun, general conditions of contract (GCC), construction clauses, contracts management, SPSS.

I. INTRODUCTION

Construction clauses are written and described for the intentions and procedure to be employed in any project. Ideally, contract clauses should be an easily understandable, mutually approved upon document that delivers solution to every project emergency. More truthfully, they often predominantly characterize the owner's interests to which the contractor agrees, with the hope that enough uncertainty exist in the document to permit several interpretations. Keeping in mind that, contracts themselves and their administration is serious subject of research, the questionnaire survey was conducted to improve the standards of contact clauses. The long-term goal research is to improve construction schedule and cost effectiveness through the improved contracting. This paper present finding and recommendations for effective delivery of infrastructure projects and improved clauses for better contracting.

II. LITERATURE

It is sometimes difficult to solve the problems arises during the construction of project due to poor framing of contract document. Arbitrators also fail to solve the problems because of wrong phrasing of contractual clauses in general conditions of contract. This failure in construction contracts leads to cost and schedule overrun. Also there are many onsite and off the site factors which causes cost and schedule overrun.

From the available literature, Kikwasi G.J. (2012) says the causes for overrun in construction industry of Tanzania are design changes, delay in payments to contractors, information delay, funding problems, poor project management, compensation issue, and disagreement on valuation of work done. C. Ramanathan. (2012) says delay occurs when progress of contract falls behind its schedule program. It may be because of any party to contract and may be direct result of one or more circumstances. C. William and David B. Ashley. (1987) says the clauses bearing most heavily

International Journal of Innovative Research in Science, Engineering and Technology

(An ISO 3297: 2007 Certified Organization)

Vol. 5, Issue 8, August 2016

on project performance should be and the key elements of those clauses that are most crucial to project success are discussed in detail.

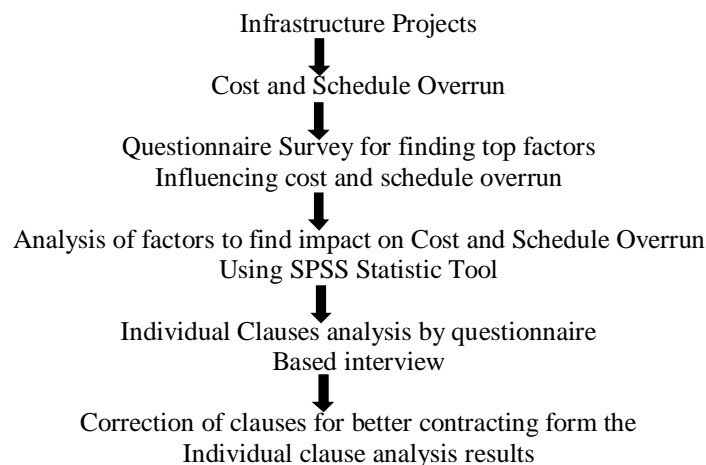
III. METHODOLOGY

The methodology adopted for present study is open interview with various stakeholders in infrastructure industry to identify different factors causing cost and schedule overrun. The identified factors are framed in questionnaire and questionnaire is distributed to expertise in infrastructure industry to find the impact of each factor at various levels of execution of infrastructure project. In questionnaire survey, findings of cost and schedule overrun of infrastructure projects included in the paper have been taken from questionnaire survey conducted with stakeholders such as client, project managers, planning engineers, architects, consultant and contractors etc. engaged in execution of infrastructure projects. This questionnaire survey was taken with 14 stakeholders of different infrastructure projects.

I] Data collected through questionnaire survey is analyzed using SPSS Statistic 22.0 Tool to identify critical factors causing A] Cost Overrun and B] Schedule Overruns respectively in infrastructure industry.

II] General conditions of contracts (GCC) play an important role in progress of project. These clauses are designed and phrased years ago. Now technology, construction policies, mentality of people, work scope and lots of things has been changed but general conditions of contracts never changed. Clauses are made just made copy and paste for every next project. It is important to check feasibility of each clause and make these clauses suitable to current era of construction industry. Individual clause analysis is conducted to check feasibility of each clause to find the gaps in current description of clauses. These gaps are fulfilled in proposed description of clauses to avoid future problems.

Flow Chart:



In questionnaire interview, analysis of individual clause analysis is done for improvement clauses for better contracting. This survey was conducted with owner and project management consultant. Each clause from general contracts conditions was questioned with 9 different questions to measure its performance and need of improvement. Results are drawn from the questionnaire survey are correlates with clauses from GCC and then individual clause analysis gives the guidelines to improvement of clauses.

IV. RESULTS AND DISCUSSION

I] Data analysis is done by using SPSS Statistic 22.0 Tool on various scales such as strongly agree, agree, disagree, and strongly disagree. Results are drawn from the analysis of questionnaire by using SPSS Statistic tool for cost and schedule overrun. For the analysis purpose two excel sheets were prepared for the weightages given by the respondents in the questionnaire survey. First sheet is for Schedule overrun and another is for Cost overrun respectively. Then these

International Journal of Innovative Research in Science, Engineering and Technology

(An ISO 3297: 2007 Certified Organization)

Vol. 5, Issue 8, August 2016

two sheets were imported in SPSS Statistic tool for analysis for finding the top factors impacting schedule and cost overrun respectively. The analysis for Cost and Schedule overrun is conducted in various phases i.e. Pre-Execution phase and Execution & Closing Phase. Sample tables of analysis were added only for Pre-Execution phase for better understanding.

A. SCHEDULE OVERRUN

1. Pre-Execution Phase: - Project Schedule Overrun

For Schedule overrun in Pre-Execution Phase SPSS Statistic Analysis is conducted. Data is used to analyse in tool is taken from excel sheet prepared for weightages given by respondents through questionnaire survey. Following are results shows impact of various factors.

Communalities

| | Initial | Extraction |
|---|---------|------------|
| Land/Site Handover (LH) | 1.000 | .964 |
| Delay In regulatory approvals (DRA) | 1.000 | .757 |
| Lack of Strong R&R Policies (LRR) | 1.000 | .895 |
| Relationship with other projects (Forward and Backward Linking) (ROP) | 1.000 | .657 |
| Non Flexible country plan (NFP) | 1.000 | .786 |
| Delay in decision making (DDM) | 1.000 | .955 |
| Ineffective procurement planning (IPP) | 1.000 | .874 |

Table 1.0

Communalities in Table 1.0 shows the how much of the variance (i.e. the communality value which should be close to 1 to be considered for further analysis. Else other variables are to be removed from further steps factor analysis. In this analysis initial Eigenvalue is assumed as 1 for each variable. From the table it is seems that extracted values for Land Handover (0.964), Delay in Decision Making (0.955) and Lack of Strong R&R Policies (0.895) are close to one are taken for further analysis.

Total Variance Explained

| Component | Initial Eigenvalues | | | Extraction Sums of Squared Loadings | | | Rotation Sums of Squared Loadings | | |
|-----------|---------------------|---------------|--------------|-------------------------------------|---------------|--------------|-----------------------------------|---------------|--------------|
| | Total | % of Variance | Cumulative % | Total | % of Variance | Cumulative % | Total | % of Variance | Cumulative % |
| 1. LH | 2.893 | 41.329 | 41.329 | 2.893 | 41.329 | 41.329 | 1.978 | 28.252 | 28.252 |
| 2. DDM | 1.864 | 26.634 | 67.963 | 1.864 | 26.634 | 67.963 | 1.968 | 28.108 | 56.360 |
| 3. LRR | 1.131 | 16.152 | 84.115 | 1.131 | 16.152 | 84.115 | 1.943 | 27.755 | 84.115 |
| 4. IPP | .678 | 9.690 | 93.806 | | | | | | |
| 5. NFP | .272 | 3.884 | 97.690 | | | | | | |
| 6. DRA | .118 | 1.680 | 99.369 | | | | | | |
| 7. ROP | .044 | .631 | 100.000 | | | | | | |

Table 1.1

In table 1.1 Total Variance Explained shows Eigenvalue actually reflects the number of extracted factors whose sum should be equal to number of items which are subjected to factor analysis. The next item shows all the factors extractable from the analysis along with their eigenvalues. The Eigenvalue table has been divided into three sub-sections, i.e. Initial Eigen Values, Extracted Sums of Squared Loadings and Rotation of Sums of Squared Loadings. For analysis and interpretation purpose we are only concerned with Extracted Sums of Squared Loadings. Here note that first factor that is Land Handover accounts for 41.329% of the variance. The second factor Delay in Decision making accounts for 26.634% and third factor Lack of Strong R&R Policies accounts for 16.152%. All other remaining factors are not significant.

International Journal of Innovative Research in Science, Engineering and Technology

(An ISO 3297: 2007 Certified Organization)

Vol. 5, Issue 8, August 2016



Fig. 1.0

The scree plot is a graph of the eigenvalues against all the factors. The graph is useful for determining how many factors to retain. The point of interest is where the curve starts to flatten. It can be seen that the curve begins to flatten between factors 3 and 4. Note also that factor 4 onwards have an eigenvalue of less than 1, so only three factors i.e. Land Handover, Delay in Decision making and Lack of Strong R&R Policies have been retained.

Component Matrix

| | Component | | |
|---|-----------|-------|-------|
| | 1 | 2 | 3 |
| Land/Site Handover | .639 | -.327 | .670 |
| Delay In regulatory approvals | -.516 | .668 | -.210 |
| Lack of Strong R&R Policies | .182 | .875 | .309 |
| Relationship with other projects (Forward and Backward Linking) | .808 | -.044 | .046 |
| Non Flexible country plan | .582 | .666 | -.063 |
| Delay in decision making | -.626 | .234 | .714 |
| Ineffective procurement planning | -.896 | -.211 | .164 |

Table 1.2

Table 1.2 Component Matrix shows the loadings (extracted values of each item under 3 variables) of the seven variables on the three factors extracted. The higher the absolute value of the loading, the more the factor contributes to the variable. We have extracted three variables wherein the 7 items are divided into 3 variables according to most important items which similar responses in component 1 and simultaneously in component 2 and 3.

From the above analysis it is seems that for schedule overrun in pre-execution phase there are three components i.e. Land Handover, Delay in Decision making and Lack of Strong R&R Policies are effecting significantly on projects schedule. Their impact on schedule overrun in pre-execution phase is Land Handover accounts for 41.329% of the

International Journal of Innovative Research in Science, Engineering and Technology

(An ISO 3297: 2007 Certified Organization)

Vol. 5, Issue 8, August 2016

variance, Delay in Decision making accounts for 26.634% and Lack of Strong R&R Policies accounts for 16.152%. And their cumulative impact on schedule overrun in pre-execution phase is 84.115%.

So from analysis it is seems that three extracted factors Land Handover, Delay in Decision Making and Lack of Strong R&R Policies effects significantly on Project schedule overrun in Pre-execution phase.

2. Execution and Closing Phase: - Project Schedule Overrun

In the Execution and Closing phase of project factors analysed in questionnaire survey are Design/Scope Change, Inadequate availability of skilled resources, Contractual Dispute, Industrial relation and law problems, Geological Surprise Pre-commissioning teething troubles, Coordination issue with project team/vendors, Geographical challenges and cultural differences, Ineffective project monitoring, Lack of awareness of modern technology and Unavailability of funds. From the analysis communalities table it is seems that 4 components extracted are Coordination issue with project team, Contractual Dispute, Unavailability of funds and Ineffective project monitoring. Total variance table shows extracted four components have eigenvalue more than one. Here from the extracted factors Coordination issue with project team accounts for 27.063% of total variance, Contractual Dispute accounts for 19.134%, Unavailability of funds accounts for 14.169% and Ineffective project monitoring accounts for 12.479%. These four factors effects significantly on project schedule overrun in Execution and Closing Phase of project. The above extracted factor affects cumulatively 72.844% on project schedule overrun and hence they are important in execution and closing phase of projects.

B. COST OVERRUN

1. Pre-Execution Phase: - Project Cost Overrun

In the Pre-Execution phase of project factors analysed in questionnaire survey are Scope Creep, Inadequate DPR original estimate and budgeting of project, Acquisition of land at market price, High cost of Environmental safeguards, Poor selection of consultant, Lack of strong R&R policies, Non flexible country plan. From the analysis communalities table it is seems that 3 components extracted are Scope Creep, Inadequate DPR, original estimate and budgeting of project and Acquisition of land at market price. Total variance table shows extracted four components have eigenvalue more than one. Here from the extracted factors Scope Creep accounts for 31.564% of total variance, Inadequate DPR, original estimate and budgeting of project accounts for 23.974% and Acquisition of land at market price accounts 19.587%. These three factors affects significantly on project cost overrun in Pre-Execution phase of project. The above extracted factor affects cumulatively 75.124%.on project cost overrun and hence they are important in pre- execution phase of projects.

2. Execution and Closing Phase: - Project Cost Overrun

In the Execution and Closing phase of project factors analysed in questionnaire survey are Material price escalation beyond projection, Ineffective utilisation of labours, Design change/ Iterations, Incremental financial cost (foreign exchange volatility, borrowing cost, etc.), Locality and connectivity of project site, Inadequate availability of skilled resources, Weak contract administration and claim management, Weak procurement planning, Contractual dispute due to poor framing of contract document, Wrong/ Poor selection of technology/equipment. From the analysis communalities table it is seems that 4 components extracted are Design change/ Iterations, Contractual dispute due to poor framing of contract document, Inadequate availability of skilled resources and Incremental financial cost (foreign exchange volatility, borrowing cost, etc.). Total variance table shows extracted four components have eigenvalue more than one. Here from the extracted factors Design change/ Iterations accounts for 28.688% of total variance, Contractual dispute due to poor framing of contract document accounts for 20.889%, Inadequate availability of skilled resources accounts for 15.315% and Incremental financial cost (foreign exchange volatility, borrowing cost, etc.) accounts for 10.727%. These four factors affects significantly on project Cost overrun in Execution and Closing Phase of project. The above extracted factor affects cumulatively 75.620% on project cost overrun and hence they are important in execution and closing phase of projects.

International Journal of Innovative Research in Science, Engineering and Technology

(An ISO 3297: 2007 Certified Organization)

Vol. 5, Issue 8, August 2016

List of top factors causing cost and schedule overrun:

| Sr. No. | Overrun | Phase | Reason | Impact (Cumulative %) |
|---------|----------|-----------------------|---|-----------------------|
| 1 | Schedule | Pre-Execution | 1. Land Handover (41.329%) 2. Delay in Decision Making (26.634%) 3. Lack of strong R&R Polices (16.152%) | 84.115%. |
| | | Execution and Closing | 1. Coordination issue with project team (27.063%) 2. Contractual Dispute (19.134%) 3. Unavailability of funds (14.169%) 4. Ineffective project monitoring (12.479%) | 72.844% |
| 2 | Cost | Pre-Execution | 1. Scope Creep (31.564%) 2. Inadequate DPR, original estimate and budgeting of project (23.974%) 3. Acquisition of land at market price (19.587%) | 75.124%. |
| | | Execution and Closing | 1. Design change/ Iterations (28.688%) 2. Contractual dispute due to poor framing of contract document (20.889%) 3. Inadequate availability of skilled resources (15.315%) 4. Incremental financial cost (10.727%) | 75.620% |

Table 1.3

Above factors in Table 1.3 are the strongly belongs to project performance. These are onsite factors and off site factors. Before starting any work taking care of these factors is not done properly. Also some are the contractual problems effects on project performance. They are discussed in individual clause analysis.

II] Individual Clause Analysis

The individual clause analysis is necessary to measure the stability of individual clause from general conditions of contract (GCC). A general condition of contract that is contract document of a construction company is taken for analysis. Questionnaire is prepared for the analysis and its responses were drew by senior level representative and project management consultant who were directly involved in project’s management.

Following are 9 questions asked to every clause for its individual analysis in Table 1.4:

List of Questions for individual clause analysis

1. Is this a company standard clause?
2. Is this clause necessary?
3. Strict enforcement?
4. Number of times clause used? (None, few, many)
5. Is responsibility defined in clause?
6. Impact of use (none, much, some)
7. Was it subject of dispute?
8. Limitations on risk exposure?
9. Should clause be improved?

International Journal of Innovative Research in Science, Engineering and Technology

(An ISO 3297: 2007 Certified Organization)

Vol. 5, Issue 8, August 2016

Individual Clause Analysis:

| Cl. No | Clause Description | Responses for questionnaire ((Y- Yes, N-None,M-Much,F-Few, S-Some)) | | | | | | | | |
|--------|---|---|---|---|---|---|---|---|---|---|
| | | Question Numbers | | | | | | | | |
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 1 | General Provisions | Y | Y | Y | M | Y | S | Y | | Y |
| 2 | The Developer | Y | Y | Y | M | Y | M | | Y | |
| 3 | The contractor obligations, duties and other essentials | Y | Y | | F | | S | Y | Y | Y |
| 4 | Submittals | Y | Y | | M | | N | Y | | Y |
| 5 | Laws and regulations | Y | Y | Y | M | Y | M | Y | Y | Y |
| 6 | Utilities and facilities for construction | | Y | | F | | N | Y | | Y |
| 7 | Contractor's supervision of works | Y | Y | | F | | N | | Y | |
| 8 | Direct sub-contractors and nominated sub-contractors | | Y | | F | | N | | | |
| 9 | Contractor's labor and his obligations | Y | Y | Y | F | Y | S | | Y | |
| 10 | Plant, materials, workmanship and quality management | Y | Y | Y | M | Y | M | | Y | |
| 11 | Commencement of work, delays and suspension | Y | Y | Y | M | Y | M | | Y | |
| 12 | Suspension of Work | Y | Y | | F | Y | S | Y | | Y |
| 13 | Testing and Inspection Requirements | Y | Y | Y | M | Y | S | | Y | |
| 14 | Developer's taking over | Y | Y | Y | F | Y | S | | Y | |
| 15 | Defects liability | Y | Y | Y | F | Y | S | | Y | |
| 16 | Measurement and evaluation | Y | Y | | F | | S | Y | Y | Y |
| 17 | Variations and adjustments | Y | Y | Y | M | Y | S | | Y | |
| 18 | Contract price and payment to the contractor | Y | Y | Y | M | Y | M | | Y | |
| 19 | Termination by the developer | Y | Y | Y | F | Y | S | | Y | |
| 20 | Risk and responsibility | Y | Y | Y | F | Y | S | | Y | |
| 21 | Insurance | | Y | | M | | S | | | |
| 22 | Force majeure | Y | Y | Y | F | Y | S | | Y | |
| 23 | Claims, disputes and arbitration | Y | Y | Y | M | Y | M | | Y | |
| 24 | Miscellaneous provision | Y | Y | Y | F | Y | S | | Y | |

Table 1.4

International Journal of Innovative Research in Science, Engineering and Technology

(An ISO 3297: 2007 Certified Organization)

Vol. 5, Issue 8, August 2016

From the above analysis it is seems that following clauses are subjected to disputes because of wrong phrasing of clauses and they need to be improved.

1. General Provisions (Cl. No.1)
2. Submittals (Cl.No.4)
3. Laws and regulations (Cl.No.5)
4. Utilities and facilities for construction (Cl.No.6)
5. Suspension of Work (Cl.No.12)
6. Measurement and evaluation (Cl.No.16)
7. Risk and responsibility (Cl. No. 20)

After the individual clause analysis further part is modification clauses. The clauses which are subjected to improvement are further analyzed to make them correct. The clauses are creating problem such as dispute, cost overrun, schedule overrun because of their improper and inadequate description. Then these clauses are improved and proposed description

From the above individual clause analysis clauses are improved. As clauses gives the guideline for the development of construction process so they should be correct to avoid cost and schedule overrun. Following are list of corrected clauses corrected as per the individual clause analysis. Three sample improved clauses were added for understanding.

Improved Clauses:

Clause No. 1: - General Provisions

Sub Cl. No. 1.6: - Ruling Language

| | |
|------------------|--|
| Existing Clause: | The language according to which the contract shall be construed and interpreted shall be English. All entries on the Contract Document shall be in English. All notes and titles on drawings shall be in English and dimensions shall be given in metric units. |
| Proposed Clause | The language according to which the contract shall be construed and interpreted shall be English. All entries on the Contract Document shall be in English. All notes and titles on drawings shall be in English and dimensions shall be given in metric units. <i>However, depending upon requirements, the contract conditions and all related documents can be provided in the language, to which contractor is convergent. But this translation will be only for the purpose of better understanding of tender and related documents drafted in English. In case of any dispute and clarifications sought during the entire contract term, the meaning of documents in English language will only be considered for resolving disputes.</i> |
| Remark | If the contractor is not convergent with language of tender, there is possibility of contractor not been aware of contractual obligations, therefore it is recommended to provide tender in the language contractor knows. But to cut the disputes out of language interpretation is risk, to overcome this risk, manuscript in English is suggested as language of tender. |

Sub Cl. No. 1.16: - Intent of the Contract Document

| | |
|------------------|--|
| Existing Clause: | The several documents forming the Contract are to be taken as mutually explanatory of one another, but in case of ambiguities or discrepancies the same shall be explained and adjusted by the Developer who shall thereupon issue to the Contractor instructions thereon without any compensation being payable to the contractor for the same and in such event, unless otherwise provided in the Contract, the priority of the documents forming the Contract shall be as follows. Contract Agreement and the sections: <ol style="list-style-type: none"> a. Tender Drawing b. Contract Schedule c. Tender BOQ |
|------------------|--|

International Journal of Innovative Research in Science, Engineering and Technology

(An ISO 3297: 2007 Certified Organization)

Vol. 5, Issue 8, August 2016

| | |
|-----------------|---|
| | <p>d. Scope of Work e. Technical Specification</p> |
| Proposed Clause | <p>The several documents forming the Contract are to be taken as mutually explanatory of one another, but in case of ambiguities or discrepancies the same shall be explained and adjusted by the Developer who shall thereupon issue to the Contractor instructions thereon without any compensation being payable to the contractor for the same and in such event, unless otherwise provided in the Contract, the priority of the documents forming the Contract shall be as follows.</p> <p><i>During tendering process various addendums issue in descending order.</i></p> <p>Contract Agreement and the sections:</p> <p style="margin-left: 40px;"> <i>a. Technical Specification</i> <i>b. Tender BOQ</i> <i>c. Tender Drawing</i> <i>d. Scope of work</i> <i>e. Contract Schedule.</i> </p> |
| Remark | <p>During the process of tendering, addendums if issued and MoM discussed shall be referred as priority document. Because latest documents will reflect more current position hence more relevant.</p> |

Clause No. 4: - Submittals (4.1.6)

| | |
|------------------|--|
| Existing Clause: | <p>The Contractor must obtain the Developer’s prior written approval of the respective samples of Workmanship and prototypes before proceeding with the execution of the various sections of the Works.</p> |
| Proposed Clause | <p>The Contractor must obtain the Developer’s prior written approval of the respective samples of Workmanship and prototypes before proceeding with the execution of the various sections of the Works. <i>The approved samples shall be maintained at site by contractor till issue of completion certificate.</i></p> |
| Remark | <p>Such storage is called as control sample. Whatever material is brought by contractor shall be checked against control sample for conformity.</p> |

V. CONCLUSION

This study has effectively validated the significance of thoughtful and careful contract preparation to achieve better project performance. Owners and contractors alike will benefit by taking a more perceptive approach to the contractual arrangements of their projects. It is conclude that

1. In the Infrastructure project 90% Projects are facing cost and schedule overrun.
2. Following are the top factors which affects Schedule Overrun.
 - a. Pre-Execution Phase:
 1. Land Handover (41.329%)
 2. Delay in Decision Making (26.634%)
 3. Lack of strong R&R Policies (16.152%)

In the pre-execution phase Land should be acquired and handover prior to commencing the project. To avoid delays in decision there should be a strong team should be there to avoid delay in decision. Decision making team should be involved in project from conceptualization stage.

- b. Execution and Closing Phase:
 1. Coordination issue with project team (27.063%)
 2. Contractual Dispute (19.134%)
 3. Unavailability of funds (14.169%)

International Journal of Innovative Research in Science, Engineering and Technology

(An ISO 3297: 2007 Certified Organization)

Vol. 5, Issue 8, August 2016

4. Ineffective project monitoring (12.479%)

In Execution and closing phase Coordination with project team is very important to avoid schedule overrun because in infrastructure projects number of 'n' number of activities are involved and hence team should be connected very well to minimise schedule overrun.

4. Following are the top factors causing cost and schedule overrun:

a. Pre-Execution Phase:

1. Scope Creep (31.564%)
2. Inadequate DPR, original estimate and budgeting of project (23.974%)
3. Acquisition of land at market price (19.587%)

In pre-execution phase of projects, cost overrun is occurred due to scope creep of projects. Scope of project should be defined in before commencing the project. Project DPR and estimates should be made in the earlier phase of project to avoid cost overrun in project.

b. Execution and Closing Phase:

1. Design change/ Iterations (28.688%)
2. Contractual dispute due to poor framing of contract document (20.889%)
3. Inadequate availability of skilled resources (15.315%)
4. Incremental financial cost (10.727%)

In Execution and Closing Phase of Project Design changes leads to cost overrun. Design should be prepared very effectively to avoid further changes during the progress of project. In India huge resources are available but quality and skilled resources are not available. Training and skill development program should be conducted for making resources skilled.

4. Following Contract Clauses found which needs to improve:

- a. General provisions (Cl.No.1)
- b. Submittals (Cl.No.4)
- c. Laws and Regulations (Cl.No.5)
- d. Utilities and Facilities for Construction (Cl.No.6)
- e. Measurement and Evaluation (Cl.No.16)
- f. Risk and Responsibilities (Cl.No.20)

5. Contract documents i.e. general conditions of contracts are generally used same for each project. Phrases of GCC are phrased years ago. But now technology has been changed, Construction policies has been changed, work scope changed, mentality of people changed, lots of things has been changed in construction industry but General Conditions of Contracts never changed. It is clearly recommend that, General conditions of contacts should be verified and moderate as per project's condition before granting any project.

6. Clearly list and include, if possible, all documents that relate to work scope definition. Owners should spend extra time before the issue of their documents to check for clashes and lapses, and contractors should quickly and fairly report any such problems.

7. Cost effectiveness can be improved by cleverly constructing the construction contract to reflect clearly the project objectives of both parties.

8. Combining project objectives into the contract will require evaluation by both parties to determine their respective interests.

9. Clear communications are improved by reducing generalizations of these interests when phrasing contractual clauses. Lack of details or specifics will commonly result in differing clarifications and, at the least, require time-consuming explanations.

10. It is strongly recommended that the clauses which are strong reason for root cause of problem, it should be negotiated and discussed in advance of construction.



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