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# COST AND TIME OVERRUNS IN INDIAN CONSTRUCTION INDUSTRY

Sai Murali Krishna Reddy.Raya [1] and S.S Bhanu Prakash[2]
[1]M.Tech Graduate, Construction Technology and Management, KL University.
[2]Assistant Professor, Civil Department, KL University.

ABSTRACT

A lot of research and studies have been done to identify the root cause of the time overrun and cost overrun in construction projects which lead to the delay in the project completion Time and cost are the lifelines of any and every project. It is of supreme importance to study, analyze and evaluate the common factors leading to these constraints and suggest the best mitigation measures to overcome time and cost overrun constraints. During the construction phase it is the prime responsibility of the project managers to monitor cost and time and avoid the overruns of the both cost and time. Due to these limitations, this paper discusses the effective cost and time control overrun practices in construction industry.

KEYWORDS :Time overrun, Cost overrun, Project controlling, Construction.

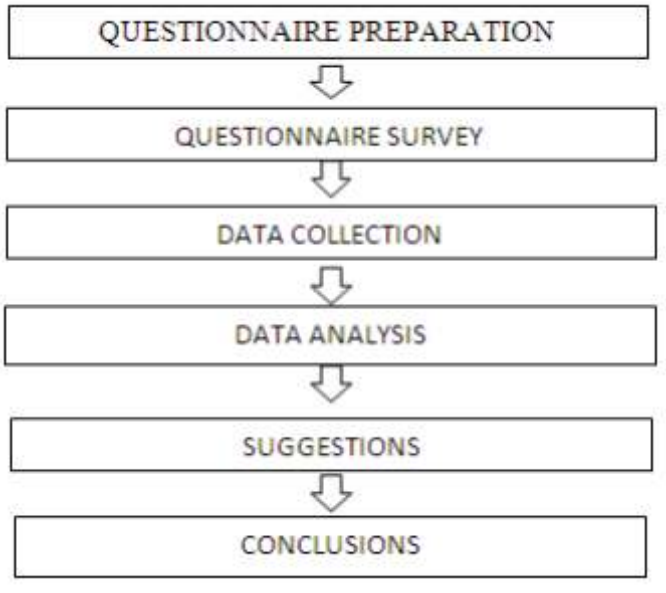
## INTRODUCTION :

It is most important to study, analyze and evaluate the common factors leading to the cost and time overruns these constraints and suggest the best and suitable mitigation measures to overcome time and cost overrun constraints. The time and cost are the lifelines of every and any project in the construction industry, the aim of the project managers, and other professionals of the project to control the time and cost and make ensure that the projects finish on time without any time overrun and within their cost (budget), without any cost overruns, with perfect management principles, without the deviation's in the project. It is a most complicated task with heavy risks do deal the project without time overrun and cost overrun by the Project managers and asst.project managers. The effective cost overrun and Time overrun has received much attention in the construction industry. The life time cycle of construction projects comprise of different phases including planning, initiation, procurement, that which involves the constant measuring progress,

evaluating plans and take the correct actions when required by the project managers. The every single minute and every single penny (paisa) is important in very construction projects not only construction each and every projects which are economy related the delay of cost and time result to the loss of potential profit of the project. The one way to avoid the loss was using the necessary tecqunices and software's related to the cost and time overruns some of the tecqunices which are used from last few decades' are PERT (Program Evaluation Review Technique) Gantt Bar Chart,CPM(Critical Path Method) are been executed, and some project control methods are the MS Project,Primavera.P6, but still the construction projects still suffer from the time overrun and cost overrun in recent times there have done lot of research lot of surveys and studies are identified for finding out the most influencing factors of cost overrun and time overrun, and it is found that the most variable causing the construction delays are the cost and time overruns the factors relating to these are the project size(large,medium,small)project type(infra,residential,etc etc.),weatherconditions,infalation of the prices, irregular polices by the govt,un-skilled labour,chages in design, poor contract management, financing and delays in payment for completed works, material shortage, stock yard problems sub-contract issues material, machinery suppliers delays. While the cost overruns than the time overruns were revealed are currency fluctuations, losses in stock market, lack of proper quantity estimates, delays in bank loans, other special works, some of the quantitatively examined factors influencing

delays of the building projects (residential, commercial, etc) projects are client characteristics, lack of proper knowledge and experience in construction field and the production process the project characteristics such as size, type, complexity and duration of the project and also the project organization factors such as duration of the project,% of design completed before tender, material procurement, type of contract, clarity of information provided and number of sub-contractor issues.

## RESEARCH METHODOLOGY




## DATA COLLECTION

### Questionnaire Survey

The software package which is used for project cost control

Table-I

| Software | Contractor | Consultant |
|---|---|---|
| Microsoft Project | 38% | 45% |
| Primavera | 25% | 20% |
| Project Costing System | 5% | 7% |
| M.S. Excel | 32% | 28% |
| Total | 100% | 100% |

## Questionnaire survey:

The target of the survey is to create and analysis the current common practices of time and cost control in the Indian construction industry. It includes the control methods and also the software application which are being used by professionals as well as a inhibiting factors that affect the project cost and time.

It started with a thorough review of existing studies that exposed a lot of problems in construction, project time & cost overruns. The questionnaire is made up of 20 multiple choice questions. The questionnaire was divided it into three sections.

Section 1:- Background information which was targeted at obtaining information on general particulars of respondents, their organization, and position within the type of project embarked
Section 2:- This is about cost and time overrun, project planning & cost and time control practice such as the frequency.
Section 3:- The third section contained specific but specific to both cost and time control practices.

## Stage 1:-

A total of 50 questionnaires were administered, 15 of construction companies in India by company turnover and the 15 companies of P.M.C by the number of professional staff employee. This ensured a very good response of 25 questions (100% response rate) was returned. Table 2 & 3 shows the profile of the questionnaires.

100% of the respondents completed the questionnaire were directors (or) commercial managers (or) senior managers. Nearly 40% of the respondents have more than 25 years of experience.

Table-II

| Role of Respondents | | |
|---|---|---|
| Roles | Number | Percentage (%) |
| Project Director | 6 | 12 |
| Commercial Managers | 6 | 12 |
| Contract Managers | 10 | 20 |
| Construction Managers | 9 | 18 |
| Project Managers | 13 | 26 |
| Quantity Surveyors | 5 | 10 |
| Others | 1 | 2 |
| Total | 50 | 100% |

Table-III

| Years of experience of respondents | | |
|---|---|---|
| Years | No. of persons | Percentage (%) |
| 0-5 | 15 | 30 |
| 6-10 | 7 | 14 |
| 11-15 | 6 | 12 |
| 16-20 | 7 | 14 |
| 21-25 | 9 | 18 |
| >25 | 6 | 12 |
| Total | 50 | 100% |

Stage 2 :-

This was conducted using a qualitative method semi structured interviews. A total of 5 companies presented relevant practioners for interviews. Table 3 provides more information of the interviewers. This table was a mix of contractors and consultants with varying but quite similar kind of projects. The total professional experience of 25 interviewers (408 years) i.e., 16.8 years (average) majority of the employees are seniors.

Survey findings of project controls in practice:-

The techniques which are used for project time control:-

Table-IV

| Techniques | Contractors | Consultants |
|---|---|---|
| Gantt Bar Chart | 40% | 38% |
| Critical Path Method | 30% | 36% |
| Milestone Data Programme Technique | 10% | 8% |
| PERT(Programme Evaluation Review Tecqunice) | 15% | 10% |
| LOB | 1% | 1% |
| Precedence Network Diagram | 3% | 5% |
| Simulation | 1% | 2% |

The software packages which are used for project time control:-

Table-V

| Software | Contractors | Consultants |
|---|---|---|
| M.S Project | 50% | 64% |
| Asta Power Project | 20% | 10% |
| Primavera | 25% | 25% |
| Project Commander | 5% | 2% |

## DATA ANALYSIS

### Survey findings of project controls in practice:-

The importance of cost and time control is widely recognized by construction authorities/professionals/authorities in practice. The questionnaire survey of this study revealed that 48% of respondents always apply time and cost controls to their project and a further 25% indicated that they frequently apply time and cost control techniques. Only 10% respondents indicate that they rarely or do not apply time but applying the cost control during their projects. The application of cost control is more irresistible with 75% of respondents specifying that at every time they apply their cost control method and 13% indicating that they often applied cost control methods to their projects. None of the respondents point out that they rarely or do not use cost control techniques supporting the importance placed on cost control by construction project experts in the construction industry. The most standard time control technique is Gantt Bar Chart, which used by 40% of contractors and 38% consultants. This is closely tracked by critical path method (CPM) used by 30% contractors and 36% consultants. The reasons for the reputation of these techniques might be used excessively due to that they are the most recognized/familiar techniques in the industry, however these are comfort to use and applicability to the construction process can also be said as being responsible (liable) for their acceptance. Additional used techniques include the Milestone Date Programming Technique (MDPT), Programme Evaluation Review Technique (PERT), Predecessor Network Diagram (PND), Elemental Trend Breakdown/Line of Balance (LOB), and Simulation. The use of these professional software support is widely spread. Three clear leading applications are Microsoft Project(Ms.p), Astra Power Project and Primavera.P6, Microsoft Project is used by 50% contractors and 64% consultants; Asta Power Project by 20% contractors and 10% consultants; and Primavera by 25% contractors and 24% consultants.

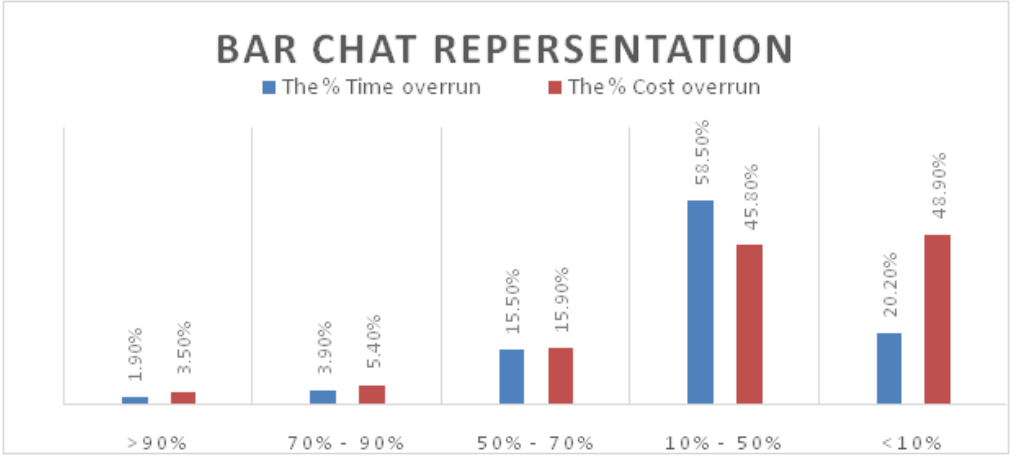
Despite the extensive application of cost and time control techniques and software's, cost and time overruns are still quite common in construction projects. Table 6 shows the results of proportion of projects that suffer from this problem as reported by the best consultants and contractors during this survey.

The Percentage of projects that encounter cost and time overruns:-

Table-VI

| Proportions of projects in %(Percentage) | The % Time overrun | The % Cost overrun |
|---|---|---|
| >90% | 1.9% | 3.5% |
| 70% - 90% | 3.9% | 5.4% |
| 50% - 70% | 15.5% | 15.9% |
| 10% - 50% | 58.5% | 45.8% |
| <10% | 20.2% | 48.9% |

Fig.1




The proportion of respondents that experience overrun on just less than 10% of their projects is 20% for time overrun and 48% for cost overrun. This means that about 80% of respondents experience time overrun on 10% or more of their projects and 52% of respondents experience cost overrun on a similar magnitude of their projects. In addition to finding out the existing status of time and cost control practice and determining the existing overrun problems still affecting construction projects, the questionnaire survey is try to find out and identify the most important factors that inhibiting(constraint's) the project controlling effort of construction projects by the practitioners(experts).

## RESULTS

### Identify the top inhibiting factors-

Prior to the survey, a literature review helped to identify most of the similar factors that regularly lead to project cost and time overruns. In total other than 50 factors were initially identified from different studies. Some of these factors are interrelated or overlapping each other. After an analysis, 20 factors are shortlisted for the survey.

- Increasing of prices(Inflation)
- Currency fluctuations/Un-certainty in exchange rate
- Irregular/Un-stable government policies
- Lack of proper regulations in work control
- Un-even weather conditions
- Material Procurement

- Tax liabilities
- Un-skilled labor(man power)
- Risk's associated with projects
- Unstable interest rates
- Poor project management/Construction management
- Lack of proper professional software
- Inaccurate evaluation of projects time/duration
- Lack of communication between parties i.e. (project client project contractor/sub-contractor).
- Project fraud and corruption
- Frequent design changes
- Funding problems for completed works
- Complexity of works(Large/Medium/Small)
- Illogical contract documentation
- Conflicts between the project parties(client/contractor)

The Ranking of the inhibiting factors are ranked by using
Relative importance index formula (RII) = ? w ÷ (H x N)
Ranking of factors inhibiting effective on project time overrun:-

Table-VII

| The inhibiting factors for Time overrun's | Rank | RII |
|---|---|---|
| Frequent design changes | 1 | 0.94 |
| Inaccurate evaluation of projects time/duration | 2 | 0.86 |
| Complexity of works(l/m/s) | 3 | 0.86 |
| Risk's associated with projects | 4 | 0.85 |
| Lack of communications between parties i.e.(project contractor/subcontractor/client) | 5 | 0.85 |
| Poor project management/Construction management | 6 | 0.78 |
| Illogical contract documentation | 7 | 0.77 |
| Un-skilled labor(manpower) | 8 | 0.74 |
| Conflict between project parties(client/contactor) | 9 | 0.74 |
| Un-even weather conditions | 10 | 0.74 |
| Funding problems for the completed works | 11 | 0.73 |
| Tax liabilities | 12 | 0.71 |
| Material procurement | 13 | 0.66 |
| Lack of proper professional software | 14 | 0.61 |
| Increasing of prices | 15 | 0.58 |
| Lack of proper regulations in work control | 16 | 0.55 |
| Project fraud and corruption | 17 | 0.50 |
| Irregular(unstable)government policies | 18 | 0.47 |
| Unstable interest rate | 19 | 0.46 |
| Currency fluctuations/Un-certainty in exchange rate | 20 | 0.45 |

Ranking of factors inhibiting effective project cost overrun:-

Table-8

| The inhibiting factors for the Cost overrun's | Rank | RII |
|---|---|---|
| Frequent design changes | 1 | 0.94 |
| Risk's associated with projects | 2 | 0.88 |
| Inaccurate evaluation of projects time/duration | 3 | 0.85 |
| Tax liabilities | 4 | 0.82 |
| Complexity of works(l/m/s) | 5 | 0.81 |
| Conflict between the project parties(client/contractor) | 6 | 0.81 |
| Illogical contract documentation | 7 | 0.80 |
| Contract and specification interpretation disagreement | 8 | 0.80 |
| Increasing(inflation)of prices | 9 | 0.79 |
| Funding problems for the completed works | 10 | 0.78 |
| Poor project management/Construction management | 11 | 0.77 |
| Un-skilled labor(manpower) | 12 | 0.69 |
| Un-even weather conditions | 13 | 0.68 |
| Material procurement | 14 | 0.65 |
| Lack of proper professional software | 15 | 0.62 |
| Unstable interest rate | 16 | 0.59 |
| Currency fluctuations/Un-certainty in exchange rate | 17 | 0.58 |
| Lack of proper regulations in work control | 18 | 0.58 |
| Project fraud and corruption | 19 | 0.55 |
| Irregular(unstable)government policies | 20 | 0.48 |

## CONCLUSION

As the project is facing cost overruns and time overrun we have used some tecqunices to control and avoid cost and time overrun. The main cause for the cost overrun and time overrun in this case are frequent design changes, poor project management, inappropriate contractors, unskilled manpower, inaccuracy of material estimate, lack of appropriate software, complexity of works. To overcome these problems the firm have to focus on better inventory control, use of adequate software and focus on activity based control. So that the project is transparent enough to rectify or overcome their mistakes at the time of work progress itself. Clearly, further development is needed to overcome the inhibiting factors beyond the top five. In accumulation, the effectiveness of these mitigation measures for the project's time overrun and cost overrun needs to be investigated in future research.

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## ANEXURE-I

### Questionnaire for section-1:-

The table I includes the basic information like their job and experience

1.Name
2.Designation
3.Educational background
4.Company Name
5.Previous company Name
6.Previous Experience
7.Total no. of years of Experience

### Questionnaire for section-2:-

This questionnaire explains about and gives an idea of the techniques used for cost overrun and time overrun.

1.Are you a

A.Contractor B. Consultant