

A Review on Cost Overruns and its Remedies for Effective Construction Management

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Abstract—In construction industry cost is amongst the major considerations throughout the project management life cycle and thus can be regarded as one of the most important parameters of a project and the driving force of project success. Despite of its proven importance it is not uncommon to see a construction project failing to achieve its objectives within the specified cost. Cost overrun is a very frequent phenomenon and is almost associated with nearly all projects in the construction industry.

Key words: Construction industry, Cost overruns, Cost management, Remedies

I. INTRODUCTION

Cost is the fundamental component for any construction project. Over the years, there have been improvements in the management of construction projects; however, the problem of cost overruns is still a critical issue in the construction industry. To avoid construction cost overrun, very first and most important step is to identify and understand the causes and factors responsible for that. Managing construction costs includes estimating, scheduling, accumulating and analyzing cost data, and finally implementing measures to correct construction cost problems. Throughout a project's planning, design, and construction phases, cost management is employed as a means of balancing a project's scope, expectations of quality and budget.

II. FACTORS AFFECTING COST OVERRUNS

The various factors affecting cost overruns in construction industry are as listed below:

- A) Lack of planning
- B) Financial management
- C) Shortage Of Construction Materials
- D) Inflation
- E) Change Orders or Variations Orders
- F) Inappropriate/Inexperienced Contractors

A. Lack of planning

Affects

Planning in construction is needed at initial phase, design phase and construction phase. If the project is not planned well, then it becomes necessary to frequently update the various construction activities in order to complete within the planned time. Thus, more cost would be incurred on construction activities considering the aspects of cost of hiring the machineries or equipment, additional labour.

Remedies

Thorough estimation process for project costs calculations, with vigilant planning, keeping in view trends of inflation

and depreciation factors, cost variations trends in sector and country with lead to smoother implementation and achievement of desired cost control.

B. Financial management

Affects

The role of project manager or project management team is probably the most important element in controlling or managing the cost of construction projects. It is often true that a good project, if combined with poor project management, will usually face serious problems.

Remedies

Good project management manages cost by estimating, scheduling, accumulating and analyzing cost data and then finally implementing measures to correct problems related to cost.

C. Shortage of Construction Materials

Affects

During periods of high development where the level of construction activity is unusually high in a particular region, there may be shortage of some construction materials. Sometimes the local market may not be able to supply the full demand of these construction materials; hence a need may arise to bring these construction materials from other regions or is needed to be imported from abroad.

Remedies

The contractors should be aware of the material fluctuation, so that they will prepared time schedule for material delivery process to the site in order to avoid shortage or fluctuation problems. Thus, it becomes necessary to anticipate about shortage of materials in the original cost estimate, which consequently leads to cost overruns in construction projects.

D. Inflation

Affects

Inflation can act to increase the construction costs. If the rate of inflation increases above the predicted level during the construction period, then the originally cost estimate will be exceeded. Due to the nature of the process and the rate of return for work undertaken on construction projects, the effects of inflation can cause loss of profit to contractors and higher cost overrun to project owners.

Remedies

In construction industry, the problem of inflation can be overcome to some extent if the government takes steps to improve its economic instability in the global market. Also, the government needs to make amendment in its administration and change the old policy. The corrupted and

ruined government administration also influences the economic instability of the country.

E. Change Orders or Variations Orders

Affects

Changes in construction projects can cause substantial adjustment to the contract duration and construction cost. Changes in designs and contract documents usually lead to a change in contract price or contract schedule.

Remedies

Allow sufficient time for proper feasibility studies, planning, design, information documentation and tender submission. This helps to avoid errors and omissions that consequentially help in avoiding or minimizing cost overrun.

F. Inappropriate/Inexperienced Contractors

Affects

If contractors are not selected on the basis of price, experience in undertaking particular type of construction projects and their reputation or track record then the productivity of labour is affected on construction work.

Remedies

Thus one must select a competent consultant and a reliable contractor to carry out the work. Also continuous training programs about construction projects performance can be provided to them. Select suitable contractors not only on the basis of price and time offerings, but also on experience, financial standing, capacity and expertise.

III. EFFECTS OF COST OVERRUN

- Delay,
- Additional cost, budget short fall,
- Adversarial relationship between participants of the project,
- Loss of reputation to the consultant, the consultant will be viewed as incompetent by project owners,
- High cost of supervision and contract administration for consultants,
- Delayed payments to contractors,
- The contractor will suffer from budget short fall of the client,
- Poor quality workmanship,
- Dissatisfaction by project owners and consequently by end users,
- Negative attitude towards the construction industry by the higher public authority and by the society as a whole,
- The contribution of the construction industry to the growth of national economy of the country will be less,
- Cost overruns in construction projects prevent the planned increase in property and service production from taking place, and this phenomenon in turn affects, in a negative way, the rate of national growth
- Weakens the growth of the construction industry by eroding mutual trust and respect,
- Pours money unnecessarily to the project at hand at the expense of other new projects,
- Distorts fair and equitable resource distribution,

- Discourage investment, the investment on building construction by public clients will be less, hence the number of projects will decrease in the future,
- Creates sceptical outlook on appraisal of other new construction projects,
- Some project owners (clients) become reluctant to effect additional payments to contractors and they view the cost overrun as a fabricated thing. This will propel to delay the project and become a source of dispute among participants of the project,
- Creates frustration on stakeholders.

IV. METHODS USED TO ANALYZE IMPORTANCE OF CRITERIA

A. Impact Factor Method (Case-Study-1)⁽⁹⁾

Nida Azhar et al carried out survey in which list of 42 factors was given to the respondents to rank and score them according to the severity on the scale of 1 to 10 and were instructed to rate score 1 to the factors which they find least contributing towards the cost overrun and a score of 10 to those factors they regard as most significant towards generating project cost overruns and rating of in between to mark the severity of factor ranging from low, medium to high. Impact of each factor was then calculated by simple calculation

$$Impact = \frac{\sum(fi * i)}{n}$$

Where,

i = is the severity score from 1 to 10

fi = is the frequency of factor getting score i

n = number of response

Rank	Factor ID	Factor Description	Impact	Category
1	1	Fluctuation in prices of raw materials	8.9	Macro-Economic Factors
2	2	Unstable cost of manufactured materials	7.6	Macro-Economic Factors
3	5	High cost of machineries	7.0	Macro-Economic Factors
4	32	Lowest bidding procurement method	6.9	Business and Regulatory Environment
5	42	Poor project (site) management/ Poor cost control	6.9	Business and Regulatory Environment
6	9	Long period between design and time of bidding/Tendering	6.9	Business and Regulatory Environment
7	24	Wrong method of cost estimation	6.9	Business and Regulatory Environment
8	23	Additional work	6.8	Management Factors

9	6	Improper planning	6.8	Management Factors
10	18	Inappropriate government policies	6.6	Business and Regulatory Environment

Table. 1: Top Ten Cost Overrun Factors

B. Significance Index (Case-Study-2)⁽⁷⁾

Kasimu et al developed a questionnaire to identify the significance impact level of the factors that causes cost overruns in building construction projects form the specialist and experts in the construction industry. The likert scale method of designing questionnaires was adopted that is five-point scale. It is categorized as follow: very high, high, moderate, little and very little (on 5 to 1 point scale). The data collected were analyzed through the computation based on the respondent respond by using formula below. The formula is used to rank the significance factors that causes cost overrun based on impact level as identified by the specialist and experts.

$$\text{Significance Index (\%)} = \sum a (n/N) * 100/5$$

Where;

a = is the constant expressing weighting given to each response (ranges from 1 for very little upto 5 for very high),
n = is the frequency of the responses, and *N* is total number of responses.

S/N	Factors	Significance index	Rank
1	Market conditions	57.00	1
2	Fluctuation in money exchange	56.50	2
3	Inflation	56.50	3
4	Delay in payment	55.00	4
5	Lack of financial management and planning	55.50	5
6	Method Estimate adopted	52.50	6
7	High interest rate charge by banks on loan (e.g. UBA)	44.50	7
8	Taxes Increase	48.50	8
9	Insurance cost	39.50	9

Table. 2: The Significance Index and Ranking of Each Factor under Financial Sectors.

The significance index for all factors was calculated. The group index was calculated by taking the average of factors under each sector.

C. Relative Important Index (Case-Study-3)⁽¹⁾

Adnan Enshassi et al used questionnaire survey to know the attitude of owners, consultants, and contractors towards the factors affecting the performance of construction projects in the Gaza Strip. Questionnaires were sent to randomly selected owners, consultants, and contractors. Consultants were identified from the listings of consultants association; the target populations of contractors were companies registered with Palestinian contractors union.

The relative importance index method (RII) was used herein to determine owners', consultants', and contractors' perceptions of the relative importance of the identified performance factors. The RII (Relative Important Index) was computed as (Cheung et al. 2004; Iyer and Jha 2005; Ugwu and Haupt 2007)

$$RII = \frac{\sum W}{A \times N}$$

Where,

W = weight given to each factor by the respondents and ranges from 1 to 5; A – the highest weight = 5; N = the total number of respondents.

Agreement among the 3 groups of respondents (owners, contractors and consultants), Kendall's coefficient of concordance is used as a measure of agreement among raters. Kendall's coefficient of concordance indicates the degree of agreement on a zero to one scale, and is computed by the following equation (Moore et al. 2003; Frimpong et al. 2003):

$$W = \frac{12U - 3m^2n(n-1)^2}{m^2n(n-1)}$$

n = number of factors; m – number of groups; j – the factors 1, 2... N.

Null hypothesis: H_0 There is insignificant degree of agreement among owners, contractors and consultants.

Alternative hypothesis: H_1 There is a statistically significant degree of agreement among owners, contractors and consultants.

Performance groups	Owner		Consultant		Contractor	
	RII	Rank	RII	Rank	RII	Rank
Cost	0.679	8	0.724	5	0.726	7
Time	0.753	4	0.757	3	0.769	5
Quality	0.792	2	0.787	1	0.794	3
Productivity	0.736	5	0.718	6	0.747	6
Client satisfaction	0.734	6	0.765	2	0.779	4
Regular and community satisfaction	0.668	9	0.680	9	0.646	10
People	0.759	3	0.712	7	0.812	1
Health and safety	0.698	7	0.686	8	0.699	8
Innovation and learning	0.821	1	0.744	4	0.804	2
Environment	0.629	10	0.586	10	0.660	9

Table. 3: Summary of Relative Importance Index and Rank of Major Groups Affecting the Performance of Construction Projects

V. CONCLUSION

Thus, from the various studies and observations interpretation can be made that cost overruns takes place in majority of the construction projects. The most crucial root causes of cost overruns in construction projects have been because of lack of planning, improper financial management, shortage of construction materials for which high cost is needed to be paid in order to complete the

project on time, inflation, variations or change of order at last moment and inappropriate/inexperienced contractors. Excessive cost overrun requires additional budget, this in turn eat up the scarce financial resources of the country, which lead to further budget short fall for construction projects. This prevents the planned increase in property and service production from taking place, and this phenomenon in turn affects, in a negative way, the rate of national growth. In addition, various methods like important factor method, significance relative method and relative important indexing can be used to investigate the root causes of cost overruns. Also this methods help in finding out the crucial factors as well as ranking them. To the industry as a whole, cost overruns could bring about a drop in building activities, bad reputation, and inability to secure project finance easily form public authorities in the future.

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