Journal of Civil Engineering and Environmental Technology
Print ISSN: 2349-8404; Online ISSN: 2349-879X; Volume 2, Number 14; July-September, 2015 pp. 24-26

http://www.krishisanskriti.org/jceet.html

Risk Management in Construction Projects of Developing Countries

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Abstract—*Construction is a risky industry and there is no other industry that requires proper application of business practices much as construction industry. The main objective of this research is to gain understanding of risk factors faced by building projects in Developing Countries. The study also aims to investigate the effectiveness of risk preventive and mitigative methods. The objectives of this research have been achieved through a comparative study of closed ended questionnaires with interviews and a case study. The results of analyzing the 20 questionnaires that were directed to contractor respondents concluded that the most important risk factors are: financial failure of the contractor, working at hot (dangerous) areas, closure, defective design and delayed payments on contract. On the other hand, owner respondents concluded that the most important risk factors are: awarding the design to unqualified designer, defective design, occurrence of accidents, difficulty to access the site, and inaccurate quantities. The study findings show that the contractors and the owners suffer from lack of innovative methods to prevent or mitigate risks. According to results contractors and owners do not utilize risk analysis techniques but depend widely on direct judgment in estimating time and cost. The results of this study recommend that there is an essential need for more standardization and effective forms of contract, which address issues of clarity, fairness, roles and responsibilities, allocation of risks, dispute resolution and payment. Both owners and contractors are called for identification of possible risk factors that could be faced and to allocate them contractually. There is a need to keep a computerized historical data of finished projects to help in rights reservation and to be an information source for future comparison. A standard form of contracts which address all issues should be adopted for all the projects in Developing Countries instead of the consequential disorder that result from applying different types of contracts. More effort should be made to properly apply risk management in the construction industry.*

Keywords*:-Risk Management, construction projects, risk identification.*

1. INTRODUCTION

The aim of this study is to determine the risk factors in construction industry, allocation of these factors, methods used to deal with risks and the techniques adopted in analyzing these risks. Then, a comparison will be held between contractors and owners' perspectives regarding the severity and allocation of each risk factor.

Risk management in the construction project Management context is a comprehensive and systematic way of identifying, analyzing and responding to risks to achieve the project objectives. The benefits of the Risk Management process include identifying and analyzing risks, and improvement of Construction project management processes and effective use of resources. Construction projects can be extremely complex and fraught with uncertainty. Risks and Uncertainties can potentially have damaging consequences for the construction projects. Therefore nowadays, the risk analysis and management continues to be a major feature of the Project management of construction projects in an attempt to deal effectively with uncertainties and unexpected events and to achieve overall project success. Construction projects are always unique and risks raise from a number of the different sources. Construction projects are inherently complex and dynamic, and involve multiple feedback processes. A lot of participants – individuals and organizations are actively involved in the construction project, and their interests may be positively or negatively affected as a result of the project execution or project completion. Different participants with different experience and skills usually have different expectations and interests. This naturally creates problems and confusion for even the most experienced Project Managers and Contractors.

Cost of risk is a concept which many construction companies have never thought about despite the fact that it is one of the most expensive items. Risk management helps the key project participants (client, contractor or developer, consultant, and supplier) to meet their commitments and minimize negative impacts on construction project performance in relation to cost, time and quality objectives. Traditionally, practitioners have tended to associate construction project's success with three aspects i.e. time, cost and quality outcomes.

The current economic downturn and challenges in a highly competitive construction sector require contractors to manage

risks by themselves. This paper reports the research that aims to examine the risk analysis and risk management practices in the Developing countries.

2. LITERATURE REVIEW

Risk management is probably the most difficult aspect of project management. A project manager must be able to recognise and identify the root causes of risks and to trace these causes through the project to their consequences. The use of risk management from the early stages of a project, where major decisions such as choice of alignment and selection of construction methods can be influenced, is essential. The benefits of the risk management process include identifying and analyzing risks, and improvement of construction project management processes and effective use of resources. The construction industry is heterogeneous and enormously complex. There are several major classifications of construction that differ markedly from one another: housing, non-residential building, heavy, highway, utility, and industrial. Construction projects include new construction, renovation, and demolition of both residential and nonresidential projects, as well as public works projects, such as streets, roads, highways, utility plants, bridges, tunnels, and overpasses. The success parameters for any project are in time completion, within specific budget and requisite performance (technical requirement). The main barrier for their achievement is the change in the project environment. The problem multiplies with the size of the project as uncertainties in project outcome increase with size. Large construction projects are exposed to uncertain environment because of factors such as planning, design and construction complexity, presence of various interest groups (owner, consultants, contractors, suppliers, etc.), resources (manpower, materials, equipment, and funds) availability, environmental factors, the economic and political environment and statutory regulations.

Construction projects can be unpredictable. Managing risks in construction projects has been recognized as a very important process in order to achieve project objectives in terms of time, cost, quality, safety and environmental sustainability. Project risk management is an iterative process: the process is beneficial when is implemented in a systematic manner throughout the lifecycle of a construction project, from the planning stage to completion. Worldwide, construction workers are three times more likely to be killed and twice as likely to be injured as workers in other occupations. The costs of these accidents are immense to the individual, to the employer and to the society. It can amount to an appreciable proportion of the contract price. Construction workers are killed, injured or suffers ill-health more than in any other industry. In 2011, 13 construction workers were killed whilst at work, compared to 7 industrial workers and 4 agricultural workers. In comparison to 2010, the number of fatal accidents in construction enterprises increased by more than 2 times, i.e. from 6 to 13 cases.

3. OBJECTIVES

- To apply Risk Management fundamentals to identify Human Risk Factors
- to identify and propose solutions to problems which pose risk in the area of occupational and environmental health and safety
- to identify and minimize the exposure to hazards in the area of fire and life safety
- to investigate health and safety concerns of staff, faculty and students
- to procure liability, automobile, property, workers' compensation and other insurance that protects University assets and manage all insurance claims in these areas
- to manage cash reserves to cover uninsured claims
- to assess the risk of new and existing programs or activities and suggest ways to minimize liabilities and accidents
- to conduct training on safety and health related to driving, ergonomics, chemical use, exposure to blood borne pathogens, and environmental awareness
- to conduct campus inspections to assess fire, chemical and other safety hazards, as well as non-compliance issues
- Identifying key risk factors that could stand in front of construction processes by reviewing the literature and through the additions that could be made by the industry practitioners, i.e. contractors and owners.
- Investigating the severity and the allocation of each identified risk factor according to the perspectives of contractors and owners.
- Examining the risk management actions efficiency that is applied in the industry by each category (contractors and owners).

4. RISK IN CONSTRUCTION

The construction industry generally has a bad reputation for its work. The industry has a reputation for time and cost overruns. This bad reputation is due to many reasons. One of them is that the construction industry is one of riskiest business types. There are many types of risks in the construction contracts;

- Physical works
- Delay and disputes
- Direction and supervision
- Damage and injury to person and property
- External factors
- Payment
- Law and arbitration

5. CAUSES OF RISK

There exists no comprehensive study explaining the causes of risks among construction companies, a number of authors

have attempted in their studies to ascertain the causes of threats in the construction have ascribed the high threats to:

- A highly fragmented industry.
- Industry highly sensitive to economic cycles.
- Fierce competition as result of an over-capacitated market.
- Relative ease of entry.
- Management problems.
- Trading including: competitive quoting.
- Outsize projects.
- High gearing.
- Resistance to change.
- Accounting, where inconsistencies occur in the financial data generated for management.
- Increase in project size.
- Unfamiliarity with new geographic area.
- Moving into new type of construction.
- Change in key personnel.

6. QUESTION STRUCTURE

Risk factor for this study is classified as:

- Financial Reasons.
- Availability of Commodity/Resource.
- Quality of Commodity/Resource.
- Problem during execution of construction work.
- Due to Policy & Hedging Management.
- Nature of Human behavior.
- Due to delay of work.
- Due to variation of cost from current position to after completion of work.
- Contract Management.
- Availability of Fire controlling panel.
- Life safety Management.
- Delay of work due to Information/Communication problem from top management to lower management.
- Due to lack of labour and Engineer.
- Due to quality of labour and Engineer.
- Handover of the project after its Completion.
- Due to lack and availability of highly effective equipment.
- Due to surrounding local body.
- Due to environmental issue.
- Due to demanding the project before completing time.
- Due to transfer of the project to other contractor because of any reason.

7. RESULT

All the risks observed in the questionnaire can apply to any construction project. On the basis of a survey with construction industry practitioners owning boisterous knowledge and experience of construction projects, 20 key risk factors were taken to measure, out of which the major risk factors which came out are: “Financial reasons”, “Quality of Commodity and “due to demanding the project before completing time”.

8. CONCLUSION

The construction industry has characteristics that sharply distinguish it from other sectors of the economy. It is fragmented, very sensitive to economic cycles, and highly competitive because of the large number of firms and relative ease of entry. It is basically due to these unique characteristics that it is considered a risky business. In this study, identifying the risk factors faced by construction industry is based on collecting information about construction risks, their consequences and corrective actions that may be done to prevent or mitigate the risk effects. Risk analysis techniques were investigated too. However, determination of severity and allocation of these risk factors were the main result of this research. The focal point of this research is to explore and identify the key risk factors could be faced by construction industry. Analysis of these risk factors was carried out to measure their effects on building projects and to assign each risk factor to the party who is in the best position to handle such situations. These factors were investigated to measure the severity of each.

9. ACKNOWLEDGEMENTS

I would like to thank to Asst. prof. Manoj Sharma and Head of dept. Ramesh Kumar Batra for their assistance in preparing and distributing the survey questionnaires. I would also like to thank the practitioners who have kindly responded to our survey questionnaires. I also thank also our University for constantly motivating and encouraging me in making my Research work successful.

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