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A STUDY ON RISK MANAGEMENT TECHNIQUES FOR CONSTRUCTION PROJECTS BASED ON CASE STUDY AND QUESTIONNAIRE SURVEY IN GAZA STRIP

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Abstract

The objective of this paper is to understand the risk and to represent risk preventive and mitigative methods. This research aims to identify risk management tools. The research has been carried out a case study and questionnaire survey in Gaza Strip. The risk analysis can be done by collecting data, analyzing data and case study.

Keywords: Risk, Brainstorming, Delphi Technique

1. INTRODUCTION

There is always risk in construction projects. Risk management is one of the major steps in the construction industry. Risk can be minimized but it cannot be ignored. Risk is the uncertain event that may have a positive or negative impact on the project. In order to utilize risk management, we need to analyze the risk. The objective is to identify various risks in construction projects and then categorized the risks on the basis of their impact, priorities and urgency. There are number of different sources of risk-Pawel szymanski explains the identification and classification of the risks and also analyzed role of escorts and stake holders in risk management.

Wenzhe Tang, David M. Young (Dec 2007) "Risk Management in the Chinese Construction Industry" explains the importance of project risks management, risk management techniques and the barriers to risk management. Mulholl. B and J. Christian "Risk Assessment in Construction Schedules" suggested systematic way to evaluate uncertainty in construction schedule.

1. RISK MANAGEMENT PROCESS

The purpose of current work is to study various risk in construction projects, their importance and impact on the project goals and identification of high risks using qualitative risk analysis. Here, an effort is made to recognize and evaluate risk in construction projects. The methodology selected for risk management is distributing survey to the various contractors and owners.

Table 1 Types of Risks

Types of Risks	
1. **Technical Risks:** - Incomplete Design - Inadequate specification - Inadequate site investigation - Change in scope - Construction procedures - Insufficient resource availability	2. **Construction Risks:** - Labour productivity - Labour disputes - Site condition - Equipment failures - Design changes - Too high quality standard - New technology
3. **Physical Risks:** - Damage to structure - Damage to equipment - Labour injuries - Equipment and material fire and theft	4. **Organisational Risks** - Contractual relations - Contractor's experience - Attitudes of participants - Inexperienced work force - Communication
5. **Financial Risks** - Increased material cost - Low market demand - Exchange rate fluctuation - Payment delays - Improper estimation - Taxes	6. **Socio-political Risks** - Changes in laws and regulations - Pollution and safety rules - Bribery/Corruption - Language/Cultural barrier - Law and order - War and civil disorder - Requirement for permits and their approval
7. **Environmental Risks** - Natural Disasters - Weather Implications	

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Figure 1 Risk Management Process

Risk Identification

It can be done by the following methods:

The most common cause of a risk in projects are delays and cost overruns.

Brainstorming: It is used for idea generation. All relevant persons (Project Managers or Engineers) associated with project come together at one place to discuss the various aspects related to project.

Delphi Technique: In this technique is used to identify risk factors with consulting only one relevant person at a time. The persons of different skills, knowledge and experiences can share the wide range of risks.

Interview/Expert Opinion

All the relevant persons in the project can be interviewed for the identification of risk factors.

Checklists

The check list contains a list of the risks identified in projects undertaken in the past and the responses to those risks.

Risk identification is an iterative process. There are several factors involve in task such as geological or pollution related conditions, construction faults and construction accidents.

Risk factors can be identified through a quantitative process or qualitative process.

Risk Assessment

Sensitivity Analysis: This is carried out to identify the uncertain project components which will have maximum impact on the outcome of the project. After a risk model is made a sensitivity analysis is carried out to check the sensitivity of different elements of the model on project outcome. To do these the values of one variable at a time is changed and the impact of these changes is then seen on the project.

Scenario Analysis: Scenario analysis gives the impact of different scenario of the project or impact of different risk if that occurs simultaneously. A fair decision can be made after this analysis, the option which will give lesser loss or hazards that option can be opted.

Probabilistic Analysis (Monte Carlo Simulation): Monte Carlo Simulation is generally used to analyze the impact of different level of uncertainties and risks on project budget and Schedule. It is an iterative process. By using probability distribution, it works on random values. It estimates most likely, worst case and best-case duration for each task.

Decision Trees: This analysis is carried out by decision tree diagram. Decision trees are very helpful to both formulate the risk. In this analysis there are graphical models used to represent project and can clearly reflect the effects of each decision taken in the project.

Contingency Plan

Sometime we should have a feedback plan in reserve to deal with unknown risk in the form of costs.

Risk Response Planning

Risk Avoidance

We can execute the project in a different plan to prevent the risk by removing the cause of the risk.

Risk Transfer / Share

Transferring risk cannot eliminate it. The risk can be transferred to other owner or party to deal with financial exposure.

Risk Mitigation/Reduction

In this method, we can reduce the frequency of a risk and its impact on project to an acceptable level.

Risk Control

It is a final step of risk management. We must keep the record of response action.

2. CONCLUSION

The different methods were discussed to classify project risks for construction projects from various point of view of contractors to owners. A brief mitigation plans for avoiding and resolving of the risks are prepared.

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