iJRASET
International Journal For Research in Applied Science and Engineering Technology

# INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

**Volume:** 6 **Issue:** IX **Month of publication:** September 2018

**DOI:**

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
*ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 6.887*
*Volume 6 Issue IX, Sep 2018- Available at www.ijraset.com*

# A Review of Risk Management Techniques in Indian Construction Projects

Manoj Sharma[1], Dr. A.S.Trivedi[2], Akash Chauhan[3]
[1]*Associate. Professor, Civil IPS CTM Gwalior, RGPV University Bhopal (M.P) / India*
[2]*Professor, Civil IPS CTM Gwalior, RGPV University Bhopal (M.P) / India*
[3]*Research Scholar, M. Tech Civil IPS CTM Gwalior, RGPV University Bhopal (M.P) / India*

***Abstract:*** ***Construction industry is very risk prone, with complicated and dynamic project environments that produce an environment of high uncertainty and risk. The business is prone to varied technical, socio-political and business risks. The documentation to manage these risks has not been superb in construction industry. As a result, the folks operating within the business bear varied failures, love failure of permanent by quality and operational necessities, value overruns and unsure delays in project completion. Risk management may be a method that consists of identification of risks, assessment with qualitatively and quantitatively, responses with an appropriate technique for handling risks, and so controls the risks by watching. This paper covers the ideas of risk management and varied risk analysis techniques to be used for the one stop resolution for all sorts of hazards presumably to occur throughout any construction project lifecycle.***
***Keywords: Risk, Risk Analysis, Risk Management, Construction Projects,***

## I. INTRODUCTION

The development of infrastructure is one amongst the foremost vital activities that may intensify the business of varied industries, thereby increasing the gross domestic product (GDP) of the country. Construction comes area unit continually distinctive and risks raises from variety of various sources. Risk is outlined as any action or incidence which can have an effect on the accomplishment of project objectives. Risk management may be a technique that is employed in several different industries from, IT relating to business, automobile, pharmaceutical business, to the development sector. Risks and uncertainties inherent within the housing industry area unit over the other industries. several industries became a lot of proactive concerning mistreatment risk management techniques in project. However, with relation to the development business, constant isn't used unremarkably. Risk is Associate in Nursing integral element of any project. Risk is gift all told comes regardless of their size or sector. No project is completely free from risks. If risks don't seem to be properly analysed and techniques don't seem to be trained to agitate them, the project is probably going to steer to failures. Risk is Associate in Nursing integral element of any project. Risk is gift all told comes regardless of their size or sector. No project is completely free from risks. If risks don't seem to be properly analyzed and techniques don't seem to be trained to agitate them, the project is probably going to steer to failures.

## II. OBJECTIVE

The objective of this paper is to identify the key risk factors which affect construction process and present an affective recommendation for adoption to avert the threat which causes severity effect to construction project. This paper covers the concepts of risk management and various risk analysis techniques to be used for the one stop solution for all types of hazards most likely to occur during any construction project lifecycle.

## III. CONCEPT OF RISK ANALYSIS AND MANAGEMENT

*A.* Technical Risks: The risks associated with the Incomplete Design, Inadequate specification, inadequate website investigation, amendment in scope, Construction procedures and insufficient resource availableness etc. square measure termed as technical risks.

*B.* Construction Risks: These risks include Labor productivity, Labor disputes, website condition, instrumentality failures, style changes, too top quality customary and new technology.

*C.* Physical Risks: The risks arising from the damage to structure, Damage to equipment, Labor injuries, Equipment & material fire and theft etc. are known as physical risks.

*ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 6.887*
*Volume 6 Issue IX, Sep 2018- Available at www.ijraset.com*

*D.* Organizational Risks: The organizational risks consist of Contractual relations, Contractor's experience, Attitudes of participants, inexperienced work force and Communication.

*E.* Financial Risks: Increased material cost, Low market demand, Exchange rate fluctuation, Payment delays and improper estimation taxes etc. are related to financial risks.

*F.* Socio-Political Risks: Changes in laws and regulations, Pollution and safety rules, Bribery/Corruption, Language/Cultural barrier, Law & order, War and civil disorder and Requirement for permits and their approval.

*G.* Environmental Risks: Natural Disasters and Weather Implications.

## IV. RISK MANAGEMENT PROCESS

Risk management is the process which consists of identification, assessment, response, control as shown in figure no. 1.


Figure: 1 Risk Management Process

### *A. Risk Identification*

Risk identification can be done by the following methods

1) *Brainstorming:* This is one of the most popular techniques. Generally, it is used for idea generation; it is also very useful for risk identification. All relevant persons associated with project gather at one place. There is one facilitator who is briefing about various aspects with the participants and then after note down the factors. Before closing it the facilitator review the factors eliminate the unnecessary ones.
2) *Delphi Technique:* This technique is similar to brainstorming but the participants in this do not know each other and they are not at the same place. They will identify the factors without consulting other participants. The facilitator like in brainstorming sums up the identified factors.
3) *Interview/Expert Opinion:* Experts or personnel with Sufficient experience in a project can be a great help in avoiding/solving similar problems over and over again. All the participants or the relevant persons in the project can be interviewed for the identification of factors affecting risk.
4) *Past Experience:* Past experience from the same kind of project, the analogy can be formed for identification of the factors. When comparing the characteristics of projects will provide insight about the common factors.
5) *Checklists:* These are simple but very useful predetermined lists of factors that are possible for the project. The check list which contains a list of the risks identified in projects undertaken in the past and the responses to those risks provides a head start in risk identification.
6) *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.
7) *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.
8) *Monte Carlo Simulation:* A project simulation is done using a model to show the potential impact of different level of uncertainties on project objectives. Monte Carlo Simulation is generally used for this analysis. It can quantify the effect of uncertainties and risks on project budget and schedule. It simulates the full system many times, each time randomly choosing a value for each factor from its probability distribution. It uses three point estimates like most likely, worst case and best case duration for each task in time management.

9) *Decision Trees:* This analysis is carried out by decision tree diagram. Decision trees are very helpful to these projects. Formulate the problem and evaluate options. In this analysis there are graphical models used to represent a project and can clearly reflect the effects of each decision taken in the project.

Risk Response Planning can be done by the following methods:

*a)* *Risk Avoidance:* Risk can be warded off by removing the cause of the risk of executing the project in a different direction while still aiming to accomplish project objectives. Change project management plan to eliminate a threat, to isolate project objectives from the risk‟s impact, or to relax the project objective that is in jeopardy, such as extending schedule or reducing the scope.

*b)* **Risk Transfer**: Transferring risk involves finding some other party who is willing to accept responsibility for its management, and who will bear the liability of the risk should it occur. Transferring a threat does not eliminate it; the threat still exists however it is owned and managed by another party. Transferring risk can be an effective way to deal with financial risk exposure. The aim is to ensure that the risk is owned and managed by the party best able to deal with it effectively.

*c)* *Risk Mitigation/Reduction:* Risk mitigation reduces the probability and/or impact of an adverse risk event to an acceptable threshold. Taking early action to reduce the probability and/or impact of a risk is often more effective than attempting to repair the damage after the risk has passed.

*d)* *Risk Exploit:* This strategy seeks to eliminate the uncertainty associated with a particular upside risk by creating the opportunity definitely happens. Eliminate the uncertainty associated with a particular upside risk. An opportunity is defined as a risk event that if it occurs will have a positive effect on achievement of project objectives.

*e)* *Risk Share:* Allocate risk ownership of an opportunity to another party who is best able to maximize its probability of occurrence and increase the potential benefits if it does happen. Transferring threats and sharing opportunities are similar in that a third party is used, those to whom the threats are transferred take on the liability and those to whom opportunities are allocated should also be allowed to share in the potential benefits.

*f)* *Risk Enhance:* This response aims to alter the “size” of the positive risk. The opportunity is enhanced by increasing its probability and/or impact, thereby maximizing the benefits gained from the project. Seeking to facilitate or strengthen the cause of the opportunity, and proactively targeting and reinforcing its trigger conditions.

## V. METHODOLOGY

The general methodology of this study relies largely on the survey questionnaire which will be collected from the local building contractors of different sizes by mail or by personnel meeting. A thorough literature review was initially conducted to identify the risk factors that affect the performance of construction industry as a whole. This study has adopted the more general and broad definition of risk as presented by Shen et al (2001) on China’s construction joint ventures and more risk factors from other literature. Also some interviews with industrial practitioners were conducted to produce to check effectiveness of questionnaires. After receiving the responses a model is used to evaluate the risk. The raw data obtained from the respondent will be analyzed and studied in depth before deriving conclusion.

## VI. DATA COLLECTION

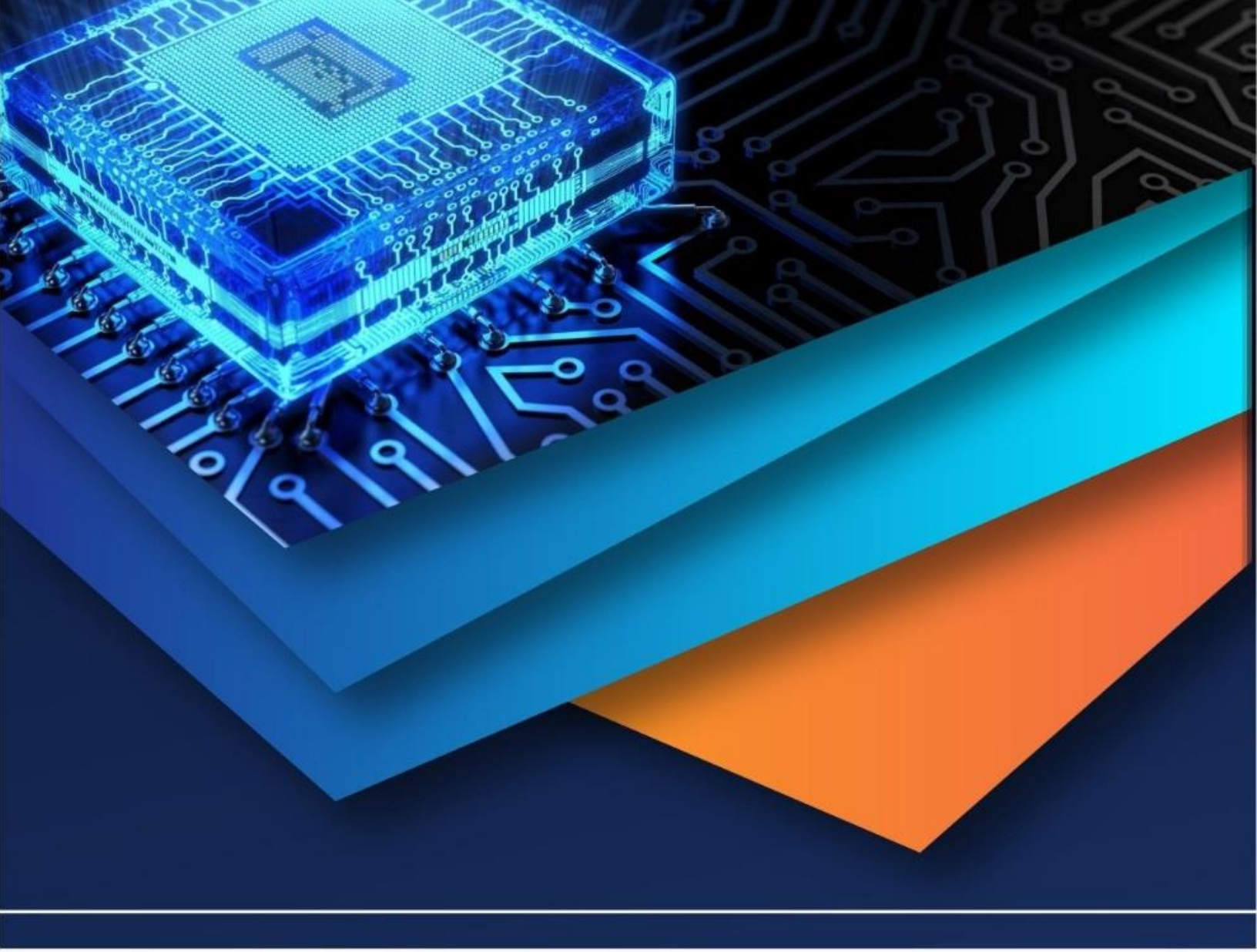
The data of this research were collect through the literature review and survey questionnaires. The information gotten in the survey was broke down by Relative Importance Index (RII) method.

## VII. CONCLUSIONS

The aim of this analysis was to spot the danger factors in construction comes, since risk square measure thought-about to be a heavy downside within the housing industry. Through elaborate literature review and interview with consultants from housing industry, risk factors were known. consistent with tool used then quantified relative importance of delay factors and demonstrate the ranking of the factors and teams consistent with their importance level on delay. This objective was achieved through analysis of interview out comings. consistent with the computed relative importance indices, all factors and teams were hierarchic and verify the foremost vital factors and teams to cause delays. the danger management technique ought to be applied into any construction project at the initial stage of the project to induce most good thing about the technique.

## REFERENCES

[1] Akintoye, A.S. and MacLeod, M.J.; "Risk analysis and management in construction"; International Journal of Project Management 1997
[2] Baker, S., Ponniah, D., and Smith, S.,; Risk response techniques employed currently for major projects, Construction Management & Economics (1999)
[3] Dariusz Skorupka,; "Risk management in building projects"; AACE International Transactions (2003)
[4] Dilesh Pardhi AnandKumar Patil,; "Risk Management In BOT Projects",; Thesis (2008)
[5] Dr. M. J. Kolhatkar, Er. Amit Bijon Dutta,; "Study of Risk in Construction Projects", GRA (2013)
[6] Ekaterina Osipova,;"Risk management in construction projects: a comparative study of the different procurement options in Sweden" Thesis (2008)
[7] F. Y. Y. Ling and L. Hoi, "Risks faced by Singapore firms when taking construction projects in India," (2006)
[8] Kinnaresh Patel M.E. (C.E.M.)*,; A study on risk assessment and its management in India,; AJCE (2013)
[9] Mehmood Alam, Dr. Nadeem Ehsan, Ebtisam Mirza, Azam Ishaque,;"Risk Management in construction industry",;(2010)
[10] Prof. Shakil S. Malek, Nazneen I. Pathan, Haaris Mal,; "Risk Management in construction Industry" IJAR (2013)
[11] S. Q. Wang and M. F. Dulami,; "Risk management frame work for construction projects in developing countries," (2004)
[12] Smith, N.J., Tony, M., and Jobling, P.,; Managing risk in construction projects, 2th ed: Blackwell Publishing (2006)
[13] Soon Kim; Deepak Bejaj,; Risk management in construction: An approach for contractors in South Korea,; (2000)
[14] S. Q. Wang and M. F. Dulami,; "Risk management frame work for construction projects in developing countries," (2004)
[15] Smith, N.J., Tony, M., and Jobling, P.,; Managing risk in construction projects, 2th ed: Blackwell Publishing (2006)
[16] Soon Kim; Deepak Bejaj,; Risk management in construction: An approach for contractors in South Korea,; (2000)
[17] Tsung-ChiehTsai, Min-LanYang,; "Risk assessment of Design-Bid-Build and Design-Build Building projects"; Journal of the Operations Research Society of Japan (2010)
[18] Uher, T. E. & Toakley, A. R.; Risk management in the conceptual phase of a project. International Journal of Project Management (1999).
[19] Zenghua Kuang,; "Risk Management in Construction Projects"; (2011)



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

# INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY