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Review on Potential Risks in Construction Process

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Abstract: ***Risk assessment is an important part of project management in the construction industry. It includes identifying, identifying and mitigating risks that may affect project objectives. This article provides an overview of the various risk assessment methods used in the construction industry, from quantitative to fuzzy methods. This study introduces validation methods such as Monte Carlo simulation, sensitivity analysis, critical path analysis, fault tree analysis, tree analysis and failure models, effects and critical analysis. These versatile methods provide an overview of the likelihood of their occurrence and its impact on the objectives of the project, making them effective tools in the field. In addition, the article explores the idea of turbidity as a way to quantify the quality of certain risks in underground construction projects. Legislative frameworks and tools for assessing land development related issues that offer new solutions for risk management in complex situations are also discussed. Analysis pointed out that there is no single method of risk assessment that concerns all organizations and activities. In summary, risk assessment plays an important role in construction decision making, resource allocation and the development of risk mitigation strategies. Continuous research and development in this area will further refine and improve the risk assessment method, resulting in the overall success and sustainability of construction.***
Keywords: Construction, risk, land, mitigation and management

I. INTRODUCTION

Economic development plays an important role in the economic development of a country. The real development of the country depends on the amount of development in the region, industry and infrastructure. In 2018-19, the construction industry contributed an estimated Rs 11 billion to the country's GDP. The industry is fragmented with a few large companies involved in many construction projects; medium-sized companies specializing in niche activities; and small and medium-sized contractors working in this field as workers.

The construction industry can face many risks when financing, designing, constructing and managing facilities. The construction sector is more risky than other sectors as it includes many resources. Every project has advantages and disadvantages. If not managed properly, these risks can create uncertainty about the timing and cost of the construction investment, which can affect the quality and safety of the building. It is important to manage risks in order to achieve the objectives within the time and budget determined by the project. Risk is defined as "an event, a problem or problem that arises in the form of its probability and severity of impact".



Fig.1: Construction Process

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"Risk" comes in many forms and is also referred to by words like "danger" or "uncertainty". All the work we do has features that may pose some degree of risk. Therefore, risk management is a new concept for many businesses. Therefore, companies/parties frequently use risk management strategies in their operations to increase efficiency and achieve cost, quality and safety objectives. The construction industry has long been seen as risky.

Risk management controls the level of risk and reduces its effects in order to eliminate or eliminate adverse effects without affecting quality and safety. Risk management processes in the construction industry include risk analysis, risk assessment, risk allocation, mitigation and risk monitoring. The literature review shows that various risks in the construction project have a different impact on the success of the project.

II. LITERATURE REVIEW

If there are no identified risks, they cannot be controlled, changed or otherwise managed, and it is impossible to try to eliminate all risks from a project. Therefore, a formal risk management process is required to manage all risks. The success of a project often depends on the combination of all risks, the response strategies used to mitigate them, and the company's ability to manage risks. Therefore, the main idea of risk management is to manage risk effectively. Risk management can contribute to various project and organizational outcomes, including (Akintoye & MacLeod, 1997).

PMBOK lists risk management as one of the nine main elements of project management and defines risk management as the process of identification, analysis, response, evaluation and control activities. Risk management in construction is a challenge because project objectives tend to change over the life of the project, often due to the susceptibility of projects to risks that are not affected by environmental changes, the large number of people involved in the project's value chain, and the nature of construction (P. X. Zou & Zhang, 2009).

Construction projects are complex and unique, and risk comes from many different sources. The sources of construction risk are different and can be divided into internal and external risk. Internal resources, also known as control centers, include customers, consultants, designers, cost control, construction management, contractors, human production and sales offices. External factors are out of control and include global market fluctuations, unpredictable situations, government/legal/regulatory issues, environmental restrictions, health and safety issues and health problems beyond the control of the group (Pamukcu, 2015).

In large-scale construction projects, capital can be divided into business risk, implementation risk, and local risk. Business risk arises mainly from the uncertainty of demand, and success risk refers to business risk during and after the project is completed. Institutional risk is inherently associated with political uncertainty (Mills, 2001).

Risk management is an integrated process that includes the tasks of identifying project uncertainties, predicting their impact, analyzing their interactions, managing them during execution, and even providing feedback to sustain intellectual capital. According to the literature, risk management uses the following five steps (Bahamid & Doh, 2017).

The first step in risk management is risk identification. Risks must be understood before they are followed. Identify risks before they become problems and impact operations. It refers to suggestions from previous experience or similar situations applicable to the current task to avoid or improve the possibility of affecting the success of the task (Topchiy and Bolotova, 2020).

Construction risks can be divided in various ways according to the location of the risk, level of response or business level. According to its location, the risk of the project is divided into two groups as internal and external risks. Internal risks arise from within the project, and external risks arise from the project environment. During the risk analysis, all internal and external risks should be identified. These risks should be evaluated after creating an inventory of dangerous situations that occur during work (Smith et al., 2014).

The main purpose of risk assessment is to estimate risk by identifying adverse events, their probability of occurrence, and the probability of such events. Risk assessment includes quantitative or qualitative measures to assess the importance of individual factors affecting the project and to provide an assessment of the risk of success of the project. However, the results of these steps will be useful for determining the best decision. With better forecasting, managers can see which risks are more important and then send more resources to them to eliminate or reduce the expected results (Ganbat et al., 2019).

Identifying and assessing project risk is an important process for project success and often becomes an important factor in decision making. Most authors refer to the process of integrating risk analysis and assessment as the "risk assessment" phase (P. X. Zou et al., 2007).

A risk assessment can help understand specific sources of risk and enable management to develop treatment plans. Many researchers have proposed and used a variety of methods to help contractors and subcontractors evaluate and select the best projects to determine which projects are riskier (Thompson & Perry, 1992).

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Risk assessment methods include mathematical models ranging from simple classical methods to fuzzy methods. Most of the construction risk assessment methods currently in use are mature tools. Monte Carlo simulation, sensitivity analysis, critical path, fault tree analysis, event tree analysis, failure modes, effects and critical analysis are classical quantitative methods for construction industry risk (Mubin and Mubin, 2008).

These techniques just use more information, so good knowledge is a prerequisite to be able to use such methods. Only a few projects and contracts handle risk reliably and appropriately; Many tests are very important. Therefore, some teaching models include both quantitative and qualitative models (Carr & Tah, 2001).

Some researchers have also used risk assessment methods. The concept of risk assessment is examined and classification criteria are developed for various construction risks. They used the Analytical Hierarchy Process (AHP) to assess the actual construction risk. A three-level hierarchical risk collection model has been developed for the integration of risk plans (Yazdani et al., 2019).

Use the Evaluation Hierarchy method for evaluation for this integration. Another hierarchical risk model has been identified as a suitable model for effective risk assessment. In their article, using fuzzy approaches and various combinations, the relationship between specific risk areas and the evaluation of the project is recognized and evaluated (Osei-Kyei et al., 2022).

also provides another way of incorporating uncertainty into risk assessment models in the construction industry using the concept of turbidity. A fuzzy risk assessment method is proposed for underground construction. Legal frameworks and related tools have been developed to assess and resolve land development related issues (Schieg, 2007).

The proposed risk assessment process has four levels: identification, analysis, analysis and control of risks inherent in construction projects. develop a method for dealing with construction-related risks in difficult situations (Albogamy & Dawood, 2015).

A model that can use technical knowledge, engineering judgment and historical data for risk assessment that can be directly assessed using the language used in the risk assessment. An AHP-based model was introduced to help practitioners assess and monitor the significance of road risk in China (Kishan et al., 2014).

A method of measuring the positive effects of risk factors. There are many comparisons between these methods, each with advantages and disadvantages. Therefore, there is no best risk assessment method that fits all organisations, because each organization and project has its own advantages, so the organization and management team must choose the most appropriate method based on their own characteristics. This topic is tagged Choosing a Risk Assessment Model (Chatterjee et al., 2018).

III. CONCLUSION

In summary, risk assessment in the construction industry encompasses a wide variety of mathematical models, from quantitative to fuzzy methods. This process plays an important role in identifying, identifying and managing construction risks. Various techniques such as Monte Carlo simulation, sensitivity analysis, critical path analysis and tree analysis have been developed and used to assess construction risk. While these methods are important tools for risk assessment, their effective use requires good knowledge and skill. Not all projects and risk management contracts are reliable and there are many issues that need to be addressed. Therefore, some teaching methods combine quantitative and qualitative methods to improve the risk assessment process.

Researchers have explored different risk assessment methods such as the Heuristic Process (AHP), fuzzy methods, and the concept of turbidity. This process is designed to incorporate uncertainty into the risk assessment model and provide insight to assess the specific risks and benefits of the project. It must be recognized that there is no one-size-fits-all approach to risk assessment. Every organization and project has unique characteristics that must be carefully considered when choosing the most appropriate risk assessment method. The choice of path should be based on the capability of the organization and the skills of the management team.

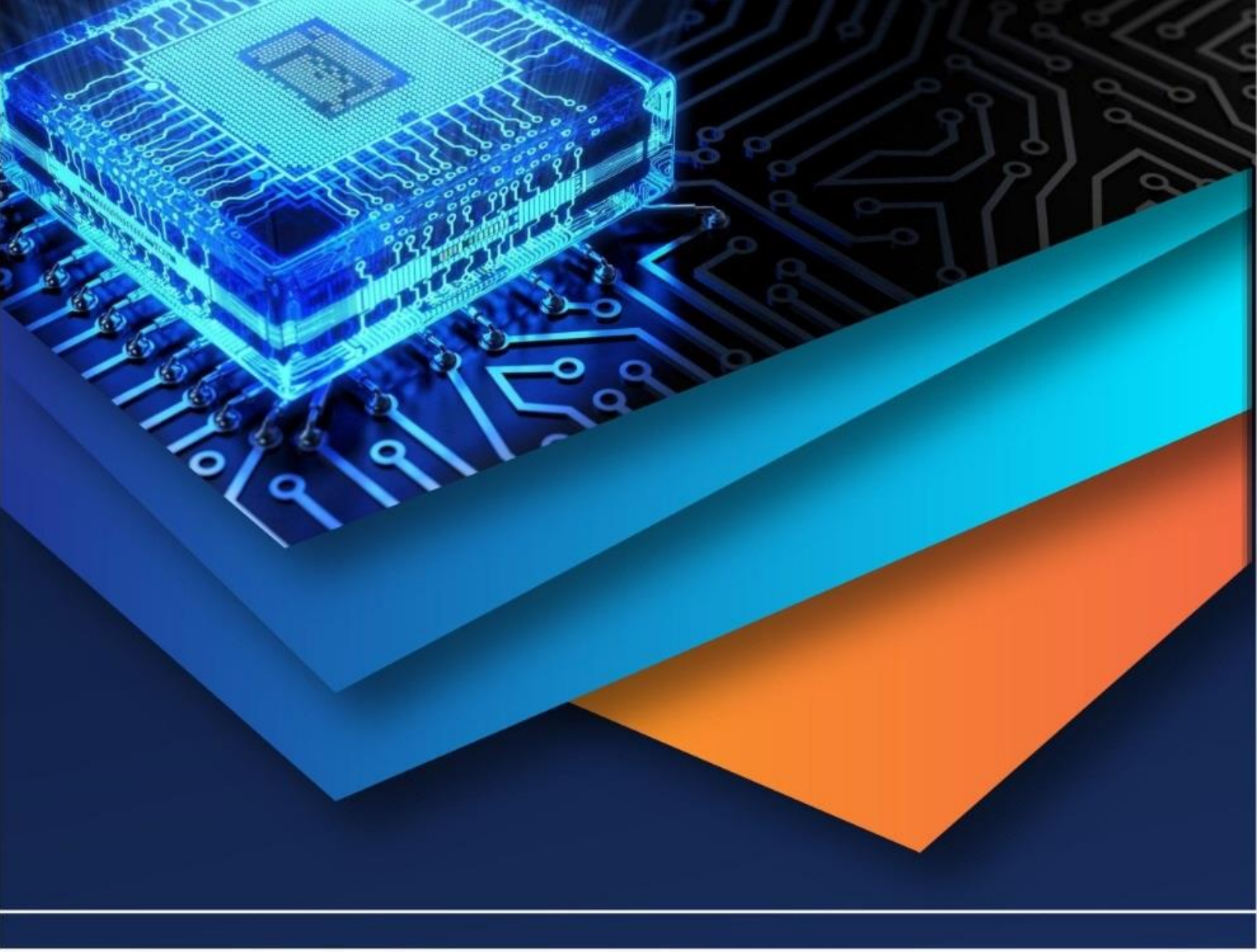
Overall, the risk assessment method is an important tool for decision making, resource allocation and risk mitigation strategies in construction. By using an appropriate risk assessment model, organizations can improve their ability to manage risk and achieve project success. Continuing research and development in this area will improve and refine risk assessment in ways that benefit the construction industry as a whole.

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