

## Understanding Risk Management w.r.t Time and Cost Factors in Mixed - Use Construction Projects in Pune

Ar. Hiitesh Bambori<sup>1</sup>, Prof. Naziya Mistry<sup>2</sup>

<sup>1</sup> Architecture, Allana College of Architecture, Maharashtra, India.

<sup>2</sup>Architecture, Allana College of Architecture, Maharashtra, India.

**Corresponding Author:** Ar. Hiitesh Bambori ( [ar.hiitesh@gmail.com](mailto:ar.hiitesh@gmail.com) )

### Article Information

### ABSTRACT

#### Article history:

Received Jun 10, 2023

Accepted Dec 10, 2023



Any risk in a construction project is the likelihood of an occurrence that lessens the project's viability or an occurrence that could hurt or change a project's feasibility. The main hazards that fall under this category of risks include financial risk, time limit constraint, contract risk, project schedule risk, design risk, cost overrun risk, labour risk, and risk associated with economic requirements. In order to be able to better the construction industry, a few interviews with employees chosen from a variety of Construction Developers, Architects, Project Managers, and Contractors are being noted and then carefully looked upon. The theoretical framework in the domain of risk management is designed to deal with Mixed-Use Projects that have plot areas between 5,000 sq. ft. - 15,000 sq. ft. ( 465 sq. m. - 1,393 sq. m. ) The intention is to present previous studies in the field of construction risk management in the form of case studies. The results of various case studies show that risk management needs to be improved in universal construction projects

#### KEYWORDS:

Risks, Mixed - Use Projects, Time and Cost over-run, Project Schedule, Uncertainty, Obstacles.

### 1. INTRODUCTION:

There's plenty of history in the building industry. Since humans left the caves, housing has been built, and the construction project as a business has been in existence since before the pyramids. The issue of uncertainties and risks has been constantly under consideration. Risk is a contingency event that, depending on its results, may have positive or negative implications for the project. It's a surprise, it's an unforeseen event. stealing, a catastrophe, hurt, all sorts of things. In such cases, the organization may be incurring costs, has a poor

reputation, is suffering damage or even closing its doors.

Compared to other businesses, the construction sector has greater inherent risks and uncertainties. All project activities must be carefully planned, carried out, and maintained. Due to the high level of unpredictability in the construction business, there will be a number of hazards during the construction or operational phases of the structure. Construction industry risk has come under attention as a result of how frequently projects go over budget and time.

The level of risk varies from one project activity to the next, but it is present in all of them to some extent. The

process that seeks to recognize potential risks connected to a project and address those risks includes project risk management. The government established the Building Commission, whose task was to concentrate on where the problems were and how to raise the effectiveness instead of the expenses due to the sector's problems with numerous flaws and the higher costs for constructions. Cost issues and construction flaws are a couple of the more typical ones. Risks and other uncertainties can result in losses that drive up costs, cause delays, and result in poor quality over the course of a project as well as after its conclusion.

The act of identifying all potential risks that could harm the project and assessing those risks using a risk analysis is known as risk management. A strategy is developed to either avoid or decrease the impact of the risks after they have been classified. Uncertainties and risks can take on many different forms. The most frequent project objectives relate to time, cost, quality, function, and client satisfaction. Risk is defined in the construction industry as a group of behaviors that have a negative impact on the project's time, cost, scope, and quality objectives. While certain hazards in the construction process are obvious or easy to spot, others may come as a complete surprise. In organizations, depending on the hazard administration center, diverse relations between the goals and the definition of chance exist.

## **2. BACKGROUND:**

The definition of "Risk" is in this manner exceedingly subordinate on the choice of connected administration center within the organization. Within the development industry the administration center on location is closest related to what is portrayed as extend chance administration and security chance administration. At other levels, separated from the extend location, the center is to some degree diverse.

Variety is one of the most serious problems facing the development sector. They occur in every construction project, and the magnitude of these variants varies greatly from project to project. The construction sector is typically depicted as unstable, which might be true while carrying out a venture. Development itself is more frequently erratic as a result of the various situations an extension may encounter. Within the potential, during development, and even after the project is finished, changes may take place.

Risk management is a component of other administrative frameworks like quality, security, protections, etc. Numerous quality and natural administration frameworks share a few core values. the dedication of every employee, the administration's

commitment, the focus on preparation, continuous change, and fact-based decisions.

The technique of risk management is locating all potential risks that could harm the project and prioritizing them using a risk analysis. A strategy is developed to either avoid or decrease the impact of the risks after they have been classified.

## **3. AIM:**

To identify, analyze and study the causes, reasons and impact of different types of Risks w.r.t Time and Cost encountered in a Mixed - Use construction project in Pune and hence to make an attempt to derive valid observations and conclusions based on the collected data.

## **4. OBJECTIVES:**

- Identifying the key risk factors that impact Construction process by reviewing literature.
- To define, understand and assess major common risks (revise the sentence)
- To review and analyze risks that impact Cost and Time over run in Mixed - Use projects.

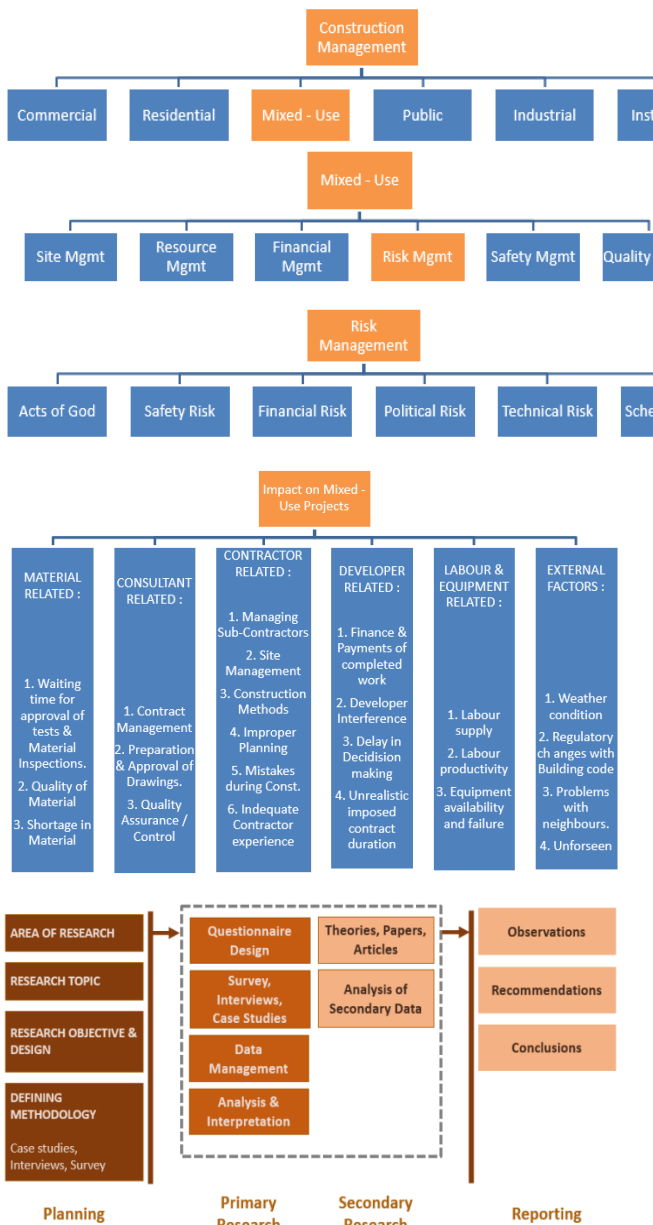
## **5. SCOPE:**

- The relation between the research questions, where the fifth research question ties them all together.
- The research questions cover different parts of the context for risk management in construction projects.
- Their relation and interference are tied together through a focus on obstacles and drivers for applying risk management.

## **6. LIMITATIONS:**

- Risks appear at different levels and likewise have different consequences for their surroundings.
- Depending on the approach taken, different risks will be found. In this study, risks in construction projects are examined, from the contractor's perspective.
- Risks that appear at other levels are not considered, although they could affect the project's objectives.
- The project to be chosen is to be with in the area of 5,000 sq. ft. – 15,000 sq. ft.

## 7. RESEARCH METHODOLOGY:



## 8. LITERATURE REVIEW:

### 8.1 What is Risk?

Risk is the likelihood that future tragedy, injury, or unfavorable outcomes will occur. The likelihood that something will occur that appears to have a negative impact on a person, organization, or framework. Chance is prevalent in many facets of life, including business, finances, health, and security.

Risk is uncertainty about the effects or suggestions of a change on something that people value (such as their health, wealth, property, or the environment), frequently focusing on unfavorable outcomes. "Effect of instability on objectives" is the accepted definition of chance for use in a variety of contexts.

Chance is frequently associated in business with the possibility of financial loss, such as venture chance. Risk can also refer to a potential for injury or harm in other contexts, such as when it comes to health and security risks. The concept of risk, methods for evaluating and managing it, representations of risk, and definitions of risk are all fundamentally different depending on the industry - for example, commerce, finance, the environment, funds, data innovation, well-being, protections, security, etc.

### 8.2 Risks and Uncertainty:

Chance and uncertainty are not the same thing, although they are related ideas. Although they are similar ideas, uncertainty and hazards are not the same. Vulnerability refers to the requirement for information or data about a certain situation or occurrence; it is the inability to predict exactly what will occur in the future. There are many factors that can lead to instability, including incomplete data, intricate systems, or peculiar occurrences.

Contrarily, risk is the likelihood that a particular event or scenario will result in bad luck or other unfavorable outcomes. Hazard is most frequently expressed in terms of the likelihood and potential consequences of an adverse outcome.

### 8.3 Project Risk Classification:

Risks that are known or that have been identified recently at the start of an extension or migration are possible risks. These risks can be planned for in advance and are typically anticipated. Known hazards are frequently identified by prior experiences, industry standards, or specific extent requirements. They can be categorized and analyzed to develop controls or oversight methods.

Conversely, obscure risks are those that were not recognized or anticipated at the start of a stretch or movement. These hazards could materialize at any time during the life of the project and could have severe negative effects. A variety of factors, including shifting environmental conditions, unforeseen occurrences, or stunning connections between several venture components, can result in obscure hazards.

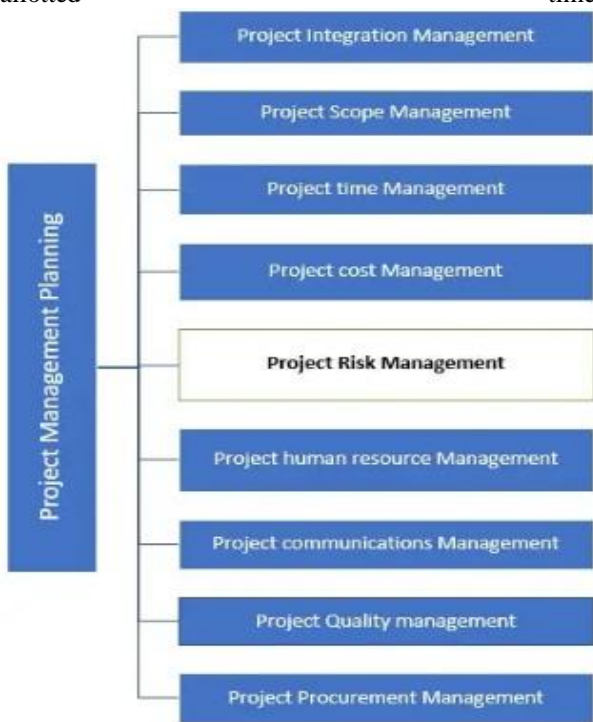
Since unknown hazards are unforeseeable and cannot be planned for during development, they are typically more difficult to monitor than recognized risks. However, it is still possible to lessen the impact of unknown risks by keeping the extend plan flexible and adaptable, constantly monitoring the extend for emerging risks, and preparing alternative plans that can be quickly implemented when necessary.

<p><b>Unknown-Knowns</b> (Hidden facts)</p> <ul style="list-style-type: none"> <li>• These are untapped knowledge.</li> <li>• You don't know about it, but someone else with the community knows.</li> </ul>	<p><b>Unknown-Unknowns</b> (Unknown risks)</p> <ul style="list-style-type: none"> <li>• You don't know about it.</li> <li>• Also, someone else within the community or sphere of influence does not know about it.</li> </ul>
<p><b>Known-Knowns</b> (Facts and requirements)</p> <ul style="list-style-type: none"> <li>• Not risks!</li> <li>• These are managed as part of project scope.</li> </ul>	<p><b>Known-Unknowns</b> (Known risks)</p> <ul style="list-style-type: none"> <li>• Classic risks. More predominant.</li> <li>• You have the knowledge of probability and impact values of such risks.</li> </ul>

### 8.4 Risk Management Process:

Efficient risk management is an ongoing procedure that calls for constant thought and effort. Project managers can increase the likelihood of project success by identifying potential risks, analyzing their likelihood and impact, developing procedures to reduce or manage risks, regularly monitoring the extent for emerging risks, and responding effectively and quickly to hazard situations.

Understanding and managing risks in a project is governed by the risk management process. It consists of three major stages: discernible evidence, evaluation and research, and response. When dealing with hazards, all steps in the risk management process should be applied in order to successfully carry out the plan within the allotted time.



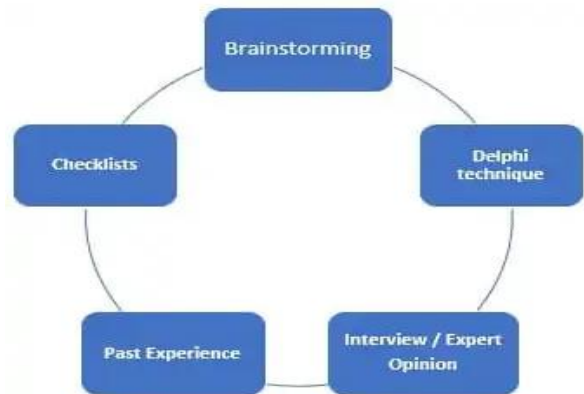
*Construction Project Planning and Management*



*Risk Management Process in Construction*

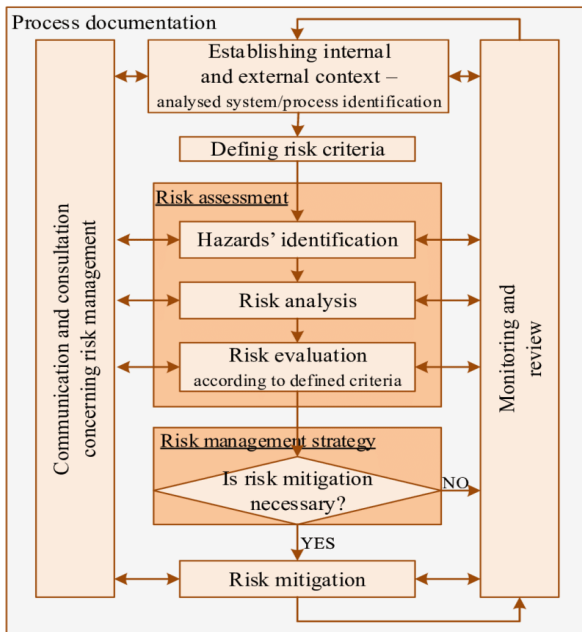
### 8.5 Risk Identification:

Recognizing possible risks related to the extend is the first step. This will be accomplished using brainstorming sessions, real-world information research, master conclusions, or other techniques. To ensure that all potential risks are recognized, all partners should be involved in this handle. The goal isn't to have unrealistic expectations for the future; rather, it's to be aware of potential risk factors that, should they materialize, may have a significant impact on a particular project.



*Five basic ways through which risk identification is done*

The fact that it is impossible to foresee every possible risk should serve as justification for not doing so. In order to ensure that potential risks are assessed and managed in a way that enables the achievement of the overall targets, it is deliberate to identify and evaluate the risks.



### 8.6 Risk Assessment:

As if it were the first step, the differentiating evidence of risk is that certain of the recognised risks may be thought to be more serious and should be assisted by analysis. The next phase is to quantitatively determine their noteworthiness, as of late the response administration plan. The goal of hazard appraisal and inquiry is to fully describe and prioritise the hazards scenarios. The writing on hazard appraisal often falls into two broad groups, namely subjective and quantitative study. The former can be handled via interviews, checklists, and conceptualising, whilst the latter is carried out using an information-driven approach. The impact of each risk within the range of tall measures is characterized by chance appraisal through quantitative study.



### 8.7 External Sources of Risk:

**Uncertain events such as:**

1. An act of nature,
2. Political unrest
3. War
4. Labor unrest
5. Limits on availability of material
6. Skilled craft workers

**Uncertain conditions would include:**

1. Rates of exchange
2. Or inflation
3. Productivity of the local labor force
4. Local holiday productivity losses
5. Learning curves for new technology

**Internal Sources of Risk:**

1. Contractual risk
2. Scope definition risk
3. Project plan risk
4. Unknown conditions risk
5. Schedule risk

6. Budget risk

7. Project safety and quality risk

Risk definition for results the term "risk" refers to any situation in which there is a possibility of unfavorable outcomes. There are many different ways to classify risks.

**8.8 Dynamic Risks:**

risks that arise because of changes in the economy are referred to as dynamic risks. For instance, alterations in costs, client preferences, benefits, efficiency, and innovation could result in financial losses. Dynamic risks benefit society in the long run. These have an impact on many people. However, they are less predictable than passive dangers.

**8.9 Static Risks:**

Inactive risks, in contrast to dynamic risks, are calamities that do occur even when there are no specific economic developments. Several people would still experience financial hardships even if consumer preferences, performance, salary levels, and the level of innovation can all be maintained. These catastrophes occur for causes other than changes in finances, such as because other people are unreliable. When it comes to inactive misfortunes, society does not benefit in any way. These kinds of catastrophes are either brought on by the resource's physical wear and tear or by its misfortune as a result of theft or human error.

**8.10 Fundamental and Particular Risks:**

Fundamental risks are losses that are unaffected by the sort of loss sustained or the outcome of it. A large group of people, or even the entire population, will be affected by the calamities, such as those related to labor, war, financial instability, everyday disasters, etc.

Risks are unfortunate outcomes that result from certain individual circumstances. Typically, these misfortunes affect a small number of people rather than many.

There are both passive and aggressive forms of risk. Both a bank robbery and a structure burning down are examples of dangers. Fundamental hazards are not under the control of the people they affect, hence they are not brought on by negligence on anyone's part. While certain major risks are covered by private protective firms, social protections or government

programs will also be responsible.



Likelihood	Consequences				
	Insignificant <i>Risk is easily mitigated by normal day to day process</i>	Minor <i>Delays up to 10% of Schedule Additional cost up to 10% of Budget</i>	Moderate <i>Delays up to 30% of Schedule Additional cost up to 30% of Budget</i>	Major <i>Delays up to 50% of Schedule Additional cost up to 50% of Budget</i>	Catastrophic <i>Project abandoned</i>
<b>Certain</b> >90% chance	High	High	Extreme	Extreme	Extreme
<b>Likely</b> 50% - 90% chance	Moderate	High	High	Extreme	Extreme
<b>Moderate</b> 10% - 50% chance	Low	Moderate	High	Extreme	Extreme
<b>Unlikely</b> 3% - 10% chance	Low	Low	Moderate	High	Extreme
<b>Rare</b> <3% chance	Low	Low	Moderate	High	High

Construction Risk Impact Matrix

**8.11 Risk Response:**

According to PMBOK, the improvement of options and decision-making activities to improve opportunities as well as reduce threats to the project aims constitute the arranging prepare of risk reaction. The effectiveness of this stage will determine whether or not the risks increase or decrease over time. This handle includes the task of the parties to demand responsibility for each agreed-upon chance reaction. Writing suggests that there are basically four risk reduction strategies that may be put into practice in order to reduce exposure to the risks associated with an endeavor.

**8.12 Avoidance:**

If the risk is judged to have real consequences on a level that would necessitate a reevaluation of the entire enterprise, a reaction in the form of shirking can be justified. By altering extension plans in a way that renders the risk negligible, one can use avoidance to manage risk. It could be necessary to reevaluate the concept or even to cancel the extension. This tactic encourages modifying long-term objectives in order to encourage the end of the opportunity or to protect the enterprise goals from a potential adverse effect.



### 8.13 Transfer:

If the risk is judged to have real consequences on a level that would necessitate a reevaluation of the entire enterprise, a reaction in the form of shirking can be justified. By altering extension plans in a way that renders the risk negligible, one can use avoidance to manage risk. It could be necessary to reevaluate the concept or even to cancel the extension. This tactic encourages modifying long-term objectives in order to encourage the end of the opportunity or to protect the enterprise goals from a potential adverse effect.

### 8.14 Risk Monitoring:

Ceaseless observing and audit of potential risks is a critical in respects to the usage of the risk administration prepare. It ensures unused risks are identified and overseen. The extend director ought to screen a list of the major dangers that have been recognized for hazard treatment activity.



### 8.15 Risks That Cause Time Over-runs:

The alter of a plan amid the development stage can result into major reallocation of assets. In this way, the temporary worker will be required to either give extra assets or protect a few assets to stay sit still. Another primary reason why there are delays in development is the alter of arrange or scope that more often than not comes about in insufficient arranging at the characterizing organize since of need of intrigued or association of the partner amid the plan stage. Stakeholder's monetary issues can influence the advance of the extend. Money related issues frequently lead to alter within the work plans and determinations, which at that point comes about in influencing the quality of the extend (Clough and Burns, 1994; O'Brien, 1998). Careless decision-making prepare is another reason why they are delays. Disappointment to create choice effectively may result in delays causing rising extend costs.

Plan changes are more often than not visit particularly when the development begins some time recently the ultimate plan is finalized in this way influencing the extend in a few ways depending on the timing of the

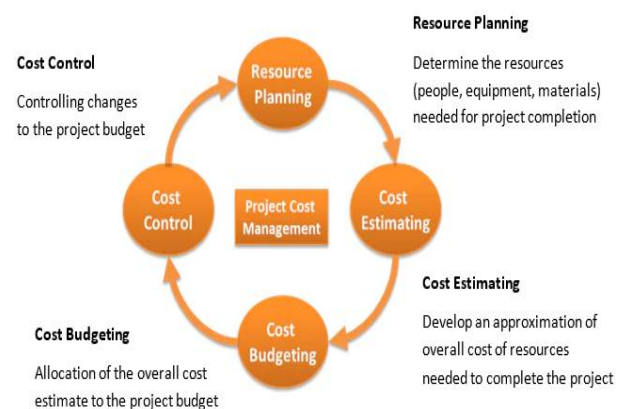
alter. The plan plays a major noteworthy part in construction so when there's a complex plan it requires interesting abilities and development strategies. The complexity of the plan influences the stream of development exercises though less complex development designs are easier to handle.

Development could be a labor driven industry. Whether the temporary worker has been paid on time or not, the compensation of the specialists must still be paid convenient. Thus, money related troubles confronted by the temporary worker can result into rare assets and extend delays.

Numerous times, amid the extend execution, minor issues recognized by the planner, design, and temporary worker can in the long run lead to alter orders. In any case of its beginning, a alter arrange is issued by the partner. Alter orders cover a large number of things such as plan advancements, scope changes, acknowledgment of genuine location condition. An illustration may well be soil conditions that were not known with a adequate degree of certainty until exhumed or uncovered can lead to changes in unique arrange (Owalabi; 2014).

### 8.16 Cost Control During the Implantation of the Project:

Agreeing to (Nicholas J.M and Steyn H, 2008) taken a toll estimation and fetched control may be a complicated handle since of the data accessible in a distinctive stage of the venture. For that reason, the center of venture management team in fetched administration ought to be within the higher level, something else, fetched invade it'll be unavoidable driving to non-accomplishment of extend scope or to the disappointment of the extend.

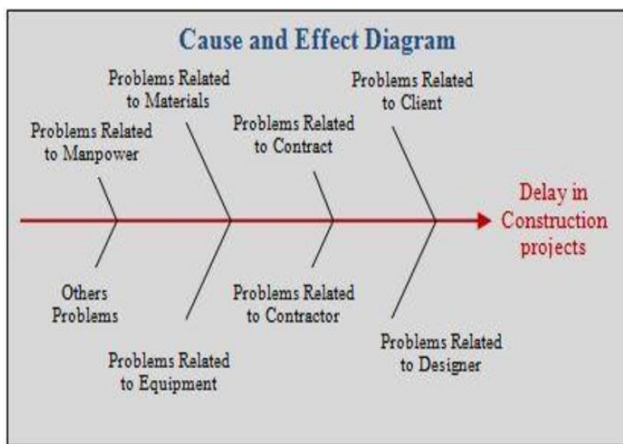


### 8.17 Effects of Project Delays on Cost Over-runs:

Delays in ventures can strain the relationship between the partners, engineers, temporary workers and others included amid the development prepare as well as include taken a toll invade. Not as it were does the work stream get disturbed but too attempting to get speedy reactions, drawings and other things required to urge

back to plan to cause strain on a working relationship. Abdul-Rahman et al. (2008) recognized imperative causes and critical impacts of development venture delays. It is concluded that the partner is ordinarily the foremost mindful party for the delay. The consider found out that the by and large normal increment in add up to costs are 11.3% when a alter of order is made in a venture. The paper too concluded that when there's alter of the scope of the venture due to the prerequisites of the partner it leads to major taken a toll invades. The extend costs and time overwhelm were found to be the two primary effects of the changes made to a extend. The alter of plans by the partners is the most source of delays and another imperative source is plan mistakes.

Increment in venture taken a toll is respected as the foremost common impact of varieties in a venture execution arrange Ehrenreich-Hansen (1994) detailed that delay in ventures is usually 9% of the first planned time duration for ventures. Ordinarily, a possibility amount is doled out to assist give for conceivable changes within the extend and coming about minor taken a toll invades. Thus, ventures require handling methods, paper work and audits some time recently they can be actualized. This handle may lead to costs for all the parties concerned. Ordinarily these costs are given from the possibility support distributed for the extend.



Cause & Effect Problem for Delay

With all the delays and changes, the quality of work is habitually influenced. This impact is still anticipated indeed in case the venture changes happen after the larger part of development is as of now completed. In spite of the fact that it may not require any adjust or devastation on the destinations, it still leads to fetched overwhelm. Another impact is calculated delays, which includes the utilize of modern or extra sum of fabric and hardware. Typically said by analysts as among the critical impacts of extend alter in development ventures. These calculated delays seem incorporate the delay in getting fabric or apparatuses, which at that point puts the work on hold.

To conclude, making changes particularly in a development venture can cause a major debate between the partner and the temporary worker. This sort of impact is never the most excellent and it is as a rule the foremost critical. Most individuals attempt to maintain a strategic distance from this since it may lead to law suits, debate, parts of breach of codes and contract debate among partners and temporary workers. Subsequently, making it outlandish for the work to be done coming about in advance delays and fetched invades.

## 9. CONCLUSION:

Based on comes about, I realized that, noteworthy causes of taken a toll & time invades are destitute arranging administration, misfortune of materials, materials not conveyed at location, Quality mistakes like plan, execution mistakes, destitute fabric administration, destitute communication between partners of the venture.

To overcome these cost & time overruns, following is suggested:

- **Site Management:** Making strides location hones by the usage of 5S standards to sort obligations, oversee store & characterize method.
- **Quality Management:** Progressing quality conventions in execution by appropriate characterizing & setting rules in terms of making SOP (Standard Working Method) for a prepare, the checklist for fabric quality.

### 5S Summary

Seiri	Seiton	Seison	Seiketsu	Shitsuke
<b>Sort</b>	<b>Set in order</b>	<b>Shine</b>	<b>Standardize</b>	<b>Sustain</b>
Remove all of the clutter from the work place	Organize in an efficient and ergonomic manner.	Clean up the entire area removing all dirt	Ensure standard ways of working for the first three stages.	Ensure that 5S principles are part of the culture

- **Knowledge Management:** Improving communication between partners of ventures coming about in miscommunication mistakes in drawings, records by making a standard with changes endorsed by all partners.
- **Procurement Management:** To dodge any misfortune or delay due to materials, the JIT (Just in Time) strategy of incline can be coordinates with 5S strategies to move forward location obtainment.
- **Contract Management:** Integration with lean philosophy to avoid schedule claims.



## 10. REFERENCES:

1. "Risk Management for Design and Construction" by Ovidiu Cretu and Mihai Maftai.
2. "Understanding Risk Management in Construction Projects" by Dr. Amit Bijon Dutta.
3. "Risk Management for Construction Projects" by Roger Flanagan, George Norman, and David Marsh.
4. "Risk Management in Construction Projects" by David Baccarini and Stephen Rowlinson.
5. "Construction Risk Management" by John Schaufelberger and Steven Peterson.
6. "Project Risk Management Guidelines: Managing Risk with ISO 31000 and IEC 62198" by Dale Cooper, Pauline Bosnich, and Stephen Grey.
7. "Risk Management in Architectural Projects" by Brian Cashell and Alain Thierstein.
8. "Risk Management for Architects and Engineers" by Matthew Marston and Christopher Hayes.
9. "Mixed Use Development Handbook" by David R. Pogue and Craig S. Ross.
10. "Managing Risk in Construction Projects" by Nigel J. Smith and Tony Merna.
11. "Risk Management for Real Estate Development" by Charles K. Hoag and Leonard V. Zumpano.