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Risk Involved in Construction Supply Chain Management

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Abstract – Risk is present in all projects irrespective of their size or sector. If risks are not properly analyzed and strategies are not developed to deal with them, the project is likely to lead to failures. Therefore, special strategies and processes should be established during the initial phases of the project and also monitored throughout the project life cycle. There are different techniques of risk identification and analysis in construction projects. Applicability of various risk assessment techniques has been demonstrated by many researchers. Failure Mode and Effects Analysis (FMEA) is a logical, proactive technique that is used to identify and eliminate potential causes of failures. The standard FMEA process evaluates failure modes for occurrence, severity, and detection. In the project various factors causing risks in construction projects of Mumbai city of multi-storeyed building are studied. Pareto has been applied to prioritize the risk obtained from FMEA analysis. RPN (risk priority number) is used to focus corrective action. Risk mitigation plans covers both preventive actions to prevent the risk from occurring as well as a suitable response in case the risk actually occurs.

keywords: *SCM, FMEA, Project life cycle, RPN, Risk analysis.*

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I. INTRODUCTION

The supply chain management (SCM) writing offers numerous minor departure from the same subject when characterizing a production network. The most well-known definition, as proposed by (Houlihan 1985), (Stevens 1989), (Lee et al., 1993) and (Lamming 1996) is an arrangement of suppliers, makers, merchants, retailers, and clients where materials stream downstream from suppliers to clients, and data streams in both headings. The development business, is described by discontinuity and poor coordination by its players which prompts wastefulness, waste, low quality, and security issues. supply chain management (SCM) is seen as a key vital apparatus for corporate aggressiveness since it can enhance proficiency and profitability while decreasing the general working expenses, as saw in different assembling segments.

Utilizations of store network administration methods in assembling situations have spared a huge number of dollars while enhancing client administration (Arntzen, et. al, 1995). Failure mode effects analysis (FMEA) is apparatus used to gather data identified with danger administration decisions.12 There are archived methodology to finish a FMEA and cases of its application in different commercial ventures. Failure mode effects analysis (FMEA) is a legitimate, proactive method that is utilized to distinguish and dispose of potential reasons for disappointments.

Venture administration or the association can separate tasks into stages to give better administration control proper connections to the progressing operations of the performing association. All things considered, these are known as the task life cycle. The fundamental Objectives of this exploration paper is to study venture life cycle and idea of store network administration in development part, to research the diverse dangers included in development inventory network with various development site, to apply failure mode effects analysis (FMEA) for danger evaluation of undertaking under thought and to draft hazard relief arrangement for production network administration development ventures under thought.

II. METHOD

2.1 Qualitative Techniques Risk Priority number:

In order to identify those risks that should be managed aggressively apply the previously mentioned rating process of High, Medium and Low on the risk probability and the risk impact on each individual/specific risk event separately instead of rating the complete project. A matrix known as a Risk Priority number (RPN) can be constructed that assigns risk ratings to risks based on combining some probability and impact scales. Risks with high probability and impact are likely to require further analysis, including quantification and aggressive risk management.

The risk rating is done using a matrix and risk scales for each risk. There are various ways of sensitizing the combination of probability/impact factor i.e. the Probability that the risk will occur and its Impact on cost. We have demonstrated this by assigning a value of 1, 2 and 3 to Probability of Risk occurring and 1, 2 and 3 to the Impact of Risk. This is based on a 3 by 3 matrix. The higher the risk score, more carefulness is required to manage the risk as a maximum of 9 represents the maximum probability and the maximum impact.

2.2 FMEA (FAILURE MODE AND EFECTIVE ANALYSIS)

The FMEA as a Project Risk Management Tool:

Risk analysis techniques include expert interviews, expected monetary value and response matrices, along with more advanced risk techniques which provides comprehensive information about and references to risk analysis for various

application and requirements. One risk management technique multiplies probability of risk occurring with expected impact of risk. This leads to an evaluation of each risk. In this work the method of using the risk probability multiplied by the risk impact value is expanded by also multiplying detection value for each risk. Multiplying three values of likelihood of occurrence, severity, and detection is the familiar format of the failure mode and effects analysis used for process design and service planning. In the method of applying the FMEA format to project risk, it is defined here as project risk FMEA or RFMEA. The RFMEA technique is not just another way of analyzing project risk but helps focus the risk contingency planning required early in the project on critical risks.

The standard FMEA process evaluates failure modes for occurrence, severity, and detection
RPN = Occurrence*Severity*Detection

In using the RFMEA approach required there are few required modification to the standard FMEA format. The project RFMEA is a tool to identify, quantify and remove or reduce risks in a project environment versus with the products technical aspects identified the FMEA.
The table no. 1,2 and 3 shows the risks priority numbers (RPN) of occurrences, severity and detections respectively.

Step 1: Occurrence

Rating	Meaning
1	No effect
2/3	Low (relatively few failures)
4/5/6	Moderate (occasional failures)
7/8	High (repeated failures)
9/10	Very high(failure is almost inevitable)

Table 1. Occurrence RPN

Step 2: Severity

Rating	Meaning
1	No effect
2	Very minor
3	Minor
4/5/6	Moderate
7/8	High
9/10	Very high and hazardous

Table 2. Severity RPN

Step 3: Detection

Rating	Meaning
1	Almost certain
2	High
3	Moderate
4/5/6	Moderate – most customers are annoyed
7/8	Low
9/10	Very remote to absolute uncertainty

Table 3. Detection RPN

III. DATA COLLECTION &ANALYTICAL WORK

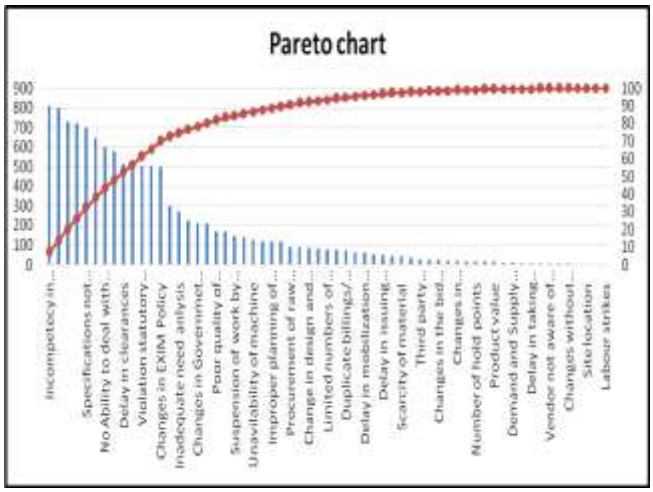
The contextual analysis were done to discover different variables bringing about dangers in development activities of Mumbai city identified with various field of operation brought on by different faculty included in finish of the work. A contextual investigation is finished the examination of specific task. It is done to discover fundamental danger elements and its impact on development. Contextual investigation is a wonder inside its genuine setting. As a result of this reason considering "knoui towers" as a contextual investigation which was begun in this year (2014). For this situation study rundown of Risks included in a task is recorded.

A higher FMEA score shows more serious danger. Regular variables used to measure danger are recurrence of an action connected with the imperfection, amount of parts connected with the deformity, capacity to identify the imperfection, likelihood of imperfection and seriousness of imperfection. Reporting and dissecting danger is a key component to kept learning and process change. in the wake of ascertaining RPN for every danger, the dangers are dissected. Moves are then made to relieve dangers, and the procedure can be performed again to assess lingering.

3.1 Pareto analysis:-

A Pareto chart, also referred to as a Pareto diagram, is a specific type of histogram, ordered by frequency of occurrence. It shows how many defects were generated by type or category of identified cause. Rank ordering is used to focus corrective action. The project team should address the causes creating the greatest number of defects first. Pareto diagrams are conceptually related to Pareto's Law, which holds that a relatively small number of causes will typically produce a majority of the problems or defects. This is commonly referred to as the 80/20 principle, where 80% of the problems are due to 20% of the causes. Pareto diagrams can also be used to summarize various types of data for 80/20 analyses

Pareto has been applied to prioritize the risk obtained from FMEA. Figure 1 shows the pareto analysis chart in which different risk involved in a project with RPN.



IV. CONCLUSION

A. From RPN calculations Pareto chart is prepared which shows probability of occurrence, severity and detection. By taking “Pareto chart” into consideration which says 80% of problems are cause by 20% of the factor, helps 20% of the factors to be monitored easily. From Pareto distribution mitigation plan are prepared according to probability of risks

B. example for a risk of Incompetency in management capabilities mitigation plans can be Hiring fully professional experienced personnel team, Allocation of more time to planning of activities, Imparting management training to the experienced person to deal with the problems.

C. The Risk mitigation and planning efforts may require that the companies set policies, procedures, goals, and responsibility standards.

D. Formalizing risk mitigation and planning throughout will be developed and which will help in establish a risk culture that should result in better cost management from planning through construction and better allocation of project risks that align teams with customer-oriented performance goals.

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