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RISK MANAGEMENT FOR CRITICAL INFRASTRUCTURAL PROJECTS & ENGINEERING FACILITIES SUSTAINABILITY

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Presentation Outline

- What is RISK?, What is RISK Management
- Some Ground Rules on Risk
- What are the Risk Management Processes
- Processes Used in Managing RISKS (RMKA)
- Identifying risks, Purpose of Risk Management
- What is Risk Analysis? Why analyse Risk and what are the processes or procedures?
- Steps to Risk Analysis
- Practical Approach to Risk Management
- Mapping the Risk Management Process to the Process Groups
- The Decision-making Process
- Risk Impact Definitions for Four Project Objectives



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What is RISK? and What is RISK Management

Uncertainties are all around us and in our projects. Risk refers to an uncertain event or condition that, if it occurs, will have a positive or negative effect on meeting the project objectives. It may also be referred to as the exposure to the consequences of Uncertainty, it is probabilistic, that is the CHANCE of something happening that will have an IMPACT(s) on the goals or objectives of any endeavour. It includes the possibility of loss or gain, or variation from a desired or planned outcome, because of the uncertainty associated with following a particular course of action.

RISK Management

Refers to culture, processes and structures that are directed towards the effective management of potential opportunities and adverse effects. It deals with balancing the conflicts inherent in exploring opportunities on the one hand and avoiding losses, accidents and disasters on the other. It also relates to all ACTIVITIES, CONDITIONS and EVENTS that can affect the organization and its ability to reach the organization's goals or vision. It provides a structured way of assessing and dealing with future uncertainty which includes planning risk management, identifying and analyzing the risks, preparing the response plan, monitoring the risk, and implementing the risk response if the risk occurs

Some Ground Rules in Risk Management

- After the project starts executing, you will not have enough time to plan a response to risk if it occurs, so you need to plan the risk responses before the project starts executing.
- To do that, you need to identify the risks and analyze them
- Not all risks are equal
- You prioritize the risk based on the analysis and plan responses accordingly
- Also, you need to monitor and control the implementation of your risk management plan and risk responses to ensure the implementation and also to deal with the possible side effects of the implementation.
- How do you manage risks?
- In search of an answer, we will explore three avenues: planning risk management and risk responses, identifying and analyzing risks, and monitoring and controlling risks

What are the Risk Management Processes?

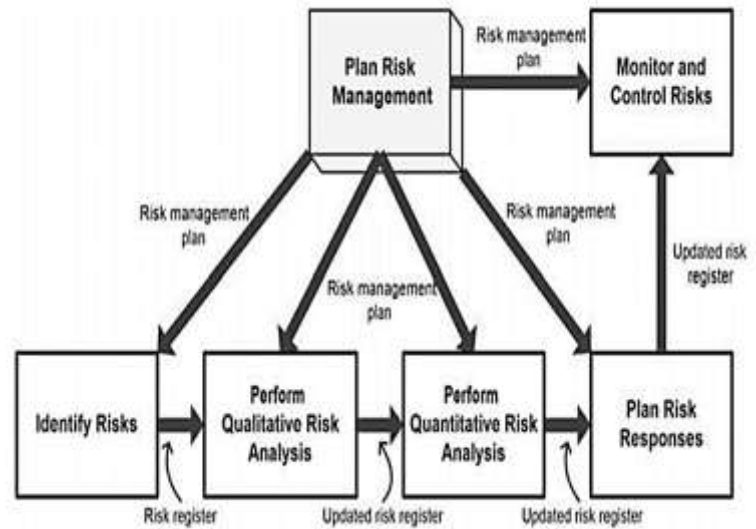
The risk management process involves the systematic application of management policies, processes and procedures to the task of establishing the CONTEXT, IDENTIFYING, ANALYSING, ASSESSING, TREATING, MONITORING and COMMUNICATING RISK. And this process applies to every phase of any project life cycle.

Risk Management processes are structured to assist planners and managers in identifying significant risks and developing measures to address them and their consequences and this leads to more effective and efficient decisions, greater certainty about outcomes and reduce risk exposure.

Processes Used in Managing RISKS (RMKA)

- 1. Plan Risk Management:** A process to determine the how of risk management: how to conduct risk management for the project at hand.
- 2. Identify Risks:** A process to identify and document risks that might occur for a given project.
- 3. Perform Qualitative Risk Analysis:** A process used for estimating the overall probability for risks to occur and their impact and prioritizing them accordingly for further analysis.
- 4. Perform Quantitative Risks Analysis:** This process evaluates the impacts of risks and quantifies the overall

risk exposure of the project by assigning numeric probabilities to each risk and their impact on the overall project objectives



5. Plan Risk Responses: A process used to prepare a risk response plan in order to increase the positive impact and decrease the negative impact of risks on the project

6. Monitor and Control Risks: A process used for tracking identified risks, identifying new risks, executing risk response plans, and evaluating the effectiveness of executing responses throughout the lifecycle of the project.

What is Risk Analysis? Why analyse Risk and what are the processes or procedures

Why risk analysis? The objective of a risk analysis is to describe risk, i.e., to present an informative risk picture. Risk Analysis is the systematic deployment or application of available information to DETERMINE how often specified events may occur and the magnitude of their consequences.

The risk analysis process Is a central part of risk management and has a basic structure independent of its application area.

There are several ways of presenting the risk analysis process, but most structures contain the following three key elements:

- 1. Risk Management Planning:** Its purpose is to create a risk management plan which is ‘when and how’ one will deal with risks on a project. It describes how one will define, monitor and control risks throughout the project.

2. Risk assessment (Risk analysis + Risk evaluation = Risk assessment)

Risk assessment is followed by risk treatment. This represents the process and implementation of measures to modify risk, including tools to avoid, reduce, optimise, transfer and retain risk. Transfer of risk means to share with another party the benefits or potential losses connected with risk. Insurance is a common type of risk transfer”.

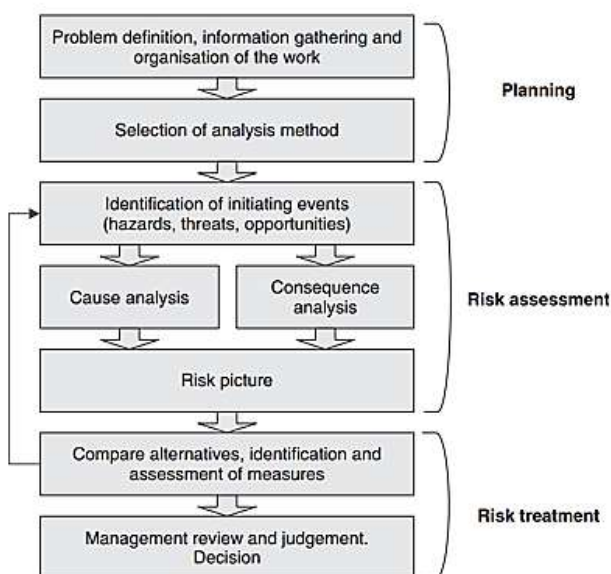
Risk Analysis

- Identification of initiating events
- Cause analysis
- Consequence analysis
- Risk description
- Risk evaluation

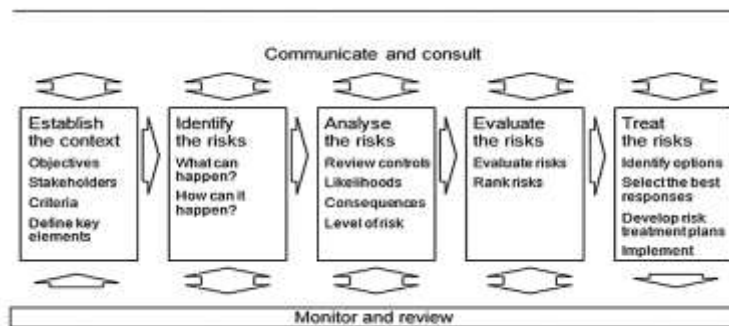
Risk Treatment

- Risk avoidance
- Risk Optimisation
- Risk transfer
- Risk retention
- Risk acceptance
- Risk communication

Steps to Risk Analysis



Project Risk Management Process



Risk assessment

- Identification of initiating events
- Cause analysis
- Consequence analysis
- Probabilities and uncertainties
- Risk picture: Risk presentation
- Sensitivity and robustness analyses
- Risk evaluation

Risk analysis methods

- Coarse risk analysis
- Job safety analysis
- Failure Modes and effects analysis
 - Strengths and weaknesses of an FMEA
- 4. Hazard and operability studies
- 5. SWIFT
- 6. Fault tree analysis
 - Qualitative analysis
 - Quantitative analysis
- 7. Event tree analysis
 - Barrier block diagrams
- 8. Bayesian networks
- 9. Monte Carlo simulation.

Approach to Risk Management

This section will entail deploying the risk management processes earlier highlighted. A solid and credible risk management methodology enables you to manage your projects proactively and on the other hand reacting to events as they occur is not risk management but crisis management and this is not the objective of risk management.

The process starts with the creation or development of a risk management plan in order not to allow problems to run haywire, therefore identifying, analyzing, prioritizing and then planning for the management of risks and monitoring the plans is much better and more professional. The steps to be taken are in line with the risk management knowledge area (RMKA).

1.) Risk Management Planning: The purpose of the risk management planning process is to create a project management plan; it describes how you will go about dealing with risks on the projects. It should describe how you will define, monitor and control the risks throughout the project life cycle. It equally describes how other processes in the knowledge area would be implemented, monitored and controlled throughout the project.

2.) Risk Identification: This involves identifying and documenting all the risks that could impact the project. This includes reviewing the project document, categorizing the risks, reviewing checklists applying applicable techniques –brainstorming to identify risks to ultimately list out all the risks.

3.) Qualitative Risk Analysis: This process determines the consequences of identified risks in the risk's identification process may have on the project objectives. It entails determining the probability that the risk will occur and ranking risks according to their effect on the project objectives.

4.) Quantitative Risk Analysis: This process evaluates the impacts of risks and quantifies the overall risk exposure of the project by assigning numeric probabilities to each risk and their impact on the overall project objective. The primary output of this process is a prioritized list of quantified project risks.

5.) Risk Response Planning: This entails deciding what actions to take in order to reduce threats while maximizing opportunities discovered during the performance of the risk processes, this includes assigning staff as risk owners. The risk owners are responsible for executing the risk response plans.

6.) Risk Monitoring and Control: The purpose of this process is to respond to the risks as they occur, track and monitor identified risks, evaluate risks response plan for effectiveness, identify new risks and ensure proper risk management procedures are complied with strictly as identified in the risks management plan.

Mapping Risk Management Process to the Process Groups

Risk Management Process	Process Group	Major Output
Plan Risk Management	Planning	Risk management plan
Identify Risks	Planning	Risk register
Perform Qualitative Risk Analysis	Planning	Risk register updates
Perform Quantitative Risk Analysis	Planning	Risk register updates
Plan Risk Responses	Planning	Risk register updates
Monitor and Control Risks	Monitoring and controlling	Risk register updates

The Decision-making process




Risk management often involves decision-making in situations characterised by high risk and large uncertainties, and such decision-making presents a challenge in that it is difficult to predict the consequences (outcomes) of the decisions.



Generally, the decision process includes the following elements

1. The decision situation and the stakeholders (interested parties):
 - What is the decision to be made?
 - What are the alternatives?
 - What are the boundary conditions?
 - Who is affected by the decision?
 - Who will make the decision?
 - What strategies are to be used to reach a decision?
 - What do the various interested parties want?
 - How to weigh the pros and cons?
 - How to express the performance of the various alternatives?

2. Goal setting, preferences and performance measures
3. The use of various means, including various forms of analyses to support the decision-making:
 - Risk analyses
 - Cost-benefit analyses
 - Cost-effectiveness analyses
4.  Review and judgement by the decision-maker.



Risk Impact Definitions for Four Project Objectives

Risk Impact/ Project Objectives	Very Low (0.05)	Low (0.10)	Moderate (0.35)	High (0.65)	Very High (0.90)
Cost	Less than 1% cost increase	1-20% cost increase	20-50% cost increase	50-80% cost increase	80-100% cost increase
Time	Insignificant time increase	1-10% time increase	10-30% time increase	30-60% time increase	60-100% time increase
Scope	Scope decrease unnoticeable	Scope of only a few minor areas affected	Sponsor approval necessary for scope reduction	Scope reduction unacceptable to the sponsor	Project and item are effectively useless
Quality	Unnoticeable quality reduction	Only a few applications will be affected	Quality sponsor approval	Quality reduction unacceptable	Project and item are effectively useless

NIFEngM North-Central Chapter Courtesy Visit to Director, FEMA

June 21, 2023



The Nigerian Institution of Facilities Engineering & Management (NIFEngM) North-Central Chapter orchestrated a momentous courtesy visit to the Director of the FCT Emergency Management Agency, skillfully led by their dedicated Chapter Chairperson, **Engr. Fatima Mohammed Tukur Ahmed**. This visit epitomized the chapter's unwavering commitment to fostering partnerships and strengthening ties within the realm of emergency management. During this significant encounter, chapter representatives engaged in insightful discussions with the Director and agency personnel. They shared valuable knowledge, exchanged ideas, and explored avenues for collaboration and mutual growth. Engr. Fatima Mohammed Tukur Ahmed's exemplary leadership was instrumental in orchestrating this collaborative dialogue, which underscores the chapter's dedication to enhancing emergency response and preparedness in the North-Central region.

This visit showcased the NIFEngM North-Central Chapter's dedication to promoting excellence and innovation in the field of engineering and facilities management while emphasizing the importance of cooperation for advancing emergency management initiatives in Nigeria.



NIFEngM North-Central Chapter's Courtesy Visit to NSE Maitama Branch Chairman

June 21, 2023



The NIFEngM North-Central Chapter, under the leadership of Chairperson Engr. Fatima Mohammed Tukur Ahmed, recently paid a significant courtesy visit to the Chairman of the Nigerian Society of Engineers (NSE) Maitama Branch, Engr. Okoye Ugochukwu Henry. This visit marked a demonstration of the chapter's commitment to building strong connections within the engineering community. In the course of their meeting, chapter representatives and Engr. Okoye Ugochukwu Henry exchanged insightful and beneficial views. They looked into areas where they might work together to promote regional engineering standards. The leadership of Engr. Fatima Mohammed Tukur Ahmed was instrumental in planning this fruitful discussion, demonstrating the chapter's commitment to

advancing excellence in engineering and facilities management. The visit served as a reminder of the North-Central Chapter of the NIFEngM's aim to advance the engineering profession by highlighting the value of collaboration and shared knowledge.

