

# CESA Webinar – Risk & Quality Management

**A HIGH-LEVEL PRESENTATION OF**

**CESA's RMIG**

21<sup>st</sup> July 2021





**Risk Management is to Reach out to an Uncertain Future  
and to Bring it Under Control**

The Purpose of **Risk Management** is to pre-empt the hazards  
that may Impact on your business

and

The Purpose of **Quality Management** is to ensure that your business  
is sufficiently robust to withstand the hazards that may occur

Risk or Quality Management in isolation cannot  
assure the successful outcome of your business

**They are two sides of the same coin**



## What is Risk?

Risk is **caused** by some action or by some inaction  
and has a harmful or beneficial **effect**

Risk is a combination of the **frequency of the cause**  
and the **impact of the effect** of the hazard

Risk = Probability of **cause** x Impact of **effect**

## **What is Risk Management?**

Risk Management is the process whereby the risks that can affect the operation and survival of your business are identified, evaluated and managed either by:

1. Avoiding the risks,
2. Reducing or Mitigating them,
3. Transferring the risks, or
4. Accepting the risks

THE **ROADMAP** TO HIGH-LEVEL RISK MANAGEMENT COMPRISES:

- **TWO KINDS OF RISK**
- **THREE LEVELS OF ENTERPRISE RISK MANAGEMENT**
- **SEVEN PHASES OF PROJECT LIFECYCLE RISKS**



## **Two Kinds of Risk**

Engineering Consultancies are exposed to

**Enterprise Risks** and to

**Project Lifecycle Risks**

## THREE LEVELS OF ENTERPRISE RISK MANAGEMENT

### IN RISING ORDER OF COMPLEXITY

- Informal** Enterprise Risk Management - **Anecdotal**
- Stepping-Stone** Enterprise Risk Management - **Qualitative**
- Advanced** Enterprise Risk Management - **Quantitative**



## THREE LEVELS OF ENTERPRISE RISK MANAGEMENT

### First Level - **Informal** Enterprise Risk Management

- **House Rules**
- **Practice Notes**

FIDIC's **House Rules** in the following categories may be adopted to Informally Pre-Empt Practice Risks, refer CESA's RMIG Guideline

1. Professionalism,
2. Communication,
3. Avoiding and Managing Disputes,
4. Business Practices,
5. Technical Procedures,
6. Professional Liability Insurance and
7. Fiscal and Corporate Liability

Alternatively, CESA's **Practice Notes** in the following categories may be adopted to Informally Pre-Empt Practice Risks, refer CESA's RMIG Guideline

1. Clients and Appointments
2. Construction Stage Services
3. Good Business Practice
4. Legal Responsibility & Disputes
5. Professional Conduct & Development
6. Quality & Risk Management

Various sub-categories are presented in the **Practice Notes** to cover the Multiplicity of risks to which a practice is exposed

## THREE LEVELS OF ENTERPRISE RISK MANAGEMENT

### Second Level – **Stepping-Stone** Enterprise Risk Management

- How to Identify Risks
- Primary Enterprise Risks
- Rank Primary Risks



## Second Level – **Stepping-Stone Enterprise Risk Management**

Requires the **Primary Risks** to the business to be systematically identified, **qualitatively** evaluated and actively managed

**The risks in most businesses are adequately addressed at this level**

## Second Level – **How to Identify Risks**

Brief overviews of fourteen risk identification methods  
are given in CESA's RMIG Guideline

The method selected is primarily based on the **motivation for the study**  
and on the **type of results** required whilst the importance of the  
risks, determines the comprehensiveness and the cost of the study

Fault and Event Tree Analyses are suitable  
to identify risks in engineering practice

## Second Level – **Primary Enterprise Risks**

**Primary risks** are the root causes of lapses in business sustainability and survival

A small group should identify the primary risks in face-to-face workshop discussion

Identify risks in open-minded unconstrained pre-mortem thinking

Capture risks on sticky notes and flipcharts displayed against the walls

The **Primary Risks** to key aspects of the business should be limited to 30

## Second Level – Rank Primary Risks

**Qualitatively** evaluate the **probability** of each risk, refer CESA's RMIG Guideline

**Subjectively** assess the **impact** of each risk, refer CESA's RMIG Guideline

Classify the risks in terms of a **Qualitative** Risk Ranking Matrix, refer CESA's RMIG Guideline

Likely take action on only 5 of the primary risks

Probability Ranking	Certain	8	8	16	24	32	40	48	56	64	72	80
	Very High	7	7	14	21	28	35	42	49	56	63	70
	High	6	6	12	18	24	30	36	42	48	54	60
	Moderate	5	5	10	15	20	25	30	35	40	45	50
	Low	4	4	8	12	16	20	24	28	32	36	40
	Very Low	3	3	6	9	12	15	18	21	24	27	30
	Extremely Low	2	2	4	6	8	10	12	14	16	18	20
	Practically Zero	1	1	2	3	4	5	6	7	8	9	10
			1	2	3	4	5	6	7	8	9	10
			Nil	Insignificant	Minimal	Minor	Moderate	Major	Disruptive	Incapacitating	Destructive	Catastrophic
			Severity of Impact Ranking									

Table 4: Risk Ranking Matrix

## ROADMAP TO HIGH-LEVEL RISK MANAGEMENT

### THREE LEVELS OF ENTERPRISE RISK MANAGEMENT

#### Third Level – **Advanced** Enterprise Risk Management

- Advanced Enterprise Risk Management **Process**
- Quantitative Evaluation of **Frequencies**
- Quantitative Evaluation of **Impacts**
- **Thresholds** for Advance Enterprise Risks
- **Implementation** of Advanced Enterprise Risk Management



### Third Level – Advanced Enterprise Risk Management

Here the **incidence** and **impact** of the risks on the business are **quantitatively** evaluated and managed on an on-going basis

**Justified only on high priority issues with small margins for cost and time overruns**

### Third Level – Risk Management **Process**

**Compilation of Fault Trees** for Advanced Enterprise Risks in Consultancies

is **very onerous** but **common** to most practices, refer CESA's RMIG Guideline

The Fault Trees in the Guideline are useful **checklists**

Accordingly **tailor** the Fault Trees to suit your practice

### Third Level – Quantitative Evaluation of **Frequencies**

Read **Lifetime Probabilities** from Table 2 Appendix 6 in the Guideline

Alternatively,

- Consider past or expected future frequencies of occurrence of risks, or
- Rigorously calculate the probability if sufficient data is available

Although the probabilities in Table 2 appear to be extremely small, they are based on value scales that Actuaries in the Financial and Insurance Services Sectors rely upon

### Third Level – Quantitative Evaluation of **Impacts**

Read **Impacts** of risk from Table 3 Appendix 6 in the Guideline

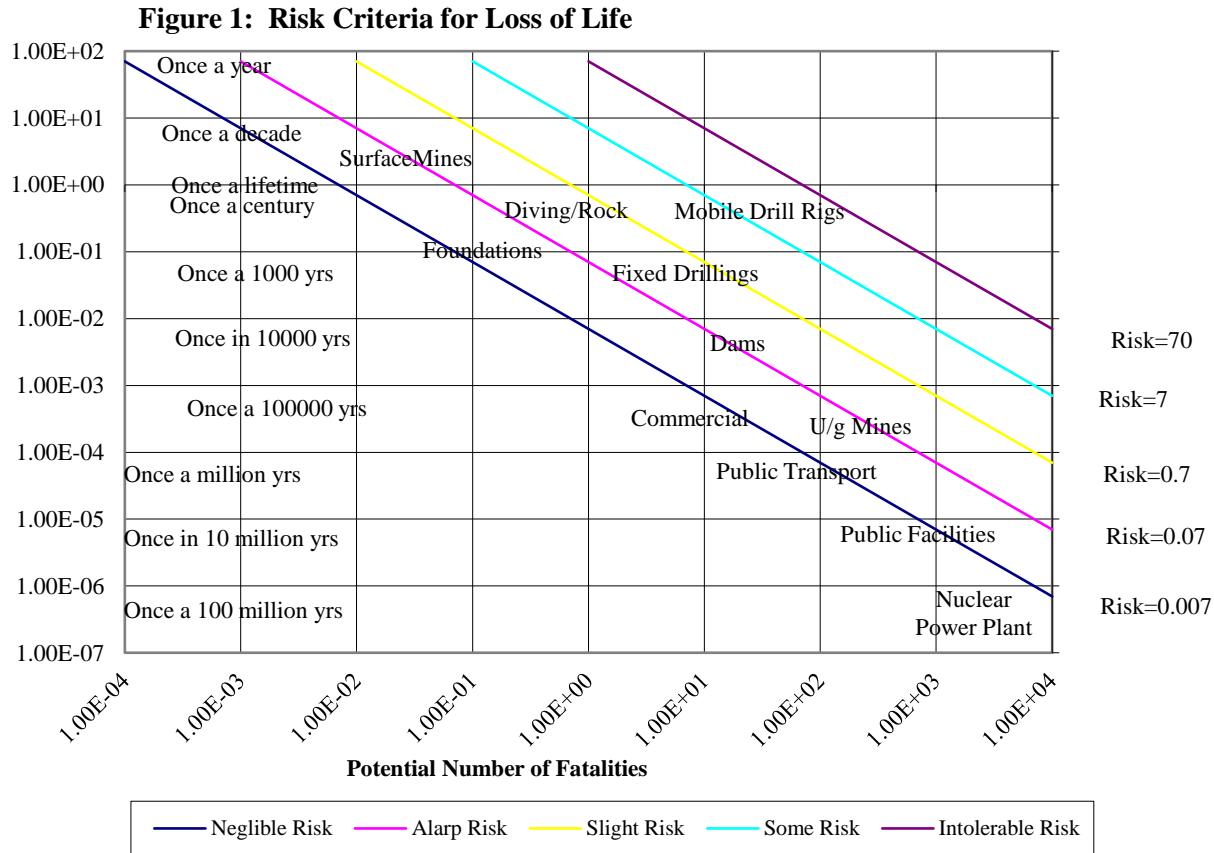
Alternatively,

- Calculate the actual value of an impact based on information available, or
- Use injury statistics on the number of incidences and on medical and insurance costs in respect of personal health and safety

### Third Level – **Thresholds** for Advanced Enterprise Risks

**Quantitative** tolerable thresholds for Enterprise Risks are given in

Appendix 7 in the Guideline





### Third Level – **Implementation** of Advanced Enterprise Risk Management

The steps to implement Advanced Enterprise Risk Management  
are given in Appendix 7 in the Guideline

## ROADMAP TO HIGH-LEVEL RISK MANAGEMENT

### ➤ TWO KINDS OF RISK

- **Enterprise** Risks
- **Project** Lifecycle Risks

### ➤ THREE LEVELS OF ENTERPRISE RISK MANAGEMENT

- **Informal** Enterprise Risk Management
  - House Rules
  - Practice Notes
- **Stepping-Stone** Enterprise Risk Management
  - How to Identify Risks
  - Primary Enterprise Risks
  - Rank Primary Risks
- **Advanced** Enterprise Risk Management
  - Advanced Enterprise Risk Management Process
  - Quantitative Evaluation of Probabilities
  - Quantitative Evaluation of Impacts
  - Thresholds for Advance Enterprise Risks
  - Implementation of Advanced Enterprise Risk Management

### ➤ SEVEN PHASES OF PROJECT LIFECYCLE RISKS

## Phases of Project Lifecycle Risks

1. Feasibility
2. Appointment
3. Conceptual Design
4. Design
5. Contract Award
6. Implementation
7. Commissioning & Post Contract

Potential risks and possible remedies during these phases that are common to most projects are presented in detail in CESA's RMIG Guideline









**To Manage Risk is to Favorably Improve the Odds  
of Uncertainty by Proactive Decision Making**

**‘Your Partner in Enabling  
Consulting Engineering  
Excellence’**