Jabatan Kesihatan Negeri Johor
Bahagian Kesihatan Awam

RISK ASSESSMENT METHODOLOGY

Concept of

- The essence of risk management is to avoid high risks, manage medium risks and live with low risks
- The process of analyzing exposure to risk and determining the best control measures to handle such exposure.
- Risk is uncertainty of outcome.
- Risk management is an integral part of performing OSH.
- Risk management is the Critical Success Factor (CSF) in OSH.

Concept of

Risk:

The likelihood that a specified undesired event will occur due to the realisation of a hazard by, or during work activities or by the products and services created by work activities.

Combination of the probability of an event and its consequences (ISO/IEC Guide 73)

In the safety field, it is generally recognized that consequences are only negative and therefore the management of safety risk is focused on prevention and mitigation of harm

What is a risk?

Combination of the likelihood and consequence(s) of a specified hazardous event occurring.

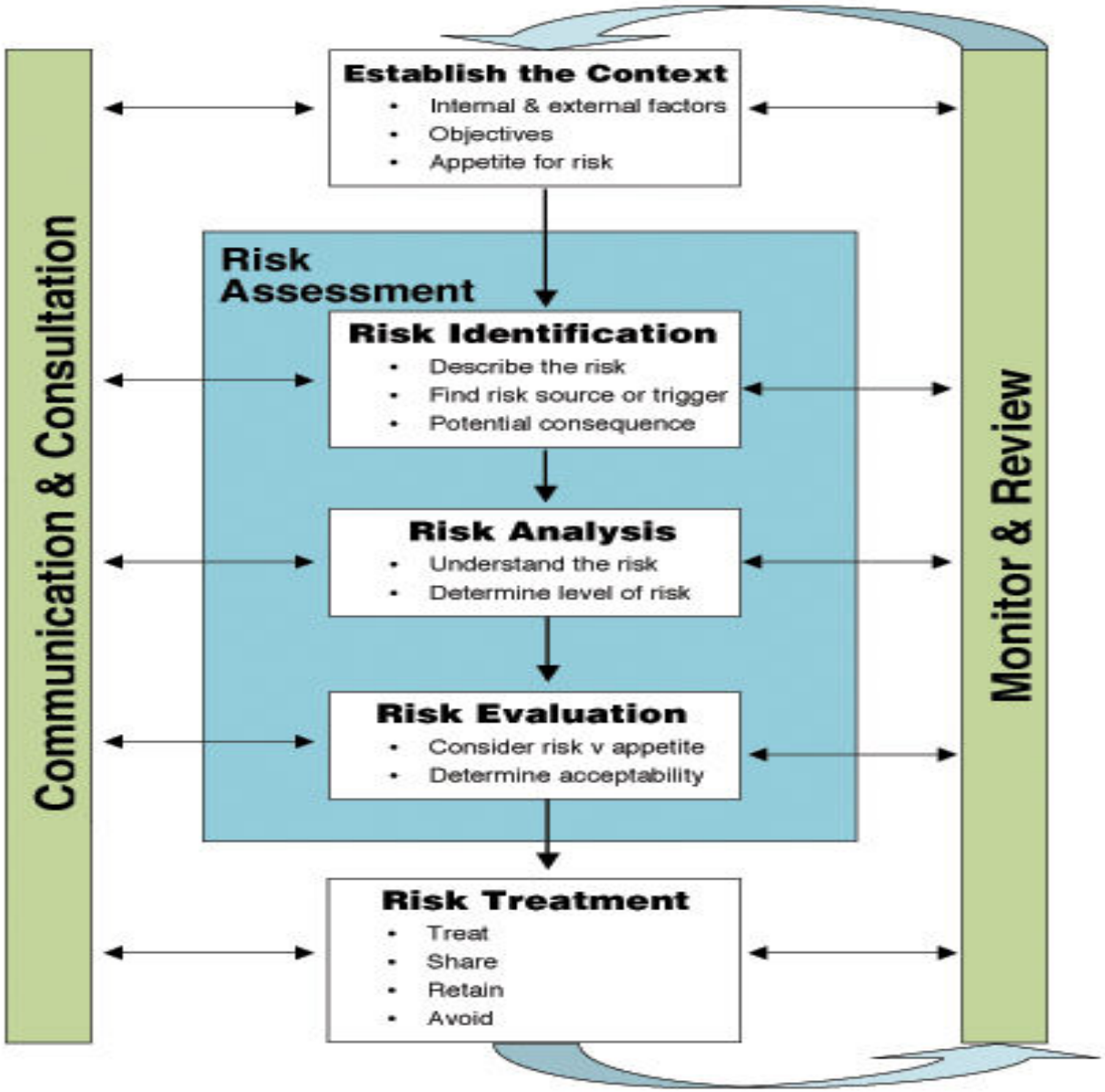
- Likelihood that a hazard may occur (probability).
- Consequence(s) of the hazardous event (severity).

Risk management can be defined as:

The eradication or minimisation of the adverse affects of risks to which an organisation is exposed.

Risk Management describes the total procedure associated with identifying a hazard, assessing the risk, putting in place control measures, and reviewing the outcomes.

RISK MANAGEMENT PROCESS



Risk Management

- Sensible risk management

- workers and the public are properly protected

- benefits to society by balancing benefits and risks

- enabling innovation and learning

- have to exercise responsibility

- is not creating a totally risk free society

- is not scaring people by publicizing trivial risks

The Range of Risks

The Range of Risks (Category of Harm)

- **Risks of injury**
- **Risks of reputation**
- **Risks of financial loss**
- **Risks of loss of facilities**
- **Risks of imprisonment**

Probability

- "Probability" has a precise statistical meaning.

- Alternative terms in risk guidelines to describe uncertainty dimension

  - frequency

  - likelihood

  - chance

Determining Likelihood

- 2 versions of likelihood:

a) Based on frequency of exposure, and/or number of people exposed.

b) Based on likelihood of incident during any exposure, case by case

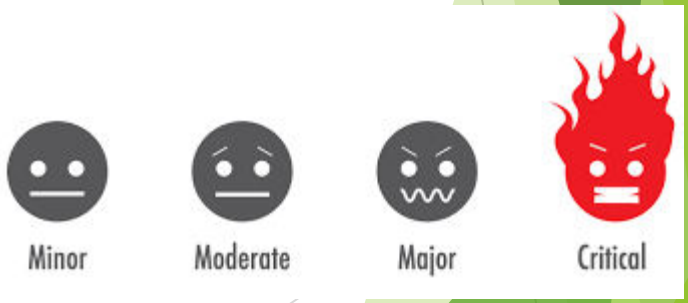
Likelihood of Occurrence Table

LIKELIHOOD (L)	EXAMPLE	RATING
Most likely	The most likely result of the hazard / event being realized	5
Possible	Has a good chance of occurring and is not unusual	4
Conceivable	Might be occur at sometime in future	3
Remote	Has not been known to occur after many years	2
Inconceivable	Is practically impossible and has never occurred	1

Table A

Determine Severity

- Severity is an estimate of how serious the injury or illness will be as a result of an accident.
- To establish potential severity of hazard, consider
  - part(s) of the body likely to be affected / harm to health
  - damage to environment
  - damage to property
  - or any combination of these



Determine Severity

- Severity also measures the level of “pain” to the organization. Examples:
- Financial : Loss or cost to repair
- Operational : Lost time, production or delivery
- Reputation : Loss of customer or consumer
- Competitive : Reduction of market advantage
- Regulatory : Legal liability

Determine Severity

- Establish the ranking. Example;

SEVERITY (S)	EXAMPLE	RATING
Catastrophic	Numerous fatalities, irrecoverable property damage and productivity	5
Fatal	Approximately one single fatality major property damage if hazard is realized	4
Serious	Non-fatal injury, permanent disability	3
Minor	Disabling but not permanent injury	2
Negligible	Minor abrasions, bruises, cuts, first aid type injury	1

Table B

RISK ASSESSMENT METHODOLOGY

Risk Assessment

Risk Assessment

- Is the process of evaluating the risk to safety & health from hazards at work

Types

- - Qualitative
- - Semi-quantitative
- - Quantitative

Qualitative Analysis

- Judgement decisions with technical knowledge
- Professional and personal experiences/biases
- Extremely subjective
- Personal and individual variations
- May not be bought in to by any medium to large scale organization
- Probability and consequence model

Qualitative Analysis

- Severity (S)
  - Catastrophic
  - Fatal
  - Serious
  - Minor
  - Negligible

VS

- Likelihood (L)
  - Most Likely
  - Possible
  - Conceivable
  - Remote
  - Inconceivable

Qualitative Analysis

An example of risk matrix (Table C) is shown below:

Likelihood (L)	Severity (S)				
	Negligible	Minor	Serious	Fatal	Catastrophic
Inconceivable	Medium	Medium	High	High	High
Remote	Low	Medium	Medium	High	High
Conceivable	Low	Medium	Medium	Medium	High
Possible	Low	Low	Medium	Medium	Medium
Most Likely	Low	Low	Low	Low	Medium

A qualitative analysis uses words to describe the magnitude of potential severity and the likelihood that those severity will occur. This method uses expert knowledge and experience to determine likelihood and severity category.

Quantitative Analysis

- Uses numerical values for both severity and likelihood using data from a variety of sources such as past accident experience and from scientific research.
- Comparison of results with limit values.

Semi-Quantitative Analysis

- Set of methods, principles or rules to assess the risk that uses bins, scales or representative numbers whose values and meanings are not maintained in other contexts.

Semi-Quantitative Analysis

An example of semi-quantitative risk matrix (Table D) is shown below:

Likelihood (L)	Severity →				
	1	2	3	4	5
5	**5**	**10**	**15**	**20**	**25**
4	**4**	**8**	**12**	**16**	**20**
3	**3**	**6**	**9**	**12**	**15**
2	**2**	**4**	**6**	**8**	**10**
1	**1**	**2**	**3**	**4**	**5**

↑ Likelihood (L)

High

Medium

Low

To use this matrix, first find the severity column that best describes the outcome of risk. Then follow the likelihood row to find the description that best suits the likelihood that the severity will occur. The risk level is given in the box where the row and column meet.

Relative Risk Values

Table D determines priority based on the following ranges:

RISK	DESCRIPTION	ACTION
15-25	HIGH	A HIGH risk requires immediate action to control the hazard as detailed in hierarchy of control. Actions taken must be documented on the risk assessment form including date for completion.
5 - 12	MEDIUM	A MEDIUM risk requires a planned approach to controlling the hazard and applies temporary measure if required. Actions taken must be documented on the risk assessment form including date for completion
1 - 4	LOW	A risk is identified as LOW may be considered as acceptable and further reduction may not be necessary. However, if the risk can be resolved quickly and efficiently, control measures should be implemented and recorded.

Levels of Risk Assessment

Level 1

- Qualitative
- Simple, single screen (5 X 5 risk matrix)
- Quick and easy but result in fairly conservative risk rankings
- For initial pre-screening of risk

Level 2

- Semi quantitative, intermediate method
- Ask more questions, takes more time to accomplish
- More accuracy and avoid overly conservative risk ranking

Level 3

- Quantitative
- More detailed and more accurate method
- Calculates specific consequence score, specific likelihood of failure score of each piece of equipment

THANK YOU