



# Responsible Production

---

## Risk Analysis, Hazard Prioritization and Identification of Risk Reduction Actions





# Contents

1. Background
2. Objectives
3. Hazard and Risk
4. What is a risk analysis and what is it for
5. Creation of a Risk Analysis team
6. Preliminary Risk Analysis and identification of risk reduction actions
7. Group exercise – Risk analysis and prioritization of Hazard Hotspots
8. Topics for discussion



Object	Operation	Hazard (quantity)	Risk- type	Threat- ened object	Conse- quences	Seriousness				Probability	Priority	Comments
						L	E	P	S			
<b>Object</b>												

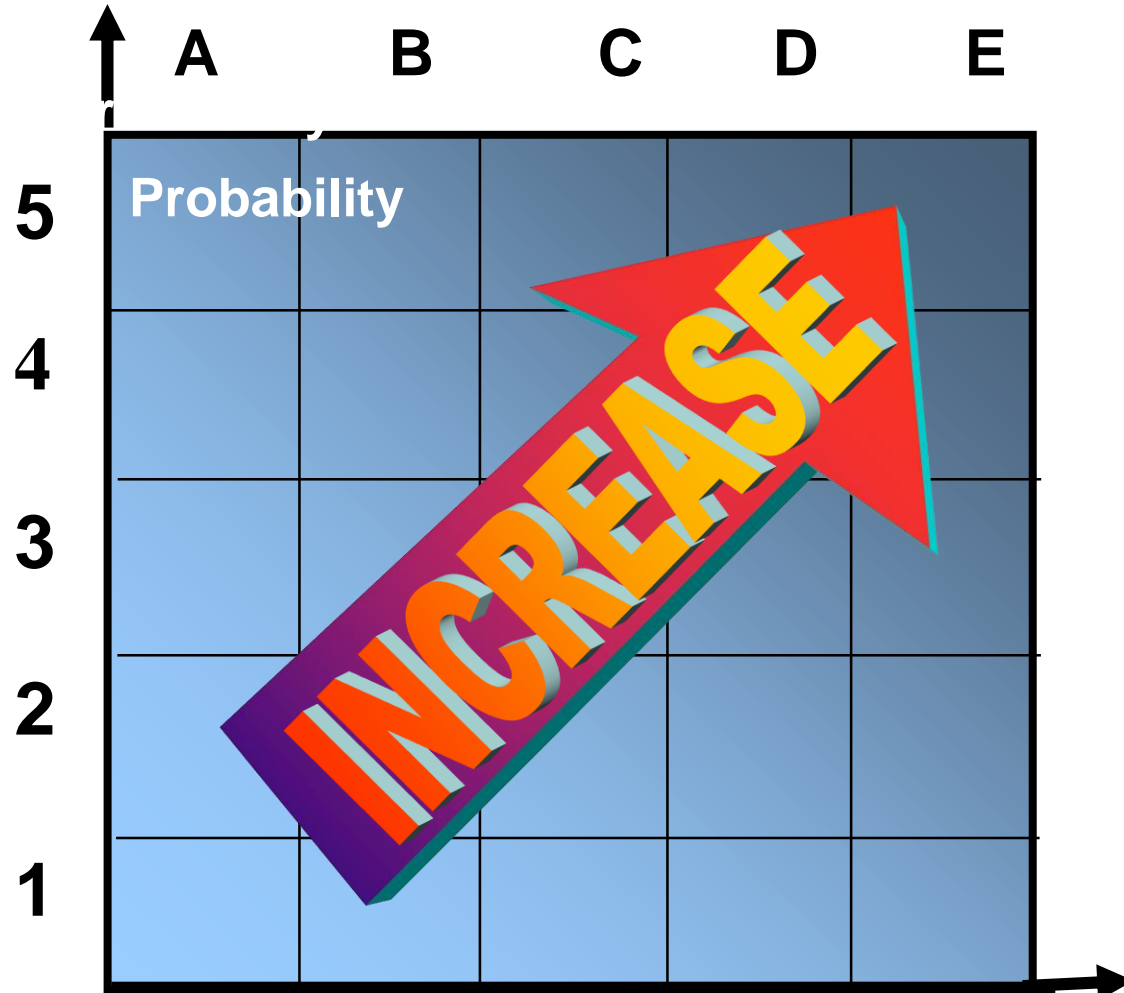
**Very probable**  
More than once a year

Once in 1 - 10 years

**Quite probable** Once per 10 to 100 years

Once per 100 to 1000 years

**Improbable**  
Less than once per 1000 years



**Unimportant**   Limited   **Serious**   Very serious   **Catastrophic**

Seriousness				Probability	Priority	Comments <sup>13</sup>
7	8	9	10	11	12	
L	E	P	S			

**Classification**



**Ranking**

**7 Life**

**9 Property**

**8 Environment**

**10 Speed**





# Identification of Risk Reduction Actions

- Risk reduction actions aim at preventing and reducing risks posed by the hazards that were prioritized by using tools such as the PRA approach above.
- RP sequence for identifying actions for risk reduction:
  - STEP 1: REVIEW THE HAZARDS IDENTIFIED
    - Reviewing of the list of hazards and hazard hotspots identified and the risks prioritized
  - STEP 2: IDENTIFYING PREVENTATIVE MEASURES
    - Discussion with workers, supervisors, business partners and other external stakeholders (where appropriate) for identification of possible preventive actions
  - STEP 3: CHECKING OPPORTUNITIES FOR IMMEDIATE RISK REDUCTION ACTIONS
    - Reviewing of the process flow chart for identification of steps where actions for risk reduction can be implemented

# Identification of Risk Reduction Actions

- Some risk reduction actions:
  - Eliminating hazards (by minimizing or avoiding toxic, flammable and explosive substances; eliminating or replacing chemicals with less hazardous ones; etc.)
  - Enclosure or isolation of hazards (enclosing equipment and providing secondary containment; separating hazardous processes and hotspots from other processes, areas and ignition sources; etc.)
  - If applicable , ventilation of areas where the hazards are located (provision of general and local ventilation to remove or reduce concentrations of hazardous fumes, gases, vapours and mists)
  - Improvement of housekeeping measures and disposal routines
  - Promoting the use of personal protection equipment

- Some risk reduction actions (continued):
  - Raising awareness to hazards and risks (informing workers about hazards and properties of hazardous chemicals; making available MSDS, first aid procedures and other informational materials on chemical safety in the language of the workforce)
  - Keeping non-authorized personnel away from hazards hotspots (improving awareness of hazards and risks; using hazard symbols, labels and warning signs; locking areas of restricted access)
  - Preventing public access to hazardous chemicals storage areas (fencing off/locking storage areas; appointing a responsible person to check regularly storage facilities; making sure that entry into storage areas is only allowed to authorized personnel)
  - Avoiding trespassing (guard and lock facilities) and implementing emergency alarms

- Some risk reduction actions (continued):
  - Re-evaluating routes used for the transport of hazardous chemicals (changing routes whenever possible to avoid driving through or in the vicinity of densely populated areas, schools and hospitals, natural protected areas, heritage areas, etc.)
  - Whenever applicable, providing police and/or emergency response teams escorts when transporting hazardous chemicals through communities or areas which present maximum risk.
  - Avoiding shipments of high-risk chemicals during rush hours to reduce accident probability and numbers of people exposed to risk.
  - Considering temporary restrictions on dangerous goods traffic during hazardous weather conditions: low visibility due to fog, high winds, or slipperiness due to heavy rain, snow or ice.

<b>Frequency 5</b>	(5/1)	(5/2)	(5/3)	(5/4)	(5/5)
<b>Frequency 4</b>	(4/1)	(4/2)	(4/3)	(4/4)	(4/5)
<b>Frequency 3</b>	(3/1)	(3/2)	(3/3)	(3/4)	(3/5)
<b>Frequency 2</b>	(2/1)	(2/2)	(2/3)	(2/4)	(2/5)
<b>Frequency 1</b>	(1/1)	(1/2)	(1/3)	(1/4)	(1/5)
	<b>Gravity 1</b>	<b>Gravity 2</b>	<b>Gravity 3</b>	<b>Gravity 4</b>	<b>Gravity 5</b>

Area where risks are considered unacceptable

Area where risks are critical and require monitoring / control

prioritize the hazard hotspots you have preliminary identified, taking into the account their assigned risk factors