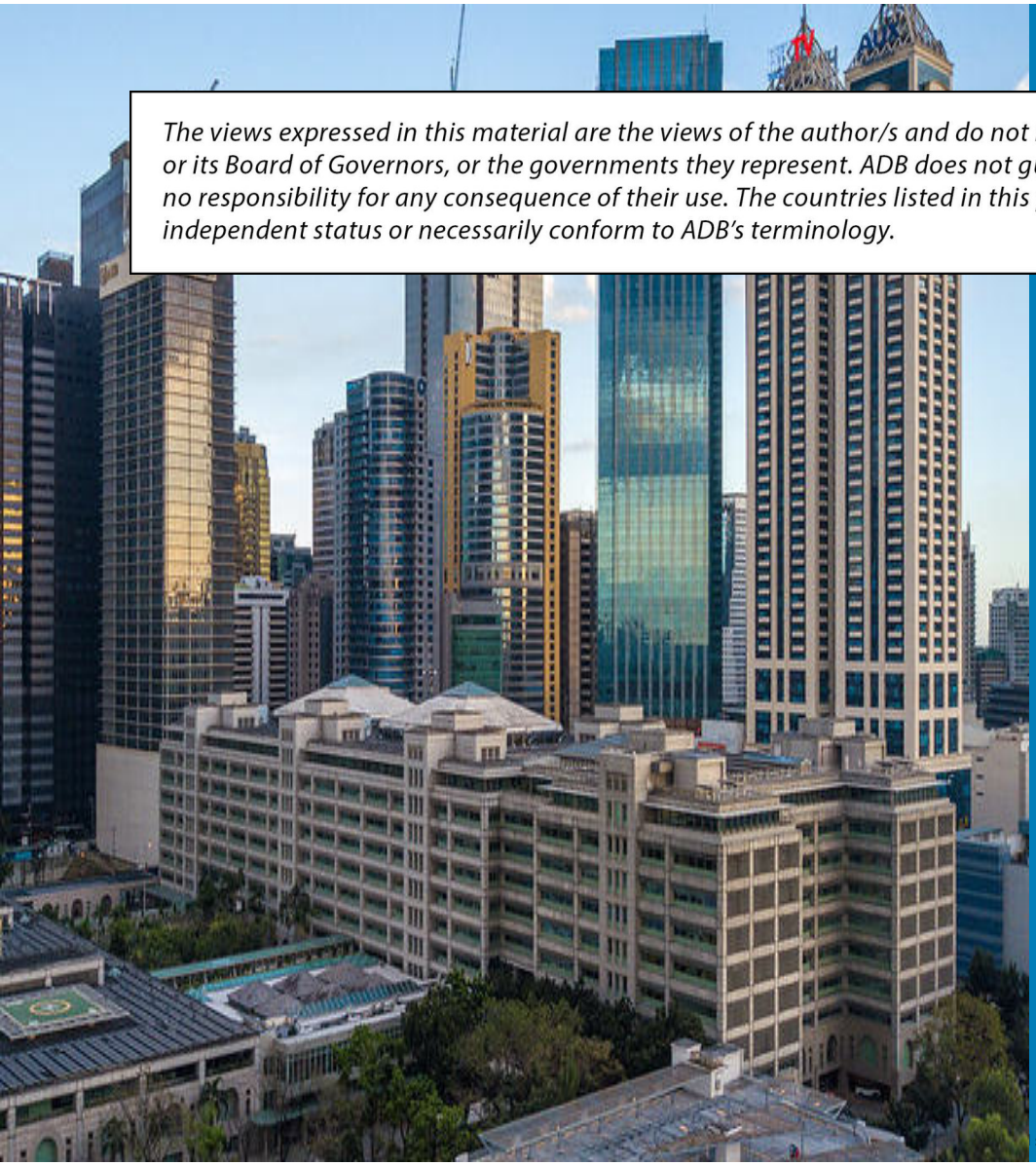


The views expressed in this material are the views of the author/s and do not necessarily reflect the views or policies of the Asian Development Bank, or its Board of Governors, or the governments they represent. ADB does not guarantee the accuracy of the data included in this presentation and accepts no responsibility for any consequence of their use. The countries listed in this presentation do not imply any view on ADB's part as to sovereignty or independent status or necessarily conform to ADB's terminology.

ADB Health, Safety and Security (HSS)

Awareness Training Course

ADB

MODULE 2

HSS Risk Management

Identify hazards and risks, assess their impact and how to control them

Hazard

A **hazard** is anything that has the ***potential*** to cause harm.


WORK SAFE
STAY SAFE
BEHAVIOUR
KEY PERFORMANCE INDICATORS
Video: Safety Culture HAZID
ADB

Hazard Wheel

A hazard wheel can help to identify hazards when performing an operation or task.

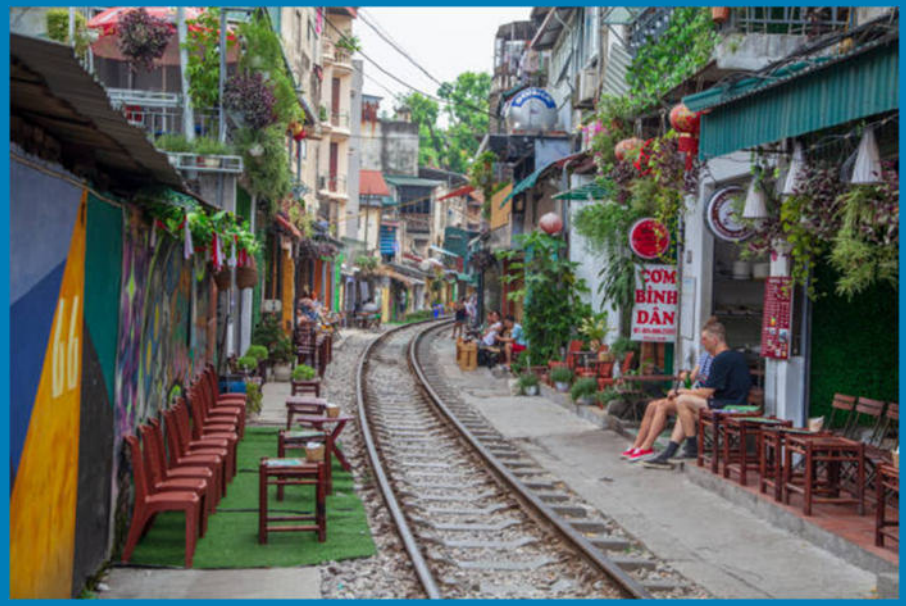
Hazardous Event

For a hazard to cause harm, a hazardous **event** must happen.

Assessing Risks

We need to understand the ***definition*** of **risk** and be able to evaluate and reduce it.

Perception of Risk



Limited "Receptors" = Limited Risk

Add "Receptors" = Higher Risk

Risk

Risk is the combination of the ***likelihood*** of a hazardous event occurring, and the ***consequence***.

Risk = Likelihood x Consequence

Defining “Hazard” vs “Risk”

HAZARD

RISK

Defining “Hazard” vs “Risk”

What is an obvious “Hazard”?

What is the “Risk”?

Defining “Hazard” vs “Risk”

Same “Hazard”…

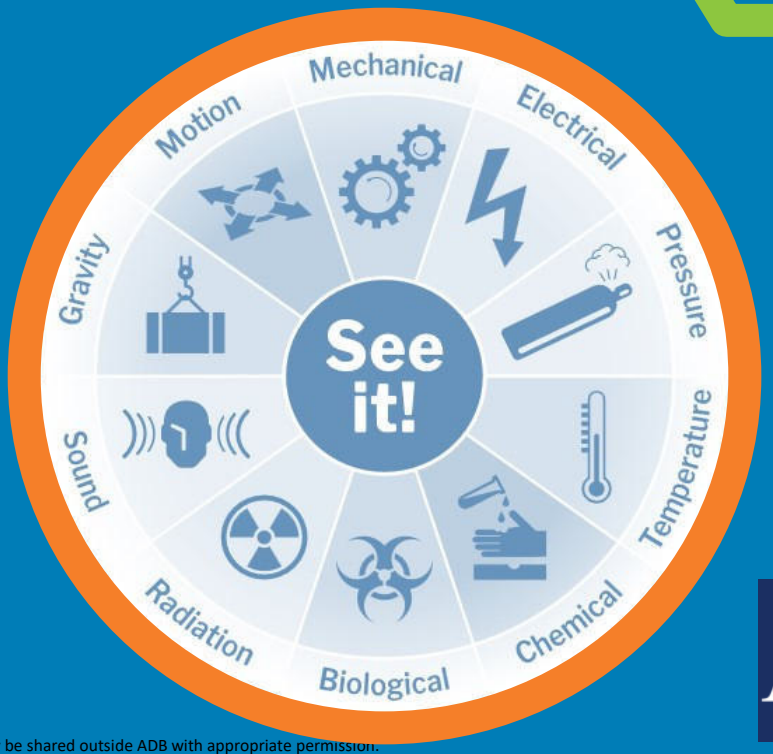
Now what is the “Risk”?

ADB

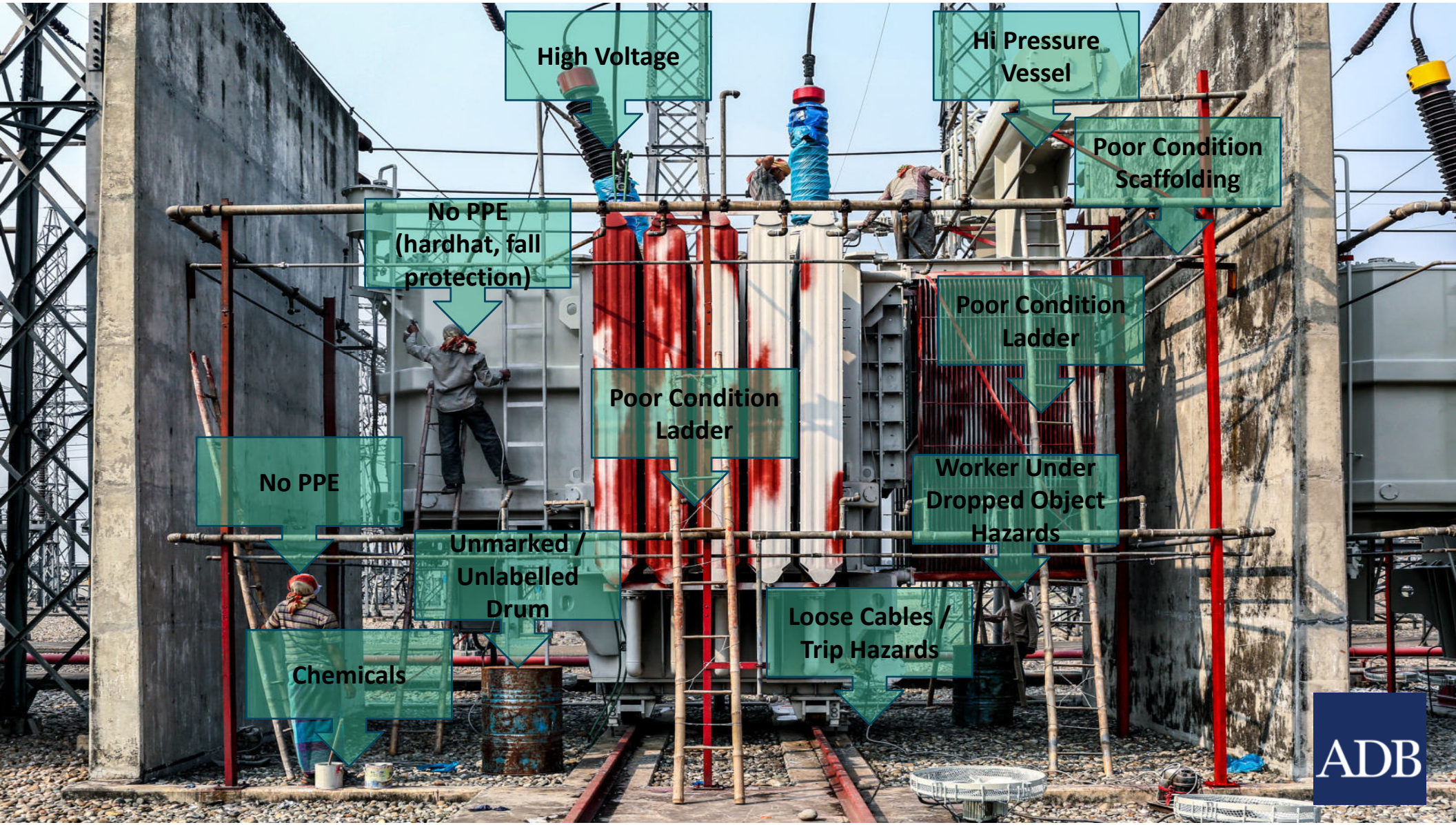
Hazard Event Consequences

Exercise

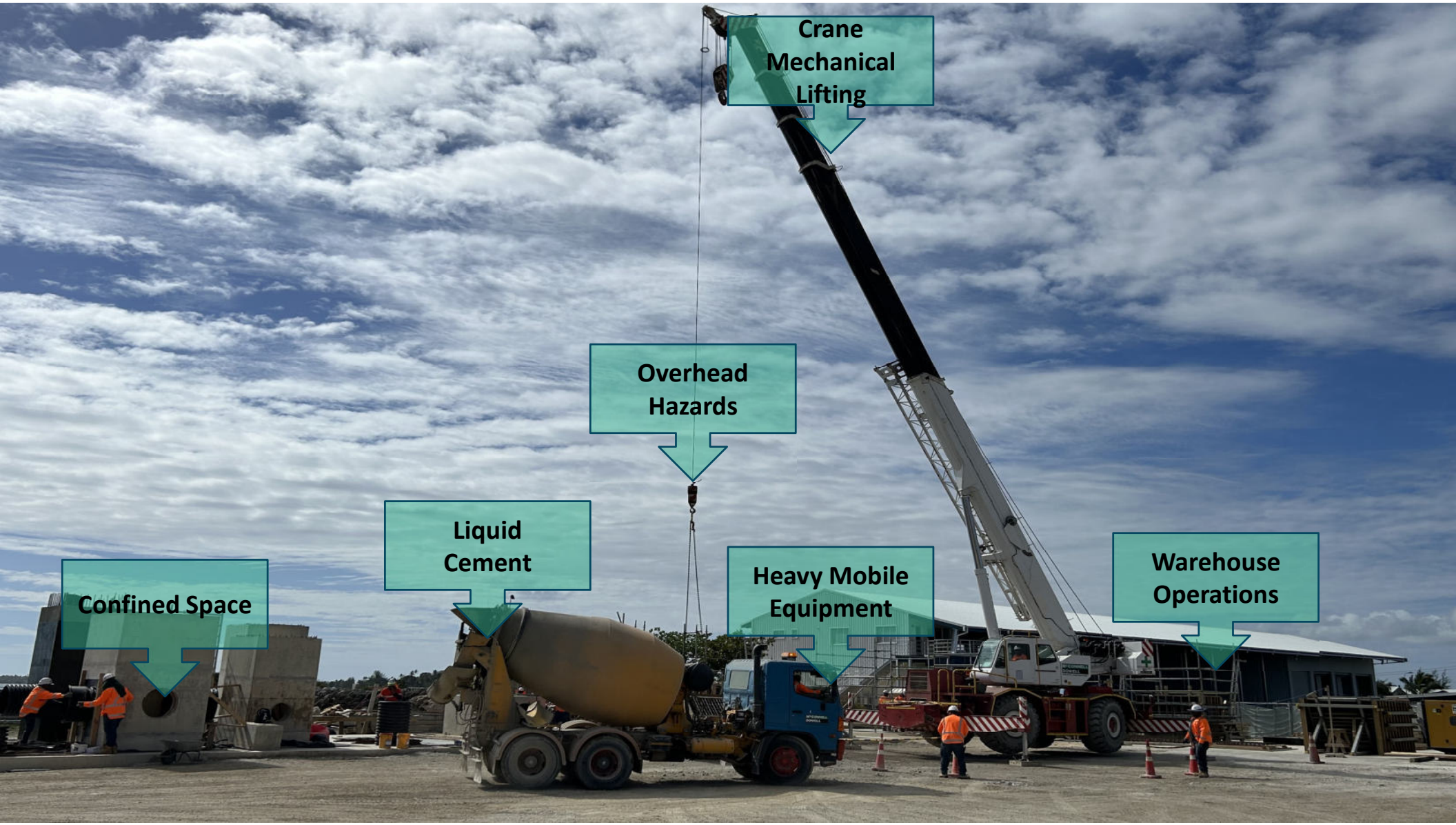
Provide an example of how a person could be harmed for each hazard group.




No PPE
No Fall Protection
No Fall Protection
Power Lines
Chemical Storage
Scaffold Lacks Toe Boards
Dropped Objects
Poor Housekeeping


High Voltage
Hi Pressure Vessel
Poor Condition Scaffolding
No PPE (hardhat, fall protection)
Poor Condition Ladder
Poor Condition Ladder
No PPE
Worker Under Dropped Object Hazards
Unmarked / Unlabelled Drum
Loose Cables / Trip Hazards
Chemicals
ADB

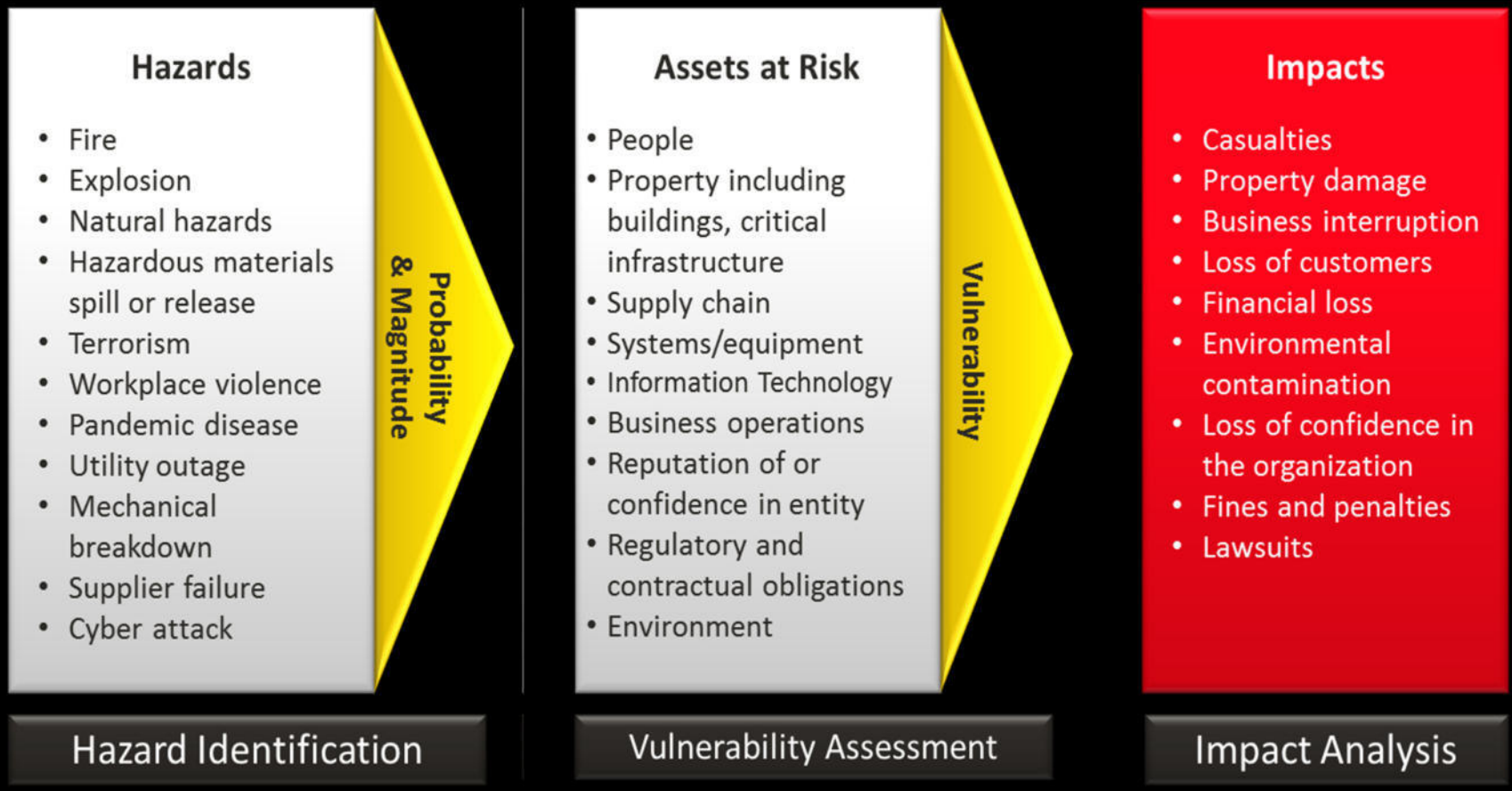

Overhead Powerline
Work at Height
Heavy Mobile Equipment
Fuel Storage
Security Breach
Restricted Space
Chemical Totes
Site Drainage / Runoff


Crane Mechanical Lifting
Overhead Hazards
Liquid Cement
Confined Space
Heavy Mobile Equipment
Warehouse Operations

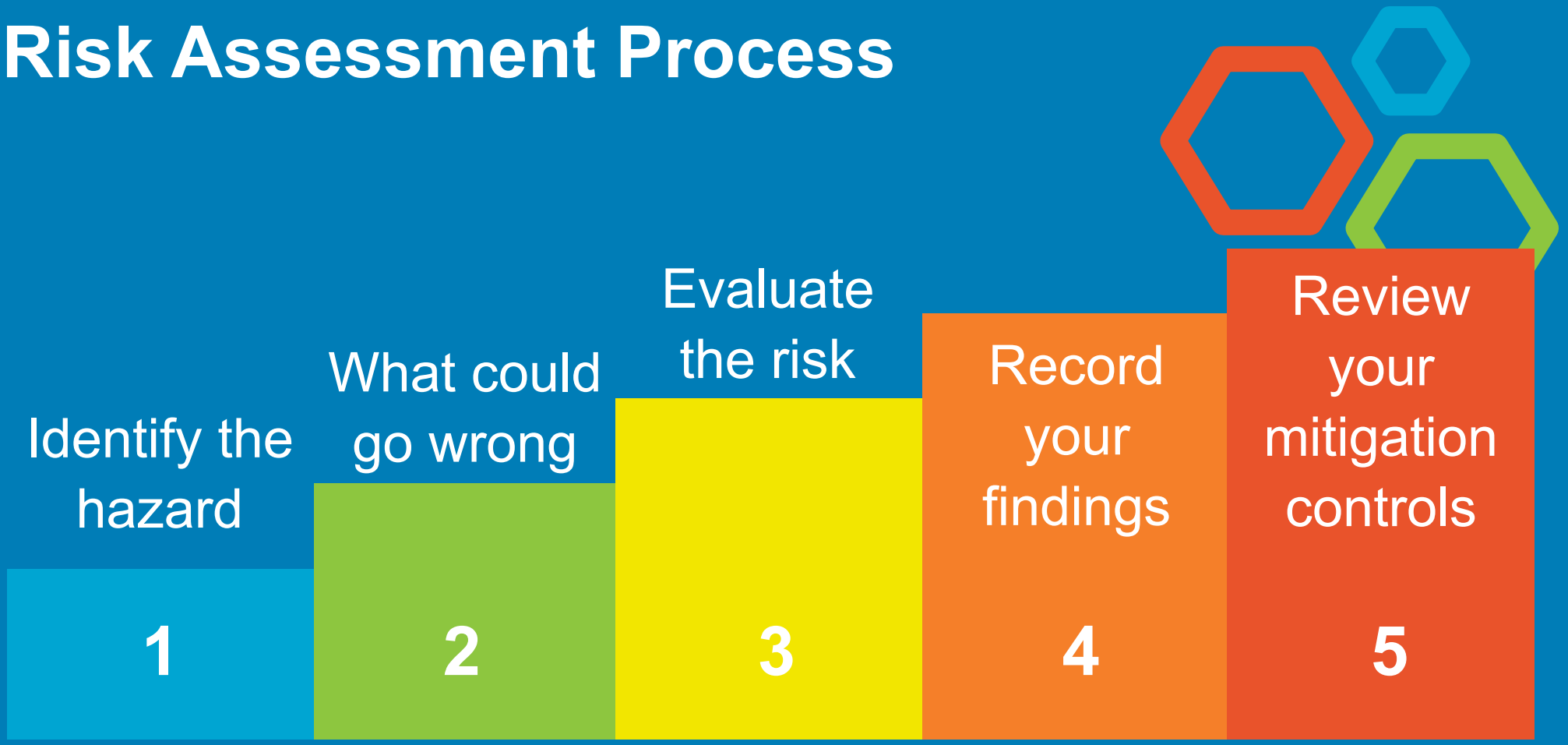
Risk Management

Identifying and evaluating risks, and identifying mitigation measures, to reduce risk to "**as low as reasonably practicable**" (**ALARP**).

High Level Hazards



Risk Assessment Process



Using a Risk Matrix (Basic 3x3)

		Consequence		
		Slightly Harmful	Harmful	Extremely Harmful
Likelihood	Likely	Medium Risk	High Risk	Extreme Risk
	Unlikely	Low Risk	Medium Risk	High Risk
	Highly Unlikely	Negligible Risk	Low Risk	Medium Risk

Risk Matrix (many styles = same principles – e.g., 5x5)

Consequence

Likelihood

	Insignificant	**Minor**	**Moderate**	**Major**	**Catastrophic**
Very Likely	Low-Medium	Medium	Medium-High	High	High
Likely	Low-Medium	Low-Medium	Medium	Medium-High	High
Possible	Low	Low-Medium	Medium	Medium-High	Medium-Heigh
Unlikely	Low	Low-Medium	Low-Medium	Medium	Medium-High
Very Unlikely	Low	Low	Low-Medium	Medium	Medium

SAMPLE Corporate Risk Matrix

People	Environment	Assets	Reputation

"PEAR" Principle

Consequence Severity	Health&Safety	Environment	Financial	Reputation	Probability / Likelihood			
					A - Remote	B - Unlikely	C - Likely	D - Frequent
1- Minor	-Minor Injury or illness -First Aid	-Minimal cleanup needed -Fully contained on site -Negligible impacts	Less than $10,000	-No public disruption -No media attention	A1	B1	C1	D1
2- Moderate	-Medical Treatment -Restricted Work	-Some clean-up offsite -Localized impacts	$10,000 to $100,000	-Regulatory attention/letters -Minimal public disruption - Briefly in local media	A2	B2	C2	D2
3- Major	-Lost Time Incident (LTI) -Multiple injuries	-Widespread but recoverable -Short term impacts	$ 100,000 to $ 500,000	-Regulatory action/fines -Local public disruption -Prolonged local media attention	A3	B3	C3	D3
4- Critical	-Fatality -Permanent health impact -Long term disability	-Widespread and irreversible -Long term impacts	Over $ 500,000	-Regulatory shutdown -Wide public disruption -Prolonged wide media attention	A4	B4	C4	D4

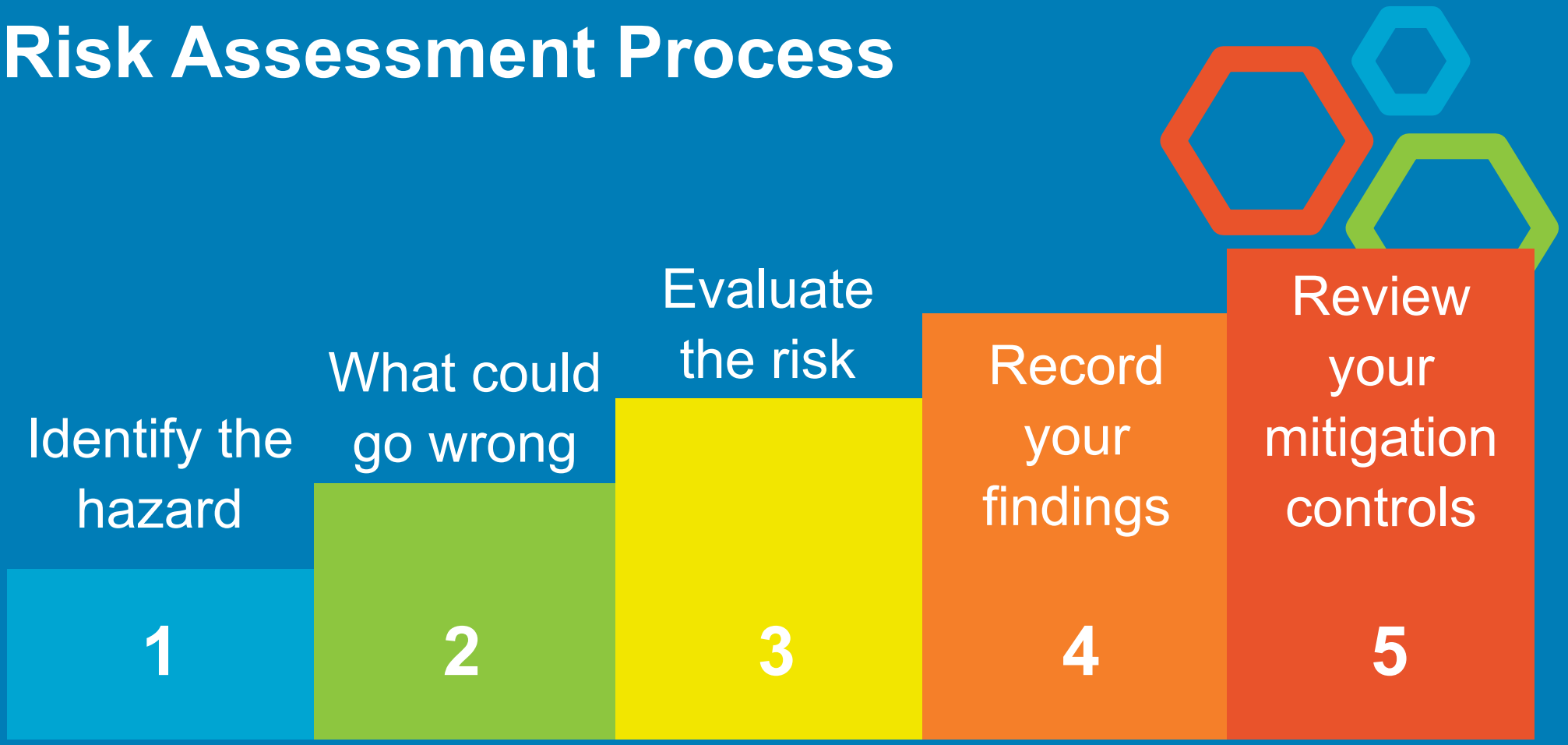
SayleGroup Inc. THE TRUSTED NAME

Risk Management

Identifying and evaluating risks, and identifying mitigation measures, to reduce risk to "**as low as reasonably practicable**" (**ALARP**).

High Level Hazards

Risk Assessment Process



Using a Risk Matrix (Basic 3x3)

		Consequence		
		Slightly Harmful	Harmful	Extremely Harmful
Likelihood	Likely	Medium Risk	High Risk	Extreme Risk
	Unlikely	Low Risk	Medium Risk	High Risk
	Highly Unlikely	Negligible Risk	Low Risk	Medium Risk

Risk Matrix (many styles = same principles – e.g., 5x5)

Consequence

Likelihood

	Insignificant	Minor	Moderate	Major	Catastrophic
Very Likely	Low-Medium	Medium	Medium-High	High	High
Likely	Low-Medium	Low-Medium	Medium	Medium-High	High
Possible	Low	Low-Medium	Medium	Medium-High	Medium-Heigh
Unlikely	Low	Low-Medium	Low-Medium	Medium	Medium-High
Very Unlikely	Low	Low	Low-Medium	Medium	Medium

ADB

SAMPLE - Corporate Risk Matrix

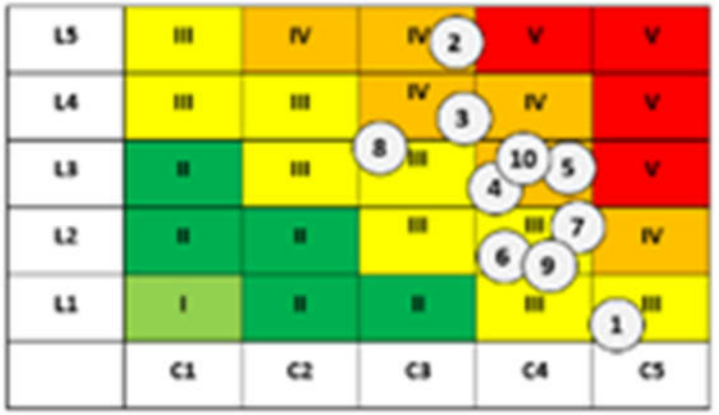
People	Environment	Assets	Reputation

"PEAR" Principle

Consequence Severity	Health&Safety	Environment	Financial	Reputation	Probability / Likelihood			
					A - Remote	B - Unlikely	C - Likely	D - Frequent
1- Minor	-Minor Injury or illness -First Aid	-Minimal cleanup needed -Fully contained on site -Negligible impacts	Less than $10,000	-No public disruption -No media attention	A1	B1	C1	D1
2- Moderate	-Medical Treatment -Restricted Work	-Some clean-up offsite -Localized impacts	$10,000 to $100,000	-Regulatory attention/letters -Minimal public disruption - Briefly in local media	A2	B2	C2	D2
3- Major	-Lost Time Incident (LTI) -Multiple injuries	-Widespread but recoverable -Short term impacts	$ 100,000 to $ 500,000	-Regulatory action/fines -Local public disruption -Prolonged local media attention	A3	B3	C3	D3
4- Critical	-Fatality -Permanent health impact -Long term disability	-Widespread and irreversible -Long term impacts	Over $ 500,000	-Regulatory shutdown -Wide public disruption -Prolonged wide media attention	A4	B4	C4	D4

Corporate Risk Worksheet - Sample

DRAFT			Consequence	Probability	Inherent Risk = before Mitigation	Mitigation (currently in place) that reduces the risk rating.	Note: The residual risk ratings below DO NOT APPLY unless all current mitigation and control measures are in place.			Recommendation: Mitigation which is required, to further reduce the risk to an acceptable level.	Company and/or individual responsible to ensure mitigation is in place prior to activity	Additional Notes
ID	"What If" Risk Scenario	Hazards & Impacts (without mitigation)	Consequence	Probability	Inherent Risk	Current Mitigation/Controls	Consequence	Probability	Residual Risk	Additional Mitigation/Controls	Responsibility	Comments
	* What if personnel executing COVE work do not comply with Health & Safety (H&S) requirements, resulting in a serious incident or fatality? (regardless of specific cause for purposes of this assessment) Litigation, Fines/Penalties	People:	1 - Critical	B - Likely		1. COVE Safety and Environmental Expectations 2. Marine Access Permits and Onshore Access Permits (incl SIMOPS considerations) 3. Operational Safety Plans for all marine and onshore operations that outline HSE requirements and identify PICs who are responsible to ensure HSE requiements are satisfied - Pre-operation planning sessions - Same-day toolbox meetings - Post operation review meetings for continuous improvement - Emergency Response Plans 4. Liability and Environmental Impairment Insurance coverage 5. JRCC	1 - Critical	D - Remote		1. Consider SIMOPS Risk Assessment 2. Conduct detailed Risk Assessment for subsea cable damage for future mooring operations and other subsea activities. 3. Liability Insurance coverage 4. Crisis communications planning 5. Consider specific OHS - Safety Culture training for key COVE personnel 6. Consider raising the bar for H&S standards as part of the "Fundy Standard" above minimum regulatory compliance (i.e., similar to say CNSOPB).		* Site/task-specific risks should be addressed through separate Task/Job Safety Analysis processes with specific Berth holders, including the various specific potential fatality scenario risks and control measures.
		Environment:	5 - N/A	E - N/A			5 - N/A	E - N/A				
		Assets:	1 - Critical	B - Likely			1 - Critical	D - Remote				
		Reputation:	1 - Critical	B - Likely			1 - Critical	D - Remote				

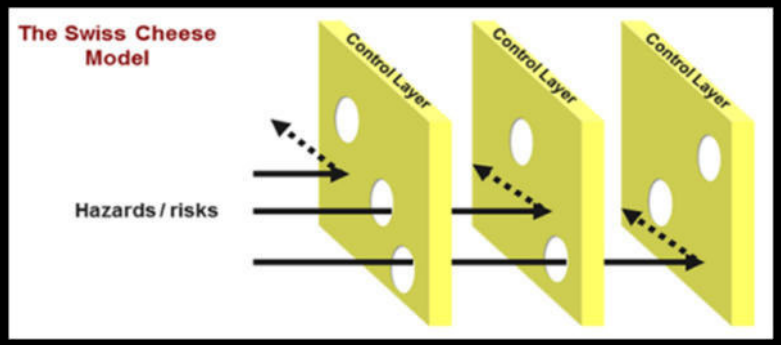


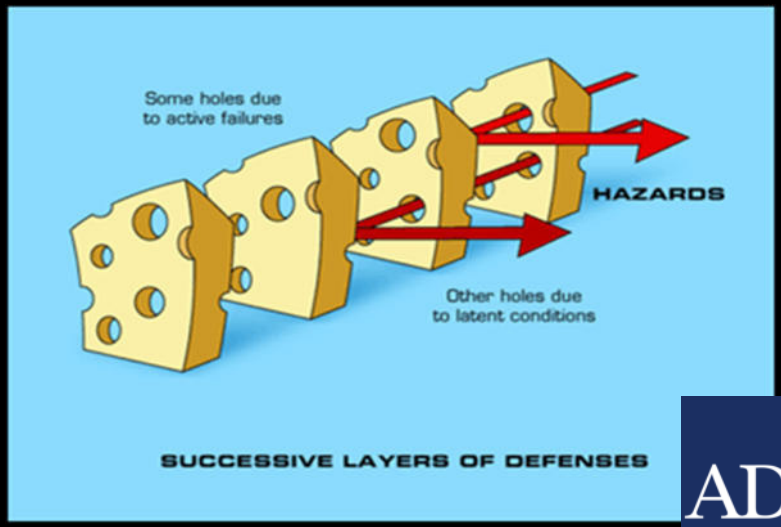
SayleGroup Inc. THE TRUSTED NAME

Risk Management – LAYERS of Protection

Swiss Cheese Risk Model

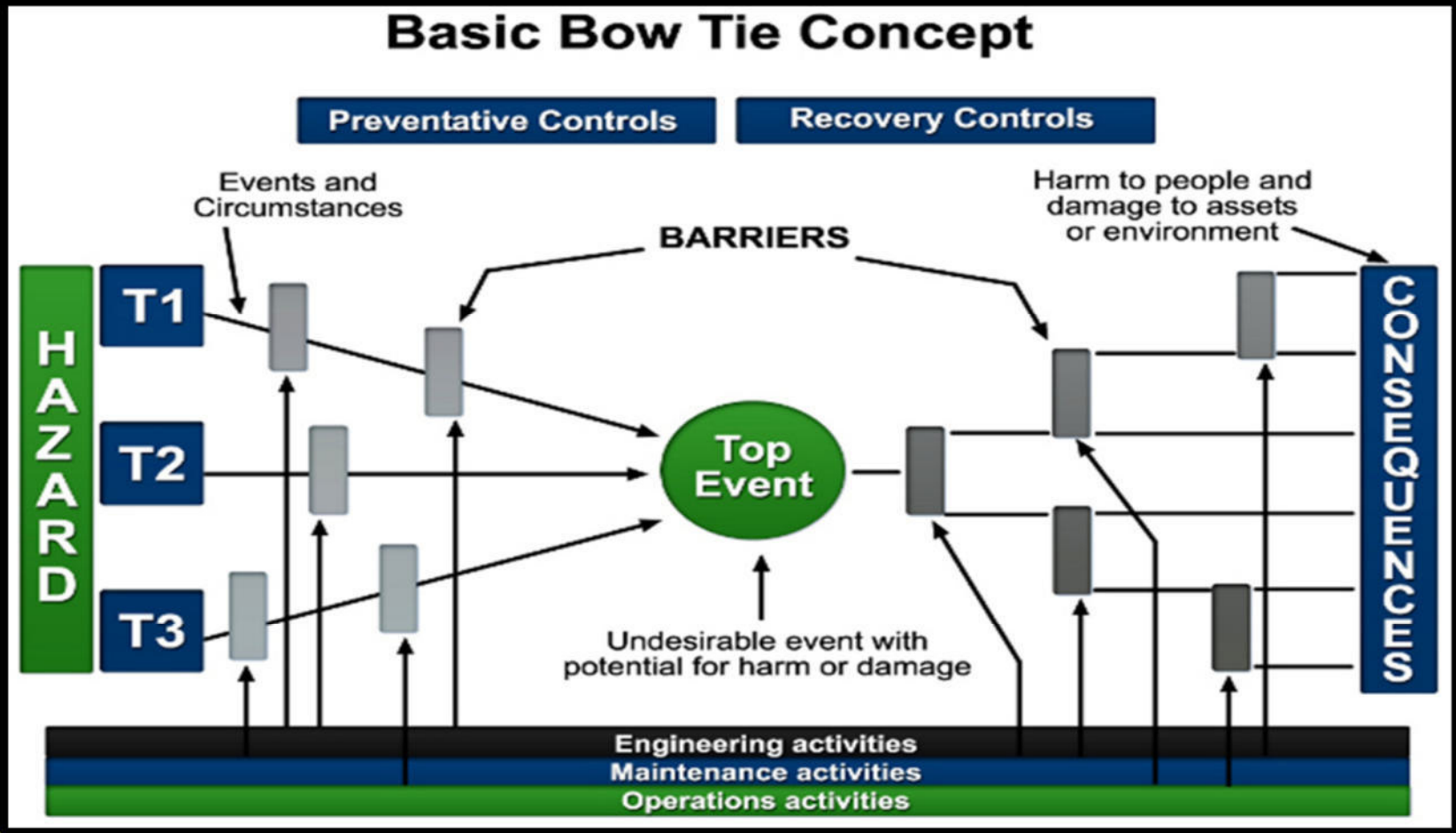
- Layers of protection needed for Emergency Prevention & Response





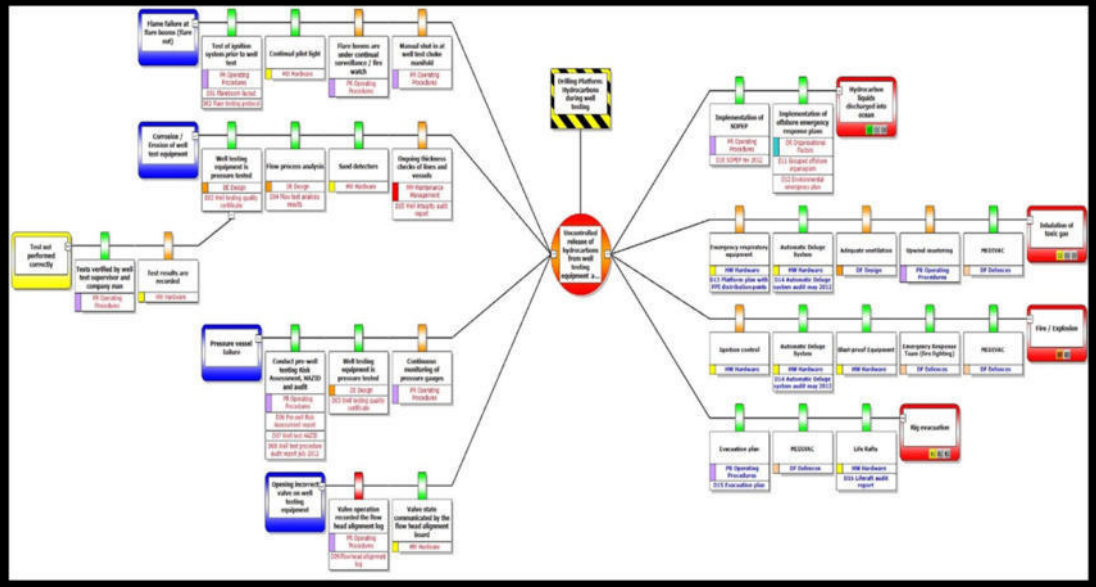
ADB

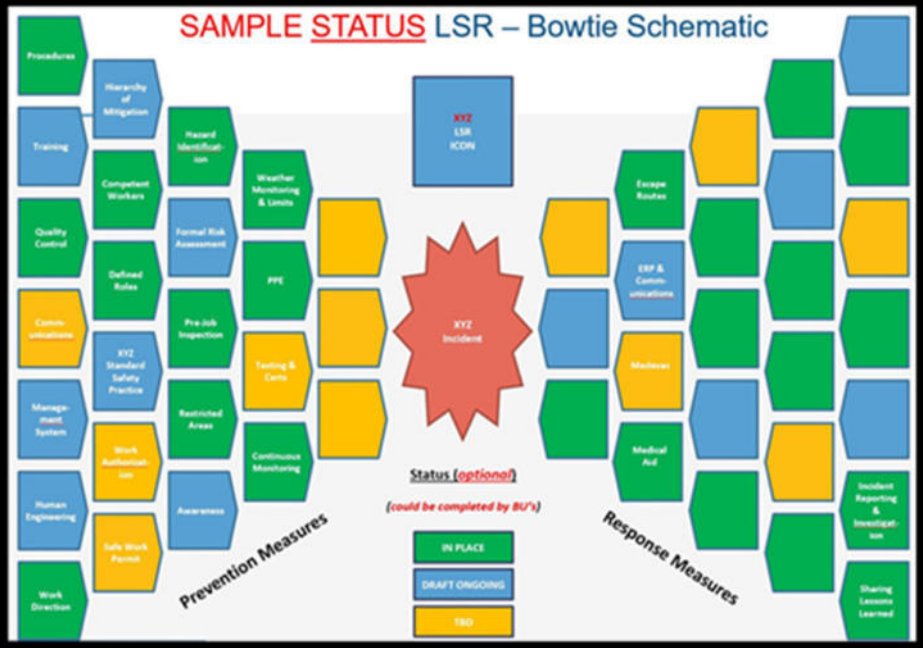
Risk Management – LAYERS of Protection



Discussion – House Fire
- List out examples for "Prevention & Response"

Risk Management – LAYERS of Protection



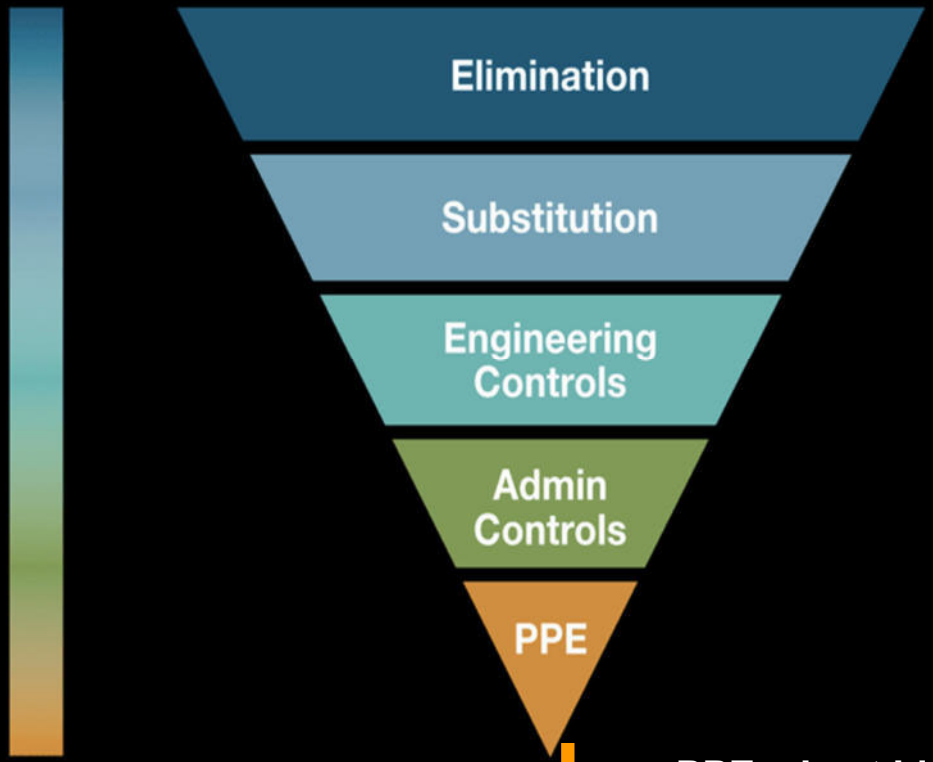


Discussion – House Fire

- List out examples for "Prevention & Response"

Hierarchy of Controls

ADB Hierarchy of Controls



PPE = Last Line of Defense !

Using a Risk Matrix (Basic 3x3)

		Consequence		
		Slightly Harmful	Harmful	Extremely Harmful
Likelihood	Likely	Medium Risk	High Risk	Extreme Risk
	Unlikely	Low Risk	Medium Risk	High Risk
	Highly Unlikely	Negligible Risk	Low Risk	Medium Risk

Typical Life-Saving Rules

Other LSR online video summaries from IOGP

Links to all LSR videos (1-2 minutes each)

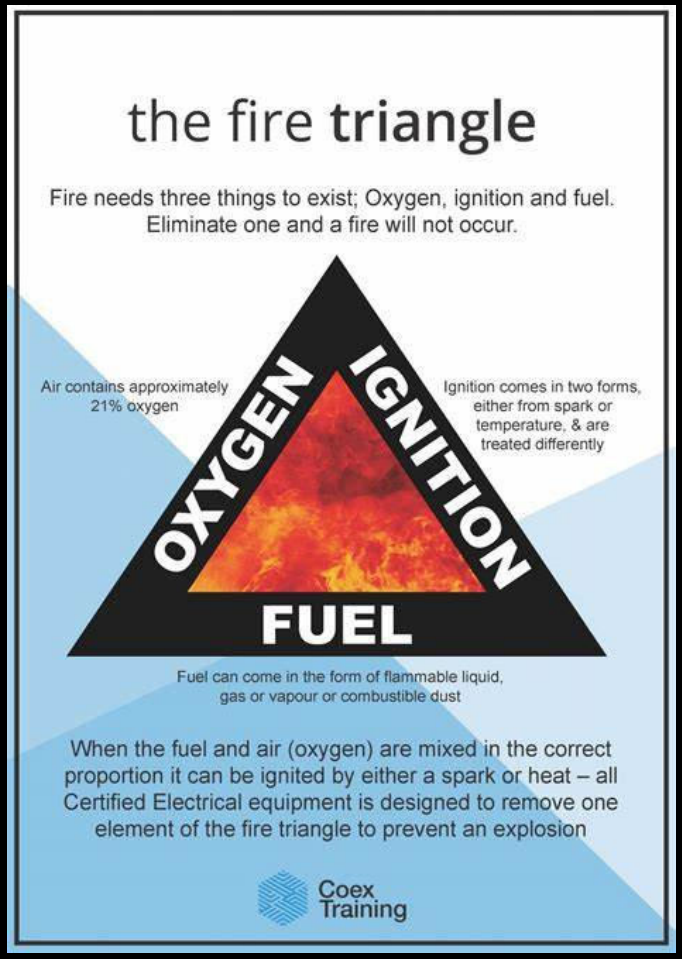
- Youtube:
  - https://www.youtube.com/playlist?list=PLt0-qTVCvEp1Dxe7j7SDbbiLrYIkUqYov

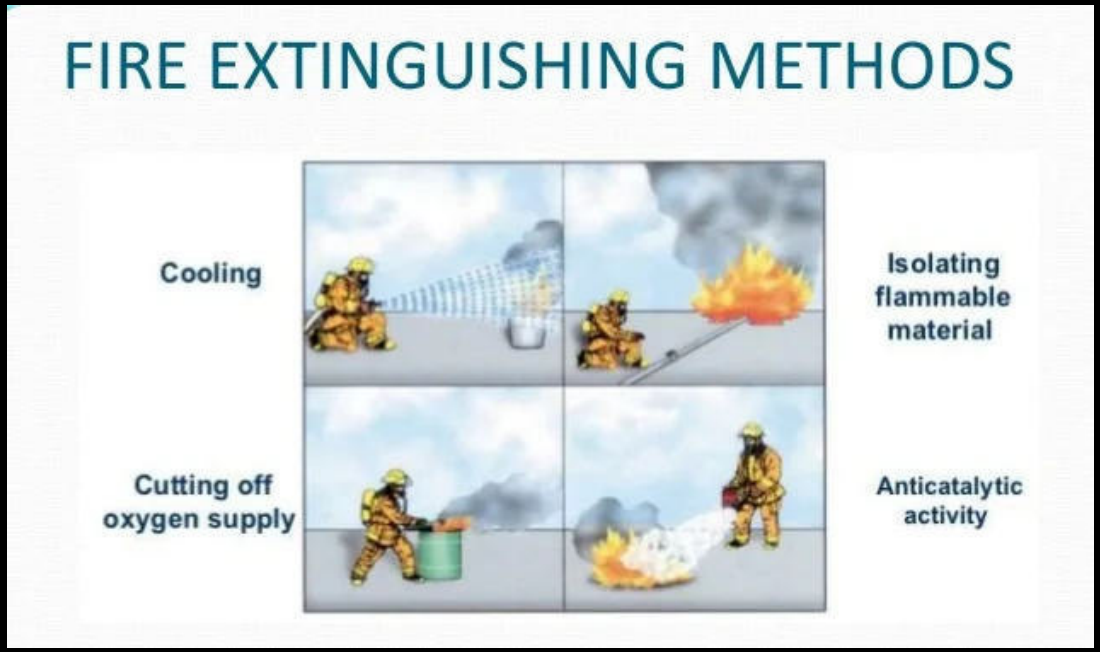
- Vimeo: (show Energy Isolation & Work at Heights)
  - https://vimeo.com/showcase/5939420

Office Safety - Controls

Office Safety - Controls

Example of Controls for Fire Protection





https://www.youtube.com/watch?v=yodLMfOZNvA

Example of Controls for Fire Protection

Symbols found on fire extinguishers and what they mean. FireArrest	Water	Foam Spray	ABC Powder	Carbon Dioxide	Wet Chemical
Class A Wood, Textiles & Paper	✓	✓	✓	✗	✓
Class B Flammable Liquids	✗	✓	✓	✓	✗
Class C Flammable Gases	✗	✗	✓	✗	✗
Class D Electrical Contact	✗	✗	✓	✓	✗
Class F Cooking Oils and Fats	✗	✗	✗	✗	✓

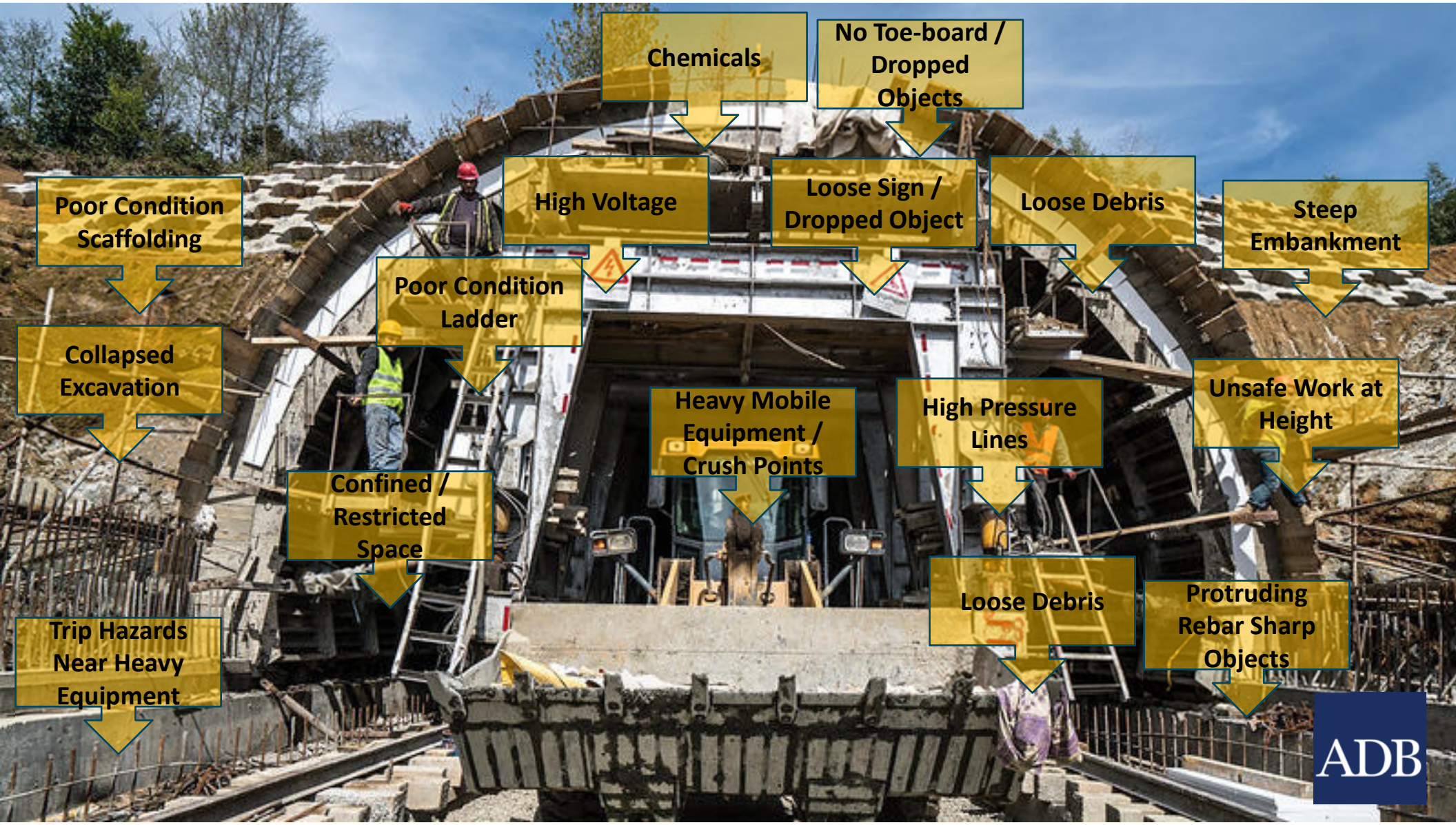
https://www.youtube.com/watch?v=yodLMfOZNvA

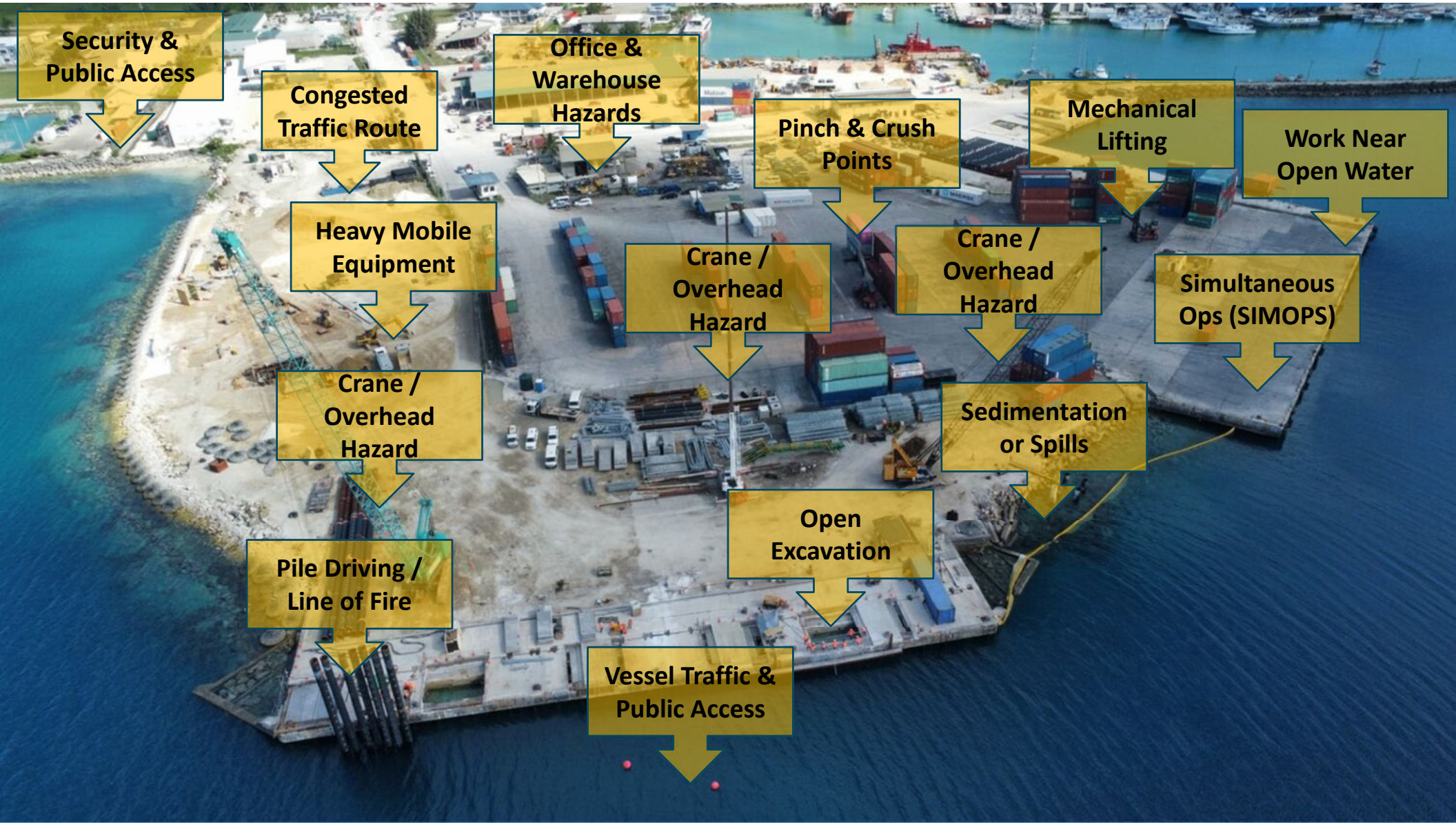
Signage & Barricades

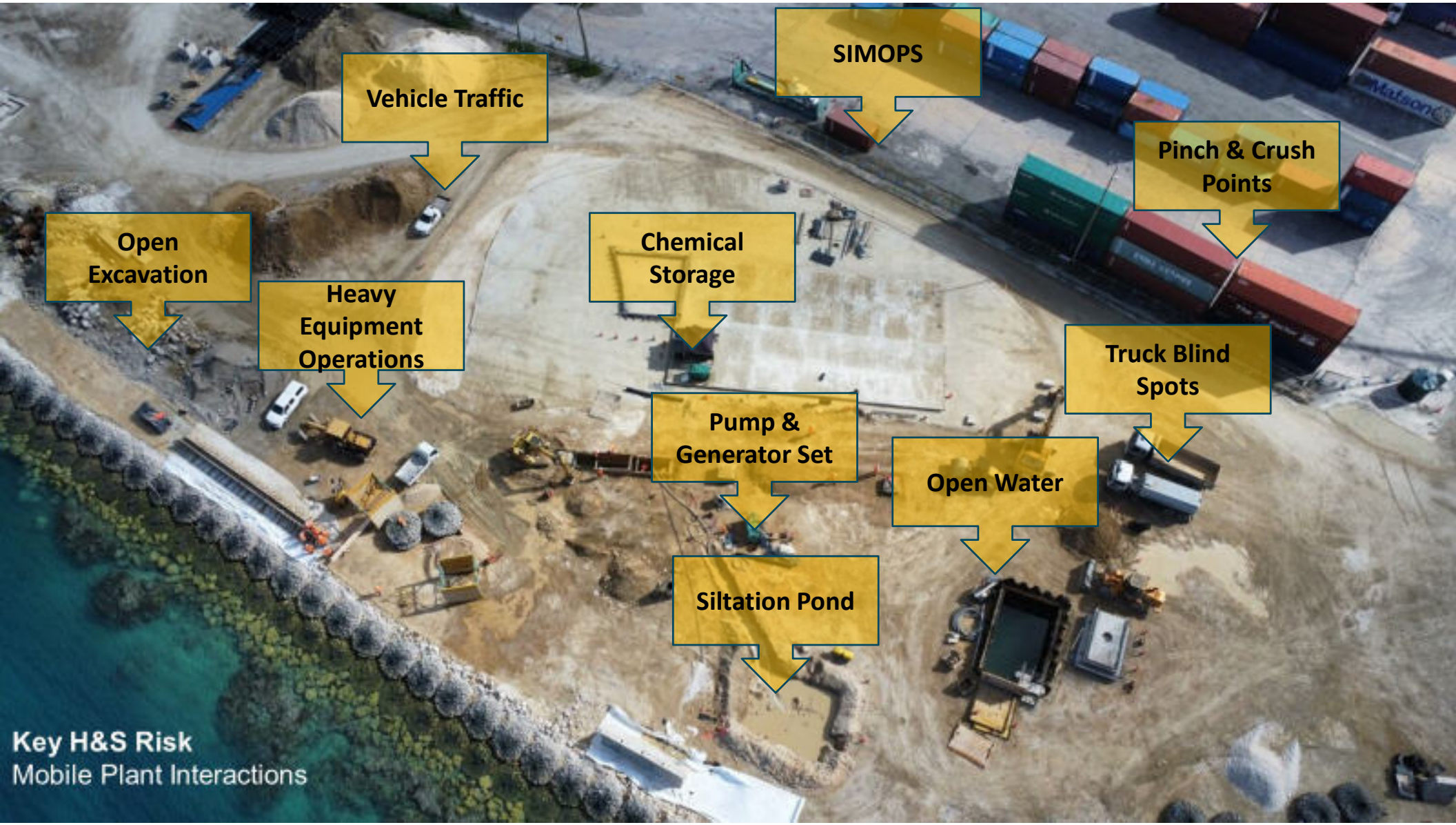
Engineering Design Hazards / Failures

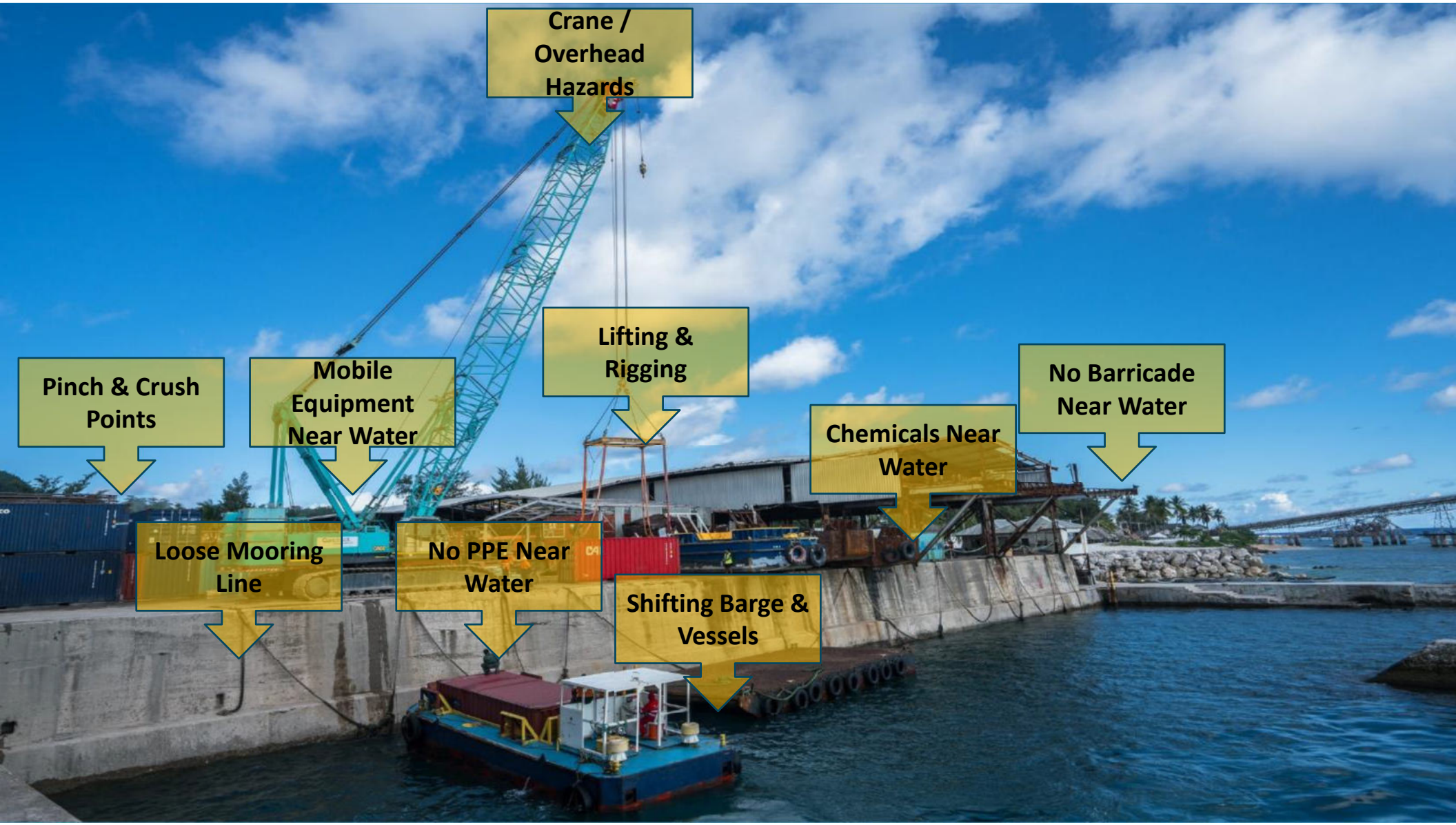
Engineering Controls

Signage & Barricades


Chemicals
No Toe-board / Dropped Objects
Poor Condition Scaffolding
High Voltage
Loose Sign / Dropped Object
Loose Debris
Steep Embankment
Poor Condition Ladder
Collapsed Excavation
Heavy Mobile Equipment / Crush Points
High Pressure Lines
Unsafe Work at Height
Confined / Restricted Space
Loose Debris
Protruding Rebar Sharp Objects
Trip Hazards Near Heavy Equipment
ADB


Security & Public Access
Congested Traffic Route
Office & Warehouse Hazards
Pinch & Crush Points
Mechanical Lifting
Work Near Open Water
Heavy Mobile Equipment
Crane / Overhead Hazard
Crane / Overhead Hazard
Simultaneous Ops (SIMOPS)
Crane / Overhead Hazard
Sedimentation or Spills
Open Excavation
Pile Driving / Line of Fire
Vessel Traffic & Public Access


SIMOPS
Vehicle Traffic
Pinch & Crush Points
Open Excavation
Chemical Storage
Heavy Equipment Operations
Truck Blind Spots
Pump & Generator Set
Open Water
Siltation Pond
Key H&S Risk
Mobile Plant Interactions


Crane / Overhead Hazards
Pinch & Crush Points
Mobile Equipment Near Water
Lifting & Rigging
Chemicals Near Water
No Barricade Near Water
Loose Mooring Line
No PPE Near Water
Shifting Barge & Vessels

Summary

- risk management applies across all sectors
- hierarchy of controls to minimize or eliminate a hazard
- all personnel are responsible for assessing and addressing risks
- this includes the Contractor supply chain !