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ADB Health, Safety and Security (HSS)

Awareness Training Course

ADB



Training on Health and Safety in Pakistan

19–22 August 2024 • Islamabad, Pakistan

HSS WORKSHOP

FOCUS:

- ADB - HSS
- Safety Culture
- Hazard Identification
- Life Saving Rules
- Risk Management
- HSS Good Practice Guide
- Safe Work Practices
- Incident Reporting & Investigation
- Emergency Preparedness





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.



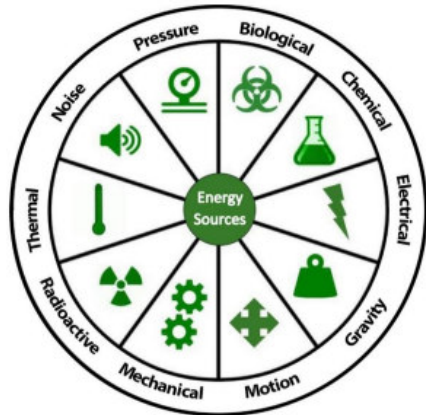
Hazard Wheel

Tool Box Talk

The Hazardous Energy Wheel

The Energy Wheel

The Hazardous Energy Wheel is a tool designed to improve hazard recognition. It is gaining traction in construction and other industries. It consists of 10 listed sources of energy that may be present in the workplace. Workers use the categories on the wheel to find previously unknown or unidentified hazards. Hazards may fall into one or more of the categories.



The 10 Hazardous Energy Sources

- **Biological** - Hazards created by living organisms. Examples include blood-borne pathogens, insects, animals, plants, viruses, bacteria, as well as psychological hazards like harassment, violence, stress, conflict, poor workplace relationships and culture, etc.
- **Chemical** - Hazards created by chemicals and their reactions to one another. Examples include corrosive products, cleaning agents and solvents, toxic or flammable fumes and vapours, carcinogens, oxygen-deprived or enriched environments, etc.
- **Electrical** - Hazards created by the presence of electrical charge or current. Examples include overhead power lines, static discharge, lightning, cords, plugs, transformers, etc.

- **Gravity** - Hazards created by the downward force of mass towards the earth. Examples include falls from heights, materials or tools dropped from heights, collapse of structures, etc.
- **Motion** - Hazards caused by the motion of objects, machinery and people. Examples include repetitive motions, manual or mechanical lifting or pulling, vehicles and equipment, projectiles, etc.
- **Mechanical** - Hazards created by mechanical means. Examples include gears, cogs, turntables, motors, pulleys, augers, powered tools, springs, conveyors, etc.
- **Radioactive** - Hazards created by subatomic particles, electromagnetic waves and ionizing radiation. Examples include ultraviolet rays from the sun, welding, X-rays, microwaves, naturally occurring radioactive material (NORMS), radioactive waste, nuclear substances, etc.
- **Thermal** - Hazards created by thermal differences. Examples include extremely hot or cold environments, humidity levels, open flames, steam, hot or cold surfaces, liquid nitrogen, friction, etc.
- **Noise** - Hazards created by audible vibrations that interfere with hearing. Examples include heavy machinery, equipment, powered or pneumatic tools, impact tools, ambient noise levels, etc.
- **Pressure** - Hazards created by objects or substances with a high force per unit area. Examples include hydraulics, compressed cylinders, tanks, vessels, pipelines, etc.

Practical Application

Hazard identification is an important aspect of safety. If we do not identify, we are not aware of what can hurt us. Using this tool correctly can increase the amount of hazards identified by 30%. Workers should use this after "obvious hazards" have been identified, as the tool does not replace their knowledge, but intends to question where additional hazardous energy may be present.

This was designed to be a visual aid. To utilize this tool effectively, it must be seen while the hazard assessment is taking place. Consider using this tool while completing your next hazard assessment.

- Training is available for free from WorkSafe Saskatchewan here:
- <https://worksafesask.bluedrop.io/storefront/worksafesaskatchewan/online-registration/24070>



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

https://www.youtube.com/watch?v=OxOi_P1zdAo

<https://www.youtube.com/watch?v=hVNbK3SovL8>



Limited “Receptors” =
Limited Risk



Add “Receptors” =
Higher Risk

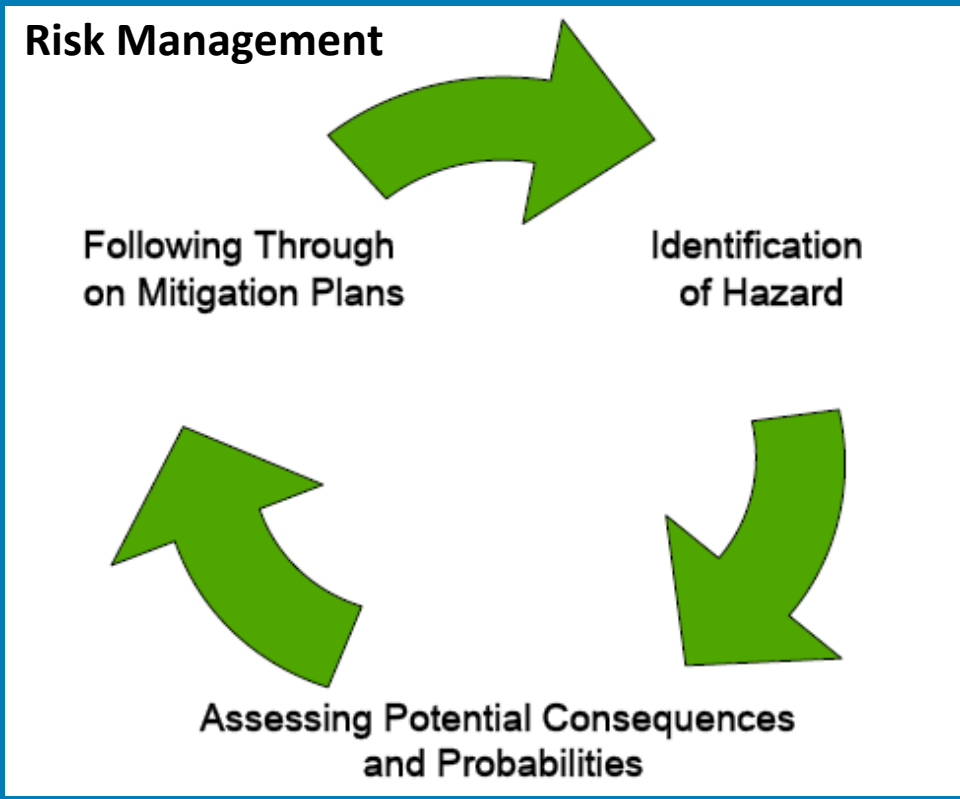
Risk

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



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



**Overhead
Powerline**

Work at Height

**Heavy Mobile
Equipment**

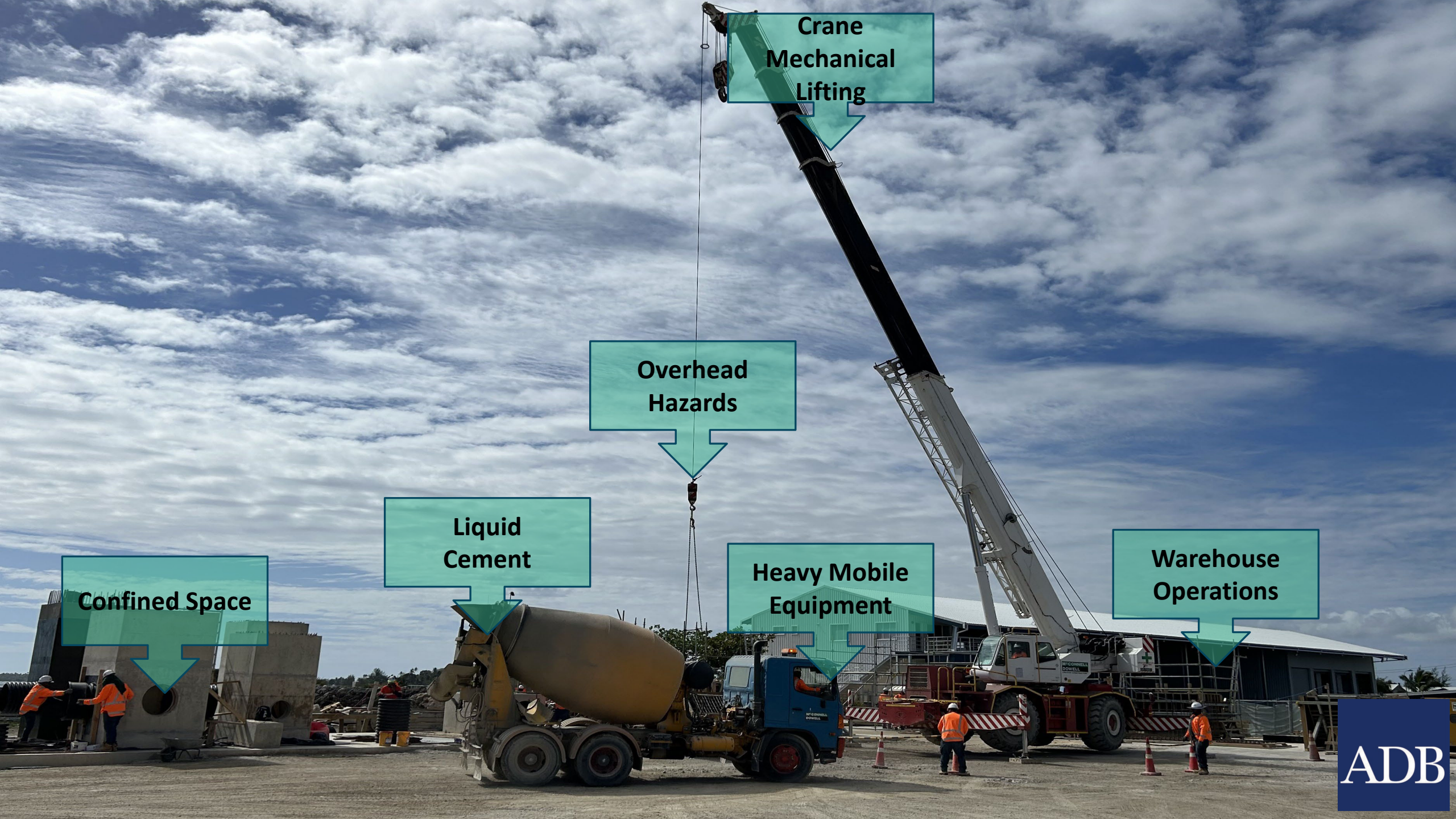
Fuel Storage

**Restricted
Space**

Chemical Totes

**Security
Breach**

**Site Drainage /
Runoff**



**Crane
Mechanical
Lifting**

**Overhead
Hazards**

**Liquid
Cement**

**Heavy Mobile
Equipment**

**Warehouse
Operations**

Confined Space

Risk Management

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



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-High
Unlikely	Low	Low-Medium	Low-Medium	Medium	Medium-High
Very Unlikely	Low	Low	Low-Medium	Medium	Medium

SAMPLE Corporate Risk Matrix



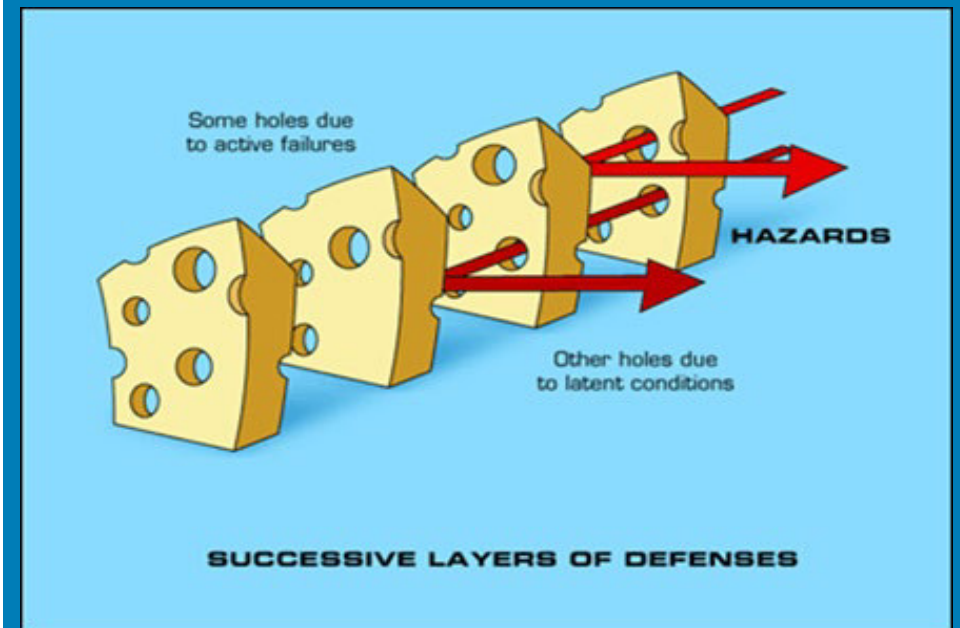
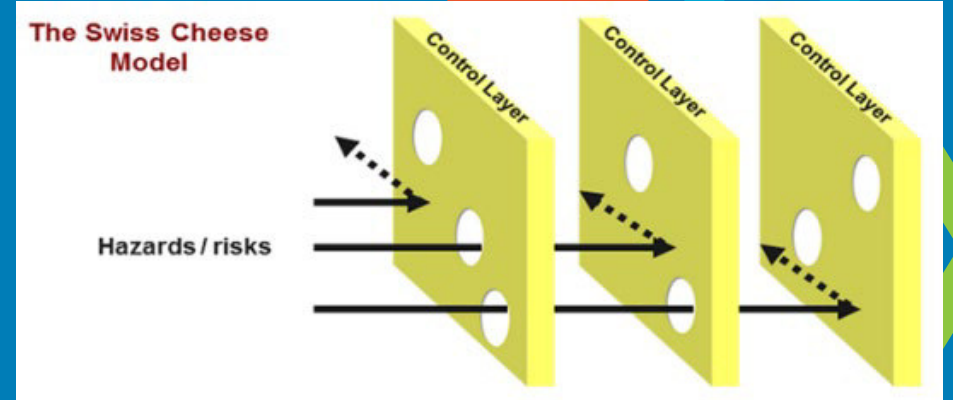
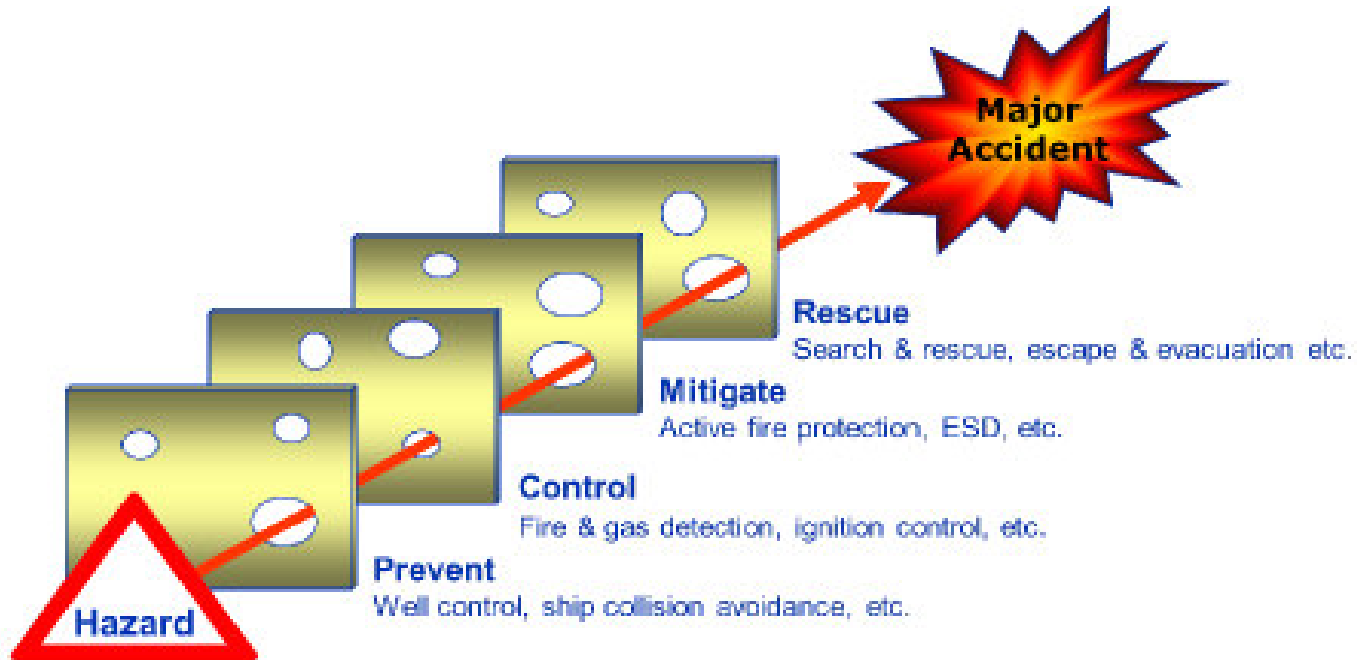
Consequence Severity	Health&Safety	Environment	Financial	Reputation	Probability / Likelihood			
					A - Remote	B - Unlikely	C - Likely	D - Frequent
1- Minor	-Minor Injury or illness -First Aid	-Minimal cleanup needed -Fully contained on site -Negligible impacts	Less than \$10,000	-No public disruption -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

“PEAR” Principle

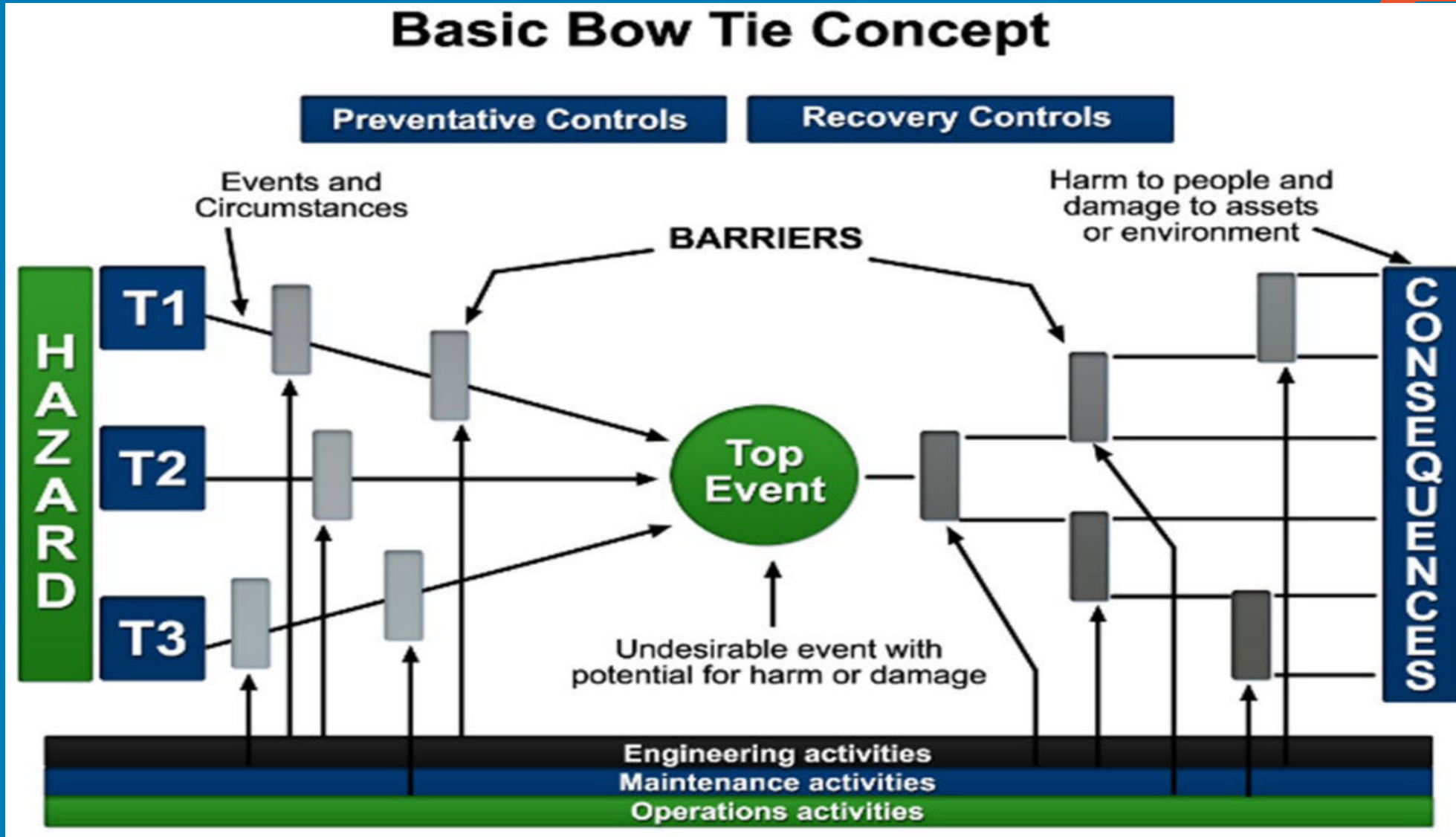
Risk Management – LAYERS of Protection

Swiss Cheese Risk Model

- Layers of protection needed for Emergency Prevention & Response



Risk Management – LAYERS of Protection



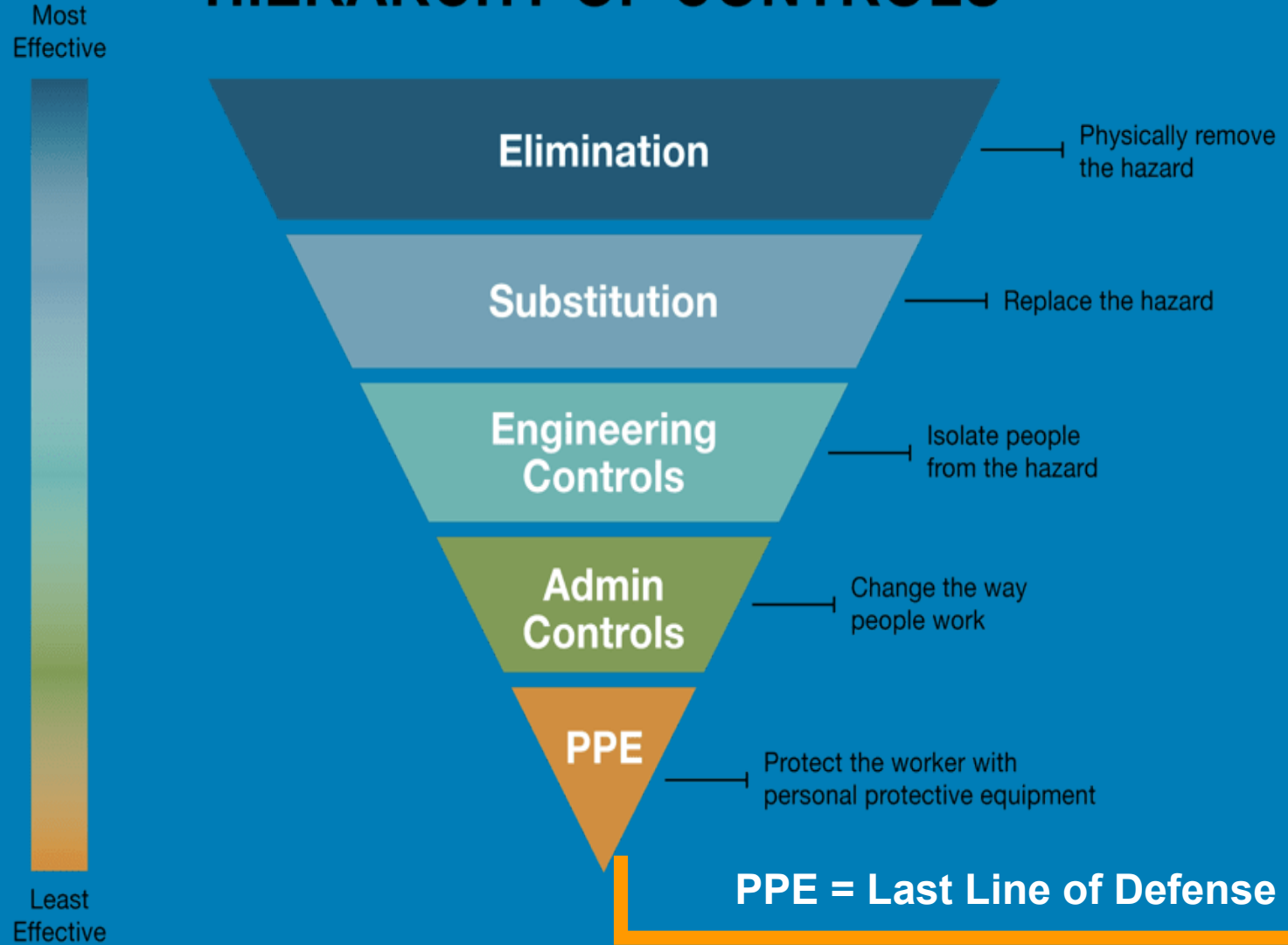
Discussion – House Fire: List out examples for “Prevention & Response”



Hierarchy of Controls

ADB Hierarchy of Risk Controls

HIERARCHY OF CONTROLS



PPE = Last Line of Defense !



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

Ergonomic Safety



OFFICE HEALTH HAZARDS

ENSURE PROPER POSITIONING

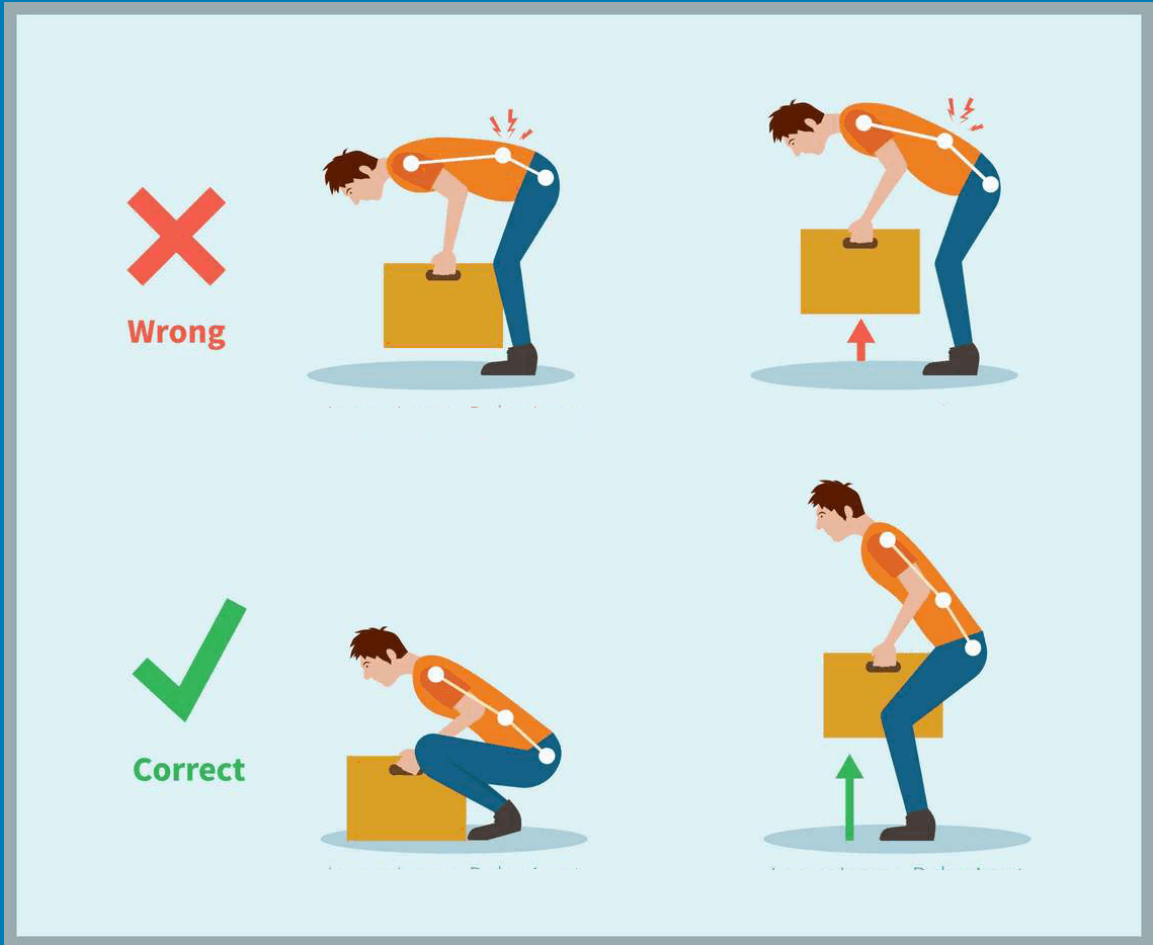
The diagram illustrates the correct office posture. It shows a person sitting at a desk with the following specifications:

- VIEWING DISTANCE 18-24"
- VIEWING ANGLE
- WRIST BEND 20°
- WRIST STRAIGHT
- SEAT BACK ANGLE 90°
- KNEE ANGLE 90°
- FEET ON FLOOR

OFFICE SYNDROME

- EYE HYPEREMIA
- HEADACHE
- SHOULDER PAIN
- BACKACHE
- NECK PAIN
- TUNNEL SYNDROME

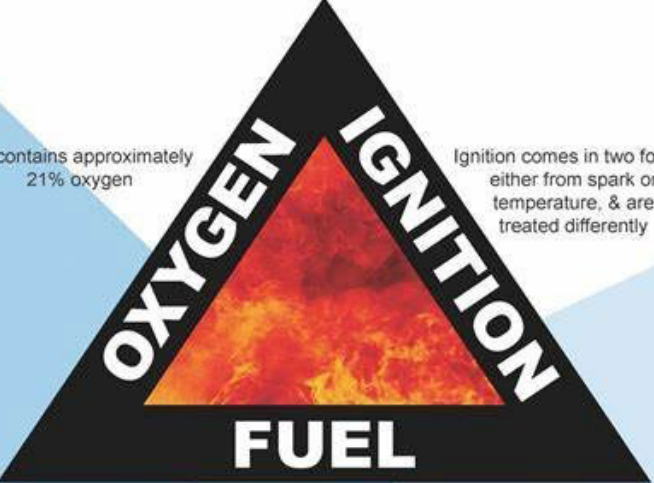
Office Safety - Controls



Example of Controls for Fire Protection

the fire triangle

Fire needs three things to exist; Oxygen, ignition and fuel.
Eliminate one and a fire will not occur.



Air contains approximately 21% oxygen

Ignition comes in two forms, either from spark or temperature, & are treated differently

Fuel can come in the form of flammable liquid, gas or vapour or combustible dust

When the fuel and air (oxygen) are mixed in the correct proportion it can be ignited by either a spark or heat – all Certified Electrical equipment is designed to remove one element of the fire triangle to prevent an explosion

Coex Training

FIRE EXTINGUISHING METHODS



Cooling

Isolating flammable material

Cutting off oxygen supply

Anticatalytic activity

Example of Controls for Fire Protection

Symbols found on fire extinguishers and what they mean.

FireArrest

	Water (Red)	Foam Spray (Cream)	ABC Powder (Blue)	Carbon Dioxide (Black)	Wet Chemical (Yellow)
Class A Wood, Textiles & Paper	✓	✓	✓	✗	✓
Class B Flammable Liquids	✗	✓	✓	✓	✗
Class C Flammable Gases	✗	✗	✓	✗	✗
Class D Electrical Contact	✗	✗	✓	✓	✗
Class F Cooking Oils and Fats	✗	✗	✗	✗	✓

DRY POWDER	FIRE HOSE REEL	FOAM SPRAY	WATER	CO ₂
<ul style="list-style-type: none"> USE ON: Wood, Paper and Textiles USE ON: Flammable Liquids USE ON: Gaseous Fires USE ON: Live Electrical Equipment 	<ul style="list-style-type: none"> DO NOT USE ON: Live Electrical Equipment DO NOT USE ON: Flammable Liquids DO NOT USE ON: Flammable Metal Fires 	<ul style="list-style-type: none"> USE ON: Wood, Paper and Textiles USE ON: Flammable Liquids DO NOT USE ON: Live Electrical Equipment DO NOT USE ON: Flammable Metal Fires 	<ul style="list-style-type: none"> USE ON: Wood, Paper and Textiles DO NOT USE ON: Live Electrical Equipment DO NOT USE ON: Flammable Liquids DO NOT USE ON: Flammable Metal Fires 	<ul style="list-style-type: none"> USE ON: Flammable Liquids USE ON: Live Electrical Equipment DO NOT USE ON: Wood, Paper and Textiles DO NOT USE ON: Flammable Metal Fires DO NOT: Hold horn when operating



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

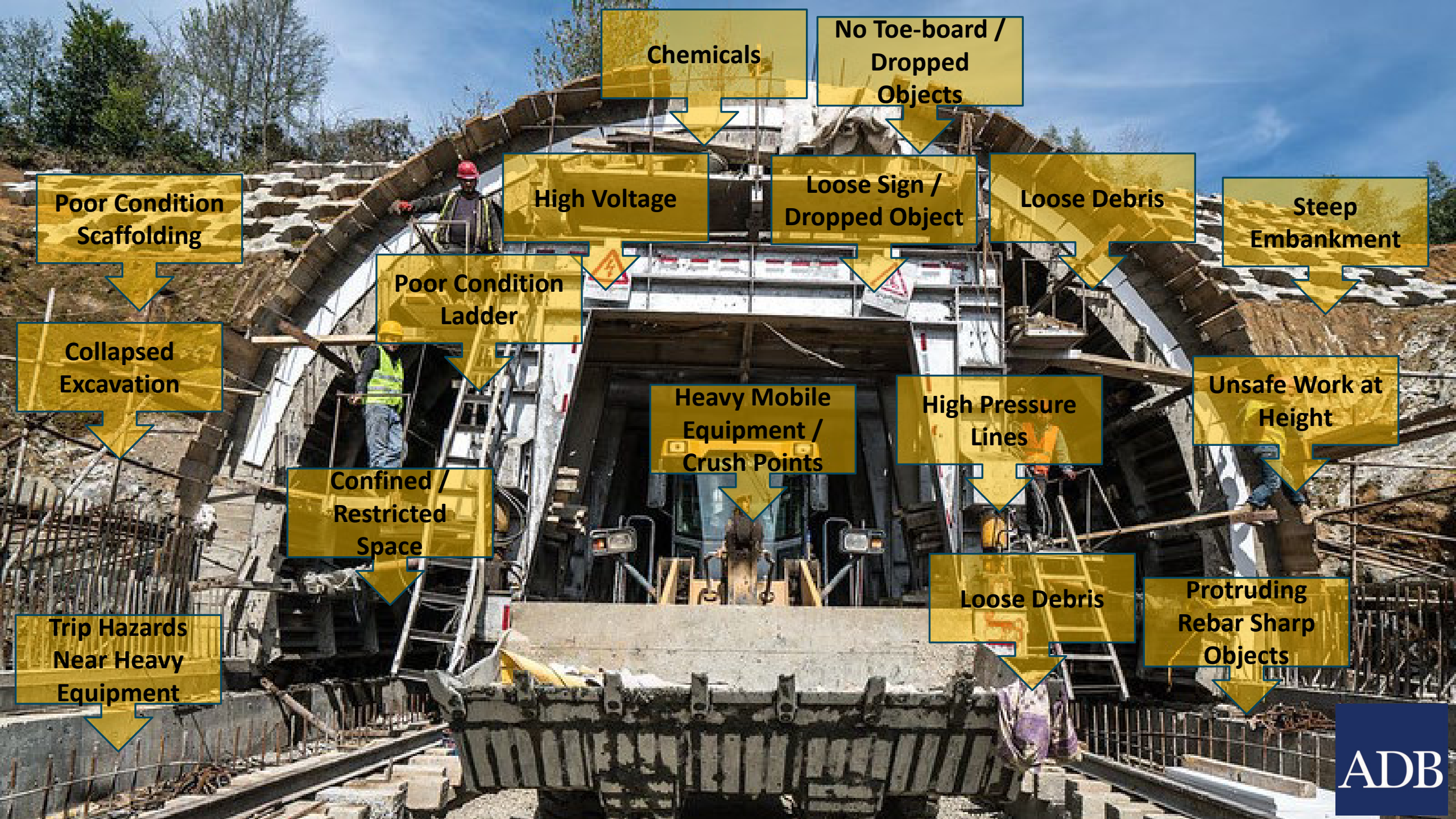


Signage & Barricades



Reviewing Safety Issues





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

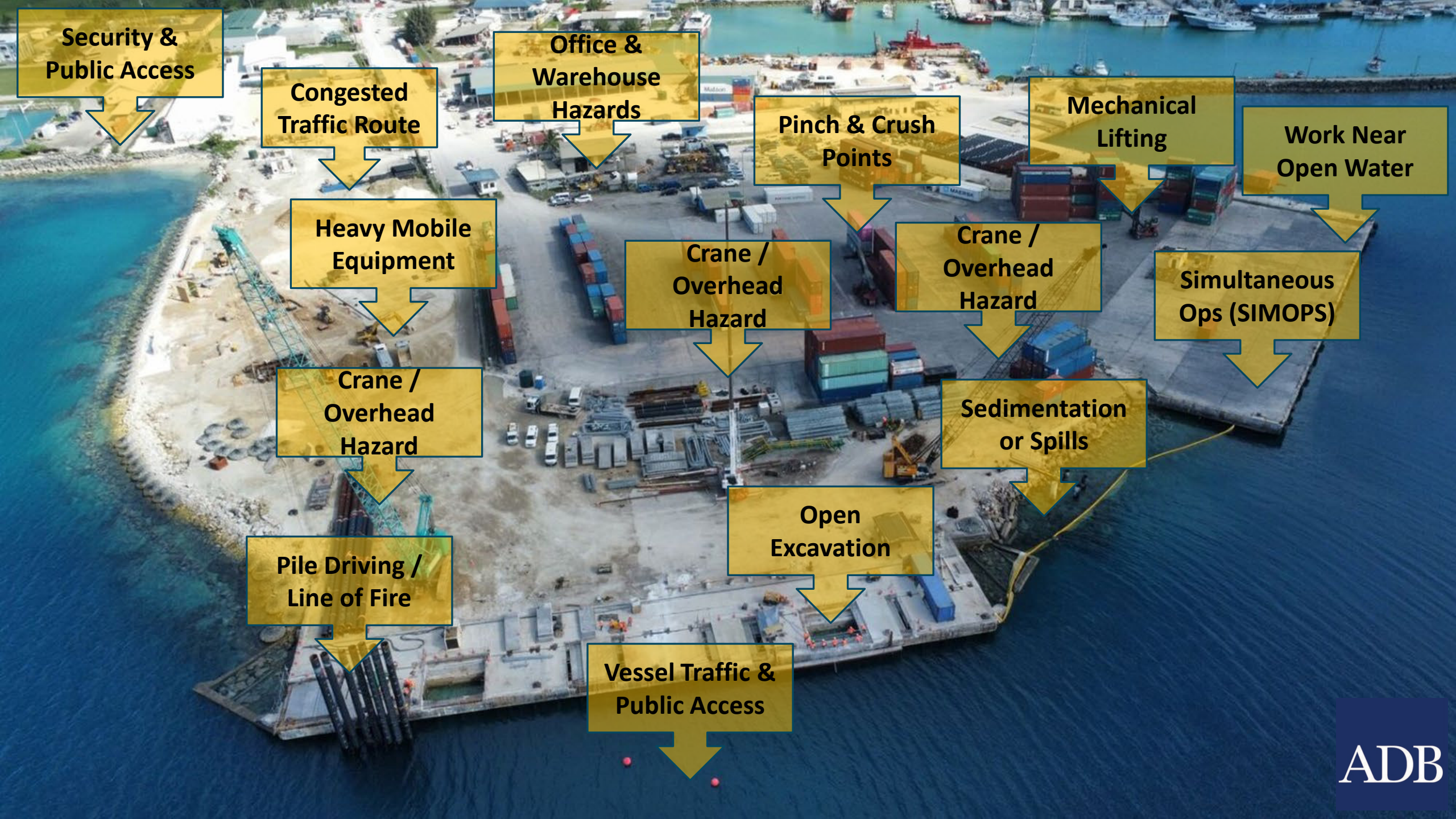
Unsafe Work at
Height

Confined /
Restricted
Space

Trip Hazards
Near Heavy
Equipment

Loose Debris

Protruding
Rebar Sharp
Objects



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

Pile Driving / Line of Fire

Open Excavation

Vessel Traffic & Public Access



Vehicle Traffic

SIMOPS

Pinch & Crush Points

Open Excavation

Heavy Equipment Operations

Chemical Storage

Pump & Generator Set

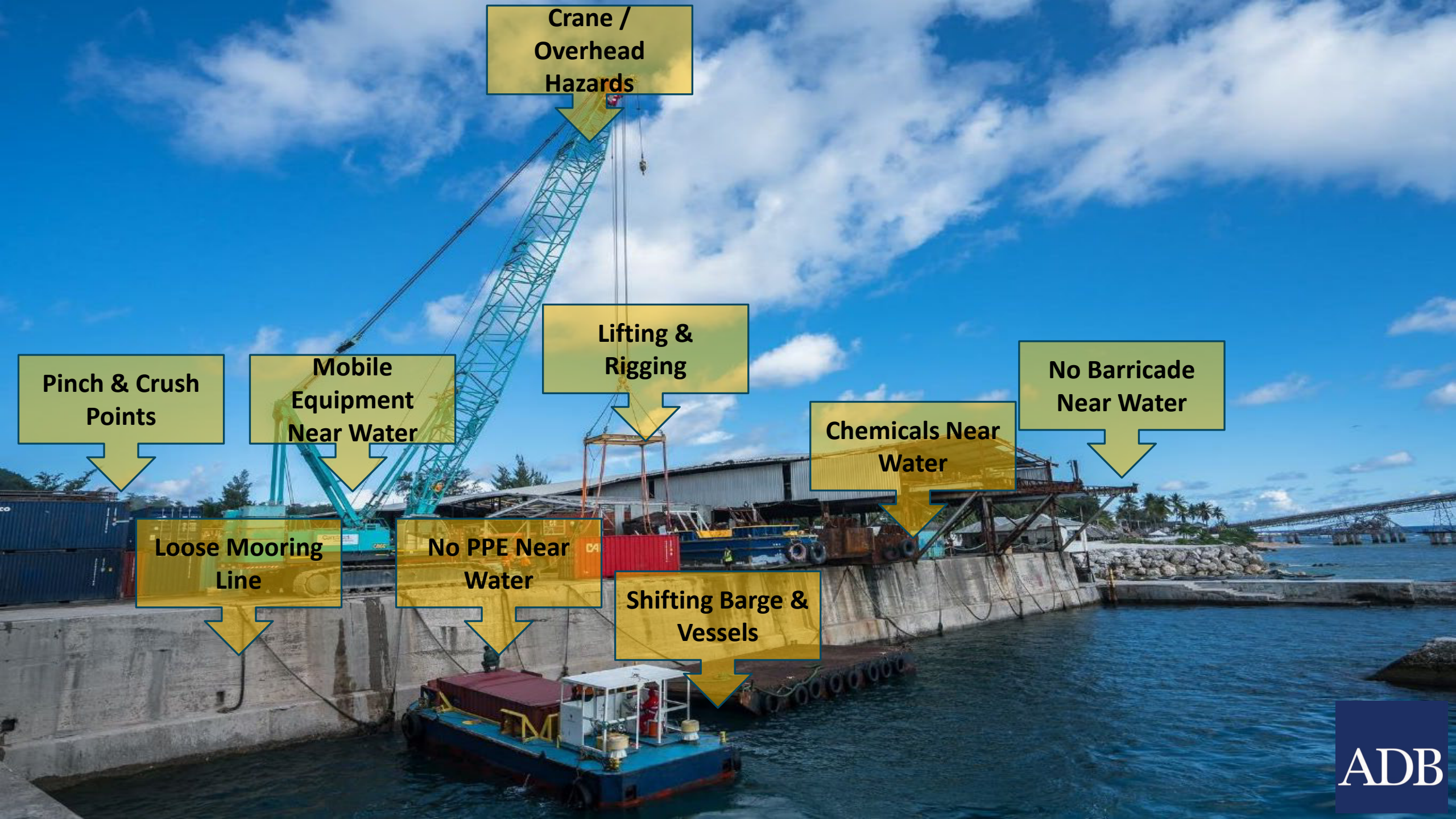
Truck Blind Spots

Open Water

Siltation Pond

Key H&S Risk
Mobile Plant Interactions





**Crane /
Overhead
Hazards**

**Lifting &
Rigging**

**No Barricade
Near Water**

**Chemicals Near
Water**

**Mobile
Equipment
Near Water**

**Pinch & Crush
Points**

**No PPE Near
Water**

**Shifting Barge &
Vessels**

**Loose Mooring
Line**

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 !

