Construction, Explosives and Major Hazard Installation

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employment & labour
Department:
Employment and Labour
REPUBLIC OF SOUTH AFRICA

A NATION THAT WORKS FOR ALL

G20 SOUTH AFRICA 2025

2030 NDP

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Mandate

Bill of Rights- Constitution of South Africa

24. Everyone has the right

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a. to an environment that is not harmful to their health or well-being; and

b. to have the environment protected, for the benefit of present and future generations, through reasonable legislations and other measures that ….

Labour Legislations

Establishes the fundamental rights of workers:

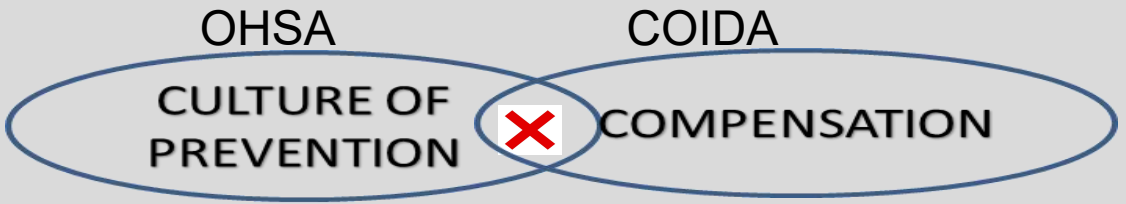
-Promoting good employment practices

-BCEA, LRA, UIF

-Workplace equality

-EEA

-Health and safety of workers



Occupational Health and Safety Act

Purpose of OHS Act, 83 of 1993

to protect for the health and safety of:

- persons at work (employees, visitors, contractors & regulators)
- persons in connection with the use of plant and machinery (operators)
- the protection of persons other than the persons at work against hazards to the health and safety arising out of or in connection with the activities of persons at work (public)

- Establish an advisory council regarding OHS maters

OHSA and Regulations

23 Regulations

Major Hazard Installation Regulations

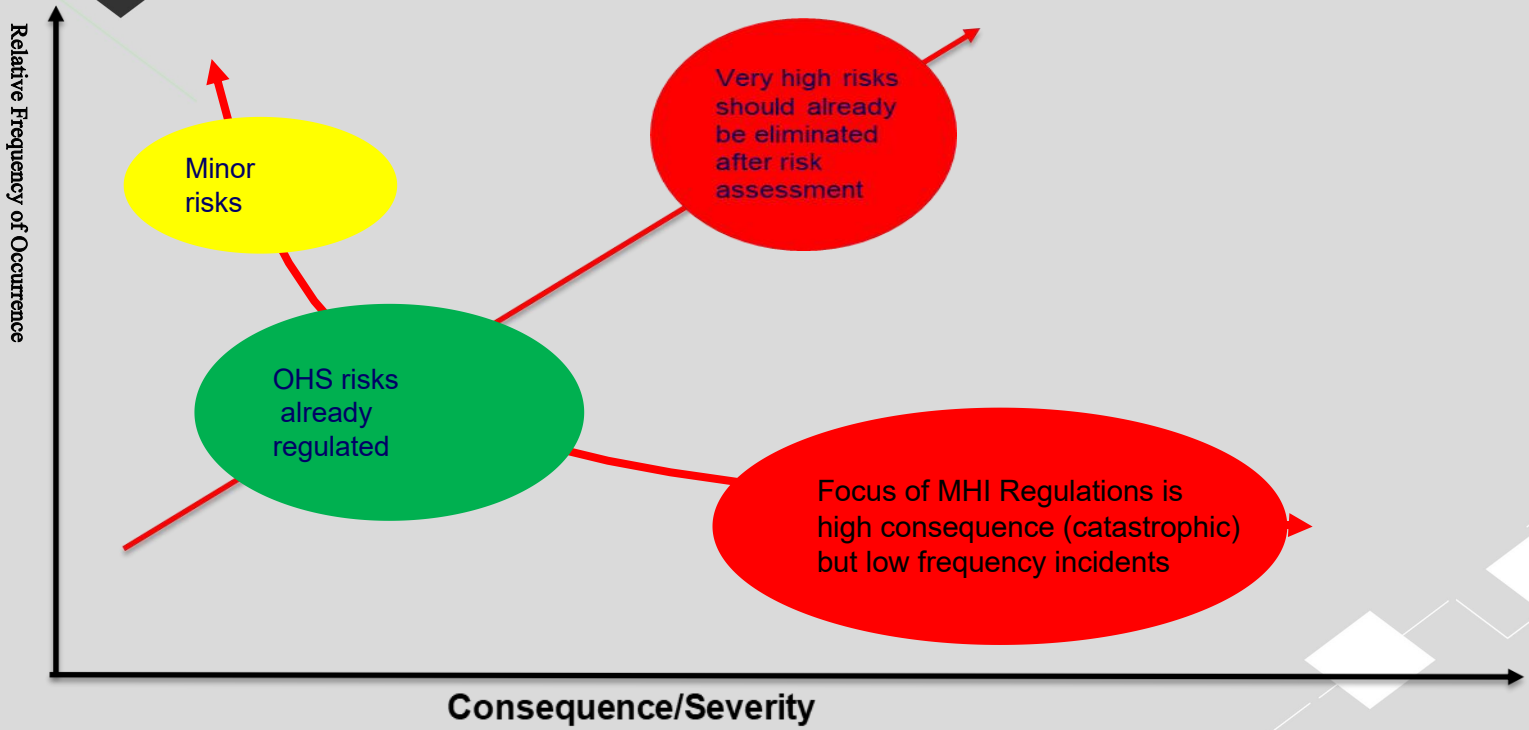
Aims

-protect workers and public members from risk pose by dangerous/hazardous substances

Objectives

-Major installations are build for safety
-Located at a strategic area where they do not pose a risk to vulnerable (e.g. schools, airports, hospitals, parks, residential areas)
-Operated safely and maintained in a good state of repair
-Emergency plan in place

OHSA and Major Hazard Installation Regulations



Major Hazard Installation Regulations

Consequences/severity

1X 1000/ 10000/100000/1000 000 per year/decade/century

MHI risks
rare, fatal, cause destruction, expensive, national/international interest

Increasing risk

OHS risks
frequent, minor, e.g. slips, trips, OEL exposures, burns, falling objects, falling from heights etc.

1 hour/day/week/month

Frequency of occurrence

Major Hazard Installation Regulations

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Protect workers and public members from risk pose by dangerous/hazardous substances

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-Operated safely and maintained in a good state of repair
-Emergency plan in case of loss of containment

Scope of Application

-Regulation 2

-major hazard installations:

- -Prescribed quantities (3 Classes – low , medium and High)
- -3 Chapters (1 : named substances, 2: categories and 3 – pipeline)

-Local government : (land planning and zoning, disaster management and emergency plan activation)

-Problem: Major hazard installation causes major incidents

- -Thermal radiation, toxic emissions , explosions
- -Video

Video

Major Hazard Installations

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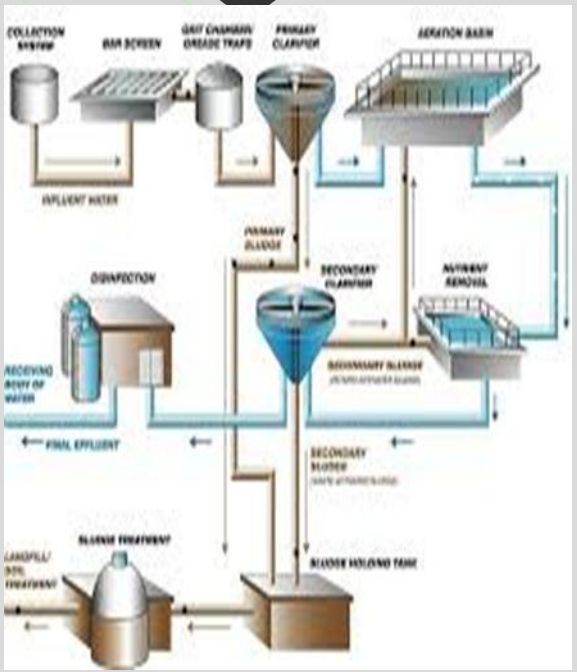
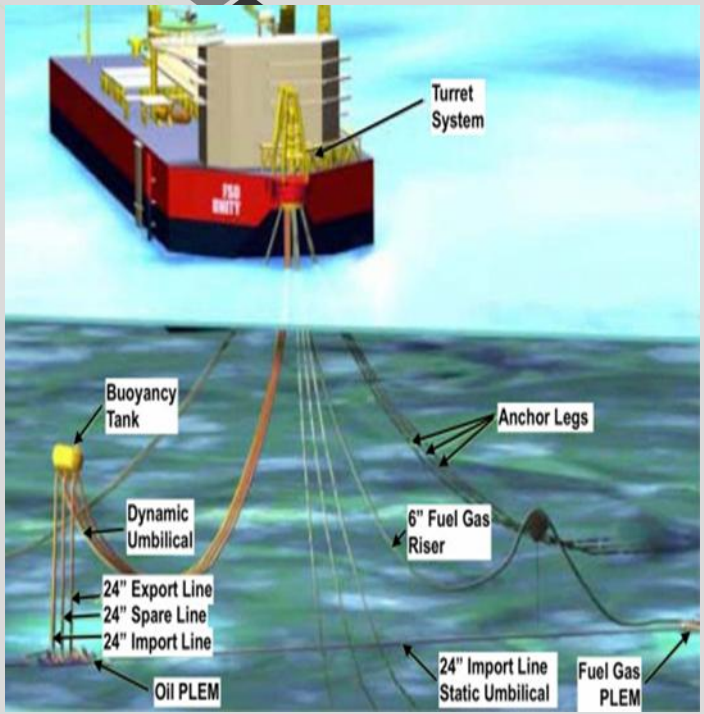
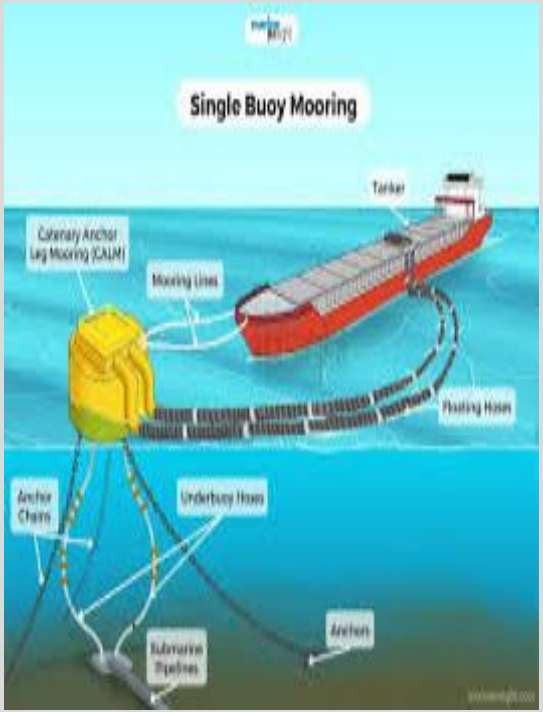
Major Hazard Installations



Major Hazard Installations





Regulatory Framework

LG

Approval
NBS &
BR ACT
Section 4

DEL

AIA QRA

Registration and licensing

Public Participation

Monitoring and enforcement

MHI R 3(1)
QRA (SANS 1461)
EP (SANS 1514)

MIPP (Medium, High)
Safety Reports (high)

- Information and Training
- Suppliers (SDS& 24 hr. support)
- Report emergencies and major incidents
-Revocations and suspension

PSM

- Change in details
- Updating of the QRA safety report & renew registration (5 years)
- License validity – design life but not more than 25 years after issue
- Review EP (3 years)
- Test the EP (annual with LG)
- Closure (ceasing of operations)

Major Incident Prevention Policy

Application - Medium and High (annexure C & D)

- formal document established in writing,
- ensures a high level of protection from process hazards,
- that outlines an organization's commitment to preventing major incidents,
- create a structure for identifying, assessing, and managing risks associated with the operations
- Must include resources to implement the PSMS

a mini safety report

GOAL: achieving plant safety and ensuring high level of protection to human and environment
Applies : onsite and offste

Safety Report

Regulation 12

- High hazard Establishment

- aims to demonstrate that MIPP has been developed and implemented into PSMS, failures are continually identified, controls maintained and improved to remain appropriate to the changing operations and be ready for any emergencies or major incidents.

Regulatory Requirements:

Similar to MIPP

Safety Barrier

Active Safety Barriers

- Detect a hazardous condition

- Action to be activated to prevent the cause and mitigation of hazard e.g. high pressure valve trip = e.g. can shut down a reactor, to stop overpressure to stop rupture,
- High level alarm: which can automatically shuts off feed into a tank to stop overflow

Passive Safety Barriers

- No action by a device/person
- They perform function because they exist
- e.g. bund, blast resistant walls on vessels, coatings
- Sprinkler system to mitigate the effects of fire, scrubber

Safety barriers

Administrative Safety Barrier

- Management, Procedural and organizational controls
- Prevent or mitigate consequences
- E.g. written safe procedures that prompt people to carry out specific tasks such as start up, shutdowns, permit-to-work, MOC- systematic process for evaluating risks before implementing change, shift handover procedures,
- Training programs, inspections to ensure SCE remains functional
- Incident reporting and investigations, emergency plans

Failures at MHI

1. Equipment failure: - sudden failure e.g. overpressure
   Gradual failure: corrosion

2. Process failure: poor hazard id, prioritising production, cost cutting over safety, normalising deviations in safety rules, failure to recognise new hazards, deficient MOCs

3. Material properties: no longer perform intended function, such physical , mechanical properties has deteriorated,…

4. Ignition sources: charge accumulation in conductive parts, static electricity, sparks, electrostatic discharge

Failures at MHI

5. Control failures

- systems designed to monitor, regulate and maintain safe operation conditions fail to keep process within intended limits

- e.g. critical alarms, emergency shutdowns, interlocks, shutdown valves, flow meters, level transmitters, gauges, etc.
- Failures can lead to pressure build up or drop, heating, cooling, solidifying

“People design the plant, people build the plant, people operate the plant, people maintain the plant, people write the procedures, people conduct audits and inspections, people make errors, people commit violations, people copy what they see others do “

Human Machine Intervention in MHI

refers to action taken by operators, technicians, engineers, supervisors, to monitor, to control, to respond, to activate functions, etc. through interaction with equipment, control system, alarms, safety systems,

Types : operational – adjusting process parameters

- Alarm response: investigate triggered alarms and taking corrective action to avoid escalation, verify validity

Failures: interaction fails, poor control room interface design, misinterpretation of process data, high workload and stress, operating procedures not clear and etc.

Technology not achieving intended safety outcome…..

Conclusion

“Malcom Turnbull “

“if we learn from every disaster, whether be - fire or a flood, we can learn something from it so we can respond to the next one better”

THANK YOU

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