

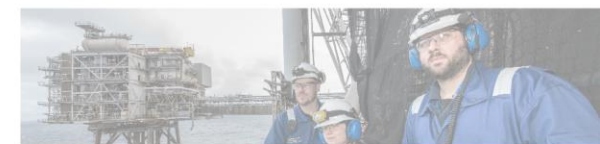


# It's all about the barriers

Making process safety barriers simple and relatable.  
Where do human factors fit in?

OEUK HSE Conference, February 2025

Mike Richardson, Principal Process Safety Engineer – UK Business Unit  
Jamie Marcus, Lead Process Safety Engineer – UK Business Unit, Harbour Energy



# Process safety management... - it's complicated!

## How can we communicate this to the workforce?

### Human factors / Human performance

- Highly academic
- Lots of 'detailed' guidance
- 'Fluffy stuff'
- 'Black art'
- Experts, regulators, industry bodies

### Things change

- M&As
- Projects
- Decommissioning
- Reorganisations
- Management systems
- Industry climate

**It really is complicated!!!**

How do we demystify HF and relate to barriers?

What can we keep constant?

How do we translate this for daily use by all?

NEED

- Simple concept
- Adds value
- Relatable
- Fit for all

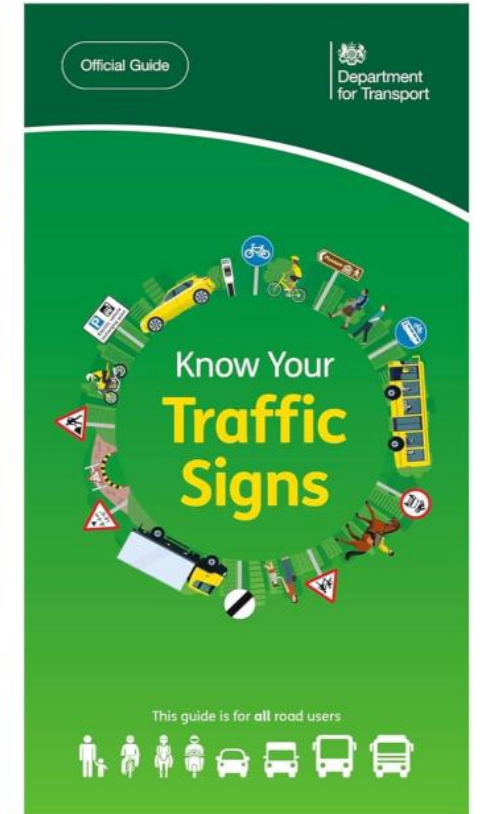
- PFEER
- DCR
- SCR
- COMAH
- PUWER
- DSEAR
- ACOPs
- HSWA
- MHSWA
- Safety Case
- Perf. Stds.

- Management system std
- Standards & procedures
- RBI, PMRs
- Asset integrity
- M&R
- **It's complex**
- **It's technical**
- **Involves experts**

# Process safety management... - it's complicated!

## It's a bit like driving a car...

- Road Traffic Act 1988
- Road Traffic Regulation Act 1984
- Traffic Management Act 2004
- Road Traffic Offenders Act 1988
- Road Safety Act 2006
- Transport Act 2000
- Vehicle Excise and Registration Act 1994
- Motor Vehicles (Construction and Use) Regulations 1986
- Road Vehicles (Registration and Licensing) Regulations 2002
- Road Vehicles (Construction and Use) (Amendment) Regulations 2003
- Motor Vehicles (Driving Licences) Regulations 1999
- Road Traffic (New Drivers) Act 1995
- Road Traffic (Temporary Restrictions) Act 1991
- Road Traffic Reduction Act 1997
- Road Traffic (Vehicle Emissions) (Fixed Penalty) Regulations 2002
- Road Traffic (Driving Instruction by Disabled Persons) Act 1993
- Road Traffic (Driver Licensing and Information Systems) Act 1989
- Road Traffic (Northern Ireland) Order 1981
- Road Traffic (Consequential Provisions) Act 1988
- Road Traffic (Foreign Vehicles) Act 1972



# Harbour's 'I am a process safety leader' booklet

## This is how we have solved the problem

### Human factors / Human performance

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### Things change

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### Barrier thinking

Process safety barriers can help to explain the controls required for safe operation.



**Enabling**  
The process and management systems that define how we manage our assets



**People**  
How we control and manage the people who operate the plant, including discipline, safety culture, competence, physical attributes



**Plant**  
The safety systems that prevent a failure or mitigate the consequences as safety elements

The following pages list the descriptions we use at Harbour Energy for each of the plant barriers. For the people barrier, we use a set of standard human performance barriers and enable all the people to



## I am a process safety leader

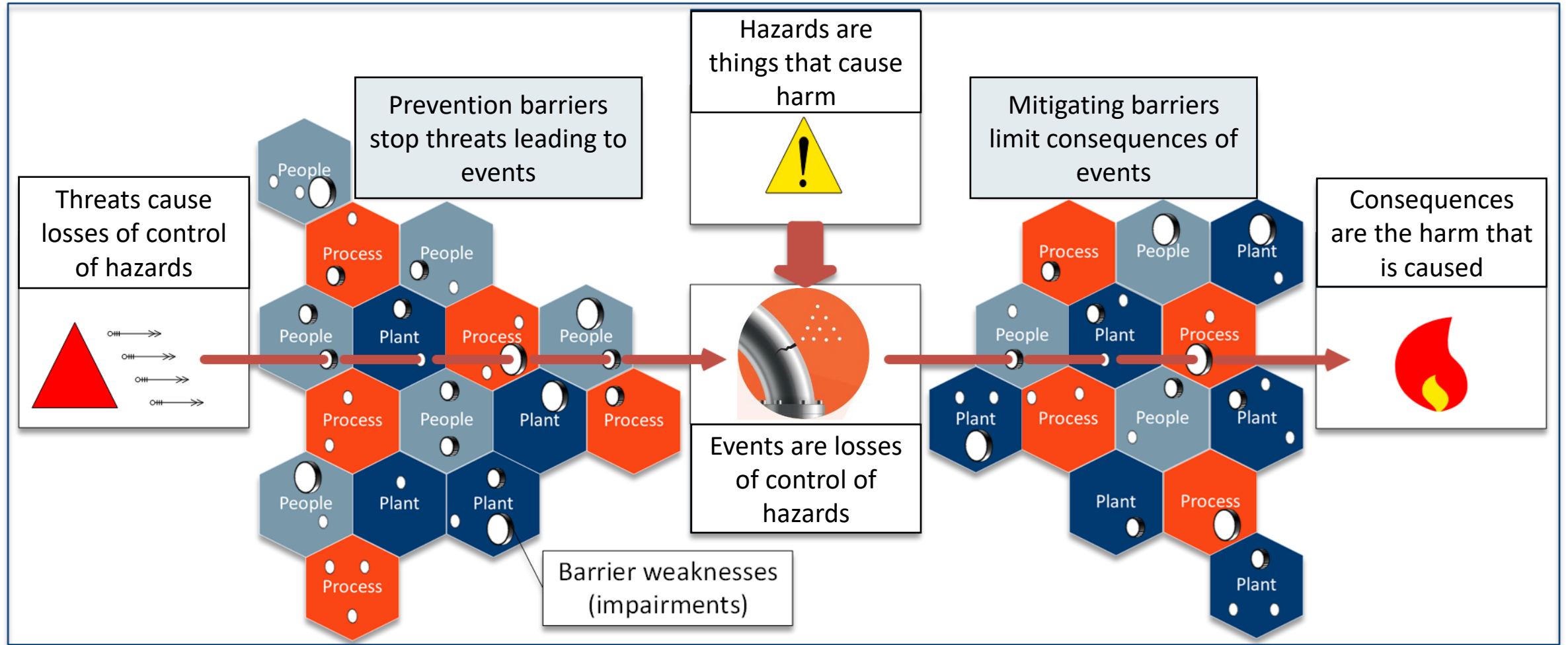
HSES Starts with Me



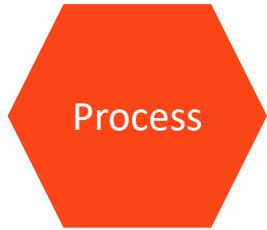
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- Simple concept
- Adds value
- Relatable
- Fit for all

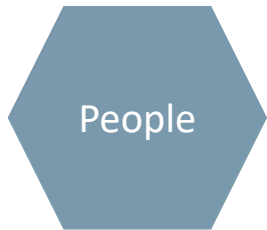
# It's all about the barriers



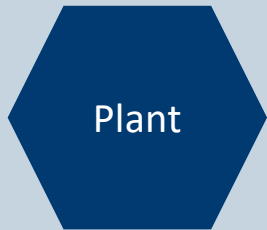
# Plant barriers



Process



People



Plant

The safety critical equipment and systems that have to work to either prevent a major accident occurring or mitigate its consequences; known as safety and environmental critical elements (SECEs).

- The hardware
- Familiar, recognised approach



Layout &  
Orientation



Structural  
Integrity



Process  
Containment



Shutdown  
Systems



Detection  
Systems



Ignition  
Control



Protection  
Systems



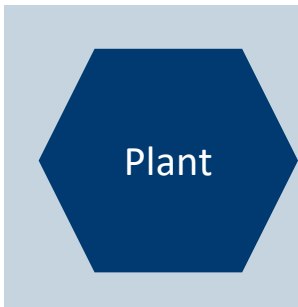
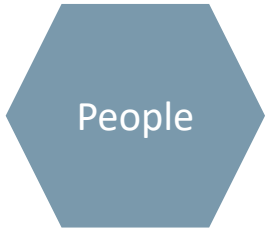
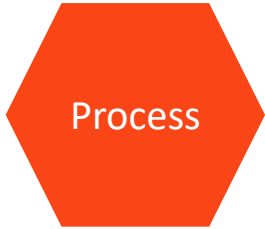
Emergency  
Response



Life-Saving  
Systems



Each one divided into barrier sub-groups



## Shutdown systems

- Emergency shutdown systems (including logic solver/panel, emergency shutdown valves (ESDVs), riser emergency shutdown valves (RES DVs) and trips which isolate electrical power).
- Depressurisation systems (including flare, vent, blowdown and closed hazardous drain systems – excluding process containment aspects).
- Safety Instrumented Functions (including logic solver/panel, process shutdown (PSD) system, sensors, shutdown valves (SDV), high-integrity pressure protection systems (HIPPS)).
- Pipeline isolation/sectionalising valves (manual).
- Subsea isolation valves (SSIVs).
- Operational well isolation (including well safety valves).
- Drilling and well intervention/well control equipment.



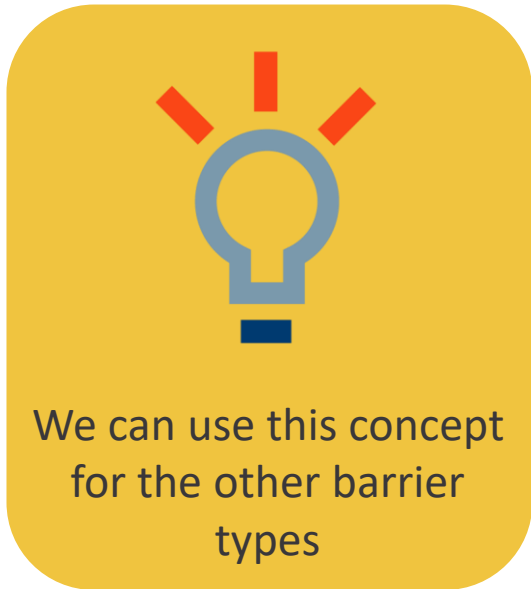
## Detection systems

- Fire detection (including call points).
- Flammable gas (or flammable mist) detection (including call points).
- Toxic gas detection (including call points).
- Fire and gas system logic solver/panels.
- Pipeline leak detection.
- Security systems.
- Analysers (process and environmental).



## Ignition control

- Hazardous area ventilation.
- Non-hazardous area ventilation (including temporary habitats for hot work).
- Inert, blanketing and purge gas systems.
- Flare tip ignition systems.
- Fired equipment/engines/hot surfaces.
- Flame and spark arrestors.
- Certified electrical equipment.
- Electrical earthing (grounding) and bonding.



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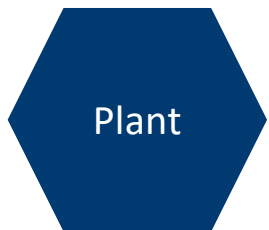
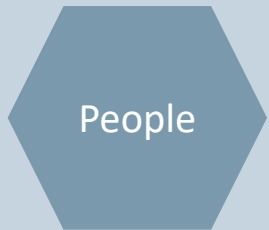
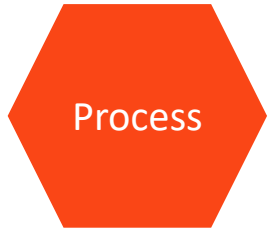


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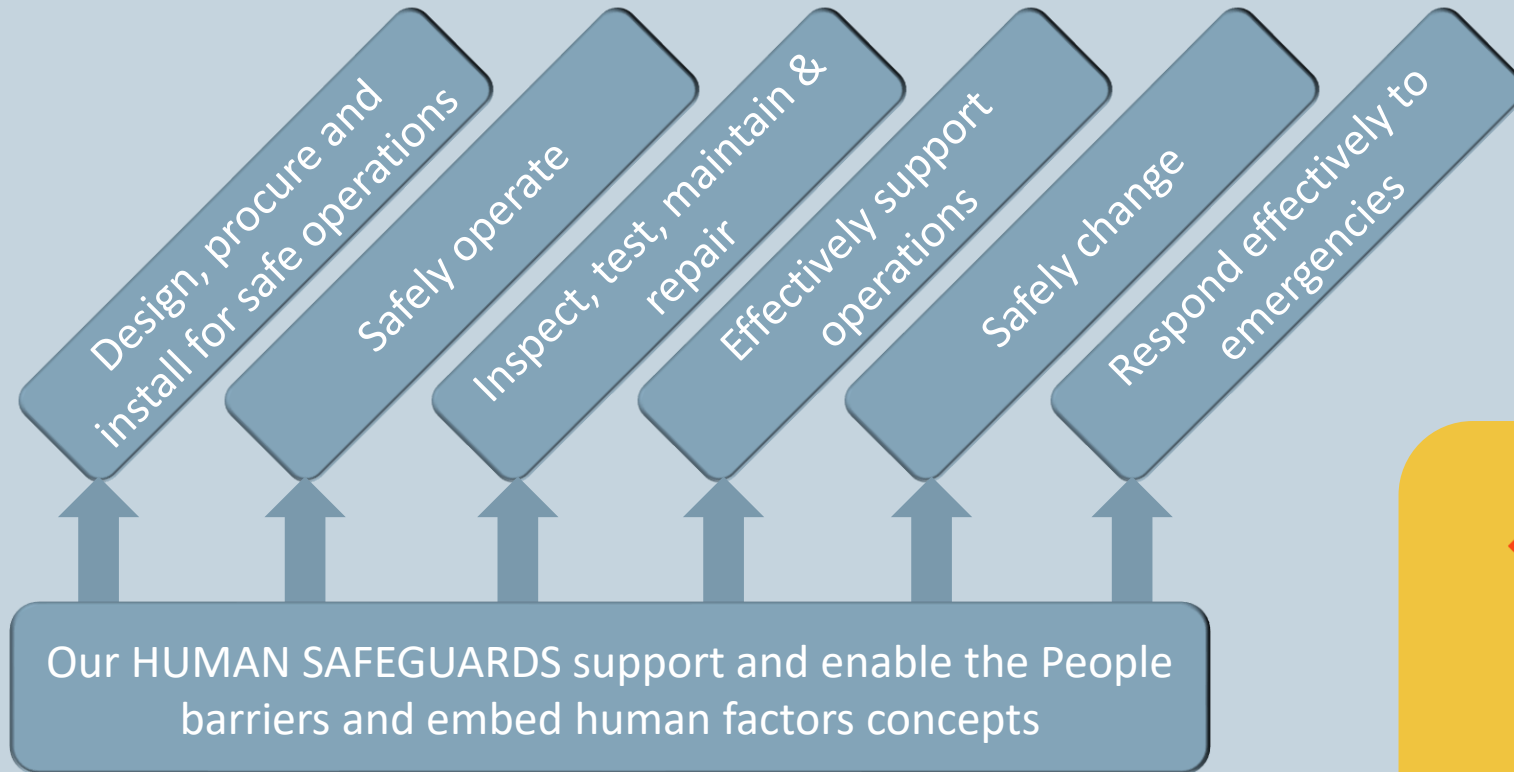


Detection  
Systems

# People barriers

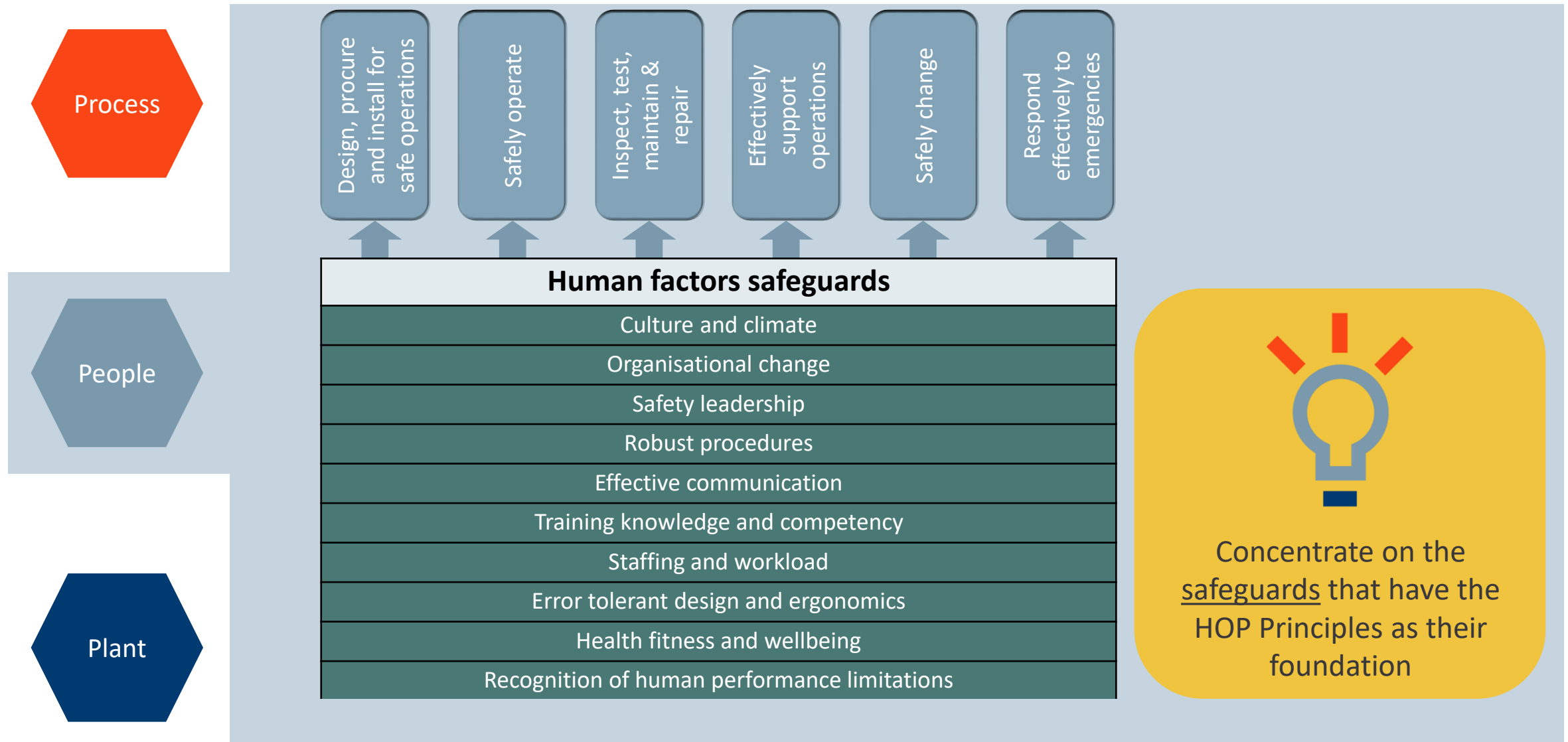


How we conduct ourselves while implementing the enabling processes; otherwise known as operating discipline, which includes our safety culture, understanding, competencies, capabilities and physical and mental health.

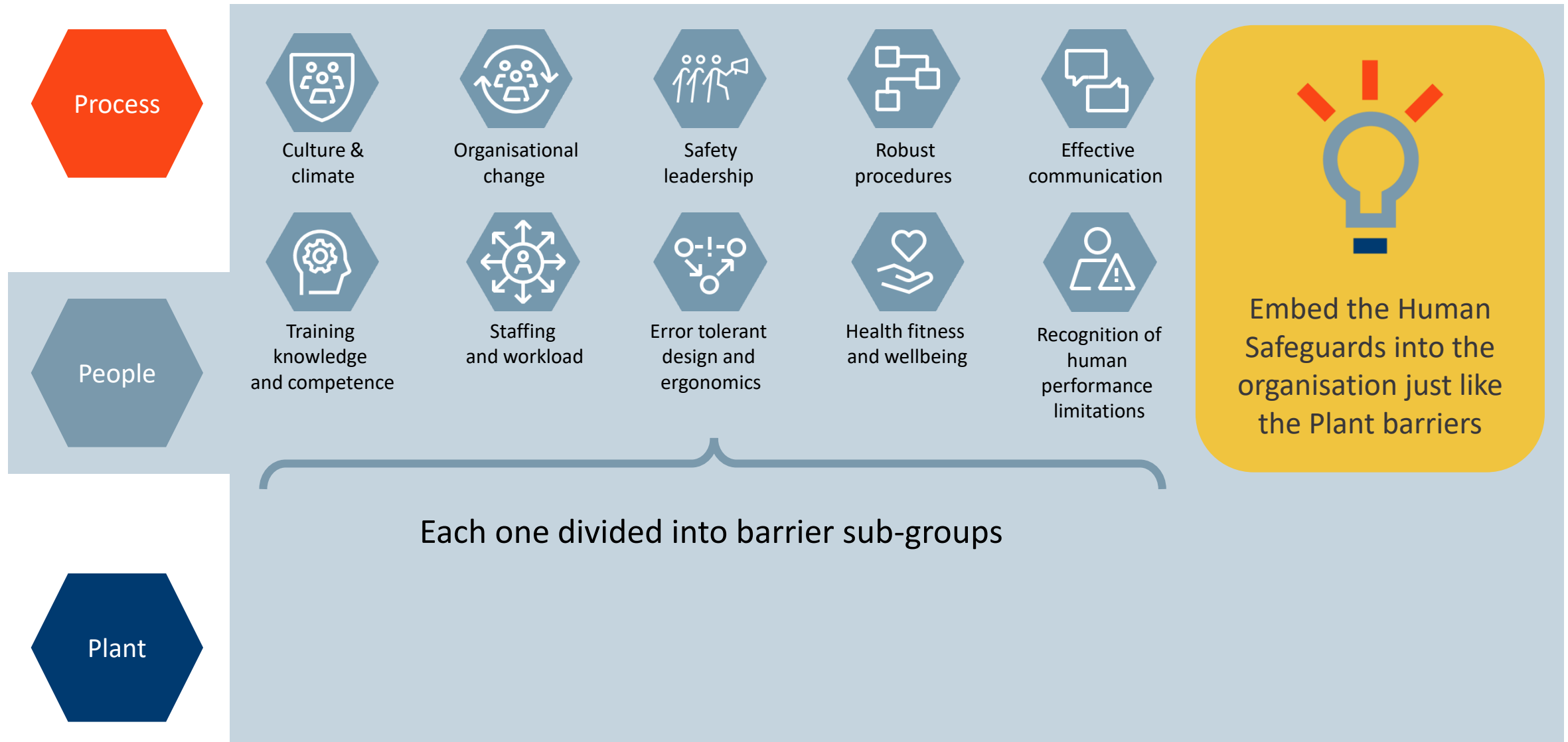


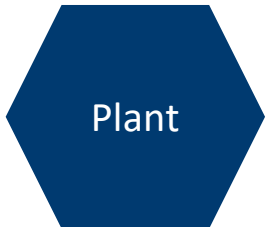
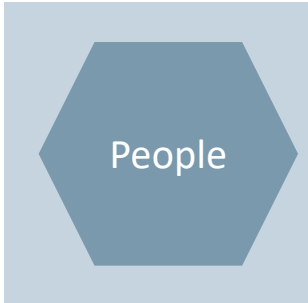
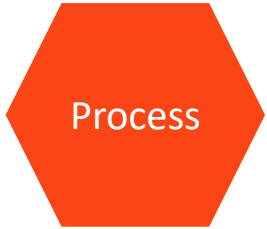


# Human safeguards



# Human safeguards





## Training, knowledge and competence

**We have trained, knowledgeable and competent people.**

- We have a formal process for managing training and competence.
- We have integrated competence criteria into recruitment and selection activities (internal, promotions, new people, contractors).
- We exercise caution as we understand that competence is the combination of training, knowledge and experience, not just certificates and qualifications.
- We prioritise safety-critical competencies in our training and development plans.



## Staffing and workload

**We have the right number of people with a manageable workload.**

- We maintain safe staffing levels to ensure adequate capability in the workforce to enact current and planned work scopes.
- We have contingency plans to maintain safe staffing levels.
- We ensure people with dual roles are trained and competent.
- We ensure we have adequate resources to meet operational requirements.



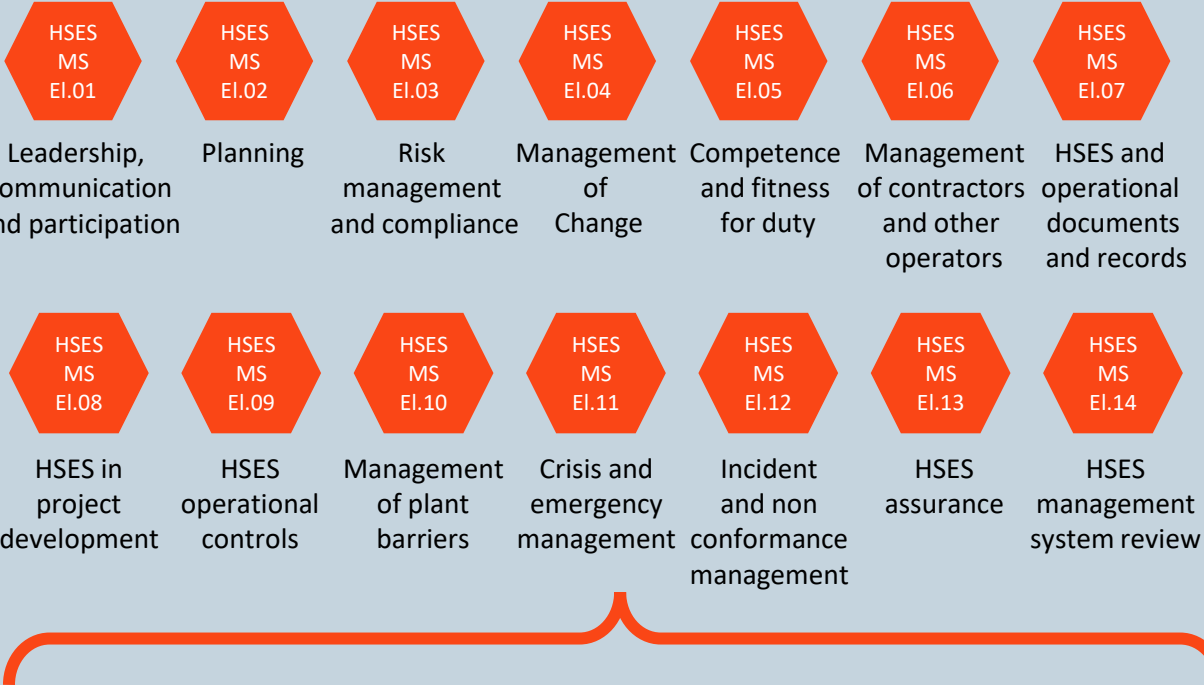
...and the Human  
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plant barriers

# Process barriers

## Process

The procedures, standards, practices and manuals in the business management system that document how we should operate and maintain our assets.

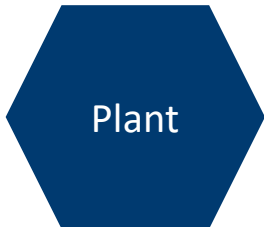
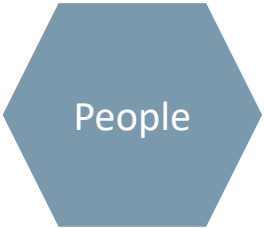
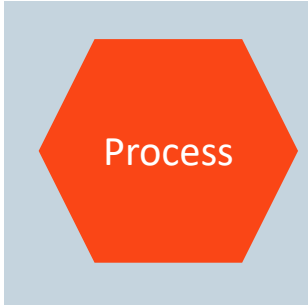
- 'How to' documents
- Structure of management system
- Simple generic sub-group titles



Each one divided into barrier sub-groups

## People

## Plant



## 9 HSES operational controls

- Operational readiness and process start-up (see also MOC).
- Integrated asset planning.
- Operator daily rounds.
- Shift/crew handover.
- Control room operator (CRO) and process operations.
- Site instructions, standing orders and reporting.
- Permit to work.
- Isolation.
- Overrides and inhibits of safety systems.
- Access control and security.
- Routine and non-routine lifting.
- Secured valve/locked open-locked closed (LO/LC) process.
- Marine operations and movements.
- Aviation operations and movements.
- Diving operations.
- Temporary equipment.
- Well operations and intervention.

## 10 Management of plant barriers

- Inspection, testing and maintenance (including asset integrity).
- Performance standards.
- Permanent integrity repairs.
- Temporary integrity repairs/defined life repairs (DLR).
- Fitness for service assessments.
- Flange management.
- Small bore tubing management.
- Hose management.
- Other registers (eg blinds, dead legs, fugitive emissions).
- Well integrity assurance.
- Functional safety.
- Alarm management (including response to process and non-process alarms).
- Safe operating limits.

we should

HSES MS EI.06

HSES MS EI.07

management contractors and other operators  
HSES and operational documents and records

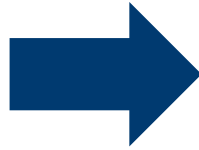
HSES MS EI.13

HSES MS EI.14

HSES assurance  
HSES management system review

## Using process safety barrier nomenclature as metadata

- Process safety near-miss / incident event reporting.
- Audit findings.
- Verification findings.
- Quality non-conformances.
- Process safety performance indicators.
- Cataloguing and organising Management System documents
- Commonality of Plant barrier (SECE) language



**Plant Barrier Failed/Impaired**

- Piping Systems (incl. Flanges, Smallbore Tubing and Flexible Hoses)
- Relief systems
- Safety Instrumented Functions and Process Shutdown Systems / Components (incl. Logic Solver / Panel, PSD Sensors / Final Elements, SDVs)
- Certified Electrical Equipment
- Lifeboats / TEMPSCs
- Emergency Shutdown Systems (incl. Logic Solver / Panel, ESDVs, Riser ESDVs, trips which isolate electrical power)
- Depressurisation Systems (i.e. Flare, Vent, Blowdown and Closed Hazardous Drain Systems - excl. process containment aspects)

**Process Barrier Failed/Impaired**

- Inspection, Testing and Maintenance (incl. Asset Integrity)
- Process Safety Critical Asset Documentation set (P&IDs, Cause & Effects diagrams, registers, etc.)
- Technical MOC in operations (incl. life extension, Use of new or unconventional technologies or new applications of proven technologies, P
- Isolation
- Design, Installation, pre-commissioning, commissioning (incl. QA/QC, project HSES deliverables by project phase)
- Flange management
- Procurement, Quality Assurance and Control of supplied product/service

# Conclusion – a little booklet that...

## Addresses process safety widely



- Workforce
- Supervisors



- Offshore management
- Engineers



- Planners
- Non-technical onshore functions



- Onshore management
- Leadership team

- Projects
- MoCs

- Health & well being

## Ensures we focus more widely than solely on Plant barriers

For example, effective isolations mainly rely on

- Robust and accurate procedures (Process barrier)
- Operators acting correctly (People barrier)

### From the boardroom to the front line

Process safety leadership must be active at all levels across the organisation, **“from the boardroom to the front line”**.

Only then will we truly begin to reduce our major accident hazard risk.



## Becomes a simple coherent relatable thread





Board Room to  
the Front Line

Process

Policy to Toolbox Talk

People

# Thank you

Plant

DHSV to Export Pipeline

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