



PETRONAS

Process Safety challenges in Asia Pacific – PETRONAS perspective

22 September 2014

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PETRONAS

PETRONAS – At a glance

PETRONAS Background



Total Number of Employees Groupwide

TOTAL	43,266
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- Established in 1974
- Manage and add value to the petroleum resources
- Presence in 54 countries

PETRONAS has presence in 54 Countries



Exploration & Production

- Malaysia
- Algeria
- Cameroon
- Chad
- Mauritania
- Mozambique
- South Sudan
- Sudan
- Australia
- Brunei
- Indonesia
- M'sia-Thai JDA
- Myanmar
- Vietnam
- Turkmenistan
- Uzbekistan
- Cuba
- Venezuela
- Iraq
- Oman
- Canada
- Egypt



Petrochemical

- Malaysia
- Vietnam



Refineries

- Malaysia
- South Africa



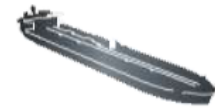
LNG

- Malaysia
- Australia
- Egypt
- Canada



Lubricants

- China
- India
- Indonesia
- Philippines
- Thailand
- Europe
- North & Latin America



Trading & Marketing*

- India
- Indonesia
- Philippines
- Thailand
- UAE
- China



Retail

- Malaysia
- Thailand
- Sudan & South Sudan
- Indonesia
- Philippines
- Vietnam
- South Africa
- Sub-Saharan Africa

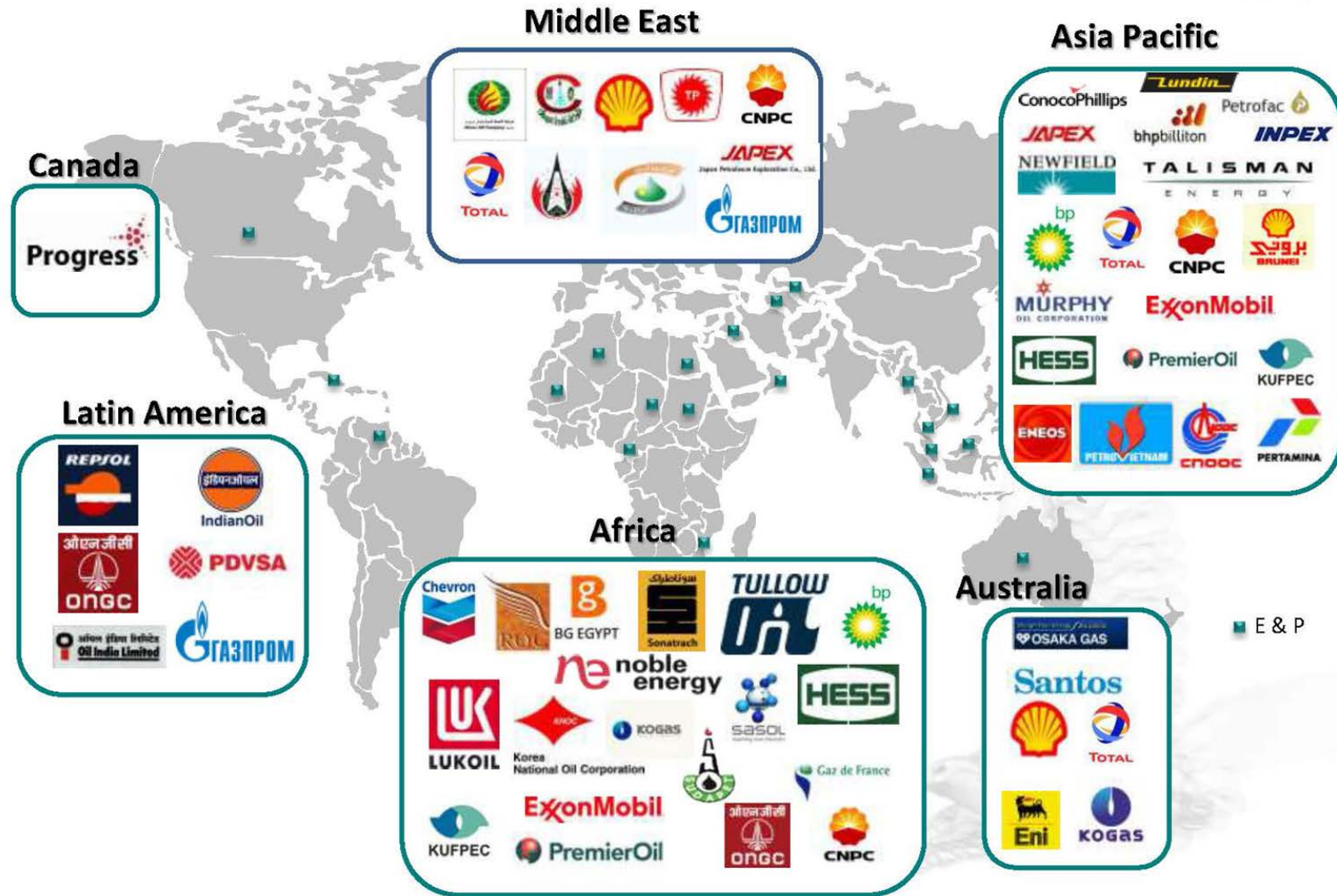


Gas & Power

- Malaysia
- Indonesia
- Singapore
- Thailand
- Uzbekistan
- Ireland
- United Kingdom

*Petrochemical, lubricants and petroleum products

Alignment of PETRONAS HSE MS and process safety with JV Partners



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 Group Health, Safety and Environment, PETRONAS



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HSE Management System

PETRONAS is committed to Health, Safety and Environment excellence

PETRONAS POLICY STATEMENT ON HEALTH SAFETY AND ENVIRONMENT

PETRONAS is committed to Health, Safety and Environment excellence in all its activities wherever it operates.

PETRONAS shall take reasonable and practicable steps to prevent and eliminate the risk of injuries, occupational illnesses and damage to properties.

PETRONAS shall take proactive steps to protect the environment and to use natural resources efficiently.

PETRONAS shall ensure that the facilities it designs, builds and operates, the products it manufactures and the services it provides are in accordance with appropriate legal requirements and industry best practices.



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PETRONAS shall provide the necessary resources and organization, and where appropriate, engage with key stakeholders on Health, Safety and Environment matters.

PETRONAS shall ensure that contingency plans are in place to deal with emergencies.

PETRONAS shall ensure continual improvement in its Health, Safety and Environment management and performance, leveraging on people, process and technology.

PETRONAS requires all its employees and contractors to strictly adhere to this policy at all times.

A handwritten signature in black ink, appearing to read "Shamsul Azhar Abbas", written over a circular stamp or seal.

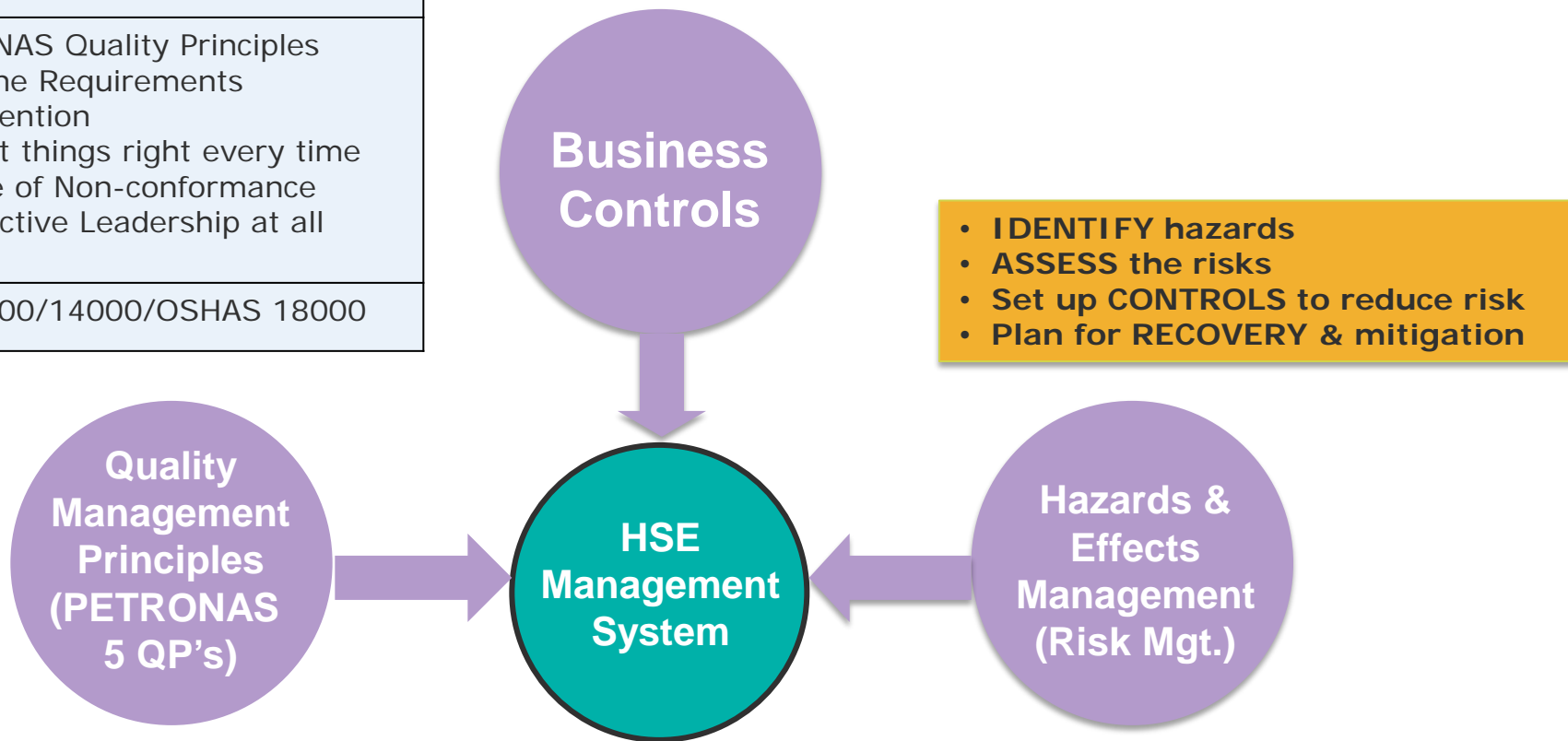
Tan Sri Dato' Shamsul Azhar Abbas
President and Group Chief Executive Officer, PETRONAS

15 February 2013



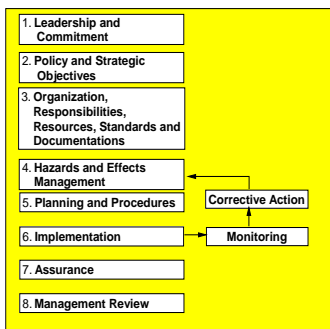
HSE MS integrates the Business Controls, Quality Management System & Risk Management into a single management system

Plan - Do - Check - Action
PETRONAS Quality Principles 1. Define Requirements 2. Prevention 3. Right things right every time 4. Price of Non-conformance 5. Proactive Leadership at all levels
ISO 9000/14000/OSHAS 18000



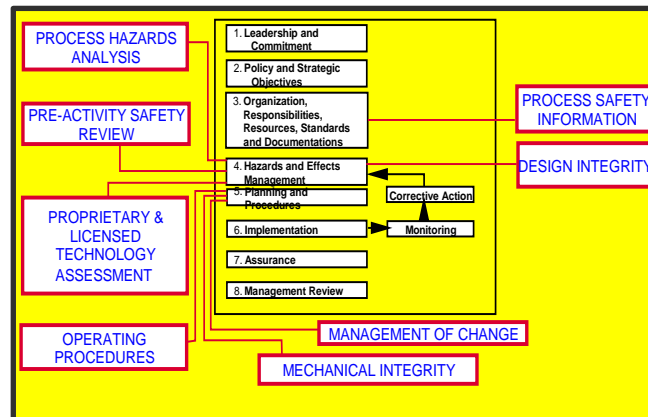
Strengthening HSE MS with Process Safety requirements

1997



PETRONAS HSE MS

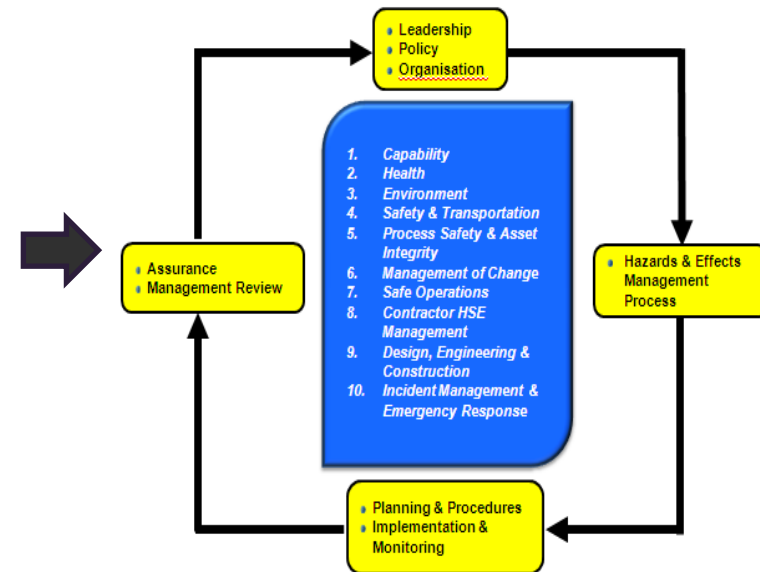
2006



PSM

Lesson learned from Texas Refinery incident

2012



Mandatory Control Framework (MCF) – clear and prescriptive requirements



PETRONAS Technical Standards covers all phases of a project life cycle

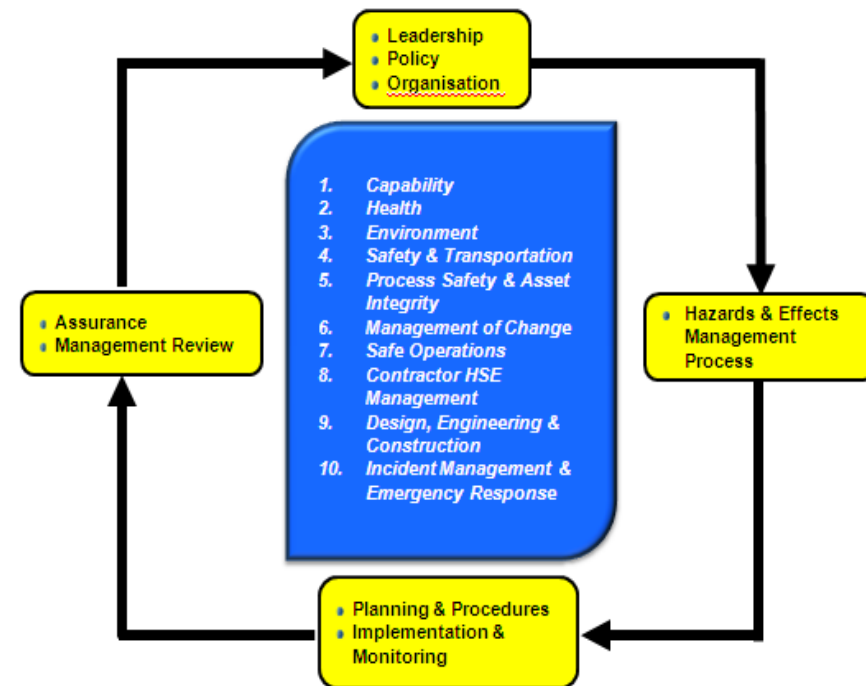
Development started in 1992 based on international and national standards/codes/guidelines including own operating experience

- Design and Engineering
- Project Management
- Material Management
- Operations Management
- Maintenance Management
- Laboratory Management
- Health, Safety and Environment
- Quality Assurance

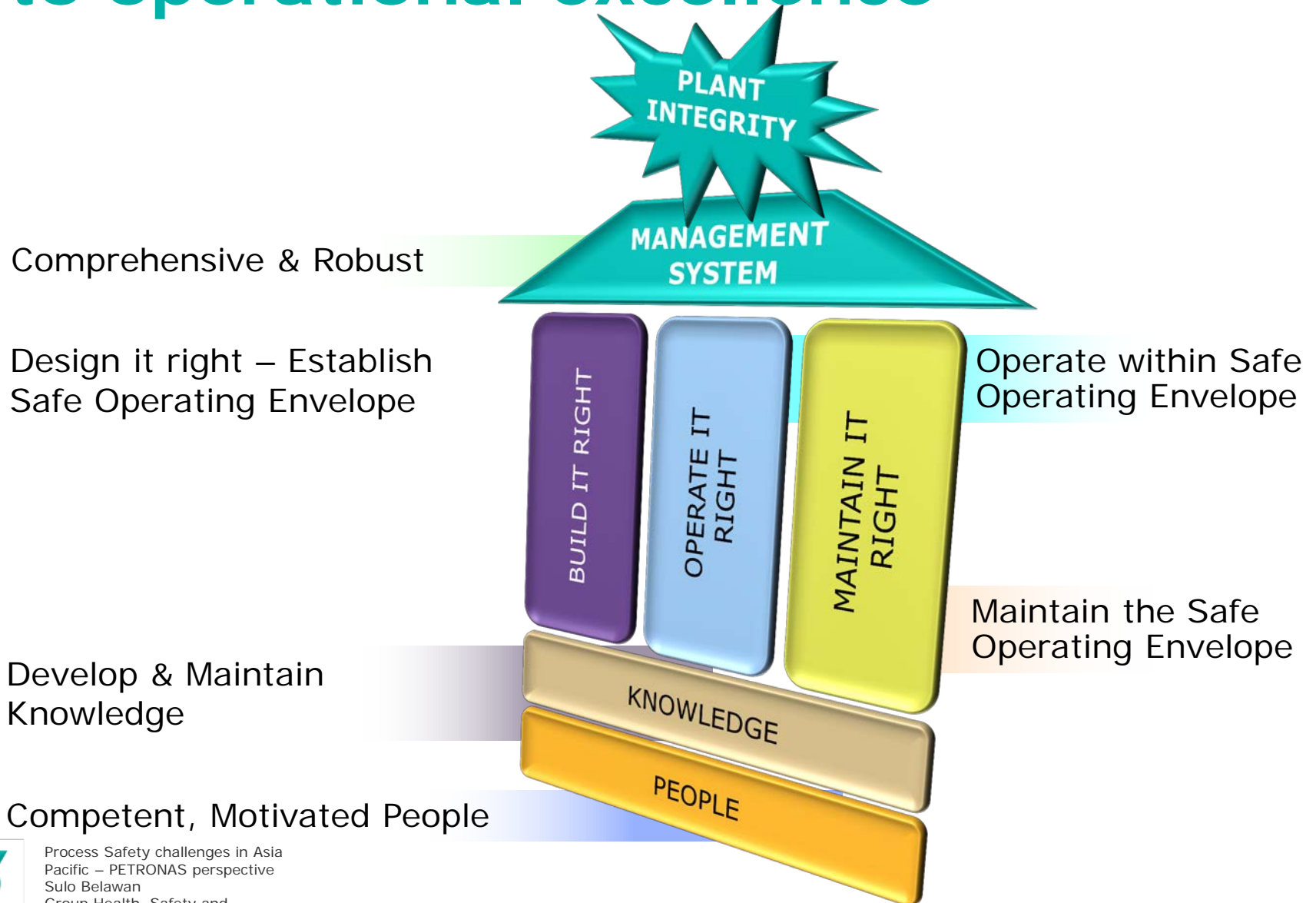


Process Safety Elements are incorporate into our Mandatory Control Framework (MCF)

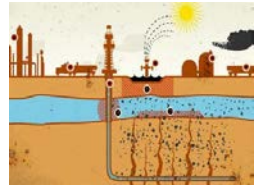
- Process Safety Information (PSI)
- Process Hazard Analysis (PHA)
- Pre-Activity Safety Review (PASR)
- Management of Change (MOC)
- Operating Procedures (OP)
- Proprietary & Licensed Technology Assessment (PLTA)
- Design Integrity (DI)
- Mechanical Integrity (MI)
- Design and Engineering Process Safety Requisites (PSR)
- Contractor HSE
- Emergency Preparedness



Safe and reliable plants are critical to operational excellence



Process Safety Challenges



New/Unconventional Technologies



PS Capability



Regulatory Requirement

PS Challenges

Cultural Diversity



Operating Environment



Challenges: Process Safety Capability

Process Safety is relatively new in certain parts of the World



Developing HSE Culture



Different HSE Practices and Belief



Low Process Safety Awareness

Challenges: Cultural Diversity

Understanding the local culture is crucial to our business :

- Language barriers
- Socio-economic constraints
- Divergent Values



Challenges: Difficult Operating Environment



Sand Storm



Extreme Temperature



Adverse Weather

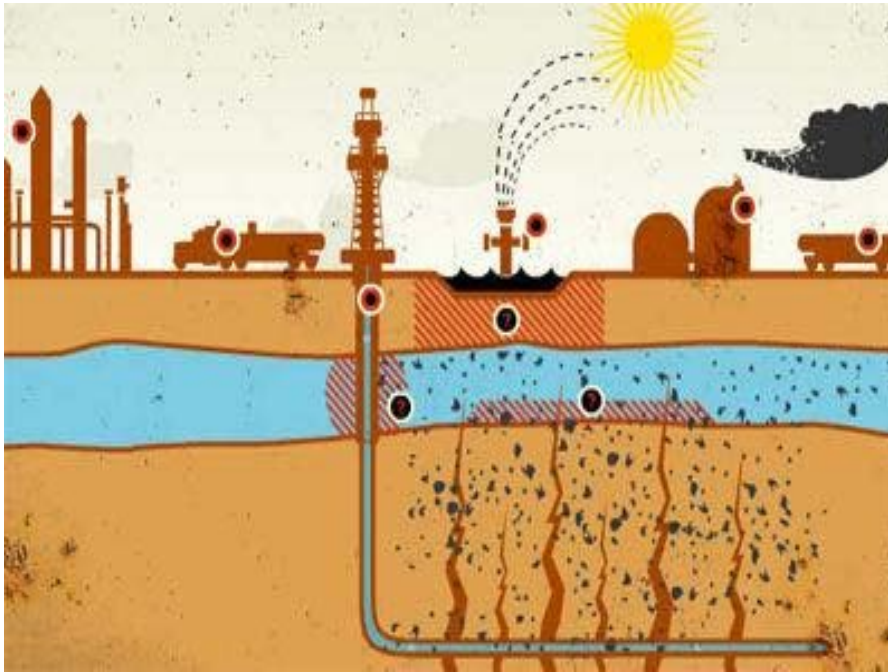


Sensitive Environment



Challenges: New/Unconventional Technologies

Shale gas technology



Floating LNG

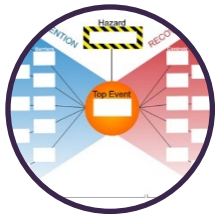


Shale gas stakeholder engagement in Canada

Challenges: Regulatory Requirement



Risk-based Approach



HSE Critical Barrier Management



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Capability

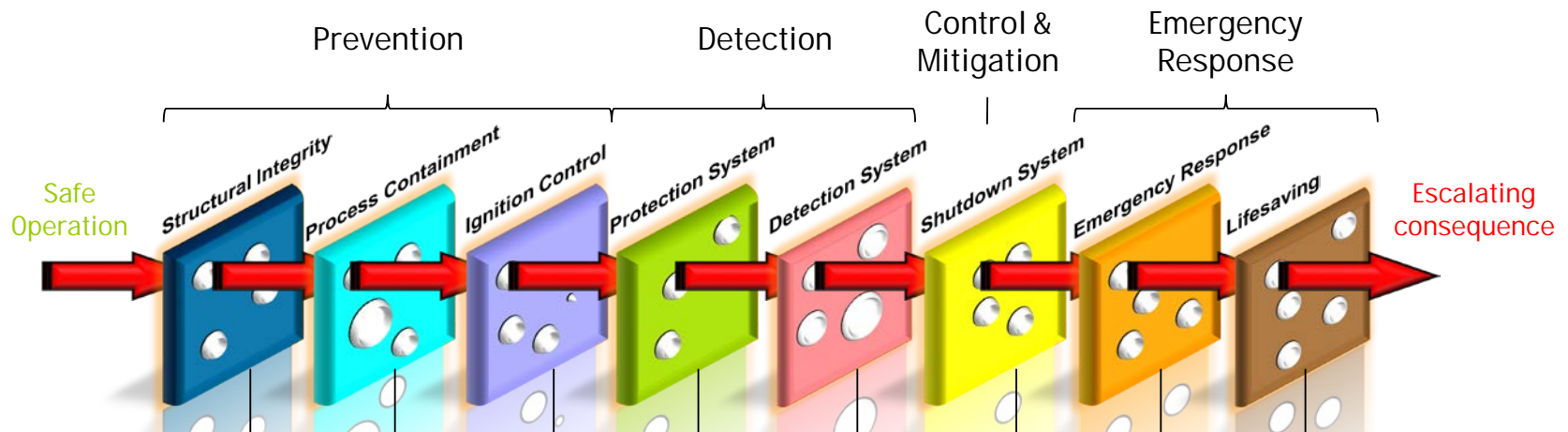
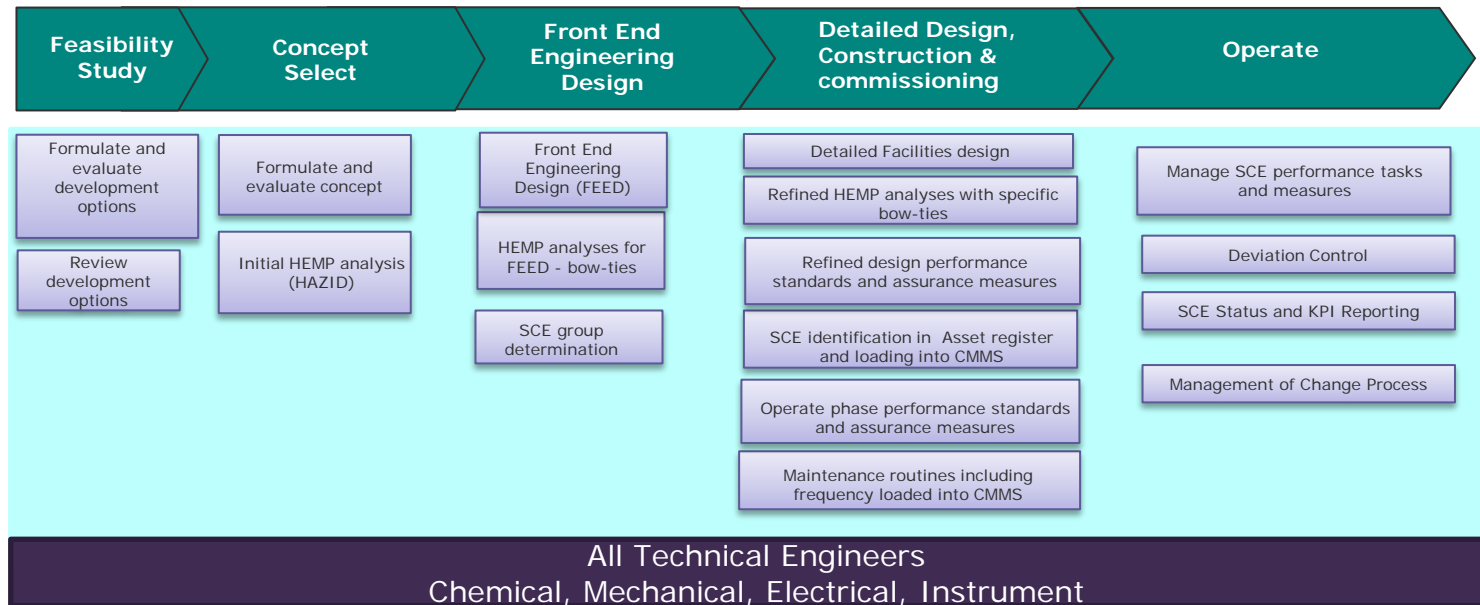
Process Safety Capability Building through structured skill training programmes



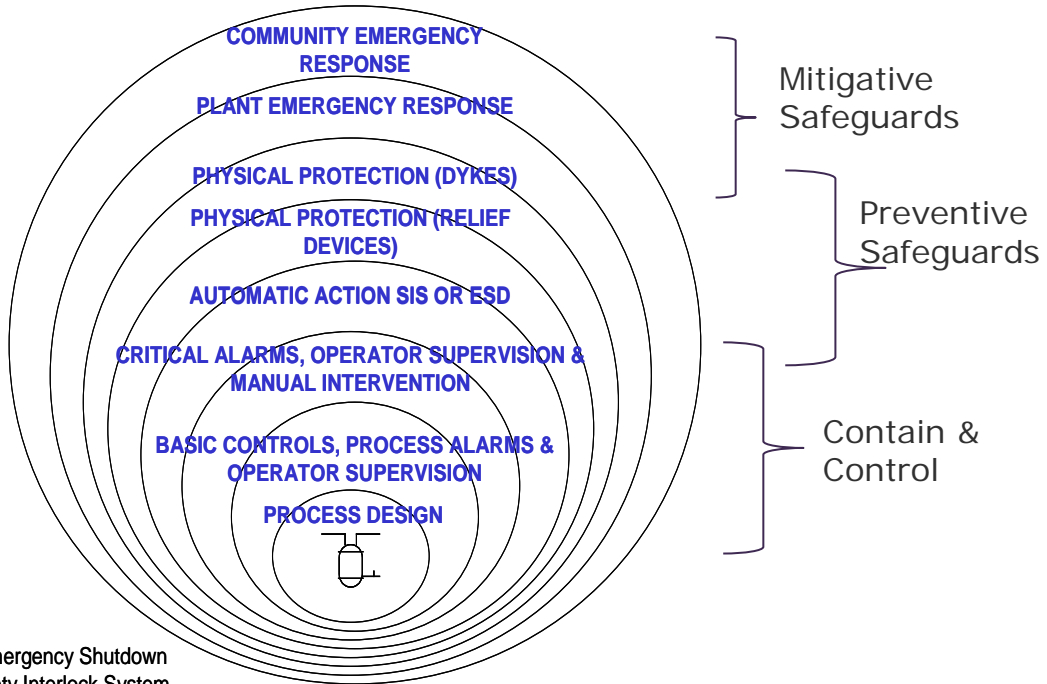
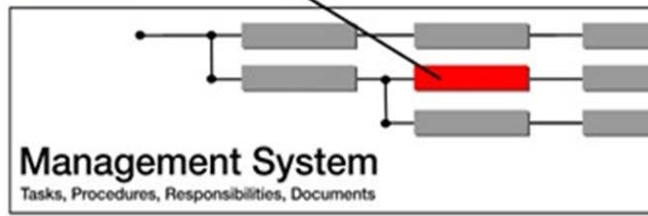
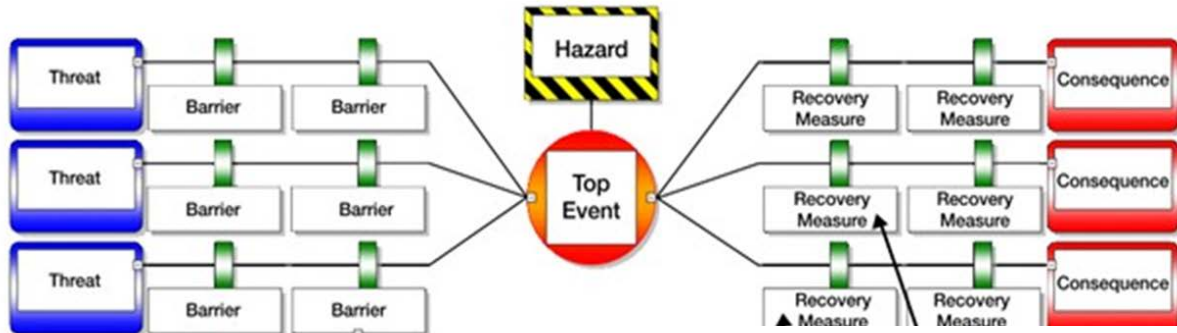
Process Safety Capability Building through education, training and communication



Improving process safety through SCE Management



Various tools consistently applied to barrier management



Note: ESD – Emergency Shutdown
SIS – Safety Interlock System

Typical layers of protection in a modern plant

Capability management for all technical disciplines

SKG 09	• Geoscience
SKG 10	• Petroleum Engineering
SKG 11	• Civil & Structural
SKG 12	• Mechanical
SKG 13	• Electrical
SKG 14	• Instrumentation and Control
SKG 15	• Materials, Corrosion and Inspection
SKG 16	• Process Technology or operations
SKG 18	• Health, Safety and Environment
SKG 19	• Project management
SKG 20	• Maritime

Embedding HSE in Technical Skill Groups

1. Understanding of common HSE requirements applicable to all skill groups
2. Application of HSE aspects in **own areas of work/ functions**, focusing on the following :
 - HSEMS Elements
 - Regulatory Requirements
 - Safe Systems of Work
 - Risk Assessment and Barriers Management



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Human Factors

Human Factor Issues contribute to Major Process Safety Incidents



Flixborough, 1974



Bhopal, 1982



Texas Refinery, 2005



Macondo, 2010



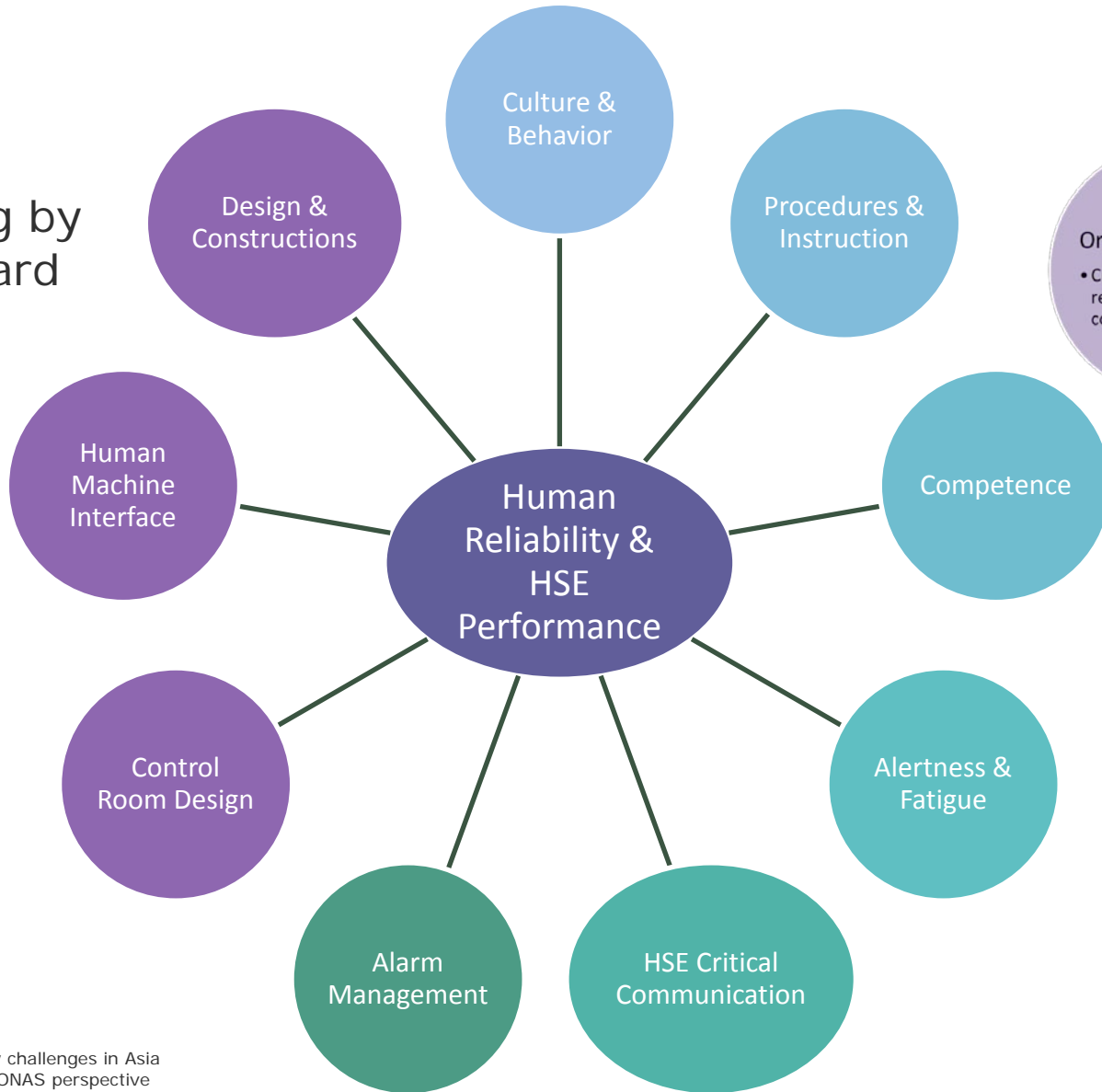
West Fertilizer, 2013



Williams Olefins, 2013

Human Factors Focus Areas

Controlling by Design “hard barriers”



Controlling through “soft” barriers

Human factors Embedded in Plant Lifecycle



HFE screening	Design validation	Design validation	Design validation		
HFE design analysis	HFE design analysis				
Fatigue & alertness	Fatigue & alertness	Fatigue & alertness	Fatigue & alertness	Fatigue & alertness	Fatigue & alertness
		Operating Procedure	Operating Procedure	Operating Procedure	Operating Procedure
		Critical communications	Critical communications	Critical communications	Critical communications
Competence Assurance	Competence Assurance	Competence Assurance	Competence Assurance	Competence Assurance	Competence Assurance
	Alarm management	Alarm management	Alarm management	Alarm management	
Culture & Behavior	Culture & Behavior	Culture & Behavior	Culture & Behavior	Culture & Behavior	Culture & Behavior

Enhancing Human Factors to strengthen process safety performance



Enhanced management of human factors

- Improved work environment
- Increases staff morale
- Improved human performance



Minimise human error

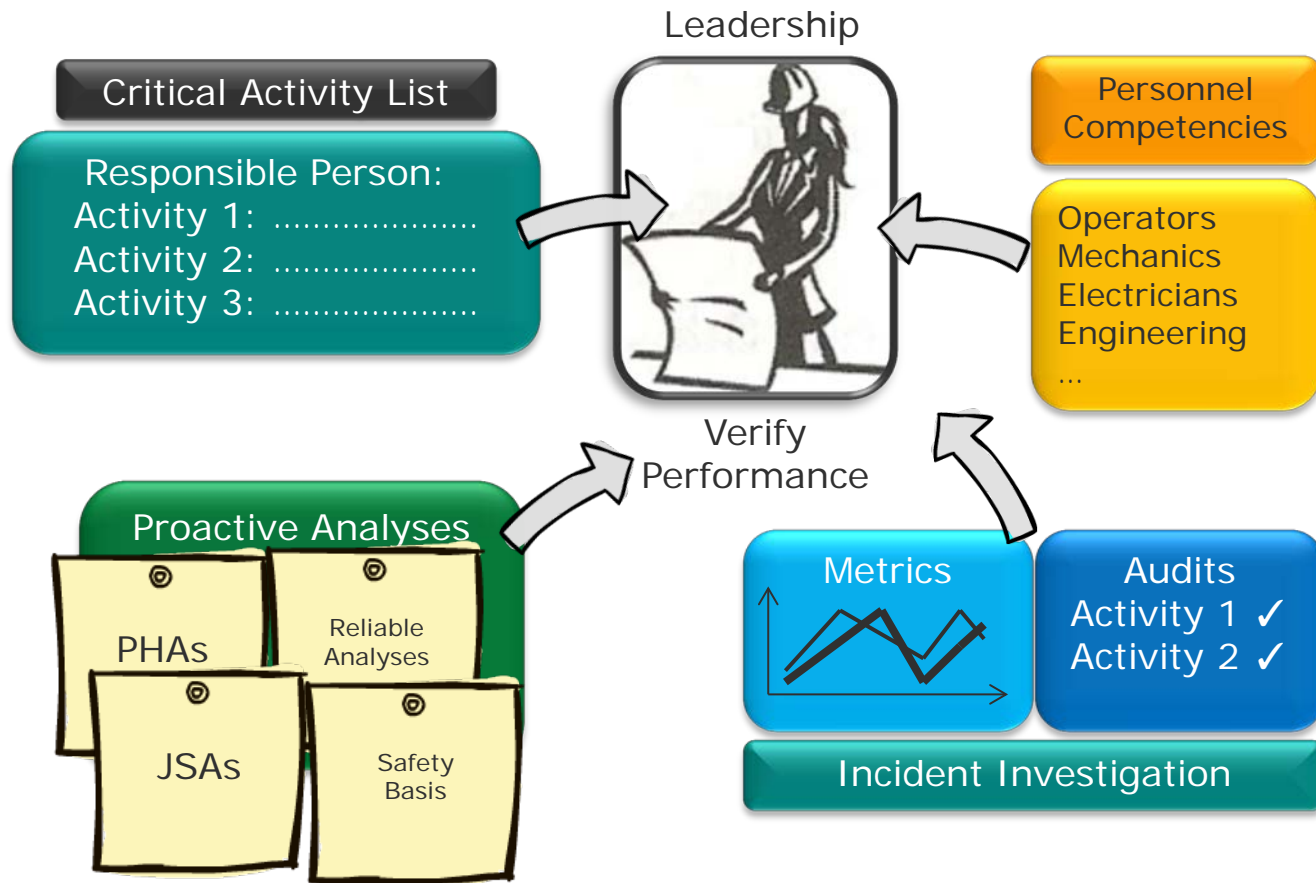
- Less rework
 - Increases quality & productivity
- Less incident/accident
 - Reduction in insurance premium & Accident cost
 - Increases staff morale & company reputation



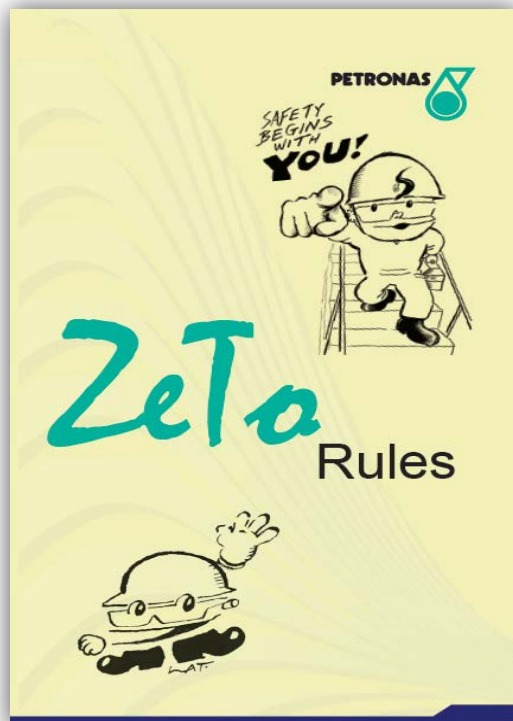
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HSE Leadership

HSE leadership is critical in driving effective Process Safety implementation



Instilling safety culture and compliance



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Zeta Rules

- 

Work with a valid work permit (PTW) required by the Job
Bekerja menggunakan permit kerja (PTW) sah yang diperlukan
- 

Verify energy isolation before starting work
Sahkan pengasingan tenaga sebelum memulakan kerja
- 

Obtain authorisation before overriding or disabling safety critical equipment
Dapatkan kebenaran sebelum memintas atau menghentikan peralatan keselamatan kritikal
- 

Obtain authorisation before entering a confined space
Dapatkan kebenaran sebelum memasuki ruang terkurung
- 

Protect yourself against a fall when working at height
Lindungi diri daripada terjatuh ketika bekerja di tempat tinggi
- 

Use the correct personal protective equipment (PPE) when handling hazardous chemicals
Gunakan peralatan perlindungan diri (PPE) yang betul ketika mengendalikan bahan kimia berbahaya
- 

Obtain authorisation before excavation or entering a trench
Dapatkan kebenaran sebelum melakukan kerja penggalian atau memasuki parit
- 

Do not position yourself under a suspended load
Jangan berada di bawah muatan tergantung
- 

Do not smoke outside designated areas or bring potential ignition sources into process areas without authorisation
Jangan merokok di luar kawasan yang dibenarkan atau membawa masuk sebarang sumber penyalaan (ignition source) ke dalam kawasan pemprosesan tanpa kebenaran
- 

Do not use your mobile phone/walkie-talkie while driving, follow the speed limit and use your seat belt
Jangan gunakan telefon bimbit/walkie-talkie ketika memandu, patuhi had laju dan pakai tali pinggang keledar

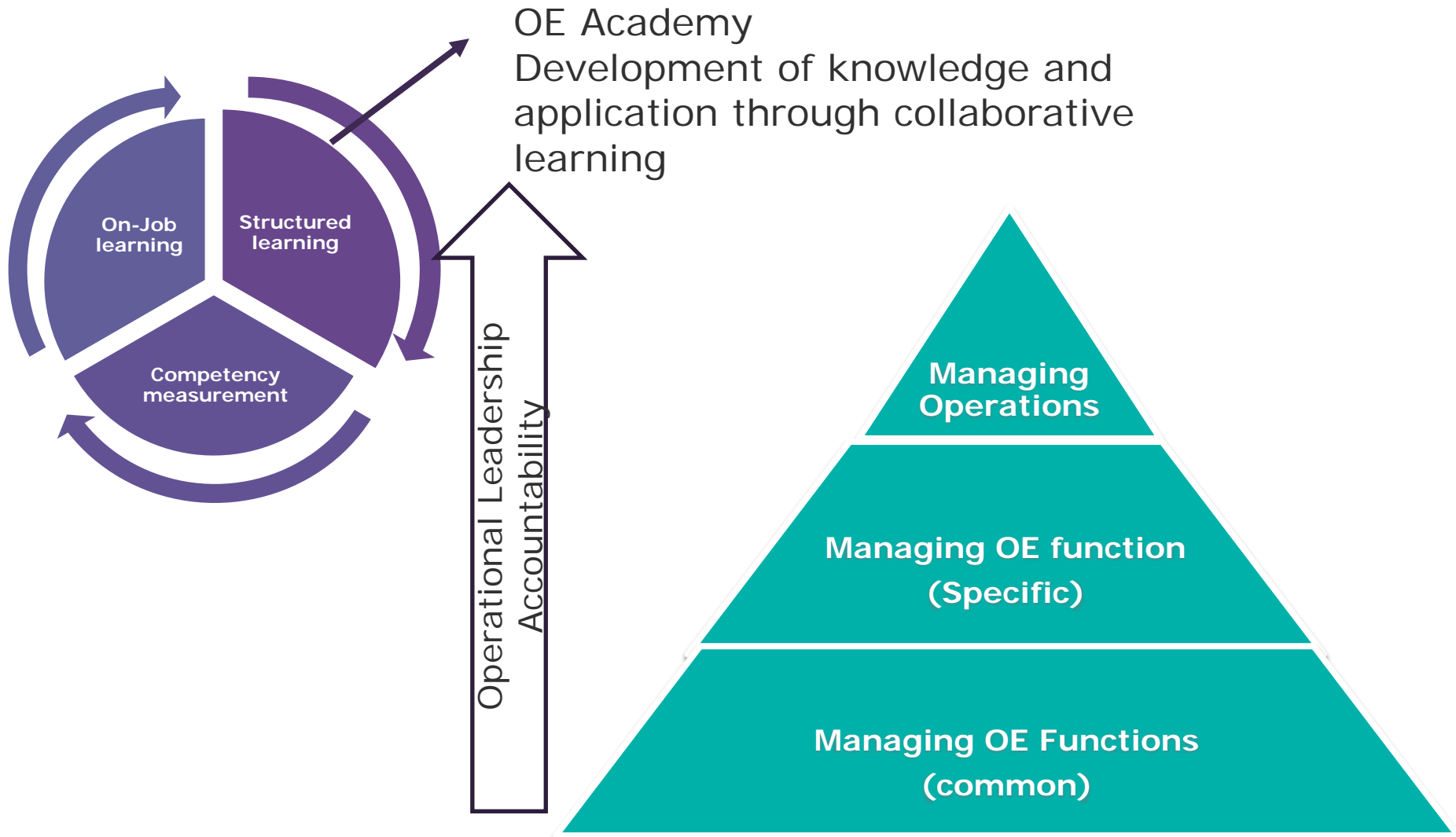
Group Health, Safety and Environment

Leadership building programs to achieve leadership and commitment at all level

- Process Safety Leadership workshops
- Felt Leadership workshops
- Management walk-about utilizing the “field guide for process safety leadership”
- CCPS Workshop for plant on “Recognition Catastrophic Incident Warning Signs in Process Industries”



Established OE Academy to build Plant Technical Leaders

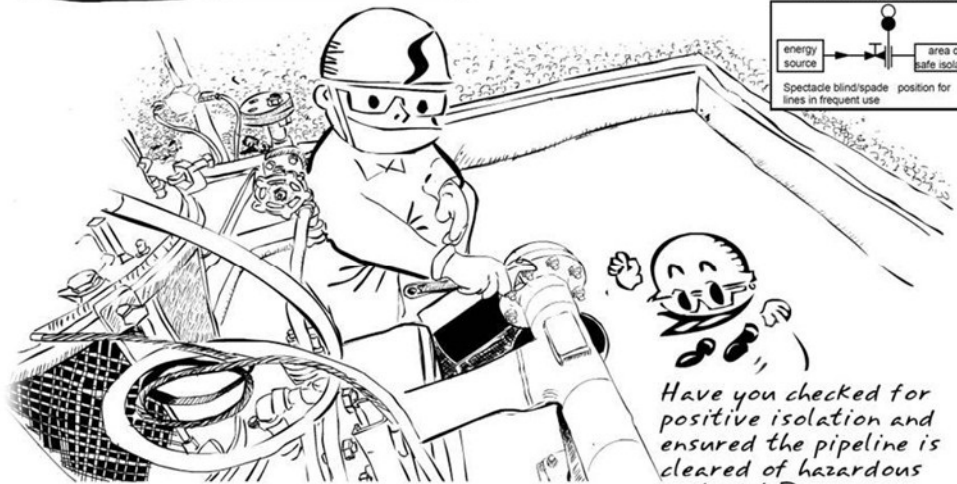


Various media applied for effective communications of HSE messages (1/2)

Handy Hand Tools!



PROCESS SAFETY TIPS



Have you checked for positive isolation and ensured the pipeline is cleared of hazardous materials?



All modifications require Management of Change process.



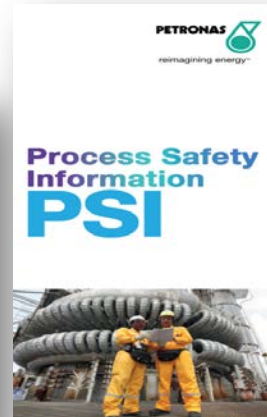
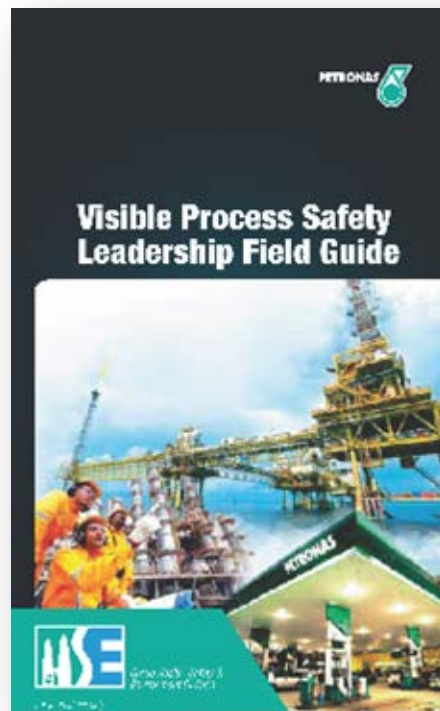
ZeTo Rule # 2 – Verify energy isolation before starting work



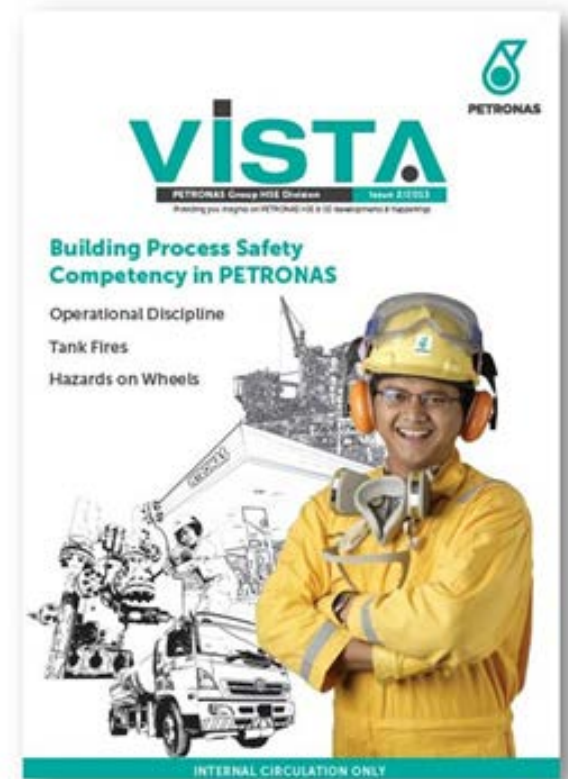
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Group Health, Safety and Environment, PETRONAS

Various media applied for effective communications of HSE messages (2/2)

Process Safety Publications



HSE Magazine on Process Safety Competency



Collaboration with Regulatory Bodies

- Offshore Self-Regulation Management System (OSR MS)
- Code of Practices on High Risk Activities
- P-RBI (PETRONAS Risk Based Inspection)
 - Enhancement of Asset Integrity assurance



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Thank you