



PETRONAS

Building Process Safety Competency

5th CCPS Global Summit on Process Safety

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High Level of Process Safety Management is Crucial to Prevent Major Hazards

- Major process safety incidents rarely happen, however if they do the results are catastrophic
- Companies involved in such incidents normally suffer:
 - Loss of Reputation
 - Financial Loss
 - Legal Suits
 - Loss of business opportunities
- Maintaining a high standard of Process safety is a License to Operate
- It is our role as leaders to make sure that adequate process safety standards are established in our company or the site in which we operate.

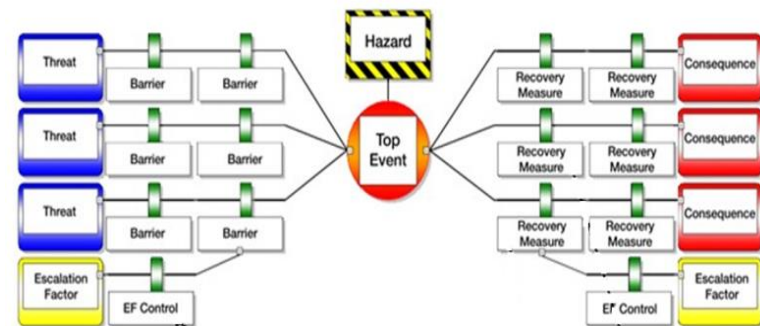
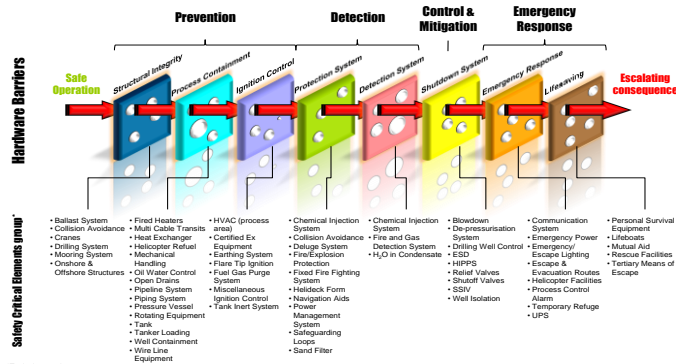
High Level of Process Safety Management is Crucial to Prevent Major Hazards

Reports on major process safety incidents citing competency of personnel as one of the top 10 human factor issues contributing to major incidents.

- ❑ West Fertilizer Explosion and Fire
 - Material exploded
 - Poor hazard awareness
 - 15 fatalities, >160 injured
- ❑ Chevron Refinery Fire
 - Pipe ruptured release of flammable gas
 - Poor understanding of damage mechanism
 - 15,000 residents sought medical treatment
- ❑ T2 Laboratories explosion and fire in Florida
 - Reactive chemical explosion
 - Lack of knowledge on reaction and hazards
 - 4 Fatalities
- ❑ Texas Refinery explosion
 - Explosion after liquid release from flare
 - Insufficient skilled staff during start-up
 - 16 Fatalities

Ensuring Relevant Barriers are Identified, Installed, Maintained and Practices that help to Reduce the Risk

Major Incidents Findings Indicate Multiple Failures of Process Safety Barriers

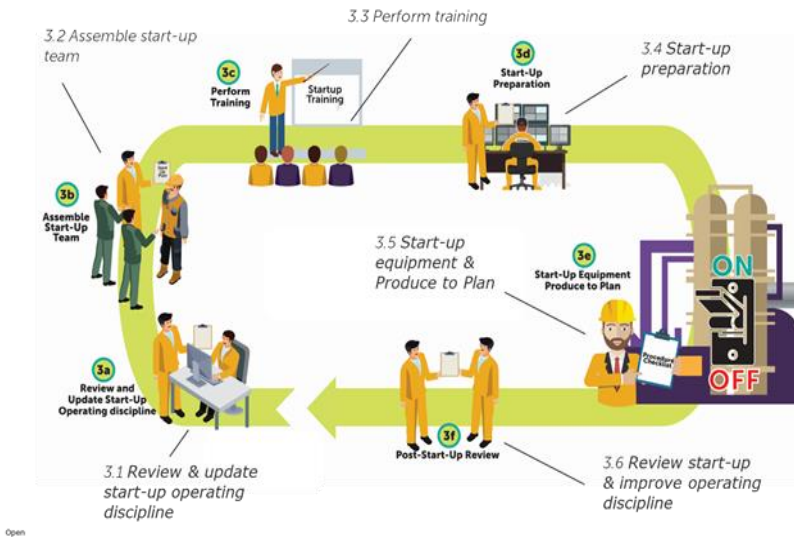
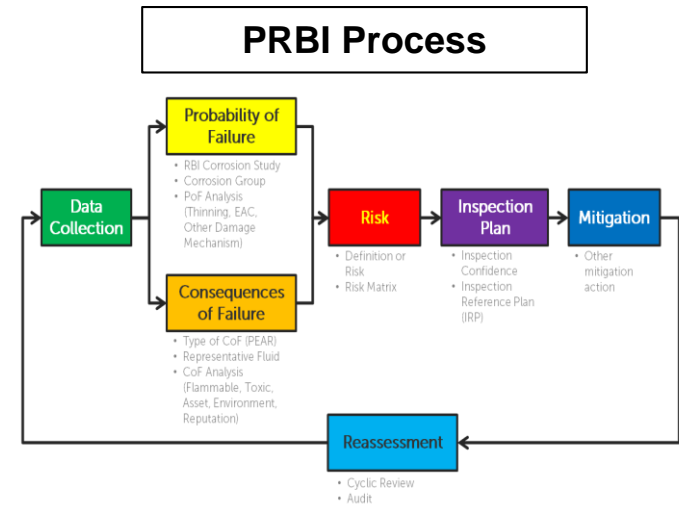


Barriers (Safety Critical Elements)

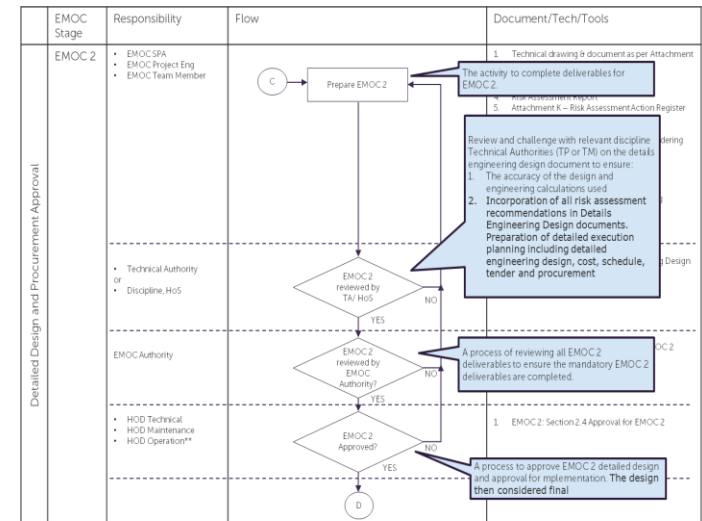
HEMP: Bow-Tie

Structured System and Work Processes Need to be Established to Manage Change

- **Potential higher risks with new changes**
 - Unit/Plant Start-Up
 - Shutdown and Maintenance Activities
 - Equipment/process modifications
 - Organisational change
 - Addition of new unit/system/technology
 - Shift handover



Work Process for Plant/Unit Start-Up



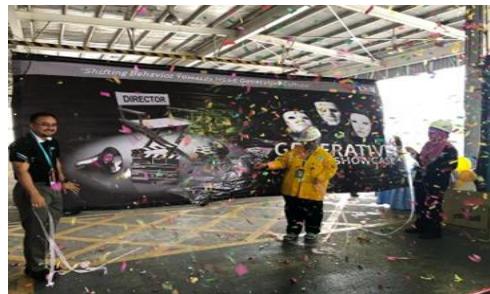
Engineering Management of Change

Important to Build Competencies to Uphold Process Safety Standards

- Individual
 - Subject Matter Experts such as-
 - Engineering Design
 - Process Technology – inherent process safety
 - Maintenance (Mechanical Integrity)
 - Equipment specialist
- Organisation
 - Learning Organisation
 - Technical Authority – important prior to introduce change
 - System and Process for Compliance Assurance



Classroom

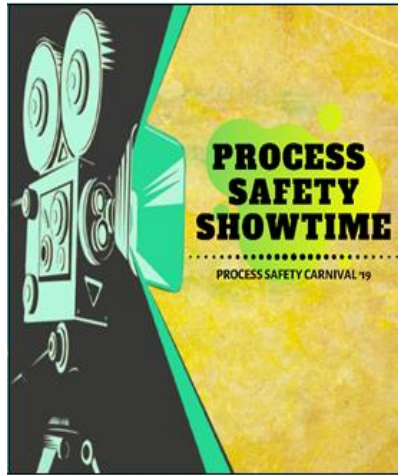


Culture Launching



On Job Training

More Creative and Innovative Approach Required in Building Competencies



Edutainment



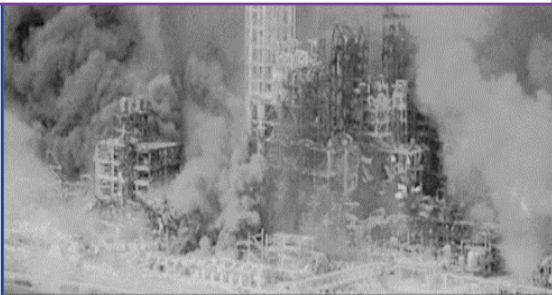
Technical Knowledge



Culture Transformation

More Creative and Innovative Approach Required in Building People Competencies

Learning from Past Incidents and Application of Lesson Learned



Lesson Learnt

1. The control room was in close proximity to equipment and was completely destroyed by explosion
 - Locate buildings based on risk assessments



- Leaders drive the organisational culture
- Leaders set the pace for organizational learning



Sharing Correct Practices

- Leaders should provide the platform for sharing of lessons learnt from past incidents
- A system should be established for tracking of closure and application of lessons learnt

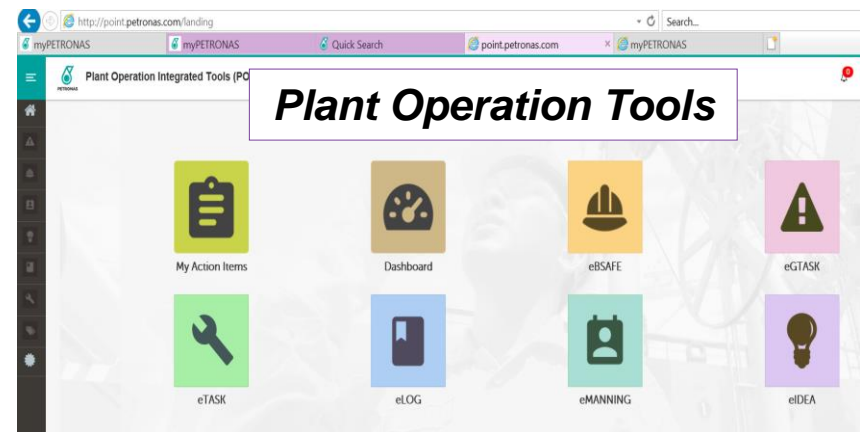
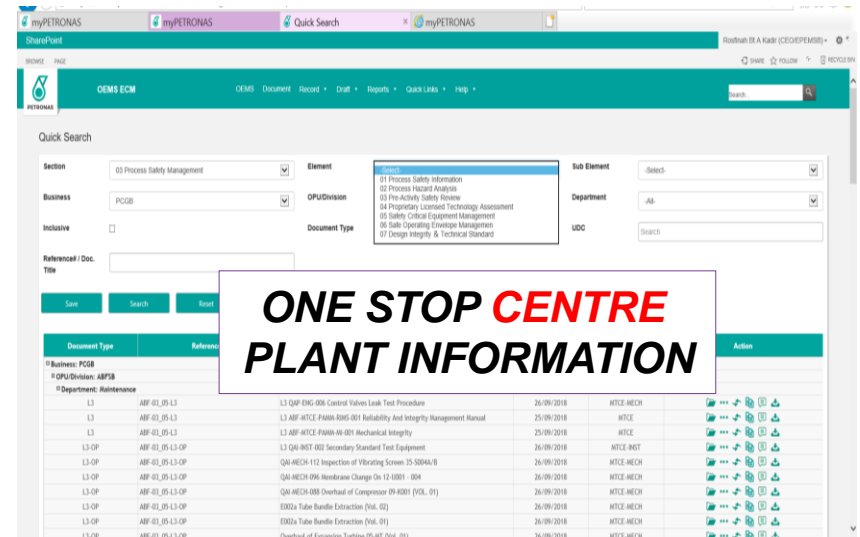


Leadership Conversation

- Localised Learning is usually the most effective approach

Importance of Digital System in Building Competency

- Process Safety Information is important for plant personnel to execute the work safely.
- The availability and accessibility of the required information to relevant personnel when needed are crucial
- Relevant infrastructure should be made available
- Establish a Management System Review to measure the effectiveness of implementing Process Safety



Selection of the Right Digital Tools helps to Reduce Risk of Process Safety Incidents

- Correct information made available to avoid process safety incidents due to wrong selection e.g.
 - Location of work
 - Type of hazards
 - Type of gaskets
 - Torqueing value to be used
 - Standards and Rating applied

Flange Management Tool is a "one-stop-center" online database for flange management from project until operation stage

Flange Management Database development

- 1 "Single source of truth" flange management data center to ensure correct, accurate and verified data
- 2 Important information on flange is in place for Joint Integrity hence avoid wrong data use and reduce preparation time for JICS

Joint Information	Joint Construction Data
Flange Material	ASME Class 2
Flange Size	Body Flange in
Flange Rating	CUSTOM
Flange Type/View	BODY FLANGE

JOINT DIMENSIONS AND TOLERANCES	
Bolt Diameter and Thread Type	3/4" UNF x 3 in
Bolt Length	1400 mm
Bolt Quantity	100
Bolt Material	A193 B7
Nut/Spacer Size	1/2 in
Nut Material	A194 2H
Lubricant	Molykote 1000
Plan Report	2021
Actual Report	2018

Illustration Only

Item	SmartPlant 3D
Property	
SPOJ Moniker	
Name	
System Path	
Fluid Type	
Operating Temp	
Test Pressure	
Test Medium	
PID Reference	
Stress Category	
PSIRT	
Radograph	
Painting	
OD	
ShotCode	
Community Option	
NPD	
Community Code	
Materials Management/Idet	
Operating Action	
Description	
Dry Weight	
Stress System/No	
Isa Sheet No	
Design Max Temperature	
Design Max Pressure	
Flow Direction	
Pipeline	
PipeRun	
Spec	
Spool	
User Created	
Date Created	
User Last Modified	
Date Last Modified	
Permission Group ID	

Building and Maintaining Process Safety Competency

- Establish an environment where people continue to seek process safety knowledge and build competency
- Availability and easy accessibility of correct Process Safety Information for those who need them – e.g. by utilisation of digital system
- Continuous Learning from Past Incidents or Inherent Technology
- Establish a tracking system that ensures consistent application of what has been learnt
- Continuous improvement from improved technology or application of improved barriers



Conclusion

Reminder to Myself and All Leaders

- We as Leaders are accountable in ensuring Process Related Matters are properly addressed in our organization.
- Our Approach May Differ, but Our Goals are the same.
- To develop the individual and strengthen organisation competency is crucial to prevent major hazards due to Process safety Incidents.
- Process Safety Competency requires Skills, Knowledge and Passion.
- Design It Right, Operate It Right, Maintain It Right!

Thank you for your passion!

