



THE SHELL RISK BASED INSPECTION AND SAFETY APPROACH OF PETROCHEMICAL AND GAS INTALLATIONS

1st CEOC International Safety Seminar, 3rd Feb. 2010, Brussels

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*S-RBI is a Shell trade mark



SHELL
GROUP ACTIVITIES

App. 50 manufacturing & gas sites

UPSTREAM BUSINESSES

- Exploration & Production
- Gas & Power
- Oil Sands

DOWNSTREAM BUSINESSES

- Oil Products
- Chemicals

CORPORATE

SHELL PROJECTS & TECHNOLOGY Corporate



SHELL
PROJECTS & TECHNOLOGY

Unit created in 2009, merging:

- Global Solutions
- Technology directorate of Exploration & Production
- Safety and environment function
- Contracting and procurement function



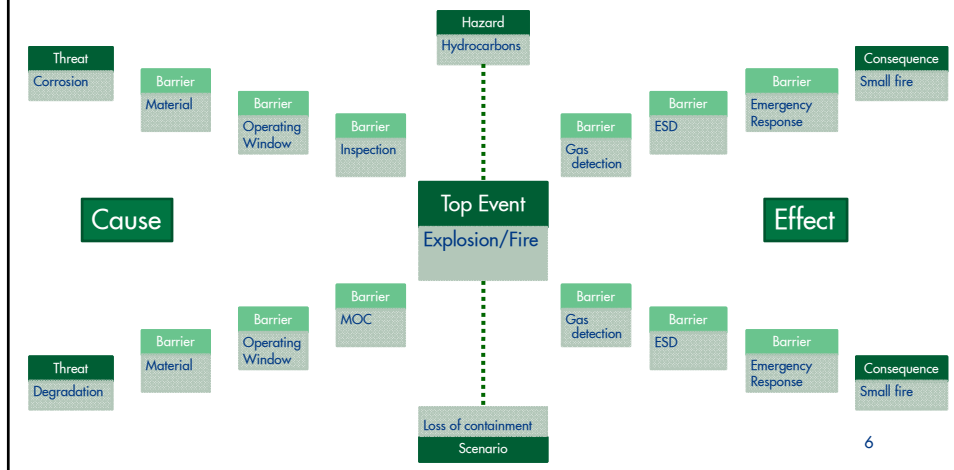
Safety is No Harm - Goal Zero - within Shell

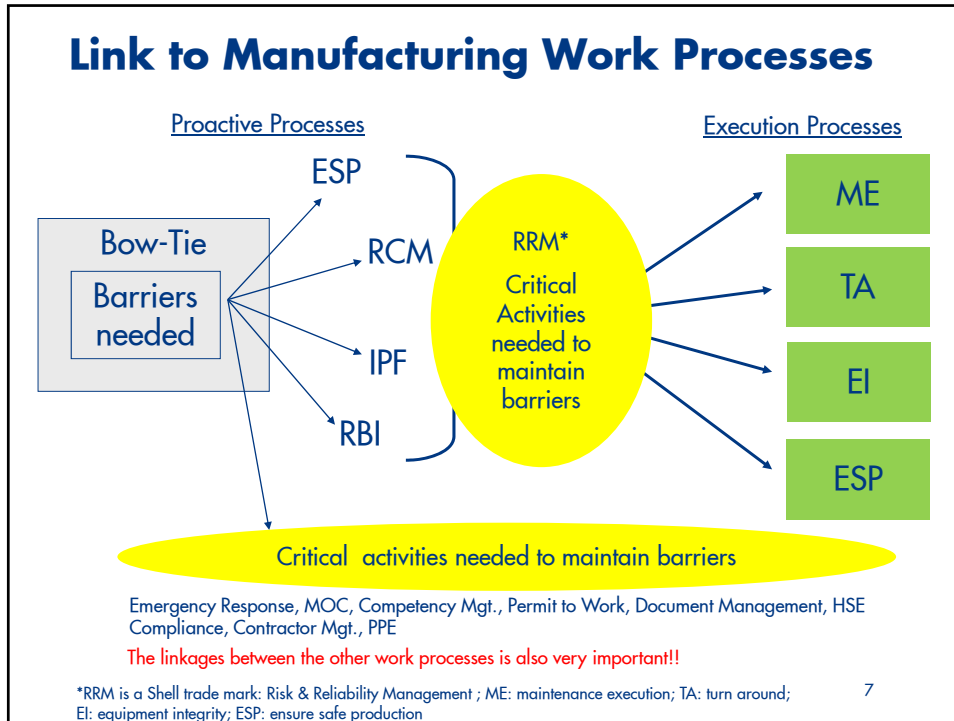


Managing Process Safety

Bow-Ties are used for:

- the identification and risk assessment of HSE hazards
- the evaluation and implementation of control and recovery measures and
- to document that major HSE risks have been reduced to as low as reasonably practicable (ALARP).

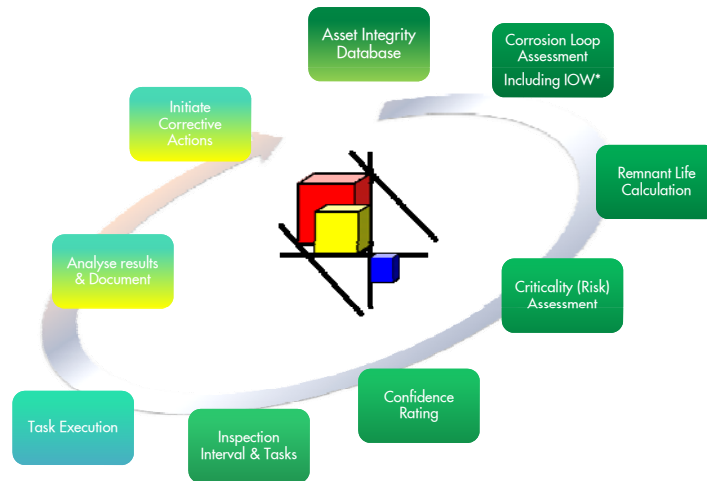




Shell RBI has a strict definition

Is a risk-based decision support process
 structured and multidisciplinary
 to determine and document, cost-effectively,
 The optimum inspection requirements
 of pressure containing equipment in its operating context
 and safeguards integrity

S-RBI requires regular updating (evergreening)



*IOW: Integrity Operating Window

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Assessment of the Criticality (RAM)

Susceptibility to Failure			Criticality				
PROBABILITY CLASS	H	Very susceptible to degradation	L	MH	H	E	E
	M	Susceptible to degradation under normal conditions	L	M	MH	H	E
	L	Susceptible to degradation under upset conditions	N	L	M	MH	H
	N	Not susceptible under any foreseen conditions	N	N	L	M	MH
CONSEQUENCE CATEGORY	ECONOMICS (US\$)		no/slight damage	minor damage	local damage	major damage	extensive damage
	HEALTH & SAFETY		no/slight injury	minor injury	major injury	single fatality	multiple fatalities
	ENVIRONMENT		no/slight effect	minor effect	local effect	major effect	massive effect
CONSEQUENCE CLASS			NEGLECTIBLE	LOW	MEDIUM	HIGH	EXTREME

RAM = Risk Assessment Matrix

N = Negligible

L = Low

M = Medium

MH = Medium High

H = High

E = Extreme

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S-RBI is documented & managed

Methodology



Process



people



Tool



RRM = process : people : tools = 40 : 40 : 20

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Deliverables S-RBI

- ✓ Corrosion Control Document per Unit
 - Corrosion loops (systems)
 - potential degradation mechanism
 - integrity operating parameters
 - RBI study validity window
- ✓ Summary S-RBI analyses
 - Criticality distribution
 - Focus on critical equipment and piping
 - Optimised Inspection Interval
 - Summary of equipment with intervals < TA interval
 - High level inspection plan
 - Follow-up actions and recommendations
- ✓ Shared knowledge and buy-in by stakeholders
- ✓ Auditable process (transparency)

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Implementation experience [1/2]

Study based on present knowledge and experience

- Evergreen RBI in the run and maintain phase
- Progressing insights – failure (degradation) modes – during
 - inspections and turnarounds
 - failure and incident investigations
- Need for knowledgeable team members and shared experience from the industry (standards and procedures)

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Implementation experience [2/2]

Actions and recommendations

- Interaction with other work processes, i.e EI, ME, TA, ESP, MOC.....

Competence of RBI facilitators

- RBI knowledge (i.e. API 580, CEN)
- Facilitation skills
- Project management skills
- Methodology skills


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How can CEOC play a role?

Inspection and certification bodies

- Standardisation and guidelines
- Certification
 - knowledge (i.e. API 580, CEN etc.)
 - facilitation skills
 - project management skills

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THANK YOU

Discover more at www.shell.com or contact:
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