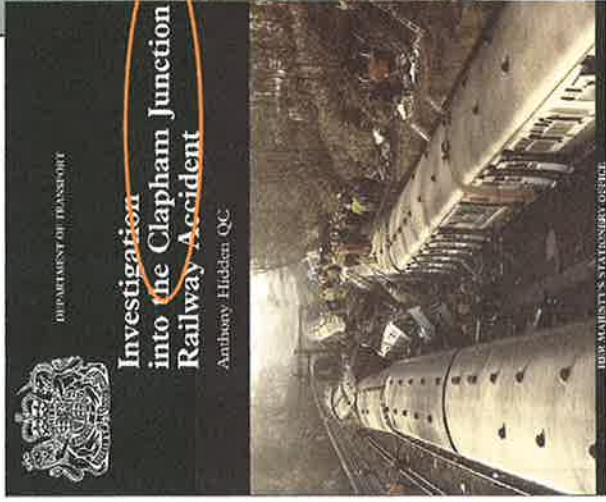


Asset Integrity Management



**“If you think safety is expensive
- try an accident”**



Bophal



Piper Alpha

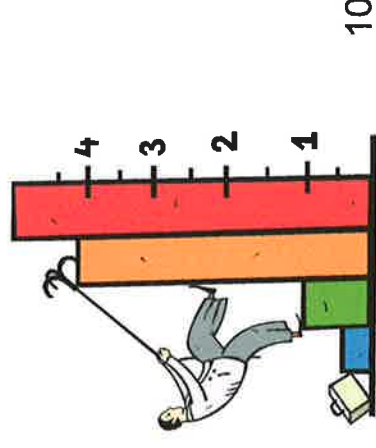
Thank you and have a nice evening.

Asset Integrity Management Corrosion Under Insulation

- **Implementation**
 - Design for Prevention of CUI
- **Continues Improvement**
 - Learning from Near Misses
 - Learning from Case Studies



- **Proactive Maintenance**
 - FMECA – PDCA – Kaizen – Six Sigma ...



Asset Integrity Management Corrosion Under Insulation

CUI approach:

- NDE Screening Methods
- External Visual Inspection (with or without removal of insulation).
- Ultrasonic Thickness Measurement (with or without removal of insulation – through inspection openings).
- Flash Radiography.
- Guided Wave Ultrasonic.
- Profile/Flash Radiography.
- Pulsed Eddy Current.
- Digital/Real Time Radiography.
- Infrared.
- Neutron Backscatter.
- Dye Penetrant Testing.
- Guided Wave Ultrasonic.
- Moisture detection Probe.



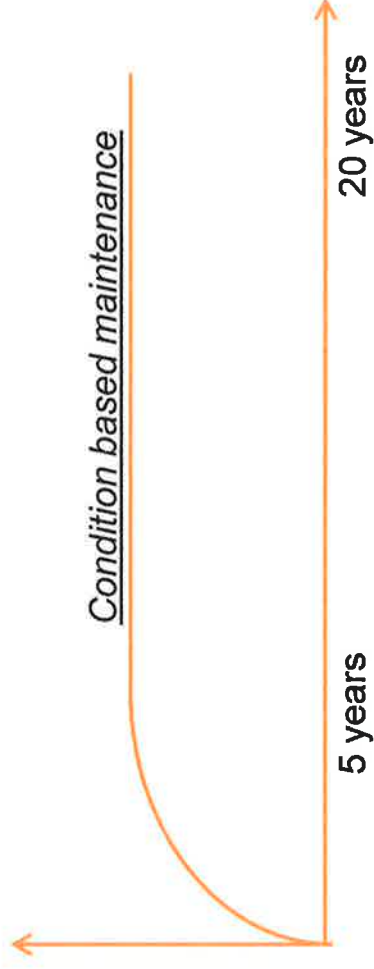
➤ Best Practice

Asset Integrity Management Corrosion Under Insulation



CUI approach:

- Planning and Inspection
- Time based contra Condition based (NDE screening)!



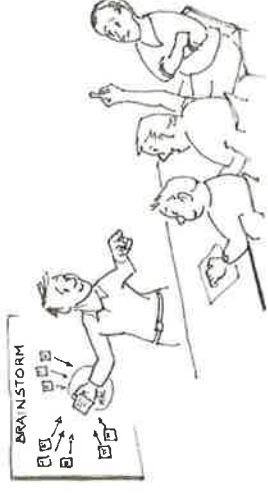
Asset Integrity Management

Corrosion Under Insulation



CUI approach:

- Inspection and Maintenance
- Challenging for the need for Insulation
- Data Validation and Reality



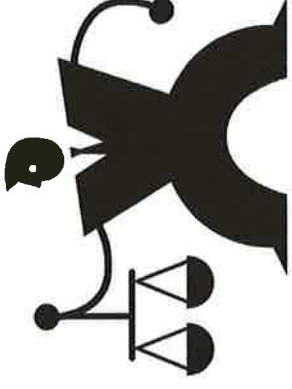
- RBI
- Methodology for CUI
- Risk Assessment Matrix

Severity	CONSEQUENCES				INCREASING LIKELIHOOD				
	People	Assets	Environment	Reputation	A	B	C	D	E
0	No injury or health effect	No damage	No effect	No impact	Never heard of in the Industry	Heard of in the Industry	Has happened in the Organisation or more than once per year in the Industry	Has happened at the Location or more than once per year in the Organisation	Has happened more than once per year at the Location
1	Slight injury or health effect	Slight damage	Slight effect	Slight impact					
2	Minor injury or health effect	Minor damage	Minor effect	Minor impact					
3	Major injury or health effect	Moderate damage	Moderate effect	Moderate impact					
4	PTD or up to 3 fatalities	Major damage	Major effect	Major impact					
5	More than 3 fatalities	Massive damage	Massive effect	Massive impact					

Asset Integrity Management Corrosion Under Insulation

CUI approach:

- Cost analysis
- Cost/Benefit analysis:



- Policy
- Ownership and Responsibility:



- Strategy
- Unit Prioritisation:



Asset Integrity Management Corrosion Under Insulation

Examples:



with loose wires. The buckled area is in the



Asset Integrity Management



- Why is HSE important?
- Whom are HSE important for?
- How can we measure HSE – or find the best KEY?

Company example:

Score from 1 to 5 and weighted between 0,33 – 0,66 or 1,00.

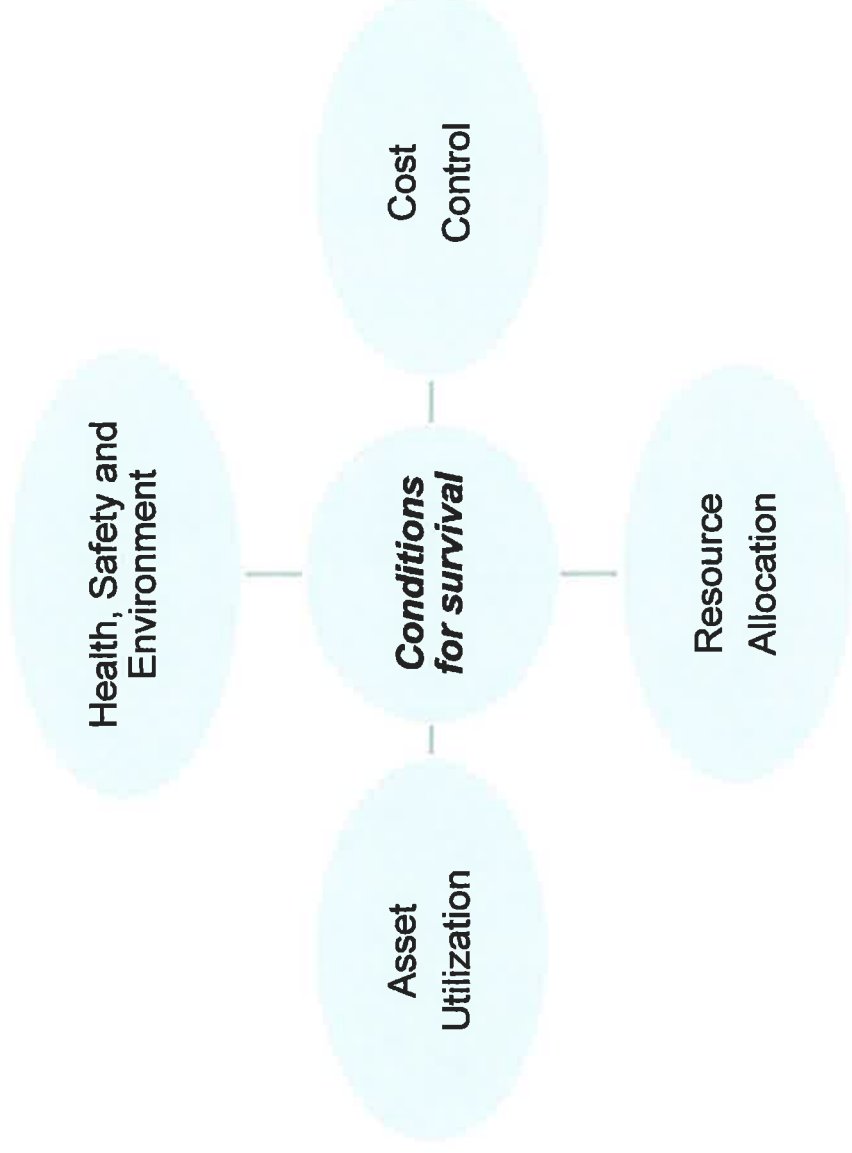
- *Politics* = 4 x 0,66 = 2,64
- *Work instructions* = 3 x 0,66 = 1,98
- *Education* = 3 x 0,66 = 1,98
- *Registration of incidents and near miss* = 4 x 0,66 = 2,64
- *Asset integrity* = 5 x 1,00 = 5,00
- *Management of reengineering* = 3 x 0,66 = 1,98
- *Supervision of extern workers* = 2 x 0,33 = 0,66
- **Total SHE score = 16,8/(0,66+0,66+0,66+0,66+1,00+0,66+0,33) = 3,65**

- **Asset Integrity**
 - Corrosion Under Insulation (CUI)

Asset Integrity Management



- What is most important when we are thinking maintenance?
- What is conditions are controlling our opportunity hfor survival?



Svend Aage West



- **Senior Consultant from 2009**
- **Director at Center of Asset Maintenance management in Denmark from 2006 to 2009.**
- **Rector at Fredericia Marine Engineering College from 1984 to 2006**
- **Member of European Certification Committee in EFNMS from 1996 to 2000.**
- **Member of European Training Committee in EFNMS from 2000 to 2008 .**
- **Had written many articles and papers about maintenance. The latest one is the most used maintenance book in Danish (475 pages).**
- **Main developer of Maintenance Management education in Denmark**
- **Chairman of the presidium of the Danish Maintenance Society from 2007.**
- **The Danish representative in European federation for National Maintenance Societies (EFNMS) from 1995.**
- **Member of the steering committee of World Maintenance Forum.**
- **Member of the Health, Safety and Environment committee in EFNMS from 2009.**
- **He is 64 years old, married and have two married children with 7 grandchildren .**
- **Educated as Marine Engineer in 1969.**
- **Educated as fitter and mechanic in 1966.**

Asset Integrity Management



Corrosion under insulation