

# 8<sup>th</sup> Chemical Process Safety Sharing (CPSS)

Presentation Topic

## CUI Practices, Findings and Improvements

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# Introduction



Corrosion under insulation (CUI) plays a vital role in managing an integrity of the pipes. CUI is an unavoidable problem which is potentially cause loss of containment and leading to the injury in hydrocarbon plant. BST has been established for 30 years, around 80% of pipe issues CUI was found in our plant. It is a significant challenge in our plant for reasons of high cost and risk because it proceeds undetected under insulation. The mitigation and inspection are set up to reduce and eliminate this problem. **This presentation illustrates the procedure; activities have been done so far and the solutions implemented such as insulation improvement. It will then show digitalization can be developed, contributed to decrease the risk and cost of CUI problem.**

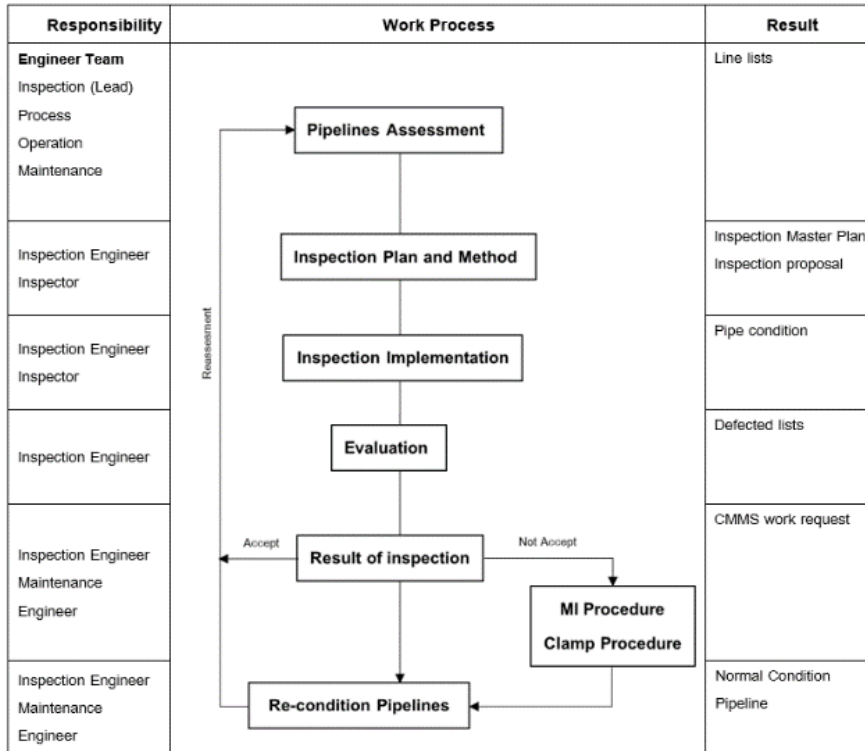


# Procedure & Workflow

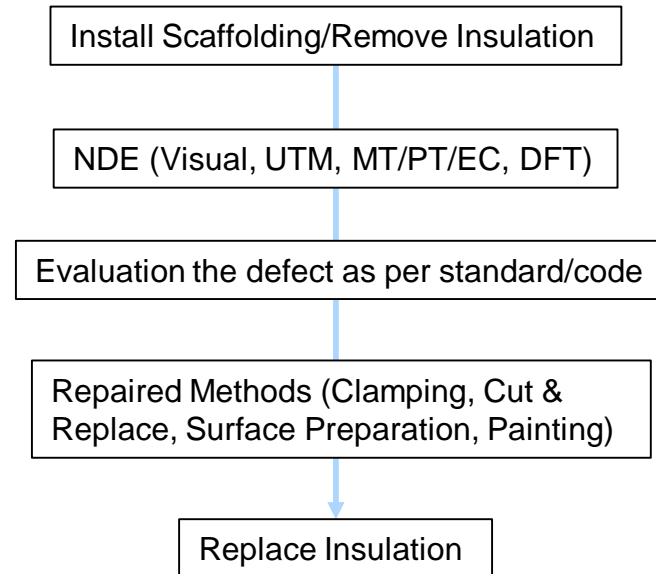


## PROCEDURE

INSPECTION (Related Code & Standard API570, API580, API581, API583, ASME B31.3, ASME PCC2)



### Steps of Work

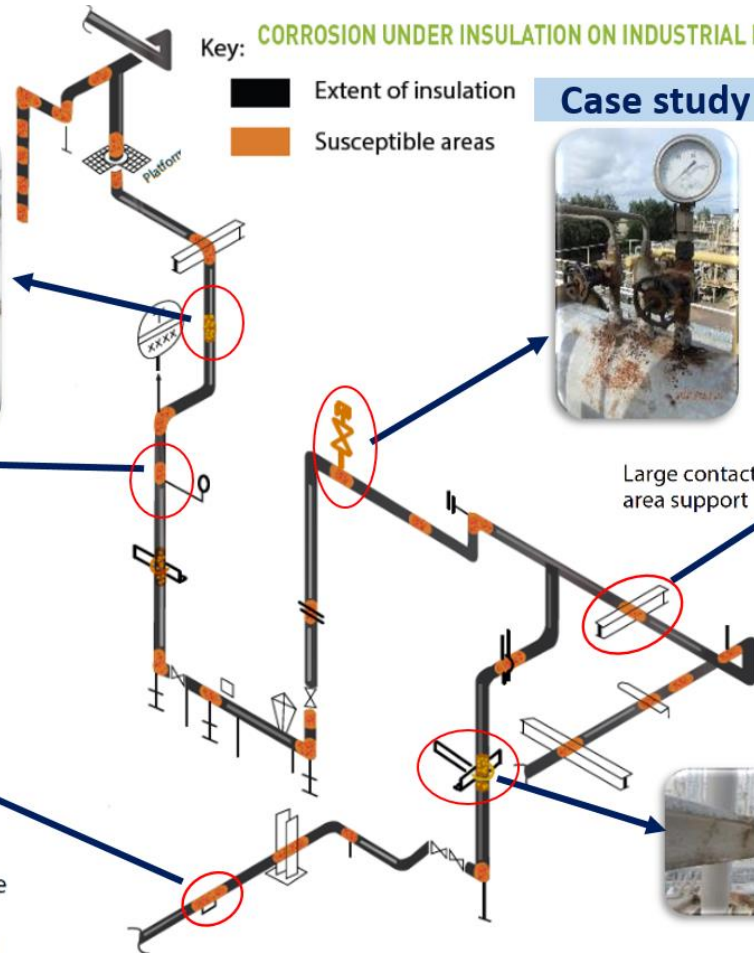


# Corrosion Under Insulation

## Susceptible areas CUI&CUS

Key: CORROSION UNDER INSULATION ON INDUSTRIAL PIPING

- Extent of insulation
- Susceptible areas



Case study 1



Case study 2



Small bore connection protruding through insulation

Case study 3



Shoe support (can be susceptible depending on height of vertical section and insulation standard)

Case study 4



Vents (and drains) protruding through insulation (typical)

Case study 5



Large contact area support

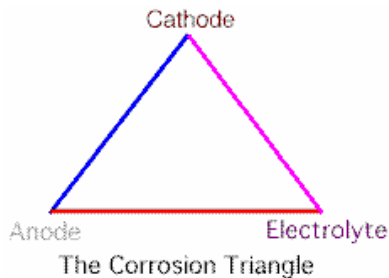
Case study 6

U bolt attachment – protruding through insulation





# Improvement & Future Plan



## Eliminate/Minimize corrosion (Major Factor)

- Control the environment, such as humidity (**Impractical**) (BST improved insulation and cladding to reduce water accumulates)
- Improve material (BST improved some material of pipe support)
- A barrier between metal and electrolyte (BST improve coating spec and apply)
- Cathodic protection (BST implemented)

## Monitor (Minor Factor)

- Inspection Plan and increase area of inspection (BST implemented)
- Tool of warning –studying ★ (BST plans to install 100 monitoring points of CUI sensor)



## BST (Insulation cladding Improvement)



Before



After



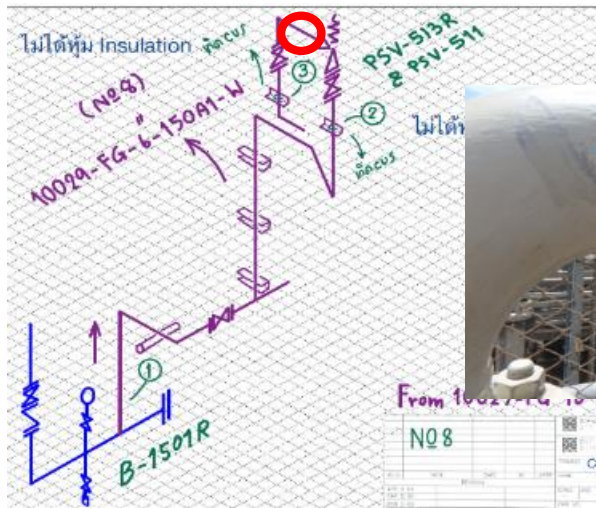
Before



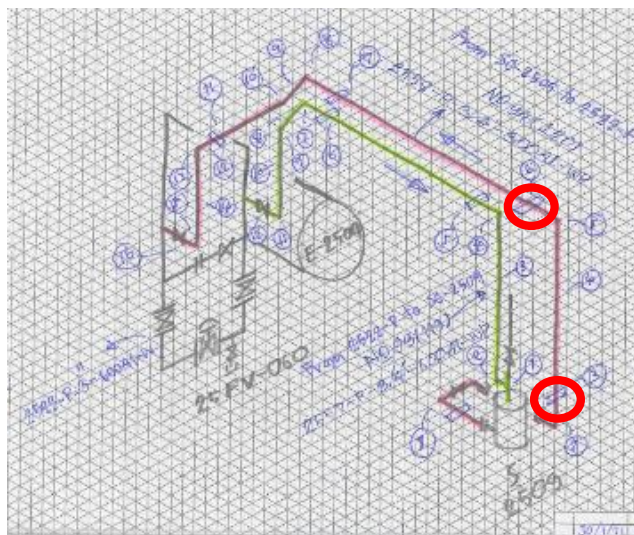
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# Example cases



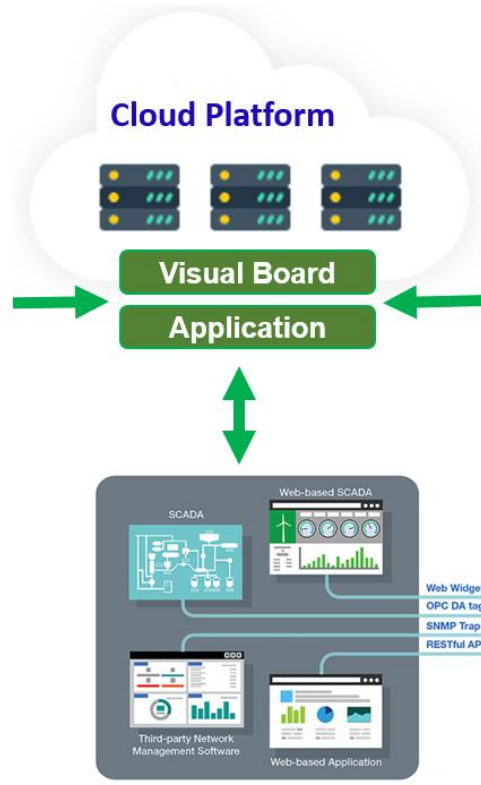
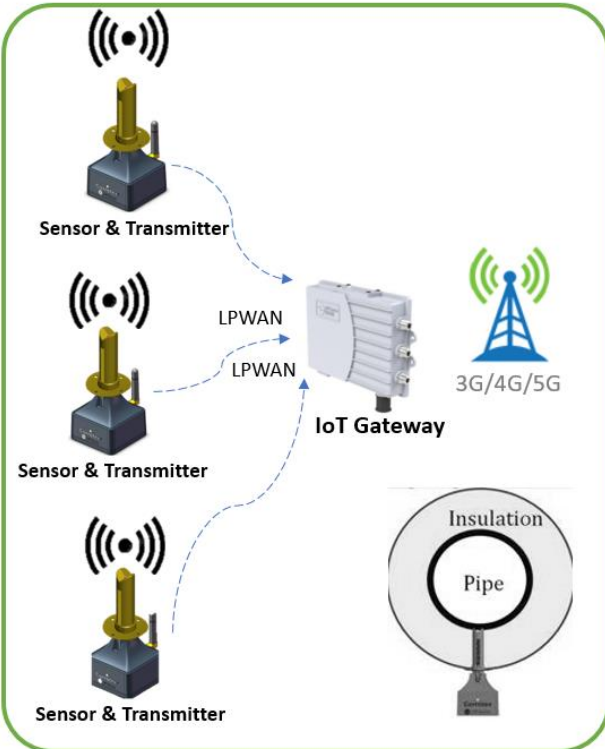
BST (I-rod and Nu-bolt )







## CUI sensor device system



## Smart Workforce





Thank you for your attention



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