CASE STUDY

Carbontech Case study 026

Co2 Skid Valve Flanges

CARBONTECH

COMPOSITE SYSTEMS

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PROJECT DETAILS

Case Study Number

CTCS:026

Design Pressure

24.13 Bar

Repair Summary

CUI

Operating Pressure

19.65 BAR

Client

Linde Gas Singapore Pte Ltd

Design Temperature

93.33°C

Service Type

CO^2

Operating Temperature

-18.2°C

Wrapping was conducted in ambient condition

Line Size

11/2"

Base Material

Carbon steel

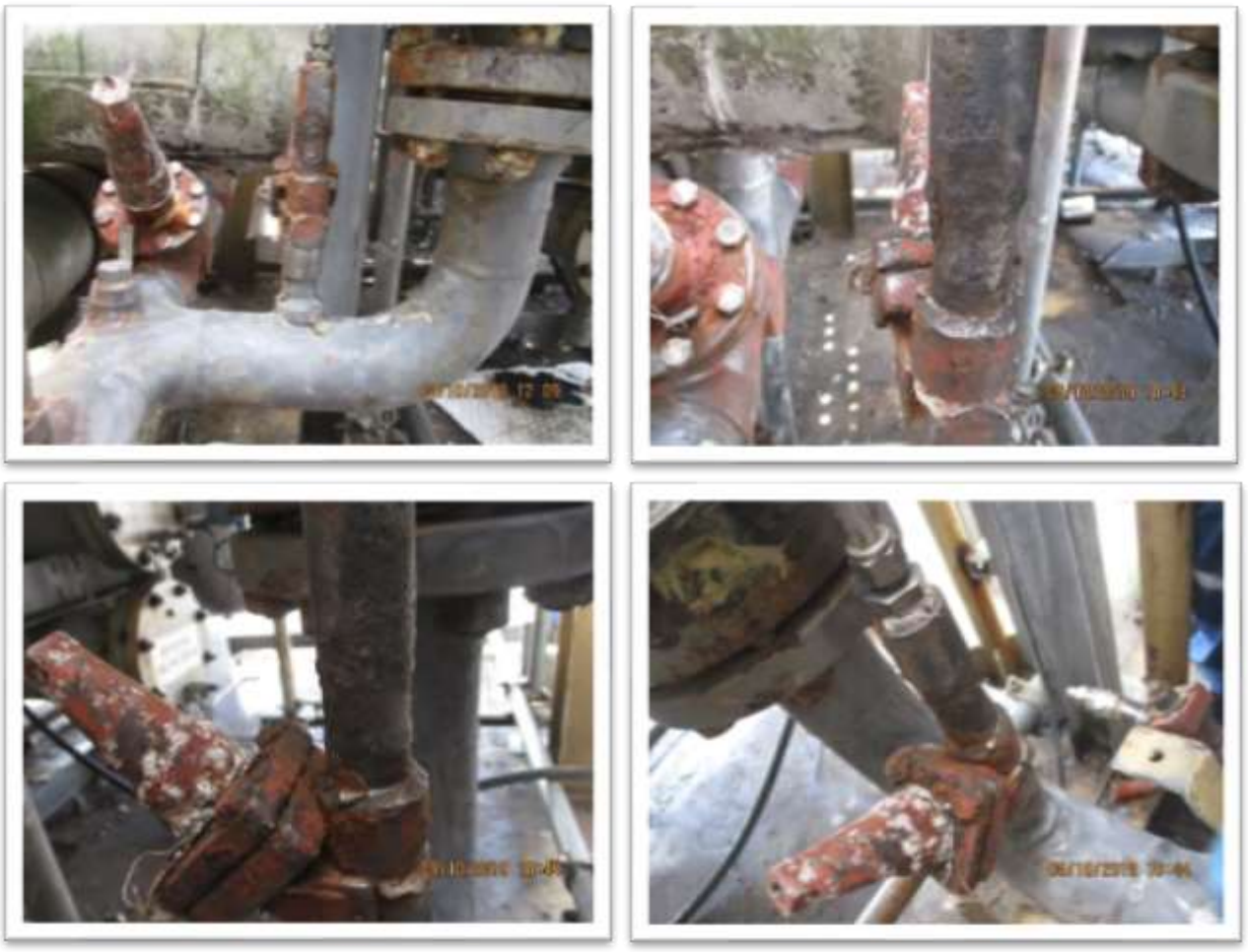
Line Class

N/A

ANOMALY DESCRIPTION

Severe corrosion was observed on vent line upon removal of insulation. (See Figure 1).

Fig 1: CO2 Nozzle



INTEGRITY CONCERNS

The occurrence of CUI (Corrosion under insulation) in the straight pipe signifies compromised structural integrity. In consideration of the process service (CO2), as well as the extensiveness of the defect, this hazard poses a significant risk. Failure to resolve can potentially lead to loss of vital function

THE CARBONTECH SOLUTION

To address the CUI (non-through-wall defect), a carbon fibre composite laminate repair was applied to provide structural pressure containment as the wall loss experienced by the pipe negated the substrate's load-carrying capacity. The substrate surface preparation consisted of manual intervention (Sand paper and filing) to achieve a sufficient surface profile for adequate adhesion between the substrate and the laminate. The laminate was applied as a spiral wrap consisting of 4 layers for a total repair length of 90 mm and the appropriate cure cycle was executed. The installed Revowrap 110 composite repair system is fully qualified and compliant with ASME PCC-2 to meet the demands of petroleum, petrochemical and natural gas industries for various service types. Figure 2 illustrates the application of the repair solution system and the completed wrap respectively

Surface Preparation achieved: SP3
Product used: Revowrap 110
Engineering calculations: ASME PCC2
Layers used: 4 layers
Post cured: Not Required

Fig 2: Completed wrap

CONCLUSION

The composite repair system designed by Carbontech and satisfying the ASME PCC-2 standard was successfully installed. The corrosive nature of the process fluid and the length of the defect presented a challenge for the repair solution which was expertly addressed by Carbontech. As a non-through-wall defect repair, the laminate wrap provides structural integrity to the pipe in accordance with the required design specifications that will withstand the internal corrosion for the remainder of the required design lifetime

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We strive by a zero-failure philosophy and warrant our engineered composite solutions are tested, proven and validated. We vow to provide dependable, responsible and accurate information regarding the capabilities of our systems

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