CASE STUDY

Carbontech Case study 002
12" Straight Pipe Repair

CARBONTECH
COMPOSITE SYSTEMS

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PROJECT DETAILS

Case Study Number
CT-CS:002

Design Pressure
34.7 BARg

Repair Summary
9 Meter Internal corrosion

Operating Pressure
5 Bar

Client
Astron Energy Refinery

Design Temperature
48°C

Service Type
White oil

Operating Temperature
25°C

Line Size
12 Inch

Base Material
Carbon steel

Line Class
NA

ANOMALY DESCRIPTION

Upon inspection of a 12" crude oil pipeline, a defect of approximately 9000mm was detected in a straight section of the pipe caused by internal corrosion. The pipe was below ground level- requiring excavation (see **Error! Reference source not found.**).

INTEGRITY CONCERNS

The occurrence of internal corrosion in the straight pipe represents compromised structural integrity. Considering the process service (white oil), as well as the length of the defect (9000mm), this hazard poses a significant risk that, if not resolved, could potentially lead to loss of containment. This would ultimately be disastrous for the plant, and the environment and any personnel in the vicinity of the pipe defect.

Figure 1 Excavated white oil straight pipe section.

THE CARBONTECH SOLUTION

Surface Preparation achieved: SA2.5
Product used: Revowrap 110
Engineering calculations: ASME PCC2
Layers used: 4 layers
Post cured: Not required.

To address the internal corrosion (non-through-wall defect), a carbon fibre composite laminate repair was designed 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 sand blasting 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 8 layers for a total repair length of 9255mm 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 and Figure 3 illustrate the application of the repair solution system and the completed wrap respectively.

Figure 2: Application of the carbon fibre composite laminate repair system.

Figure 3: Completed carbon fibre composite laminate repair solution.

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.

CARBONTECH

The place chemistry, engineering and global expertise are brought together to drive progressive innovation in advanced composite technologies for the emergency repair of critical assets "There is nothing generic about us" we don't just sell pipe wraps; we provide accurate engineering backing to deliver tailored solutions

Sound and responsible engineering is the basis on which we build our company, products and services. It is the core to our success and it is the foundation on which we have engineered and manufactured our innovative and bespoke products

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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