

CASE STUDY

Carbontech Case study 021
High Temperature, High Pressure steam line



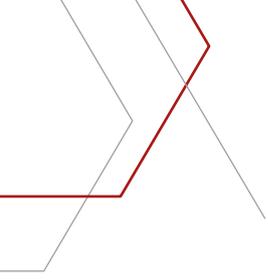


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PROJECT DETAILS



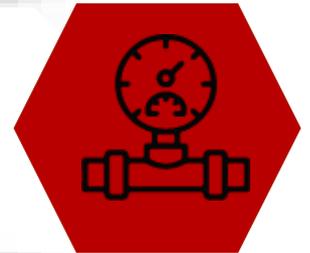
Case Study Number
CTCS:021

Design Pressure
125 Bar



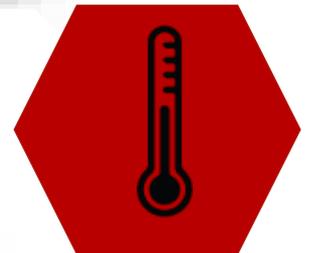
Repair Summary
Internal corrosion on
numerous 1" to 4" lines

Operating Pressure
125 Bar



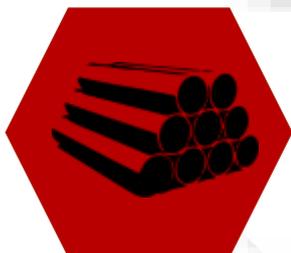
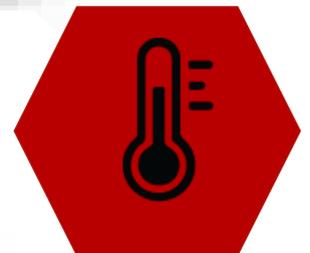
Client
Astron energy

Design Temperature
245°C



Service Type
Saturated steam

Operating Temperature
221°C



Line Size
2"

Base Material
SA-516 Gr-70N



Line Class
300#



ANOMALY DESCRIPTION

Numerous through-wall defects were detected caused by internal corrosion on the entire steam system of this unit. The defects ranged from severe internal corrosion to large through wall defects which needed to be plugged and repaired before wrapping the lines for a permanent repair

Figure 1:

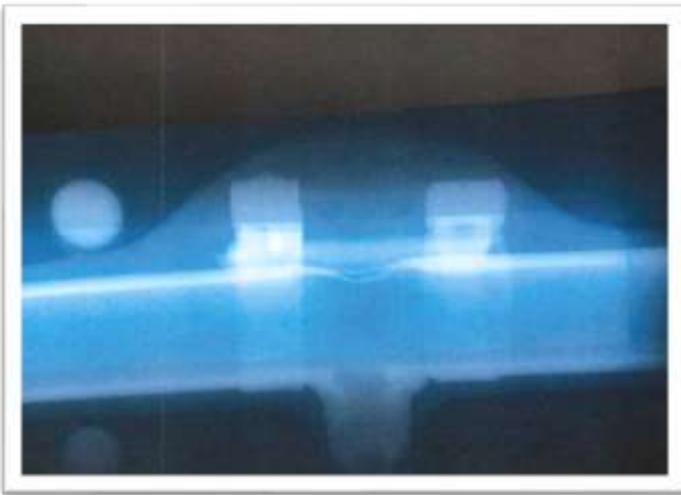


Figure 2:



INTEGRITY CONCERNS

The active leaks represent loss of containment. Such defects is a manifestation of severe internal corrosion indicating compromised structural integrity. Considering the operating temperature and pressure, this hazard poses significant risk to on-site workers. Additionally, the steam pipeline component has ceased to perform its desired function as a system component- providing potential for further unintended consequences.



THE CARBONTECH SOLUTION

The leaks arrested by clamps. The substrate surface was prepared in accordance with the SSPC-SP2 standard to achieve the required surface profile. Revofill putty was applied over the clamps to produce a smooth profile to which the wrap was applied. The 50 mm carbon fibre tape was applied in spiral wrap consisting of 4-6 layers. The surface temperature of the pipe was confirmed to exceed the minimum set temperature for the epoxy resin and the post-cure cycle was achieved by the skin temperature of the pipe (97 °C). A full quality control was carried out post installation. The installed Revowrap 225 composite repair system is fully qualified and compliant with ISO 24817 to meet the demands of petroleum, petrochemical and natural gas industries for various service types- including steam.

Figure 1 illustrates the final repair system and a radiographic scan (see Figure 2) confirmed the desired outcome of the solution.

Surface Preparation achieved: SA2.5
Product used: Revowrap 185
Engineering calculations: ASME PCC2
Layers used: 4 layers
Post cured: Not Required - Line temperature provided sufficient heat to cure the wrap.

Figure 3:



Figure 4:



CONCLUSION

The composite repair system designed by Carbontech and satisfying the ISO 24817 standard was successfully installed. The complex geometry associated with elbows, tees and the clamped plates, required to arrest the leak, presented a novel challenge for the repair solution which was expertly addressed by Carbontech. As a through-wall defect repair, the laminate wrap provides structural integrity to the pipe- in accordance with the required design specifications in addition to providing internal corrosion protection with a design lifetime of 1 year.



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

www.revowrap.com

CONTACT DETAILS

Office: +27 (0) 10 446 6866

Email: info@revowrap.com

PHYSICAL ADDRESS:

Unit A5 • Growthpoint Industrial Estate • Bell Street • Meadowdale Germiston • 1614 • South Africa

PROGRESSIVE COMPOSITE ENGINEERING

