



CLOCK SPRING®

Pipe Support

The Fast, Economical Solution for Low Pressure Pipeline Repair



3 x 18" repairs were made in support locations.

The Pipe could not be raised so blocks were inserted and the supports were cut away. The pipe was then hand prepared to remove all traces of zinc paint and any corrosion scabs.

The 3 repairs were completed within 2 hours.



FOR FURTHER INFORMATION ON CLOCK SPRING® REPAIR SOLUTIONS CONTACT:

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CLOCK SPRING®

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Steel Works

Tight Access

Location:

Western Europe – Steel Works

Pipe Details:

20" diameter
45.5 barg design pressure
-20 to +50°C operating temperature
Contents is oxygen gas
12.7 mm original wall thickness

Defect Details:

Up to 50% internal wall loss in 2 patches with a maximum axial length of 200 mm.

Repair Application:

The existing epoxy coating was removed using sanding disks and the bare pipe metal was exposed, grit blasting was not suitable at this location.

High compressive strength filler was placed in the defect area, to pass the loading from the defect to the Clock Spring.

A 20" Clock Spring was installed under the supervision of a Clock Spring technician using the "hand spool" method which is used in areas with tight access.

The repair is considered permanent with a 50 year validated lifetime.

Repair Time:

½ a day including cleaning of the pipe using wire brushing and sanding disks.



Defect and surrounding pipe cleaned to S.T. 3



Repair installed using the "hand spool" method



Repair tightened and taped while it cures



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Leak Repair

Location:

Western Europe

Pipe Details:

8" diameter straight pipe
7 barg operating pressure
30°C operating temperature
8.18 mm original wall thickness
1300 kN equivalent axial load
Cooling water line contents

Defect Details:

Wall thinning in the air to ground interface zone with pinhole leaks present, which were sealed using a clamp.

Repair Application:

A repair was designed by the Clock Spring Technical Centre using ISO 24817.

The leak was sealed using a clamp and plastic steel was placed around the edges of the clamp. The pipe was then cleaned using water and sand blasting.

12 layers of Clock Spring Contour were applied over the pipe.

Repair Time:

3 days on-site using Clock Spring Contour trained and approved technicians.



Area to be repaired with 3 pinhole leaks present



Clamp applied over the leaks and sealed with plastic steel



12 layers of Clock Spring Contour applied, the leak has been completely stopped



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**Leak Repair &
Flange Encapsulation**

Location:

Western Europe

Pipe Details:

30" diameter with 18" diameter tee
2 barg operating pressure
30°C operating temperature
9.53 mm original wall thickness

Defect Details:

Wall thinning at the air to ground interface with some pinhole leaks. An encapsulation of the blind flange was also needed.

Repair Application:

A repair was designed by the Clock Spring Technical Centre in accordance with ISO 24817 guidelines.

The pipe was cleaned using a slurry blast system. Pinhole leaks were then sealed with plastic steel and any sharp gradients were tapered out.

19 layers of Clock Spring Contour were applied.

Repair Time:

4 days on-site using Clock Spring Contour trained and approved technicians.



Area to be repaired



Plastic steel used to seal leaks and taper any sharp gradients



Repair nearing completion



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Mitre Bend Repair

Location:

Western Europe

Pipe Details:

14" diameter bend
2 barg operating pressure
30°C operating temperature
9.53 original wall thickness



Area to be repaired after sand blasting

Defect Details:

3.2 mm of wall thickness remaining.

Repair Application:

A repair was designed by the Clock Spring Technical Centre using ISO 24817.

The pipe was cleaned using water and sand blasting.

15 layers of Clock Spring Contour were applied over the pipe.

Repair Time:

3 days on-site using Clock Spring Contour trained and approved technicians.



First 4 layers installed and left to cure



Completed repair



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Pipeline

Casing Spacers

Location:

Atmore, Alabama, U.S.A.

Pipe Details:

8" pipeline, X-52, double fusion bonded epoxy coating

Operating pressure 975 psi

Encased pipe under highway (HCA)

Defect Details:

Replacement with new pipeline.

Pipe had defect from original pull where spacers failed to stay in place.

Repair Application:

Existing pipeline was cut and pulled through casing for removal. Almost all of the existing casing spacers were broken, showed significant corrosion at bolts, and many failed to hold during pipe removal. Clock Springs were custom cut to 5 ½" widths and used as casing spacers to provide protection of girth welds and pipeline during installation.

Repair Time:

57 units, spaced 12' apart, were installed on new pipe sections in advance of installation. The crew of 10 installed all 57 units in 8 hours. Sections were then assembled on-site. Entire replacement of pipeline took approximately 4 days.



Clock Springs pre-installed on pipe sections



Casing spacers at girth weld joint



Clock Spring cut to 5 ½" width and installed as casing spacer



Spacers from old pipe, failed to stay in place when pipe removed – with corrosion

Before



After





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Internal Corrosion

Location:

Middle East

Pipe Details

Line contents is Naphtha
10" pipe diameter
7 Barg operating pressure
70°C operating temperature
9.27 mm nominal wall thickness
30 m repair length

Training Delivered:

A Clock Spring technician was mobilised to train the asset owners chosen contractors how to install the repair through a variety of classroom and practical sessions over 5 days. The contractors then had a test spool pressure tested to validate them to install the repair, prior to beginning installation on the main pipe.

Repair Application:

The pipe was grit blast in a series of stages to Sa 2 ½ and then preserved using CS 600 epoxy resin and peel ply. 5 layers were then installed across the 30 m of pipe including bends and tees with full installation taking around 5 days.

Repair Designed:

The repair was designed by the Clock Spring Technical Department in the United Kingdom to the standards set out in ISO 24817. The repair required 5 layers to seal a 100 cm² hole for a lifetime of 20 years.



A vertical, horizontal and 2 bends repaired with Clock Spring Contour



A straight section of pipe wrapped with Clock Spring Contour



Vertical section of pipe, bend and horizontal section of pipe wrapped with Clock Spring Contour



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Pipeline

External Corrosion

Location:

Benelux

Pipe Details:

10" natural gas pipeline
66.2 Barg design pressure
14.4°C operating temperature
5.56 mm original wall thickness
4.89 mm remaining wall thickness

Defect Details:

External corrosion due to a holiday in the corrosion coating which was spotted early due to regular pigging. A Clock Spring was applied to prevent further corrosion and reinforce the area of wall loss.

Repair Application:

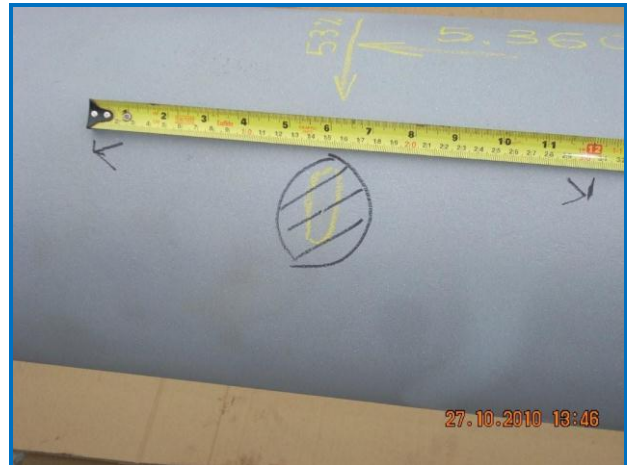
Pipe was excavated and grit blast to Sa 2.5 prior to the application commencing. One 295 mm wide Clock Spring was placed over the defect with the installation taking 20 minutes. After 2 hours curing marker bands were installed, the repair was coated and the hole back filled.

Repair Lifetime:

The repair has a proven lifetime of > 50 years.

Marker Bands:

Clock Spring approved marker bands were applied to the edges of the repair, these highlight the repair area when future MFL pigging is used.



Pipe cleaned to Sa 2 ½ and defect area marked and measured.



Installation of the Clock Spring Composite Sleeve using a trained technician.



Repair completed and marker bands applied.