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A PERMANENT SOLUTION

MATT BOUCHER, CLOCK SPRING, USA, DETAILS A SOLUTION FOR PIPELINE PROTECTION AT SUPPORT AND HANGER LOCATIONS, WHICH CAN PREVENT PIPELINE CORROSION AND REDUCE INSPECTION COSTS.

Terminals, plants, transmission pipelines and refineries require a wide range of pipe support configurations to protect pipelines from environmental factors and to meet government regulations on atmospheric corrosion. Pipelines are subject to movement, elongation, severe weather conditions and other physical wear and tear that all take their toll on pipeline integrity. Corrosion and defects at pipe support locations complicate maintenance procedures and require costly repairs and inspections, which can interrupt service and production.

Operators seek a solution that provides protection and prolongs the life of damaged pipe. An example of this is Clock Spring's Pipe Support product, which provides both a preventive

and a rehabilitative maintenance solution, helping pipeline operators maximise safety, productivity and efficiency.

Corrosion inspection

Atmospheric corrosion occurs when the pipeline surface collects moisture due to rain, fog and/or precipitate. Aside from weather conditions, air pollutants and material conditions can also result in corrosion.

Regulatory bodies around the world require routine maintenance and inspections for early detection of corrosion. Operators must inspect each exposed pipeline, or portion of exposed pipeline, carrying gas or liquid for evidence of atmospheric corrosion. Pipeline inspections must occur at least

once every three years, not exceeding 39 months. Corrosion inspections are required in all sectors: upstream, midstream and downstream.

These inspections require visual and nondestructive examination (NDE) and mapping of pipe integrity in 360°. They require lifting the pipeline to understand what is happening underneath the pipe at the support contact point. For pipes located in areas of restricted access, it is difficult to facilitate these tests since access is severely limited.

A better repair and support solution

The traditional solution to preventing the effects of abrasion, movement and atmospheric corrosion has been a thin layer of epoxy and a fibreglass reinforced plastic (FRP) pad at the support location. Unfortunately, in many cases, the epoxy that operators traditionally use at support locations is not durable. The epoxies fail as a result of pipe movement and moisture ingress, and the FRP pads cannot stay in place. Water collects at the contact point and corrosion often occurs underneath the support system due to the deterioration of the epoxy, FRP pad and coating.

Clock Spring created a permanent repair application in response to this challenge. Applied directly to the pipe or over the defect, the company's Pipe Support protects the pipe and the support location from the effects of movement and moisture, and minimises the likelihood of atmospheric corrosion.

Clock Spring's Pipe Support is a derivative to the original Clock Spring product and comprises:

- A fibreglass composite sleeve installed with high performance adhesive and filler material that permanently bonds to the pipe and provides 360° encapsulation.
- External resin and/or biaxial glass layers that act as a bearing surface to protect the inner layers from wear.

Pipe is subject to various terrains and geographies, increasing the likelihood of crevice and galvanic corrosion and erosion. Specifically, transmission pipelines located along rivers,

mountains, plains and farmland are at greater risk. The pipeline operator is often challenged with identifying a permanent repair alternative that protects and reinforces the pipe at support locations located along the line. The operator must meet operating specifications, as well as transport product on time.

The robust layers of the Clock Spring Pipe Support system create a sacrificial wear plate, eliminating both crevice and galvanic corrosion. The repair accommodates both the weight of the pipe and abrasion from potential pipe movement. The fibreglass shield, when permanently bonded to the pipe, creates a 'non-corrosive environment' where the pipe comes into contact with the support. The high strength, corrosion resistant fibreglass sleeve provides 360° protection at metal to metal contact points, and is both easy to install and cost-effective to deploy.

For example, a natural gas transmission company used the Clock Spring Pipe Support at each of its mainline valve installations to protect the bypass lines at each support location. The pipeline was coated and reinstalled on the support in just two hours.

"Clock Spring Pipe Support protects the coating from abrasion and ensures that no water collects at support contact points and hanger locations," said Clock Spring CEO and President Matt Boucher. "The product minimises and extends re-inspection intervals required by the Department of Transportation, enhancing safety by eliminating the need for field work and heavy lifting equipment. It ensures asset integrity with a permanent solution and reduces costs incurred performing mandated inspections and future pipeline rehabilitation work."

Operators that install Clock Spring Pipe Supports can amend their mandated inspection requirement to a visual inspection of the physical condition of the supports instead of in-depth inspection checks. In an in-depth inspection, the operator must expose the pipe to deflection and workers to the safety hazards of heavy lifting equipment, requiring workers to lift the pipe away from the support to inspect for atmospheric corrosion.

"Inspecting every point of contact between the pipe and supports introduces unnecessary safety and integrity hazards, and is costly and time consuming," Boucher explained. "Clock Spring Pipe Supports remove and reduce hazards by eliminating the need for lifting equipment, help reduce costs and lower the chance of stress-induced failures due to multiple lifts of the pipe."

Responding to operator demand for wider sleeves

Clock Spring recently demonstrated a 1 m wide system to increase coverage, eliminate seams and help further prevent moisture build-up on the pipe. This new innovation, which the company calls Clock Spring Snap Wrap EX, can wrap around almost any pipe diameter and shield the pipe from environmental conditions. The wider sleeve significantly reduces the chance of the pipe coming under attack from environmental, mechanical and other variables, and combines multiple installations into one unit, maximising efficiency and safety.

The wider sleeve system can reach support locations that are not possible with other products, simply due to size



Figure 1. Workers installing Clock Spring's Pipe Support.

limitations. Both Clock Spring Pipe Support and Clock Spring Snap Wrap EX complement each other, as operators seek solutions with extended support locations.

“The technical challenges associated with ageing infrastructure, extending the life of assets and greater understanding of integrity issues are challenging us to create more enhanced and innovative new products. Our design focus is to always remove and reduce field safety hazards and variables while simultaneously developing solutions to enhance integrity that are easy to install, cost-effective to deploy and durable for decades,” Boucher said.



Figure 2. Clock Spring's Pipe Support applied to a liquid pipeline.



Figure 3. Clock Spring's Pipe Support applied to refined product pipe.

Case study one

Clock Spring Pipe Support was applied to a liquid pipeline in Pasadena, Texas (USA).

Pipe and defect details

Pipeline operators inspect support locations everyday throughout the world. Many operators use a Clock Spring 360° pipe support sleeve to eliminate lifting the pipe for pipes located in challenging areas. In this case, the contact point only requires a visual inspection process.

Figure 2 is an example of an elevated pipe. The height of the pipe limits access to heavy equipment, causing the operator to select the Clock Spring pipe support system.

Repair application approach

The continuous wrap protects the full circumference of the pipe. This sleeve, which is actually a series of split sleeves, is easy to install in tight spaces and limited clearance areas. In this particular case, installation was only 1 - 2 in. of clearance and done from a manlift.

This process minimises potential damage from lifting the pipe and enables the installation crew to move more efficiently at the jobsite.

Results

Pipeline operators can improve safety during federally mandated post inspections for atmospheric corrosion with a proper operating and maintenance plan using Clock Spring Pipe Supports.

The process reduces costs and saves time. The amended inspection process visually validates the ongoing bond between the Clock Spring Pipe Support and the existing pipe.

Case study two

Clock Spring Pipe Support was applied to a refined product pipe at a tank farm in Pennsylvania (USA).

Pipe and defect details

Pipeline operators often implement Clock Spring Pipe Support as preventative maintenance in order to protect bearing locations. In doing so, the pipe is protected and future mandated inspections are amended.

Figure 3 is an example of a 12 in. refined product pipe.

Repair application approach

Prior to installation of the pipe support system, the pipe was jacked, blocked and sanded with a mechanical grinder. Implementing a pipe support system as a preventive measure elevates the integrity of the pipe and reduces the risk of the operator having to interfere with production due to corrosion at support locations.

Results

Recently, auditors and inspectors have been focused on pipelines susceptible to atmospheric corrosion. Additionally, corrosion can be the result of different factors, which makes conditional monitoring difficult. The pipe support system acts as an insulator and prevents the onset of corrosion, ultimately benefiting the operator and increasing efficiency regarding inspections. 