

Atlas Provides Quick Dent Repair Solution for Liquids Pipeline

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USA

Summary

Through its extensive network of pipelines, a major North American energy supplier transports crucial resources, such as natural gas and crude oil, to support U.S. energy needs. This infrastructure not only fuels homes and businesses but also powers industries and contributes to economic growth. To ensure safe and effective operation is maintained, lines are routinely inspected for defects and degradation. During a routine in-line inspection (ILI) smart pig run, a defect was discovered in a high-pressure, high-temperature liquids pipeline. As the most-tested, high-temperature, carbon fiber composite solution for the permanent repair and rehabilitation of pipelines and piping structures, [Atlas™](#) was selected for the repair.

Benefits

- Ideal for repair of corrosion, dents, gouges and wrinkle bends
- Permanent repair with minimal disruption to pipeline operation
- Flexible repair system for complex deformities and geometries, including those in areas of low clearance
- Engineered for permanent repair and rehabilitation of pipelines and piping structures operating at high temperatures up to 450°F (232°C).
- Installed and inspected with cost-effective field labor
- Reduce time and cost in the ditch, repairing more anomalies in less time
- Can be installed over non-injurious hard spots and laminations without safety risk, reducing the total repair length, cost and time required compared to steel sleeves

Challenge

An 8.4-inch-long dent was identified on a 30-inch diameter carbon steel pipe used to transport crude. The circumferential extent of the dent was 6.1 inches, with a maximum depth of 0.159 inches. A repair compatible with the high-temperature, high-pressure operating conditions of the pipe was required.



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ILI smart pig markers were put in place for easy monitoring of the repair.



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The Atlas repair is wrapped with a protective wrap prior to curing.

Solution

CSNRI proposed a customized solution for the repair with Atlas. Atlas is engineered to repair pipelines and piping systems that have experienced third-party damage, such as dents, gouges and scratches. The carbon fiber composite solution restores the original strength of pipelines experiencing both common and complex pipeline anomalies.

Application

The repair area was grit-blasted to remove any original coatings and then cleaned with acetone. An EP-HT epoxy filler material with very high compressive strength and modulus was applied to the unusually angled dent to reshape the defect and provide a transitional zone while maintaining stress distribution from the substrate to the composite. Next, an epoxy coating was applied to the entire repair zone. ILLI smart pig markers (magnets) were installed at both ends of the repair. The solution, a custom design utilizing the Atlas system, included 12 layers wrapped in an offset method for two linear feet to restore the structural integrity of the pipeline to its original function and strength. The repair was then covered with constrictor wrap and post-cured with heating blankets. The constrictor wrap was removed and a customer-supplied topcoat was applied to further protect the repair.

Results

The Atlas repair was completed in one hour and 16 minutes by three CSNRI wrap installers and contractor personnel. After 10 hours of post-curing, the resulting repair measured between 82 and 96 on the Shore D hardness scale. The simplicity and efficiency of the field-applied solution resulted in minimal interruption of operations in a specific segment of the pipeline. The repair restored the integrity of the pipeline, resulting in an immediate and effective return to operation.



A heat blanket was applied over the constrictor wrap to expedite the curing process.



The completed Atlas repair fully restored structural integrity and pipe function.