

Line Lifting Methods For Addressing Corrosion Under Pipe Supports

Abstract

On-stream inspection techniques exist that inspect for Corrosion Under Pipe Supports (CUPS), also known as Touchpoint Corrosion. These include Electromagnetic Acoustic Transducer (EMAT), Guided Wave and others. These methods are effective at evaluating corrosion severity, especially at pipe touchpoints, without the need for lifting. Before their arrival it is necessary to perform a direct visual inspection and/or UT measurement at the touchpoint rather than at some distance away from it.

These new methods allow operators to reduce the costs of performing inspections. However, to mitigate any identified problems, line lifting is still required at touchpoints to perform necessary repairs.

Many pipe lifting methods have been developed or simply implemented that are unsafe, costly, or impractical, in many instances compelling operators to rely on them only in critical situations such as when there is a loss of containment.

This paper discusses the conventional methods of line lifting, their benefits and shortcomings for various pipe sizes and layouts and introduces recommended engineering and safety requirements that support a proactive approach to addressing Corrosion Under Pipe Supports.

Introduction

Petrochemical facilities and refineries consist of many miles of above ground piping that transports product between processing and storage units. These pipes are either supported at ground level or in multi-story pipe racks on varying types and sizes of supporting structures. A common problem these structures create is corrosion and erosion at the junction between the pipe and the support, which reduces the remaining wall thickness of the pipe and compromises the integrity of the entire system.

Inspection techniques such as EMAT and Guided Wave Ultrasonics allow owners to safely inspect and provide qualitative information about the condition of these touchpoints while the lines are on-stream and without the need for lifting.

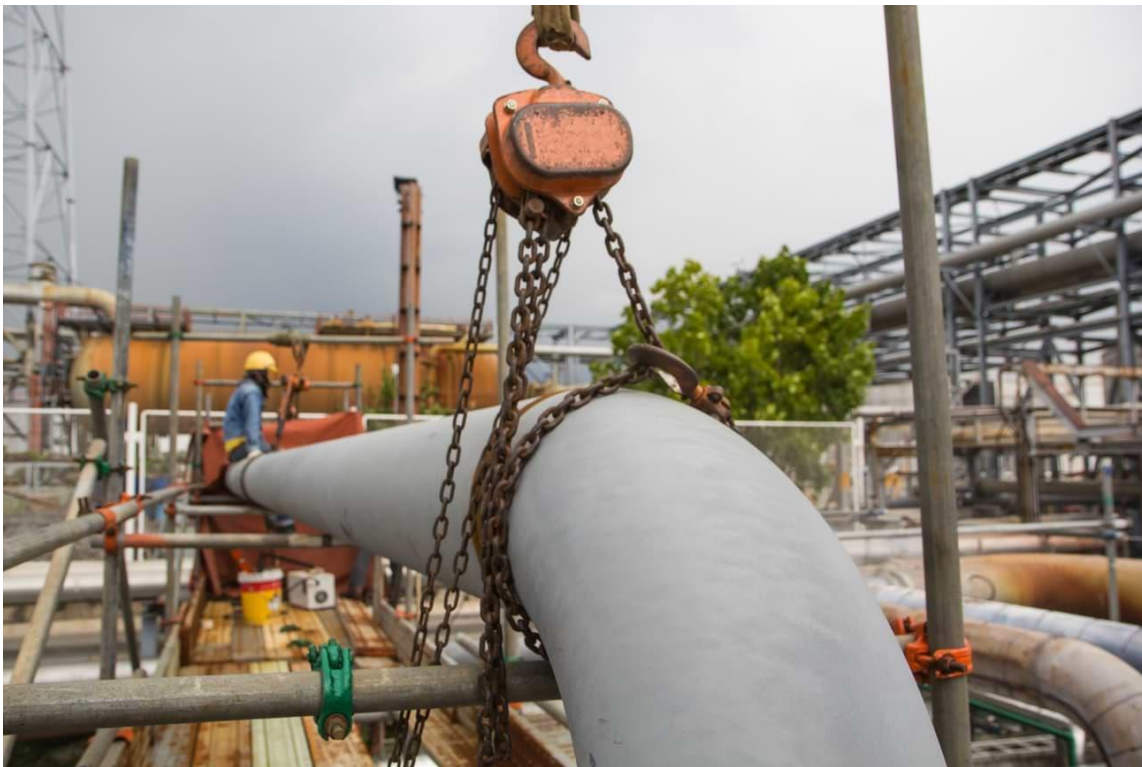
This has many benefits, including reducing costs and associated risks of performing inspections which traditionally required the lines to be lifted. Operators also have a better understanding of the high-risk areas that require further inspection or repair.

However, line lifting is still required for providing free access at the pipe touchpoint for crews to mitigate the damage. There are conventional tools and methods used to lift lines, but almost all lack required safety features, procedures and engineering which make them safe for use on on-stream equipment.

Chainfalls

Chainfalls are the most commonly used tool for line lifting. They are relatively cheap and quick to deploy but must be rigged from a supporting structure at higher elevation. Such structure may be a pipe rack or a temporarily installed strongback structure, which will be at an additional cost exclusive of the chainfall itself. Operators are also standing alongside the touchpoint being lifted, which places them at risk during the critical initial breakaway lift, especially when the lines are on-stream and there is the added risk of a loss of containment.

Chainfalls are considered suspended loads since they don't have a positive mechanical locking mechanism keeping them elevated. For that reason, they are unsafe to work beneath and cannot be left elevated for extended periods of time. The most significant risk of all however is that most users don't have a complete understanding of the resultant pipe stresses and line weights in the lifted position, which places users and pipes at risk due to equipment overloading.



Line Lifting Using Chainfall Erected To A Strongback

Cranes

Cranes are another popular method of line lifting and are mostly used to lift larger lines resting on ground level supports or lines on the top levels of pipe racks. Line lifting requires lifts of as little as 0.5 inches, so little that a crane operator is unable to discern any pipe movement and is entirely reliant on the radio communication from an observer situated at the touchpoint.