



CASE STUDY

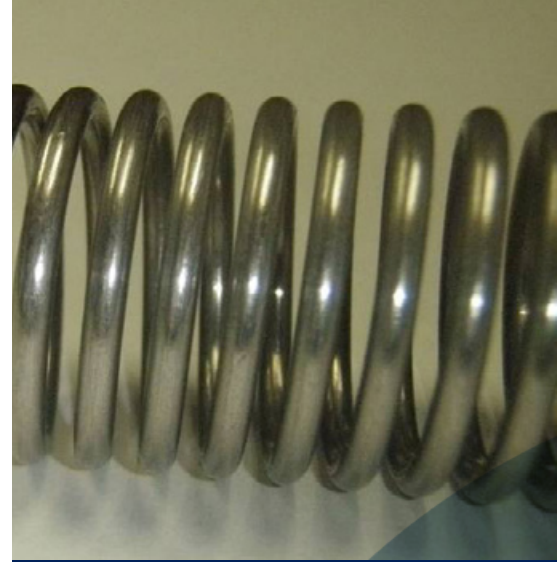
SITE INVESTIGATION PUTS THE SPRING BACK INTO DOWNSTREAM OPERATIONS

- Pump reliability restored
- Unplanned downtime minimized
- Maintenance costs significantly reduced

CHALLENGE

A reciprocating pump was causing unacceptable downtime issues for this downstream oil & gas operation. Frequent valve spring failures were resulting in a pump shut down every 2 to 3 weeks. The pump had been on the customer's "bad actor" list for some time due to the need for frequent maintenance and the associated costs.

The reciprocating pumps had been installed originally to replace smaller wash water pumps, with no modification to the piping. At the time of sale, the customer had been made aware that the piping system was undersized and that reliability would be compromised. The pumps had a long history of breaking suction and discharge valves, until a modified valve design was proposed and installed. The remaining reliability issues focused around packing and valve springs.



**CLYDEUNION®
PUMPS**

Industry: Oil & Gas - downstream
Region: Americas
Category: Site investigation
API Type: Reciprocating pump

SOLUTION

The ClydeUnion Pumps Aftermarket Services team conducted a site investigation to determine the cause of the frequent valve spring failures. Springs were analysed for the type of failure, repeatability of failure, and conclusions drawn regarding the cause. Analysis revealed that a fatigue failure was occurring in an area of the spring where the pitch was changed to close and grind the ends during manufacture. Surface defects in this area were produced during this pitch change, resulting in stress risers that led to a fatigue failure.

Solving the defect was reasonably straightforward. The existing valve spring design, material and manufacturing process was unchanged – with the exception that the completed valve

springs were shot peened. This additional process mitigated the stress concentration at the surface of the spring wire produced during manufacture. Upgraded valve springs were installed at the site and there have been no spring failures reported to date.

OUTCOMES

Tracing the cause of valve spring failure back to the point of manufacture and mitigating the problem at source has restored the reliability of the reciprocating pumps. Frequent downtime is a thing of the past and maintenance costs have been greatly reduced.



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