

PREVENTING A POTENTIAL HYDROGEN LEAK



Specialist reciprocating compressor monitoring identifies severe abnormal impacts and developing internal damage following overhaul.

Following a scheduled inspection and overhaul, a critical hydrogen reciprocating compressor at a UK oil refinery was returned to service. When operators reported a loud impacting noise resonating from the machine, AVT Reliability engineers were called in to investigate.

THE CHALLENGE

The compressor had recently undergone an S1 inspection and overhaul, including replacement of the suction and discharge valves and HydroCOM systems on both cylinders.

After returning to service, operators reported a loud impacting noise. AVT Reliability engineers recorded impacts of approximately 50 g, compared with the normal 2–3 g.

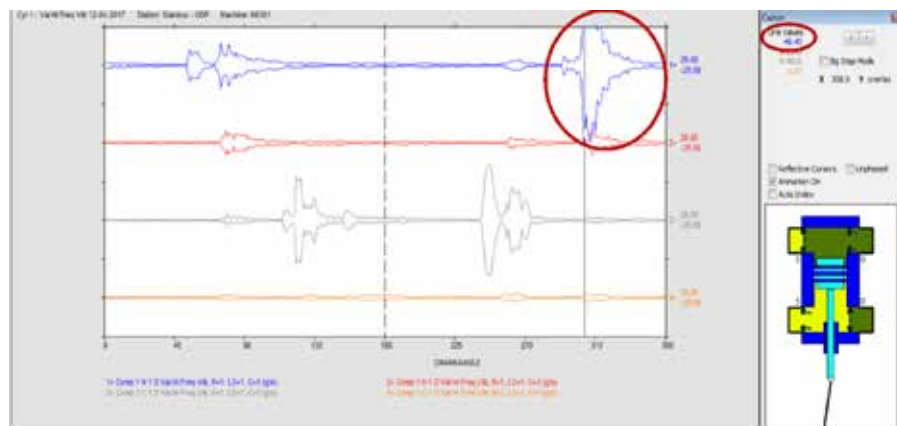
These high impact levels presented a significant reliability and safety risk, with potential for valve or HydroCOM failure and casing or structural damage.

OUR FINDINGS

Further investigation found that incorrect HydroCOM components had been installed without the required internal dampers, causing the severe impacts.

Production constraints initially kept the compressor running, leading to loose and sheared valve plate bolts. AVT Reliability's monitoring identified the developing damage, and the compressor was taken offline once the risk of a hydrogen leak became clear.

A subsequent overhaul found damaged internal components, including missing valve plates and a failed valve lip seal.



“Continued monitoring allowed us to track deterioration, identify the developing damage and get the compressor offline before it resulted in a potential hydrogen leak.”

- AVT Reliability Engineer

THE OUTCOME

Specialist monitoring provided the evidence needed to identify both the original component issue and the deterioration that followed while the compressor remained operational.

Taking the compressor offline before the developing damage resulted in a hydrogen leak reduced the risk of a potentially much more serious safety event, plant evacuation or shutdown. The case also demonstrates the value of investigating abnormal machine behaviour following maintenance or overhaul rather than assuming an asset returning to service is operating correctly.

SPECIALIST RECIPROCATING COMPRESSOR MONITORING

Reciprocating compressors are complex assets where faults within valves, unloaders and associated control components can develop rapidly and carry significant operational consequences. Specialist monitoring provides visibility of impact levels and machine behaviour that may not be apparent through routine inspection alone.

By combining appropriate diagnostic technology with engineering analysis, developing problems can be identified earlier, supporting safer operation, planned intervention and more informed maintenance decisions.



AT A GLANCE

CLIENT: UK Oil Refinery Operator

INDUSTRY: Oil & Gas

ASSOCIATED SERVICES: Condition Monitoring; Vibration Analysis

KEY FINDING: Incorrect HydroCOM components without the required internal dampers were causing severe impacts of approximately

KEY ACTION: Continued monitoring identified escalating internal damage, allowing the compressor to be taken offline before a potential