

CASE STUDY

UPGRADED PUMP HYDRAULICS LEAD TO INCREASED PRODUCTION

- Occurrence of gas pockets minimized
- Materials upgrade to allow dry running
- Vibration significantly reduced, improving MTBF
- Higher flow rates achieved without major plant alterations

CHALLENGE

The customer was experiencing high levels of vibration during operation on eight vertical pumps which formed part of an LPG process. The customer wanted to enhance the reliability of the pumps, despite non-optimal operating conditions, without changes to the current configuration of the whole installation. The customer also wished to operate at higher flows than those originally specified.



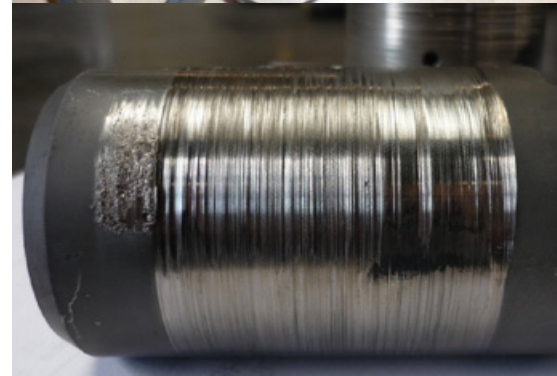
CLYDEUNION®
PUMPS

Industry: Oil & Gas

Region: Middle East

Category: Mechanical design
upgrade

API Type: VS6



Impellers, PEEK bearings and bearing sleeves damaged

SOLUTION

After inspection of the pumps, we found damage to the impellers, wear rings and intermediate bearings. The damage observed was the result of poor lubrication of the bearings due to the presence of gas phase in the pumped liquid.

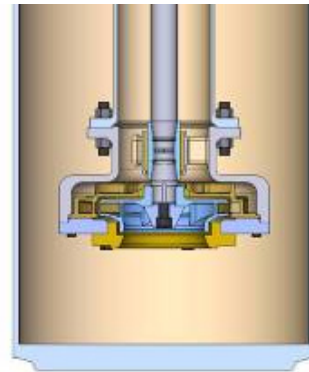
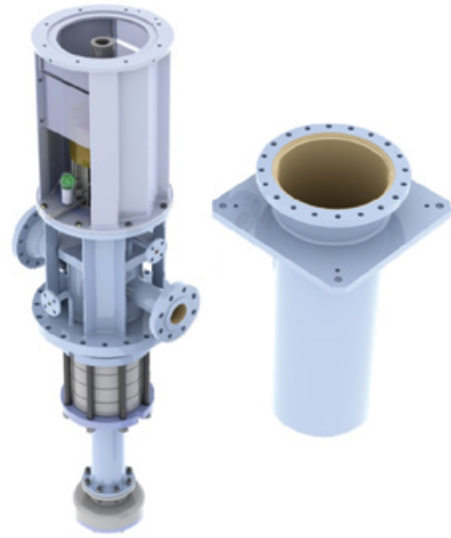
After examining the causes, it was established that the presence of gas pockets came from the installation itself (head losses along the suction line, control of levels in storage tanks compared to vapour pressures of liquids pumped), and overflow during pump start-up sequences.

Our solution consisted of changing the shaft line bearings material to improve their behaviour during pumping in the presence of gas, as well as a specific design of suction stage to improve the re-pressurisation of gas pockets. Together, these upgrades improved the overall pump performance to match new duty requirements.

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

Improved design and materials specification means that the pumps are now adapted to dry running conditions, which has eliminated the vibration problem. Downtime for maintenance has been reduced thanks to the implementation of bearing sub-assemblies that can be fitted efficiently. The new hydraulics will help to reduce the occurrence of gas pockets and enable the pumps to operate at higher flows, increasing production.



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