

Chlorine Compressor Upgrade



Project Highlights

- + Rotordynamic analysis confirming the impeller is overweight & unstable
- + Reduced impeller weight by 2.6kg
- + Manufactured a titanium impeller

Key Challenges

- + EthosEnergy specialists performed a vibration measurement on-site followed by a complete rotordynamic analysis
- + The rotor meets the API 617 requirements
- + A synchronous rotor instability analysis was executed for this compression rotor (Morton Effect)
- + The synchronous rotor instability analysis confirmed the expectation that the compressor operating speed (9,930 rpm) is close to the onset on instability & explained the high sensitivity of the rotor to impeller unbalance

Project Overview

A large chemical company contacted our Hengelo, Netherlands operation for a new titanium impeller for a chlorine compressor and upgrade. This unit was running with high vibrations and a strange response to the daily water wash cycles for over 20 years. Sometimes the vibration would drop after a water wash, and sometimes the vibration would increase after water wash cycles.

The EthosEnergy Solution

- + Reduce the overhang movement (impeller weight)
- + Reduce the differential temperature across the bearing

Key Results

- + EthosEnergy was able to reduce the impeller weight by 2.6 kg by reducing the vane width, added balancing holes, & a redesign of the impeller lock nut by carving out the back side of the impeller hub
- + After the impeller reversal & redesign, EthosEnergy started the manufacturing process of the titanium impeller
- + The customer can run the compressor in a stable mode with less water wash cycles



New and old Impeller



Rotor OpSpeed® Balance

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