

Condensate pumps retrofitted by Sulzer **offer fourfold improvement in MTBF**

CUSTOMER

International Oil & Gas company

LOCATION

Offshore Malaysia

INDUSTRY

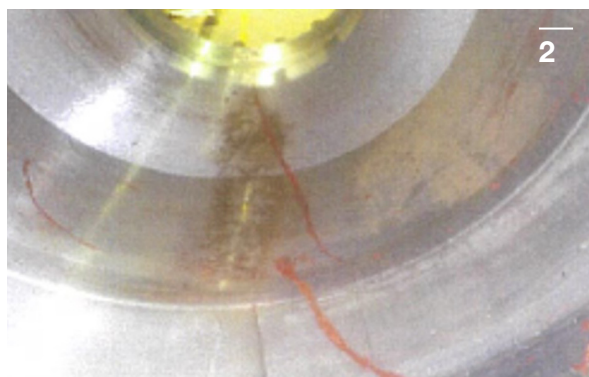
Offshore Oil & Gas

KEY SERVICES

1. OEM-X line service
2. Root-cause analysis
3. Retrofit



Unexpected faults and output reduction led to dropping MTBF



An offshore platform in Malaysia started experiencing an increased rate of seal failures in its BB5 condensate pumps, following a change in output which led to reduced condensate flow rate from 93 m³/hr to 46 m³/hr. Inevitably, the MTBF dropped to around 12 months. The pump's american OEM suggested the three pumps be replaced with new equipment, but the scale of expense and lead time was unacceptable, leading to Sulzer being approached for an alternative. A number of challenges needed to be solved:

- Pumps operating far away from its 'comfort zone'.
- Excessive vibration caused the seal leaks.
- OEM solution unacceptable in terms of cost and time.
- Operator needed a solution that ensures production continuity with minimal lead time and without substantial capital outlay.
- Cartridge was due to be replaced.
- Project was discussed and executed during the height of the Covid-19 pandemic.

1. Damage on compressed bearing housing o-ring

2. Original pump's inner casing condition

THE SOLUTION

Optimized design for reliability

Pandemic conditions meant that Sulzer's field services team were not able to 3D scan the pump on-site. The team had exercise flexibility and rely on measurements provided by the offshore operator to design and manufacture a direct replacement retrofit pump with optimized hydraulics for the revised application.

A rigorous reverse engineering process was undertaken by Sulzer's engineers to ascertain the pump's mechanics which involved:

- To overcome pandemic travel restrictions and a lack of 3D scanning expertise within the customer team, dimensions had to be taken rather unconventionally. Sulzer's experts shared a detailed format on how and which dimensions were to be taken for the pump components. Multiple video calls were arranged between the two parties to ensure that procedures were correct and also to render close advisory and support.
- Design and engineering to develop cartridge and barrel matching dimensions with existing pump and new process requirement.
- Supply of hydraulic upgraded cartridge suitable for new flow rate, compatible with existing barrel.
- Supply of spare barrel to increase interchangeability.

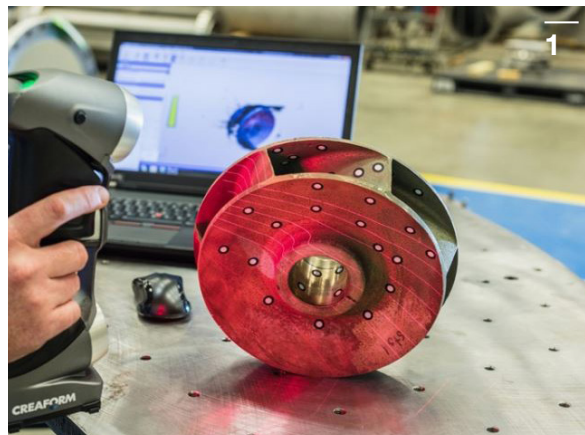
The parts' dimensions were also archived and served as assurance for future parts supply and availability to be delivered, on-demand by Sulzer.

The pump was rigorously tested before being shipped to the platform. The original mechanical seal design was retained after performing very well during testing. The deployment was well within the operator's expectations:

- Successful installation and commissioning.
- Operator intends to upgrade two more pumps.
- The whole project was delivered on time.

1. Archiving pump data through 3D scanning

2. Engineering design



Extended reliability and route to success for all condensate pumps



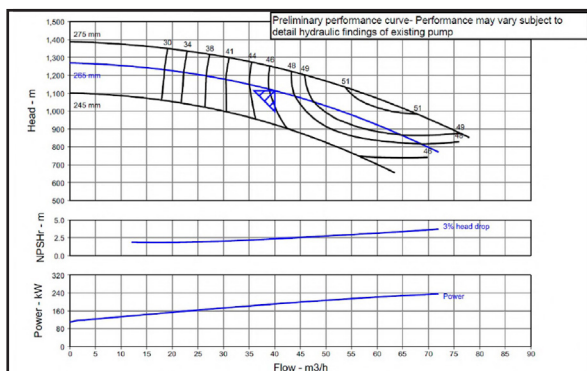
Compared to the alternative offered by the OEM, Sulzer's solution provided a cost-effective and timely solution that resolved the issue with reduced MTBF. In terms of on-site installation, there was also minimal impact on site footprint as the drop-in replacement matched existing interfaces for suction, discharge and small-bore pipe work. Most critically, the pump will be operating within the optimal 'comfort zone' on the performance curve. In addition, there was no need to replace existing seal as the shaft was able to be customized to fit into the retrofitted pump.

The new design also has a reduced power requirement, 216 kW instead of 370 kW, a 42% reduction in power. Having been installed and commissioned, the MTBF for the new pump has been calculated at 48 months – a fourfold improvement. Following the successful implementation, the platform operator requested Sulzer to engineer two remaining pumps to ensure further improved reliability and an optimized spare parts inventory.



Summary of benefits as follows:

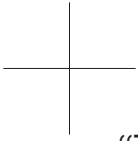
- A dramatic reduction in maintenance costs due to increase in MTBF.
- A significant saving in operating costs due to uplift in energy efficiency.
- The return on investment was just two years.
- The new design of pump conforms to API 610, providing a minimum of 36 months between maintenance interventions.



1. Increased MTBF allows engineers to dedicate time to other critical requirements

2. Rigorous pump testing in Sulzer facility before delivery

3. Pump operates within the 'pump comfort zone'



“The redesigned pump has a power requirement of 216 kW, compared to the original 370 kW, enabling the original electric motor to be retained and operate well within its capacity. Of greater significance to the platform operator, the mean time between repairs for the new pump is calculated to improve to 48 months, which will reduce maintenance costs substantially.”

Radhika Bajpai, Retrofit Specialist, Southeast Asia for Sulzer.

PROJECT KEY FACTS

MTBF INCREASE FROM 12 TO ESTIMATED

48 months

POWER REQUIREMENT REDUCED
FROM 370 kW TO

216kW

ROI

2 years

LEGACY PUMP'S YEARS OF OPERATIONS:

9 years

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