

Hydraulic upgrade on SMK 6.8.18

Industry:	Oil + Gas - downstream oil
Region:	Europe
Territory:	France
Category:	Hydraulic re-rate
API Type:	OH2

ClydeUnion Pumps Aftermarket Technical Services team has experience across a range of services on critical rotating and reciprocating equipment to improve operational safety, reliability and efficiency. The hydraulic upgrade of the SMK 6.8.18 for the oil and gas market is one of our success stories documented in our library of case studies. These case studies highlight the requirement from the customer, how we achieved the goal and the process we followed to deliver the improvements.

Image left: Finished pump before shipment

Situation

The customer wanted to modify the hydraulic performance of two SMK 6.8.18 pumps (one running, one spare) for a gas oil pumping process in a refinery, according to new process conditions. The pumps suffered intermittent cavitation phenomenon due to low available NPSH and it has been demonstrated that required changes in process conditions would lead to permanent cavitation problems.

Challenge

The customer required us to perform an upgrade to meet the new rated point and solve the cavitation issue, with a 30 week lead time to carry out the pumps disassembly and modifications during a process shutdown.

Solution

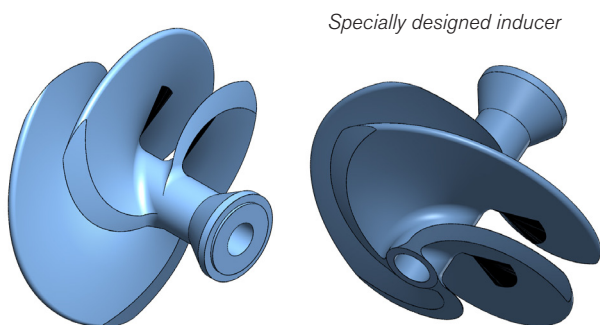
The results of pre-studies according to new process conditions were, from the technical point of view, as described below:

- Increase of impeller diameter to meet new required flow for unchanged head



Former SMK pump on site

- Add a specially designed inducer to avoid cavitation phenomenon by optimising required NPSH, especially in the area of new rated flow

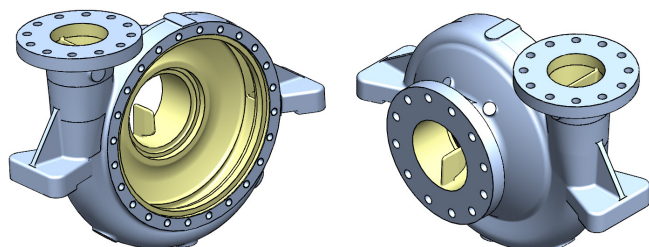


Specially designed inducer

Concerning the delivery time, the modification of both pumps before the due date was possible thanks to spare parts available from the customer. However, once the feasibility was established, the customer decided, instead of modifying the existing pumps, they would order two new bare shafts SMK 6.8.18 pumps integrating the upgrades.

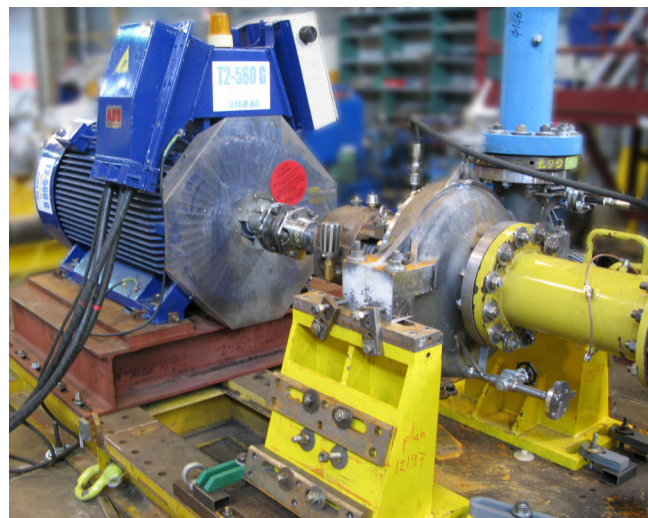
This forced us to also examine studies to adapt these new pumps to the existing baseplates. Despite the time needed to supply new cast parts the customer agreed to delay the process shutdown only by a few weeks. The following work was undertaken and completed by ClydeUnion Pumps:

- Examination of pre-studies to confirm the feasibility
- Studies for special inducer design to be in accordance with available NPSH on-site
- Studies for implementation of new components (inducer, new pump shaft)
- Studies for modification of support feet to adapt new volute on current baseplate



Modification on volute for adaptation on current baseplate

- Studies for conformity with ATEX directive
- Assembly
- Performance test in test bed
- Reassembly and performance tests on site



Pump performance test in test bed

Operational improvements

- Pumps operate on the gas oil process with increased capacity
- Increase of MTBO
- Decrease of routine maintenance by removing cavitation phenomenon

Financial illustration

- **Investment cost of parts supplied**
 - Engineering studies 18,000 Euros
 - Supply of two new bare shaft pumps 132,000 Euros
- **Savings**
 - Improvement on productivity thanks to flow increase
 - Savings due to repair/replacement decrease on parts previously damaged by cavitation

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P: +44 (0)141 637 7141 F: +44 (0)141 633 2399 E: cu.sales@spx.com

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