



CASE STUDY

NEW HYDRAULICALLY UPGRADED PUMP CARTRIDGES DRAMATICALLY REDUCES DOWNTIME

- Downtime reduced from weeks to days
- Significant production losses avoided
- 7% increase in hourly oil production

CHALLENGE

Our customer wanted to increase production at an offshore oil facility. This required a hydraulic rerate of six existing CUP-BB5 pumps to meet the new duty requirements. As the original pump manufacturer, Celeros Flow Technology brand ClydeUnion Pumps was invited to assess the project and propose the best solution.

SOLUTION

An increase in impeller diameter was required in order to achieve the required upgrade on the nine-stage pumps. It generally takes 3 to 4 weeks to remove, strip a pump cartridge, replace the impellers, cut the diffusers, rebuild and replace the cartridge. For our customer, this level of downtime was problematic – and in addition, the recutting and redressing of the diffusers required to incorporate the increased impeller diameter was impossible to achieve on-site.

To minimize impacts on customer operations, ClydeUnion Pumps replaced the entire cartridge, rather than just the impeller. The new pump cartridges were designed, manufactured and assembled at our site in Glasgow, Scotland and included the increased diameter impellers and high-efficiency diffusers to meet increased capacity, the ring sections (designed to fit in the existing barrel), as well as the shaft, balance drum, end covers, bearings and seals. This approach enabled the hydraulic re-rate to be performed in a much shorter timescale with minimum downtime and eliminated the need to replace wearing parts on-site. It also enabled dynamic balancing of the rotating element for these nine-stage pumps to be performed under factory conditions.

Upon installation on-site, a ClydeUnion Pumps engineer carried out a full performance test to ISO 9906 Grade 2 tolerances and acceptance criteria.

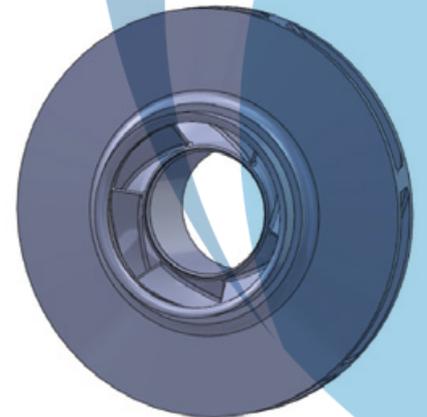
CLYDEUNION®
PUMPS

Application: Oil & Gas – upstream

Territory: Offshore

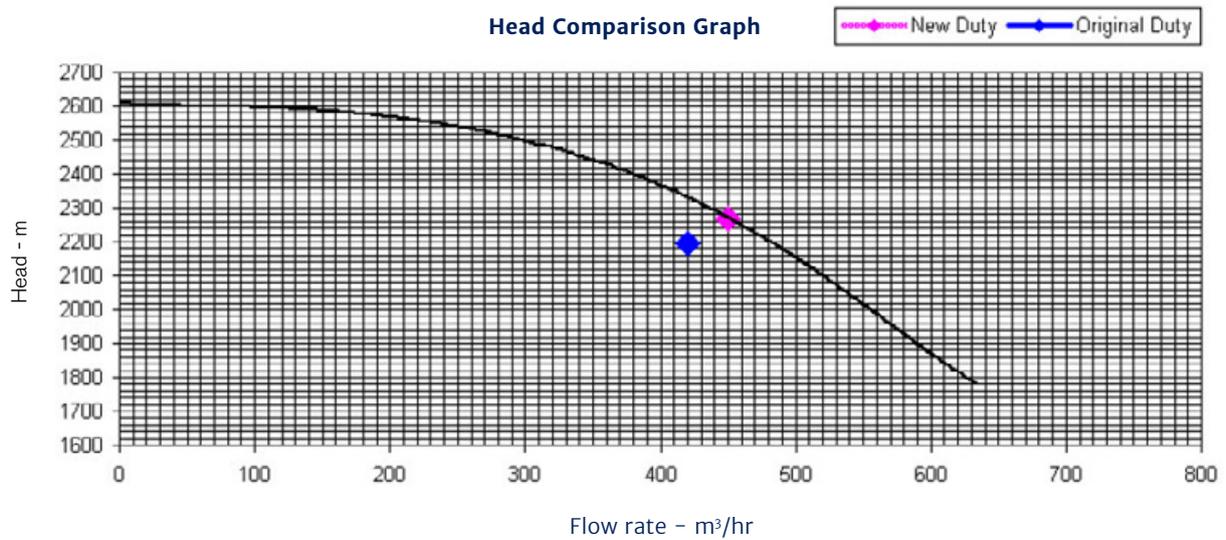
Category: Hydraulic re-rate

API Type: BB5



DUTY COMPARISON BETWEEN THE ORIGINAL PUMPSET AND PROPOSED UPGRADE:

	CURRENT	PROPOSED	% CHANGE
Speed	2969 rpm	2969 rpm	0 %
Head	2196 m	2270 m	+ 3.37%
Flow	420 m ³ /hr	450 m ³ /hr	+ 7.14 %
Power	3787 kW	4080 kW	+ 7.74 %
Head (Closed Valve)	2455 m	2609 m	+ 6.27 %



OUTCOMES

Building complete new pump cartridges meant the hydraulic re-rate could be completed in 3-4 days: a considerable time-saving of several weeks compared to undertaking the impeller replacement and associated wearing parts replacement in situ. The six BB5 pumps are now operating to required standards. The upgrade has achieved a 7% hourly increase in oil production for the customer.

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