Repair and Renewal Offer Fast Turnaround and Cost Savings

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A "temporary" repair results in five years of service.

Five years ago, an engineered pump service center in the Midwest received a call from a large municipal sanitary district. One of the company's four submersible pumps had tripped the overloads. This 890-rpm unit operated on variable frequency drives that adjusted the motor speed to match the fluid inflow. Once it had been reset, the 290-horsepower, 42-inch diameter axial flow pump exhibited significant vibration before failing. The pump was removed and sent to the service center where it was cleaned, disassembled and inspected by a team of skilled professionals dedicated to repairing submersible pumps.

The Assessment

The initial inspection revealed that a large chunk of concrete debris from nearby sewer construction caused the submersible pump to fail. The inspection also showed that the pump had several problems:

- A section of the trailing edge of one of the impeller vanes was broken.
- The rotating ring was missing.
- The impeller hub and lower mechanical seal had cracked and caused damage to the shaft keyway.

When the municipality inquired about replacement parts from the OEM, delivery was estimated at a 12- to 14-week turnaround time on a new impeller from Europe. The municipality could not afford to be without the pump for an extended period of time. Having a great deal of experience with submersible pumps, the dedicated submersible repair division proposed a temporary solution to get the pump repaired and back into service until the municipality could obtain a new impeller from the OEM.

The Service Center's Solution

The service center used its complete in-house welding, machining and manufacturing capabilities to provide the temporary solution. The shaft keyway was machined to accept an oversize key. A stepped key was fabricated to allow the ID of the impeller hub to be manufactured to factory specs. The damaged areas of the impeller and diffuser were repaired. The impeller inlet neck was machined and a stainless steel wear ring was fabricated and installed.

To improve the performance and life of the impeller, it was coated with a ceramic epoxy to aid in the resistance of abrasion and cavitation. New bearings and a new upper mechanical seal were also installed. A new mechanical seal was fitted to the hub. The impeller was balanced, and the pump was assembled according to proper acceptance criteria.

To the station operators' relief, the pump was delivered and returned to service about three weeks after it had been received at the service center.

Five Years Later

Recently, the service center received this pump for a normal overhaul. The service team learned that the station had never replaced the
temporary solution with OEM replacement parts. The same ceramic-coated impeller that provided the temporary solution was still in place. The work completed in the previous repair had allowed the station

to continue to pump over 25 million gallons per day at full speed for the five years that the pump had been in service.

Existing parts can often be repaired or renewed. Repair and renewal offers opportunities to achieve better turnaround and, in some cases, cost savings. This sanitary district was able to renew its pump and reduce its turnaround time by working with a service center that was experienced in evaluating and servicing submersible pumps.

Often when a pump has failed, repair shops may automatically replace costly parts. In many cases, through a careful independent engineering evaluation, damaged parts can be repaired and renewed to their original specifications. In some cases, upgrades can extend the pump's life. Through this process, a qualified shop with on-site engineering can offer greater value to the end user by providing both faster turnaround and cost savings.

About the Authors

Ron White has been involved with submersible pumping technology for 47 years and served as the general manager of HydroAire's Submersible Pump Repair Division for 25 years. He remains active in the company currently as the technical specialist for submersible pumps. Ben Roberson, who joined HydroAire in 2010, is the division's general manager.