

Dow Corning Barry Pump Upgrade Reduces Water Use, Maximizes Efficiency

Dow Corning's Barry, United Kingdom, operation is a 160-acre site employing more than 600 people.

During an audit of plant operations, Dow Corning discovered that four water process pumps used to maintain plant operations were consuming full load motor current, indicating high internal recirculation and excessive leakage.



Figure 1: Pre-Overhaul Pump Performance

A detailed pre-overhaul examination showed significant room for improvement. The system was running at 250 m³ of water moved per hour, or a hydraulic efficiency of only 45.9%. Furthermore, the system was losing 270.4 m³ of water per hour due to internal recirculation. Upgrading the system had the potential to significantly improve efficiency, reduce energy costs and save water.

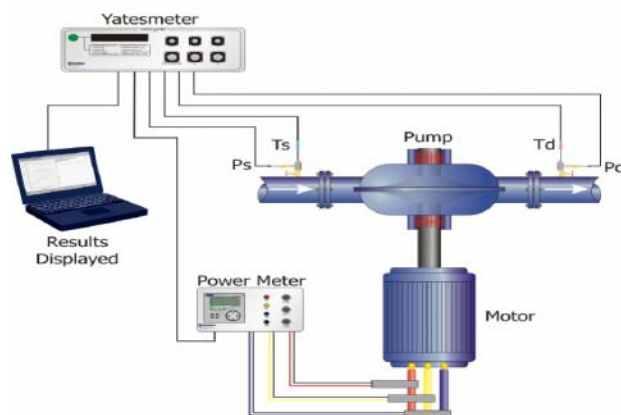


Figure 2: Performance Measurement

The challenge was that none of the pumps could be shut down for maintenance because the other pumps could not cope with demand while one pump was offline for service. To accommodate work on the pump, a risk assessment was carried out and a temporary procedure was put in place so supplied plants would not trip on low pressure when one of the pumps was removed for upgrade.

The pumps were stripped down and modified to improve performance: mechanical seals with *Molykote*® G-4700 Extreme Pressure Synthetic Grease replaced packed glands, a low-friction resistance coating was used to coat the interior of the pump and new polymeric case wear rings were fitted.



Figure 3: New Mechanical Seals Eliminated Leakage

The new mechanical seals eliminated water leakage from the pumps. Not only were the pumps not leaking, but they also were able to move more water per hour. Instead of 250 m³ of water moved per hour during the pre-upgrade performance audit, post-upgrade calculations showed that the system was able to move 555 m³ of water per hour. Overall hydraulic efficiency was also improved from 45.9% pre-upgrade to 80% post-upgrade.

By being able to shut down one of the four pumps, the plant was able to save £14,500 (\$21,357 per year). The fourth pump is currently used as a backup, allowing the pumps to be alternated to ensure the spare pump has been tested. Overall savings were calculated from the cost of treating this wastewater at the site's waste-treatment plant in water costs (11,875 UK gallons per day and £27,500 (\$40,511) in energy costs per year.

With the total cost of the upgrade coming in at £10,400 (\$15,317), the Dow Corning Barry operation realized a total savings of £31,600 (\$46,542) in the first year of implementation of this upgrade.