Increase the Operating Life of Pumps by Using Thermal Spray Coatings

Extensive research has proven that the general operating life of various components can be extended by applying protective thermal spray coatings. Pumps were chosen for our research because they are easy to treat with thermal coatings and then to monitor over time. Our process is, however, just as effective in the protection of a wide range of mechanical equipment and materials that are subject to wear and tear in operation.

Pumps are essential to many heavy industries including mining, petro-chemical, and power generation. All pumps suffer performance deterioration over time, which manifests as increased vibration, reduced efficiency, continuous decline in throughput, and ultimately reduced service life. These deficits are ultimately caused by mechanical wear, corrosion, and cavitation.

The use of optimal wear- and corrosion-resistant materials in the manufacture of OEM components is sometimes limited so as to reduce production costs, but this can impact on the end-user over time. To rectify this and prolong the life of your equipment, you need to seriously consider applying a suitable thermal spray coating.

The thermal spray coating used to combat wear and corrosion on pumps has the following properties:

- Excellent erosion and abrasion resistance
- High hardness (>1200 HV)
- Enduring toughness

Our pump coatings can effectively withstand harsh process conditions such as:

- Abrasion caused by small, hard angular water-borne particles that are encountered in some processes;
- Mild to extremely corrosive substances in the water passing through the pump and increasing the wear rates of pump components;
- Significant erosion damage to impellers and diffusers caused by particles travelling through pumps at high speeds;

Thermaspray (PTY) Ltd

Tel: +27 11 316 6520
Fax: +27 11 316 7527
Email: info@thermaspray.co.za
Website: www.thermaspray.co.za

Physical Address:
3 Axle Drive
Cnr Axle Drive & Hammer Rd
Clayville, Extension 11
Olifantsfontein
South Africa

Postal Address:
PO Box 1152
Olifantsfontein
1665

- Abrasion wear on ring landings and shaft sleeves caused by particles trapped between surfaces in relative motion.

All these conditions lead to a significant reduction in the service life of pumps, and significant increase in their energy consumption.

Condition monitoring as a tool to evaluate the benefits of thermal spray coatings[1]

Long-term condition monitoring projects were implemented by AngloGold Ashanti in order to prove that pumps with thermal spray coatings can last substantially longer than uncoated pumps. In this evaluation, nominally identical coated and uncoated Sulzer HPH dewatering pumps (Sulzer HPH 32-17 ½ 9 stage and HPH 54-25- 6 stage) were installed at the same mine shaft, at the same time, and the pumping performance of the pumps were monitored over time.

The delivery flow rates and power consumed by the pumps were measured on regular intervals and recorded. The results obtained are shown here:

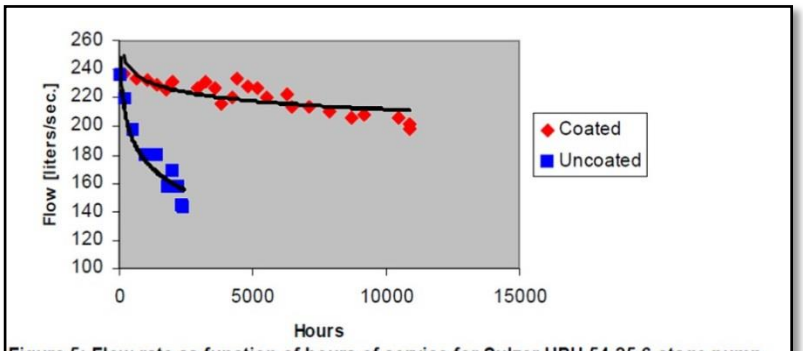

Figure 5: Flow rate as function of hours of service for Sulzer HPH 54-25 6-stage pump

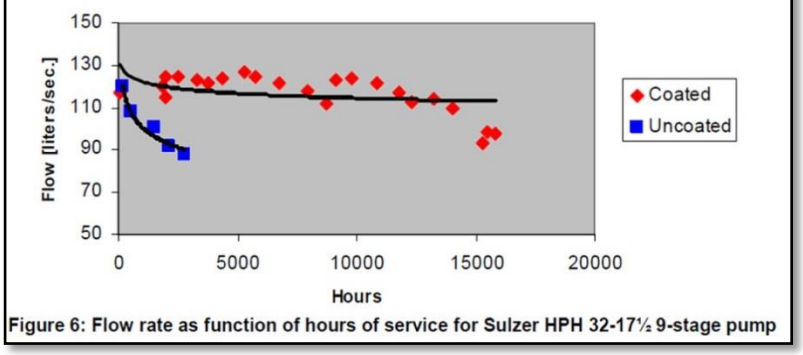

Figure 6: Flow rate as function of hours of service for Sulzer HPH 32-17½ 9-stage pump

[1] ***The use of Thermal Spray Coatings to Reduce the Life Cycle costs of Dewatering pumps*** – Hugo Howse (ThermaSpray SA (Pty) Ltd), Andrew Robbins (AngloGold Ashanti), Louis van Wyk (Sulzer Pumps SA) – IPUC 2007

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It is clear that the coated pump significantly outperformed the uncoated pump, with an approximate 3 to 5 times extension of service life.

Conclusion

It was concluded that thermal spray coatings offer significant benefits in reducing the life-cycle cost of pumps through extending the service life of the pump and maintaining high pumping efficiency.

Cost calculations demonstrated that a life-cycle cost reduction of at least 20% was achievable after treating pumps with our thermal spray.

Thermal spray coatings can significantly extend the operating life of pumps and any other equipment that is susceptable to mechanical or chemical wear and to which a thermal spray coating can be applied.

Please call us to discuss how best to recondition your equipment for improved performance, prolonged lifespan, and reduced maintenance and replacement costs.

Dr Jan Lourens

Managing Director: Thermaspray

Phone: 011 316-6520

Email: jlourens@thermaspray.co.za

Web: www.thermaspray.co.za

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Fax: +27 11 316 7527
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