Ultra-Hard Tungsten Carbide Based Coatings

Alfred Conhagen, Inc.

Case Study

Profile

Alfred Conhagen, Inc is a major US pump and steam turbine design and repair specialist. For years, the company struggled with the design of unique pump components trying to strike a balance between performance and manufacturability.

Challenge

The company was particularly concerned about entrained solids and thermal growth of close clearance components in eight-stage and six-stage high performance centrifugal pumps designed for high temperature refinery service - operating at 450^{O}F/230^{O}C. At this temperature both octane and diesel have poor lubricity. There was pipe scale and some coke fines in the diesel application and the octane pump had occasional catalyst carryover which was destroying fine clearances.

Solution

Together with Alfred Conhagen's engineers, we designed a solution which involved coating the hydrodynamic/hydrostatic radial and thrust bearings in the centrifugal pump. The chosen substrate was 410 stainless steel to match the thermal coefficient of the other parts in the assembly and maintain close clearance over a wide temperature range. The bearings have been in service for three years during which time they have experienced moderate to severe ingestion yet the coated bearing surfaces remain in excellent condition with a number of parts showing no signs of wear at all. There has been no galling or cracking of the coated surfaces.

The Hardide process allows Alfred Conhagen to machine finish the intricate geometry before a precise thickness of the Hardide coating is added to produce a part with high wear resistance and a low coefficient of friction.

An Alfred Conhagen customer suffered a system upset and introduced a large amount of ceramic bead catalyst to the pumpage and destroyed all of the eight-stage pump internals except the Hardide coated components which were then re-used in the refurbished pump.

Further information

Robin Gillham
Business Development Manager

M: +44 (0) 7949 292719

E: info@hardide.com

W: www.hardide.com