IMPROVEMENT OF LAPPING PROCESS

Overview

Lapping process is the method that John Crane have been implemented over time to prevent the leakage in operating pumps between the rotating shaft and the stationary pump casing. In this process, a mechanical seal with two flat rings running against each other and a narrow gap between the faces for a lubricating film. In this case, the seal faces must be extremely flat, about two helium light bands. John Crane has been utilizing the lapping process to produce these flat faces; however, it is often time consuming and difficult to obtain flatness of the seal faces within the necessary tolerances with lapping.

Objectives

Our team’s primary objective was to optimize the current lapping process by exploring variables that reduce the overall temperature generated by the lapping plate during the lapping process.

Approach

- Describe the approach your team took to solve the problem using a bulleted list of steps
- Conduct meetings to gather information on current workflow
- Identify control variables associated with lapping.
- Analyze current lapping process to understand deficiencies
- Propose optimal modifications to control variables (Temperature) through innovative solution
- Interview operator on specific amounts of solution they add and when it's added
- Visit John Crane workcenter in New Jersey to see the real process and collect data
- Perform multiple testing with controlled temperature
- Validate the result by testing multiple replications.
- Conduct the result that the chilled slurry will help reduce the cycle time by reducing 20% material removal to achieve the same level of flatness.

Outcomes

- The sponsor will save an estimated $233,000 over all 8 facilities in the United States as the result of this project.
- The cycle time of lapping process was reduced by 20% as a result of this project.
- It was confirmed that chilling the abrasive slurry before application would reduce the lapping plate temperature approximately 1.03%