Aker Solutions - Development of Seal Retainer Ring

Overview

Aker Solutions current TX Seal can eject from the hub under certain and specific conditions. The major safety concern with the 16 inch and 22 inch diameter seals occurs when the 40 pound TX seal falls from overhead during operations. A falling seal can cause damage to the subsea infrastructure or bodily injury. Our team as tasked with redesigning the seal to avoid this problem. Aker Solutions wanted the solutions to be approximately $10 per seal and did not want us to redesign any geometry of the hub or TX seal.

Objectives

Provide a recommendation to Aker Solutions to effectively retain the TX Seal inside the hub. The solution needs to be safe, provide sufficient friction forces to retain the TX Seal inside the hub, be easily removed, and cost effective.

Approach

- Gathered info from Aker Solutions regarding their current solution and requirements for new solution
- Generated 8 concepts based on requirements, used weighted ranking matrices for selection
- Researched current patents relevant to the proposed solutions, reviewed competitors’ solutions
- Had multiple conference calls with the sponsor to gather info and get approval for potential ideas
- The sponsor provided the appropriate CAD models for the hub-TX seal configuration
- Used ANSYS meshes/models to develop and simulate real-world setup with appropriate conditions
- 3D printed a physical model of the hub and TX seal to aid in the visualization of the problem
- Testing of various concepts were easy to reproduce in the modelling software
- Metrics for the removal and retrieval forces of the seal were determined, analysed, and proposed to the sponsor
- Quality results from the analysis were generated and a clear method of proceeding on a specific concept was determined
- Discussed any questions about the physical use of the TX seal and hub with the sponsor throughout the design process

Outcomes

- The sponsor will only spend approximately $10 per solution, which was one of their initial requirements
- Solution is easily purchased from the vendor they currently use
- Ability for immediate implementation
- Sponsor was very pleased with our solution recommendation