Dresser-Rand Offshore Baseplate Project

Project Summary

Baseplates are utilized in offshore turbomachinery solutions by Dresser-Rand (located in Olean, New York) in order to provide stiffness and precision, as well as enable assembly at the Dresser-Rand facility rather than on-site. Currently, these baseplates are produced with excess material and manufacturing processes to ensure acceptable performance. However, with recent rises in material and manufacturing costs, there is a desire to minimize the excess and reduce the cost.

The project focused on reevaluating the baseplate design using modern analysis tools such as ANSYS to optimize the baseplates for cost while still maintaining the necessary structural integrity and dimensions. Our global team consisting of PSU and SJTU students identified a project management plan. This plan included a projected budget of under $2,000 and a full risk assessment estimating risk of schedule overruns as moderately low. A customer needs assessment has been performed which provided a guide for development of concepts moving forward. The needs were defined by the team with respect to the requests of Dresser-Rand. The needs were then weighted using an AHP table in order to prioritize the different aspects of our design efforts. An external search has been completed which provides historical background to the current problem. The focus of the research was to find baseplate patents and existing products in the market to provide additional ideas as to how a typical baseplate is developed.

Using a Finite Element Analysis report of the current baseplate design provided by Dresser-Rand, our team has completed a characterization of the engineering specifications of the baseplate. These specifications included maximum overall dimensions and maximum shaft-to-shaft relative displacement through both operating and non-operating conditions. Three concepts that were analyzed in ANSYS are given as solid models. All three concepts satisfied the stress and displacement requirements of the baseplate and will be presented to Dresser-Rand. The cost reduction ranged from 16%-30% depending on the design, which translates into millions of dollars in savings each year.