Dresser-Rand 6B: OWC Turbine Mounting – Team 2

Overview
Dresser-Rand aims to expand their revenue portfolio into the emerging renewable market of wave energy. With CFD-backed highly efficient product, Dresser-Rand needs help designing the OWC system. Currently, the model is only a concept illustration and not an engineered model. Therefore, the team was required to develop an engineered-backed 10.5’ diameter Rotating Disk.

Objectives
- Transform the concept illustration into an engineered model of the Rotating Disk Assembly
- Optimize for weight, cost, and structural stability, durability

Approach
- Visit Sponsor at Olean, NY for Kick-off Meeting
- Obtained customer needs from Sponsor (Structural Integrity, Reliability, Cost, Weight, and Ease to Manufacture)
- Define the restrictions and limitations of the Rotating Disk
  - Rated RPM: 233
  - Must support 9,000 lbs
  - Product life-cycle of 20 years
  - Factor of Safety > 1.7
- Research: OWC technology, competitors, patents, turbomachinery applications, wind turbine design theory, and more
- Generate concepts from the research conducted
- Prioritize concepts and select top 2 options in the following categories: structural geometry, material, and manufacturing method
- Research the selected tops further in detail and finalize top concept
- Develop first draft model in Solidworks
- Perform a static study finite element test
- Identify and iterate the areas that failed to pass the prescribed operating conditions (restrictions)
- Collect output results: Weight, Cost, and Factor of Safety
- Assess additional manufacturing and labor costs
- Summarize conclusion and final recommendations

Outcomes
- Rotating Disk cost $108,412/66
- Factor of Safety = 2.7
- Use Amerlock 400 coating to protect the exposed surface area from marine corrosion
- Emphasize on structural integrity and optimization of weight and cost over aero efficiency

Final Design