Eddy Current Damper Test Rig

Overview
Dresser-Rand is one of the global leaders in custom engineered rotating equipment solutions for oil, gas, power, and other industries. Many of these solutions are beginning to incorporate magnetic bearing rotor systems. Following loss of levitation in one of these systems, Dresser-Rand is looking to use an eddy current damper which will provide additional damping for the shaft, thus increasing the lifetime of coast-down bearings. This project is a two semester project and the design of the actuation system was our responsibility, while the eddy current damper and the associated testing will be done next semester.

Objectives
- Modify an existing test rig to simulate a rotor coast-down event following loss of levitation in a magnetic bearing rotor system.
- The design should drop the shaft, while at full operational speed, from the journal bearings onto the coast-down bearings

Approach
- Visited the Dresser-Rand technology center in Olean, NY to receive the test rig from rotor dynamics engineers and gather customer needs
- Held weekly meetings with sponsor to update customer requirements and keep sponsor updated on progress
- Generated multiple concept designs and used selection tables to narrow down to a single design
- Reviewed patents for eddy current damper and coast-down bearings
- Created CAD models of designs and updated with design changes
- Modified an existing test rig
- Tested the rig at low speeds to ensure the components functioned correctly

Outcomes
- The project was complete by December 11th for the showcase
- The bearing test rig simulates magnetic bearing failure at low speeds
- The components were machined to small tolerances, and the ten thousandths of an inch coast-down bearing clearance was met
- The next semester team will perform baseline tests at higher speeds and install an eddy current damper on the test rig