

**Project Title:** Pump Dynamometer Mechanical Redesign

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**Area:** Mechanical Engineering

**Sponsor:** Fill-Rite, A Gorman-Rupp Company

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Fill-Rite Company, located in Fort Wayne, Indiana, specializes in manufacturing fuel transfer pumps primarily for construction and agricultural applications. They have an in-house test lab that runs various tests on their production models to validate and verify their products. The lab has a pump dynamometer which they use to determine the performance of their pumps under different loading conditions.

The dynamometer provides a speed set by the user and other components in the test station collect data output from the pump to analyze its performance, flow characteristics, and efficiency. An external motor is used to simulate different testing conditions with the aid of a controller. The pump data collected includes the inlet and outlet pressures, test fluid temperature, flow rate, motor torque, and speed. The connected pump moves mineral spirits from a reservoir through the pump and back into the reservoir in a closed loop.

Fill-Rite Company is seeking assistance with the mechanical redesign of its current test station. The focus of this project is to reduce the test station footprint, reduce the pump changeover time, and improve safety concerns with its operation. The company also expects the new system to test the range of pumps currently offered in their catalog. The project requires the test station frame dimensions to be reduced by at least 40%, the variable changeover time of 24 minutes to be reduced by at least 50%, and the redesigned system to be capable of withstanding the test station parameters. The prototyping and testing budget for this system is \$3500.