



No Maintenance Pivot Point Design

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Background:

Hyster-Yale is one of the leading global manufacturers of counterbalanced forklift trucks and has a product development center right here in the Pacific Northwest near Portland, OR. These forklifts integrate several complex systems including structural components, hydraulics, electronics, engines, and drivetrains.

The focus of this project is at the interfaces between component systems that involve highly loaded pin joints. In particular, the masts on forklift trucks contain numerous iterations of these joints that require frequent lubrication for optimal component life. However, application of lubrication can often be messy, and it can attract and retain abrasive contaminants. And, as you might imagine, in many cases the requisite lubrication is not performed frequently enough (or even not at all), which adversely impacts the long-term durability of the vehicle.

Objective:

The objective for this project is to create a proof-of-concept design for a maintenance free mast mounting pivot point that requires no external lubrication and can survive up to 15,000 hours of use.

Project Scope/Deliverables:

The student team will be empowered to do the following:

- Research self-lubricating materials and maintenance free strategies for pin joints.
- Build prototype pin joint(s) that incorporate the outcome of that research while remaining as compact as possible and achieving target life.
- Design a test rig and test plan that would allow for validation of the prototype relative to an existing pivot design.

While seemingly small in scope, this project offers the opportunity for students to work on a real-world product development challenge, and potentially inform future development of a novel solution that may be implemented on a diverse product line that is sold around the world. Students will be encouraged to take a systematic and scientific approach to figure out the best solution for the objective.

Students will have the opportunity to travel to the Hyster-Yale Counterbalanced Development Center in Fairview, OR following EXPO in the Spring semester to present their findings.

Budget: Students will have up to \$2,060 to spend on travel, materials, and supplies.

Engineering Disciplines: ME

