Increasing Motorcycle Fuel Efficiency
Harley-Davidson Motor Company with Olin SCOPE

Project Description

The Harley-Davidson/Olin SCOPE team researched a method of improving the fuel economy of H-D's touring motorcycle line while maintaining driveability. The team generated a detailed model of the motorcycle and subjected it to various industry-standard drive cycles. These results informed their final recommendation as to the feasibility of the technology investigated.

Goals

1. Improve fuel economy of the H-D Road King
2. Maintain driveability of the H-D Road King
3. Assess feasibility of a possible method for improving motorcycle fuel economy

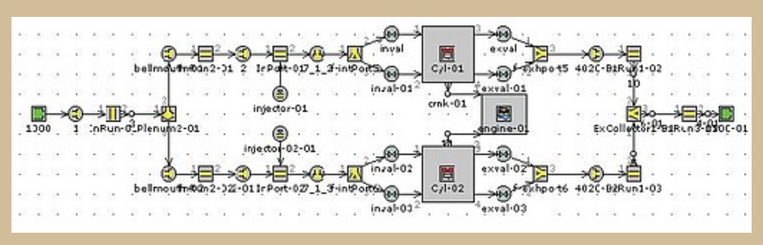


Figure 2: A common engine model created in GT Power.

Process

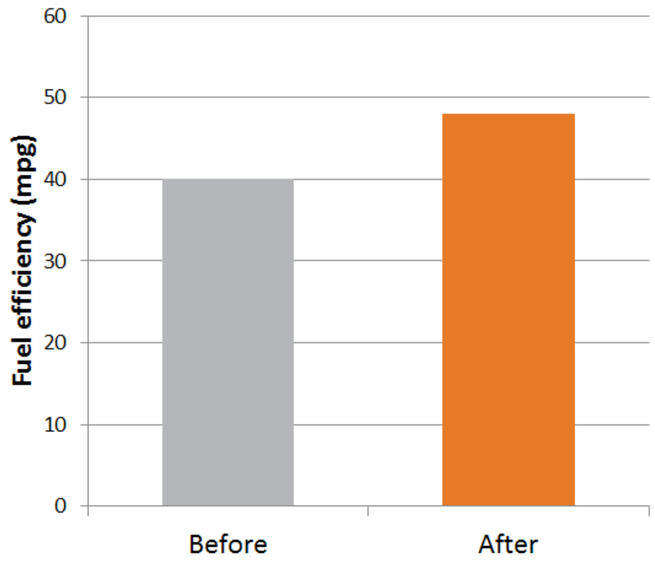
Learn software and research → Build and iterate on model → Use model to address goals → Provide final recommendations

Methods and Modeling

In order to evaluate the performance of the technology we were investigating, we developed a model in GT Power, an engine modeling software. GT Power is the industry standard for engine simulation. We were able to achieve a high fidelity, validated model in much less time than if we developed it independently. We combined this engine model with MATLAB models we developed to provide a thorough analysis of the feasibility of this technology.

Results

Our model suggested that, when running the industry standard WMTC drive cycle, a system using the technology we investigated would achieve 48 mpg. This is a **20% improvement** in fuel economy over the 40 mpg system that is currently in place on Harley-Davidson Touring motorcycles. Additionally, we found that our system did not sacrifice driveability as compared to existing technology.



Conclusions and Recommendations

Ultimately, the decision to incorporate the technology will have to factor in part costs and packaging constraints, which were not within the scope of this project. However, we believe that these would not be excessive, given that custom components could be obtained for high-volume production.

We recommend that the project be carried forward from a technical feasibility perspective. Our investigation found significant fuel saving gains for the system without sacrificing driveability, leading us to recommend Harley-Davidson to further pursue the project.

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Olin College of Engineering SCOPE