HARLEY-DAVIDSON
Increasing Electrical Power Efficiency

Olin College of Engineering SCOPE

About Harley-Davidson

Harley-Davidson is one of the world's oldest motorcycle manufacturers. Based in Milwaukee, Harley-Davidson opened its first factory in 1903. H-D leads the market in its sale of large touring bikes in the U.S. which are class-leading in terms of comfort and technology. The advanced electronics available on the motorcycles help distinguish H-D from other motorcycle brands and enhance the rider experience.

Problem: increasing demand for electrical power for accessories

Research: investigated energy conversion to increase electrical power efficiency

Design: test solutions on full scale motorcycle

Project Description

The Harley-Davidson SCOPE team researched and conducted feasibility analysis on various ways to improve electrical system efficiency. The team generated a wide range of ideas, and narrowed down potential solutions based on technical feasibility, cost considerations and adherence to brand image. The team conducted technical feasibility analysis using computational models, material testing and testing of prototype systems. Once concept solutions were selected, the team designed a full-scale prototype and performed bench top tests and in-depth financial analyses.

Process

Ideate within the problem space to define potential solutions → **Develop mathematical models for each proposed solution** → **Conduct feasibility analysis for each idea** → **Develop benchtop prototypes for promising methods** → **Implement full scale prototype of on the H-D motorcycle , test.**

Road King

Harley-Davidson has provided us with a Road King in order to conduct research, run tests, and implement new design prototypes on. The Road King is 814 lbs and has a 103.1 cu in (1689 cc) displacement, which rivals many small cars.

Areas of Exploration

A variety of potential methods were considered for increasing the electrical power efficiency of the Harley-Davidson motorcycle. All of these ideas were fully explored before choosing a final method to implement. It was just as important for us to prove what is not feasible as what is.

We ultimately discovered two methods of great interest to Harley-Davidson. One method is entirely novel in that it has never been implemented in the automobile sector before, but the materials involved are not fit for motorcycle implementation at this time. The other method holds promise for short-term implementation for meeting Harley-Davidson's power management

Team

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