True-HEV: An Innovation for Hybrid Electric Engines

Shah, Malav
Balsara, Burzin

In the modern world, fossil fuels have ignited an overwhelming concern for pollutants emitted through the burning of gasoline and other non-renewable resources in vehicles, industry, and other environments. As a result of these pressing concerns, more fuel efficient hybrid electric vehicles were created, which ultimately lead to the modern day fully electric vehicles. While existing hybrids remain accessible, their complex mechanisms require the acquisition of an entirely new vehicle should an individual want a cleaner automobile. Additionally, these mechanisms coupled with the energy used, results in a fairly inefficient system. Thus, this engineering project intended on creating a true hybrid electric vehicle, in which both electrical and gasoline components were synthesized together. Four linear actuators were used to create the electric component of a scaled version of the true hybrid engine. V4 and boxer engine configurations with different strokes were designed, implemented, and tested. These actuators were energized using switching circuit controlled via a microcontroller. Actuators were energized by varying their on-times as well as supply voltage. Test results indicated that all engine configurations are feasible for implementation within comparable voltage and on-time ranges. For the two-stroke scaled version, it was possible to achieve a maximum speed of 579 RPM. These results indicated that the creation of a true hybrid engine is feasible. Hence, it will enable many to pursue cleaner alternatives to existing internal combustion engines without the costs associated with new vehicles. This is because retrofitting an existing internal combustion engine would be a fairly simple process.

Awards Won:
Third Award of $1,000