

Automotive Technology

Robinson Engine Project

We are testing the Robinson Engine, Intake and Camshaft patent design which is a theory intended to lower pumping losses, increase compression and expansion ratio which, in turn, lowers emissions and increases overall MPG. The design utilizes a custom intake manifold in which the runners for each cylinder have been adapted to isolate the passages of each valve from each other, and one intake valve with a short duration opening at the beginning of the compression stroke. The test vehicle is a 2013 Chevrolet Malibu with a 2.5L variable valve timed (VVT) direct injection engine.

One intake valve leads to external expansion tanks and the other flows into the cylinder. When the relief intake valve opens, the air fuel mixture is pushed by the piston into the expansion tanks which are shared by companion cylinders. The gas movement creates a resonance allowing the engine to use less energy for compression. The modified camshafts allow the intake lobes to be adjusted independently. Using a calibration tool, the volumetric efficiency map was altered to allow the VVT to retard valve timing. The valve timing was altered to maximize the engine's power and MPGs.

The vehicle is tested on a 4-wheel dynamometer following the strict Federal Environmental Protection Agency's (EPA) Inspection and Maintenance (IM)-240 test procedure to simulate real world driving conditions. The IM-240 test procedure ensures consistent and repeatable results. Additionally, fuel consumption is measured by weight which allows for temperature compensation and a very accurate and repeatable measurement.

The Robinson engine patent design is being modeled using the GT-Suite software to optimize engine performance virtually. Since entering the 3-D modeling phase, many data sets have been sent to the engineering company EngSim for analysis. Once a working virtual model is built from this data we can gain a better understanding of how this design optimizes efficiency.