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**Bruce K Geist\*** ([bruce.geist@fcagroup.com](mailto:bruce.geist@fcagroup.com)), Bruce Geist, Fiat Chrysler Automobiles (FCA US LLC), Auburn Hills, MI 48326. *Better Fuel Economy Through Vibration Control*.

Significant opportunities exist to improve vehicle fuel efficiency through designing vehicles in a way that allows the power train and vehicle to operate together, as a system, more efficiently. The mathematical dependence of friction, pumping and other losses within an operating engine indicate a strategy for improving vehicle fuel efficiency: engine down-speeding. Down-speeding is a strategy of generating requested power at lower engine speeds. To enable lower speed operation, torsional vibration must be managed well. Non-circular path crankshaft pendulums can be deployed to correct torsional surging. The correction works for all speeds, and occurs within the engine. Though crankshaft pendulums offer significant advantages, they must respond well under any circumstance under which the engine may be operated. Given the variety of possible operating circumstances, it is imperative that motion paths for automotive crankshaft pendulums be designated carefully, in a way that ensures pendulums act smoothly and in unison to correct torsional vibrations. Prototype crankshafts function well to remove torsional vibration produced within a four-cylinder engine. A summary of a patented crankshaft design with epicycloidal pendulum paths and test results are presented. (Received January 08, 2015)