

Abstract Submitted  
for the DFD11 Meeting of  
The American Physical Society

**Effects of Exhaust Gas Recirculation on SI Engines at Wide Open Throttle** SYDNEY BRONSON, Carroll College, PAULIUS PUZINAUSKAS, University of Alabama — Exhaust gas recirculation, a charge dilution technique, has proven to be an effective method of reducing NO<sub>x</sub> emissions and fuel consumption of spark ignition engines. Wide open throttle operation also increases overall engine efficiency by reducing the pumping losses caused by throttling. In this study, the emissions and fuel economy benefits of exhaust gas recirculation (EGR) at wide open throttle conditions were quantified using a 2.4L port-injected engine. Engine performance and emissions data were recorded as the percentage of EGR in the intake charge was increased from zero to just above thirty percent (the EGR limit). This EGR percentage, in-cylinder pressure measurements, and the temperatures and pressures of the intake and exhaust were all recorded to ensure stable operating conditions. These tests were performed with a stoichiometric air-fuel ratio at a constant speed of 2000 rpm at wide open throttle. The variation of brake specific fuel consumption and emissions (in particular NO<sub>x</sub>) with increasing EGR percentages was analyzed.

Amy Lang  
University of Alabama

Date submitted: 02 Aug 2011

Electronic form version 1.4