

TWO CURRENT APPROACHES TO AUTOMOTIVE EMISSION CONTROL. I. N. Bishop and J. H. Jones, Ford Motor Company, Dearborn, Michigan 48121

With the ever tightening requirements for automotive emission control, as especially regards the oxides of nitrogen, and the more recent increased need for improved fuel economy, two unique variants of the spark ignited internal combustion engine have been investigated for their potential in meeting these most important objectives. These engines are:

•Fast Burn - A homogeneous charge mixture cycle engine which utilizes maximum charge dilution for NO_x control while maintaining the combustion rate and thus the engine efficiency (fuel economy) through an increased level of chamber turbulence.

•PROCO (programmed Combustion) - A direct cylinder, fuel injected, stratified charge engine which utilizes the rich/lean combustion stratification scheme for both NO_x control and improved fuel economy.

The investigations of these alternate power systems have included math modeling for prediction of NO_x levels, basic engine configuration and operating parameter studies conducted on an engine dynamometer, vehicle evaluations of low mileage emission control capabilities, fuel economy, performance and driveability and system durability when subjected to 25,000 miles of the EPA mileage accumulation schedule. The results of these investigations have led to the conclusion that low NO_x levels can be achieved with good driveability and a definite improvement in fuel economy over conventional engine designs when calibrated to the same emission levels. However, the hydrocarbon and carbon monoxide levels are extremely high and were not able to be contained even with double the nominal catalyst volume.