

NUMERICAL AND EXPERIMENTAL STUDIES OF HCCI COMBUSTION

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In this presentation we will first give a general overview of HCCI combustion in contrast to diesel combustion and spark ignited combustion. We will explain the potential of HCCI to achieve high efficiency while still obtaining close to zero NO_x and particulate matter. The difficulties of implementing HCCI (controls and low power output) will also be described. The presentation will then focus on our ongoing work. We have worked both on HCCI analysis and experimentation. The presentation covers both of these topics.

On analysis, the presentation will describe the use of a single zone model for prediction of pa-

rameters required for achieving combustion for different fuels and conditions. The applicability of a single zone model for analyzing engine control will also be analyzed. The limitations of the single zone model will be described, and contrasted with the multi-zone model.

On experimental work, the presentation will discuss our previous and current experiments, starting with the CFR engine and continuing with the 4-cylinder TDI engine and the single cylinder CAT 3401. The use of the single zone and multi-zone models for analysis of the experimental results will also be discussed.