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The Effects of Injection Methods and EGR on Combustion and Emission Characteristics of a Single Cylinder DISI Engine

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Abstract: Split injection has been known to reduce unburned hydrocarbon (UBHC) emission level and increase engine performance under certain operating conditions^{1,3}). Exhaust Gas Recirculation (EGR) is a common technique adopted for nitric oxides (NOx) reduction by the dilution of intake air, despite a sacrifice of simultaneous increase in UBHC and decrease in engine performance²). Thus, using split injection with adequate EGR may improve the emission level of UBHC, NOx and the engine performance compared to that of single-injection with or without EGR cases. The purpose of this study is to optimize the engine performance and emission levels at various engine operating conditions and injection methods when it is applied with EGR. The characteristics of single-injection and split-injection were investigated with various engine loads and EGR rates. The engine speed is changed from 800rpm to 1200rpm to investigate how the combustion characteristics are changing with increasing engine speed.