DME (Di-methyl Ether) is a potential second generation diesel fuel for compression ignition engines due to the extremely low level of particulate matter emissions, and easy to liquefy at room temperature. For this reason, the research and development of DME vehicles were introduced worldwide, but it has never been attempted advanced injection strategy to improving efficiency. In this study, the prototype DME light-duty truck was developed with 2.9 liter DME-fueled engine of common-rail injection system. Also, the performance test was carried out in order to analyze the engine performance and driving performance. And three-point injection strategy was applied in order to reduce NOx emission and improve fuel economy in range of low load and speed.

Three-point injection strategy showed the possibility to overcome the disadvantages of DME engine such as high NOx and HC emissions due to long injection duration for attaining diesel equilibrium performance. By optimizing pre and pilot injection timing and quantities, NOx emission could be reduced by maximum 74% for low speed and load conditions. Additional NOx reduction of maximum 40% could be obtain by retarding main injection timing. Also, good drivability of DME vehicle was developed using calibration data of DME engine and DME fuel supply system. As the results, the DME truck of this work could meet EURO-5 regulation and the fuel economy of 5.7km/L was achieved on the NEDC test mode.