عنوان مقاله:

Numerical investigation of the variation of compression ratio on performance and exhaust emission of a turbo-diesel engine

محل انتشار:

مجله علم مهندسی خودرو, دوره 9, شماره 3 (سال: 1398)

تعداد صفحات اصل مقاله: 11

نویسندگان:

Javad Zareei - *Department of Biosystem Engineering, Ferdowsi University of Mashhad*

Mohamad hasn aghakhani - *Department of Biosystem Engineering, Ferdowsi University of Mashhad*

saeed ahmadipour - *Ferdowsi University of Mashhad*

خلاصه مقاله:

Changing the compression ratio and presence of turbocharger are two important issues, affecting on performance, and exhaust emissions in internal combustion engines. To study the functional properties and exhaust emissions in regards to compression ratio at different speeds, the numerical solution of the governing equations on the fluid flow inside the combustion chamber and the numerical solution of one-dimensional computational fluid dynamics with the GT-Power software carried out. The diesel engine was with a displacement of ۶.۴ Lit and Turbocharged six-cylinder. In this engine was chosen, the compression ratio between ۱۵: ۱ and ۱۹: ۱ with intervals of one unit and the range of engine speed was from ۸۰۰ to ۲۴۰۰ rpm. The results showed that by the presence of a turbocharger and changing the compression ratio from ۱۷: ۱ to ۱۹: ۱, the braking power and torque increased by about ۵۶.۲۴% compared to the non-turbocharged engine. In addition, was reduced the brake specific fuel consumption due to higher power output. The amount of CO and HC emissions decreases based on the reduction of the compression ratio compared to the based case, and the NOX value increases due to the production of higher heat than turbocharged engines. The overall results showed that the turbocharged engine with a ۱۹: ۱ compression ratio has the best performance and pollution characteristics.

کلمات کلیدی:

Numerical solution, engine performance, Diesel engine, compression ratio, Turbocharger