

The Effects of the Cooling System with Al₂O₃ Nanofluids on the Thermal Performances Behaviors of the Diesel Engine

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Abstract

Experimental study with a multi-displanary analysis were performed to investigate the effect of Al₂O₃ nanofluids on the thermal performance of the diesel engine under the step load condition. Nanofluids are a new class of heat transfer fluids engineered by dispersing nanometer-sized solid particles in EGW 50% base fluid. In this work, we employed Al₂O₃ nanofluids, of which volume fraction are 1.43%. For a multi-displanary analysis, the diesel engine was modeled and simulated by a commercial code, CRUISE M. That model consists of sub-models which are an engine, a driver or a controller, and cooling systems such as oil and coolant. The pumping power for the nanofluids increased slightly, the nanofluid as working fluid provided the better thermal performance in the diesel engine. The maximum temperature of the piston with nanofluid decreased by 1.9°C comparison to that of the basefluid.

Keywords: *Nanofluid, diesel engine, cooling system, multi-disciplinary analysis*

References

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Biography

Lee is a Professor in the School of Automotive and Mechanical Engineering at Yongsan University, where has been since 2015. From 2016 to 2018, he served as Dean of the Department of Automotive Engineering. He received a B.S. from Busan National University in 1997 and an M.S. from Busan National University in 2001 in Aerospace Engineering. He received his Ph.D. in the Mechanical Engineering from KAIST in 2013. From 2002 to 2015, he worked at Korea Automotive Technology Institute (KATECH).