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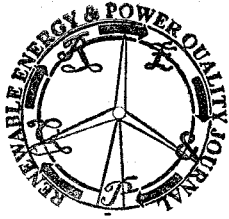
## Study on Flow Characteristic of Lubricant in the Main Shaft of Transmission in Commercial Vehicle

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**Abstract.** In this study, numerical simulation has been performed to investigate the flow characteristic of lubricant in the main shaft of transmission in commercial vehicle. It was confirmed that the mass flow rate of lubricating oil depends on the length of branch and the rotating rate of shaft. As a result, it could be verified that the discharged flow rate is considerably influenced by the length of the branch of main shaft. This study suggests the optimal design data for the lubrication system of the transmission in commercial vehicle.

### Key words

Numerical analysis, Transmission, Commercial vehicle, Main shaft, Lubricant flow

### 1. Introduction

Recently, due to high performance and capacity engine for not only passenger cars but commercial vehicles, the required transmission power has especially been increasing for commercial vehicles. The powerful lubricant system is required for supplying lubricant oil to the transmission of commercial vehicle to reduce the occurrence of wear and heat in the gear box under the condition of high speed and heavy load.

Moreover, recently, a consumer's demand for green cars has been increased in the automobile industry to resolve the environmental pollution problem. The effort for improving the efficiency of engine combustion and power transferring in transmission during car operation has also been emphasized in the commercial vehicles.

Especially, the legalistic establishment changing carbon dioxide regulation with auto-maker is in progress for the object to application in Europe in 2012 and the legislation of fuel efficiency reinforcement is also promoted in U.S.A. So, in situation under the policy of reducing carbon dioxide

related to global warming and the rising high oil prices, the development of environment-friendly commercial vehicles and the improvement of fuel efficiency are an essential task for automobile industry to survive and the technical development for high fuel efficiency transmission goes forward actively.



(a) cargo



(b) dump

Fig. 1 Types of commercial vehicle using the transmission system studied in this work

The multi-range transmission can be the one of the technical developments for high fuel efficiency commercial vehicles transmission. But the performance of the transmission system is reduced by increasing of volume and mass of multi-range transmission system. To reduce this performance loss of the transmission system, the modified reformation of transmission system should be made by the miniaturization and reducing weight of