Study on the Emission Level of Heavy-duty Vehicles in South Korea according to Real Driving Emission Regulation

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Nitrogen oxide(NO_X) has a large contribution to the generating of $PM_{2.5}$ by secondary emissions[1], and diesel vehicles, especially heavy-duty, have a large number of emissions of $PM_{2.5}$. In order to improve the exhaust emission emitted from heavy-duty vehicles, emission regulations are increasingly strengthened by introducing real driving emission (RDE) regulations. Meanwhile, numerous emission certification data measured in engine and real road driving tests have been accumulated for heavy-duty vehicles in Korea. So it is necessary to use this to analyze the certification status and the characteristics of exhaust emissions of heavy-duty vehicles according to the emission regulation standards. In this study, a dashboard that can intuitively view the test results was produced for the convenience of analyzing a number of certification data, and emission characteristics were analyzed according to the regulation stage, displacement, vehicle weight, and accumulated mileage.

Fig. 1 shows a dashboard that indicates the rate of change of NO_X and PM emissions according to the change in the emission standard and test mode of the engine certification test in South Korea. As the regulation stage is strengthened from EURO-V to VI, the average NO_X emission of certification data was improved by 89.77% in the steady-state test and 82.01% in the transient test. Additionally, the average PM emission of certification data improved by 78.58% in the steady-state test and 64.74% in the transient-state test.

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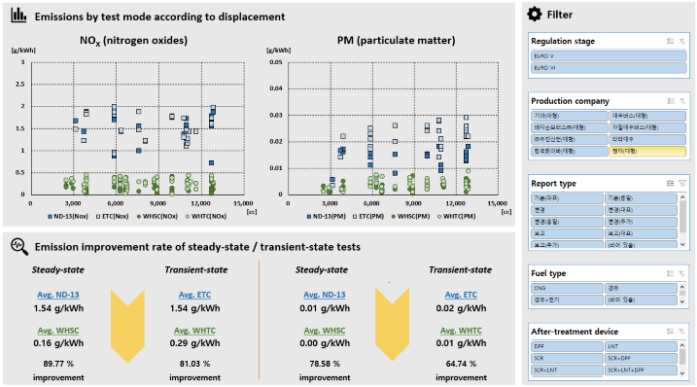

[1] Yong Pyo Kim, Min Ju Yeo, Journal of Korean Society for Atmospheric Environment, 2013, 29(4), 369-377.