Thesis Title	A Study of Oil and Filter Change Interval in Diesel Engines
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Abstract

The aims of this research work are to study suitable diesel engine oil and filter change interval, to investigate contaminants and property changes of oil, and to determine indicators for oil change. Moreover, the study of engine friction power changes for any oil ages is included. Test program was divided into two parts. The first part was the field test with three oil types. The first group consists of two oils which are in the class of API CF with viscosity of SAE 15W-40 and SAE 20W-50. They are recommended to use for 20,000 kilometers. The second group is in the class of API CH-4 with viscosity of SAE 15W-40 and recommended to use for 40,000 kilometers. For the field test five selected heavy-duty trucks were used for the first group of oil and the other five similar trucks were used with the second group. At a particular distance, the oil was sampled to examine for properties changes and contaminants. For the second part, the used oil at distance of 0, 5,000, 7,500, and 10,000 kilometers was tested for friction power. The motoring test was conducted at constant speed and oil temperature of 90 degree Celsius.

For the first group of oil, results of the field test show that the viscosity at 100 degree Celsius decreases from the original value by 7.0-23.3 percent at distances of 10,500-14,100 kilometers. Then the trend of viscosity is increased. The trend of wear metals for the first oil group increases with traveling distance and the values are low compared with the warning limits. For distance of each 20,000 kilometers, the iron wear is approximately 25.3-26.9 ppm. For the second group of oil, viscosity at 100 degree Celsius decreases from the original value by 15.5-20.0 percent at distances of 23,600-30,800 kilometers. Then the trend of viscosity is constant. For distance of each 20,000 kilometers, the iron wear is approximately 11.7 ppm.

Results of the motoring test show that the friction power of the first group of oil after used for 5,000 kilometers is comparatively lower than that of the new oil for 3.3-5.0 percent. After used for 10,000 kilometers, the first group of oil shows 0.7-1.3 percent lower friction power than that of the new oil. For the second group, after used for 5,000 kilometers the friction power is lower than that of the new oil for 1.9-2.2 percent. After used for 10,000 kilometers, the second group of oil shows similar friction power to the new oil.

In conclusion, it is noted that viscosity can be considered as one of suitable parameters to indicate for oil change interval. The second parameter is the iron wear. For heavy-duty trucks, it is difficult to determine a suitable oil change interval since there are several parameters involved. They are affected not only from the oil but also from the engine condition, the characteristics of heavy usage, the losses of oil during use, etc. It is proposed that the suitable oil change interval should be determined by checking oil viscosity and iron wear at a given distance.