

## THE CONSUMPTION TREND OF LUBRICANTS IN PUBLIC TRANSPORT AT METRO CITIES-V NAIK

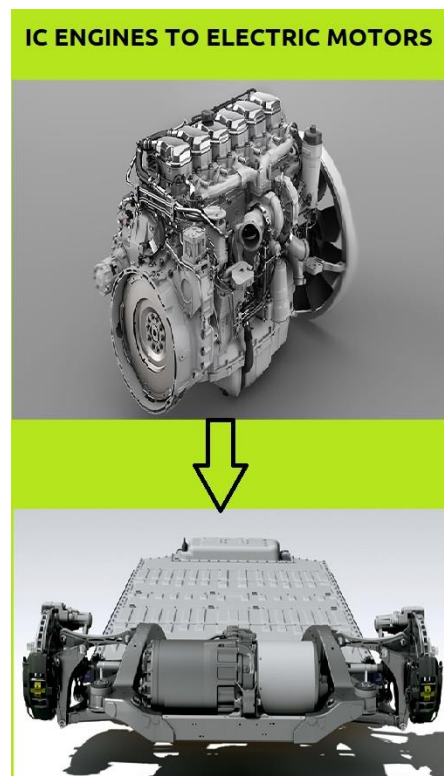
August-2020

By – V. Naik

An automobile engineer by qualification with over 15 years of experience, currently an assistant engineer at the engineering department at the one of the largest public transport fleet operators with almost 3500 busses including new electric bus variants.

Automobile industry around the world is going through a transition phase from consumable hydrocarbon fuel viz. high speed diesel (HSD), gasoline (petrol), compressed natural gas (CNG) etc. for the prime mover engine towards electric motors being prime movers with electrical energy of chargeable battery being the consumable entity.

This shift of automobile industry from engines as prime movers to electric motors will definitely have a shift in the consumption trend of lubricants, with presently most of the lubricants being consumed on a commercial vehicle is for engine oil. As a case study for diesel engine the change period for engine oil being around 25000 kms to 40000 kms of running, for viscosity grade SAE 15W40 for present grade of engine oil of CH4, CI4 & CI4 plus.



For CNG engines the change period for engine oil being around 10000 kms to 15000 kms for viscosity grade of SAE 15W40 or SAE 20W50 for Hino engines. Most of the gear box lubricants for passenger busses use the viscosity grade SAE 80w90 extreme pressure oil with change period ranging from 50000 kms to 60000 kms, which are generally GL-4 (gear lubricant) grade.

For rear axle (differential unit) most of the passenger commercial vehicles use SAE 85w140 extreme pressure oil with change period ranging from 50000 kms to 120000 kms which are generally GL-5 grade. The higher range of change period is due to use of long drain gear lubricants with superior additives.

For power steering oil the change period ranges from 80000 kms to 120000 kms for trandex II D grade. The Wheel grease used for bearings for passenger commercial vehicles have a change period range from 60000 kms to 120000 kms depending upon the operation of vehicles viz. city operations, highway operations, off highway operations etc. the change period of wheel bearing grease is extended in most cases by using synthetic base oil for the grease and the grease are described as synthetic grease. Most of the grease manufacturers use red colour for synthetic grease as an easy identification for the end user.



Another important lubricant for commercial passenger vehicle is chassis grease, which is used for greasing propeller shafts, steering linkages etc. and other moving components of chassis. As a general process followed in industry the greasing of these components are done at an interval of 10000 kms.

With the advancement of automobile sector an indication towards electrical vehicle to be used in metro cities, there is a general perception among the industry experts that although the initial capital cost of electrical vehicle is high against it's diesel and CNG vehicle, however there is a lucrative trade off with low operational costs involved in electrical vehicles.

Considering our primary focus on use of lubricants, it can be expected that consumption of engine oil will be reduced drastically in automobile passenger vehicle industry. A typical lubricant consumption on a passenger vehicle can be tabulated as below;

Type of oil	Grade	Change period (km)	Capacity (ltr) and (kg) for electric	Annual consumption
Engine oil	SAE 15W40 CH4	25000	10.5 ltr	70 ltr
Engine oil	SAE GEO 20W40	10000	10.5 ltr	80 ltr
Engine oil	SAE GEO 15W40	10000	14.5 ltr	110 ltr
Gear oil	SAE 80W90 EP GL-4	50000	6.5 ltr	14 ltr

Differential oil	SAE 85w140 EP GL-5	50000	12 ltr	18 ltr
Power steering oil	Dixtron II D	80000	4 ltr	10 ltr
Wheel bearing grease	Lithium complex	50000	2kg	5.5 ltr
Chassis grease	Calcium based	10000	-	5 kg
Engine coolant	Ethylene glycol based	90000	21 ltr	22 ltr

From above data it is clear that the total lubricant consumed by commercial passenger vehicle with engine as its prime mover have its engine oil consumption around 60% to 70% of the total lubricants expenditure on the passenger vehicle.

With the expansion of electrical vehicle, the engines will be obsolete and it will be replaced by electrical motors and batteries. The electrical vehicle will have gear train where the consumption of gear lubricants viz. GL-4 & GL-5 grade. Also electrical batteries need to be continuously cooled by ethylene glycol based coolant which is presently used in engine cooling systems.

#### Conclusion

It can be estimated that the viscosity grade of SAE 15w40 base oil will become slowly and steadily reduced in demand for commercial vehicles with the expansion of electrical vehicles in metro cities. Further the demand for other lubricants viz. gear oil, rear axle oil, wheel bearing grease, chassis grease will not be highly impacted. Hence the consumption of viscosity grade SAE 80W90, SAE 85W140, gear lubricants and both greases will not be affected much. However the requirement of ethylene glycol based coolant will definitely increase as it will be essential consumable for preventive maintenance of electrical batteries, cooling system of transmission, etc.