

## **DIRECTORATE GENERAL BORDER ROADS**

### **GENERAL MAINTENANCE INSTRUCTION NO 124**

#### **ON**

#### **FUEL ECONOMY**

#### **INTRODUCTION :**

1. With the unusual rise of cost of petroleum products it has become imperative to save this precious fuel in all possible ways. Besides savings, which can be effected by the economic use of transport, increasing Km per liters obtainable from the vehicles can also effect saving. There is no single simple way of making this saving. Meticulous maintenance, fine-tuning and adjustments especially of fuel system and ignition systems can achieve this. Considering saving can also be achieved by proper driving. Some of the factors that adversely affect the fuel consumption together with suggested measures are given in succeeding paragraphs. These have been divided into two parts – Part I 'Hints on Driving' and Part II 'Hints on Maintenance'.

#### **ACTION BY**

2. All Projects, Units and Workshops (GREF) Take necessary action as per succeeding paragraphs.

#### **DETAILS**

##### **PART I – HINTS ON DRIVING**

3. DO NOT over speed. Drive the vehicles at the optimum speeds for economy in fuel consumption. In general vehicle powered by petrol should be driven at speeds of 40 to 50 Kmph and those powered by diesel engines at about 35 to 45 Kmph in top gear. Driving faster than the above mentioned speeds, reduce the KM available per liter of fuel very steeply. In petrol engines reduction is about 10% at speed of 55 to 65 Km, 30% at 80 to 90 Km and 50% at 110 to 125 Km. Driving consumption due to vehicle having to move in low gears and the loss of performance of the engine at these speeds.

4. DO NOT resort to quick starts and stops, rapid acceleration and deceleration and violent braking. Drive at steady speeds. Anticipate stops and let the engine break the speed.

5. DO NOT drive with foot on the clutch pedal.

6. DO NOT slip the clutch to prevent engine stalling. Select and change to the correct gear.

7. DO NOT race the engine when halted momentarily at traffic checkpoints. Switch off engine if the halt is for more than one minute.

8. DO NOT make excessive use of brakes in traffic. Drive in proper gear depending upon the flow of traffic, increasing and decreasing the speed gradually to suit the conditions.
9. DO NOT drive with the choke pulled out a moment more than necessary. Driving with choke can cause loss upto 50 to 60% idling speeds. Use choke sparingly. Do not race the engine under any circumstances.
10. DO NOT fill dirty fuel. Ensure that proper attention is given to fuel storage. Fuel tanks should be cleaned at laid down intervals. Use chamois leather with the funnel for filling petrol. Ensure that filtering media of the funnels are always in serviceable condition.
11. DO NOT resort to unnecessary idling and static running for prolonged periods. It should be limited to the bare minimum necessary for either warming of the engine or maintenance.
12. DO NOT use wrong grade of engine oil. Wherever different grades of oil have been specified for use during winter/summer, carry out the changeover in time.
13. DO NOT spill fuel while refueling. Also do not fill the fuel tanks upto the cap. Fill only upto the neck of the filler tube. Ensure fuel tank caps are always fitted and are in serviceable condition.
14. DO NOT use petrol and diesel for cleaning the exterior/ interior of the vehicles.
15. DO NOT tamper with the seals of the milometer/odometer. Ensure that they are in serviceable condition at all times.
16. DO NOT park in the hot sun during the day. Park in the shade as not sun evaporates gasoline. As far as possible, park vehicles when not in use under covered accommodation.
17. DO NOT use 4x4 or all wheel drive unless absolutely necessary.

## **PART II – HINTS ON MAINTENANCE**

18. **Binding Brakes**. Binding brakes can waste fuel as such as 20% to 30% without being noticed. Check vehicles for defective brakes by jacking them up and ensuring free spinning of the wheels. During fairly long runs check brake drums. Excessively hot brake drums means that require attention by the workshop. A frequent trouble spot is the hand brake linkage. It is necessary that lubrication points of the linkages are regularly attended to.
19. **Tight wheel bearings**. Excessively tight wheel bearings have a similar effect on the consumption of fuel as the one described in the above paragraphs, For checking the wheels should be jacked up and the checked as before.
20. **Choked air filter**. Blocked air filter is a real fuel waster. -----

21. **Faulty fuel systems.** Fuel is wasted very often due to external leaks check vehicles to prevent this and tighten all the joints if leaks are noticed. Other points requiring attention are given below :-

(a) **Petrol engine.** Carburetor is a major trouble spot for excessive usage of fuel. Idling adjustments of the carburetor must be set properly. Qualified technical personnel should attend to any erratic idling noticed after the engine has been warmed up. A thin film of evaporated fuel on the outside over of the carburetor denotes incorrect setting of the needle valve resulting in flooding and wastage of petrol. They should be attended to expeditiously by nearest workshop. Any excessive fuel consumption from laid down figures should be reported to the maintaining workshop for attention. This can be due to the jets which pass both petrol and air getting worn out and should therefore be replaced whenever wear is noticed.

(b) **Diesel engine.** Excessive black smoke notice in diesel engines, after they have been warmed up, denotes malfunctioning of the fuel system. Ensure that there is no leakage at the unions. On noticing that the vehicle is emitting black smoke get the vehicle attended to by workshop.

22. **Wheel alignment.** Excessive and uneven wear on the front tyres is a sure sign of misalignment of the wheels. Similarly dragging of the vehicle to either side also denotes misalignment. Any misalignment increases the Rolling resistance of the vehicle wear of tyres. Ensure that such cases as soon as noticed are attended to by the workshop.

23. **Clutch slippage** : Slipping of the clutch causes waste of power and hence excessive fuel consumption. This is often caused due to incorrect adjustment and improper lubrication of clutch linkages. Ensure that there is proper free play of the clutch pedal as laid down in the User's Hand Book. Periodically lubricant the clutch linkages. Clutch slippage can be detected if the engine has got a tendency to race without any appreciable increase in the speed of the vehicle.

24. **Inefficient cooling system** : Over-heating of the vehicle causes loss of power and heavy fuel consumption. Fan belts should be checked periodically for the proper tension. Check for obvious leaks from the water pump and hoses. Radiator should be flushed as per laid down periodicities in the Servicing Schedules. Temperature gauges should be checked for the serviceability. Report immediately to the workshop any unusual rise noticed in the temperature of the engines. Do not remove the thermostat from the cooling system. Use clean water for the radiator. Ensure radiator caps are always fitted and in serviceable condition.

25. **Under inflation of tyres:** Low tyre pressure cause loss of fuel upto 2 to 3 Km per liter, as the rolling resistance of the vehicle increases considerably under such conditions. Driving vehicles with under inflated tyre in addition cause excessive wear of the tyre. Check tyre pressure before the vehicles is run

26. **Battery** : keep the battery charged at all times. It helps starting and ensures good ignition in case of spark ignition in case of spark ignition engines reducing loss of fuel.

27. **Plugs, contacts breaker points and ignition system :** Worn/dirty spark plugs, incorrect spark plug gap, dirty and pitted contact – breaker points, incorrect contact breaker gap, incorrect ignition timing, frayed HT leads. Faulty coils lead to poor combustion and consequently wasted fuel, in case of spark- ignition engines. Ensure that during monthly inspection of these vehicles, the qualified personnel of Unit Technical Staff attend to these aspects and correct any malfunctioning noticed. The specifications as laid down in the User Hand Book should be adhered to. Change the spark plugs as a matter of routine every 10,000 Km of run. In case the engine still runs unevenly report to the maintaining workshop for general tune –up every 4.000 Km in case of GS vehicles that are used frequently.

28. **General conditions of the engine:** The few aspects mentioned above are all that need looking into if the engine is in perfect serviceable condition. Leaky valve, gasket leakages, wears of rings and cylinder bore also cause excessive fuel consumption. Ensure that those aspects are checked by the GREF Field Workshops during their periodic inspection. Ensure therefore that vehicles are sent on due dates for inspection to the dependent workshop.

### **CONCLUSION**

29. It is imperative that all efforts should be made to save fuel under all possible ways. This can be achieved only by correct maintenance and proper driving techniques. Close supervision and concerted efforts by all users of mechanical transport can achieve a large amount of economy in fuel consumption. In addition to fuel economy, it automatically ensure higher reliability and availability of the equipment