DIRECTOR GENERAL BORDER ROADS

PREVENTIVE MAINTENANCE OF 'B' VEHS

PART-I

GENERAL INSTRUCTION NO.182

1. All drivers should be instructed to adhere to the maintenance schedule as given in the log books and GMI-6 such as :-

(i) Running Maintenance

(aa) First Parade

(bb) Halt parade

(cc) Last parade

(ii) Weekly maintenance

(iii) Monthly maintenance

(iv) Maintenance based on Hours run.

2. A few hours should be allowed in a week for each vehicle / eqpt for carrying out weekly and monthly maintenance tasks. The first three letters of the maintenance day will be painted on the front portion of the veh / eqpt to indicate the day of maintenance. Maintenance should not be left to drivers only, but a technical supervisors should be present at the time of carrying out proper maintenance. For proper maintenance every unit should have a pit or ramp and wherever possible a hard standing, so that maintenance can be carried out properly. Tar-pauline of vehicles should be tightened and tarpaulins will be repaired as and when required immediately. Officers should also over se that proper maintenance is being carried out. Surprise checks by Commanders will be helpful.

3. Every vehicle during warranty period should be marked with a 'Warranty' word and period such as 9 months, 12 months or Kms eg 16000 Kms/Hours, should also be marked at a place where it draws the drivers attention, without disturbing his vision while using the veh/eqpts. To make drivers/operators cost conscious the price of veh/eqpt should be painted at a prominent place.

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4. **Washing & Cleaning in extreme cold condition:-** General cleanliness is imperative. Never spray water on an eqpt out-doors when the temperature is below freezing point. The eqpt must be dried off before it is taken out-doors. The vehicle must be driven over a short distance with frequent application of brake and clutch, so that any water which would have found access to these components is squeezed or dried out before it has a chance to freeze. In case washing of the eqpt cannot be done, loose snow and dirt should be brushed off. Ice should never be knocked off as this will damage the paint work underneath. Dry cleaning of the eqpt, particularly of components which get warmed up during a run, must be carried out when these are still warm, after the run.

5. **Parking/drying of Vehicles:-** Eqpts may have to be parked or garaged out-doors out of necessity. Parking brakes should never be left in 'ON' position. To avoid strain on engines the following instructions should be brought to the notice of drivers:-

6. (a) Changing down to a gear that will comfortably enable the engine to function without stalling. The changing of gear depends on:-

i) Gradient
ii) Degree of bend of the road
iii) Roughness of road surface
iv) Altitude

(b) Engine should never be overheated. Hits on hill convey must be arranged depending on the nature of the terrain. Halts are essential both in the interest of the driver as well as the veh/eqpts.

(c) Vehicle should never be loaded to its maximum capacity, especially on hilly roads.

(d) In case the vehicle is to be taken on a hill section, engine should be warmed up first.

(e) In towing another vehicle the principal to be followed is that if vehicles are of the same type, the one being towed should be unloaded and the one towing, only lightly loaded, if inescapable.

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PART-II
MAINTENANCE OF VEHICLE SYSTEMS

1. **ENGINE:-** The important aspects of maintenance are indicated below:-

a) Only recommended grades of oil for engine should be used. In extreme emerges by another specified equivalent grade of oil may be used. Two grades of oil should never be mixed up while using another grade. The sump of the engine should be drained out completely, and first cleaned. Sample of oils must be displayed in bottles for purpose of easy recognition/training of new drivers.

b) Dip stick provided on all vehicles should be used for checking oil level. Oil level should be checked only after a minimum of 5 minutes of switching off of the engine and the veh should be on level ground whilst checking oil levels. Dip stick should be wiped clean before dipping, for checking of the oil level.

c) An oil funnel with coarse gauge filter must be used to fill the oil sump. The cap and filter neck must be wiped clean.

d) Every vehicle should be marked for correct oil pressure. Oil sump should always be cleaned to ensure proper dissipation of heat from hot oil in the engine sump.

e) Cleaning of the engine, top of the batteries and gauges must be ensure.

f) Checking of water and oil tight joints is necessary.

g) Periodically of changing oil, cleaning /re-placing filters, checking fan belt tightness and spark plugs must be ensured.

h) Lubrication of various parts is essential.

i) Gas tight joints, eg cylinder head joint, spark plug joint, carburetor joint, exhaust and inlet joints should be checked in the presence of technical tradesmen only.

j) Over tightening of spark plugs damages the plug, Undue force to

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k) exhaust or induction manifold damages the nuts, so proper spanners only should be used.

l) The water joints must be secured by clips securing the hose connections and nuts.

m) The sump, drain plug, timing cover, rocker cover and tappet cover should be checked for external leakages.

n) Oil filters must always be replaced as per the manufacturer's recommendations/laid down periodicities.

o) Oil in sump of FIP must always be kept to the level by checking with the dip stick. Oil level in governor should also be checked.

p) KM Cables/hour meters must be serviceable to ensure proper recording of actual KM/Hours run by engine (veh/eqpt) in use with defective cables/hours meters, must have a certificate from the OC Unit/TF/Wksp permitting its use.

2. **Cooling System:-** Water in the cooling system will freeze when sub zero temperatures are encountered. Anti-freeze mixture as indicated in the succeeding para should be used.

a) A solution containing 45% of Ethylene Glycol is to be used for temperature upto minus 35^0 C. Below this temperature solution must have 60% Ethylene Glycol.

b) Frozen radiators and failure of the engine to reach normal temperature are the two most common failures in sub zero operation. Under no circumstances will the engine be started with a frozen radiator thawed. In on starting an engine a sudden rise in temperature is recorded by the temperature gauge, a frozen radiator can be one of the major causes. In such a case, the engine should be switched off immediately and the condition of the radiator coolant checked.

c) Torn or damaged covers or muffs must be repaired or replaced immediately.

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3. **FUEL SYSTEM**

a) Caps of fuel containers should be kept tightly closed to prevent ingress of snow, ice or dirt.
b) Wipe off all snow around filter caps of fuel with chamois skin to prevent passage of water.
c) When topping up fuel tank, strain the fuel through chamois leather to prevent ingress of water.
d) Fuel tank will be topped up every day after the day's work, as it minimizes fuel tanks breathing and resultant moisture condensation over night. In case essential, one percent Methyl Alcohol with fuel should be mixed at the time of re-fuelling.
e) Whilst filling up fuel tanks need of fuel filters can not be over emphasized.
f) Barrels of diesel/petrol should be stored in vertical position to permit sediments to settle down.

4. **LUBRICATION SYSTEM**

a) The periodicity of oil changes in high altitude areas, particularly in Ladakh area, has been increased as a rough guide.

i) Engine Oil - At half the mileage in normal terrain.
ii) Transmission Oil - At 75% of the mileage in normal terrain.

Other precautions necessary to ensure proper lubrication are as under:-

(aa) Air cleaner should be checked frequently for proper functioning.

b) The most vital aspect of maintenance of any eqpt is lubrication of engine assembly, gear box, transfer case, axle, reduction gear, drives and chassis including wheels. Every vehicle should have a chart showing the type of the lubricant to be used for the other mentioned parts of the vehicle.

5. **CLUTCH/BRAKING**

(a) Riding the clutch ie, keeping the foot half pressed on clutch pedal must be avoided.

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(b) Sudden releasing the clutch pedal while on an up hill slope should be avoided.

(c) Gathering too high speed on a decline (in gear) and applying brakes suddenly to regain control is dangerous. Proper speed must be maintained whilst going down hill in particular.

6. STEERING

(a) Inspect steering mechanism from the tie rod end to steering box and tighten all loose bolts and nuts and ensure split pins are in position.

(b) Lubricate all joints and check steering box lubricants at three times the frequency laid down for normal running.

7. GEAR BOX AND TRANSMISSION

(a) Gear Box and rear axles should be topped up after opening oil filter plugs. It is also essential that while oil changing done, removed old oil should be checked thoroughly for any foreign metals. Oil filling in the gear axle is generally done by checking the over flow of oil from the axle. It is necessary to put the vehicle on a level ground, as downward slop may also cause the oil to over flow and enter into brake drums etc.

8. CHASSIS LUBRICATION

(a) Every vehicle should have the points which need lubrication painted prominently marked for easy identification. Generally lubrication is done by oil or grease gun. It must be ensured that the passage of lubrication is always clear and grease commences to oze out from the ends of the bearing or joint being lubricated.

(b) Electrical items like dynamo, self starter, magneto and exposed joints are lubricated by oil can. The lubrication points should be wiped out clean before drop of oil is put into the assembly.

(c) Every nipple and oil filter cap should be colour coated to indicate, periodicity, responsibility, type of lubricant and easy location. It is essential that a driver or an operator should be trained to be able to carry out maintenance without referring to an documents etc.

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9. **TYRES**

(a) Operator should periodically examine tyres for bad cuts, nails and embedded stones to avoid further damage to tyres. Tyre rotation is essential to be carried out after every 3200 Kms to have an even wear of tyres.

(b) In the event of a burst tyre, drivers should bring the vehicle to a stand still gradually and not by vigorous applications of brakes. Tyres should be replaced before the depth of thread pattern at the crown of the tyre is approximately 3.25 mm in depth.

(c) The painting of walls of tyres with white oil based paints for ceremonial purposes other reasons is strictly prohibited.

10. **BATTERY**

(a) All the terminals of electrical items should be tightened and frayed, burnt or cracked insulation should be taped.

(b) Electrolyte level of the battery should be checked daily and distilled water be filled and the level be kept at 6.5 mm above plates. Vent cap holes should always be clear.

(c) Mineral jelly should be applied to terminals.

11. **WHEELS :** Wheels huts always be kept tight and should be tightened evenly. The rims of the vehicle should be treated with paint, black anti corrosive acid and alkali resisting.

CONCLUSION

12. This GMI is an amplification of many instructions recommended by the manufacturers. This is in no way exhaustive and must be read/followed in amplification of the manufacturers instructions for each type of veh/eqpt. Special care will be taken at all levels to ensure that maintenance of veh/eqpt/plant and machinery is meticulously carried out, with a view to improving the reliability as well as the life expectancy of vehs/eqpts is use in Border Roads Organization.