# DIRECTORATE GENERAL BORDER ROADS

## GENERAL MAINTENANCE INSTRUCTION NO. 133

## CARE AND MAINTENANCE OF BATTERIES OF LL TYPES

### INTRODUCTION

1. Battery is the heart of the electrical system. Its condition affects the economic performance of the vehicle. It is therefore essential that it should be looked after properly. The existing instructions on the subject have been compiled below to assist the unit MTO's in improving the maintenance standard. It is a remarkable fact that unless abused grossly the battery given a satisfactory service for about 2/3 years.

### ITEMS AFFECT

2. **BATTERIES**

### ACTION BY

3. All user units and Base/ Field Workshops (GREF). Take action as per details given below.

4. **COMMON FAULTS**

(a) Deficient clamping frames and winged nuts.

(b) Batteries loose in their cradles, secured with improperly fitting wooden pieces and old strings.

(c) Hammered connectors.

(d) Corroded connectors.

(e) Clogged holes in vent plugs.

(f) Low electrolyte level.

(g) Frayed insulation and dead cable.

5. **BATTERY CRADLES**

(a) Batteries should be firmly secured in their cradles.

(b) Battery clamps and securing frames should be properly fitted and adjusted.

(c) When demanding replacements correct part number must be quoted to get the same size battery.

Contd…..P/2

**NOTES :-** In case original size battery is not available, any other battery of the same capacity in lieu is fitted. In such case battery should not be left loose in the cradle since it would be damaged. The vehicle should be sent to Workshop for necessary adjustment of the cradle or fitting of parking pieces.

6. **TERMINAL POSTS AND CONNECTORS**

(a) **TREATMENTS**

(i) Ensure that the connectors and terminal posts are clean and free from corrosion. If the battery has been removed from the cradle, the best way to remove corrosion is to dip the connectors into a small can of boiling water. This will ensure that no corrosive substance has fallen into any other metallic part of the vehicle and that the connectors are perfectly clean.

(ii) When clean, battery terminal posts and connectors should be LIGHTLY smeared with mineral jelly GS Red or Yellow (Vaseline). Excessive helly if applied may contact the battery case top thus softening the sealing compound. .

(b) **PRECAUTIONS**

(i) When removing connectors from terminal posts do not lever against the battery top with a spanner or any other tool. This practice may result in the cracking of the battery top.

(ii) Slacken the clamping nut properly and apply a slight twist to the connector to remove it easily from the terminal post.

(iii) When replacing the connector do not use force. If on tightening the clamping bolt nut the connector still remains loose report this to GREF Workshops for rectification.

**NOTE :-** Do not use hammer –this will result in change to the connector, the terminal post and plates.

(iv) Do not apply grease GS to battery terminal posts and and connectors under any circumstances. (It has an acidic content which is harmful to the battery components.

7. **MAINTENANCE (WHEN BATTERY IN USE)**

(a) Cleaning. Clean the top of the battery and wipe off any signs of corrosion around connectors with wet cloth before removing the vent plugs. This will ensure that no dirt falls inside the cells.

(b) Vents caps. Remove the vent caps and place them upside down on the side of the battery.

Contd…P/3

(c) Electrolyte level (Topping up).

(i) Check and add distilled water if necessary. Level of electrolyte should LWYS be ½" above the top plates.

(ii) Do not add acid or electrolyte to make up the electrolyte level.

**NOTE :-** Acid does not evaporate. Water only evaporates. Therefore, only distilled water should be added for topping up the battery.

(iii) Wipe off the top and sides of the battery with weak ammonia after adjusting the electrolyte.

(d) **Check**.

(i) That vent holes are clear and rubber washers intact. Replace vent caps.

(ii) Battery case for signs of cracks and leaks.

(iii) Battery cables for signs of fraying and deterioration of insulation.

(iv) Battery connectors for corrosion.

(v) Battery clamping bolts for tightness.

(vi) Earth connection for good contact.

**Specific Gravity**

8. 1270 – 1300 Fully charged.

1150 - 1000 Fully discharged.

1225 Not charged enough for starting the engine specifically in cold weather - Be careful.

1200 Lowest permissible discharge. DANGER POINT –Battery should be removed (and charged at once).

9. Specific gravity of all cells should ride or fall together. If reading of one differs by 50 or more points from the other, there is loss of electrolyte or internal trouble. Such batteries should be sent to Wksp.

10. Hydrometer reading indicate specific gravity of the cells :-

Contd……P/4

(a) Take readings of each cell at regular intervals and just before adding water. If done, immediately after adding water, weak electrolyte will be on drawn into the hydrometer (water being lighter will be on the surface) and a false reading will be indicated.

(b) In acid is added to the electrolyte (Topping up the battery) to bring up the specific gravity the electrolyte will be too strong and a false reading will be obtained.

**EFFECT OF CLIMATIC VARIATIONS**

11. **Variations of climatic effect batteries.**

(a) In hot climate water evaporate quickly –topping up of the battery with distilled water should therefore be carried out frequently.

(b) In cold climate during winter :-

(i) It is Important to keep batteries fully charged to avoid freezing.

(ii) Topping up should only be carried out when batteries are being charged.

(iii) Use starting handle for starting the engine especially in the mornings. This avoids heavy drainage of the battery. Remember it is important.

(iv) Declutch when starting the engine. This avoids the load on the battery because of the thickness of gearbox oil.

(v) Be economical with headlights – use only when necessary.

**GENERAL CARE OF THE BATTERY**

12. (a) New batteries after initial charge should be used carefully, it has only about 80% of its full capacity.

(b) Do not allow any impurities to get into the cell.

(c) If a battery discharges soon after it has been charged and this happens frequently send it to Field Workshops (GREF).

(d) If one cell regularly requires more water than the others leakage of the container is indicated. SK the dependent GREF Workshops to repair it.

Contd…. P/5

(e) Electrolyte taken out from one cell by Hydrometer should not be put into another cell. This will cause trouble because of ‘High cid’ in one cell or weakened electrolyte in another.

(f) Do not leave a fully discharged battery for a long period.

(g) Never bring an open flame near the battery.

(h) Do not over fill the battery by adding more water than necessary. The electrolyte will spill during the vehicle run and will eat up the cradle and other parts of the engines on which it drips.

(j) Self starters should not be disconnected.

(k) Do not exhaust the battery by prolonged attempts to start with the self-starter without checking up for engine troubles. In such cases starting handle should be used.

(l) Battery connections should not be removed when vehicle is jacked up or is a non-runner.

(m) Voltage regulator and dynamo wiring circuits should not be interfered with by unit personnel but should be locked into by Field Workshops (GREF).

(n) Abnormal readings on the ammeter should be reported to GREF Workshops.