

DIRECTORATE GENERAL BORDER ROADS

GENERAL MAINTENANCE INSTRUCTION NO 54

ON

EFFECT OF DESERT ON STARTING AND IGNITION SYSTEM OF VEHICLES/EQUIPMENT

1. **Aim.** This instruction enumerates the effects of desert on various assemblies/ components of the starting and ignition system of vehicles and equipment operating in desert areas. Suggested remedial measures and recommendations to overcome the same have also been explained.

2. **Characteristics of desert.** The effect of desert condition on the starting and ignition system of vehicles and equipment has been summarized under the following principal characteristics of desert :-

- (a) Sand, dust, and storms
- (b) Excessive heat
- (c) Salt and Salinity water
- (d) Dry weather (Lack of humidity and moisture).

3. **Details of the effects of desert on lubrication system.** These have been tabulated in Appendix 'A' to this **GENERAL MAINTENANCE INSTRUCTION** for necessary action.

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EFFECTS OF DESERT ON STARTING AND IGNITION STSTEM OF VEHICLES/EQUIPMENT

Affected Assy/ component	Sand, Dust & Storms	Excessive heat	Salt/ Salinity in water	Dry weather	Remedy/ Recommendation
1	2	3	4	5	6
Battery	Fine dust/ Sand particles block vent plugs. Clean them with needle daily to permit escape of gases form battery	(a) Evaporation of distilled water takes place rapidly. If not topped up, battery becomes dead prematurely. *(b) Affects specific gravity of electrolyte.	@Battery terminal posts get corroded soon and (white) sulphation is noticed thereon.	% Increases evaporation of distilled water. Top up battery daily at FIRST PARADE.	% (a) Never use drinking or saline water to top up battery. % (b) Provide "Distilled water bottle" with each vehicle/ equipment as part of its VKL to top up battery daily and during long drive. @@ Clean and smear MINERAL JELLY lightly before every long drive, otherwise treat it as a weekly maint task. *(d) The specific gravity need to be corrected to normal temperature and pressure to evaluate actual condition of battery charge. Electrician must be acquainted with the same. *(e) Ensure battery terminal are not worn out and leads are tightly fitted on posts, otherwise there will be arcing by jerks while veh is in motion. Thus heavy current will flow into the circuit and burn their armatures. Field Workshops to build-up worn out battery
Dynamo, Alternator Assy	(a) Dust particles get in between their shaft / bush causing excessive wear on dynamo armature shaft	(a) Melts bearing grease or thins `out oil film causing premature failure of	-	-	*(a) As bearing lasts longer than a bush modify dynamo end-plate of all vehicles/equipment from bush-type to bearing-type to enhance life of dynamo. Also

	<p>and bushes by grinding action and resulting into premature failure of complete assy. Also armature rubs against field and gets burnt.</p> <p>(b) Wears brushes and commutators faster leading to insufficient charging of battery.</p>	<p>dynamo/alternator gets</p> <p>(b) Dynamo/ Alternator Overheated and gives poor output. Also check fan belt free-play if became more due to softening of rubber by heat resulting into its slippage and thereby causing poor battery charging.</p>			<p>improvise wire-gauge cover on the end-plate to prevent ingress of dust inside dynamo/alternator and thus avoid premature failure of bush or bearing of dynamos/alternators.</p> <p>(b) Prefer Jeep CJ3B, NISSAN 1 Ton and NISSAN JONGA fitted with alternators (and not with dynamos) for desert terrain.</p> <p>*© Fd Wksp to provision dynamos and alternator assys as well as their armature field coils, stators, rotors, commutators, brushes and rectifiers at 5 times the normal scale and equip 'Road Patrols' with these items and include an experienced Electrician as 'Road Patrol'.</p> <p>*(d) Adjust fan belt tension to MAKER's specifications before and after every long drive in desert.</p> <p>(e) Lubricate Dynamo and Alternator bus bearing daily at FIRST PARADE by oil / grease, as applicable.</p> <p>(f) Fd Wksps to overhaul Dynamo / alternator twice a year or whenever vehicle/equipment reports to Field Workshop for inspection and repairs and thus minimize down-time. Also maintain a record of each unit by BA/EM No on the subject and organize overhaul of dynamos/alternators before and after desert exercise in Fd Workshops.</p> <p>(g) Field Workshops to ensure Cut-Out (Regulator) assy and Dynamo/ Alternator are of the same MAKE e.g. TVS-LUCAS, PRESTOLITE etc. Hence replace assy of that</p>
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					<p>very 'MAKE'. Also adjust cut-out (Regulator) assy to the precision values as per Maker's instructions with the help of PROTA-TESTER and thereafter seal it. Operators/ Drivers to be strictly prohibited to break open the seal and tamper with cut-out (Regulator) adjustment.</p> <p>*(h) Units/ Fd Workshops to avoid changing of a dynamo/ alternator from one vehicle to the other even if of the same MAKE, as cut-out adjustment is not matched to its output. If replaced during emergency ensure cut-out is also matched and adjusted accordingly, otherwise dynamo/ alternator will soon fail. Stencil BA/EM No of veh/eqpt on dynamo/ alternator assy for its implement.</p> <p>*(j) Fd Wksps to ensure correct earthing of terminal, positive or negative, as per MAKER's instructions indifferent vehicles/equipment duly considering whether provided with a dynamo or an alternator system (Separate Technical Instruction will soon</p>
<p>CB Points and Out-put (Regulator) Points</p>	<p>(a) At places, sand/ dust contain metallic particles, which leads to short-circulating/ arcing and even burning out their points. Thus needing early replacement.</p> <p>(b) If non-metallic sand gets in between CB Points, the gap is reduced and</p>	-	-	-	<p>*(a) Clean CB Points and Regulator points before and after every long drive. Check and adjust their gap (Seal Regulator Assy after checking cleaning and setting</p> <p>*(b) Fd Wksps to provision adequate CB points for replacement.</p>

	ignition timing is advanced. In case of regulator points, current & voltage are not regulated to correct values.				
Ignition Coil		Gets heated up often and thus do not develop enough voltage to ignite mixture.	-	-	Put a rag soaked in cold water on the ignition coil to cool it down, particularly during the summer months.
Self Starters Assy	(a) Ingress of sand causes early wear of self-starter pinion bush and starting dog threads with the result the meshing of starter pinion with flywheel is noisy and difficult. (b) End-plate bush wears rapidly causing armature to foul with field coils rendering it unserviceable prematurely.	(a) In certain cases oil becomes thin in the end-plate increasing rapid wear of end-plate bush. (b) In certain cases, insulation of armature and field coil gives away if gives frequently.	-	-	(a) Oil the starter pinion bush and after every long run and minimum once a week. *(b) Field Wksp to install overhaul of self-starter assy minimum twice a year as well as before and if long drive in desert. *© Fd Wksp to make adequate provision of self-starter pinion bush, starting dog and self starter end-plate bush, armatures and field coils.

Legend : Items marked * to be attended to by Field Workshops.