DIRECTORATE GENERAL BORDER ROADS

GENERAL MAINTENANCE INSTRUCTION NO 55

ON

EFFECT OF DESERT ON THE TRANSMISSION SYSTEM AND WHEELS OF VEHICLES AND EQUIPMENTS

1. Aim :- This instruction enumerates the effects of desert on various assemblies/components of the Transmission system and wheels of vehicles and equipments operating in desert areas. Suggested remedial measures and recommendation to overcome the same have also been explained.

2. Characterstics of desert: - The effect of desert condition on the Transmission system and wheels of vehicles and equipments has been summarized under the following principal characterstics of desert :-

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

3. Details of the effects of desert on the Transmission system and wheels of vehicles and equipments. These have been tabulated in Appendix ‘A’ to this GENERAL MAINTENANCE INSTRUCTION for necessary action.

HQ DGBR GMI No 55
Sated 19 Nov 1971

END.

Appendix 'A' to HQ DGBR GMI No 55 Dated 19 Nov 1971

EFFECTS OF DESERT ON TRANSMISSIN SYSTEM AND WHEELS OF VEHICLES/EQUIPMENTS

Effected assy/Com-ponent	Sand, Dust and Storms	Excessive heat	Salt/Salinity in water	Dry weather	Remedy/Recommendations
(a)Clutch assy	(a) Abrasive action of and/dust wears out clutch linings fast. (b) Frequent clutching and declutching while driving vehs in low gears in heay sand breaks clutch springs frequently and overheats assy. This overheating reduces Clutch spring tension.	Increases overheating of Clutch plates.	-	-	(a) Train drivers in desert driving particularly at night. *(b) Adjustment clutch frequent and replace clutch linings if worn. *(c) Field Workshops to adequately provision clutch plate springs, linings, rivets and clutch release bearings.
(b) Gear box and Auxilairy Gear box	(a) Due to prolonged use of low gears during desert driving, teeth of Ist and 2nd gear wear out fast and thus need replacement. (b) Ingress of sand and dust contaminates Gear Box oil, and wears all other gears also fast by abrasive action. (c) Premature wear og Gear teeth of auxiliary gear box and hence needs replacement of gears and even complete assy early .	(a) Reduction of oil viscosity and hence metal to metal contact of gears increases causing premature wear of gear teeth and increase in backlash. (b) Oil becomes thin and seal gets perished. Hence Gear box oil ofter sssps and even leaks necessitating frequent change of gear box oil	-	-	(a) Check condition of gear box oil and change whenever found dirty. (b)Reduced oil change periodicity as suggested below to be enforced under desert conditions: - **Present** **Proposal** Wheeled vehs Transmission 8000 Kms 5000 Kms or or 18 months 12 months or whenever found dirty *(c) Field Workshops to provision adequate Gear box oil sealds. Ist & 2nd gears and other gears at increased scales for replacement. *(d) Adjust back lash. (e) A central "Pool" of gear box assy be maintained.

		seals and topping up of Gear box oil.			

(c) Axles and Wheel bearings .	(a) Due to low gear driving in sand, there is more stress and strain on crown wheel and bevel pinions causing their early wear. (b) Front axle studs break frequently in desert driving., Particularly noticed in Truck I Ton Nissan. (c) Once wheel/tracks get bogged down in sand, drivers have to frequently clutch and declutch veh to take it out from sand. This breaks crown wheel and bevel pinions and also wheel bearings give way. It was particularly noticed in case of Lorry 3 Ton TMB. (d) Causes early wear of wheel bearings due to high road resistance and bad going in sand.	Grease melt away from wheels bearings leading to metal to metal contact, and thus causing all the more premature wear of wheel bearings.	-	-	(a) Field Wksp to provision crown wheel, Bevel Pinion at double the existing scale and wheel bearings and seals at increased scale. (b) Remove broken stud by drilling and modify it to fit a U bolt in its place. (c) Never run a vehicle/equipment with noisy wheel bearings. Stop and report to nearest Field Wksp to check for its wear and replacement, if necessary. Also, apply gears profusely on wheel bearing guard against ingress of sand, particularly during repairs.
(d)Propeller shaft & spider bearing	By continuous driving in loose sand, propeller shaft bolts bet loosened and even fall off leading to accidents at times.	Grease of spider bearing melts away leaving the bearing dry and causing premature failure.	-	-	(a) Driver should check and propeller shaft bolts before and after every long drive in desert, and also as a regular weekly maint task. (b) Lubricate spider bearing will once in 6 months, as well as before and after desert exercise.

(e) Rubber boots of Gear change lever & axle drive lever	-	Get Perished rapidly and need frequent replacement. If not replaced, sand particles get ingressed and affect free movement of levers.	-	-	Adequate provision of rubber boots be made and replaced whenever found perished. Treat it as an essential item in desert.
(f) Wheels (i) Wheel nuts	Continuous driving in heavy sand makes the wheel nuts work loose and these even fall off.	-	-	-	Tighter up all wheel nuts daily at FIRST PARADE, and before and after every long drive. Refit if found deficient otherwise extra load will come on other wheel nuts which may give away soon. Also keep one spare in VKL during long drive.
(ii) Tyres	Abrasive action of sand, particularly when tyres get heated up, wears out tyres much faster. This is more so when veh gets bogged down in sand and its wheels spin or skid.	Tyres and tubes perish quickly which lead to their premature wear and tear.	-	Tyre walls develop cracks, rendering it BER.	(a) Always carry spare wheel. Apply FRENCH CHALK to tyres when not in use. (b) Use 80% of the normal tyre pressure in desert :- (i) To provide greater ground contact of wheels and thus reducing ground pressure and chances of bogging down of vehs in sand. (ii) To cater for expansion of air inside tubes due to heat. (c) Preferably use of balloon (sand tyres) for cross country performance and inflate these to manufacturer's specified tyre pressure (and not 80% of normal tyre pressure). Avoid using balloon tyres on metalled roads, as these cause extra load on engine and transmission and reduce steering action of veh to negotiate sharp turns. (Veh needs modification whenever balloon tyres are fitted. Detailed modification will be issued soon in GENERAL WORKSHOP INSTRUCTION. (d) Avoid using twin wheels in the rear particularly in a recovery veh as these are more of hinderance and make the veh bog down in sand. Single sand tyres on rear wheels are more suited in desert. Alternatively, as a temporary measure cover gap between twin wheels by garnishin to avoid ingress of sand. (e) Never follow a track made by another veh in sand as

					that leads to frequent bogging down of vehicles. (f) Train drivers in desert driving. (g) Expected tyre life in desert to be reduced as under :- **Present** **Proposed** New Tyres 24000 Kms (15000 miles) 15000 Kms (10000 miles) Retreaded tyres 16000 Kms (10000 miles) 10000 Kms (6200 miles) (h) Provision tyres and tubes minimum at double the normal wastage rate.
(iii) Tubes	-	Gen punctures and even get /burst frequently.	-	-	--do-

Legend : The items marked * to be attended to by Field Repair Workshop.