

DIRECTORATE GENERAL BORDER ROADS  
GENERAL MAINTENANCE INSTRUCTION NO-41  
ON  
MAINTENANCE OF FIT VEHICLE AND MOBILE ENGINEER EQPT IN DEPOT  
STOCK/DG'S RESERVE

1. Summary This instruction lays down the procedure for the maintenance of Fit Vehicles and mobile engineer equipments of all types in Base Depot Stock as DG's reserve. A list of expendable stores required is given at Appendix 'A'.

2. Aim The aim of these instructions is to ensure that all vehicles and eqpt in storage are maintained in Base Depots, so that these are in fit state for issue and use at all times. To attain this aim, it is essential that these instructions are carried out in full. Non-compliance of any of these instructions may render the rest of the maint so ineffective that considerable workshop attention may be necessary before the eqpt can be made fit for use.

3. Pre-Storages maintenance and storage by Depot

(a) Cleaning The vehs/eqpts will be thoroughly washed/cleaned inside and outside, particular attention being paid to pockets, hidden places and behind bogies, under chassis and ancillaries. It is essential to remark all traces or moisture after cleaning. Clean exterior of the engine thoroughly using white spirit (Part ni. IHA-13030). PARAFFIN or PETROL will Not be used on machine or for engine cleaning. Engine will NOT be sprayed with WHITE SPIRIT, but hand cleaned using cleaning brushes, cotton waste or rags. Vehs/eqpts will be thoroughly dried after cleaning, care will be taken during the cleaning process to avoid contaminating the rubber connections, other rubberized engine parts and electrical components with white spirit.

(b) Lubrication

(i) Check all oil levels of engine, gearbox, back axle, final drive, steering etc and top them up where necessary.

(ii) Check oil level and hydraulic fluid levels of ancillary and auxiliary starter engine, if fitted to the base engine.

(iii) All lubrication points will be serviced with oil or grease as appropriate in accordance with relative servicing schedules (insert to vehicle/Eqpt Log Book).

(iv) Engine Clutch linkage will be lubricated with oil C-600 in throttle control movable arms and linkages etc. Heavier type exterior movable parts e.g. hinges, will also be lubricated with oil C-600 and then lightly greased with GREASE NO. 1.

(c) Ancillaries received fitted on the Veh/Eqpt will not be removed but maintained in accordance with Appx 'B'. Loose ancillaries will also be maintained in accordance with Appx 'B' and then fitted on the Veh/Eqpt.

(d) Bust removal and prevention :- Rust affected areas will be treated as follows:-

(i) If any traces of loose rust or rusty scale are found, these will be removed by means of wire brush by the use of mechanical aid such as Scraper where SOLUTION RUST REMOVING (IHA-0178) would assist in removal, it can be used as atleast resort provides, it can be thoroughly washed off after application. After removal of rust and scale, the cleaned and dried area will be painted with appropriate primer and finishers (see para 3(e) below).

(ii) All working surfaces and parts such as spring steering, braking and control linkages will be steering, braking and control linkages will be treated with oil preservation Engine SAE 30 (IHA-066 mixed with oil C-600 in the proportion 4:1 taking care that rubber hose connections, tyres and other rubber parts are not contaminated. GREASE NO. 1 WILL BE USED AS AN ADDITIONAL COATING IN CASE OF VEHICLES/EQUIPMENT STORED IN THE OPEN. Particular attention will be paid to Tractor Ball Joints, which will be maintained on final storage location. They will be thoroughly coated with GREASE No. 1.

(iii) If a Vehicle/Eqpt is fitted with winch gear, cables will be unwound sufficiently to examines the underneath wire to ensure that the coils of wire are adequately greased and rewound. If necessary, re-grease the cable with GREASE No. 1. Care will be taken to ensure that the cable is evenly rewound on the drum. Cover the drum with clean hessian or canvas.

(e) Painting

(i) Veh/Eqpt will not be put to stock with faulty or inadequate paintwork. Where absolutely necessary, they will be completely repainted. Where patches of paints are to be touch delt he affected areas will be cleaned and pained with primer and finisher.

(ii) Exhaust pipe and Silencer assys will be wire brushed and pained with PAINT PFU\* (\* PFU: Prepared for use).

(iii) Great care will be taken to ensure that the veh/eqpt's markings are correctly stenciled on them and that paint is not sprayed on rubber hose and rubber parts.

Notes: Complete repainting or eqpt/veh while in stock will not be carried out, patching only being resorted to. However, at the time of issue, repainting may be carried out if recommended by Inspection Cell, in their "Issue Inspection report".

(f) Removal of battery: Batteries will be removed, marked with the BA/EM No. of parked veh/eqpt and handed over to the Battery Stores. The battery lead terminals will be thoroughly cleaned and wrapped with tape adhesive. The battery box and recesses will be thoroughly cleaned and pained with PAINT PFU BALCK ANTI-CORROSTIVE

ACID AND ALKALI RESISTING (IHA-0204). The batteries will then be stored and maintained.

(g) Fuel Tanks

(i) Veh/Eqpt fitted with Petrol engine:-

(aa) Petrol will be drained off from petrol tanks completely.

(bb) These will be filled to the neck with OIL PRESERVATIVE ENGINE SAE 30 (CAT NO. IHA-0665) and then drained, so that a film of the preserving is left on the inner surface.

(cc) Replace drain plug and filler cap after securing their threaded portion with GREASE GS.

(dd) Seal filler cap with tape adhesive.

(ii) Machine fitted with diesel (CI) engine.

(aa) Fuel tanks will be drained off completely.

(bb) Filler cap will be replaced and sealed with tape adhesive to prevent ingress of waster.

(h) Engine preservation

(i) Cylinder bore – diesel (CI) engines: ENGINE OIL PRESERVATIVE SAE 30 should be introduced into the cylinder in the form of vapours by spraying it from inlet manifold. Spray with an 'Atomizing type appendix 'C'. The engine should be cranked in small bursts till traces of oil are noticed from the exhaust.

(ii) Cylinder bore – petrol engines

(aa) Run the engine until the petrol in the fuel tank is exhausted and the engine stalls. While the engine is running, press the acceralator to pump out the petrol in the petrol in the carburetor.

(bb) Switch off and allow the engine to cool.

(cc) ENGINE OIL PRESERVATIVE SAE 30 (IHA-0665) should be introduced into the cylinder in the form of vapors by spraying it from the inlet manifold, and while doing so, the engine be cranked by hand or by self-starter till trace of oil are noticed from the exhaust.

(iii) Radiator and water Jacket. Drain cooling system completely. Prepare a solution of SODIUM BEYZOATH (IHA 0930) BY ADDING IT AT 15 GMS PER LITRS OF WATER. Fill the cooling system with this solution and run the engine for 5 minutes.

(iv) Valve Gear Remove injection cover/tappet cover and spray valve gear with OIL PRESERVATIVE ENGINE SAE 30 (IHA-0665). Replace cover making sure that the gasket is in place.

(v) Air Cleaner Remove pre-air and oil cap. Spray inside air cleaner (screen metal wool) with OIL PRESERVATIVE ENGINE SAE 30 (IHA-0665).

(VI) Exhaust manifold Seal exhaust pipe and vent hole with wading Fabric No. 2 with tape.

(vii) Fuel injection pump, Fuel filters and governor housing Drain off fuel filter housing and wash with diesel oil. Refill with clean diesel oil and ensure that the common gallery of fuel injection pump is also full. This can be ensured either by opening the vent plug (bleeder plug) or from the fuel return pipe. Remove rack inspection cover of fuel injection pump and spray the rack and controlling accessories with OIL PRESERVATIVE ENGINE SAE 30 (IHA-0665) that lubricating oil level is correct upto oil filter. Remove inspection cover of the governor spray the housing with OIL PRESERVATIVE ENGINE SAE 30 (IHA-0665).

(viii) Crank Case Top up engine oil and seal off filler and air breather with wading Fabric No. 2 with tape.

(ix) All auxiliary engines with the base vehs/eqpt will also be treated as detailed above.

(j) Main Clutch

(i) Open Clutch The clutch will be sprayed with OIL PRESERVATIVE ENGINE SAE 30 (IHA-0665).

(II) Closed Clutch The clutch housing will also be sprayed with OIL PRESERVATING ENGINE SAE 30 (IHA 0665) from inside and sealed so that no moisture can penetrate inside the housing.

(k) Transmission housing Transmission oil will be topped up. Oil filter plug, drain plug and the breather will be sealed with WADING FABRIC NO 2 with tape.

(l) Steering clutch compartment and final drive housing These will be topped up with lubricating oil. Drain plug, filler plug breather and inspection plates will be sealed with WADING FABRIC NO. 2 with tape.

(m) Rear and equalizer springs The veh/eqpt will be jacked up and the spring will be scraped and cleaned and CAL C-600 will be smeared.

(n) Tyres and Wheels

(i) Vehs/Eqpt will be jacked up and supported on blocks placed under the axle, so that all the wheels are clear off the ground.

(II) Tyres will be removed and refitted after wheel rims are cleaned and painted according to current instructions. These need not be carried out on vehs/eqpt received after base repairs for the first time.

(iii) Tyres will be examined for embedded nails, flints and so on. Punctures and defective valves will be repaired.

(iv) Pressure in all tyres will be reduced to  $2/3^{\text{rd}}$  of the normal (scheduled) tyre pressures. When Vehs/Eqpt are not jacked up, the tyres will be inflated to 5 psi more than the normal.

(v) When vehs/eqpt are stored in the open, all tyres will be covered with HESSIAN SCREEN to protect them from the direct rays of the sun.

(o) Air bottle and reservoir Air bottle and reservoir if fitted will be drained of condensation.

(p) Hydraulic Jacks & Hydraulic System Top up with the recommended fluid as per maker's instructions and if jack rod is exposed, it will be smeared with GREASE No. 1.

(q) There is a variety of miscellaneous maintenance tasks peculiar to different engineer equipment and these are shown very clearly in the relative services schedules. All these aspects of maintenance will be carried out at this stage.

(r) Stencil on the front body (or similar position) the date when next periodic maintenance is due.

(s) For maintenance of ancillaries, see Appx 'B'.

(t) Where possible, all eqpt and ancillaries should be stored in covered accommodation, Where covered accommodation is not available, hard standing, preferable of concrete is essential.

Notes:- Vehicles should be so parked that at least 3 ft of free space is available all-round to enable maintenance team to go round.

4. (a) Vehs/Eqpt under covered accommodations

(i) Interim Continual checking at not more than monthly intervals over the vehicles/eqpt, for obvious signs of rusting of steel work and tyre condition will be carried out by the Maintenance Team, when rust is noticed on the painted surface by painting. All wheeled vehs/eqpts will have road wheels freely rotated, check that the preservation on bright surfaces eg. Buffer-spline, hydraulic piston rod etc, is intact and that no deterioration has occurred. Re-grease, if necessary.

(ii) Annual

(aa) All fit vehs/eqpt and ancillaries will be prepared for the road for inspection and classification by Maintenance Team.

(bb) Prepare vehs/eqpt for the road and for inspection as follows:-

(i) Remove all Wading Fabric and tape adhesive.

(ii) Check all oil levels and lubrication points. Top up, where necessary.

(iii) Check cooling system and top up, where necessary.

(iv) Check Tyre pressure and bring the pressure upto the laid down pressure.

(v) Replace battery where provided.

(vi) Fill up sufficient petrol for an adequate test.

(vii) Start main engine and auxiliary engine and run them for 15 Minutes.

(viii) In case of self propelled vehs/eqpt, give an adequate road test and present the vehs/eqpt for collection party.

(cc) After the Veh/Eqpt and ancillaries have been inspected by the collection party and if necessary repaired by the Base Workshop, re-preservation for storage will be carried out in all cases. Detailed maintenance will be exactly as for the pre-storage maintenance laid down in para 3 above.

(b) Vehs/Eqpt stored in the open The periodic maintenance of vehs/eqpt stores in the open will be as outlined below. It must, however, be noted that not with standing what has been laid down below, it is depot's responsibility to keep vehs/eqpt dusted and the area kept clean continually. In addition to the above, visual inspection will be carried out by Depots and remedial action will be taken on occasions such as storms and rains.

(i) Weekly Tasks

(aa) To reduce the effect of interior condensation in case of vehs/eqpt covered with cover waterproof, remover cover. Ensure that all doors are open. Re-cover after three hours where covers-waterproof are not used, all entrance doors will be opened. They will be closed again after an interval of 3 hours.

(bb) While doors are open as above, dry out any accumulation of moisture that may be inside the cap. Remove rust if any and treat surface with preservation.

(ii) Monthly Tasks

(aa) Carry out weekly tasks.

(bb) Operate all control (Clutch pedals, brake pedal, accelerator and so on) several times and lubricate as necessary.

(cc) Vehs/Eqpt fitted pneumatic tyres if, not jacked up be rolled and ensure that the tyre does not come to rest again in the original form.

(iii) Quarterly tasks

Petrol Engine

(aa) Repeat monthly tasks.

(bb) Remove all tape adhesive seals. Check oil and coolant levels and top up if necessary. Fill one petrol tank, connect slave batteries.

(cc) Start engine

(dd) Run engine for 10 minutes at fast idling speed to bring the engines to operating temperature.

(ee) Turn off the fuel supply with the engine running and pump the accelerating pedal, so that no petrol remains in the carburetor.

(ff) Drain petrol tank and re-preserve tanks according to para 3(g) (i) above.

(gg) When engine has cooled down, re-preserve engine according to para 3 (h).

(hh) Disconnect slave batteries. Replace all tape-adhesive and seals.

Notes:- Any defect noticed during the above tasks should receive immediate workshop attention preferably in situ.

(iv) Quarterly Tasks

Diesel (CI) Engines

(aa) Unseal fuel tanks and air cleaners. Remove all tape adhesive from engine accessories and prime the injection system.

(bb) Start the engine with a slave battery or a starting engine as the case may be, and run at fast idle speed for 10 Minutes.

(cc) Stop the engine and when cooled down, re-preserve according to para 3 (h).

(dd) Top up fuel tank and replace tape adhesive and seals.

Main Clutch After the re-preservation of the engine re-preserve the main clutch according to para 3 (j).

(v) Six monthly tasks All fit vehs/eqpt will be prepared for the road for inspection and classification as per Appx 'D' by the Inspection Cell. Defects brought out by them will be rectified by the concerned GREF Base Workshop before storage. Sequence of action for the preparation will be the same as laid down in sub para (a) (ii).

5. Periodical Inspection of Depot Maintenance by Commander Base Depot Commander Base Depot or his representative will report to HQ DGBR, if any comments.

6. Pre-Issue maintenance by Depot The following tasks will be carried out on a veh/eqpt prior to issue:-

(a) Dust and clean

(b) Remove all tape adhesive seals.

(c) Check all oil and coolant levels and top up, where necessary.

Note: Oils and Coolant will be replaced only if contaminated.

(d) Fit fully serviceable batteries and connect correctly.

(e) Fill up, fuel tanks in case of petrol engine veh/eqpt and top up in case of diesel CI engine Veh/Eqpts.

(f) Drive the vehs/eqpts to the washing point and wash and dry. Clean the interior thoroughly.

(g) Touch up point work, if necessary, and remove all local stencillings. See note in para 7 for complete repainting.

7. Pre-issue inspection by Inspection cell The vehs/eqpts will be inspected by Inspection Cell and repairs, if any, carried out by the Depot (If within its capacity) or by GREF Base Workshop and finally out-inspected by Inspection Cell, when Found Fit for use.

Note: Complete re-painting of veh/eqpt can be carried out by the Depot if advised by the Inspection cell.

HQDGBR GMI No. 41

Dated 18 Sep 1971



EXPENDIBLE STORES REQUIRED FOR MAINTENANCE OF  
VEHICLES/ENGINEER EQUIPMENTS

Srl NO.	Part No.	List of Stores
1.	IHA-13020	White spirit
2.	ASC item No. 20	Oil C 600
3.	ASC Item No. 20	Grease No. 1
4.	IHA-0178	Solution Rust removing
5.	IHA-0665	Oil preserving Engine SAE 30
6.	IHA – 0511 (1 lbs pack)	} Grease GS graphited
	IHA-5512 ( 28 lbs pack)	
7.	IHA-10760	Paint PFU Heat resisting black
8.	IHA-0930	Sodium Banzoate
9.	IHA-0518	Oil cutting soluble
10.	HD-1362	Tape adhesive
11.	IHA-0204	Paint PFU Black anti corrosine acid and Alkali resisting.

Appendix 'B'  
(With reference to para  
3 (c) of GMI No. 41)

MAINTENANCE OF ANCILLARY OF ENGINEER PLANTS

Srl NO.	Details	Tasks
1.	Booms, Jibe, Bukets, 'A' Frames – Bull Dozer Blade etc.	(a) Derust, Primer paint and final paint and final painting on for base machine.  (b) Oil, all removable joints and working surfaces with OIL PRESERVATING ENGINE SAE 30 (IHA-0665) mixed with oil C-600 in the proportion of 4:1. Apply GREASE NO. 1 over the oiled areas.
2.	Operative movable parts eg fair lead swivel pins, Boom foot pins, pulleys, Guide Wheels, buckets, Padlock sheaves, Face shoval slipper shaft and bearings, caterpillar saddles and blade shoulders.	(a) Thoroughly clean with White spirit and oil all movable parts joints etc with composition as in 1 (b) above. Apply Grease No. 1 over the oil areas.  (b) For loose items of this nature, coat with GREASE No. 1. These Items will be stored under cover.
3.	Hydraulic Pistons, Buffer rods and other exposed highly machines surfaces.	Thoroughly clean with WHITE SPIRIT, dry off. Oil with composition as in 1 (b) above. Carefully wrap with HESSIAN.
4.	Wire ropes, hawsers and other general reveeings.	(a) Liberally coat with GREASE No. 1  (b) Wire ropes in store and not on vehs/eqpts will be wrapped with hessian after greasing and thoroughly spraying with OIL PRESERVATING SAE 30.
5.	Small items and fitment eg Boom coupling bolts, Bull dog clips, steel securing pins, wedges, large nut and bolt connections.	Dipped in composition as in 1 (b) above and then grease with GREASE No. 1
6.	Exposed gears and Racks eg Face shovel dipper sticks	Coat with GREASE No. 1
7.	Winch Gear	Spray with composition as in 1 (b) above
8.	Counter-balance weights pile-drive hammers	Spray with composition as in 1 (b) above.

Appendix 'C'  
(With reference to para  
4 (b) (v) of GMI No. 41)

CATEGORISATION OF VEHICLES AND ENGINEER EQUIPMENT IN DEPOT STOCK

Srl NO.	Classification of Veh/Engineer Eqpt including category symbol	Condition	Remarks
1.	Class 'A'	Fit Stock	Veh/Engineer eqpt fit for issue in all respects if can be made so within 6 days by carrying out minor repairs/adjustments.
2.	Class 'C' (spares)	Fit Stock	Veh/Engineer eqpt which are awaiting essential spares or vital modification stores.
3.	Class 'D'	Obsolete	No categorization to be done.

Note:-

1. All PRIORITY 'A' modification must have been completed on eqpt class 'A'.
2. PRIORITY 'B' modification should normally be completed at the time of base repairs. However, if any such modifications are outstanding they will not hold up issue of such eqpt and units advised of the outstanding modifications through entries in the log books and IAF (EME) and E-23.
3. In assessing the state of readiness for issue, the state of special eqpt mounted to be taken into account and categorization done accordingly.
4. Classification and categorization of fit veh/eqpt will be the responsibility of Inspection cell.
5. A fit eqpt in depot stock will not be downgraded to class "B" as there are no field repairs which cannot be completed by the GREF Base Workshop within 10-15 days time. Such eqpt may therefore, be placed within the 3 categories provided.

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RESEARCH

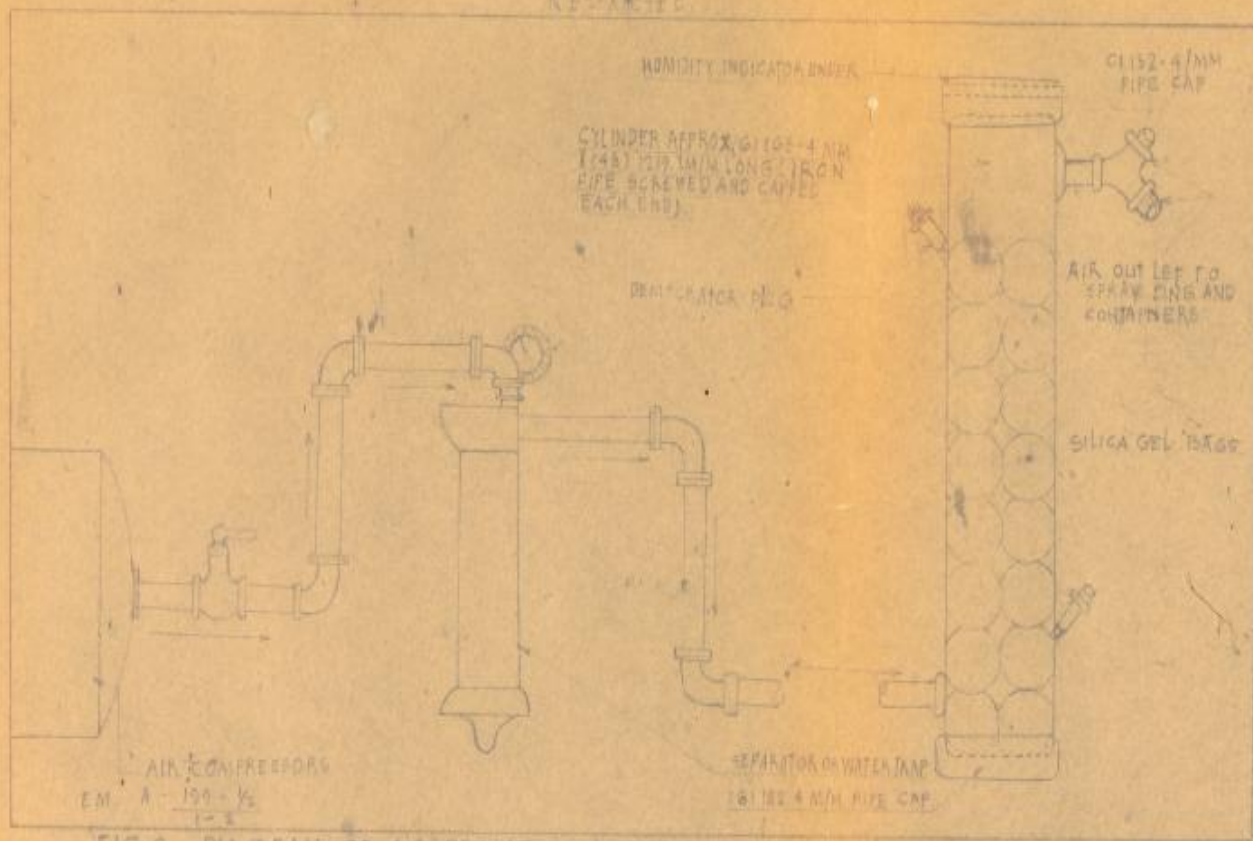


FIG. 2. DIAGRAM OF AIR DRYING CHAMBER FOR USE WITH SPRAY EQUIPMENT.