

**MOTOR TRANSPORT****Box Building Vehicle Type 1**

1 **General.** This instruction describes the Box Building Vehicle Type 1, which is designed for two man parties employed on box building.

2 **General Description.** The vehicle is a model FGK 80 Morris with a diesel engine and two man cab. The cab is fitted with inset angled doors for safety in entering or leaving the cab and with low level quarter lights to improve forward visibility. The nearside step is constructed from expanded metal in place of the standard rubber covered type. The chassis is extended to accommodate an enclosed forward compartment, a 30 cwt (see para. 7) HIAB No. 293 Lorry Loader, and an open rear platform (Fig 1). Two rotating amber beacons controlled by switches in the cab are fitted to the roof of the forward compartment.

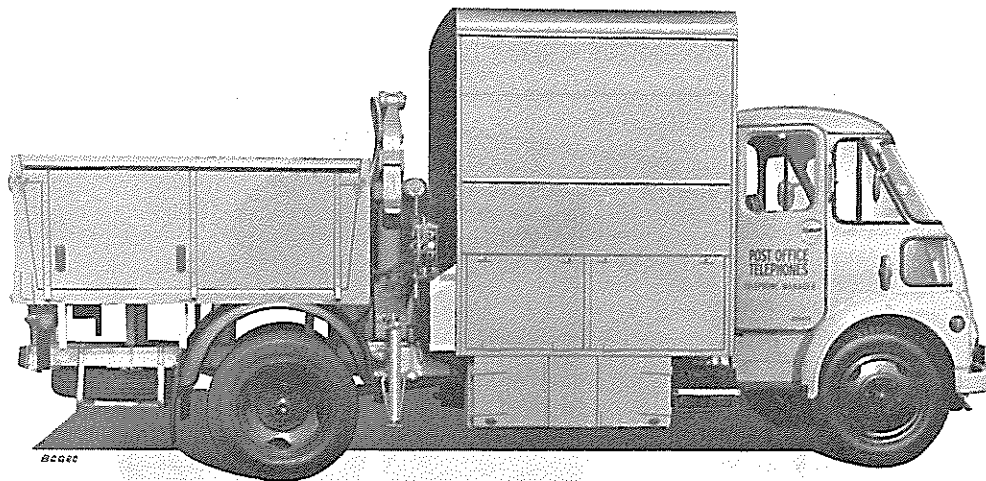


Fig 1

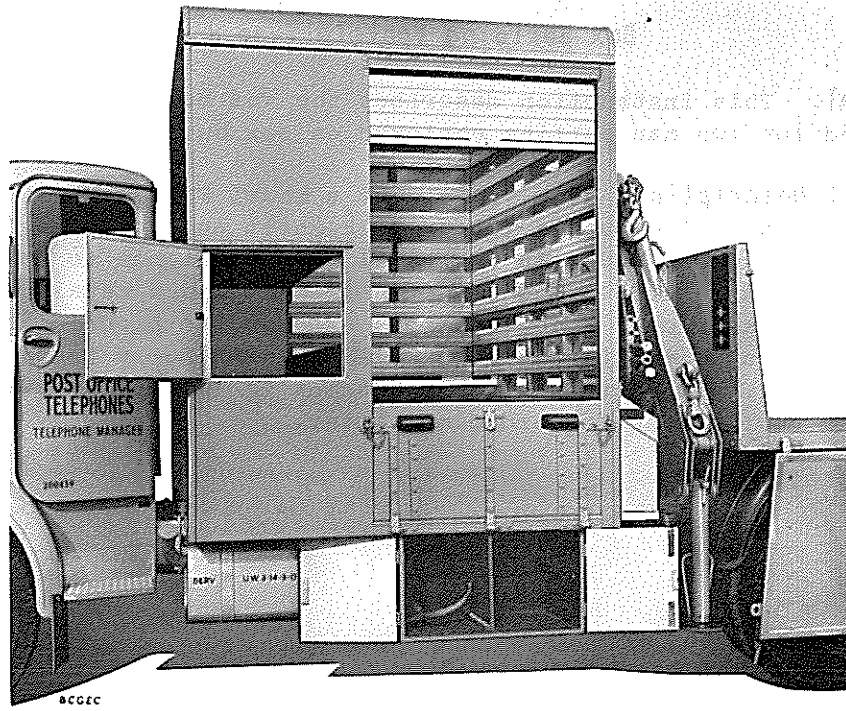


Fig 2

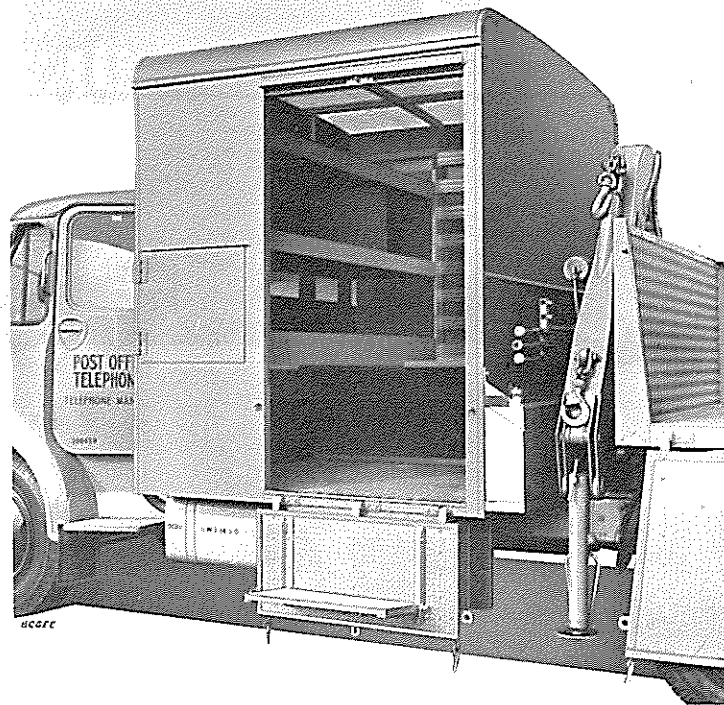


Fig 3

**3 Forward Compartment.** The forward compartment (Fig 2) provides enclosed storage space for tools, stores and 3 bags of cement. Access is by means of a roller shutter and a drop-down board fitted with a folding step (Fig 3). The compartment has lights controlled by a switch in the cab and a translucent roof. Three shelves along the forward wall provide space for tools and stores. All shelves are fitted with substantial wooden fences and the first shelf has access through a trap on the near side (Fig 2) to allow easy loading and unloading of long tools. Heavy mechanical aids are stored on the floor, which is covered with aluminium treadplate.

The 2KW generator (Electric Orange No. 2) fits underneath the bottom shelf close to the doorway. It is run on propane fuel and may be operated inside the compartment using the extension silencer, the power leads being extended to the electrically operated tools as required. The roadbreaker box is secured to the rails on the rear wall.

In order to keep the cement dry and to prevent cement dust from fouling the interior of the compartment, the cement locker (Fig 4) has separate access doors on the off side, and there is no connection between the locker and the interior of the compartment.

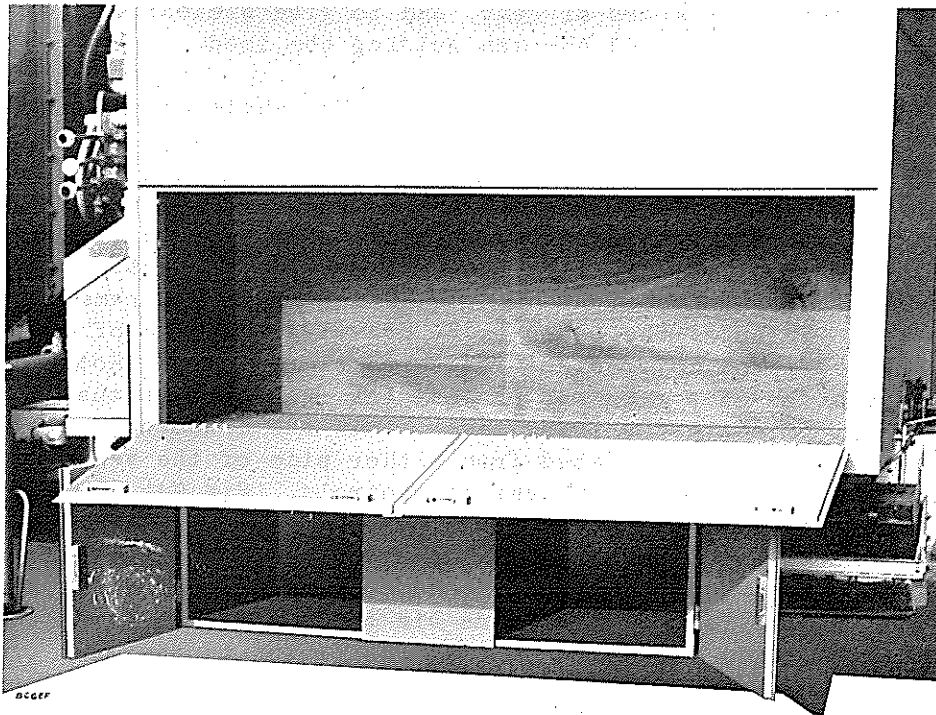


Fig 4

**4 Lockers.** Two underfloor lockers are attached to the forward compartment. The nearside locker (Fig 2) holds the spare cylinder of propane, and paraffin for the road caution lamps. The offside locker (Fig 4) holds twelve Lamps Road Caution.

**5 Security.** The cab is fitted with normal vehicle locks. The roller shutter of the box-body is retained by a padlock, and the lockers are fitted with budget locks.

**6 Water Tank.** A 27 gallon water tank is attached to the rear of the forward compartment. The captive screw-on filler cap is at the nearside (Fig 3). Buckets may be placed underneath the drain cock to which a length of hose pipe may be fixed as required. Notice plates on each end of the tank warn users that the water is not for drinking (Figs 3 and 4).

Drinking water should be carried separately in Bottles, Polythene No. 2.

In cold weather the tank should be drained each night and on no account should any sort of anti-freeze be put into it. The purpose of the tank is to carry clean water for mixing concrete and mortar. The tank should be filled at the TEC (before commencing each days work) using a hose pipe attached to the water supply.

**7 Rear Platform.** The rear platform, measuring 6' 8" long by 7' wide, is fitted with drop tail and side boards (Fig 5). The corner posts are removable to enable easy loading from the sides or rear, and to give a clear view between the operator at the crane controls and the man guiding the load.

A folding step is fitted to the tail board. The whole of the platform is covered with aluminium tread plate.

**8 Crane.** The crane (Fig 6) is fitted centrally on the chassis, between the forward compartment and the rear platform. It is a two-section folding type, hydraulically powered, with a manual extension of the outer section. The inner and outer booms are raised by means of two single-acting hydraulic rams controlled by separate levers. Lowering of the booms is by gravity, the rate of descent being controlled by the degree of movement of the appropriate lever. Rotation, or slewing of the crane is by means of a rack and pinion, the rack being actuated by a double acting cylinder controlled by the third lever. All the crane controls are duplicated so that the crane may be operated from either side of the vehicle. Instruction plates are displayed adjacent to each set of controls. (Fig 7).

The base of the crane is extended to two stabiliser legs each of which consists of a cylinder with a manually operated piston. Oil is allowed to flow by gravity from the reservoir in the base of the crane via the control valve at the top of the cylinder into the cylinder. When the foot of the piston touches the ground, shutting the valve forms a hydraulically locked support leg. The leg is retracted by opening the valve, raising the leg manually to its full extent by means of the handle, and then closing the valve.

The working pressure of the hydraulic system is 1990 psi. The oil pump is driven from a side power take off on the gearbox, and is engaged by means of a lever adjacent to the gear lever (Fig 8). A pilot light on the instrument panel indicates when the PTO is engaged.

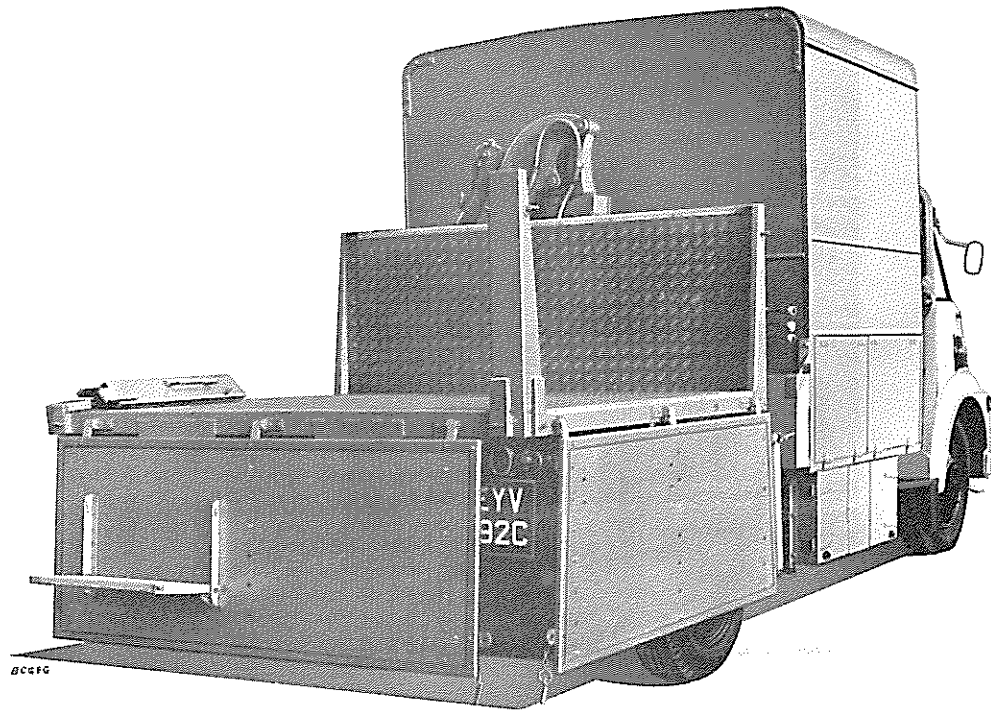


Fig 5

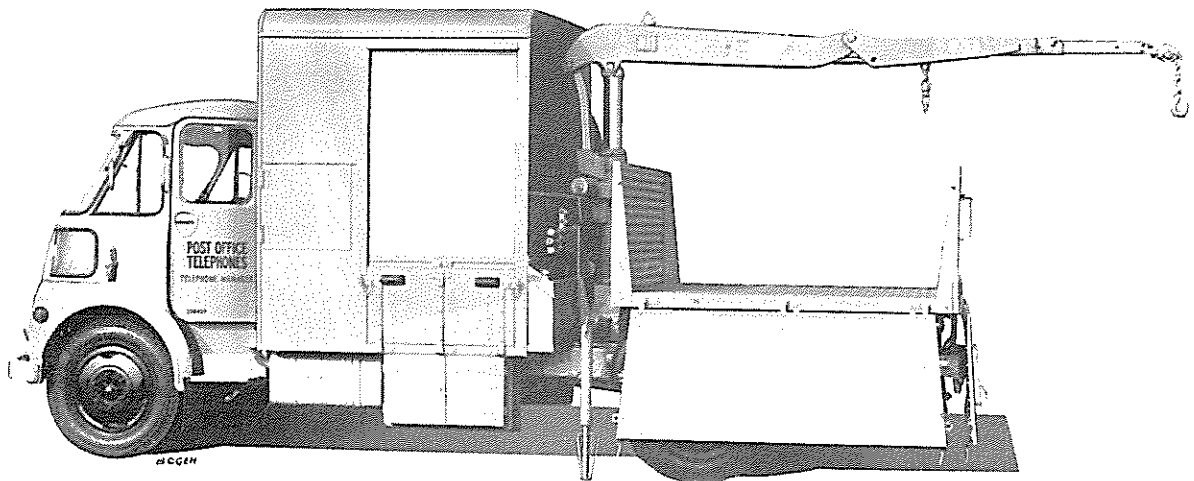


Fig 6

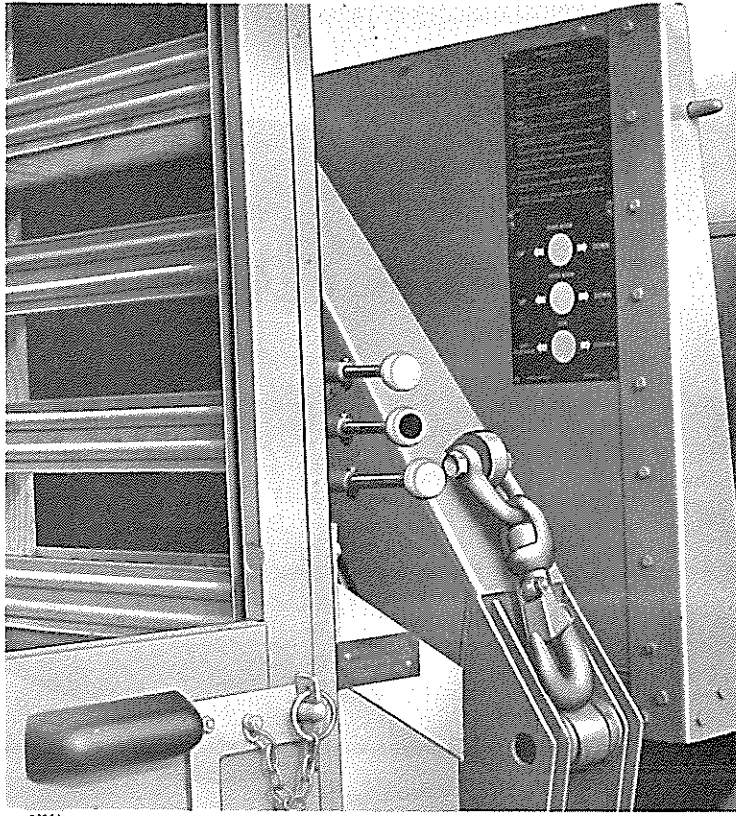


Fig 7



Fig 8

As first issued the crane was set to lift 1 ton at a radius of 5 feet, but this may be increased to 30 cwt at 5 feet (see para. 12.1).

**9 Crane lifting capacity.** Two hooks are fitted to the crane, loads over 1 ton should be lifted by means of the inner hook.

When modified to the MT Works specification quoted in para. 12.1 the lift at the full extension of 11' 6" is 12½ cwt. At a radius of 10' the lift is 15 cwt, at 7' radius 21 cwt, and at 5' radius 30 cwt.

**10 Lifting tackle.** Wherever possible standard sling chains and shackles should be used. The slings and shackles required by a box-builder are as follows:-

Chains, Sling, Four Leg with stirrups and shackles (EI Tools and Transport Mechanical Aids B1010 refers). Safe working load with legs at 90°, 10 cwt.

Slings, Four Leg, with lifting keys (EI Tools and Transport Mechanical Aids N0506 refers). Safe working load 5½ cwt.

Skips Stacking and Skips Tipping were designed in conjunction with the vehicle for the transport of materials and spoil.

The Three Skips Stacking can be used for sand and ballast to a total quantity of 18 cwts. When empty the skips may be stacked to give more room on the rear platform. By using the skips solely for ballast and sand these materials are kept clean enabling mortar and concrete of good quality to be produced.

The two Skips Tipping are for the conveyance of spoil from site. Each holds 10 cwt of spoil. When loaded they should be positioned towards the front of the platform. They may be placed one on top of the other when empty.

## **11 Operation of the crane**

**11.1 Safety Precautions.** Before using the crane the following safety precautions must be observed:-

**11.1.1** Ensure that the handbrake is firmly on and that the vehicle is safely parked.

**11.1.2** On arrival at the site use the rotating amber beacons until all warning signs, cones, etc, have been positioned. The beacons should then be switched off. If, however, it is considered that the situation requires the continuous use of flashing beacons those fixed to the vehicle may be used for short periods by running the engine to avoid discharging the battery. For all other continuous duty Beacons Electric Green numbers 1 or 2 should be employed together with the required battery and/or generator.

**11.1.3** The stabiliser legs must be lowered and locked to prevent movement of the chassis under transverse load conditions. On soft ground stout boards should be placed under the stabiliser feet to spread the load.

**11.1.4** The operator must make sure that there is no danger of fouling overhead power or telephone lines, street lighting or any other obstruction and

also that the crane will not be operated so as to extend beyond the guarded working area where it might constitute a hazard to the public.

**11.2** After the crane has been used and stowed in the normal carrying position, operators must ensure that:-

**11.2.1** The stabilisers have been raised and secured by the handle.

**11.2.2** The PTO is disengaged before driving away.

**11.3** Raising the crane to the working position. Having carried out safety precautions the power take off is engaged by depressing the clutch with engine at tick over and moving the PTO lever (Fig 8) 180° in a clockwise direction. A warning light is displayed on the instrument panel when the PTO is engaged. The clutch is then released making the hydraulic circuit operative. The method of unfolding the crane is as follows:-

**11.3.1** The booms are raised from the folded and stored position by moving the top control lever towards the rear of the vehicle. Should this control move towards the front of the vehicle to raise the booms then a modification is required (see para. 12.2).

The booms should be raised to approximately 30° above the horizontal as indicated by the small triangular hinged plate, situated on top of the inner boom, just reaching the end of its travel.

**11.3.2** Operate the bottom control lever to slew the booms so that they lie in line with the body.

**11.3.3** Operate the central lever to raise the outer boom to its maximum extension.

**11.3.4** Operate the top lever to lower the inner boom slowly until the outer boom passes the vertical position and falls forward under gravity.

**11.3.5** Operate the central lever to lower the outer boom.

**11.3.6** Extend the outer boom by removing the "R" clip from the retaining pin, pulling out the extension and refitting the retaining pin and "R" clip.

**11.4** Stowing the crane. The sequence of operations for stowing the crane is as follows:-

**11.4.1** Retract the manual outer boom extension.

**11.4.2** Slew the crane so that the booms lie in line with the vehicle.

**11.4.3** Elevate the inner boom to approximately 30° above the horizontal.

**11.4.4** Fully extend the outer boom.

11.4.5 Further elevate the inner boom until the outer boom passes the vertical position and commences to fall under gravity.

11.4.6 Lower the outer boom until it rests on top of the inner boom.

11.4.7 Slew the booms so that they lie vertically above the stowage position.

11.4.8 Lower the booms into the stowed position.

11.4.9 Retract the stabiliser legs.

11.4.10 Disengage the power take off.

11.5 **General notes on the operation of the crane.** The operator should manipulate the crane as smoothly as possible at all times. The controls are spring loaded to the "off" position. The rate of movement of the crane is proportional to the displacement of the controls. The initial movement of the controls should be by steady pressure against the spring loading while the operator watches the load for movement. In this way it is possible to exercise very delicate manoeuvres such as are required for placing frames and covers in position.

More than one control may be operated at a time as for instance during lowering and slewing.

It is not possible to overload the crane as safety valves are incorporated, but it is possible to pick up a load at a short radius and extend the radius to a point where the crane will not sustain the load.

In this case the safety valve operates and the load is automatically lowered at a fixed rate but out of the operator's control. The load may be brought under control again by reducing the radius before the load reaches the ground.

All staff should stand well clear of the load at all times. The load must never be passed over anyone's head.

When lifting a load from the forward end of the platform it may be necessary to use the inner hook first and then transfer to the outer hook, reversing this procedure when loads are to be placed well forward.

When lowering a load over the rear of the vehicle care should be taken to fold up the tailboard step, to lower the side board adjacent to the controls in use, and to remove the rear corner post on that side.

12 **Modifications.** There have been two modifications to the crane since the vehicle was first put into service.

12.1 Increase of lifting power of crane from 20 cwt to 30 cwt. See MT specification MT5/70(T).

12.2 Alteration of inner boom controls. See MT specification MT5/70(T).

These modifications will be carried out by the Workshop Supervisor at the TM's request.

**13 Maintenance.** The instructions regarding maintenance and repair of the vehicle including responsibilities for cleaning, lubrication, maintenance and repair, are given in Engineering Instructions, Tools and Transport, Vehicles L0011 and L0021.

Maintenance instructions for the lorry loader are given in L0025.

**14 Testing and Inspection.** For instructions regarding testing and inspection of the crane see EI Tests and Inspections, Routine Q3011.

For tests and inspection of the lifting tackle see Tests and Inspections, Routine, Q3030 and Q3031.

**15 Use of vehicle.** A description of the way in which jointing chambers are built using the vehicle is given in the Box Builders Handbook.

**16 Vehicle Tools.** These are kept in the vehicle cab and consist of starting handle, wheelbrace and jack.

**17 Fire Extinguisher and First Aid Box.** These are both situated on the passengers side of the cab.

**18 Spare wheel.** This is carried centrally under the rear of the chassis.

**19 Loads.** The kerb weight of the vehicle is 3 tons 17 cwt 3 qrs. The gross moving weight is 7 tons. This gives a total pay load of 2 tons 19 cwts 1 qr allowing 3 cwt for personnel.

The load on the rear platform must not exceed 2½ tons and should be placed as far forward as possible. This load is also limited by other tools and stores carried and the Total GMW of 7 tons must not be exceeded.

**20 Towing capacity.** A light towing hitch is fitted able to tow a gross trailed weight of 45 cwts. The gross grain weight must not exceed 8 tons, which, with a full vehicle load, limits the trailed weight to 1 ton. See D0031.

**21 Signwriting.** Standard inscriptions for signwriting are given in C0015.

References: C0015, D0031, L0011, L0021, L0025  
(TDS.3.1) Mechanical Aids B1010, N0506  
Tests and Inspections, Routine, Q3011, Q3030, Q3031

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