This instruction is authorised for use by command of the Chief of Army. It provides direction, mandatory controls and procedures for the operation, maintenance and support of equipment. Personnel are to carry out any action required by this instruction in accordance with EMEI General A 001.

**TABLE OF CONTENTS**

<table>
<thead>
<tr>
<th>General</th>
<th>Page No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
<td>3</td>
</tr>
<tr>
<td>Associated Publications</td>
<td>3</td>
</tr>
<tr>
<td>Safety</td>
<td>3</td>
</tr>
<tr>
<td>Authorised Personnel</td>
<td>3</td>
</tr>
<tr>
<td>General Instructions</td>
<td>4</td>
</tr>
<tr>
<td>Special Tools and Gauges</td>
<td>4</td>
</tr>
<tr>
<td>Repairs</td>
<td>4</td>
</tr>
<tr>
<td>Axles and Suspension</td>
<td>4</td>
</tr>
<tr>
<td>Axles</td>
<td>4</td>
</tr>
<tr>
<td>Spring Hangers</td>
<td>6</td>
</tr>
</tbody>
</table>

**LIST OF FIGURES**

<table>
<thead>
<tr>
<th>Figure</th>
<th>Name</th>
<th>Page No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Figure 1</td>
<td>Welding of Axle Seats</td>
<td>6</td>
</tr>
<tr>
<td>Figure 2</td>
<td>Loading Ramp Pivots – Type 1</td>
<td>7</td>
</tr>
<tr>
<td>Figure 3</td>
<td>Ramp Assist Spring</td>
<td>7</td>
</tr>
<tr>
<td>Figure 4</td>
<td>Loading Ramp Mountings – Type 2 (left), Type 3 &amp; 4 (right)</td>
<td>8</td>
</tr>
<tr>
<td>Figure 5</td>
<td>Ramp Hinge Lug - Trailer End - Type 2</td>
<td>9</td>
</tr>
<tr>
<td>Figure 6</td>
<td>Ramp Hinge Lug - Ramp End - Type 2</td>
<td>9</td>
</tr>
<tr>
<td>Figure 7</td>
<td>Loading Ramp Pivot Bushes</td>
<td>11</td>
</tr>
<tr>
<td>Figure 8</td>
<td>Spring Adjustment - Placement of Shims</td>
<td>11</td>
</tr>
<tr>
<td>Figure 9</td>
<td>Drive Leg - Type 1</td>
<td>13</td>
</tr>
<tr>
<td>Figure 10</td>
<td>Drive Leg - Type 2, 3 and 4</td>
<td>16</td>
</tr>
<tr>
<td>Figure 11</td>
<td>Slave Leg - Type 1</td>
<td>18</td>
</tr>
<tr>
<td>Figure 12</td>
<td>Slave Leg - Type 2, 3 and 4</td>
<td>20</td>
</tr>
</tbody>
</table>

**LIST OF TABLES**

<table>
<thead>
<tr>
<th>Table</th>
<th>Name</th>
<th>Page No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Table 1</td>
<td>Maintenance Supply Item (MSI) Identification</td>
<td>4</td>
</tr>
</tbody>
</table>
INTRODUCTION

1. This instruction details all the Medium Grade Repair procedures for the Trailer, Medium Plant Transporter, MC3 Haulmark, 4 Axle Dog.

Associated Publications

2. Reference may be necessary to the latest issue of the following documents:
   a. Defence Road Transport Instructions (DRTI);
   b. EMEI Vehicle A 291-1 - Tyres and Tubes – Care and Maintenance of B Vehicles;
   c. EMEI Vehicle A 291-5 – Tyres and Tubes – General Service B Vehicles Tyre Guide;
   d. EMEI Workshop D 701 – Painting of Army Equipment – Repair Policy for Equipment Painted in Polyurethane Paint – General Instruction;
   e. EMEI Workshop D 180 – Flaw Detection.
   f. EMEI Workshop E 410 – Occupational Health and Safety Instructions – Asbestos – General Instruction;
   g. EMEI Workshop E 652 – Occupational Health and Safety Instructions – Application and Removal of Polyurethane Paints and Solvents – General Instruction;
   h. EMEI Vehicle H 600 – Trailer, Medium Plant Transporter, MC3 Haulmark 4 Axle Dog – Data Summary;
   i. EMEI Vehicle H 602 – Trailer, Medium Plant Transporter, MC3 Haulmark 4 Axle Dog – Technical Description;
   j. EMEI Vehicle H 603 – Trailer, Medium Plant Transporter, MC3 Haulmark 4 Axle Dog – Light Grade Repair;
   k. EMEI Vehicle H 609 – Trailer, Medium Plant Transporter, MC3 Haulmark 4 Axle Dog – Servicing Instruction;
   l. Repair Parts Scale – 02203;
   n. AS/NZS 1554.1.2011 – Structural Steel Welding;
   o. Defence Safety Manual (SAFETYMAN);
   p. Material Safety Data Sheets (MSDS) – Product Information Sheets; and

Safety

**WARNING**

Personnel working on this equipment are to adhere to all industrial safety standards, work practices and equipment operating and maintenance instructions relating to the equipment.

Some assemblies contain powerful springs and injury can result if they are not properly disassembled. Use only proper tools and observe all precautions relevant to the use of the tools.

Authorised Personnel

3. Repairs are to be carried out by the following technical tradespersons:
a. Vehicle Mechanic ECN 229;
b. Technician Electrical ECN 418;
c. Fitter Armament ECN 146;
d. Metalsmith ECN 235-2; and
e. Civilian equivalents qualified in accordance with the requirements of the TRAMM-L.

General Instructions

4. It is vitally important that dirt and other foreign matter are not allowed to enter the brake system during repairs. Dirt in the system will cause almost immediate failure. Plug or protect openings to prevent dirt entering the system. Use plastic plugs or covers only for this purpose. Do not use cloth or paper as plugs or covers.

5. Use only authorised replacement parts and components.

6. Use only those lubricants specified in the Servicing Instruction EMEI VEHICLE H 609 and the User Handbook.

7. Any fastenings or fittings being tightened to prescribed torques are to have dry, clean, oil free threads unless otherwise specified. When specified, thread sealants are to be applied to dry, clean, oil free threads.

8. Replace all components with stripped threads or damaged parts.

9. Table 1 lists the location of the identification on the Maintenance Supply Items.

<table>
<thead>
<tr>
<th>Serial</th>
<th>Item</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Axle assemblies</td>
<td>Centre of axle beam, opposite brake chamber mountings</td>
</tr>
<tr>
<td>2</td>
<td>Ballrace</td>
<td>Outer circumference, to rear of trailer</td>
</tr>
<tr>
<td>3</td>
<td>Support legs</td>
<td>Gear case</td>
</tr>
<tr>
<td>4</td>
<td>Spare wheel winch</td>
<td>Front panel of winch assembly</td>
</tr>
</tbody>
</table>

Special Tools and Gauges

10. No additional special tools or gauges are required for Medium Grade Repair.

Repairs

11. Medium Grade Repair includes repair of the following items:

a. Axles and Suspension, including:
   (1) axles,
   (2) equaliser assembly, and
   (3) spring hangers.

b. Frame, including:
   (1) loading ramps – all types;
   (2) loading ramp hinge lugs and pin – Type 2;
   (3) loading ramp pivot bushes – Type 3 & 4; and
   (4) landing legs.

AXLES AND SUSPENSION.

Axles

12. Removal.
NOTE

Prior to removal of any components of the trailer running gear ensure that the trailer frame is correctly supported, with all weight removed from the suspension components.

a. Support the trailer on approved safety stands.

b. Ensure that the weight of each axle is correctly supported.

c. Remove the wheels from the axle/s to be removed.

d. Disconnect the two air lines at each spring brake chamber, ensuring that each line is labelled to ensure correct connection on replacement.

e. Remove the radius rod bolts, tapered bushes and steel sleeve securing the radius rods to the axle and swing the radius rods clear. If insufficient clearance is available, remove the radius rods completely.

f. Remove the U-bolt nuts securing the axle/s to the springs.

g. Using a suitable jack, lower the axle away from the springs. Take care that the axle does not roll to one side due to weight imbalance.

13. Installation.

a. Using a suitable jack, lift the axle assembly up to the springs ensuring that the spring centre bolts are correctly located into the spring seats welded to the axle tube.

b. Place the U-bolts in position ensuring that all threads are not damaged. Fit the flat washers and nuts. Torque the U-bolts evenly to 415 N.m.

c. Fit the radius rods and torque the radius rod bolts to 100 N.m.

d. Connect the air lines to the spring brake chambers ensuring that the hoses are connected to the correct ports.

e. Check and adjust the brakes in accordance with EMEI Vehicle H 603, Light Grade Repair.

14. Welding. When welding suspension component parts to the trailer axle, extreme care must be exercised to correctly locate components and ensure that the spring seat load bearing surfaces are parallel to each other. Any welding of additional attachments to the axle should be approved by Haulmark Trailers (Australia). Welding is to be carried out with an approved, low hydrogen welding rod.

15. All welds on the axles are to be located in the area of minimum stress, and as near to the horizontal axis as possible. It is important that all welds are excluded from the ‘no weld’ area, i.e. within 37 mm of either side of the vertical centre line, as shown in Figure 1. This applies equally to both the top and bottom surfaces of the axle.

Welding of spring seats in the field may result in incorrect camber setting of the axle assembly and should only be carried out when absolutely necessary. Axle assemblies should be returned to the trailer manufacturer for camber setting.
Spring Hangers

16. **Removal.** The spring hangers are fixed to the dolly frame by welding. They are to be removed, if required, by grinding away the weld material holding the hangers to the frame. Take care to prevent excessive damage to the parent material.

**CAUTION**

Do not weld across flanges.

17. **Replacement.** Prior to replacement, all surfaces to be welded are to be free of any rust or scale, and flat and flush fitting. All welds to the top of the hanger brackets are to be 10 mm fillets. When positioning the spring hangers for welding, ensure that they are correctly located and square with the frame. Tack-weld the castings in place and recheck the location before final welding. Reweld as original.

LOADING RAMPS

Loading Ramps - Type 1

18. **Removal.**

**WARNING**

The loading ramp assistance springs are under tension when the ramps are in the raised position. Take care when removing the pivot pins.

- **a.** Support the weight of the loading ramp with a suitable crane or lifting medium.
- **b.** Disconnect the loading ramp chains.
- **c.** Remove the lock pin from the hinge pin (Figure 2).
- **d.** Hold the base of the ramp in the forward position and remove the hinge pin.
- **e.** Release the spring tension, by allowing the ramp to move rearwards under control, and remove the two springs from the loading ramp.
- **f.** Lift the ramp clear of the mountings.
### Figure 2  Loading Ramp Pivots – Type 1

19. **Installation.**
   a. Lift the loading ramp, with a suitable crane or lifting medium, and position it with the pivots slightly rearward of the beaver tail.
   b. Insert the long end of the springs into the loading ramp.
   c. Locate the short end of the springs into the bracket on the lower edge of the beaver tail.
   d. Push the loading ramp into position, align the pivots and fit the hinge pin. Fit the lock pin.
   e. Fit the loading ramp chains to secure the ramp in the raised position.

### Loading Ramps - Type 2, 3 & 4

20. **Removal.**

    ![Warning Image]

    **WARNING**
    
    Due to the high compression strength of the loading ramp spring, exercise extreme caution when removing or replacing the ramp assist springs.

    a. Ensure the ramp is held in the vertical position with the ramp retaining chain.
    b. Place a jack securely under the collar of the lower spring seat to take the load off the lower spring seat bolt (Figure 3).

![Figure 3  Ramp Assist Spring Image]
c. Undo the nut and discard, extract the bolt and slowly lower the jack until the spring is under no tension, then remove the assembly.
d. Secure the loading ramp to a suitable lifting device (crane or hydraulic hoist) and support the ramp by taking up any slack in the lifting chains or slings.
e. Extract the cotter pins and washers and remove the loading ramp hinge pin(s) (Figure 4). Remove the ramp retaining chain and carefully lower the ramp to the ground.

![Figure 4 Loading Ramp Mountings – Type 2 (left), Type 3 & 4 (right)](image)

21. Installation.
   a. Lift the ramp and position it at the rear of the trailer in the travelling position with the hinge pin holes aligned.
   b. Lightly coat the hinge pins with grease and fit them into place. Fit the hinge pins from the outside edge of the trailer mounting brackets. Fit the hinge pin washers and locking pins.
   c. Fit the loading ramp retaining chain to the ramp and the deck of the trailer. Secure the ramp in the raised position.
   d. Assemble the loading ramp spring and upper spring seal onto the centre tube of the lower spring seat.
   e. Using the jack, lift the assembly into position on the loading ramp, with the rectangular tube of the lower spring seat located through the hole in the centre of the upper spring retaining bracket.
   f. Jack the spring assembly up into position until the lower spring bracket’s pivot bolt holes are aligned with the pin hole in the bottom seat of the spring assembly. Coat the bolt with a light film of grease and fit it into the mounting bracket. Fit a new locking nut and tighten.
   g. Lubricate the loading ramp hinge pins and the spring pivot bolt. A grease nipple is fitted into the recessed heads of the Type 3 & 4 pins for this purpose.

NOTE

The correct operation of the loading ramps is checked during manufacture and a steel horse-shoe shaped spacer fitted between the top spring seat and the upper spring assembly mounting bracket. This spacer is tack welded to the top spring seat.

Loading Ramp Hinge Lugs & Pin – Type 2

22. Inspection.
   a. Ensure the ramp can be secured in the vertical position.
   b. Ensure that when raising or lowering the ramp, the action is smooth and free from binding or excessive free play.
   c. Remove the ramps as detailed in Para 20.
d. Measure the internal diameter of the hinge lug drill hole, trailer end (Figure 5) and ramp end (Figure 6). Maximum internal diameter of the hinge lug drill hole is not to exceed 54 mm.

![Figure 5](image-url)  
**Figure 5  Ramp Hinge Lug - Trailer End - Type 2**

![Figure 6](image-url)  
**Figure 6  Ramp Hinge Lug - Ramp End - Type 2**

e. Measure the ramp pin, the minimum diameter at any single point is not to be less than 49 mm.

23. **Repair.** Repair the trailer by replacing the hinge lugs as follows;

a. Remove the ramps as detailed in Para 20, and place flat on a suitable surface.

b. Remove and secure any electrical harness that may be affected by heat during the cutting and welding process.
NOTE

Prior to removal of the hinge lugs form the trailer and ramps, record detailed measurements of the hinge lug positions.

c. Cut the damaged hinge lugs away from the trailer ramps and rear coaming.
d. Grind the remainder of the damaged hinge lugs ensuring that minimal parent material is removed.
e. Prepare the area by removing all paint, scale and spatter within 20 mm of the weld area.

NOTE

Ensure alignment of the trailer ramps and ramp pin, and position of the hinge lugs is correct prior to welding the replacement hinge lugs in place.

f. Weld the hinge lugs to the trailer ramps and rear coaming using an 8 mm fillet weld ± 1mm and an approved low hydrogen welding rod IAW Ref n.
g. After welding has been completed, clean the area of any weld spatter.
h. Once the area has cooled, test the area with dye penetrant IAW with Ref e and rectify as necessary.
i. Repaint IAW Ref d.
j. Refit the ramps as detailed in Para 21.
k. Ensure that when raising or lowering the ramp, there should be a smooth action.
l. Ensure the ramp can be securely restrained in the vertical position.

Loading Ramp Pivot Bushes – Type 3 & 4

a. Remove the ramps as detailed in Para 20.
b. Cut or drive the bushes out of the pivot brackets (Figure 7), taking care not to damage the bracket bore.

25. Cleaning and inspection. Thoroughly wash out the pivot bracket bore with suitable solvent and check that no burrs are present around the bore. Remove any burrs using a smooth, half-round file.

26. Installation.
a. Carefully press new bushes into the pivot bracket bores.
b. Check the fit of the pivot pins by inserting the pins into the bushes and feeling for excessive play.
c. Install the ramps as detailed in Para 21.
27. The spring assembly should not require adjustment during normal service. If adjustment does however become necessary, proceed as detailed in Paras 28 and 29 (Figure 8).
28. To Increase Spring Tension.
   a. Install two \( \frac{3}{8} \) in BSW hexagonal head, adjusting bolts into the nuts welded on the top of the spring seat. Turn the bolts clockwise alternatively until there is a 3 mm gap between the top seat and the top spring bracket (Figure 8).
   b. Install a temporary shim in the gap, back off the adjusting screws and test the loading ramp operation.
   c. Repeat this procedure if the spring still has insufficient strength to lift the ramp positively.
   d. When satisfied that the ramp adjustment is correct; measure the thickness of the additional shims fitted and fabricate a shim to the same design as the original, and to the thickness determined in sub-paras a., b. and c. Remove any mill scale or rust from all seating faces before fitting the new shim.
   e. When the adjusting bolts have been backed off, lower and raise the loading ramp to check for satisfactory operation of the ramp assist spring. Tack-weld the new shim to the original spacer.
   f. Remove the adjusting bolts.

29. To Decrease Spring Tension.

   NOTE
   It is most unlikely that the spring tension will have to be reduced.

   WARNING
   Fit the loading ramp retaining chains to secure the loading ramp during adjustment; except when the ramp is actually being raised or lowered.

   a. Install two \( \frac{3}{8} \) in BSW hexagonal head adjusting bolts into the nuts welded on the top of the spring seat. Turn the bolts clockwise alternatively until there is a 3 mm gap between the top seat and the top spring bracket (Figure 8).
   b. Remove the tack welds holding the spacer to the top spring seat.
   c. Remove the spacer and reduce its thickness by machining.

   CAUTION
   Very little material needs to be removed to have the desired effect.

   d. Refit the spacer, back off the adjusting bolts and lower and raise the loading ramp to check for satisfactory operation of the ramp assist spring.
   e. Tack-weld the spacer to the spring seat.
   f. Remove the adjusting bolts.

LANDING LEGS
30. Removal and Installation. Remove and install the landing legs from the trailer in accordance with EMEI Vehicle H 603, Light Grade Repair.

Drive Leg – Type 1
31. Disassembly. Disassemble the type 1 drive leg as follows (Figure 9):
   a. Remove the roll pin (21) from the drive handle end of the crankshaft.
   b. Remove the six bolts (18) and nuts (6) securing the gearbox cover (17) to the upper leg drive assembly (7). Remove the gear box cover and gasket (16).
   c. Remove the \( \frac{3}{8} \) inch pin (22) retaining the speed selector gear (20) to the crankshaft (23) and remove the shifter gear.
d. Remove the shifter spring (24) from the crankshaft and withdraw the crankshaft from the housing.

e. Remove the idler gear (15) and shim (14) from the idler gear shaft (11).

f. Remove the roll pin (10) retaining the stepped gear (13) to the drive gear shaft (9) and remove the stepped gear (13).

g. Remove the stepped gear (12) and shim (14) from the idler gear shaft (11) and remove the idler gear shaft.
h. Remove the two screws (2) from the cover (1) and remove the cover.

i. Remove the roll pin (10) securing the bevel gear pinion (8) to the drive gear shaft (9). Withdraw the drive gear shaft from the housing and remove the bevel gear pinion.

j. Remove the hex jam nut (3) securing the bevel gear (4) to the inner leg screw (29). Remove the bevel gear, woodruff key (27) and the polyethylene bushing (5) from the inner leg screw.

k. Withdraw the inner leg (40) complete with the inner leg plate (28) and the inner leg screw (29) from the upper leg drive assembly (7).

l. Remove the thrust bearing (25) and thrust washer (26) from the inner leg screw (29).

m. Remove the retaining pins (39) and withdraw the inner leg screw (29) and inner leg plate (28) from the inner leg (40).

n. Remove the inner leg plate (28) from the inner leg screw (29) over the tapered end.

32. Cleaning and inspection.
   a. Thoroughly clean all components in a suitable solvent.
   b. Inspect the upper and inner leg for damage and distortion. Discard and replace the leg if any damage or bending is evident.
   c. Ensure that all screw threads are free of chips or burrs and that they are free fitting for the full length of the thread.
   d. Inspect all the keyways for wear and damage. Replace and discard any components that are worn or damaged.
   e. Inspect all the thrust washers, shims and bearings for wear or damage. Replace and discard any components that are worn or damaged.
   f. Inspect all the gears and pinions for wear or damage to the gear teeth. Replace and discard any components are worn or damaged.
   g. Replace all bushings, gaskets and locking devices.
   h. Inspect all gear shafts and replace them if they are excessively worn.

33. Reassembly. Reassemble the type 1 drive leg as follows (Figure 9):

   **NOTE**
   On reassembly, all gearing, threaded and load bearing components are to be coated with grease XG-291.
   
   a. Fit the inner leg plate (28) to the inner leg screw (29).
   b. Fit the assembled inner leg plate and inner leg screw to the inner leg (40) and insert the retaining pins (39).
   c. Fit the thrust washer (26) and thrust bearing (25) to the inner leg screw (29).
   d. Fit the inner leg into the upper leg drive assembly (7).

   **NOTE**
   Ensure that the thrust washer and bearing remain in place.
   
   e. Fit a new polyethylene bushing (5) to the inner leg screw (29).
   f. Fit the woodruff key (27) and the bevel gear (4) to the inner leg screw (29). Fit and tighten the hex jam nut (3).
   g. Place the bevel gear pinion (8) in position. Insert the drive gear shaft (9) and secure it with a new roll pin (10).
   h. Fit the cover (1) and secure it with the two self-tapping screws (2).
i. Fit the idler gear shaft (11) to the upper leg drive assembly with two shims (14). Fit the undrilled stepped gear (12) onto the idler gear shaft.

j. Fit the drilled stepped gear (13) to the drive gear shaft (9) and secure it with the roll pin (10).

k. Fit a shim (14) to the idler gear shaft (11), followed by the idler gear (15) and another shim (14).

NOTE

Extra or thicker shims may be used to prevent excessive end float without preloading the gears.

l. Fit the crankshaft (23) to the upper leg drive assembly (7) and fit the shifter spring (24).

NOTE

The flat end of the shaft is to be towards the outside of the case.

m. Fit the speed selector gear (20) to the crankshaft and secure it with the ⅜ inch pin (22).

n. Fit a new gear box gasket (16) and the gear box cover (17) and secure it with six hex bolts (18) and hex locknuts (6).

o. Fit the roll pin (21) to the drive handle end of the crankshaft.

NOTE

Ensure that the roll pin is fitted to the hole nearest to the leg.

p. Fit new grease nipples to the leg assembly.

Drive Leg – Type 2, 3 & 4

34. Disassembly. Disassemble the type 2, 3 and 4 drive leg as follows (Figure 10):

a. Remove the pin (28) from the crankshaft (27).

b. Remove the six hex bolts (19) securing the gearbox cover (20) to the upper leg drive assembly (39). Remove the gear box cover and gear box gasket (24).

c. Remove the pin (29) retaining the speed selector gear (16) to the crankshaft (27) and remove the speed selector gear and shift bushing (15).

d. Remove the shifter spring (26) and shifter ball (25) from the crankshaft (27) and withdraw the crankshaft from the housing.

e. Remove the idler gear (18) from the idler gear shaft (10).

f. Remove the roll pin (12) retaining the stepped gear (14) to the drive gear shaft (13) and remove the stepped gear.

g. Remove the stepped gear (17) from the idler gear shaft (10) and remove the idler gear shaft.

h. Remove the two screws (1) from the cover (2) and remove the cover and foam gasket (3).

i. Remove the pin (29) securing the bevel gear pinion (9) to the drive gear shaft (13). Withdraw the drive gear shaft and shims (8) from the housing and remove the bevel gear pinion.

j. Remove the pin (5) securing the bevel gear (4) to the top of the inner leg (34). Remove the bevel gear, washer (6) and the plastic bushing (7).

k. Withdraw the inner leg (34) from the upper leg drive assembly (39).

l. Remove the thrust bearing (30) and thrust washer (31) from the inner leg.
35. **Reassembly.** Reassemble the type 2, 3 and 4 drive leg as follows (Figure 10):

   a. Clean and inspect all parts as detailed in Para 32.

   **NOTE**

   On reassembly, all gearing, threaded and load bearing components are to be coated with grease XG-291.

   b. Fit the thrust washer (31) and thrust bearing (30) to the inner leg (34).

   c. Fit the inner leg (34) into the upper leg drive assembly (39).
NOTE

Ensure that the thrust washer and bearing remain in place.

d. Fit a new plastic bushing (7), the washer (6) and the bevel gear (4) to the top of the inner leg (34) and insert the pin (5).
e. Place the shims (8) and the bevel gear pinion (9) in position. Insert the drive gear shaft (13) and insert the pin (29) to secure the bevel gear pinion to the drive gear shaft.
f. Fit the cover (2) with a new foam gasket (3) and insert the retaining screws (1).
g. Fit the idler gear shaft (10) to the upper leg drive assembly (39) and fit the undrilled step gear (17) on to it.
h. Fit the drilled stepped gear (14) to the drive gear shaft (13) and secure with the roll pin (12).
i. Fit a shim to the idler gear shaft (10), followed by the idler gear (18) and another shim.

NOTE

Extra or thicker shims may be used to prevent excessive end float without preloading the gears.

j. Install the crankshaft (27) into the housing and fit the shifter ball (25) and shifter spring (26).

NOTE

The flat end of the shaft is to be towards the outside of the case.

k. Fit the shifter bushing (15) and the speed selector gear (16) to the crankshaft (27) and secure them with the pin (29).

l. Fit the gearbox cover (20) with a new gasket (24) and insert and tighten the six bolts (19) to secure them to the upper leg drive assembly (39).
m. Insert the pin (28) in the drive handle end of the crankshaft (27).
n. Replace the grease nipples (40).

Slave Leg – Type 1

36. Disassembly. Disassemble the type 1 slave leg as follows (Figure 11):

a. Remove the two self-tapping screws (1) from the cover (2) and remove it.
b. Remove the pin (8) securing the bevel gear pinion (7) to the drive gear shaft (9). Withdraw the drive gear shaft from the housing and remove the bevel gear pinion.
c. Remove the hex jam nut (3) securing the bevel gear (4) to the inner leg screw (17). Remove the bevel gear, woodruff key (15) and the polyethylene bushing (5) from the inner leg screw.
d. Withdraw the inner leg (18) from the upper leg (6).
e. Remove the thrust bearing (13) and thrust washer (14) from the inner leg screw (17).
f. Depress the tabs on either side of the inner leg (18) and withdraw the inner leg screw (17) and plate (16) from the inner leg.
g. Remove the plate (16) from the inner leg screw (17) over the tapered end.
37. **Reassembly.** Reassemble the type 1 slave leg as follows (Figure 11):

a. Clean and inspect all parts as detailed in Para 32.

**NOTE**

On reassembly, coat all gearing, threaded and load bearing components with grease XG-291.

b. Fit the plate (16) to the inner leg screw (17).

c. Insert the inner leg screw (17) into the inner leg (18).
NOTE

Ensure that the two tabs are properly located and lock into place.

d. Fit the thrust washer (14) and thrust bearing (13) to the inner leg screw (17).
e. Fit the inner leg (18) into the upper leg (6).

NOTE

Ensure that the thrust washer and thrust bearing remain in place.

f. Fit a new polyethylene bushing (5) to the inner leg screw (17).
g. Fit the woodruff key (15) and the bevel gear (4) to the inner leg screw. Fit and tighten the hex jam nut (3).
h. Place the bevel gear pinion (7) in position. Insert the drive gear shaft (9) and secure it with the pin (8).
i. Fit the cover (2) and secure it with the two self-tapping screws (1).

Slave Leg – Type 2, 3 & 4

38. Disassembly. Disassemble the type 2, 3 and 4 slave leg as follows (Figure 12):

a. Remove the two self-tapping screws (1) from the cover (2) and remove the cover and foam gasket (3).
b. Remove the grease nipple (27) from the upper leg (26).
c. Remove the groove pin (10) securing the bevel gear pinion (9) to the drive gear shaft (11). Withdraw the drive gear shaft from the housing and remove the shims (8), bevel gear pinion (9) and bushing (17).
d. Remove the pin (5) securing the bevel gear (4) to the inner leg (21). Remove the bevel gear, washer (6) and the plastic bushing (7) from the inner leg.
e. Withdraw the inner leg (21) from the upper leg (26).
f. Remove the thrust bearing (18) and thrust washer (19) from the inner leg (21).

39. Reassembly. Reassemble the type 2, 3 and 4 slave leg as follows (Figure 12)

a. Clean and inspect all parts as detailed in Para 32.

NOTE

On reassembly, all gearing, threaded and load bearing components are to be coated with grease XG-291.

b. Fit the thrust washer (19) and thrust bearing (18) to the inner leg (21).
c. Fit the inner leg (21) into the upper leg (26).

NOTE

Ensure that the thrust washer and bearing remain in place.

d. Fit a new plastic bushing (7) to the inner leg (21).
e. Fit the washer (6) and bevel gear (4) to the inner leg (21) and secure them with the pin (5).
f. Place all the shims (8) and the bushing (17) in place and insert the bevel gear pinion (9) into position. Insert the drive gear shaft (11) and secure it with a new groove pin (10).
g. Fit the cover (2) with a new foam gasket (3) and secure them with the two self-tapping screws (1).
h. Fit a new grease nipple (27) to the upper leg (26).
1 Self-tapping screw  8 Shim  15 Bushing  22 Hex nut
2 Cover  9 Bevel gear pinion  16 Hex lock nut  23 Lock washer
3 Foam gasket  10 Groove pin  17 Bushing  24 Leg stay
4 Bevel gear  11 Drive gear shaft  18 Thrust bearing  25 Hex bolt
5 Pin  12 Hex bolt  19 Thrust washer  26 Upper leg
6 Washer  13 Cross shaft  20 Chain  27 Grease nipple
7 Plastic bushing  14 Hex bolt  21 Inner leg  28 Lubrication plug

Figure 12  Slave Leg - Type 2, 3 and 4

Distribution List: VEH H 05.0 – Maint level
(Sponsor: CGSVSPO, Mdm/Hvy B Vehicles EC-005604)