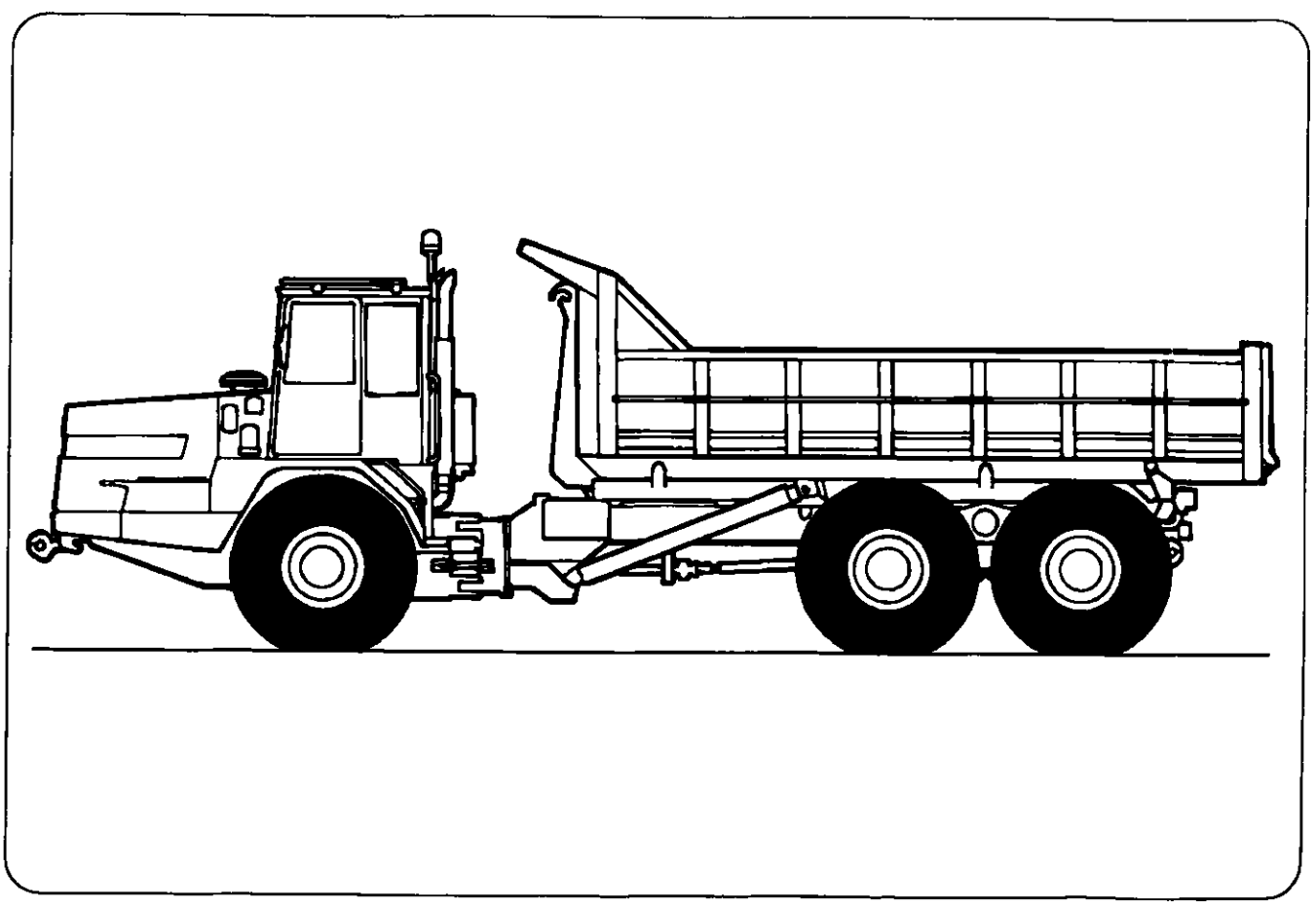
TEREX

3066FSDT
'Frame Steer Dumptruck'
Service Manual



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Index

Service Information Alert

Ref No	Date	Subject
B168	Apr 94	Viton "O" rings and seals - SAFETY HAZARD

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The information contained within this Alert must not be made available to third parties not authorised to receive it.

Service Information Alert

DATE: April 1994 **B168**

MODEL: General

SUBJECT: VITON 'O' RINGS AND SEALS (FLUORO-ELASTOMERS) - SAFETY HAZARDS

PURPOSE:

To advise potentially hazardous condition.

DETAIL:

It has been brought to our attention that 'Viton' material used in manufacture of oil seals and 'O' rings, produces a highly corrosive acid (Hydrofluoric) when subjected to temperatures above 315° C.

The resulting contamination can have extreme consequences on human tissue since it is almost impossible to remove after contact.

We therefore recommend the following procedure when it is necessary to inspect any equipment that has been subjected to a high temperature i.e. fire.

a. Visually inspect for any gaskets or seals which have suffered from heat; they will appear black and sticky.

b. If this is affirmed - **Do Not Touch**

c. Make enquiries to ascertain the material composition. Any Fluoro-elastomer (Viton, Fluorel or Tecmoflon) should be considered dangerous but natural rubber and nitrile are non-hazardous.

d. If Fluoro-elastomer seals have been used, then the affected area MUST be decontaminated before undertaking further work.

e. Disposable Heavy Duty Gloves (Neoprene) MUST be worn and the affected area decontaminated by washing thoroughly with Limewater (Calcium Hydroxide solution).

f. Any cloths, residue and gloves used MUST be safely discarded after use.

Note: Burning of the discarded items is NOT RECOMMENDED, except in an approved incineration process

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IMPORTANT SAFETY NOTICE

Proper service and repair is important to the safe, reliable operation of all motor vehicles. The service procedures recommended and described in this publication, are effective methods for performing service operations. Some of these service operations require the use of tools specially designed for the purpose. The special tools should be used when, and as recommended.

It is important to note that this publication contains various WARNINGS and NOTES which should be carefully read in order to minimize the risk of personal injury to personnel, or the possibility that improper service methods will be followed which may damage the vehicle or render it unsafe. It is also important to understand these WARNINGS and NOTES are not exhaustive. It is not possible to know, evaluate and advise the service trade of ALL conceivable ways in which service might be carried out, or, of the possible hazardous consequences of each way. Consequently, no such broad evaluation has been undertaken. Accordingly, anyone who uses a service procedure, or tool, which is not recommended, must first satisfy themselves thoroughly that neither their safety, nor vehicle safety, will be jeopardized by the service method he/she selects.

Two types of heading are used in this manual to attract your attention.

1. ⚠ **WARNING** - This symbol is used when an operating procedure, practice, etc., which, if not correctly followed could result in personal injury or loss of life. Look for this symbol to point out important safety precautions. It means - **ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!**

2. **Note** - This is used when an operating procedure, practice, etc., which, if not strictly observed, could result in damage to or destruction of equipment.

⚠ **WARNING**
Never use parts which are altered, modified, or weakened in operation. This can seriously jeopardize the integrity of the machine and could result in property damage or serious personal injury.

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GENERAL INFORMATION

SECTION 0

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General Information - 3066FSDT (Section 0)

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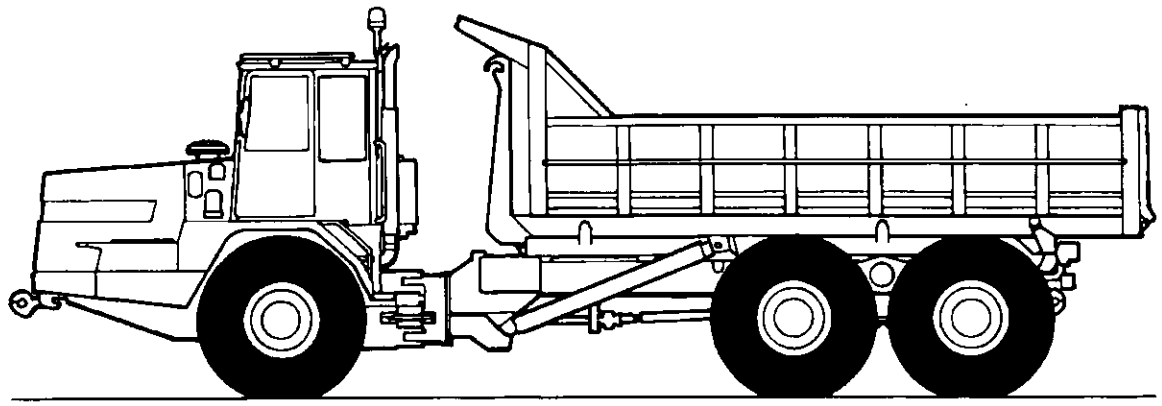

Fig. 1 - Model View of 3066FSDT

3066FSDT Technical Data

Engine

Make/Model ..... Cummins LTA10-C290
Type ..... Four stroke, direct injection diesel, turbocharged and aftercooled. Watercooled.

Gross power at 2 100 rev/min ..... 216 kW (290 hp, 294 PS)
Net power at 2 100 rev/min ..... 206 kW (276 hp, 280 PS)

Note: Power to EEC 80/1269, SAE J1349 Reference conditions: 1 bar (14.5 lb/in²) pressure. (Equiv. 100 m (330 ft) altitude) 25° C, (77° F) temperature. 32% relative humidity.

Maximum Torque ..... 1 180 Nm (870 lbf ft) at 1 300 rev/min
Number of cylinders/configuration ..... 6, in line
Bore and stroke ..... 125 x 136 mm (4.92 x 5.35 in)
Total Displacement ..... 10 litres (610 in³)
Air cleaner ..... Dry type, double element.
Starting ..... Electric
Max. Speed (No load) ..... 2 450 rev min
Max. Speed (Full load) ..... 2 100 ± 50 rev min
Idle Speed ..... 700 ± 25 rev/min

Transmission

Make/Model ..... ZF 6WG 200 with torque converter close-coupled to powershift counter-shaft gearbox with hydraulically operated multi-plate clutches. A integral wear-resistant hydrodynamic retarder is included as standard.

Controls ..... Electric
Speeds ..... 6 Forward, 3 Reverse

Ratios:
Torque Converter Multiplication 1.545:1
Transmission:
Forward 1st 5.986
2nd 3.420
3rd 2.594
4th 1.480
5th 1.178
6th 0.672
Reverse 1st 5.986
2nd 2.594
3rd 1.178

Maximum Speed:
Forward ..... 57 km/h (35.5 mile/h)
Reverse ..... 33 km/h (20.5 mile/h)

Pressures:
Converter 'IN' ..... 8.61 bar (125 lbf/in²)
Converter 'OUT' ..... 5.17 bar (75 lbf/in²)
Converter Relief Valve ..... 8.48 bar (123 lbf/in²)
Cooler By-pass Valve ..... 2.48 bar (36 lbf/in²)
Lube Pressure (min) ..... 0.21 bar (3 lbf/in²)
Main Pressure ..... 15.2 - 17.2 bar (220 - 250 lbf/in²)

Normal Oil Temperature Range ..... 80° - 110° C (176° - 230° F)
Maximum Oil Temperature ..... 120° C (248° F)

Stall Speed ..... 1 790 ± 50 rev/min

Axles

Type ..... Heavy Duty Full Floating
Differentials:
  Type ..... Spiral Bevel Ring and Pinion
    All Three Cross Axles ..... Automatic Limited Slip Action
    Center Axle Through Drive ..... Manually Lockable
Ratios:
  Differential 2.58:1
  Planetary 6.353:1
  Total Reduction 16.39:1

Suspension

Front: Axle is carried on leading arms of a sub-frame pivoting on the main frame. Suspension by self-levelling air units with heavy duty hydraulic dampers.

  Axle Vertical Travel ..... 127 mm (5 in)

Rear: Each axle coupled to chassis by three rubber-bushed links with lateral restraint by transverse link. Longitudinal rocking beam at each side of frame equalizes load between axles. Suspension by rubber/metal laminated units between axles and beam ends.

  Axle Oscillation ..... ±12°
  Suspension Travel ..... ± 130 mm (5.12 in)

Brakes

Type:
  All Wheels (6) ..... Single Caliper Dry Disc

Independent Circuits Front and Rear
Normal Actuation (all wheels) ..... Air Over Hydraulic
Air Pressure at Brake Callipers ..... 172 bar (2 500 bf/in²)
Total Air Reservoir Capacity ..... 51.93 litres (3 169 in³)
Hydraulic Brake Fluid Capacity ..... 2.64 litres (0.58 gal)
Automatic Safety Actuation ..... Air Over Hydraulic (all wheels)

Parking Brake

Type ..... Dry Disc On Driveline
Actuation ..... Spring Apply, Air Release

Wheels and Tyres

Tyres ..... 23.5 R25 Michelin XHAD ** Radial
Rims:
  Size ..... 19.5 in
  Type ..... Five piece earth-mover
  Mounting ..... 12-stud mounting flange
Inflation Pressure ..... 3.5 bar (50 lbf/in²) All Round

Steering System

Type ..... Full hydrostatic power steering with pressure compensating piston pump.
Maximum Operating Pressure ..... 172 bar (2 500 lbf/in²)
Steering Gear ..... Hydrostatic Steering Valve
Steering Cylinders:
  Number ..... Two
  Type ..... Single Stage, Double Acting
Filter ..... Full flow filtration on the pressure line protected to 25 micron particle size and 6 micron on the return line.
Accumulator:
  Oil capacity ..... 16.8 litres (3.70 gal)
  Nitrogen Precharge Pressure ..... 55 bar (800 lbf/in²)
Steering Angle (left and right) ..... 45°
Lock to Lock Turns (steering wheel) ..... 4 Time.....3 - 5 sec
Vehicle Clearance Circle (SAE) ..... 19.5 m (64 ft) approx.
Pump:
  Type ..... Pressure Compensating Piston
  Capacity at 2 300 rev/min ..... 1.75 litre/s

Load Handling System

Relief Pressure ..... 295 bar (4 275 lbf/in²)
Pump:
  Type ..... Tandem
  Capacity at 1 500 rev/min ..... 4.53 litre/s
Control Valve:
  Type ..... Electro Mechanical
Cylinders:
  Tipping Rams ..... Two
  Middle Frame Rams ..... Two
  Hook Arm Rams ..... Two
  Locking Rams ..... Two
Loading Time - Mount ..... 33 sec Approx
Unloading Time - Demount ..... 34 sec Approx
Max. Angle of Approach (lateral) ..... 5°
Max. Angle of Approach (longitudinal) ..... 5°
Tipping Time (laden) ..... 18 sec
Angle of Tip ..... 58°

Electrical System

Type ..... 24 volt, Negative Ground.
Batteries ..... Two, 12 Volt, 165 Ah each, Maintenance Free
Accessories ..... 24 Volt
Alternator ..... 75 Amp

Service Capacities

Fuel tank ..... 320 litres (70.4 gal)
Hydraulic System
  (steering & load handling) ..... 200 litres (44 gal)
Engine Crankcase ..... 34 litres (7.5 gal)
Cooling System ..... 60 litres (13.2 gal)
Transmission (with filters) ..... 28 litres (6.2 gal)
Differentials - Front & Rear (each) ..... 11 litres (2.4 gal)
Differential - Centre ..... 14 litres (3.1 gal)
Planetaries (each) ..... 3.5 litres (0.8 gal)

Body Capacities

Load Capacity ..... 20 tonnes
Struck (SAE) ..... 12.75 m³ (16.7 yd³)
Heaped 2:1 (SAE) ..... 16.7 m³ (21.8 yd³)

VEHICLE WEIGHTS AND DISTRIBUTION, WITH GENERAL PURPOSE SKIP BODY

Net Weight Distribution	kg	lb
Front Axle Centre Axle Rear Axle	11 530 6 260 6 010	25 412 13 797 13 246
Net Vehicle Weight	23 800	52 455
Payload	20 000	44 090
Gross Weight Distribution	**kg**	**lb**
Front Axle Centre Axle Rear Axle	13 420 15 350 15 030	29 577 33 831 33 126
Gross Vehicle Weight	43 800	96 535
Rolling Chassis, less skip	19 710	43 440
General Purpose Skip Body	4 090	9 014
NATO Interoperable Flatrack	1 750	3 860

Key To Fig. 2

a - Ground Clearance
b - Wheel Track Width
c - Width Over Tyres
d - Body Height
e - Width Between Mirrors
f - Body External Width
g - Height To Body Cutout
h - Height To Flashing Beacon
i - Tow Hook Height
j - Approach Angle
k - Front Overhang
l - Front Axle Centre to Articulation Point
m - Front Axle Centre to Centre Axle Centre
n - Centre Axle Centre - Rear Axle Centre
o - Rear Overhang
p - Overall Length
q - Peak Angle
r - Departure Angle
s - Height of Floor From Ground
t - Internal Body Height
u - Internal Length of Body
v - External Length of Body
w - Articulation Angle
x - Body Internal Width
y - Body External Width
z - Body Maximum Tipping Height
A - Body Maximum Tipping Angle
B - Height From Ground at Maximum Tip
C - Body Maximum Angle at Offloading
D - Maximum Body Height at Offloading
E - Overall Length With Body Offloaded

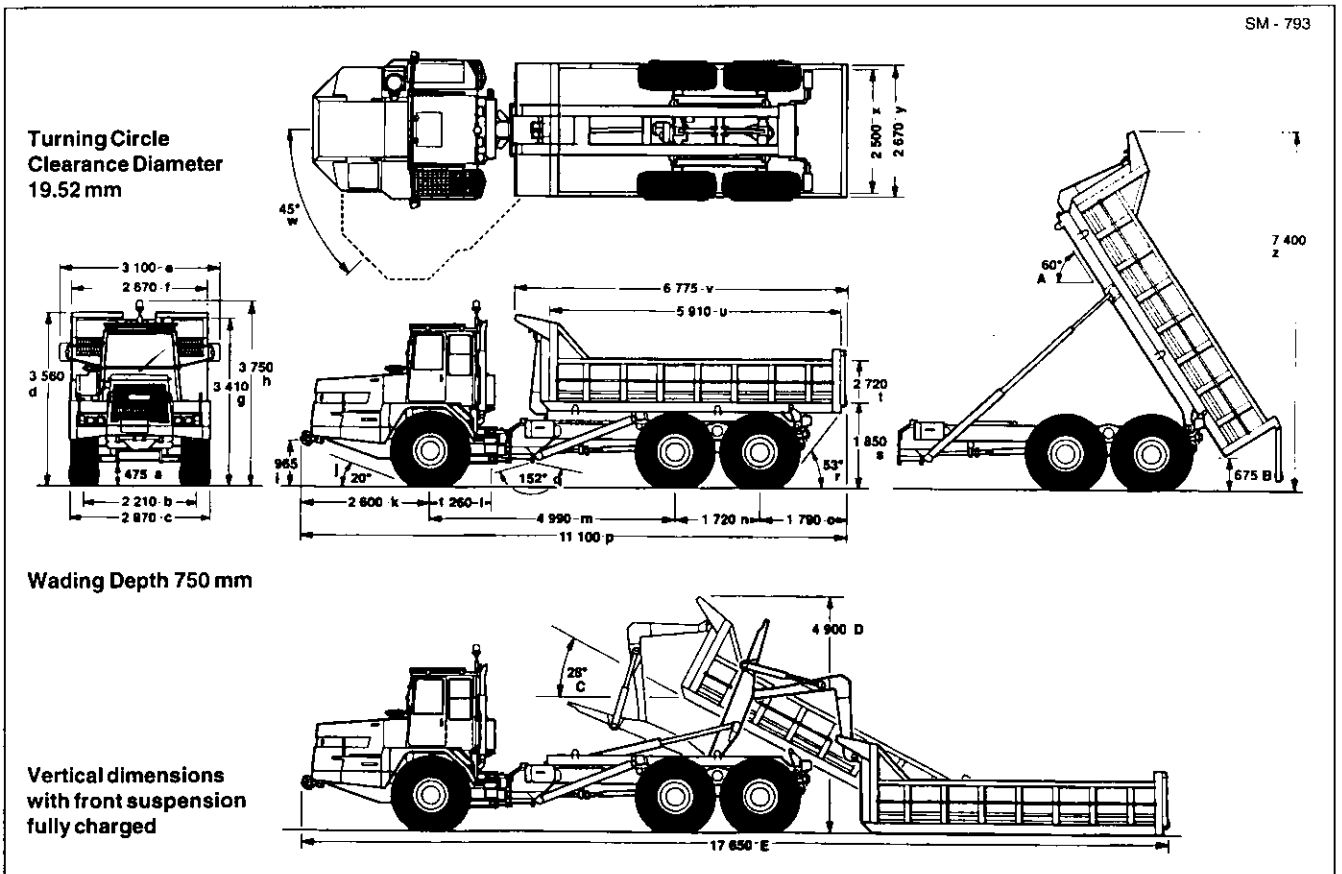

Fig. 2 - Machine Dimensions Standard Machine Dimensions in mm

Performance Characteristics and Remarks

Technical Evaluation (Memorandum 92504)
Pre-production Quality Liason meeting (Nov 92)
Performance/Characteristics and Remarks
Specification 632 issue 1.

The maximum payload which the equipment can legally carry on UK public highways is 930 kg and not a minimum 6 tonne as required in the specification. This deviation has been accepted by Engr 4a.

FSDT (with LHS) designated serial numbers: A5001000 to A5001075.

Equipment Registration Marks (ERM) are 11KL73 to 12KL47 inclusive.

Rear chevron markings are to BS Au 152.

The variation in height of an ISO container on a DROPS flatrack of 58 mm over the permissible height has been accepted by Engr 4a.

The payload capacity of the skip body is 20 tonne.

The skip body internal dimensions will be changed to 2.5 m x 5.9 m x 0.87 m with a 150 mm gusset around the three sides. This will equate to an approximate body capacity of 12.6 m^3 (from 12.8 m^3).

The capability of climbing and descending a gradient of 1 in 3.3 when fully laden and stopping and starting on this gradient cannot be achieved and have been reduced to 1 in 4 and accepted by Engr 4a.

A turning circle of 18.4 m between curbs was accepted by Engr 4a as satisfactory.

The fuel tank capacity has been increased, reference CCC 025.

All slinging points are to be painted white and marked 'Lift Here'. Each wheel now has 2 lifting eyes formed as an integral part of the wheel rim.

Steering ram locking bars are to be painted red.

Major component lifting eyes are to be painted red and issued with 'certificates'.

Recovery points and towing pantiles fitted to the front and rear of the equipment are in accordance with Def Stan 25-6.

The relaxation of braking requirements from an incline of 1:3.3 to 1.4 has been confirmed by Engr 4a.

Note: Maximum retardation achieved during evaluation trial:
Unladen (DRA) - 5.08 m/s^2 Laden (DRA) - 3.33 m/s^2
Essential requirement:
At least 3.65 m/s^2 and desirably 4.4 m/s^2

Tyre pressures are 3.5 bar and should be marked adjacent to each station.

The load handling system is considered to be a jacking or recovery system and is therefore NOT subject to lifting legislation as the load is supported by either the ground or the vehicle at any time.

The vehicle is capable of towing an in service Barmine Laying Plough or a fully laden 10 ton tilt trailer.

The vehicle can pick up, carry, and set down a DROPS flatrack and comfortably hand load up to a maximum of 20 tonne rated load capacity.

The 2 line braking system adopted by Terex is as detailed within DEF STAN 25-1 Part 1 based upon the requirements of STANAG 2604. The 2 line system is that commercially adopted throughout Europe and is interchangeable with the 3 line braking system. The in-service 10 tonne Tilt Trailer can be towed with the 2 line system proposed by Terex if the BLUE line is left disconnected. Engr 4a has accepted the fitting of the 2 line system to the FSDTM.

* * * *

CHASSIS

SECTION 1

Contents

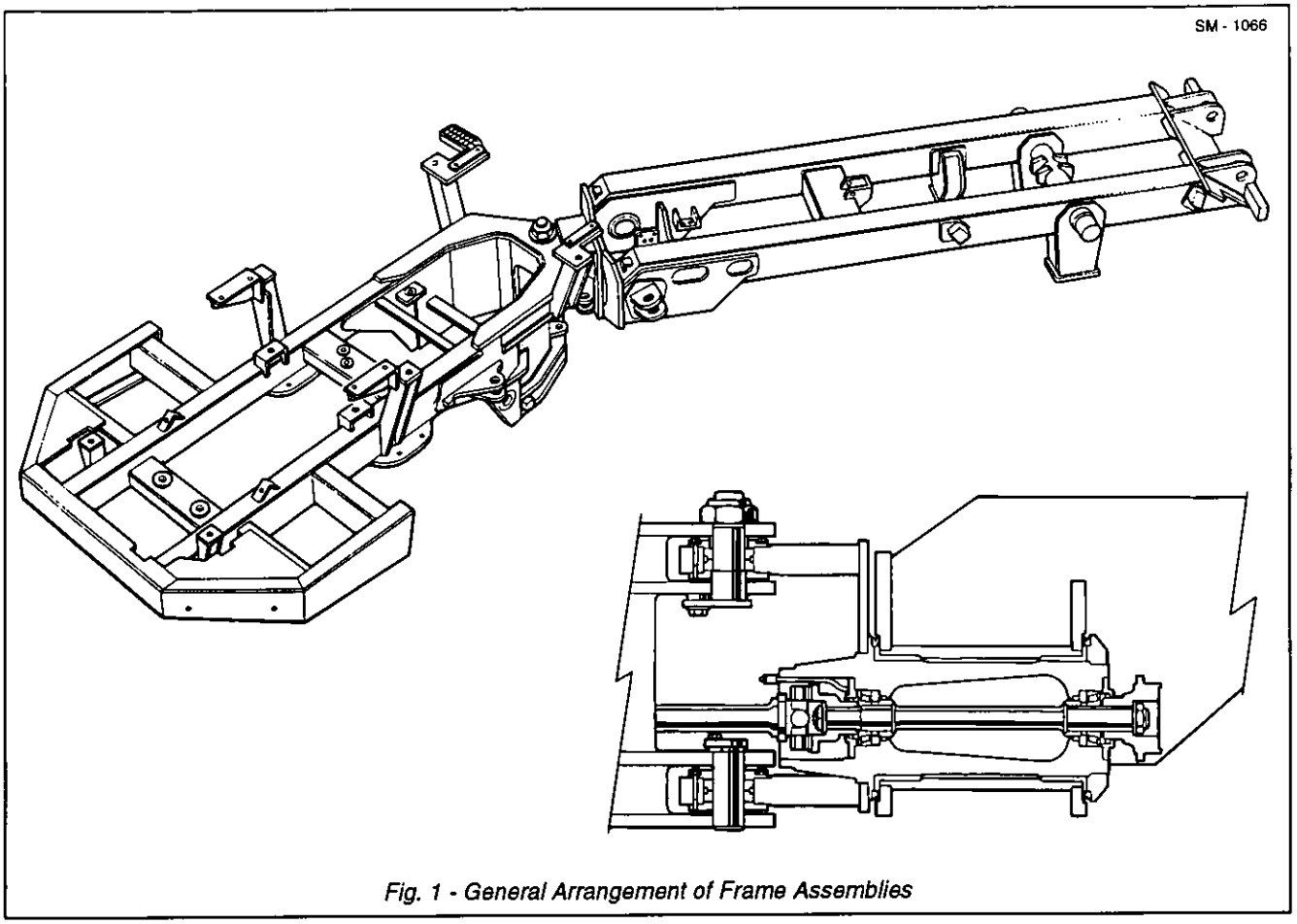

Fig. 1 - General Arrangement of Frame Assemblies

DESCRIPTION

The chassis consists of two separate frame assemblies which provide the articulation of the unit. The front and rear frames are constructed of all welded high-grade steel fabrications with rectangular box section beams forming main, side and cross members. The frames are coupled to provide 45° articulation to each side as well as oscillation.

The front frame contains engine mounting rails which extend forward to the front bumper assembly. These chassis members are fabricated to form a rigid structure to carry the cab, power train and suspension system.

The rear frame is fabricated to form a rigid structure which carries the body, body hydraulics, suspension and rear drive axles.

Oscillation between the front and rear frames is provided by a large diameter cylindrical coupling carried on nylon bushes located in the rear frame. Longitudinal shocks are absorbed by the thrust faces of the nylon bushes. A large thrust nut, which is threaded to the end of the coupling and locked to the frame, secures the coupling in position. Wear on the thrust faces of the bushes is compensated by tightening this thrust nut.

INSPECTION AND MAINTENANCE

Inspection

Inspect the frames and attached parts at intervals not exceeding 250 hours for cracked or broken welds and bending of the frame. Any defects found should be repaired before they progress into major failures.

Straightening

Hydraulic straightening or aligning equipment should be used to straighten bent or twisted frames whenever possible. However, if heat must be applied, never heat the metal beyond a dull, cherry red colour, as too much heat will weaken the metal. When it is necessary to heat the metal, apply heat uniformly over the area to be straightened and protect the heated surface from sudden cooling. Frame parts that cannot be straightened should be renewed.

Welding

Electric arc welding is recommended for all welded frame repairs. Since the nature and extent of damage to the frame cannot be predetermined, no definite repair procedure can be established. As a general rule however, if parts are twisted, bent or pulled apart or a frame is bent or out of alignment, no welding should be done until the parts are straightened or realigned.

Successfully welded repairs will depend to a great extent upon the use of the proper equipment, materials and the ability of the welder. The Service Department can be consulted regarding the feasibility of, welding repairs.

Note: Disconnect the battery and alternator cables before performing any welding on the frames. Failure to do so may seriously damage the machines electrical equipment. Always fasten the welding machines ground cable to the piece/frame being welded if possible.

Note: The current from the welding rod always follows the path of least resistance. If, for example, the ground clamp is attached to the rear frame when welding is performed on the front frame, the current must pass a frame connection to return to the welding machine. Since the pivot coupling offers the least resistance but not a sound electrical connection, small electric arcs may be set up across the moving parts which may cause welding blotches on their wearing surfaces and increase the wear rate of these components.

Reinforcement

Frame reinforcement can be made with channel or angle or flat structural stock. Whenever possible, the reinforcement should extend well beyond the bent, broken or cracked area. The reinforcement stock thickness should not exceed that of the frame stock and the material should be of the same tensile strength.

Painting

To keep rust and corrosion to a minimum, periodic painting of abrasions and other exposed metal areas on the frames is highly recommended.

If painting of a frame is required, thoroughly clean the areas to be painted. Apply a primer coat of synthetic red oxide and then a finish coat of synthetic enamel.

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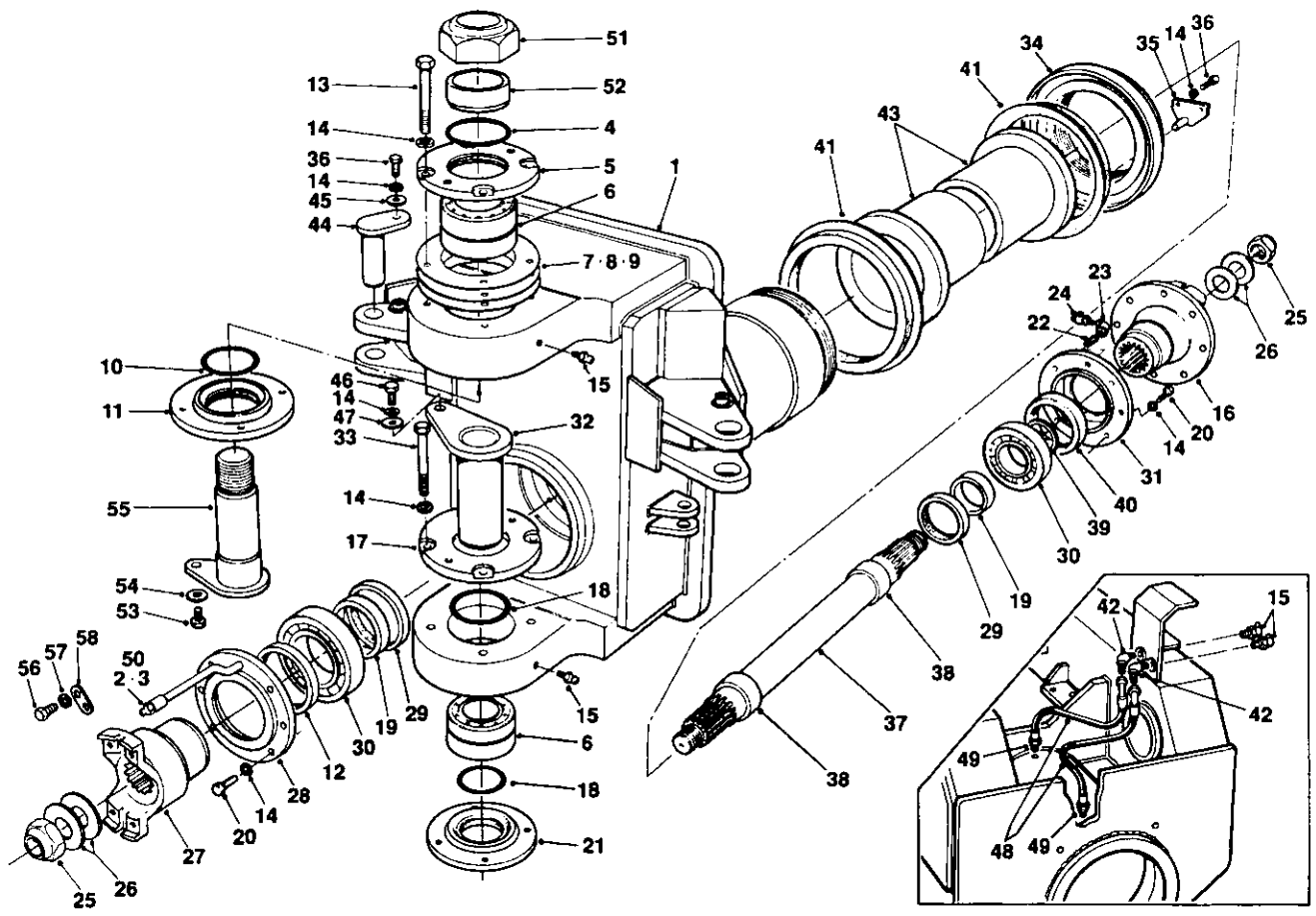

1 - Pivot
2 - Coupling
3 - Pipe
4 - 'O' Ring
5 - Retainer
6 - Bearing
*7 - Shim
*8 - Shim
*9 - Shim
10 - 'O' Ring
11 - Retainer
12 - Seal
13 - Bolt
14 - Lockwasher
15 - Lube Fitting
16 - Brake Yoke
17 - Retainer
18 - 'O' Ring
19 - Spacer
20 - Bolt
21 - Retainer
22 - Nipple
23 - Elbow
24 - Lube Fitting
25 - Locknut
26 - Washer
27 - Front Yoke
28 - Housing
29 - Seal
30 - Bearing
31 - Housing
32 - Pin
33 - Bolt
34 - Thrust Nut
35 - Lockplate
36 - Bolt
37 - Shaft
38 - Bush
39 - Washer
40 - Seal
41 - 'V' Ring
42 - Elbow
43 - Bush
44 - Pin
45 - Washer
46 - Bolt
47 - Washer
48 - Lube Line
49 - Connector
50 - Lube Fitting
51 - Nut
52 - Spacer
53 - Bolt
54 - Hardened Washer
55 - Pin
56 - Bolt
57 - Lockwasher
58 - Bracket

* Lower bearing shims not shown

Fig. 1 - Articulation and Oscillation Pivot

DESCRIPTION AND OPERATION

The articulation and oscillation pivot allows the front and rear frames to rotate horizontally (articulation) and tilt laterally (oscillation) with respect to each other. It is also the main load bearing coupling between the two frames. The pivot assembly houses the driveshaft connecting the drive between the front and rear frames.

Articulation bearings, oscillation bushes, pivot driveshaft bearings and associated parts can be removed, inspected and replaced or renewed by following the procedures outlined in this section.

PIVOT DRIVESHAFT BEARINGS

Removal

Numbers in parentheses refer to Fig. 1, unless otherwise specified.

Note: It is not necessary to separate the frames in order to remove the pivot driveshaft assembly.

> ⚠ **WARNING**
> **To prevent personal injury and property damage, make sure blocking or lifting equipment is properly secured and of adequate capacity to do the job safely.**

1. Position machine on a level floor. Switch off the engine and operate the steering several times to discharge the steering accumulator.

2. Block all road wheels and place the battery master switch in the off position.

3. Open drain cocks on air tanks to drain air pressure from the tanks. Close air tank drain cocks when air has exhausted from the air tanks.

Note: Take extra care when handling drivelines as any deformity on a rotating mass creates vibration and excessive wear during any operation.

4. Match mark yokes and mating surfaces of transmission - pivot driveline (Fig. 2) to aid in 'Installation'. Remove bolts, lockwashers and caps and remove driveline from the machine.

Note: Take care to avoid damaging pipe (3) when performing Step 5.

5. Remove locknut (25) and washers (26) from front yoke (27). Remove yoke (27) from shaft (37).

6. Remove bolts (1, Fig. 3), lockwashers (2, Fig. 3), nuts (3, Fig. 3) and protective guard (4, Fig. 3), if fitted, from beneath rear of pivot housing.

> ⚠ **WARNING**
> **Tensioned spring on adjuster.**

7. Slacken adjuster (14, Fig. 3) until brake pads (13, Fig. 3) are sufficiently clear of parking brake disc (5, Fig. 3) to permit removal of calliper (7, Fig. 3).

8. Note positions of front and rear wedge plates (8 & 9, Fig. 3) to aid in 'Installation'. Remove bolts (6, Fig. 3), washers (11, Fig. 3), nuts (12, Fig. 3), front and rear wedge plates (8 & 9, Fig. 3) and left hand torque plate (10, Fig. 3).

9. Move and secure calliper (7, Fig. 3) clear of parking brake disc (5, Fig. 3).

Note: Take extra care when handling drivelines since any deformity on a rotating mass creates vibration and excessive wear during any operation.

10. Match mark brake yoke (16) and mating surface of pivot - centre axle driveline (Fig. 2) to aid in 'Installation'. Remove bolts, lockwashers and caps and remove driveline from the machine.

11. Remove bolts (57) and lockwashers (14) from rear housing (31).

Note: Take extra care when handling driveshafts as any deformity on a rotating mass creates vibration and excessive wear during any operation.

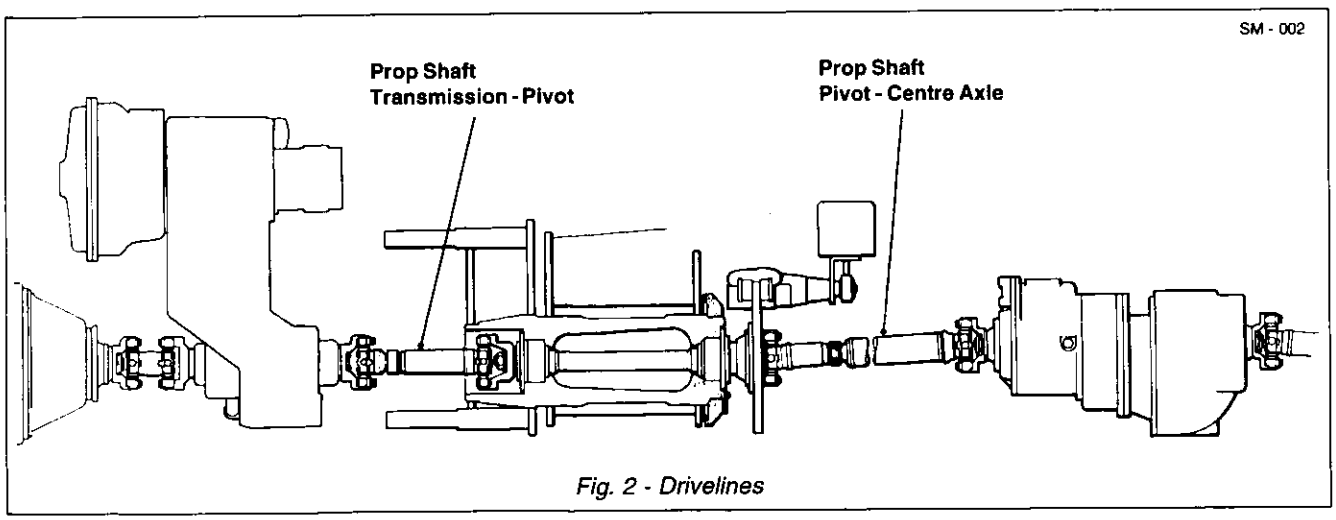

Fig. 2 - Drivelines

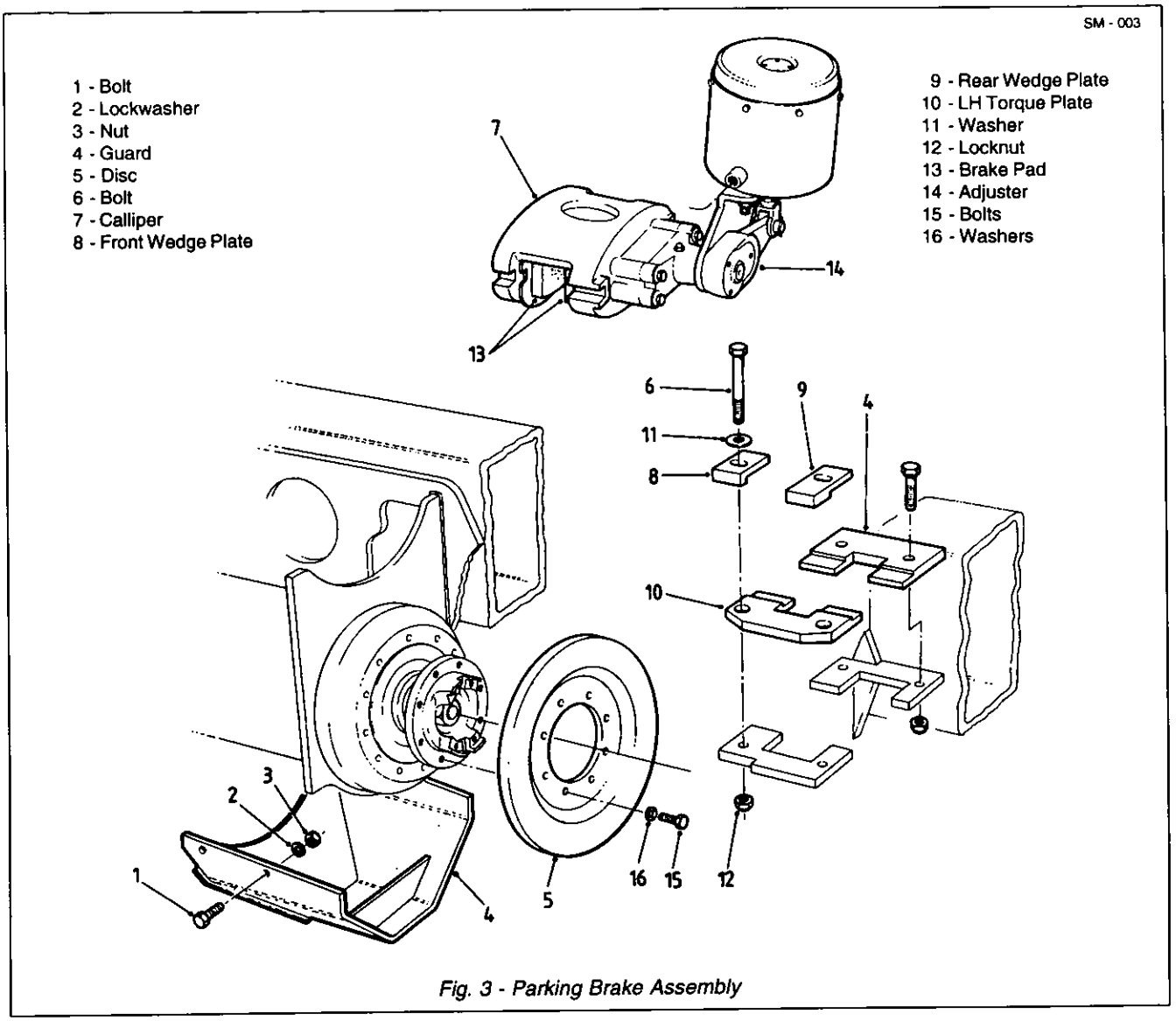

Fig. 3 - Parking Brake Assembly

12. Withdraw pivot driveshaft assembly from pivot by pulling rearwards on brake yoke/disc assembly and place in suitable location for further work.

13. Remove front locknut (25) then position front yoke (27) fully on to front of shaft (37) and suitably restrain to resist rotation. Remove rear locknut (25), washers (26) and rear yoke brake/disc assembly (16). Tag front and rear ends of shaft (37) and install locknuts (25) on the shaft to protect the threads.

14. Tag and remove housing (31). Note position of seal (40) to aid in 'Installation'. Remove and discard seal (40).

15. Remove washer (39), rear bearing (30) and spacer (19) from rear of shaft (37).

16. Remove bolt (56), lockwasher (57) and bracket (58) securing pipe (3) to pivot (1) assembly.

Note: Take care to avoid damaging pipe (3) when performing Steps 17 through 18.

17. Remove bolts (20) and lockwashers (14) from front housing (28).

18. Tag and remove front housing (28). Note position of seal (12) in front housing (28) to aid in 'Installation'. Remove and discard seal (12).

⚠ WARNING
When necessary to drive out components, use a soft drift to avoid injury and damage from flying chips.

19. Using a suitable puller/drift, remove bearing (30).

20. Remove spacer (19). Note position of seals (29) in pivot (1) housing to aid in 'Installation'. Remove and discard seals (29).

Inspection

Numbers in parentheses refer to Fig. 1, unless otherwise specified.

1. Clean parts with a suitable solvent and let dry. DO NOT spin bearings with compressed air. Place bearings on clean surface, cover with lint free cloth and allow to dry.

2. Check pivot driveshaft bearings (30) for wear or damage, replace if required.

3. Inspect bushes (38) for wear. Replace if badly scored.

Installation

Numbers in parentheses refer to Fig. 1, unless otherwise specified.

Note: Tighten all fasteners without special torques specified, to standard torques listed in Section 59-91, STANDARD BOLT AND NUT TORQUE SPECIFICATIONS.

Note: If bushes (38) are to be renewed, then proceed with Steps 1 thru 5, if the bushes (38) are satisfactory, proceed from Step 6.

> ⚠ **WARNINGS**
> **To prevent personal injury and property damage, make sure blocking or lifting equipment is properly secured and of adequate capacity to do the job safely.**
>
> ⚠ **When necessary to drive out components, use a soft drift to avoid injury and damage from flying chips.**

1. Apply suitable heat to bushes (38) to break bond of retaining compound. Remove locknuts (25) from their protective position on shaft (37), then remove bushes (38) with a suitable drift.

2. Allow shaft (37) to cool. Thoroughly clean shaft (37) and new bushes (38) with a suitable solvent. Wash mating faces of shaft (37) and new bushes (38) with chlorethane and allow to dry.

3. Apply LOCTITE primer to mating faces of shaft (37) and new bushes (38) and allow to dry. Refer to Fig. 4.

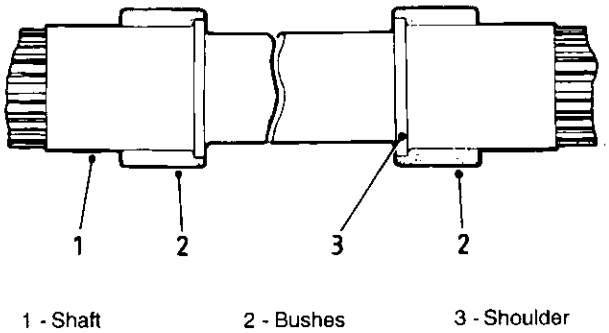

Fig. 4 - Shaft and Bushes

4. Apply LOCTITE Fugeteile 35 to shaft (37) mating faces and install new bushes (38), with the recesses in bushes (38) against shoulder on driveshaft (37). Make sure that bushes (38) are fully home against the shoulders. Refer to Fig. 4.

5. Allow 15 minutes for retaining compound to cure to handling strength.

6. Degrease front bearing (30) housing in pivot (1) with a suitable solvent and allow to dry.

Note: Do not use retaining compound on the housing for the rear pivot shaft bearing.

Note: Front bearing (30) of shaft (37) is secured with retaining compound as well as normal hardware. Cleaning the bearing housing ensures a good bond. THE REAR BEARING IS SECURED BY NORMAL HARDWARE ONLY.

7. Apply coat of grease to new seals (29) and install seals in pivot housing. Make sure seal lips are facing outwards as shown on Fig. 5.

8. Make sure that pivot shaft bearing (30) is pre-packed with grease then position spacer (19), bearing (30) and washer (39) on rear of shaft (37).

9. Apply bead of grease to fill inner rim of new seal (40) and position new seal in rear housing (31). Refer to Fig. 6. Fill lube fitting (24) assembly on rear housing with grease and make sure that nipple (22) does not protrude into grease slot in rear face of housing (31).

Note: Take extra care when handling driveshafts as any deformity on a rotating mass creates vibration and excessive wear during any operation.

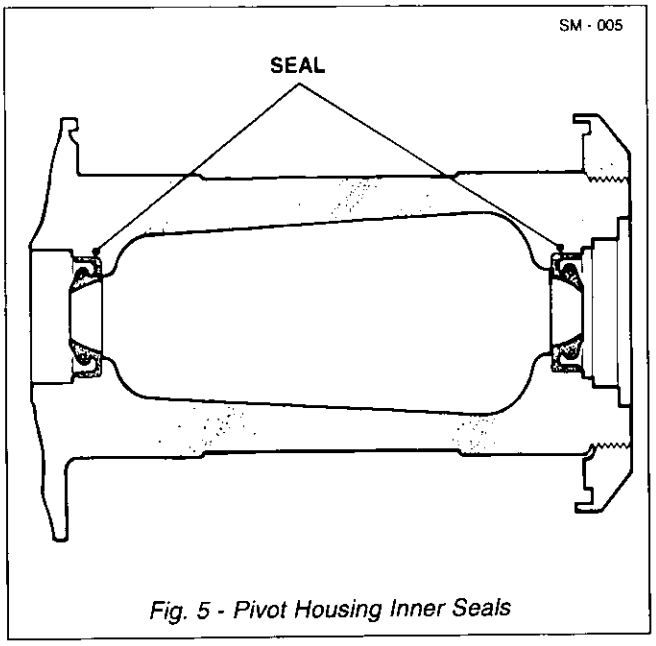

Fig. 5 - Pivot Housing Inner Seals

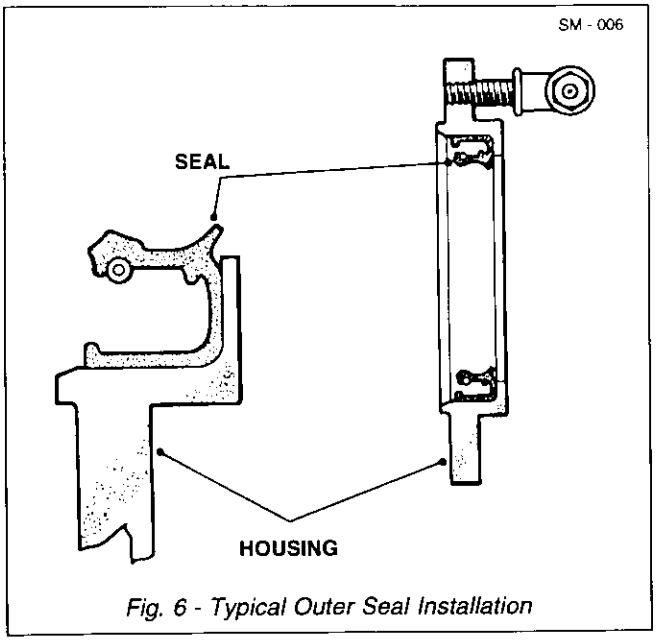

Fig. 6 - Typical Outer Seal Installation

10. Assemble rear housing (31) and brake yoke/disc assembly (16) onto rear of shaft (37). Secure with locknut (25) and both washers (26) but only fingertight at this stage.

11. Insert shaft (37) assembly fully into pivot (1) from the rear. Take care not to dislodge internal seals (29).

12. Partially withdraw shaft (37) assembly to enable housing of rear pivot driveline bearing (30) to be filled with grease from 1/3 to 1/2 of capacity.

13. Reposition shaft (37) assembly fully in pivot (1).

14. Align housing (31) with lube fitting (24) uppermost and secure with lockwashers (14) and bolts (20). Torque tighten bolts (20) to 106 Nm (78 lbf ft).

15. Apply a bead of grease to fill inner rim of new seal (12) and position seal in front housing (28). Refer to Fig. 6. Fill pipe (3), through lube fitting (50), with grease. Make sure that pipe (3) does not protrude into grease slot in rear face of housing (28).

16. Install spacer (19) onto front of shaft (37).

17. Pre-pack bearing (30) with grease taking care not to place any grease on outer curved surface. Clean this surface with a suitable solvent where necessary and allow to dry.

Note: Make sure that Steps 18 through 22 are performed within the hardening time of the retaining compound in use.

18. Make sure mating surfaces of housing (28) are still clean then apply coating of retaining compound to mating surfaces of bearing (30) and housing (28). Install bearing (30) on to front of shaft (37).

19. Pack housing (28) of with grease from 1/3 to 1/2 of capacity.

20. Install front housing (28), front yoke (27), both washers (26) and locknut (25).

Note: Take care to avoid damaging the pipe (3) when performing Steps 21 through 22.

21. Lock brake yoke/disc (16) assembly with a suitable tool and install locknut (25) on front yoke (27). Torque tighten locknut (25) to 678 Nm (500 lbf ft).

22. Lock front yoke (27) and torque tighten locknut (25) on brake yoke assembly to 678 Nm (500 lbf ft).

23. Align front housing (28) with pipe (3) uppermost and secure in place with bolts (20) and lockwashers (14). Torque tighten bolts (20) to 106 Nm (78 lbf ft).

24. Install bracket (58), and secure with lockwasher (57) and bolt (56).

25. Check that no end float exists by pulling and pushing on the brake yoke/disc assembly.

Note: Take extra care when handling drivelines as chips, dents, burrs or deformity on any rotating mass creates vibration and excessive wear during any operation. (Steps 26 & 28).

26. Connect pivot - centre axle driveline (Fig. 2) to brake yoke/disc assembly as noted on 'Removal'. Install caps and secure with lockwashers and bolts.

27. Position parking brake calliper (7, Fig. 3) in position and install left hand torque plate (10, Fig. 3), front and rear wedge plates (8 & 9, Fig. 3) and secure in place with bolts (6, Fig. 3), washers (11, Fig. 3) and locknuts (12, Fig. 3).

28. Install transmission - pivot driveline (Fig. 2) with caps, lockwashers and bolts as noted on 'Removal'.

29. Position guard (4, Fig. 3), if fitted, and secure to frame using bolts (1, Fig. 3), lockwashers (2, Fig. 3) and nuts (3, Fig. 3).

30. Place the battery master switch in the on position, start the engine and allow air pressure in the tanks to build up to correct operating pressure.

31. Adjust parking brake as shown in Section 10-2, PARKING BRAKE.

32. Remove all blocking from the road wheels.

ARTICULATION BEARINGS

Removal

Numbers in parentheses refer to Fig. 1, unless otherwise specified.

Note: The lengths of the electrical, hydraulic and air connections between the two frames are designed to permit articulation. As a result, the frames can be separated sufficiently to permit removal of the articulation bearings without disconnecting these connections.

> ⚠ **WARNING**
> **To prevent personal injury and property damage, make sure blocking or lifting equipment is properly secured and of adequate capacity to do the job safely.**

1. Position machine on a level floor. Switch off the engine and operate the steering several times to discharge the steering accumulator.

2. Block all road wheels and place the battery master switch in the off position.

3. Open drain cocks on air tanks to drain air pressure from the tanks. Close air tank drain cocks when air has exhausted from the air tanks.

4. Position levelling jack under centre front portion of the front frame. Raise jack and block frame to remain level after removal of the articulation pins. Check that front wheels are still effectively blocked.

Note: Make sure that front frame is correctly supported and prevented from tilting on the axle, or damage to coupling etc. could result.

5. Disconnect steering cylinders by removing bolts (36), lockwashers (14), washers (45) and pins (44) from attachment points on pivot (1) housing. Move steering cylinders clear of pivot (1) housing and secure.

Note: Take extra care when handling drivelines as chips, dents, burrs or deformity on any rotating mass creates vibration and excessive wear during any operation.

6. Match mark yokes and mating surfaces of transmission - pivot driveline (Fig. 2) to aid in 'Installation'. Remove bolts, lockwashers and caps and remove driveline from the machine.

7. Remove bolt (53) and hardened washer (54) securing pin (55) to pivot (1) housing. Remove nut (51) and withdraw pin (55), tapping pin downwards to ease removal. Take care not to damage the threads on pin (55).

Note: It may be necessary to adjust the frame levelling jack to relieve binding between pin (55) and pin bores during removal.

8. Remove bolt (46), lockwasher (14) and washer (47) securing pin (32) to pivot (1) housing.

9. Remove pin (32), tapping pin upwards to ease removal. Take care not to damage the threads on pin (32).

Note: It may be necessary to adjust the frame levelling jack to relieve binding between pin (32) and pin bores during removal.

10. Attach suitable lifting equipment to the rear frame and take up slack.

Note: Only separate the frames sufficiently to permit removal of the articulation bearings or damage to electrical, hydraulic and air connections could result.

11. Remove blocking from the rear frame and wheels

and use lifting equipment to pull the rear frame away from the front frame. After moving, block the rear frame and wheels securely.

12. Mark all bearing retainers (5, 11, 17 & 21) to aid in 'Installation'.

Note: Retainers (5, 11, 17 & 21) are not interchangeable.

13. Remove bolts (13), lockwashers (14), retainers (5, 11, 17 & 21) and upper and lower shims (7, 8 & 9).

14. Remove and discard 'O' rings (4, 10 & 18). Remove spacer (52) noting orientation to aid in 'Installation'.

15. Remove and tag all bearings (6) to aid in 'Installation', where appropriate.

Note: Never interchange cups or cones between bearings.

Inspection

Numbers in parentheses refer to Fig. 1.

1. Clean parts with a suitable solvent and let dry. DO NOT spin bearings with compressed air. Place bearings on clean surface, cover with lint free cloth and allow to dry.

2. Check articulation bearings (6) and pins (32 & 55) for wear or damage. Renew if required.

Installation

Numbers in parentheses refer to Fig. 1, unless otherwise specified.

> ⚠ **WARNING**
> **To prevent personal injury and property damage, make sure blocking or lifting equipment is properly secured and of adequate capacity to do the job safely.**

Note: Two bearings are installed on EACH articulation point. Each bearing comprises a cup and a cone and are installed into the articulation point with the cones 'back to back'. Refer to Fig. 7.

Note: Never interchange cups or cones between bearings.

1. Insert both bearing cups and cones into housing so that bearing cones are back to back and position retainer (11), for top articulation bearing, and retainer (21), for bottom articulation bearing on underside of bearing housing. Make sure that bearings are pre-packed with grease including end faces and faces on bearing cups.

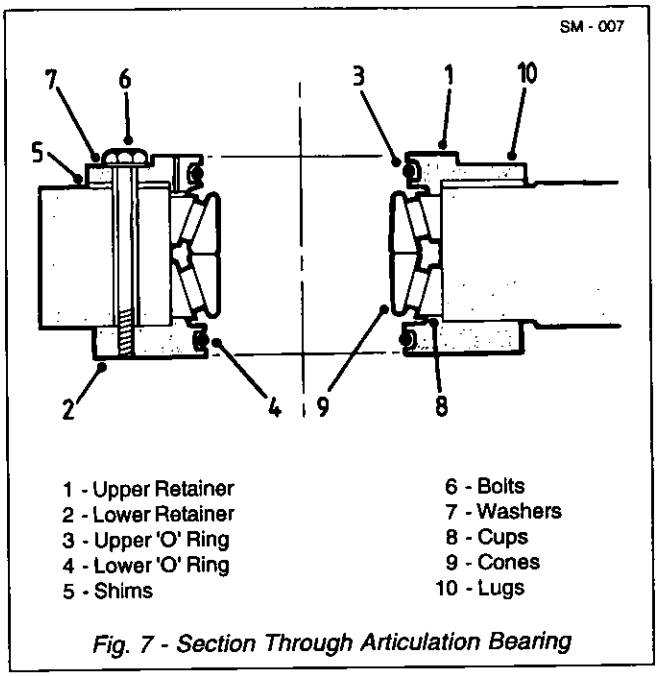

Fig. 7 - Section Through Articulation Bearing

2. Install top retainer (5), for top articulation bearing, and retainer (21), for bottom articulation bearing.

3. Lubricate bolts (13 for top and 33 for bottom) and install along with washers (14). Torque tighten bolts (13 & 33) to 27 Nm (20 lbf ft).

4. Use feeler gauges to measure end float and record value. Refer to Fig. 8.

Note: End float is equal to the sum of the clearances between both retainers and the lug.

5. Select shims to total value of -0.07 to +0.02 mm (-0.003 to +0.001 in) of that recorded at Step 4.

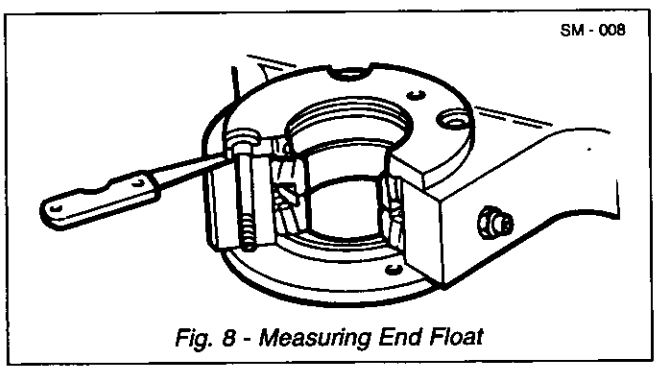

Fig. 8 - Measuring End Float