



QS 9000 Registered

# **800 SERIES HEAVY DUTY SERVICE MANUAL**

**65,000 – 100,000 LB**

**PART# EDOC002**

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## 1.0 GENERAL INFORMATION

This manual is to be used for the service of a Chalmers 800 Series Tandem Suspension 65,000 to 100,000 lbs capacity and is intended to give guidance and recommendation for the care, maintenance, inspection and safe operation of the above suspension. It is not a replacement for existing or future specific Pre-Delivery Inspection (P.D.I.) & Preventative Maintenance Programs.

Before proceeding with any work on or with the suspension, please read this manual completely to familiarize yourself with the maintenance and operation of the Chalmers Suspension.

TAKE SPECIAL NOTICE of procedures 1.1 through 1.6 that must be followed without exception when working on any procedures described in this manual.

- 1.1 ALL CHALMERS FASTENERS must be torqued to the specific values shown in Table 2 and to the specific period shown on the Service Inspection Requirements Section 3.0.

**\*\*IMPORTANT – Failure to check torque, may lead to fastener failure and consequent loss of vehicle control and void warranty.**

- 1.2 DO NOT USE ANY mineral based oils, greases, jellies, or solvent soaps as a lubricant to aid in the assembly of the rubber bushed torque rods. Use only quality rubber lubricants. Failure to do so will void warranty.
- 1.3 DO NOT AT ANY TIME WORK AROUND OR UNDER A VEHICLE SUPPORTED ONLY ON LIFTING DEVICES. THE VEHICLE MUST BE SECURELY CHOCKED AND SUPPORTED ON RIGID STANDS BEFORE WORK MAY COMMENCE.
- 1.4 ALL RELEVANT, MACHINERY, TOOL AND WORK PLACE SAFETY procedures and instructions must be followed without exception when working on any procedures described in this manual.

**FAILURE TO ADHERE TO ANY SAFETY PROCEDURES OR INSTRUCTIONS, MAY LEAD TO PERSONAL INJURY.**

- 1.5 USE ONLY CHALMERS APPROVED REPLACEMENT PARTS. Tests have shown alternate parts, particularly torque rod bushings, do not meet the performance expectations or engineering criteria established for the original products. This has created extreme hard part wear or hardware failures with consequent loss of warranty and more important loss of vehicle control.
- 1.6 DO NOT operate the vehicle with the suspension in an over loaded condition. Operating at a gross rear axle weight (GRAW), which exceeds the rated suspension capacity will lead to a suspension failure with consequent loss of vehicle control and void warranty.

## **2.0 INTRODUCTION TO THE SUSPENSION**

The Chalmers 800 Series Rear Suspension is a walking beam-type tandem axle suspension that uses hollow rubber springs instead of leaf springs or air bags. Each hollow rubber spring is mounted between a frame-rail plate and the centre (front-to-rear) of the steel walking beam. A hanger bracket assembly is attached to the frame and provides mounting points for the lower torque rods that tie the axles to the frame. The upper torque rods are fastened to brackets that bolt to the frame side rails and to tower assemblies that are welded to the top of the differential housings. See Fig.1.

The 800 Series Rear Suspension allows a high degree of both parallel and diagonal articulation, while maintaining wheel load equalization to within 3%.

The Chalmers suspension design separates the rear suspension's responsibility for supporting/cushioning the load from that of locating/guiding the axles. The suspension is very light, relative to its load carrying capacity and requires very little maintenance. In fact, there are no lubrication fittings since grease and oil are never needed.

The 800 Series is available in 60" and 65" axle spacing for the 65,000 lbs capacity and in 65" axle spacing for the 80-100,000 lbs capacity. The axle spacing and capacity is included as part of the suspension name, e.g. "Chalmers 860-65 Suspension" or Chalmers 865-100 Suspension.

The rear suspension may be precision-aligned by adjusting the length of the lower torque rods. These rods have both left and right hand threads cut on the same tube so rotating the tube changes the effective length of the tube.

## **2.1 SUSPENSION PART NAMES**

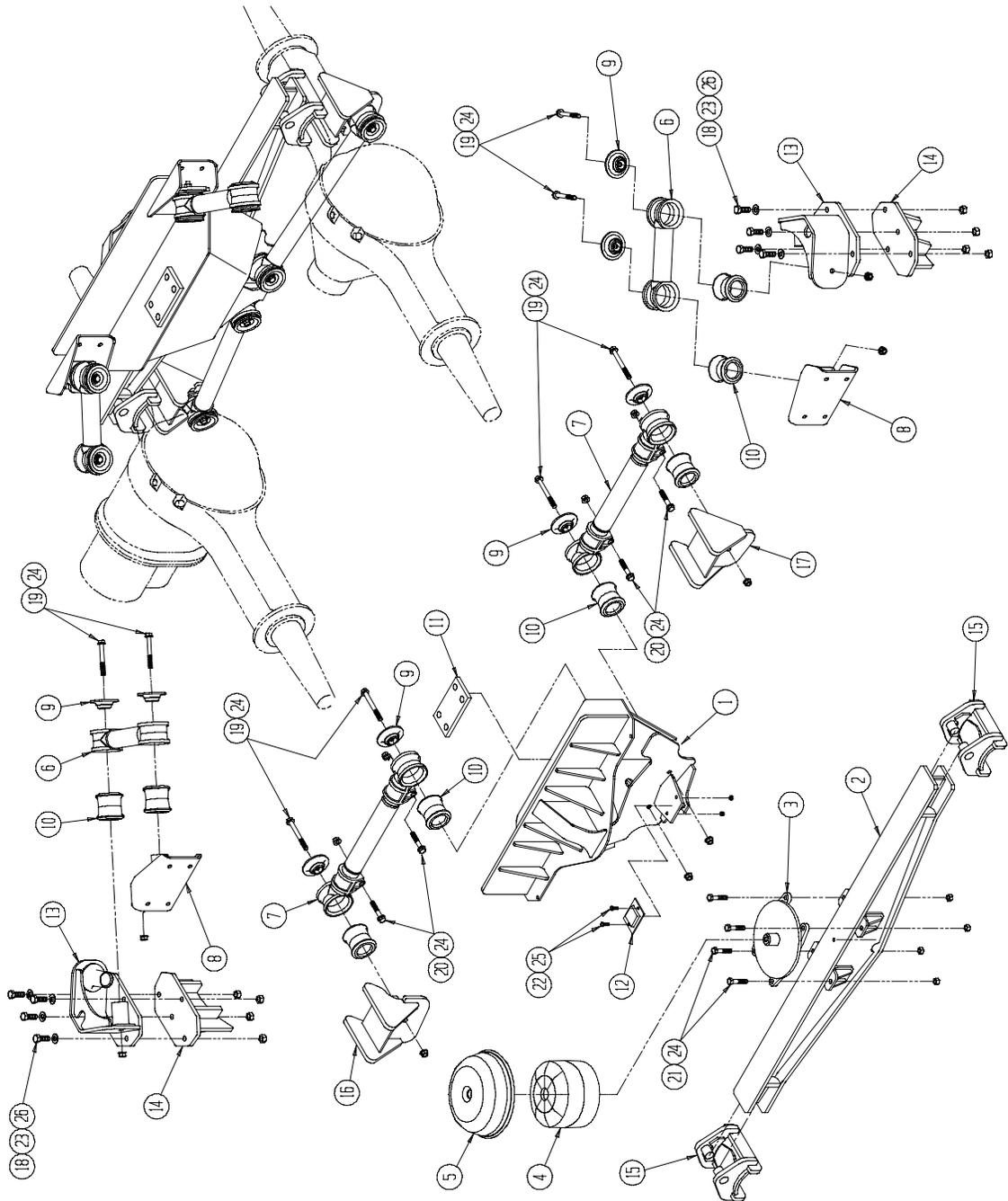
Fig.1A shows an exploded view of a typical 800 Series Suspension 65,000lbs capacity.

Fig.1B shows an exploded view of a typical 800 Series Suspension 80-100,000 lbs capacity.

Throughout this manual, parts will be referred to by the names shown on this figure.

### SUSPENSION NOMENCLATURE

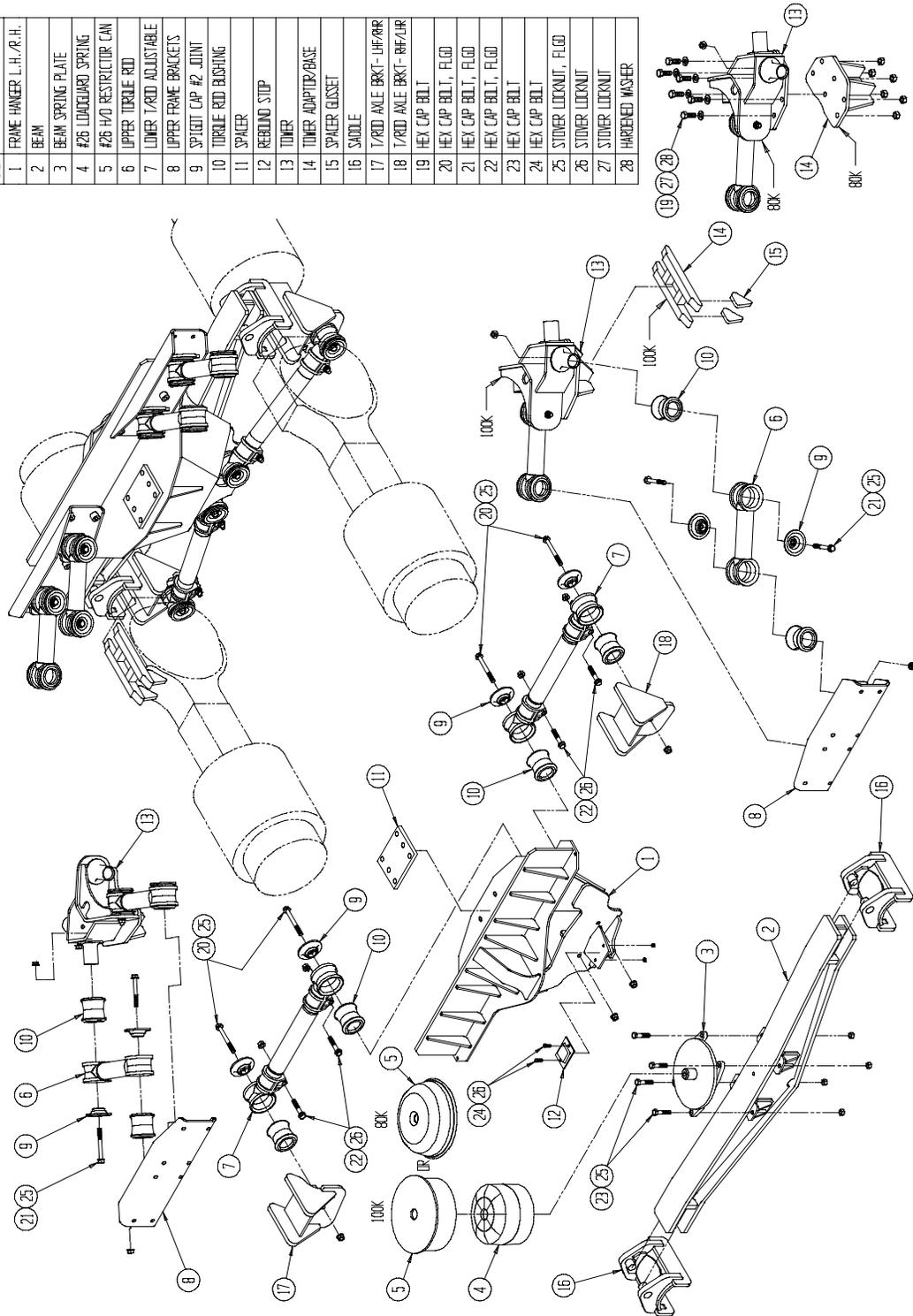
| ITEM | DESCRIPTION              |
|------|--------------------------|
| 1    | FRAME HANGER L.H./R.H.   |
| 2    | BEAM                     |
| 3    | BEAM SPRING PLATE        |
| 4    | #26 LOADGUARD SPRING     |
| 5    | #26 RESTRICTOR CAN       |
| 6    | UPPER TORQUE ROD         |
| 7    | LOWER T/RD ADJUSTABLE    |
| 8    | UPPER FRAME BRACKETS     |
| 9    | SPLIT JOINT #2           |
| 10   | TORQUE ROD BUSHING       |
| 11   | SPACER                   |
| 12   | REBOUND STOP             |
| 13   | TOWER                    |
| 14   | TOWER ADAPTOR            |
| 15   | SADDLE                   |
| 16   | T/RD AXLE BRKT - L/F/R/R |
| 17   | T/RD AXLE BRKT - R/F/L/R |
| 18   | HEX CAP BOLT             |
| 19   | HEX CAP BOLT, FLOD       |
| 20   | HEX CAP BOLT, FLOD       |
| 21   | HEX CAP BOLT             |
| 22   | HEX CAP BOLT             |
| 23   | STOWER LOCKNUT           |
| 24   | STOWER LOCKNUT, FLOD     |
| 25   | STOWER LOCKNUT           |
| 26   | HARDENED WASHER          |



**FIGURE 1A**  
(65,000 lbs suspension shown)

### SUSPENSION NOMENCLATURE

| ITEM | DESCRIPTION              |
|------|--------------------------|
| 1    | FRAME HANGER L.H./R.H.   |
| 2    | BEAM                     |
| 3    | BEAM SPRING PLATE        |
| 4    | #26 LONGUARD SPRING      |
| 5    | #26 H/O RESTRICTOR CAN   |
| 6    | UPPER TORQUE ROD         |
| 7    | LOWER T/R/D ADJUSTABLE   |
| 8    | UPPER FRAME BRACKETS     |
| 9    | SPRIGIT CAP #2 JOINT     |
| 10   | TORQUE ROD BUSHING       |
| 11   | SPACER                   |
| 12   | REBOUND STOP             |
| 13   | TOWER                    |
| 14   | TOWER ADAPTER/BASE       |
| 15   | SPACER GUSSET            |
| 16   | SADDLE                   |
| 17   | T/R/D ANGLE BRKT - L/H/R |
| 18   | T/R/D ANGLE BRKT - R/H/L |
| 19   | HEX CAP BOLT             |
| 20   | HEX CAP BOLT, FLDG       |
| 21   | HEX CAP BOLT, FLDG       |
| 22   | HEX CAP BOLT, FLDG       |
| 23   | HEX CAP BOLT             |
| 24   | HEX CAP BOLT             |
| 25   | STONER LOCKNUT - FLDG    |
| 26   | STONER LOCKNUT           |
| 27   | STONER LOCKNUT           |
| 28   | HARDENED WASHER          |



**FIGURE 1B**  
(80-100,000 lbs suspensions shown)

### 3.0 SERVICE – INSPECTION REQUIREMENTS

The Chalmers 800 Series Suspension was designed to require minimum general maintenance. The recommendations shown on the following chart are precautionary and are aimed at avoiding future problems.

| PART               | ACTION  | P.D.I. | 1000 Mile<br>1600 KM | DLY | MTH    | YRLY |
|--------------------|---|--------|----------------------|-----|--------|------|
| All Hardware       | Check torque to values shown on Table 2.<br><br>On the daily walk around<br>Visually inspect for looseness.   | •      | •                    | •   |        | •    |
| Torque Rod Bushing | Wear check. See Section 4.2 for guidelines.<br><br>Visually inspect for tears or cracks.<br><br>Visually inspect for correct installation. See Sections 4.2 & 4.3 for guidelines. | •      | •                    |     | •<br>• |      |
| Restrictor Can     | Visually inspect for wear or cracking. Replace as required. See Sections 4.4 & 4.5 for guidelines.<br><br>Visually inspect for missing cans, and cans not centered on spring.     | •      |                      |     | •      |      |
| Spigot Cap         | On the daily walk around visually inspect for missing, cracked, broken or loose caps. Replace as required or retorque. See Sections 4.6 & 4.7 and Table 3 for guidelines.         | •      | •                    | •   |        |      |

| PART                              | ACTION  | P.D.I. | 1000 Mile<br>1600 KM | DLY | MTH | YRLY |
|-----------------------------------|---|--------|----------------------|-----|-----|------|
| Walking Beam                      | Inspect for wear and cracks. See Sections 4.8 & 4.9 for guidelines.<br><br>Inspect for beam free float in axle saddles, 1.75" (45mm) fore and aft. .38" (10mm) side to side. See Section 4.8.   | •      |                      |     |     | •    |
| Saddle                            | Inspect for wear. See Sections 4.10 for guidelines.   |        |                      |     |     | •    |
| Axle Bracket, Hanger Bracket Assy | Visually inspect for road damage or cracks. Replace any damaged parts as required. Contact Chalmers for guidelines.   |        | •                    |     |     | •    |
| Rubber Spring                     | Visually inspect for chemical damage, deep tears and deformed springs. Replace as required. See sections 4.11 & 4.12 for guidelines.<br><br>Visually inspect that the spring is sitting centrally on the spring plate and is seated down fully. | •      | •                    |     | •   |      |

**NOTICE:**

The above chart was developed from Chalmers experience on parts subject to wear in normal service. The wear rate is dependent on a number of factors such a load carried, speed travelled, roadbed conditions, traffic density and number of stops.

**NOTE:**

IF THE OPERATOR OF THE VEHICLE IS IN ANY DOUBT ABOUT THE SAFETY OF THE SUSPENSION, HE SHOULD NOT OPERATE THE VEHICLE AND SHOULD IMMEDIATELY SEEK QUALIFIED ADVICE.

#### 4.0 **GUIDELINES TO THE INSPECTION AND REPLACEMENT OF SERVICE PARTS**

Recommended tools needed to carry out the work covered in Section 4.1 through 4.13.

##### **TOOL LIST**

Open End Wrench: 9/16", 3/4", 15/16", 1-1/8", 1-5/16"

Box Wrench (Offset Preferred): 9/16", 3/4", 15/16", 1-1/8", 1-5/16".

Standard Socket (1/2" Drive): 9/16", 3/4", 15/16", 1-1/8", 1-5/16".

Extra Deep Socket (1/2" Drive): 15/16".

Impact Socket (1/2" Drive): 9/16", 3/4", 15/16", 1-1/8", 1-5/16".

Extra Deep Impact Socket (1/2" Drive): 15/16".

Torque Wrench (1/2" Drive): 25 – 250 Ft. Lbs. (CALIBRATED)

##### **GENERAL TOOLS**

Socket Drive Ratchet (1/2" Drive)

Heavy Mallet (Rubber, Copper or Hide)

2 lbs. Copper/Hide Hammer

Large (12" Long Min.) Square Blade Screwdriver

Pinch or Wrecking Bar (3/4" size)

Tape Measure (16 ft.)

Vernier Caliper (6.0" Reading .001")

Impact Wrench (1/2" Drive)

Bottle Jack (5 ton)

Wheel Chocks

Various Wooden Blocks

##### **LUBRICANTS**

Rubber Lubricant: Rimslip or equivalent  
**Important – Do not use oil or grease.**

#### 4.1 FASTENERS

This guideline is to be used for the inspection or replacement of Chalmers supplied fasteners ONLY. Not supplied by Chalmers are the fasteners attaching the triangular frames and upper frame brackets to the vehicle frame. For inspection and specification on these, please refer to the vehicle manufacturer.

The fastener systems used in a Chalmers suspension are the key to the care and safe operation of the suspension.

These systems comprise of an SAE GR.8 flanged head bolt and SAE GR.G flanged head "Stover" locknut. The sizes of these systems have been specifically engineered for each of their positions and functions within the suspension. See the following Table 1 for size and function.

**TABLE 1**

| SIZE      | CAPACITY                | FUNCTIONS   |
|-----------|-------------------------|---|
| 3/4" Dia. | 65,000<br>to<br>80,000  | Tower to Tower Adapter Assembly   |
| 5/8" Dia. | 65,000<br>to<br>100,000 | ALL Torque Rod Joints &<br>Torque Rod Eye Pinch Bolts*<br>Spring Plate to Beams |
| 3/8" Dia. | 65,000<br>to<br>100,000 | Rebound Stop to Hanger Bracket<br>Assembly                                      |

\* Single pinch bolt style

For the safety and proper operation of the suspensions **ALL FASTENERS MUST**, using a calibrated torque wrench, be initially torqued and retorqued at 1000 miles/1600 km of service, to the specific values shown on Table 2.

**TABLE 2 Torque Specifications**

**For Bolts and Locknuts provided by Chalmers**

| <b>BOLT SIZE</b> | <b>ASSEMBLY TORQUE FT. LBS.</b> |
|------------------|---------------------------------|
| 3/8"             | 35                              |
| 1/2"             | 65                              |
| 5/8"             | 135                             |
| 3/4"             | 250-280*                        |

\* Value for tower to tower adapter assembly. For all other uses contact Chalmers Suspensions.

**The above torques are recommended for Chalmers-supplied hardware only, and are NOT intended for hardware supplied by others.**

**NOTE: Re-torque must be done to both original and replacement fasteners.**

**IMPORTANT:** For fastener replacement use **ONLY NEW CHALMERS** approved fasteners. **DO NOT RE-USE or use other fasteners.** To do so may lead to fastener failure and consequent loss of vehicle control.

**IMPORTANT:** **FAILURE TO CHECK TORQUE MAY LEAD TO FASTENER FAILURE AND CONSEQUENT LOSS OF VEHICLE CONTROL.**

#### **4.2 TORQUE ROD BUSHING INSPECTION.**

All 800 Series Suspensions incorporate rubber bushed torque rod joints that isolate the vehicle from axle braking and driving shocks. The Chalmers bushings absorb axle shock by compression. This compression may give a false impression of a worn bushing. To reduce the chances of prematurely replacing a good bushing, the following steps should be used when inspecting all Chalmers bushings:

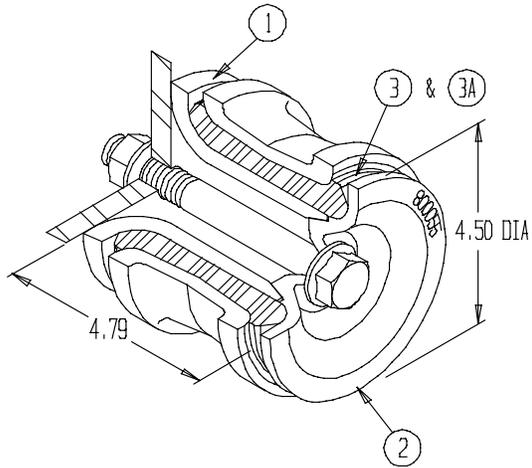
**STEP 1** - If possible power wash the torque rod ends. As a minimum, the ends should be brushed with a hard bristle brush to remove road dirt accumulations so that the rubber bushing may be seen.

**STEP 2** – Chock the front tires to prevent the vehicle from moving. Remove all drive axle brake or wind up loads by placing transmission in neutral, releasing spring brakes, or driveline brake.

**STEP 3** – **USING HANDS ONLY** attempt to move the torque rod ends, checking for **FREE** play. If free play is felt, the bushing should be replaced. (If in doubt contact Chalmers).

**NOTE: DO NOT USE A PRY BAR OR LEVER** to check for free play. To do so may lead to premature bushing replacement.

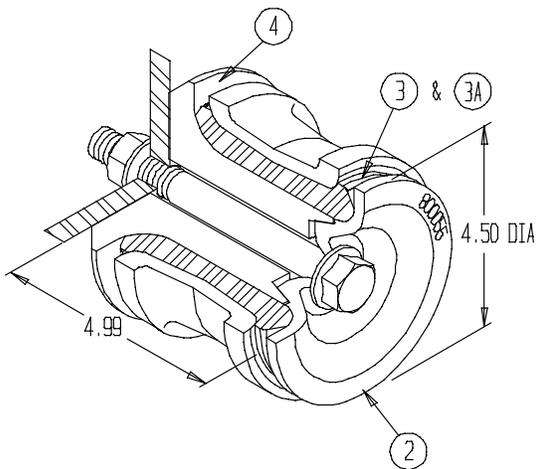
**SPIGOT JOINTS**



NUMBER "2" JOINT  
ASSEMBLY  
STANDARD BASE

| Item | Part No. | Description                     |
|------|----------|---------------------------------|
| 1    | 800021   | Spigot Base #2 Joint            |
| 2    | 800055   | Spigot Cap #2 Joint             |
| 3    | 800010   | T/Rod Bushing #2 Joint          |
| * 3A | 800009   | T/Rod Bushing-Oversize #2 Joint |
| 4    | 02P00141 | Spigot Base H/D #2 Joint        |

\* Service Bushing



NUMBER "2" JOINT  
ASSEMBLY  
HEAVY DUTY BASE

#2 Joint (800021 Base)  
800 Series Tandem Truck 65,000 lbs. Capacity (all Rods) & 80-100,000 lbs. Capacity (upper Rods).

#2 Joint (02P00141 Base)  
800 Series Tandem Truck 80-100,000 lbs. Capacity (lower Rods).

**FIGURE 2**

### 4.3 TORQUE ROD BUSHING REPLACEMENT

Replacement of Chalmers Torque Rod Bushings may be achieved easily and quickly in any shop without the use of a press or special tools, using the following steps as a guide.

STEP 1 – If possible power wash the torque rod ends, as a minimum, the ends should be brushed with a hard bristle brush to remove road dirt accumulations.

STEP 2 – Chock the front tires to prevent the vehicle from moving. Remove all drive axle brake or wind up loads by placing transmission in neutral and releasing the spring or driveline brakes.

STEP 3 – Lift the rear of the vehicle. Support the frame on stands so all weight is just taken off the suspension.

NOTE: All stands and lifting devices **MUST** be of sufficient strength and rigidity to safely support the vehicle. **DO NOT WORK AROUND OR UNDER THE VEHICLE WHEN SUPPORTED ON LIFTING DEVICES.**

STEP 4 – Work on only one torque rod at a time. Remove the 5/8” NC joint fasteners and spigot caps. Discard the fasteners, keep the spigot caps for inspection and cleaning. Remove the torque rod from the spigots by prying at each end until it comes free of the spigots.

NOTE: By completely removing and re-fitting only one torque rod at a time the chance of torque rod mix-up, which could lead to re-alignment of the suspension, or loss of axle planning angle and consequent axle damage, will be eliminated.

STEP 5 – Place the torque rod on a bench or the floor with the bushing end facing up. Remove the bushings by inserting the tip of a large screwdriver down between the bushing and the torque rod eye and prying out. Discard the bushing.

STEP 6 – Using a wire brush and/or scraper clean all rust, scale and rubber accumulations from the spigots, torque rod eyes and spigot cap, taking particular care to clean the inside taper of the spigots.

STEP 7 – Inspect the torque rod eyes, spigots and spigot caps for visual cracks and wear.

Should any of the following parts show visual cracks, the part **MUST** be discarded and replaced:

- Torque Rod and Eye
- Spigot Cap

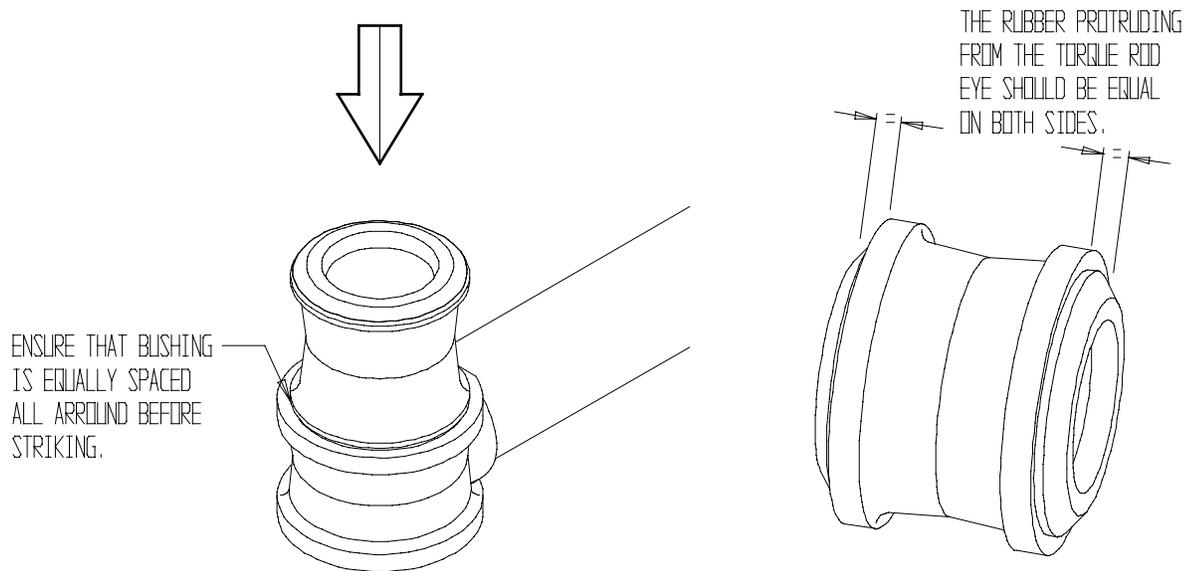
Should the spigot show visual cracks, contact Chalmers for guidelines.

For wear limits, refer to Table 6. Chalmers allows for wear in its design by providing oversize replacement bushings for the 65,000 lbs. to 100,000 lbs. Suspensions. Refer to Table 6 for when to use.

**STEP 8** – Liberally lubricate the inside diameter of the torque rod eye, and the outside diameter of the replacement rubber bushing with a quality rubber lubricant such as Rimslip or equivalent.

**IMPORTANT:** Never use any mineral based oils, greases, jellies or solvent soaps as a lubricant. To do so will lead to the premature failure of the bushing.

Place the torque rod on a solid level floor with the open eye end up. Place a rubber bushing onto the eye so as the outside tapered end of the bushing just enters the eye. Try to make sure the bushing is as even as possible to the eye. With a heavy, soft-faced mallet, quickly strike the bushing to drive it down into the eye. See Fig.3.



**FIGURE 3**

**NOTE:** Repeat the above procedure for the 2<sup>nd</sup> bushing. Then, flip the torque rod over 180 degrees. Tap with a mallet to drive the bushings completely through the eyes until they are positioned evenly in the eyes. See Fig.3.

**STEP 9** – Liberally lubricate the torque rod rubber bushings and the relevant spigots with a quality rubber lubricant.

**IMPORTANT:** Never use any mineral based oils, greases, jellies or solvent soaps as a lubricant to aid in the assembly of the rubber bushed torque rods. To do so will lead to the premature failure of the bushing.

**STEP 10** – Push each end of the torque rod onto its relevant spigot. Using a heavy soft-faced mallet, drive the torque rod onto the spigots. For best results, alternate end to end driving so as the torque rod bushings travel evenly over the spigots. Continue driving until the bushing contacts the spigot bottom face.

STEP 11 – Press the spigot caps into the ends of the torque rod bushings, secure the ends in place using new 5/8” NC fasteners.

Torque the 5/8” NC fasteners to 135 ft. lbs. See Table 2.

**\*\*IMPORTANT:** Failure to check torque may lead to fastener failure and consequent loss of vehicle control and void warranty.

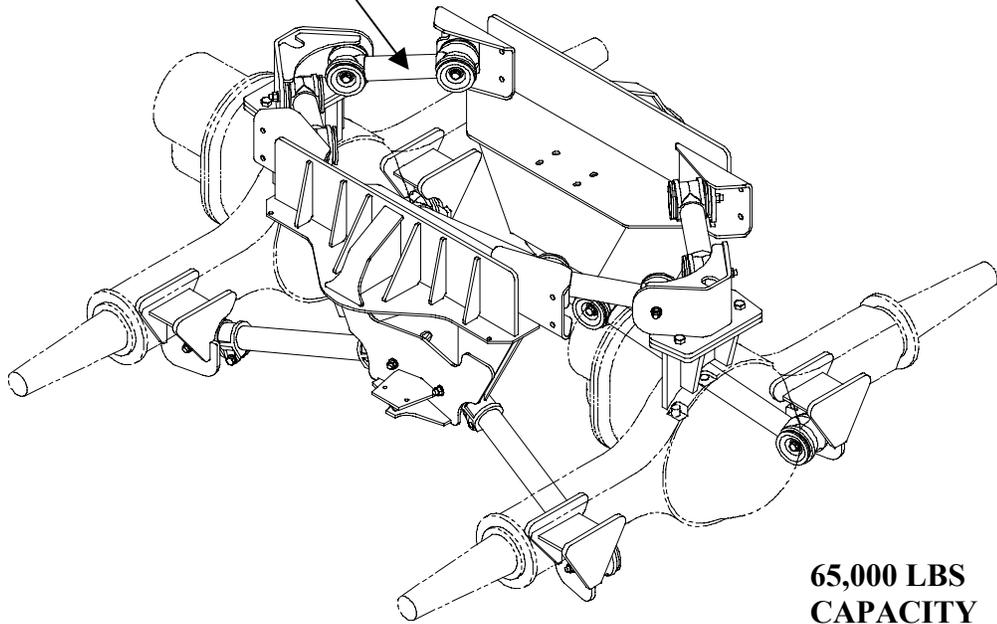
Repeat Steps 1 through 11 for each torque rod to complete the suspension rebushing.

**IMPORTANT:** USE ONLY NEW CHALMERS approved 5/8” NC fasteners for the joints. DO NOT RE-USE or use other fasteners. To do so may lead to fastener failure and consequent loss of vehicle control and void warranty.

When finished rebushing, check to see if the torque rods have been replaced as per Fig.4.

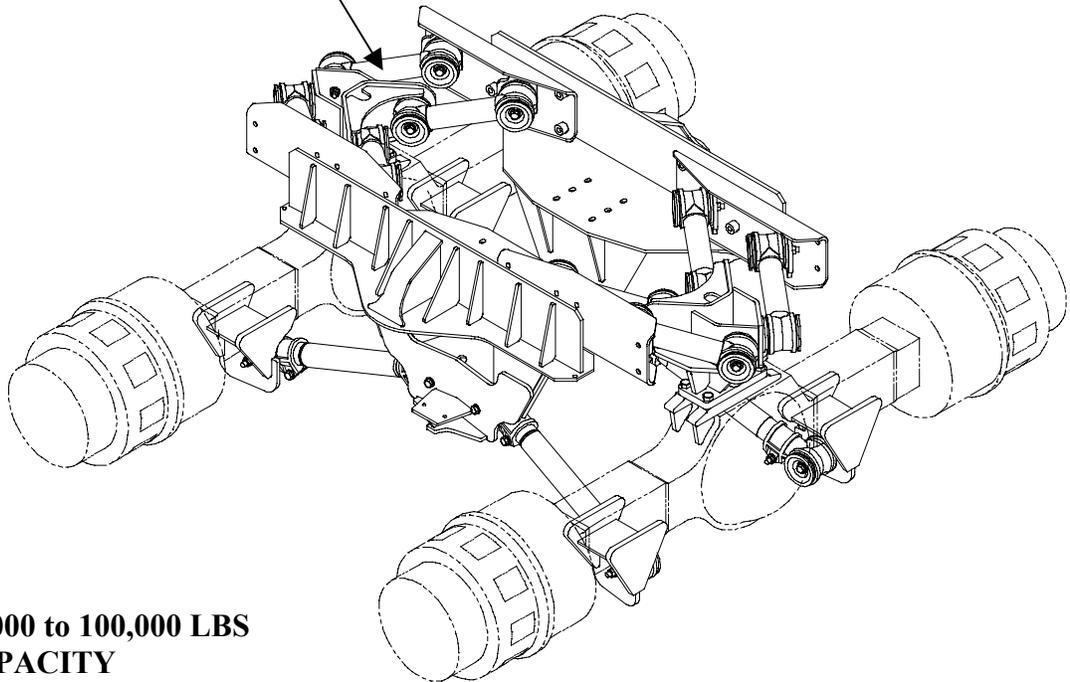
### TORQUE ROD INSTALLATION

UPPER TORQUE RODS #05S00004



**65,000 LBS  
CAPACITY  
SUSPENSION**

UPPER TORQUE RODS #805131



**80,000 to 100,000 LBS  
CAPACITY  
SUSPENSION**

**FIGURE 4**

#### 4.4 RESTRICTOR CAN INSPECTION

The Chalmers spring system comprises of a rubber spring and an enclosing metal restrictor can. The purpose of the restrictor can is to provide specific ride, road handling characteristics and protection to the spring.

To accommodate the different road handling conditions that may be encountered, Chalmers produces a number of different sized restrictor cans. Refer to Appendix “A” for application guidelines.

The free floating design of the Chalmers spring and beam, requires that the restrictor can be free to move on the vehicle frame. The restrictor can will wear or corrode over a period of time and will require replacement. Carefully inspect the restrictor can for cracks or severe corrosion, using the following steps as a guideline:

STEP 1 – If possible, power wash the restrictor can spring area. As a minimum, brush the area with a hard bristle brush to remove road dirt accumulations.

STEP 2 – Chock the front tires to prevent the vehicle from moving. Lift the rear of the vehicle, support the frame on stands so that all weight is just taken off the suspension.

NOTE: All stands and lifting devices, **MUST** be of sufficient strength and rigidity to safely support the vehicle. **DO NOT WORK AROUND OR UNDER THE VEHICLE WHEN SUPPORTED ON LIFTING DEVICES.**

STEP 3 – Rotate the restrictor can completely around, looking at the top and sides for visual cracks and signs of severe corrosion or distortion. If any of these are present, or the restrictor can is missing, it should be replaced. It is recommended that both restrictor cans be replaced to assure evenness of ride and handling.

NOTE: Should a cracked or missing restrictor can be found during vehicle operation, it may be driven **SLOWLY** to the nearest maintenance shop for replacement.

**ALL CRACKED OR MISSING** restrictor cans **MUST** be replaced. Failure to do so may lead to loss of vehicle control and consequent personal injury.

#### 4.5 RESTRICTOR CAN REPLACEMENT

Replacement of Chalmers restrictor cans may be achieved easily and quickly in any shop without the use of special tools, using the following steps as a guide.

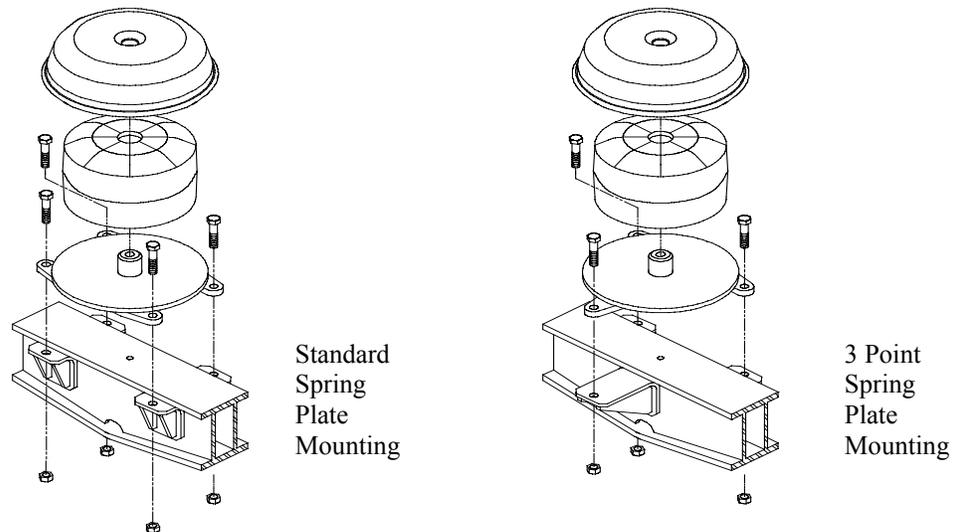
STEP 1 – If possible, power wash the restrictor can spring area. As a minimum, brush the area with a hard bristle brush to remove road dirt accumulations.

STEP 2 – Chock the front tires to prevent the vehicle from moving. Lift the rear of the vehicle, support the frame on stands so as all weight is just taken off the suspension.

**NOTE:** All stands and lifting devices **MUST** be of sufficient strength and rigidity to safely support the vehicle. **DO NOT WORK AROUND OR UNDER THE VEHICLE WHEN SUPPORTED ON LIFTING DEVICES.**

**STEP 3** – Remove the four (or three) 5/8” NC fasteners holding the lower spring plate to the beam. Discard the fasteners.

**STEP 4** – Pull the lower spring plate, spring and restrictor can as one assembly outward off the beam. See Fig.5.



**FIGURE 5**

**STEP 5** – Separate the restrictor can, spring and lower spring plate. Discard the restrictor can. Using a wire brush or scraper, remove rust and road accumulations from the spring plate. Clean out the centre vent holes in the beam and lower spring plate. See Fig.5. Inspect the lower spring plate for visual cracks. If cracked, replace. Contact Chalmers for details.

**STEP 6** – Turn the spring upside down so as the old top is now down. Place on lower spring plate, inserting the spring dowel into the centre spring hole. Place the replacement restrictor can over the spring. Make sure the can centre locator is in the centre spring hole. See Fig.5.

**STEP 7** – Lift and place as one assembly, the lower spring plate, spring and restrictor can onto the beam. Line up the 5/8” fastener holes.

**STEP 8** – Install and tighten the new 5/8” NC spring plate fasteners. Torque to 135 ft. lbs. See Table 2.

**STEP 9** – Repeat Steps 3 through 8 to complete. Before removing vehicle from stands, check both restrictor cans for an even gap around the spring. Adjust if required.

#### 4.6 SPIGOT CAP INSPECTION

The spigot caps are part of the Chalmers torque rod joint system and play a key part in this system by placing a small amount of end compression to the rubber bushing and providing end retention to the joint.

The suspension capacity and spigot cap used is shown in the following Table 3.

**TABLE 3**

| JOINT SIZE | CAPACITY                    | SPIGOT CAP NO. | BUSHING |         |
|------------|-----------------------------|----------------|---------|---------|
|            |                             |                | O.E.M   | SERVICE |
| #2         | 65,000 lbs.<br>100,000 lbs. | 800055         | 800010  | 800009  |

Visual inspection of the spigot caps should be done on a daily basis. See Section 3.0 Service Inspection Requirements.

**IMPORTANT:** If a missing, cracked or broken spigot cap is detected, it MUST be replaced immediately. DO NOT operate the vehicle. To do so may lead to consequent loss of vehicle control and personal injury.

**IMPORTANT:** If a loose spigot cap is found, retorque the 5/8" NC fasteners to 135 ft. lbs. See Table 2. Should persistent loosening occur, replace the 5/8" NC fastener as hard part wear is affecting the bolt seat

#### 4.7 SPIGOT CAP REPLACEMENT

Replacement of the spigot caps may be achieved easily and quickly with no requirements to remove major parts from the vehicle or use special tools, using the following steps as a guide.

**STEP 1** – If possible power wash the torque rod ends. As a minimum, the ends should be brushed with a hard bristle brush to remove road dirt accumulations.

**STEP 2** – Chock the front tires to prevent the vehicle from moving. Remove all drive axle brake or wind up loads by placing transmission in neutral and releasing, the spring or driveline brakes.

**STEP 3** – Remove the 5/8" NC fasteners and pry off the spigot cap, discard both.

**STEP 4** – Press the replacement spigot cap into the ends of the torque rod bushings.

**STEP 5** – Install and tighten new 5/8" NC torque rod joint fasteners. Torque to 135 ft. lbs. See Table 2.

**IMPORTANT:** Failure to check torque may lead to fastener failure and consequent loss of vehicle control and void warranty.

## 4.8 WALKING BEAM INSPECTION

The Chalmers 800 Series Walking Beam is a key part of the load support and equalization system of the suspension. It not only acts as a lower support and anchor point for the spring system, but also provides the means to equally share the vehicle load to the axles.

To allow the high articulation that the 800 Series Suspension provides, the walking beams **MUST** be free to move a total of 1.75" (45mm.) fore and aft, and .38" (10 mm.) side to side when the vehicle is on level ground and loaded.

The walking beams have two wear points, at the contact between the beam-ends and axle saddles. The rate of wear at these points will vary depending on the operating conditions, axle loading, and distance travelled.

Chalmers recommends inspecting the beams for end wear and cracks at the intervals shown in Section 3.0 Service Inspection Requirements.

Inspect the beam-ends carefully, looking for cracks and lower flange wear. Cracks along welds may be repairable while cracks in or across the beam flanges require walking beam replacement. See Fig. 1 Appendix "C". Lower flange wear requires the accurate measurement of lower beam flange thickness. Measurements taken at the flange edges are not an accurate indication of beam wear, see Fig.6, and may lead to unnecessary beam repair/replacement. Inspection of the beam-ends may be done without removing any major parts using the following steps as a guideline.

**STEP 1** – If possible, power wash the beam end. As a minimum brush the area with a hard bristle brush to remove road dirt accumulations.

**STEP 2** – Chock the front tires to prevent the vehicle from moving. Lift the rear of the vehicle, support the frame on stands so as all the weight is just taken off the suspension, and the beam-ends are off the saddles.

**NOTE:** All stands and lifting devices **MUST** be of sufficient strength and rigidity to safely support the vehicle. **DO NOT WORK AROUND OR UNDER THE VEHICLE WHEN SUPPORTED ON LIFTING DEVICES.**

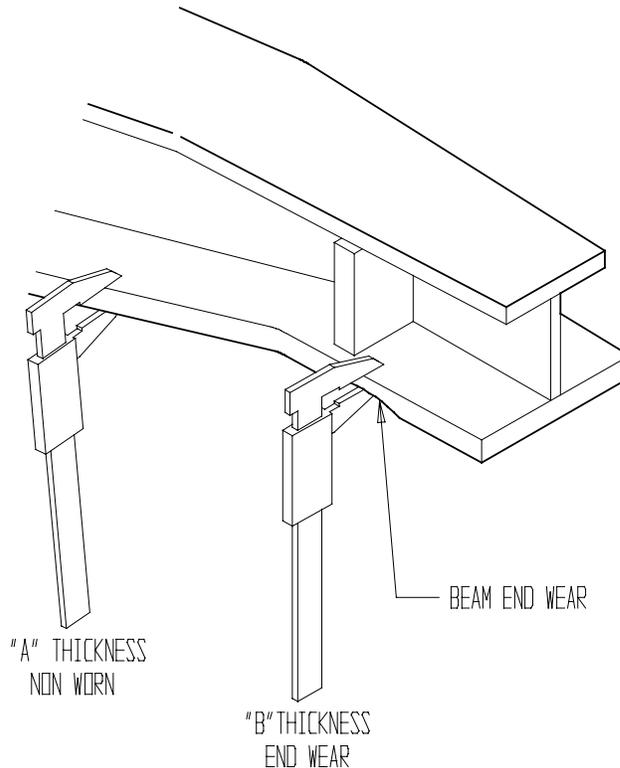
**STEP 3** – Manoeuvre the beam so as the wear area thickness on the bottom face, may be determined using either a micrometer or a vernier calliper. Measure the thickness at the wear area, and a non-worn area. See Fig.6. The wear allowance is the difference between thicknesses and **MUST** not be any greater than .062" (1.5 mm).

**NOTE:** All measurements should be taken as a minimum of ½" from the beam flange edges to eliminate any edge wear that may have occurred.

If the beams show wear greater than the .062" (1.5 mm) allowable, a Chalmers supplied wear plate **MUST** be installed. Contact Chalmers for details.

**NOTICE:** Should excessive wear or cracks be found during vehicle operations, it may be **SLOWLY** driven to the nearest repair shop. Failure to repair or replace excessively worn or cracked walking beams will lead to failure of the beam ends and consequent loss of vehicle control.

### BEAM WEAR MEASUREMENT



Beam Wear Maximum Limit

“A” Thickness minus “B” Thickness ----- .062” (1.5mm) Maximum

**FIGURE 6**

## 4.9 WALKING BEAM REPAIR/REPLACEMENT

Repair of the walking beam entails the use of electric arc welding and **MUST** be performed by a qualified shop. See Appendix “B” for repair installation instructions and guidelines.

Replacement of the walking beams may be done in any shop without the use of special tools using the following steps as a guide:

**STEP 1** – If possible, power wash the walking beam. As a minimum, the beam should be brushed with a hard bristle brush to remove road dirt accumulation.

**STEP 2** – Chock the front tires to prevent the vehicle from moving. Remove all drive axle brake or wind up loads by placing transmission in neutral and releasing the spring or driveline brakes.

STEP 3 – Lift the rear of the vehicle. Support the frame on stands so all weight is just taken off the suspension.

NOTE: All stands and lifting devices **MUST** be of sufficient strength and rigidity to safely support the vehicle. **DO NOT WORK AROUND OR UNDER THE VEHICLE WHEN SUPPORTED ON LIFTING DEVICES.**

STEP 4 – Remove the spring plate, spring and restrictor can following Steps 3 and 4 in Section 4.5.

STEP 5 – Remove the upper, and if necessary, the lower torque rod from the rear most axle following Step 4 outlined in Section 4.3.

NOTE: Tag or mark each torque rod so as each rod may be replaced in the exact position it came off.

STEP 6 – Roll the rear axle back so as the beam end is free of the saddle. Raise the free end up and slide the beam back to remove from suspension.

STEP 7 – Install the replacement or repaired beams by sliding the beam-ends into the respective saddles on the front axle. See Fig.7. Roll the rear axle forward and at the same time, slide the rear beam-ends into their respective saddles.

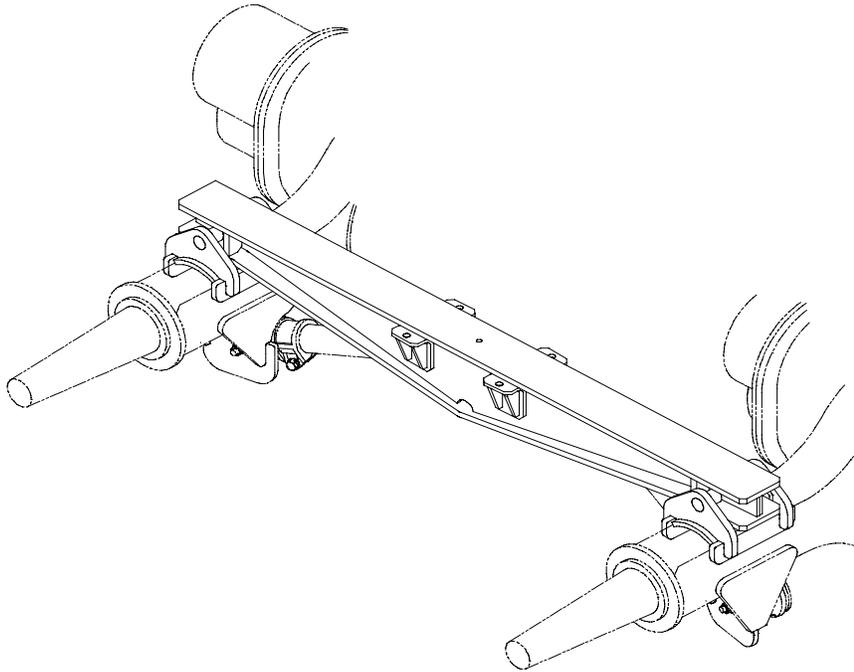
STEP 8 – Replace the rear axle upper and lower torque rods following Step 9 through 11 in Section 4.3.

STEP 9 – Replace the spring plate, spring and restrictor can following Step 6 in Section 4.5.

STEP 10 – Torque all fasteners to values shown in Table 2.

**\*\*IMPORTANT: FAILURE TO CHECK TORQUE MAY LEAD TO FASTENER FAILURE AND CONSEQUENT LOSS OF VEHICLE CONTROL AND VOID WARRANTY.**

## BEAM INSTALLATION



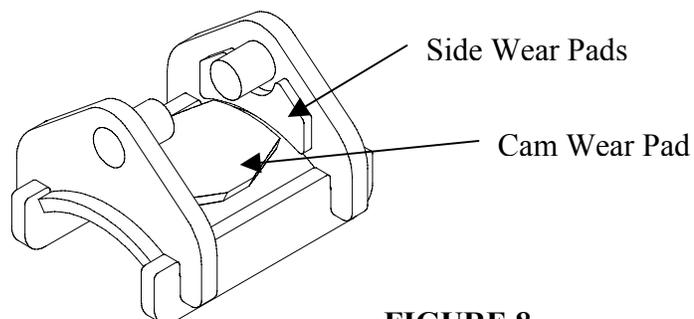
**FIGURE 7**

### 4.10 SADDLE INSPECTION

The Chalmers 800 Series Saddles have been designed with three “wear” pads intended to prolong the life of the Chalmers Walking Beam. See Fig 8. These pads, located below the beam and to each side, are designed to wear down over time and be replaced. The rate of wear on these pads will vary depending on the operating conditions, axle loading and distance travelled.

Chalmers recommends inspecting the saddles for pad wear at the intervals shown in Section 3.0 Service Inspection Requirements and any time the beam is removed from the suspension.

Inspect the pads on all four saddles looking for wear. Pads which have wear that exceeds  $\frac{1}{2}$  of the pad material thickness should be replaced. Instructions for the replacement and welding of new pads are found in Appendix “C”.



**FIGURE 8**

#### 4.11 RUBBER SPRING INSPECTION

The Chalmers patented rubber springs used in the 800 Series Suspensions are manufactured to very exacting standards from a high quality natural rubber compound, and in the vast majority of cases will last the life of the vehicle.

The rubber springs are factory matched to the capacity of the suspension to provide the best ride possible. Three sizes are used in the 800 Series and are shown in Table 4.

**TABLE 4**

| CAPACITY                    | SPRING SIZE | PART NUMBER |
|-----------------------------|-------------|-------------|
| 36,000 lbs.                 | #15         | 15015       |
| 40,000 lbs. to 58,000 lbs.  | #20         | 15002       |
| 65,000 lbs. to 100,000 lbs. | #26         | 15026       |

Under normal operation, the Chalmers rubber springs do not require periodic maintenance or replacement. Minor scrubbing from the restrictor can is normal. The springs also lose a little in overall height due to compression set. This reduction in height occurs in the first few loads, making an in-service spring shorter than a new spring.

To reduce the chances of prematurely replacing a good spring, the following steps should be used when inspecting all Chalmers rubber springs.

**STEP 1** – If possible, power wash the restrictor can spring area. As a minimum, brush the area with a hard bristle brush to remove road dirt accumulations.

**STEP 2** – Chock the front tires to prevent the vehicle from moving. Lift the rear of the vehicle, support the frame on stands so all the weight is just taken off the suspension.

**NOTE:** All stands and lifting devices **MUST** be of sufficient strength and rigidity to safely support the vehicle. **DO NOT WORK AROUND OR UNDER THE VEHICLE WHEN SUPPORTED ON LIFTING DEVICES.**

**STEP 3** – Rotate the spring completely around, looking at the rubber spring below the restrictor can for deep cuts, severe distortion, and signs of chemical attack leaving the surface sticky or dry cracked.

If severe distortion is noticed, contact Chalmers for details.

**NOTICE:** Should a damaged spring be found during vehicle operation, it may be driven **SLOWLY** to its maintenance shop for spring replacement. Springs may be replaced in ones; they do not require replacing in sets. Failure to replace a damaged spring may lead to a hard ride or vehicle control problems with consequent vehicle damage.

#### 4.12 RUBBER SPRING REPLACEMENT

Replacement of Chalmers rubber springs may be achieved easily and quickly in any shop, without the use of special tools, using the following steps as a guide.

STEP 1 – If possible, power wash the restrictor can spring area. As a minimum, brush the area with a hard bristle brush to remove road dirt accumulations.

STEP 2 – Chock the front tires to prevent the vehicle from moving. Lift the rear of the vehicle, support the frame on stands so all weight is just taken off the suspension.

NOTE: All stands and lifting devices **MUST** be of sufficient strength and rigidity to safely support the vehicle. **DO NOT WORK AROUND OR UNDER THE VEHICLE WHEN SUPPORTED ON LIFTING DEVICES.**

STEP 3 – Remove the 5/8” NC fasteners holding the lower spring plate to the beam. Discard the fasteners. Pull the lower spring plate, spring and restrictor can, as one assembly outward off the beam. See Fig.5.

STEP 4 – Separate the restrictor can, spring and lower spring plate. Discard the rubber spring. Using a wire brush or scraper clean all rust, scale and road dirt accumulations from the spring plate. Clean out the centre vent holes in the beam and lower spring. See Fig.5. Inspect the lower spring plate for visual cracks. If cracked, replace. Contact Chalmers for details.

STEP 5 – Place the new spring on the lower spring plate, inserting the spring dowel into the centre spring hole. Place the restrictor can over the spring. Make sure the can centre locator is in the centre spring hole. See Fig.5.

STEP 6 – Lift and place, as one assembly, the lower spring plate, spring and restrictor can onto the beam. Line up the 5/8” fastener holes.

STEP 7 – Install and tighten the new 5/8” NC spring plate fasteners. Torque to 135 ft. lbs. See Table 2.

#### 5.0 AXLE ALIGNMENT

The 800 Series Tandem Suspension uses four torque rods for each axle. These torque rods are the **ONLY** parts in the suspension that affect the location or alignment of each axle.

The four (2 per axle) top vee torque rods, set the axle spread, side to side centre and axle operating planning angle. They are factory set and play **NO** part in the alignment process. See Fig.4.

The four (2 per axle) bottom torque rods set the axle spread, axle operating angle, and axle alignment. These rods are the **ONLY** means of making periodic adjustments for axle alignments. See Fig.4.

The Chalmers 800 Series Suspension allows for the precision alignment of each axle by the use of fine threads cut into the bottom torque rod tubes. These rods incorporate left and right hand cut threads on the same tube, thus by rotating the tube, the rod length may be increased or decreased (within the limit of the rod) to achieve the desired alignment.

To accommodate all suspension capacities, Chalmers uses two sizes of torque rods and tubes. See Table 5.

**TABLE 5**

| <b>CAPACITY</b>               | <b>TORQUE ROD SIZE</b> | <b>DIAMETER</b>      |
|-------------------------------|------------------------|----------------------|
| 60,000 lbs. to<br>80,000 lbs. | #2                     | 2-7/8" Outside Dia.  |
| 100,000 lbs.                  | #2                     | 2-7/8" Outside Dia.* |
| 1000,000 lbs.                 | #2                     | 3" Outside Dia. **   |

\* Upper Torque Rods

\*\* Lower Torque Rods

## **5.1 AXLE MEASUREMENT**

Measurement and alignment of a vehicle fitted with a Chalmers 800 Series Tandem Suspension may be done with any of the commercially available alignment systems. If this type of specialized equipment is not available, alignment may be carried out using a tape measure and plumb bob.

No matter which method is used, due to the compressible design of the Chalmers rubber torque rod bushing, ALL measurements and adjustments MUST be made with the bushings in a neutral, fully relaxed state. Any compression remaining in the suspension will result in false readings or measurements and will lead to a misalignment being carried out. To reduce the chances of this happening, the following steps should be carried out prior to measurement and/or alignment.

STEP 1 – To remove any cornering compression, either drive the vehicle back and forth a few times or, if this is not possible, lift the rear of the vehicle so all the load is just off the suspension. Hold for a few minutes, and then lower down. **Do not set park brake.**

**DO NOT AT ANY TIME WORK AROUND OR UNDER A VEHICLE SUPPORTED ONLY ON LIFTING DEVICES. THE VEHICLE MUST BE SECURELY CHOCKED AND SUPPORTED ON RIGID STANDS BEFORE WORK MAY COMMENCE.**

STEP 2 – Chock the front tires to prevent the vehicle from moving. Remove all drive axle loads by placing transmission in neutral and releasing the spring or driveline brakes.

STEP 3 – Using a relevant alignment system and following all the manufacturers operating and safety instructions, take measurements of the axle alignment. Compare these to the vehicle manufacturers specification. If none are available, the following may be used as a guide:

For Hunter type equipment - .08 deg. Max thrust angle.

Rear axle for Bee Line type equipment -  $\pm 3/8$  off centre (290" from target)  
-  $\pm 1/4$  off centre (190" from target)

The front rear and rear rear axle must **“TRAM “** to  $\pm 1/16$ ” side-to-side.

STEP 4 – Use only when no alignment systems are available.

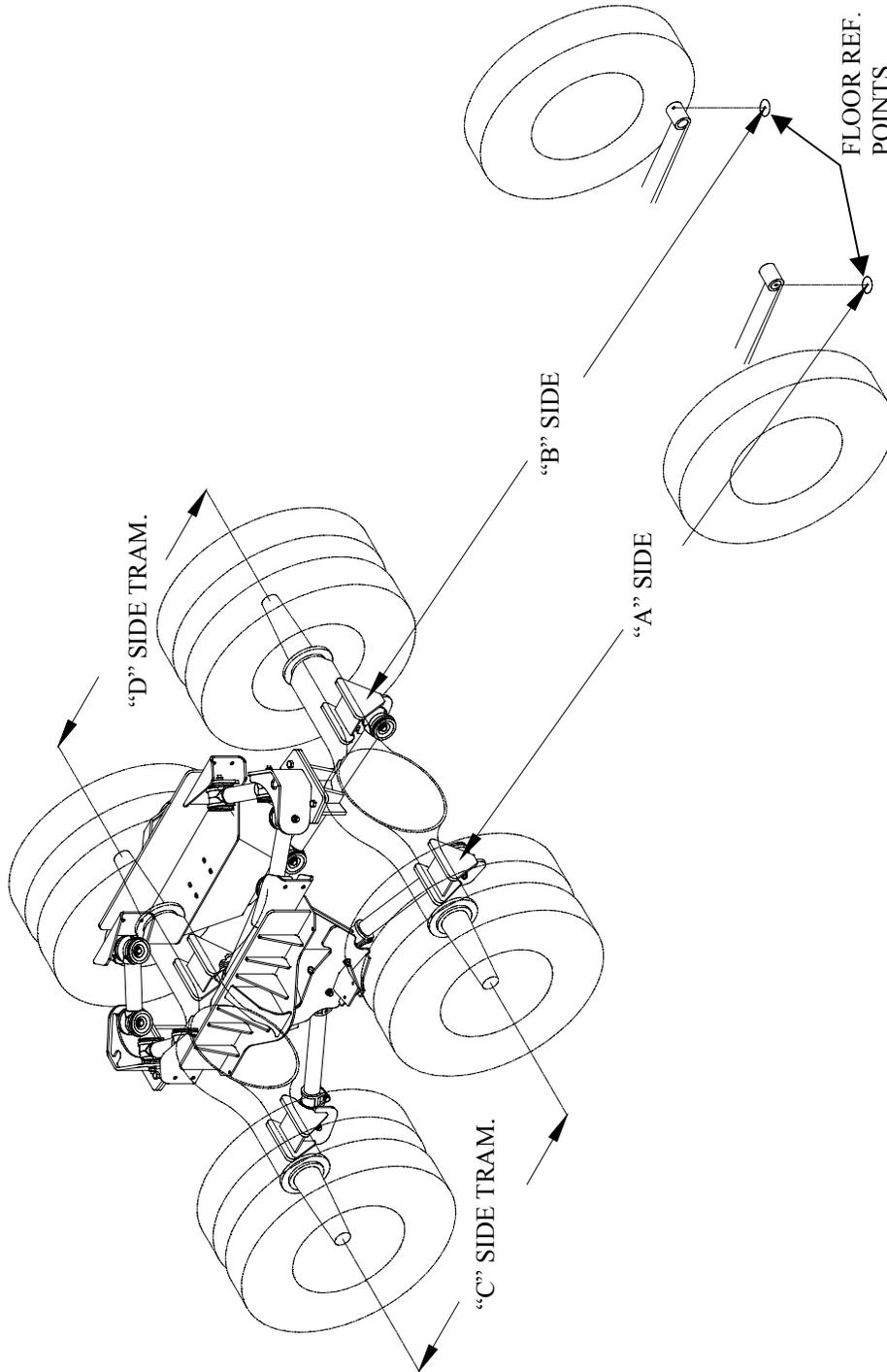
Locate the grease fitting on the FRONT spring eye pin (steering axle). Attach a plumb bob to this fitting so the point is just above the floor. Mark the floor right under the bob point. Repeat this procedure for the other pin. This now gives two fixed measuring points that are referenced off the vehicle frame. See Fig.9.

NOTE: Make sure to wrap the plumb bob string in the same direction on both grease fittings (ensuring that the plumb bob string hangs in an identical manner on both sides).

With a good quality tape, measure the distance from the front axle floor fixed points to the front flange on the torque rod axle brackets. See Fig.9. Repeat for other side.

Now do side-to-side axle “TRAM”. Compare these dimensions. For the axles to be in alignment ALL of the dimensions MUST be within  $\pm 1/16$ ”. See Fig.9.

**AXLE ALIGNMENT ( NO ALIGNMENT SYSTEM )**



**FOR COMPLETE AXLE ALIGNMENT**  
"A" Side measurement must equal "B" Side measurement to within 1/16" (1.5mm)  
"C" Side TRAM measurement must equal "D" Side TRAM measurement to within 1/16" (1.5mm)

**FIGURE 9**

## 5.2 AXLE ALIGNMENT ADJUSTMENTS

Should the results of Step 3 or 4 from Section 5.1 show that the axles are not within either the vehicle manufacturers specifications or the Chalmers recommended guidelines, an axle adjustment will be required. This may be done without the use of any special tools using the following steps as a guide.

STEP 1 – If the vehicle has been moved after measurement, then the bushings **MUST** be neutralized, and if a tape measurement is to be used, reference points marked. See Section 5.1, Steps 1 through 4.

STEP 2 – Working on the axle to be adjusted and on **ONLY ONE** torque rod at a time, loosen the lower torque rod eye pinch bolts (both ends). See Fig.10.

NOTE: If the pinch bolt fasteners are badly corroded or damaged, replace with **NEW** hardware.

STEP 3 – Attach a pipe wrench to the torque rod tube. (A chain type wrench preferred). Rotate this tube to either lengthen or shorten the torque rod. Continue this process until the axle is within alignment specification referred to in Section 5.1, Steps 3 or 4.

NOTE: If difficulty is encountered rotating the tube, the threaded ends may have become corroded. Apply a quality penetrating oil to the threads. If difficulty is still encountered, wedges may be driven between the eye lugs to remove the clamp effect.

Before retightening the torque rod pinch bolts, visually check the rubber bushings. They should appear even around the eye with **NO** distortion. If distortion is seen, neutralize the bushing and re-measure.

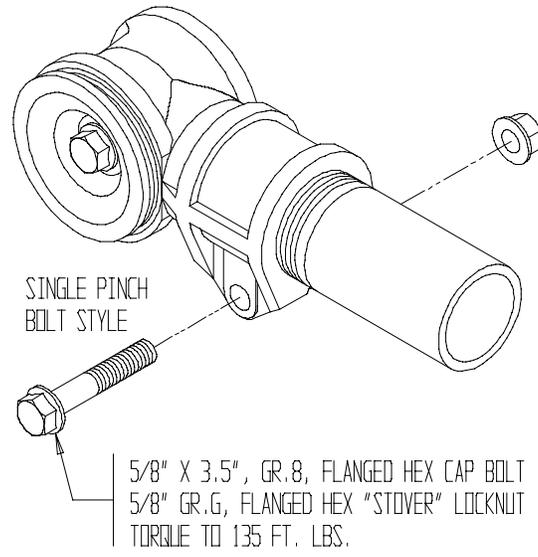
STEP 4 – Tighten and torque the eye pinch bolts. If the bolts are corroded or damaged, replace with **NEW** fasteners. See Fig.10.

Torque 5/8” NC fasteners to 135 ft. lbs. See Table 2.

STEP 5 – Repeat Steps 1 through 3 to complete alignment.

STEP 6 – Torque **ALL** fasteners to values shown on Table 2.

**IMPORTANT: FAILURE TO CHECK TORQUE MAY LEAD TO FASTENER FAILURE AND CONSEQUENT LOSS OF VEHICLE CONTROL AND VOID WARRANTY.**



**FIGURE 10**

## 6.0 TROUBLE SHOOTING

| <b>PROBLEM</b>                                   | <b>POSSIBLE CAUSE AND CORRECTION</b>   |
|--|--|
| Loose Spigot Caps                                | <p><b>(Fasteners Not Torqued Properly)</b><br/>Re-torque to 135 ft. lbs. And re-check at 1,600 km/1,000 miles. If repeated loosening occurs, replace fasteners &amp; spigot cap if required. Torque to 135 ft. lbs. And re-check at 1,600 km/1,000 miles. See Sections 4.6 &amp; 4.7.</p>  |
| Prematurely Loose or Worn Bushings               | <p><b>(Chemical Attack, Petroleum Products or Worn Bushings Used in Installation or Cleaning)</b><br/>Remove all traces of petroleum products and re-bush.<br/>See Sections 4.2 &amp; 4.3.</p> <p><b>(Hard Part Wear)</b><br/>Re-Bush using oversize bushings, see Sections 4.2 &amp; 4.3.</p> <p><b>(Spigot Cap and/or Fasteners Loose)</b><br/>Re-Bush and torque check to 135 ft. lbs. See Sections 4.2, 4.3 &amp; Table 2.</p> |
| Adjustable Torque Rod Tube Pull Out or Back Off. | <p><b>(Eye Pinch Bolts Not Torqued Properly)</b><br/>Replace torque rod and torque check pinch bolts. See Table 2.</p>   |
| Walking Beam Touching Hanger Bracket Assembly    | <p><b>(Worn or Loose Upper Torque Rod Bushings)</b><br/>Re-Bush upper torque rods. See Sections 4.2 &amp; 4.3.</p>   |
| Premature Beam End Wear                          | <p><b>(Wet Highly Abrasive Road Conditions)</b><br/>Add wear pads to beam or replace beam. See Sections 4.8 &amp; 4.9.</p>   |
| Excessive Tire Wear                              | <p><b>(Axles Out of Align)</b><br/>Re-Align. See Sections 5.1 &amp; 5.2.</p> <p><b>(Tire Pressure)</b><br/>Check tire pressure and inflate to manufactures specification.</p>  |
| Excessive Axle Movement                          | <p><b>(Worn Bushings)</b><br/>Re-Bush. See Sections 4.2 &amp; 4.3</p> <p><b>(Adjustable Torque Rod Pull Out)</b><br/>Replace torque rod and torque check pinch bolts. See Table 2.</p>   |
| Excessive Wheel Bounce or Hop                    | <p><b>(No Shocks Fitted)</b><br/>Install shock kit.</p> <p><b>(Tire Pressure)</b><br/>Check tire pressure, balance, and inflate to manufacturers specifications.</p>   |

| <b>PROBLEM</b>                  | <b>POSSIBLE CAUSE AND CORRECTION</b>   |
|---------------------------------|--|
| Vehicle Does Not Sit Level      | <p><b>(Broken or Missing Restrictor Can)</b><br/>Replace both restrictor cans. See Sections 4.4. &amp; 4.5.</p> <p><b>(Damaged Spring)</b><br/>Replace spring. See Sections 4.11 &amp; 4.12.</p> <p><b>(Damaged Walking Beam)</b><br/>Replace walking beam. See Sections 4.9.</p> <p><b>(In a New Vehicle High/Low Beam Installation Problem)</b><br/>Replace incorrect beam.</p>  |
| Vehicle Unstable Rolls          | <p><b>(Broken or Missing Restrictor Can)</b><br/>Replace both restrictor cans. See Sections 4.4 &amp; 4.5.</p> <p><b>(Damaged Spring)</b><br/>Replace spring. See Sections 4.11 &amp; 4.12.</p>  |
| Vehicles Rides Excessively Hard | <p><b>(Tire Pressure)</b><br/>Check tire pressure and inflate to manufacturers specifications.</p> <p><b>(Damaged Spring)</b><br/>Replace spring. See Sections 4.11. &amp; 4.12.</p> <p><b>(Insufficient Clearance Between Beam Stop and Beam)</b><br/>Replace with correct length stop.</p>   |
| Vehicle Handles Poorly          | <p><b>(Tire Pressure)</b><br/>Check tire pressure and inflate to manufacturers specification.</p> <p><b>(Axles Out of Align)</b><br/>Re-align. See Sections 5.1 5.2.</p> <p><b>(Worn Bushings)</b><br/>Re-bush. See Sections 4.2 &amp; 4.3</p> <p><b>(Broken or Missing Restrictor Can)</b><br/>Replace both restrictor cans. See Sections 4.4 &amp; 4.5.</p> <p><b>(Damaged Spring)</b><br/>Replace spring. See Sections 4.11 &amp; 4.12.</p> <p><b>(Insufficient Beam Stop/Beam Clearance)</b><br/>Replace with correct length stop.</p> |

**TABLE 6**                      **SPIGOT WEAR LIMITS**

| ITEM | PART NO. | SPIGOT                  | WEAR LIMIT FOR<br>STANDARD BUSHING |                   | WEAR LIMIT FOR<br>OVERSIZE BUSHING |                    |
|------|----------|-------------------------|------------------------------------|-------------------|------------------------------------|--------------------|
| 1    | 800021   | Spigot #2               | 2.530"<br>Min.                     | 800010<br>Bushing | 2.530" Max                         | 800009*<br>Bushing |
| 4    | 02P00141 | Spigot #2<br>Heavy Duty | 2.530"<br>Min.                     | 800010<br>Bushing | 2.530" Max                         | 800009*<br>Bushing |

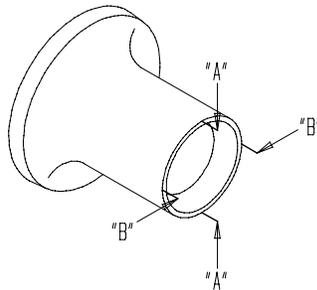
\*SERVICE BUSHING

**WEAR MEASUREMENT**

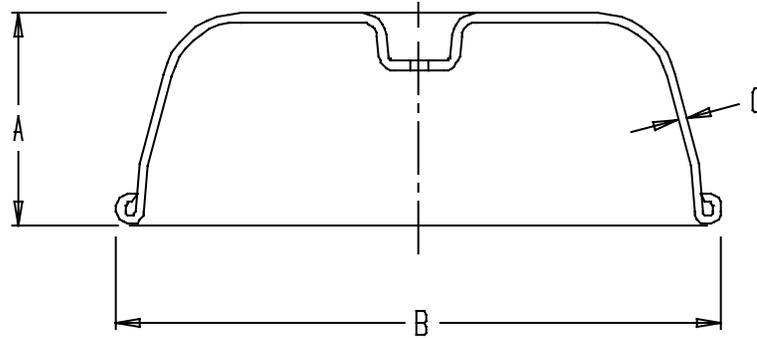
To determine wear take two measurements 90 deg. apart "A-A" and "B-B" as shown, or measure over visible wear area.

The smaller of the two dimensions is to be taken as the wear limit. See Table 6 for values.

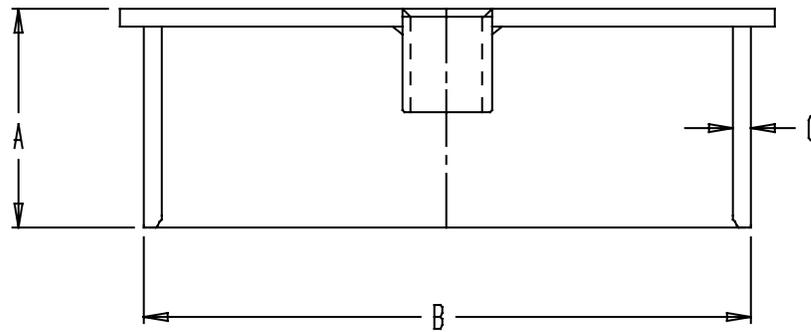
**NOTE:** If spigot is below min. dimension shown in Oversize Table, contact Chalmers for guidelines.

**#2 Joint**

800 Series Tandem Truck 60,000  
to 100,000 lbs Capacity

**APPENDIX "A"****Restrictor Can Available and Application Chart**

65,000 lbs to 80,000 lbs Style



100,000 lbs Style

**TRUCK SUSPENSION MODEL**

| <b>Restrictor Can#</b> | <b>Part No.</b> | <b>A</b> | <b>B</b> | <b>C</b> | <b>Usage by Model/Capacity</b>  | <b>Standard Optional</b> | <b>Comments</b> |
|------------------------|-----------------|----------|----------|----------|---------------------------------|--------------------------|-----------------|
| 26                     | 373032          | 4.44"    | 14.19"   | 0.188"   | 800-XX Series<br>65-80,000 lbs. | Std.                     | Tandem Axle     |
| 26 HD                  | 07S00001        | 4.62"    | 12.00"   | 0.38"    | 800-XX Series<br>100,000 lbs.   | Std.                     | Tandem Axle     |

## APPENDIX “B”

### **REPAIR & WELD INSTRUCTIONS** **Walking Beam Ends**

#### 1.0 Scope:

- 1.1 This procedure shall be used when repairing and welding Chalmers Suspensions International Inc. walking beam-ends.

#### 2.0 Safety:

- 2.1 The following safety instructions must be read and followed. Failure to do so could lead to serious injury or possible loss of life.
- 2.2 Prior to any work commencing on the vehicle, the cargo compartments and delivery systems must contain a non-explosive and non-toxic atmosphere.
- 2.3 Any stands or jacks used to support or lift the vehicle must be of sufficient capacity to do so with adequate safety margins. Do not work under the vehicle when supported by jacks only.
- 2.4 All welding equipment and power tools must be used in and according to the manufacturer's safety and operating instructions.

#### 3.0 General Instructions:

- 3.1 MATERIAL CLEANING – all material shall be free from loose scale, slag, oil, rust and other foreign material.
- 3.2 JOINT PREPARATION – joint surfaces shall be free from loose scale and rust. Burned surfaces shall be smooth within 1/32”.
- 3.3 TACK WELD – use appropriate size electrode and same type as specified below. Employ corresponding weld data from chart below.
- 3.4 PREHEAT weld joint area as specified in 4.0.
- 3.5 CLEAN all slag and spatter between passes.

#### 4.0 Welding Process(es):

- 4.1 USE REVERSE POLARITY – electrode positive.
- 4.2 WELDING SPEED shown is the ABSOLUTE MINIMUM. DO NOT WELD SLOWER.
- 4.3 THICKNESS in between those specified on the chart, use data from column of next smaller weld size.

## 4.4 MANUAL SHIELDED ARC PROCESS:

|                      |      |      |
|----------------------|------|------|
| Thickness            | 1/4" | 3/8" |
| Type                 | 7018 | 7018 |
| Electrode Size       | 1/8" | 1/8" |
| Amperage             | 130  | 130  |
| Voltage              | 22   | 22   |
| Weld Speed<br>I.P.M. | 9    | 6    |

Preheat to room temperature, 70 – 110 deg.F.  
Number of passes depends on type and size of joint.

## 4.5 METAL – INERT GAS PROCESS:

|                      |       |       |
|----------------------|-------|-------|
| Thickness            | 1/4"  | 3/8"  |
| Type                 | E70T1 | E70T1 |
| Electrode Size       | 1/16" | 5/64" |
| Amperage             | 250   | 350   |
| Voltage              | 28    | 26    |
| Weld Speed<br>I.P.M. | 20    | 19    |

Preheat to room temperature, 70-100 deg. F.  
Number of passes depends on size of joint.

4.6 ELECTRODE WIRE – use E70T1 electrode wire or equivalent.

4.7 COVER GAS – use welding grade C02 cover gas (Minimum Dew Point – 50), or 95Ar-5C02.

4.8 REGULAR SETTING – 35-48 cu.ft. per hour.

5.0 Welding Sequence:

5.1 PREHEAT to temperature as specified in Section 4.0.

5.2 CHIP AND BRUSH all slag and spatter between passes, grind out all defects.

6.0 Inspection:

6.1 Visually inspect every completed row.

7.0 Repair:

7.1 Prior to any repair work, read all safety notes in Section 2.0.

7.2 Prior to any installation, support the vehicle on stands, apply brakes and block wheels.

7.3 Prior to any welding, read all general notes and welding process in Sections 3.0, 4.0, 5.0 and 6.0.

7.4 Remove both beams from the suspension; clean and inspect.

7.5 Inspect beam-ends for cracks. Only cracks in or through the web and stop plate may be repaired. Any cracks that propagate into or through the flanges may not be repaired and the beam must be replaced. See Fig.1.

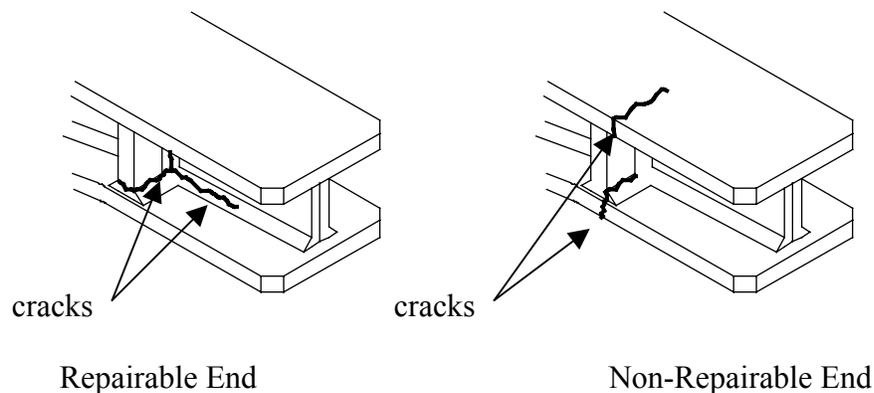
7.6 Grind or air-arc out the crack areas. Do not cut into the flanges.

7.7 Reweld beam end web and stop plates. Build welds to 1/4" minimum, 5/16" maximum fillets.

7.8 Prime and repaint reworked areas.

7.9 Reinstall beams into suspensions. Check all bolts for correct torque. See Technical Service Bulletin #8018.

7.10 Remove all stands and wheel blocks.



**Figure 1**

**APPENDIX “C”****REPLACEMENT & WELD INSTRUCTIONS  
Saddle Wear Pads****1.0 Scope:**

- 1.1 This procedure shall be used when replacing and welding Chalmers Suspensions International Inc. saddle wear pads.

**2.0 Safety:**

- 2.1 The following safety instructions must be read and followed. Failure to do so could lead to serious injury or possible loss of life.
- 2.2 Prior to any work commencing on the vehicle, the cargo compartments and delivery systems must contain a non-explosive and non-toxic atmosphere.
- 2.3 Any stands or jacks used to support or lift the vehicle must be of sufficient capacity to do so with adequate safety margins. Do not work under the vehicle when supported by jacks only.
- 2.4 All welding equipment and power tools must be used in and according to the manufacturer's safety and operating instructions.

**3.0 General Instructions:**

- 3.1 MATERIAL CLEANING – all material shall be free from loose scale, slag, oil, rust and other foreign material.
- 3.2 JOINT PREPARATION – joint surfaces shall be free from loose scale and rust. Burned surfaces shall be smooth within 1/32”.
- 3.3 TACK WELD – use appropriate size electrode and same type as specified below. Employ corresponding weld data from chart below.
- 3.4 PREHEAT weld joint area as specified in 4.0.
- 3.5 CLEAN all slag and spatter between passes.

**4.0 Welding Process(es):**

- 4.1 USE REVERSE POLARITY – electrode positive.
- 4.2 WELDING SPEED shown is the ABSOLUTE MINIMUM. DO NOT WELD SLOWER.
- 4.3 THICKNESS in between those specified on the chart, use data from column of next smaller weld size.

## 4.4 MANUAL SHIELDED ARC PROCESS:

|                      |      |      |
|----------------------|------|------|
| Thickness            | 1/4" | 3/8" |
| Type                 | 7018 | 7018 |
| Electrode Size       | 1/8" | 1/8" |
| Amperage             | 130  | 130  |
| Voltage              | 22   | 22   |
| Weld Speed<br>I.P.M. | 9    | 6    |

Preheat to room temperature, 70 – 110 deg.F.  
Number of passes depends on type and size of joint.

## 4.5 METAL – INERT GAS PROCESS:

|                      |       |       |
|----------------------|-------|-------|
| Thickness            | 1/4"  | 3/8"  |
| Type                 | E70T1 | E70T1 |
| Electrode Size       | 1/16" | 5/64" |
| Amperage             | 250   | 350   |
| Voltage              | 28    | 26    |
| Weld Speed<br>I.P.M. | 20    | 19    |

Preheat to room temperature, 70-100 deg. F.  
Number of passes depends on size of joint.

4.6 ELECTRODE WIRE – use E70T1 electrode wire or equivalent.

4.7 COVER GAS – use welding grade C02 cover gas (Minimum Dew Point – 50), or 95Ar-5C02.

4.8 REGULAR SETTING – 35-48 cu.ft. per hour.

5.0 Welding Sequence:

5.1 PREHEAT to temperature as specified in Section 4.0.

5.2 CHIP AND BRUSH all slag and spatter between passes, grind out all defects.

## 6.0 Inspection:

6.1 Visually inspect every completed row.

## 7.0 Repair:

7.1 Prior to any repair work, read all safety notes in Section 2.0.

7.2 Prior to any installation, support the vehicle on stands, apply brakes and block wheels.

7.3 Prior to any welding, read all general notes and welding process in Sections 3.0, 4.0, 5.0 and 6.0.

7.4 Remove beam(s) from the suspension; clean and inspect.

7.5 Clean saddle(s) prior to beginning any work.

7.6 Grind or air-arc out the welds securing the wear pad plates to the saddle. Take special care not to damage the actual saddle assembly.

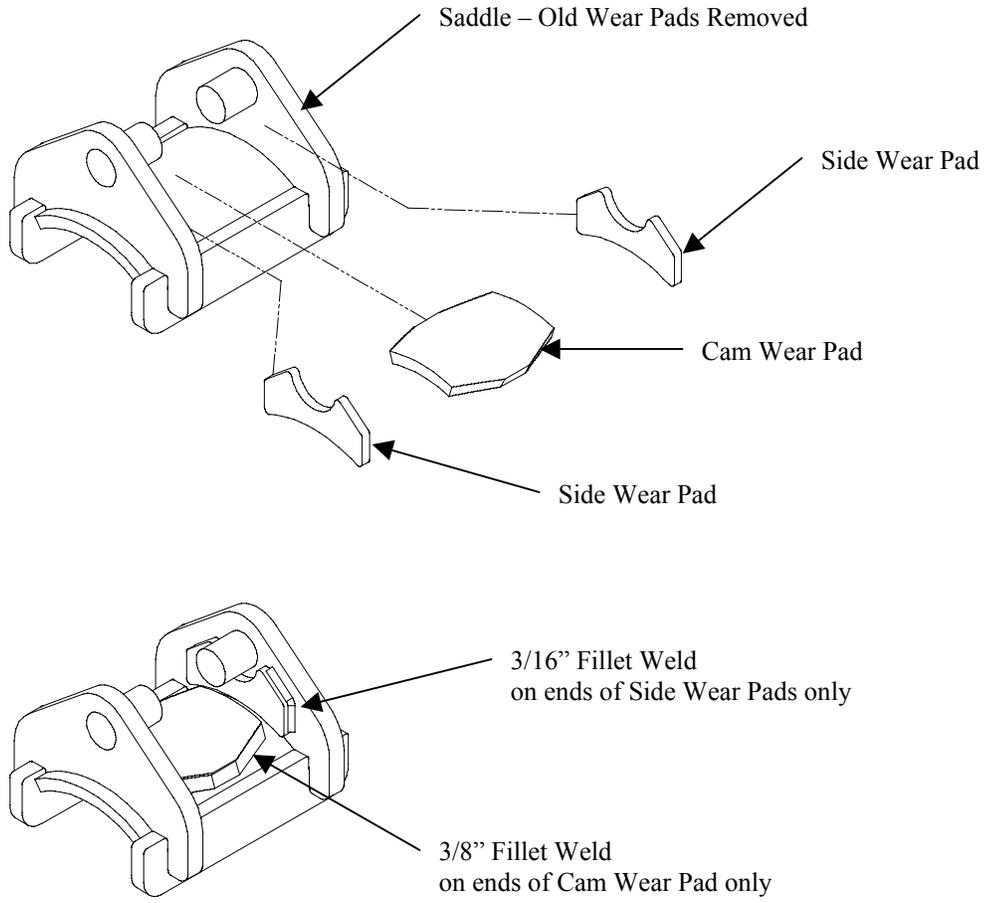
7.7 Grind and prep the wear pad locations prior to install the replacement pads. Again take care not to cut into the saddle assembly.

7.8 Install the new plates, welding should only occur at the ends of the plates so they may be easily removed should they require replacement. See Fig. 1.

7.9 Prime and repaint reworked areas.

7.10 Reinstall beams into suspensions. Check all bolts for correct torque. See Technical Service Bulletin #8018.

7.11 Remove all stands and wheel blocks.



**Figure 1**