



QS 9000 Registered

# **800 SERIES SERVICE MANUAL**

**40,000 – 58,000 LB**

**PART# EDOC001**

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*OUR EDGE IS OUR PRODUCT*

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## 1.0 GENERAL INFORMATION

This manual is to be used for the service of a Chalmers 800 Series Tandem Suspension 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 sawhorse 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 also available in three different axle spacings: 54-inch, 60-inch and 72-inch axle-to-axle. The axle-to-axle spacing dimension is included as part of the suspension name, e.g. "Chalmers 854 Suspension" or "Chalmers 860 Suspension."

Shock absorbers are optional on all versions of the suspension, and available in two styles – beam mounted and axle housing mounted.

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.1 shows an exploded view of a typical 800 Series Suspension.

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

### SUSPENSION NOMENCLATURE

ITEM	DESCRIPTION
1	TRIANGULAR FRAME
2	BEAM
3	BEAM SPRING PLATE
4	#20 LOADGUARD SPRING
5	#28 RESTRICTOR CAN
6	UPPER TORQUE ROD
7	LOWER T/ROD FIXED
8	LOWER T/ROD ADJUSTABLE
9	LOWER T/ROD FIXED
10	LOWER T/ROD ADJUSTABLE
11	TORQUE ROD FRAME BRKTS
12	SPIGOT CAP #1 JOINT
13	TORQUE ROD BUSHING
14	TOWER PLUG
15	UPPER SHOCK BRACKET
16	SHOCK ABS/REBOUND STOP
17	TOWER FORWARD
18	TOWER REAR
19	SADDLE LOW
20	SADDLE HIGH
21	TORQUE ROD BRKT - LHF/RHR
22	TORQUE ROD BRKT - RH/FLR
23	HEX CAP BOLT, FLDG
24	STOVER LOCKNUT, FLDG
25	HEX CAP BOLT, FLDG
26	STOVER LOCKNUT, FLDG
27	HEX CAP BOLT, FLDG
28	STOVER LOCKNUT, FLDG

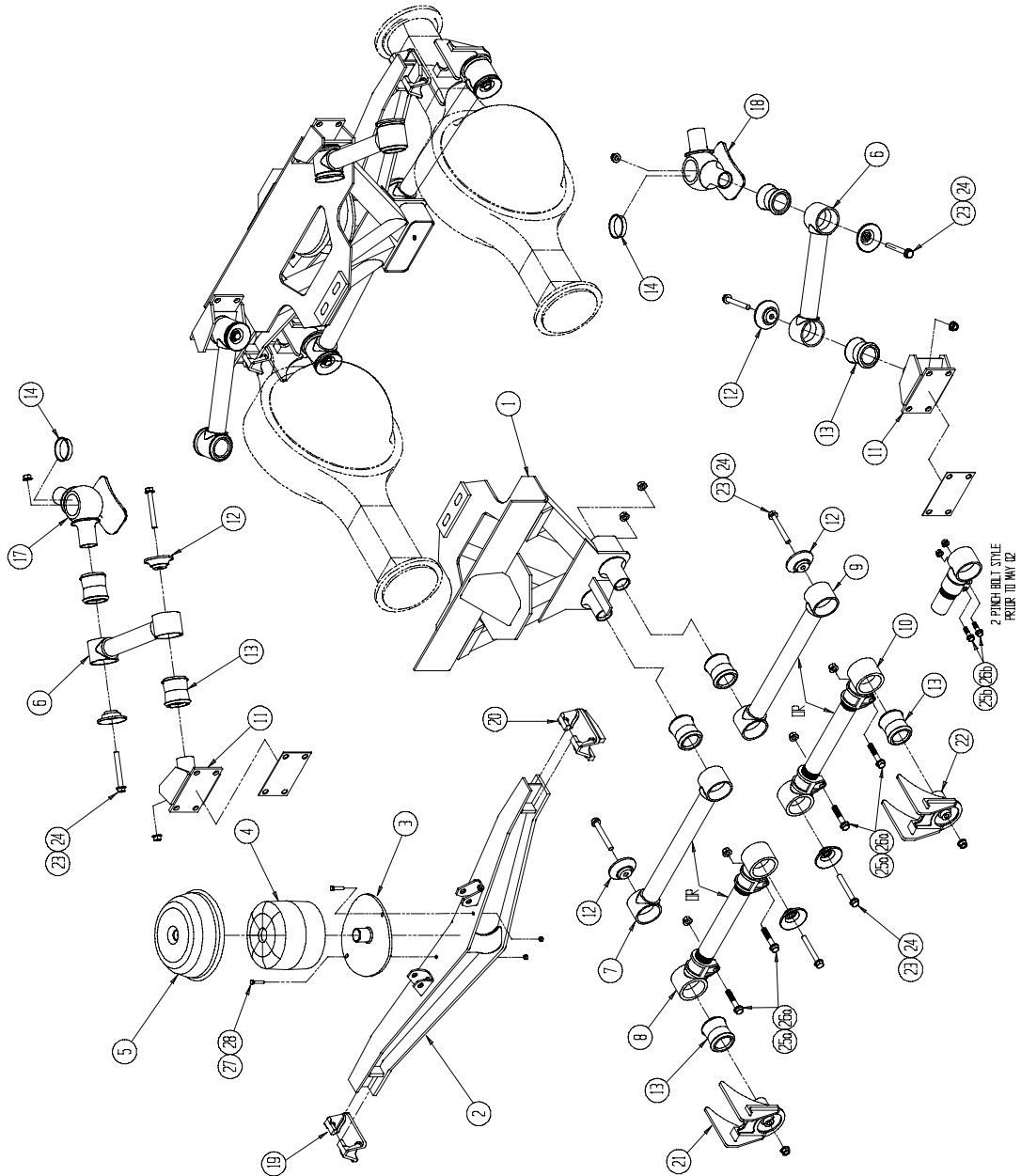


FIGURE 1

### 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 1600 KM	DLY	MTH	YRLY
All Hardware	Check torque to values shown on Table 2.  On the daily walk around Visually inspect for looseness.	•	•			•
Torque Rod Bushing	Wear check. See Section 4.2 for guidelines.  Visually inspect for tears or cracks.  Visually inspect for correct installation. See Sections 4.2 & 4.3 for guidelines.	•	•		• •	
Restrictor Can	Visually inspect for wear or cracking. Replace as required. See Sections 4.4 & 4.5 for guidelines.  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 1600 KM	DLY	MTH	YRLY
OPTIONAL Shock Absorber (if fitted)	Visually inspect for leaks, cylinder damage or worn rubber end bushings. Verify inspection schedules. See Sections 4.8 & 4.9 for guidelines				•	•
Walking Beam	Inspect for wear and cracks. See Sections 4.10 & 4.11 for guidelines.  Inspect for beam free float in axle saddles, 1.25" (32mm) fore and aft. .25" (6mm) side to side. See Section 4.10.	•				•
Axle Bracket, Triangular Frame	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 4.12 & 4.13 for guidelines.  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
7/8" Dia.	46,000 to 58,000	Shock Absorber Option Frame to Axle
3/4" Dia.	40,000 to 58,000	Shock Absorber Option Frame to Beam
5/8" Dia.	40,000 to 58,000	ALL Torque Rod Joints & Torque Rod Eye Pinch Bolts*
1/2" Dia.	40,000	Torque Rod Eye Pinch Bolts **
3/8" Dia.	40,000 to 58,000	ALL Spring Plates To Beams

\* Single pinch bolt style

\*\* Double 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"	170*
7/8"	170*

\* Values for shock installation only. 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. To accommodate the full range of suspension capacities, Chalmers has two sizes of bushing. See Fig.2 for details. Both bushings are similar and they both 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:

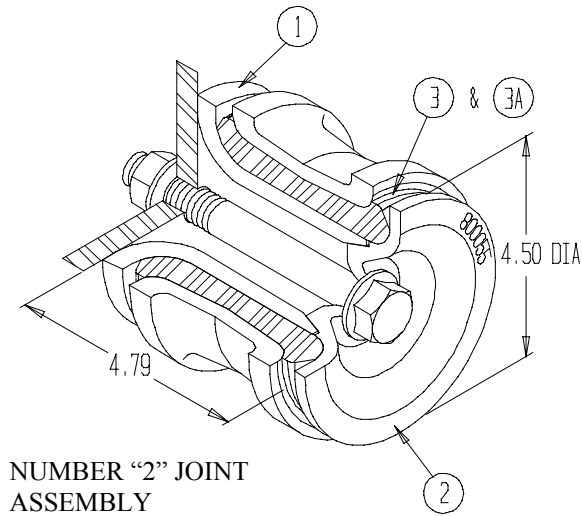
**STEP 1** - If possible power wash the torque rod ends. As a minimum, the ends should be brushed with a hard bristle brush to remove road dirt accumulations so that the rubber bushing may be seen.

**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.

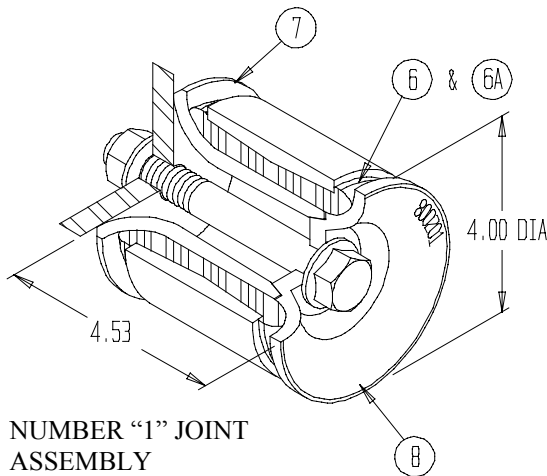
**STEP 3** – **USING HANDS ONLY** attempt to move the torque rod ends, checking for **FREE** play. If free play is felt, the bushing should be replaced. (If in doubt contact Chalmers).

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

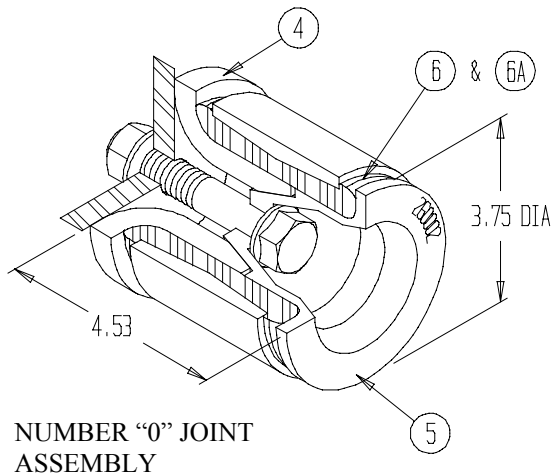
**SPIGOT JOINTS**



NUMBER "2" JOINT ASSEMBLY



NUMBER "1" JOINT ASSEMBLY



NUMBER "0" JOINT ASSEMBLY

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	700096	Spigot Base #0 Joint
5	260002	Spigot Cap #0 Joint
6	22128	T/Rod Bushing #0 & #1 Joint
* 6A	22129	T/Rod Bushing-Oversize #0 & #1 Joint
7	800200	Spigot Base #1 Joint
8	800201	Spigot Cap #1 Joint

\* Service Bushing

#2 Joint  
800 Series Tandem Truck 46-58,000 lbs. Capacity

#1 Joint  
800 Series Tandem Truck 40,000 lbs. Capacity – as of Jan 01/93

#0 Joint  
800 Series Tandem Truck 40,000 lbs. Capacity – prior to Jan 01/93

**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: On the axle towers, pry off the tower plug cap to access the joint nuts. Keep the plug cap.

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

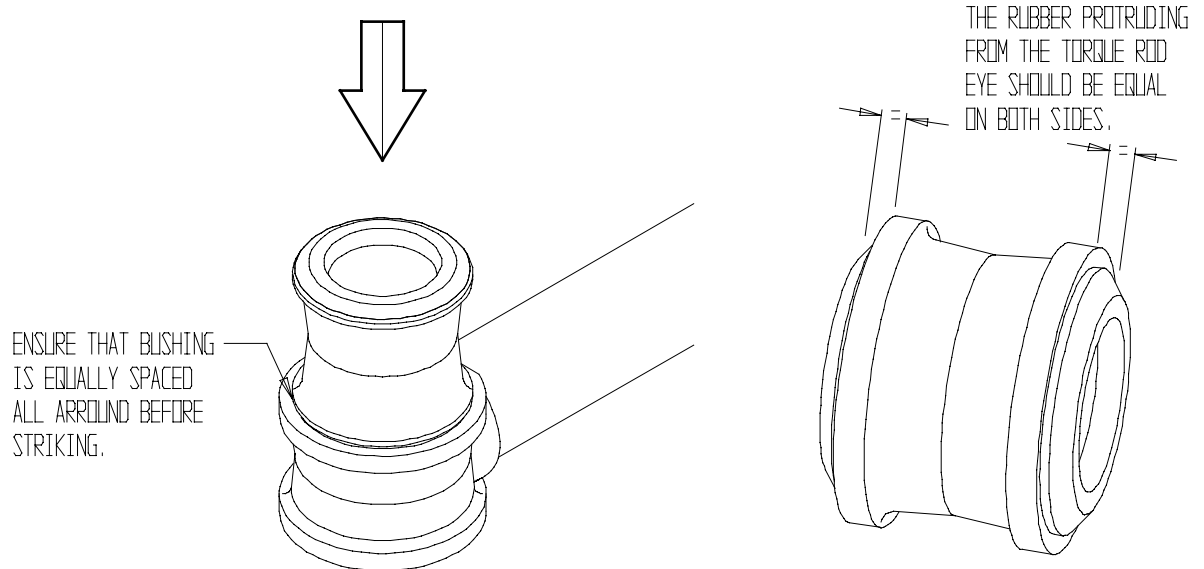
Should the spigot show visual cracks, contact Chalmers for guidelines.

For wear limits, refer to Table 6 and Appendix “A” Service Bulletin Re: Part No. 260002. Chalmers allows for wear in its design by providing oversize replacement bushings for the 40,000 lb. and 46,000 to 58,000 lb. 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.

The 46,000 to 58,000 lbs. Suspension upper rods must be oriented as shown in Fig.4.

































































