Safety Recall

G-–03509

U.S., Export

Date: June, 2003

Subject File: STEERING

Subject: Steering Arm Tapered Bore Oversize

Model: 8600
Start Date: 06/21/2002 End Date: 05/05/2003

DEFECT DESCRIPTION

Print ready (PDF file) copy of the dealer letter

Print ready (PDF file) copy of the customer letter

The tapered bore in the steering arm/steering knuckle assembly was machined too large on some steering knuckles where it connects to the drag link. The clearance between a correctly sized drag link ball stud and the oversized tapered bore is great enough to allow the drag link ball stud to fatigue and break. This condition may also allow the castle nut to back off and shear the cotter pin allowing the drag link to fall off, possibly resulting in **property damage, personal injury, or death.**

MODELS INVOLVED

This campaign covers 8600 models built 6/21/2002 through 5/5/2003 with the following front axle feature codes: 02AGG, 02AGE, and 02AGB.
OWNER NOTIFICATION

International Truck and Engine Corporation will notify owners of these vehicles about this campaign. During the recall process a listing of owner names and addresses will be furnished to the involved dealers to enable dealers to follow up with owners and have the vehicles corrected. You must limit the use of this listing to this campaign, because the list may contain information obtained from state motor vehicle registration records and the use of such motor vehicle registration data for purposes other than this campaign is a violation of law in several states.

SERVICE PROCEDURE

NOTE – This Recall has two procedures: an INSPECTION PROCEDURE and a REPAIR PROCEDURE. Please perform Inspection Procedure first to determine if Repair Procedure is required.

Inspection Procedure

Before performing the inspection, please read and understand the following instructions completely.

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SERVICE PROCEDURE (CONT.)

⚠ WARNING – To prevent serious eye injury, always wear safe eye protection when you perform vehicle maintenance or service.

1. Set parking brake and block rear wheels to prevent vehicle from moving.

2. Raise the front axle and position vehicle on floor stand(s).

⚠ WARNING – A jack must never be used alone to support vehicle while under-chassis service is being performed. The jack may lower and serious personal injury could result. Always support vehicle with floor stands.

3. Turn steering wheel to the right, to gain access to steering arm for inspection.

VISUAL INSPECTION

Please use the following method of visual inspection. If, by this method, it cannot be determined if the Repair Procedure is required, continue on to use the DIAL INDICATOR INSPECTION procedure.

4. Inspect the position of the castle nut relative to the cotter pin hole in the drag link ball stud. If the cotter pin hole in the drag link ball stud is above the top of the castle nut (as shown in figure 1) the **steering knuckle needs to be replaced**.

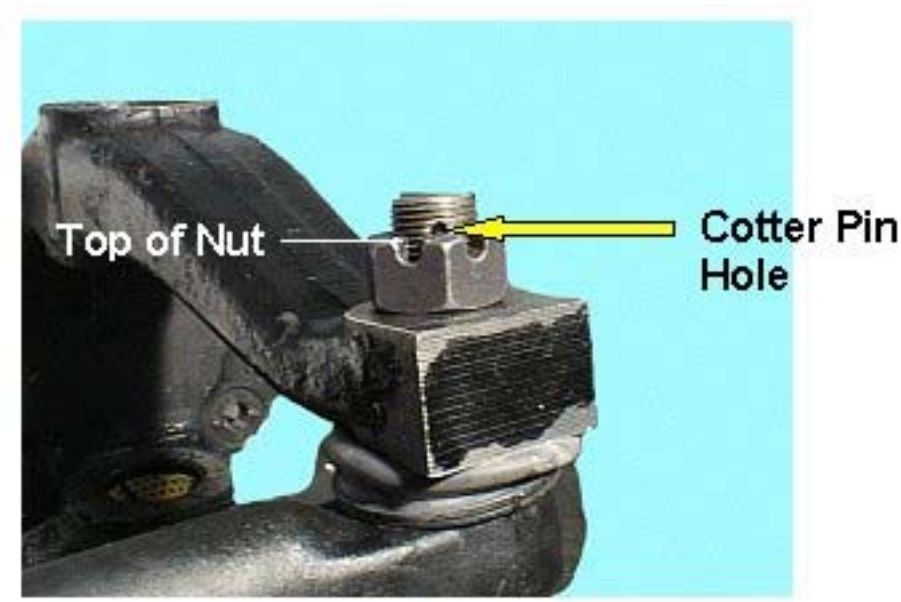


Figure 1 Figure 1

SERVICE PROCEDURE (CONT.)

5. While applying an upward force to the drag link, determine if there is a gap between the castle nut and the top of the steer arm machined surface (as shown in Figure 2). If a gap exists the **steering knuckle needs to be replaced**.

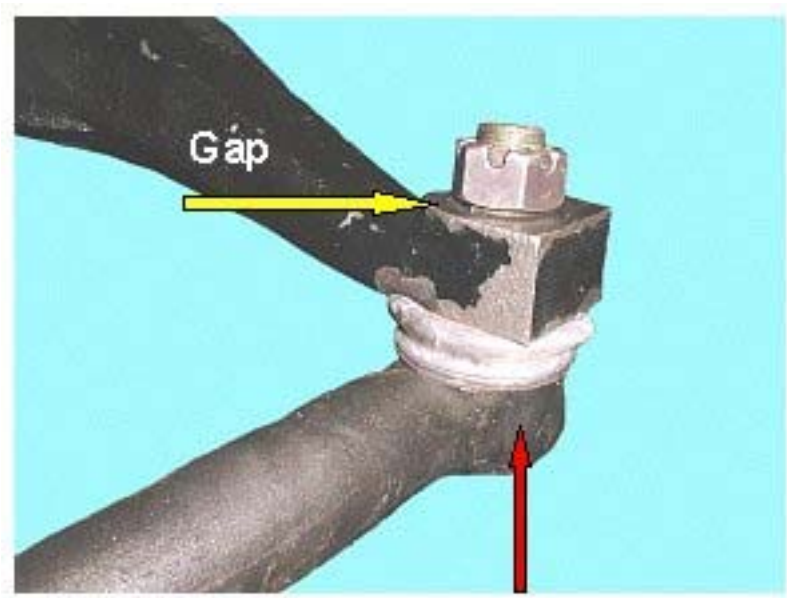


Figure 2 Figure 2

6. If **none** of the above conditions exist, continue on to the **DIAL INDICATOR INSPECTION** procedure.

7. If **any** of the above conditions exist, skip the **DIAL INDICATOR INSPECTION** procedure and go directly to the **REPAIR PROCEDURE**.

DIAL INDICATOR INSPECTION

8. Mount a magnetic based dial indicator on the steer arm, with the indicator tip contacting the center of the drag link ball stud (as shown in Figure 3).

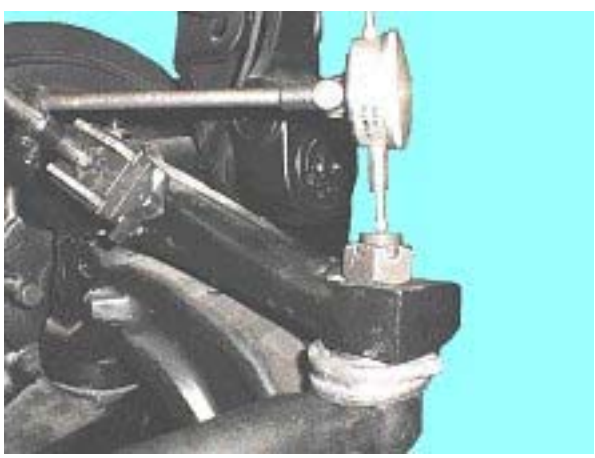


Figure 3 Figure 3

SERVICE PROCEDURE (CONT.)

9. Push and pull the drag link in an up and down motion (as shown in Figure 4). If the dial indicator detects any movement, the steering knuckle will **need to be replaced**.

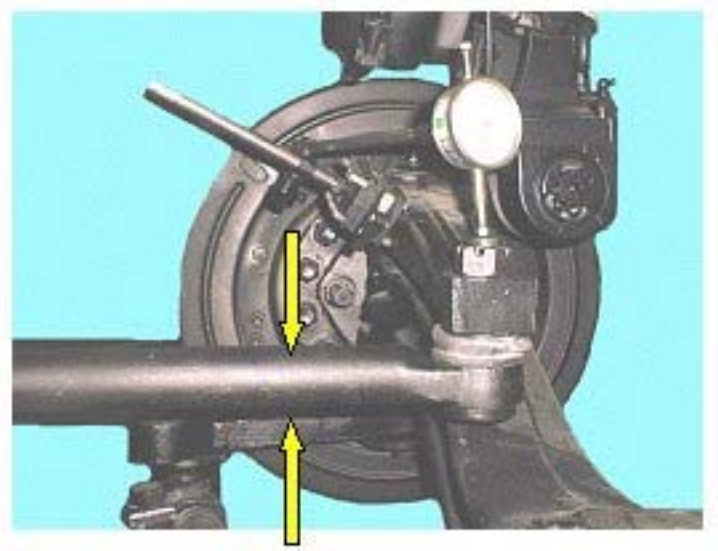


Figure 4 Figure 4

REPAIR PROCEDURE

Steering Knuckle Removal Procedure

NOTE – The procedure below begins with the wheel, hub, and brake assembly already removed and starts with steps to remove the steering knuckle. If instructions are needed at any point in this repair procedure, refer to the Master Service Manual. Follow all standard safety precautions and procedures recommended by the Master Service Manual.

1. Remove cotter pin and slotted nut on tie rod end.

REPAIR PROCEDURE (CONT.)

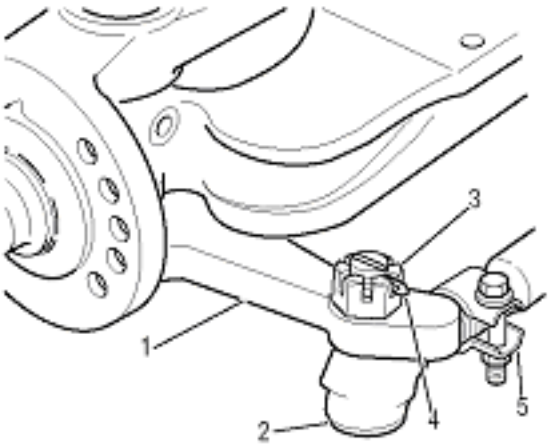


Figure 5 Figure 5

1. TIE ROD ARM
2. TIE ROD END
3. SLOTTED NUT
4. COTTER PIN
5. POSITION CLAMP FASTENER AWAY FROM BEAM

2. Disconnect tie rod end from tie rod arm using a suitable tool such as a pickle fork.

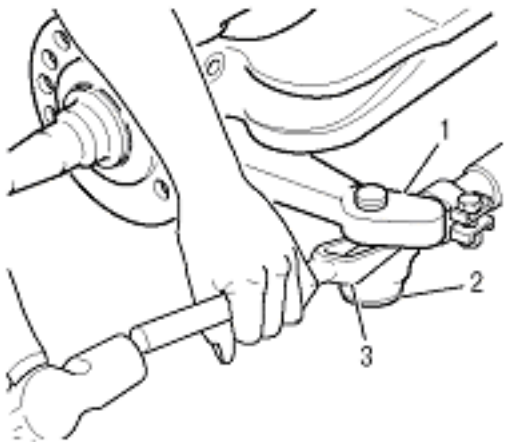


Figure 6 Figure 6

1. TIE ROD ARM
2. TIE ROD END
3. PICKLE FORK

NOTE – Be careful not to damage the tie rod end boot during this removal procedure.

CAUTION – Do not use heat on any axle parts or fasteners.

REPAIR PROCEDURE (CONT.)

3. Disconnect drag link from steering arm and Pitman arm by removing cotter pins and slotted nuts.

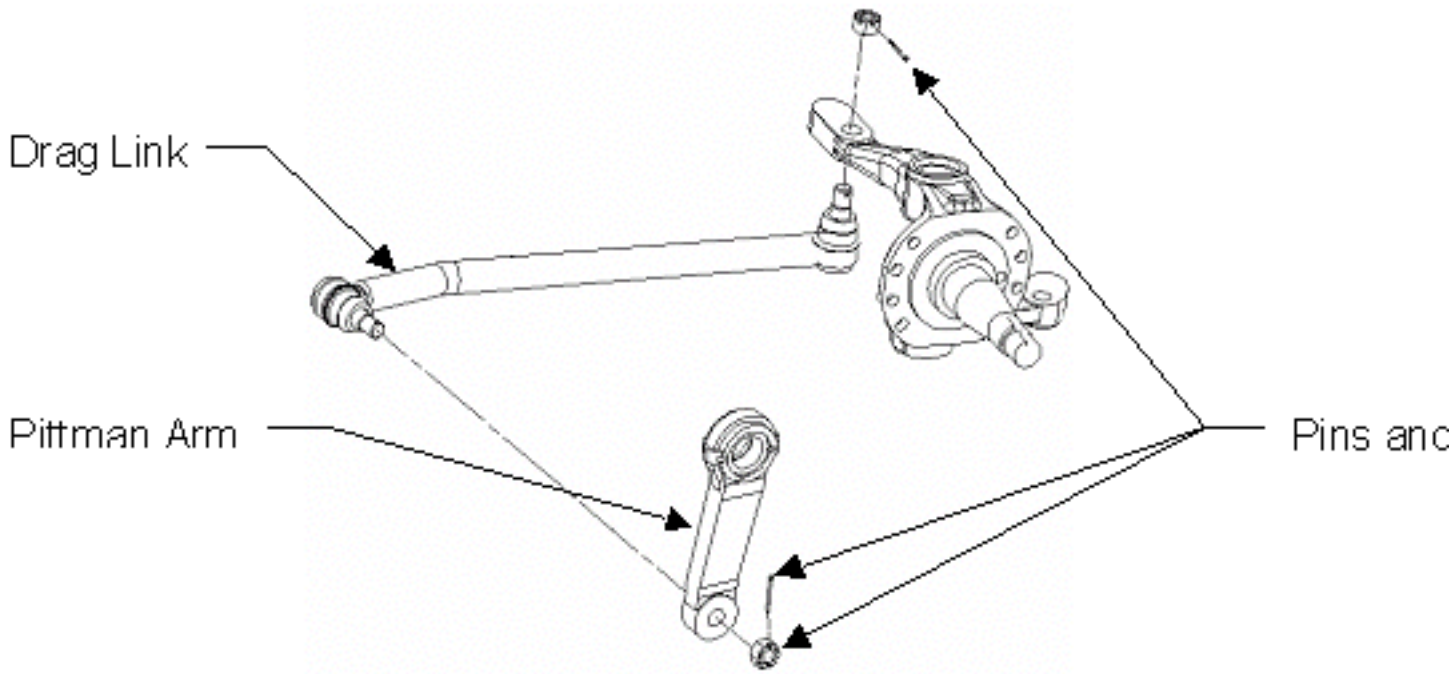


Figure 7 Figure 7

4. Remove top and bottom knuckle caps.

5. **Dual draw keys.** Remove both draw key nuts. Then drive keys out using a brass hammer and drift.

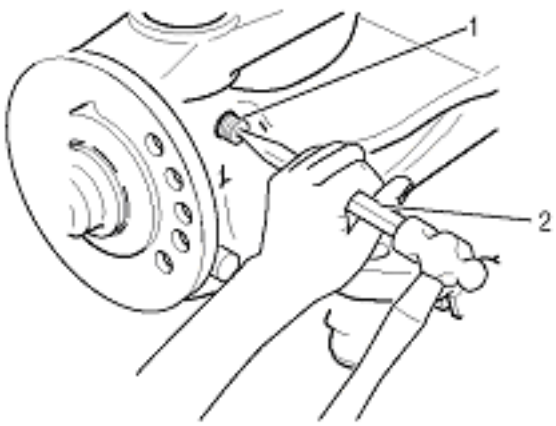


Figure 8 Figure 8

1. DRAW KEY
2. BRASS DRIFT

6. Drive kingpin out with a brass hammer and drift.

REPAIR PROCEDURE (CONT.)

NOTE – Do not damage kingpin, it will be re-used during installation of new knuckle.

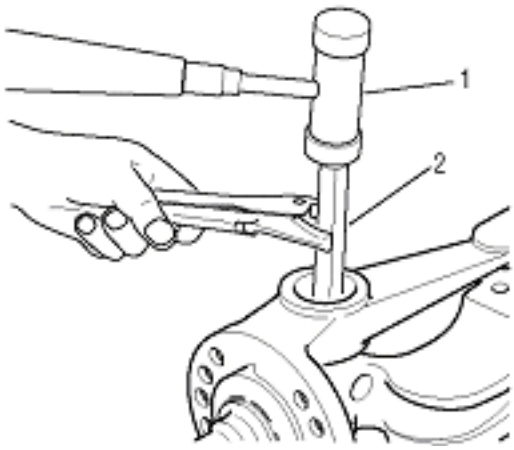


Figure 9 Figure 9

1. BRASS HAMMER
2. DRIFT

7. Remove steering knuckle from axle beam.

8. Remove steering stop adjustment Screw, lock-nut, and adapter fitting from old knuckle. They will be cleaned and re-installed on new knuckle.

NOTE – Measure and record distance the old Steering Stop Screw protrudes out of the knuckle before removing it.

When installing the screw into the new knuckle make the initial setting (protrusion) approximately 1/8 inch longer. This will prevent over-traveling of the steering linkage and steering gear in full left turn, minimizing the possibility of adjusting steering gear poppets.

Complete stop screw adjustment while on turntable as described in STEERING KNUCKLE STOP ADJUSTMENT section.

WARNING – To prevent personal injury, never strike hardened metal parts with a steel hammer or tool.

Cleaning

After disassembly, clean axle end as follows:

1. Steel parts with ground or polished surfaces.

   - Wash in a suitable cleaning solvent.
   - Rinse thoroughly to remove any cleaning solution.

REPAIR PROCEDURE (CONT.)

- Dry parts with clean rags.

2. Clean castings, forgings and other rough-surface parts.

   - Wire brush or steam-clean areas that are susceptible to accumulation of mud, road dirt, salt.

WARNING – Gasoline is not an acceptable cleaning solvent because of its extreme combustibility. It is unsafe in the workshop environment.

Steering Knuckle Installation Procedure

1. Install the old steering stop adjustment screw, lock nut and adapter fitting. Torque adapter fitting to **120-160 Lbf-Ft** (160-217 Nm). Be sure screw is cleaned as per the above procedure.

2. Before installing the kingpins, lubricate inside of bushing and outside of kingpins with Fleetrite EP2 Moly Grease or equivalent NLGI No. 2 multipurpose lithium grease to provide initial lubrication.

3. Make certain that kingpin hole in axle center is clean and dry.

4. Align the steering knuckle yoke holes with axle and thrust bearing holes.

5. Pre-adjust knuckle vertical play by wedging the steering knuckle up and filling the gap at the top side of the knuckle with shim(s).

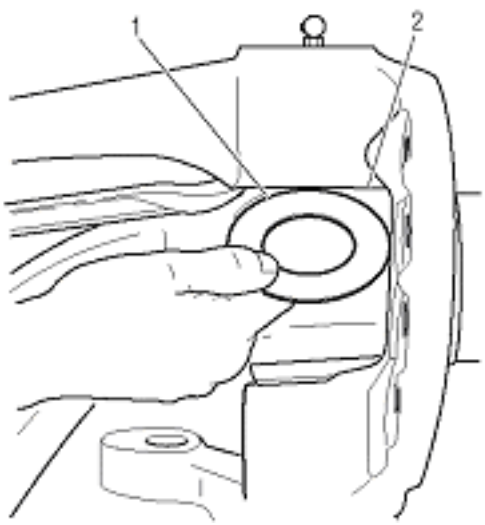


Figure 10 Figure 10

1. INSTALL SHIM(S) AS NEEDED
2. SHIM ONLY TOP OF KNUCKLE

NOTE – Floor jack can be used to wedge up steering knuckle.

6. Install kingpin from the top with notch and draw key hole aligned. Hand start in bushing.

REPAIR PROCEDURE (CONT.)

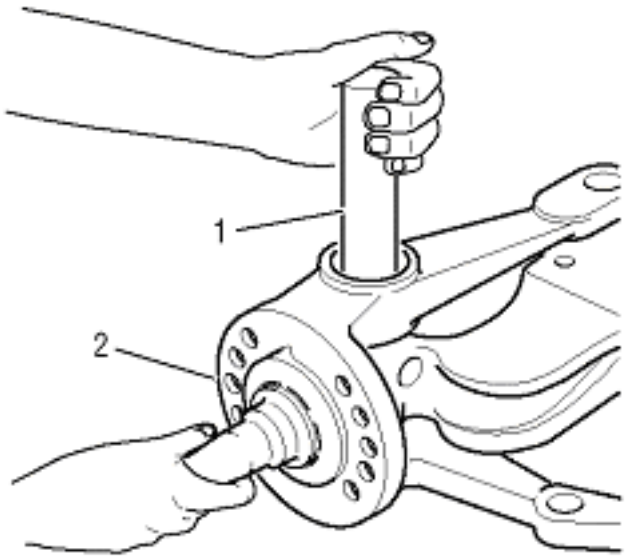


Figure 11 Figure 11

1. KINGPIN
2. STEERING KNUCKLE

CAUTION – Never shim on the bottom side of the beam.

7. Install kingpin in knuckle and axle beam. If necessary, lightly tap kingpin in place using hammer and brass drift.

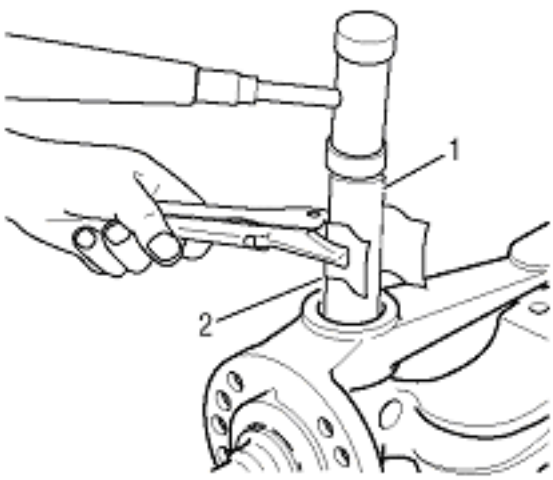


Figure 12 Figure 12

1. KINGPIN
2. PROTECT WITH SHIM STOCK

REPAIR PROCEDURE (CONT.)

CAUTION – Protect kingpins with a suitable material such as shim stock.

NOTE – At this point in reassembly, check knuckle vertical play and adjust if necessary.

8. Center steering components.

9. Mount dial indicator to steer beam and reference top of the knuckle. Zero dial indicator.

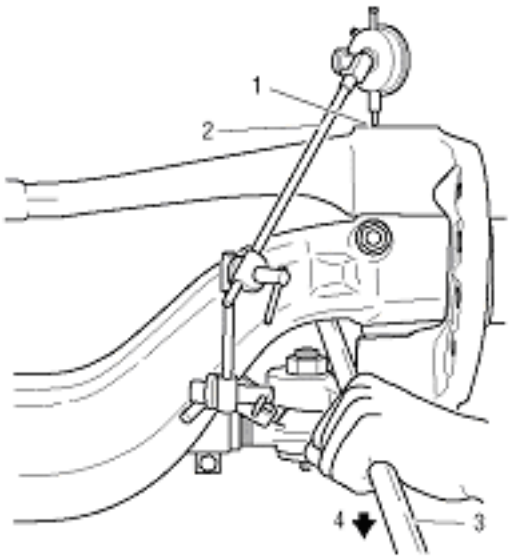


Figure 13 Figure 13

1. REFERENCE ON TOP OF KNUCKLE
2. DIAL INDICATOR
3. PRY BAR
4. PRY KNUCKLE DOWNWARD

10. Simulate axle loading with a jack and note dial indicator reading.

REPAIR PROCEDURE (CONT.)

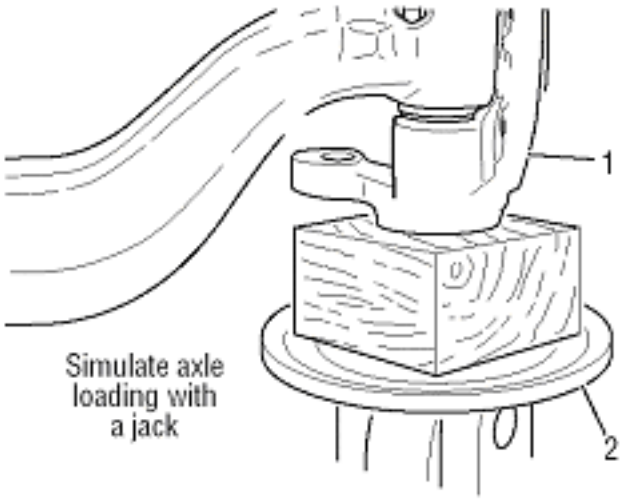


Figure 14 Figure 14

1. STEERING KNUCKLE
2. JACK

NOTE – Floor jack can be used to wedge up steering knuckle.

11. Knuckle vertical play should be .002" -.012" (.051 -.305 mm). Add or remove shims as necessary to obtain correct endplay. Center shims to prevent damage during assembly.

12. When vertical play adjustment is correct, align draw key opening and pin flat alignment.

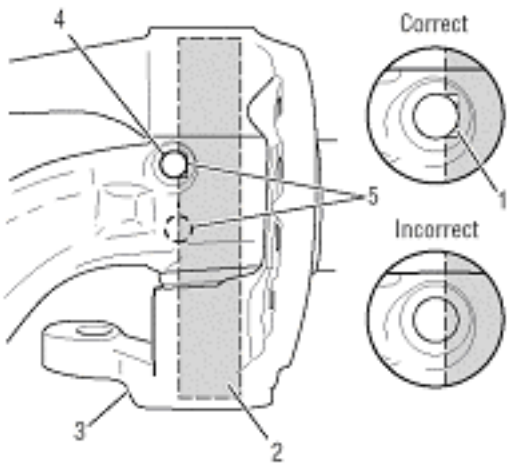


Figure 15 Figure 15

1. KINGPIN NOTCH
2. KINGPIN
3. STEER KNUCKLE
4. SINGLE DRAW KEY
5. DUAL DRAW KEYS

REPAIR PROCEDURE (CONT.)

13. Install new draw keys.

14. Seat draw keys with a hammer and punch.

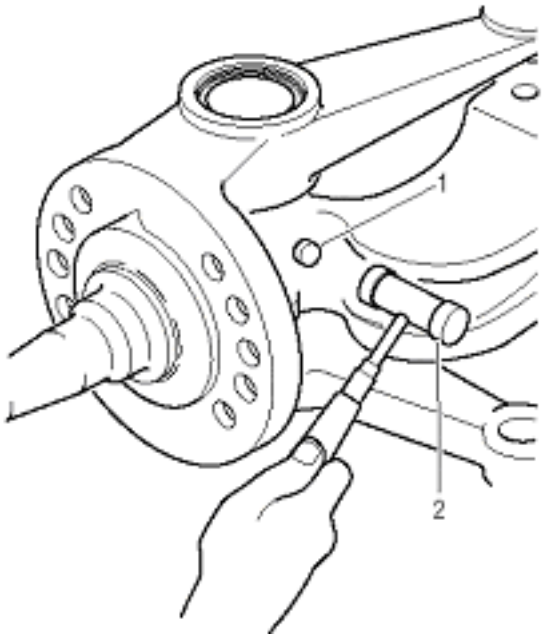


Figure 16 Figure 16

1. DRAW KEY
2. BRASS HAMMER

15. Install draw key nuts and tighten to **30-45 Lbf-Ft** (41-61 Nm).

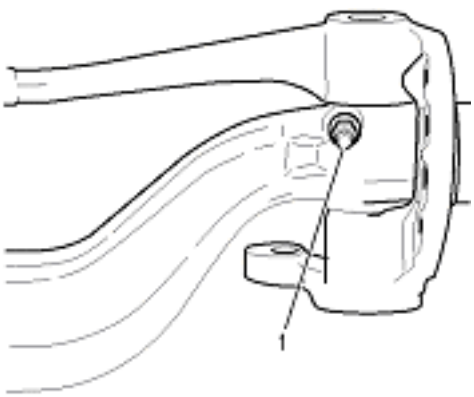


Figure 17 Figure 17

1. DRAW KEY NUT

16. Ensure draw key is fully seated by repeating step 13 and 14. Recheck draw key nut torque.

17. Install kingpin caps. Tighten caps to **50-75 Lbf-Ft** (68-102 Nm).

REPAIR PROCEDURE (CONT.)

NOTE – Tighten nut to range minimum in steps 14 and 17, then tighten just enough to align cotter pin hole.

18. Attach new drag link to steering arm and Pitman arm. Install and torque nuts to **165-230 Lbf-Ft** (224-312 Nm).

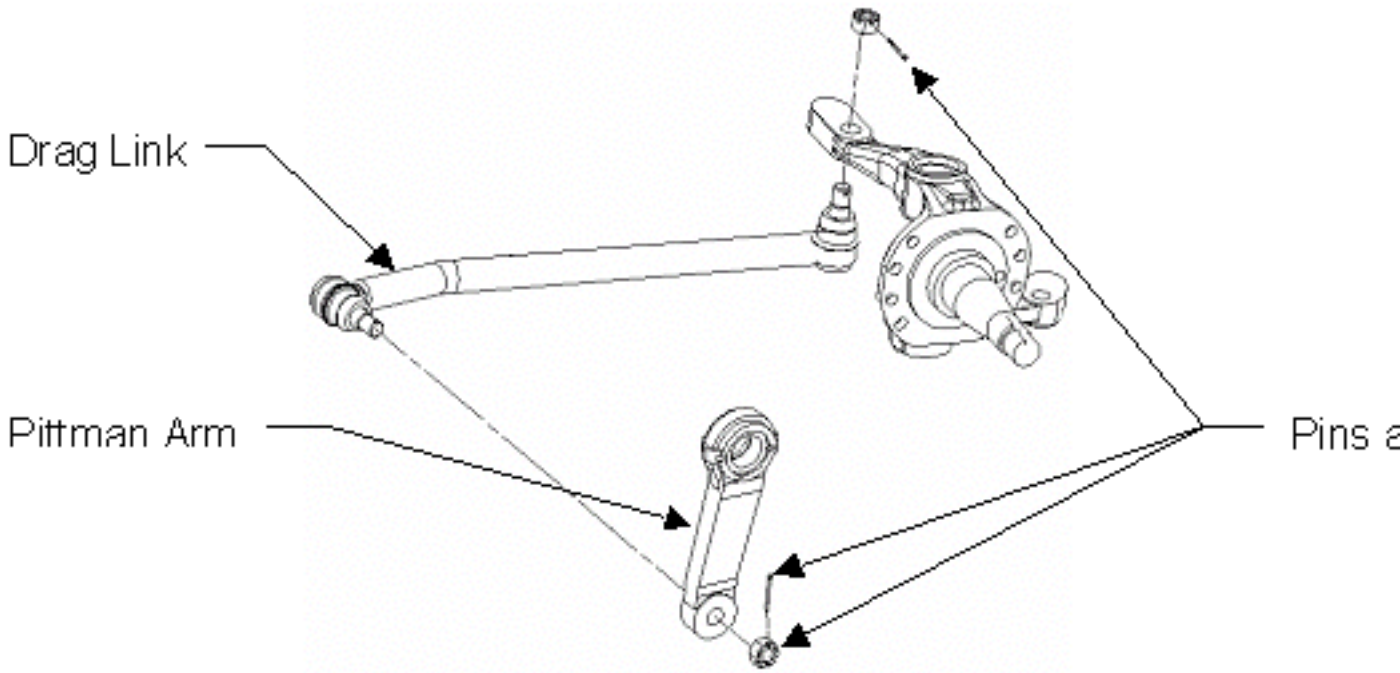


Figure 18 Figure 18

19. Install new cotter pins into the drag link nuts.

20. Attach tie rod end to tie rod arm on knuckle. Install nut and tighten to **120-160 Lbf-Ft** (163-217 Nm).

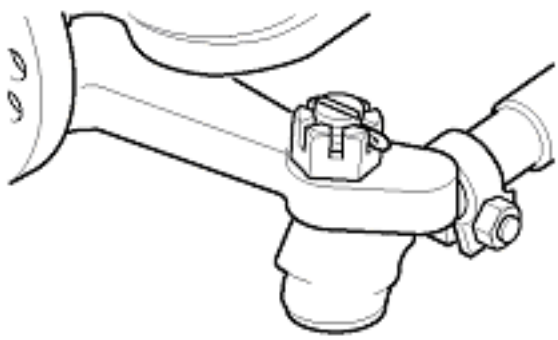


Figure 19 Figure 19

21. Install new cotter pin.

REPAIR PROCEDURE (CONT.)

22. Grease all kingpin and tie rod assemblies as required.

Steering Knuckle Stop Adjustment

1. Old Steering Stop Adjustment Screw, lock-nut, and adapter must be re-installed onto new knuckle. Torque adapter to **110-120 Lbf-Ft** (150-163 Nm).

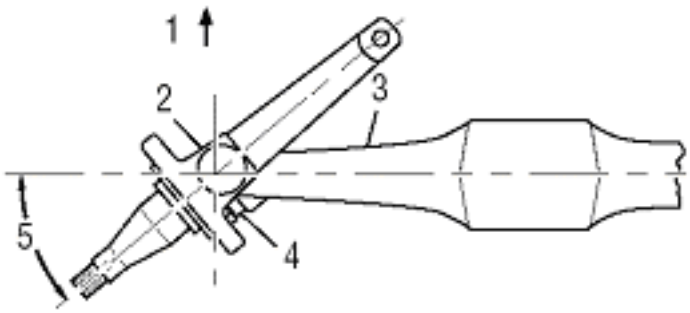


Figure 20 Figure 20

1. FRONT OF VEHICLE
2. STEERING KNUCKLE
3. AXLE BEAM
4. STEERING STOP ADJUSTMENT (BOTH ENDS OF AXLE)
5. DEGREE OF STEERING ANGLE

2. Check steering angle with alignment turntable set. Refer to the following tables to determine the correct steering angle for the truck:

Table 1 With Front Tire Size: 11R24.5 Use the following table:

Front Axle Lineset Code	Steering Gear Lineset Code	Turn Angle
02AGG	05PRJ	42°
02AGG	05PSA	46°
02AGE	05PRJ	42°
02AGE	05PSA	46°
02AGB	05PRJ	32°
02AGB	05PSA	39°

Table 2 With ALL OTHER Front Tire Sizes Use the following table:

Front Axle Lineset Code	Steering Gear Lineset Code	Turn Angle
02AGG	05PRJ	46°
02AGG	05PSA	50°
02AGE	05PRJ	46°
02AGE	05PSA	50°

REPAIR PROCEDURE (CONT.)

Table 2 With ALL OTHER Front Tire Sizes Use the following table: (cont.)

Front Axle Lineset Code	Steering Gear Lineset Code	Turn Angle
02AGB	05PRJ	40°
02AGB	05PSA	43°

3. If adjustment is required, loosen jam nut and turn stop screw as necessary.

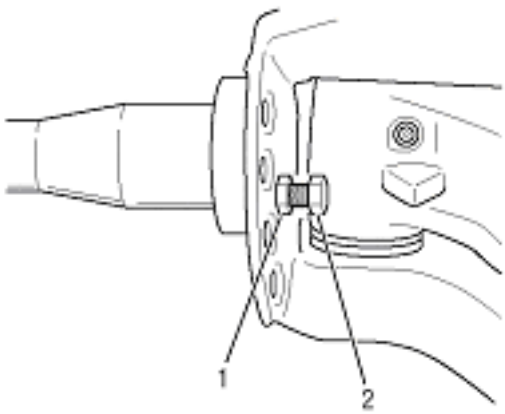


Figure 21 Figure 21

1. JAM NUT
2. STOP SCREW

4. After adjustment, tighten stop screw jam nut to **90-120 Lbf-Ft** (122-163 Nm).

NOTE – Adjust power steering unit so that power assist stops approximately 3° or 1/8" (3.175 mm) before touching the stop screws. Please refer to the Master Service Manual for instructions on making this adjustment.

CAUTION – Steering gear must be functioning properly or steering linkage damage may occur. Poppet relief must be checked after adjusting stop screw setting.

NOTE – Please refer to the Master Service Manual for instructions on checking and setting the poppet relief valve properly for each steering gear set.

Wheel Alignment Check

NOTE – The procedure below begins with the wheels, hubs, and brake assemblies already re-installed and with the front axle raised off the ground. If instructions are needed at any point in this repair procedure, refer to the Master Service Manual. Follow all standard safety precautions and procedures recommended by the Master Service Manual.

NOTE – Please replace wheel hub seals during re-installation of wheel hub.

REPAIR PROCEDURE (CONT.)

NOTE – If electronic alignment equipment is used to set the toe-in, it is very important that the equipment be in calibration to insure an accurate toe reading.

The following procedure may be used to set the toe-in when electronic alignment equipment is not available. To obtain an accurate toe reading, two mechanics are required to insure that the pointers are always placed or adjusted to be exactly in front of the line scribed on both front tires.

1. Turn the front wheels to the exact straight-ahead position.

2. Wipe off excess dirt and moisture from the center of both front tire treads (360°). Use a piece of chalk to mark the center area of both front tires around the complete circumference.

3. Put a scribe or pointed instrument against the center of the whitened part of each tire and rotate the tires 360°. The scribe must be held in place so that a single straight line is marked all the way around the tires.

4. Put a full floating radius gauge plate under each wheel. Lower the vehicle and remove the lock pins from the radius gauge plates to allow the front wheels to return to the normal operating position. If full floating radius gauge plates are not available, lower the vehicle to the floor and roll it forward 12 to 15 feet (3.65 to 4.57 m) to neutralize the front suspension. Neutralizing the front suspension is extremely important especially if the vehicle has been jacked up to scribe the tires; otherwise, the front wheels will not return to the normal operating position due to the tires gripping the floor surface when the vehicle is lowered.

5. Set the sliding scale end of a trammel bar to zero (0) and lock the scale in place.

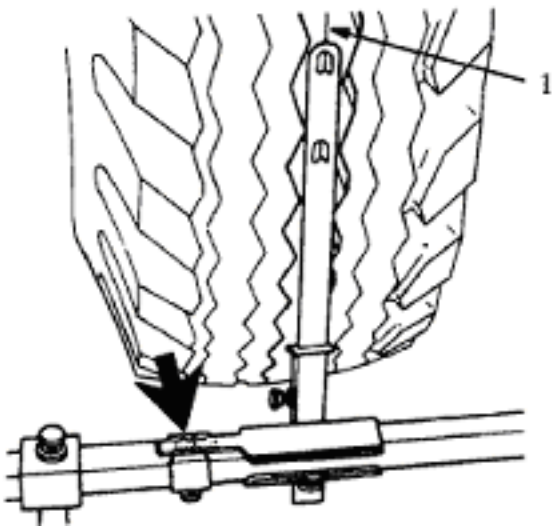


Figure 22 Figure 22

1. SCRIBED LINE

6. Put the trammel bar at the rear of the front tires so that the sliding scale that was set to zero in step 6 is centered against the scribed line on one of the tires.

7. Adjust the pointer on the end of the trammel bar opposite the sliding scale so it lines up with the scribed line on the rear of the opposite front tire. Lock the pointer in place on the trammel bar.

REPAIR PROCEDURE (CONT.)

8. Put the trammel bar against the front of the tires so the pointer end is against the scribed line on the front tire. Loosen and move the sliding scale pointer on the opposite end of the trammel bar so it is against the scribed line on the opposite tire. Lock the scale in place.

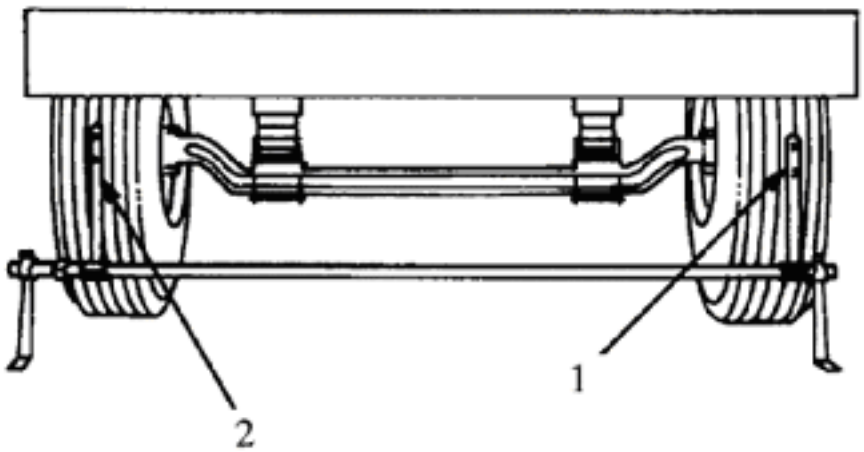


Figure 23 Figure 23

1. POINTER END
2. SLIDING SCALE END ADJUSTED TO SCRIBED LINE TO INDICATE ACTUAL TOE SETTING

9. Read the toe-in or toe-out on the sliding scale. If toe-in is correct, it will read **1/16** inch ± **1/16** inch (1.59mm ± 1.59mm).

NOTE – If toe-in adjustment is necessary, use the following procedure:

- Loosen the tie rod clamps that secure the tie rod ends in position in the tie rod.
- Set the sliding scale on the trammel bar to read 1/16 inch (1.59mm) toe-in.
- Turn the tie rod to set the toe-in. After the toe-in is set, the sliding scale and the pointer should both be on the scribed line of the tire each is in front of.
- Turn the steering wheel in each direction to center the steering linkage (if the vehicle has power steering, start the engine before turning the wheel). Make sure the front wheels are in a straight ahead position (stop engine), and re-check the toe-in setting. Make any necessary adjustments.
- Repeat step 4 until the toe-in reading is **1/16** inch ± **1/16** inch (1.59mm ± 1.59mm).
- Position and tighten the tie rod clamp bolts to **45-65 Lbf-Ft** (61-88 Nm).

PARTS INFORMATION

The part required for this recall is:

PARTS INFORMATION (CONT.)

Table 3 Parts Information

Part Number	Description	Quantity
8900101R91	03509 Recall Service Kit	1
Wheel Seals	As per Lineset 29XXX Code	As Req'd

This Service Kit 8900101R91 contains the following parts:

Table 4 Service Kit 8900101R91

Part Number	Description	Quantity
329825	Dana Recall Kit	1
	Recall Kit Contains:	
	971683 Steer Knuckle Assy	1
	160HP104-1 Draw Key	1
	160HP104-2 Draw Key	1
	220HN103 Draw Key Nuts	2
	817493 .005" Shim	5
	817494 .010" Shim	5
	971370 Knuckle Caps	2
	HP102 Pitman Arm Cotter Pin	1
3571919C92	Link, Steering Drag, RH-HDD	1
137214	Drag Link Cotter Pin	2

NOTE – This Recall service kit DOES NOT contain wheel seals. Please replace with wheel seals as per Lineset code 29XXX for each truck.

Only approximately 50 trucks are expected to need the recall kit. Please order a Recall Kit only when the Inspection Procedure determines it is required.

All removed parts should be destroyed locally.

Table 5 Labor Information

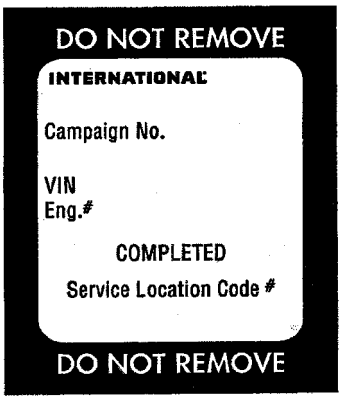
Operation No.	Description	Time
A40-03509-1	**Inspect** Steering Arm and Drag Link Clearance Only	0.7 Hr.
A40-03509-2	**Replace** Steering Knuckle and Drag Link Only	3.8 Hrs.

CAMPAIGN IDENTIFICATION LABEL

CAMPAIGN IDENTIFICATION LABEL

Each vehicle corrected in accordance with this campaign **MUST BE** marked with a CTS-1075 campaign Identification Label.

Complete the label and attach on a clean surface next to the vehicle identification number (VIN) plate.



ADMINISTRATIVE/DEALER RESPONSIBILITIES (U.S. & POSSESSIONS)

Proceed immediately to make necessary correction to units in inventory. **All inventory vehicles subject to this recall campaign must be corrected prior to sale, transfer or delivery.** If vehicles have been sold or transferred and you are in receipt of Customer Notification Letters and Authorization for Recall Service cards for those vehicles, transfer location or customer must be notified **IMMEDIATELY** from your dealer location.

Dealers must correct all vehicles subject to this campaign at no charge to the owner, regardless of mileage, age of vehicle, or ownership, from this time forward.

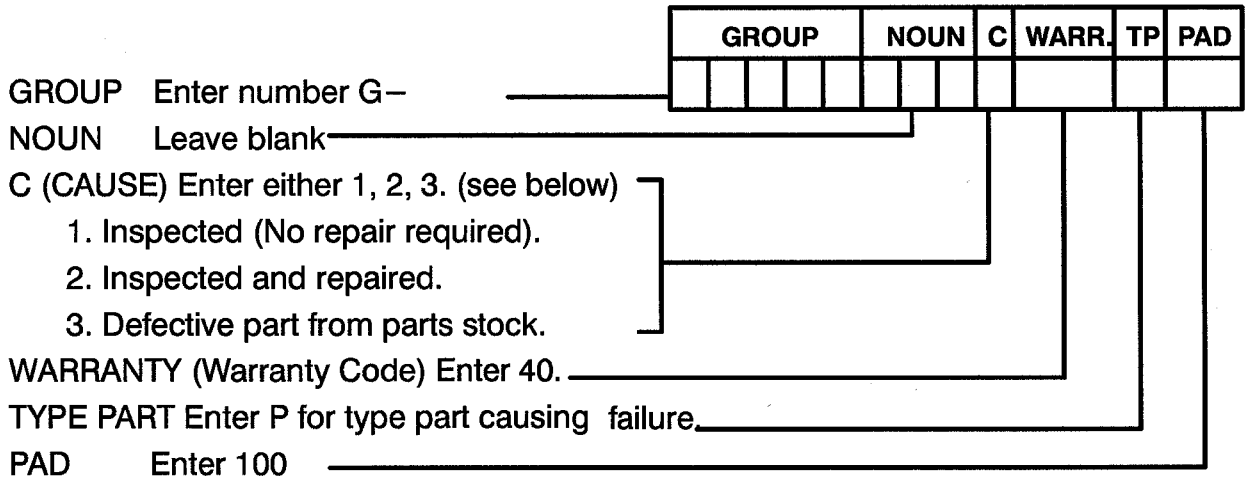
The National Traffic and Motor Vehicle Safety Act, as amended, provides that each vehicle that is subject to a vehicle recall campaign must be adequately **repaired** within a reasonable time after the owner has tendered it for repair. A failure to adequately repair within **60 days** after a tender of a vehicle is prima facie evidence of failure to repair within a reasonable time. If the condition is not adequately repaired within 60 days, the owner may be entitled to **replacement** with an identical or reasonable equivalent vehicle at no charge, or to a **refund** of the purchase price less a reasonable allowance for depreciation.

However, consistent with the customer notification, dealers are expected to complete the repairs on the mutually agreed upon service date.

To avoid having to replace a vehicle or refund the purchase price less a reasonable allowance for depreciation, every effort must be made to promptly schedule an appointment with each owner to repair his or her vehicle as soon as possible.

Refer to Dealer Warranty Manual for procedures to conduct Recall Campaigns.

It is important that the Recall Coding be completed properly to assist in processing the warranty claim. Complete instructions will be found in the Warranty Manual, Section 7-1. Special attention should be given to Items 39 through 44:



ADMINISTRATIVE/DISTRIBUTOR RESPONSIBILITY (EXPORT)

Proceed **immediately** to make necessary correction to units in inventory. **All inventory vehicles subject to this recall campaign must be corrected prior to sale, transfer or delivery.** If vehicles have been sold or transferred and you are in receipt of Customer Notification Letters and Authorization for Recall Service cards for those vehicles, transfer location or customer must be notified from your distributor location.

Export locations are to submit warranty claims in the usual manner making reference to this Recall number.

We ask for your full cooperation and follow-up to this important subject matter. If you have any questions or need further assistance, please contact your Regional Service Manager.