Hazard Warning Definitions

⚠ DANGER	**Immediate hazards which WILL result in severe personal injury or death.**
⚠ WARNING	**Hazards or unsafe practices which COULD result in severe personal injury or death.**
⚠ CAUTION	**Hazards or unsafe practices which COULD result in minor personal injury or product or property damage.**
NOTE	A note gives key information to make following a procedure easier or quicker.

Disclaimer

This Service Manual has been prepared by TRW Commercial Steering Systems for reference and use by mechanics who have been trained to repair and service steering components and systems on heavy commercial vehicles. TRW Commercial Steering Systems has exercised reasonable care and diligence to present accurate, clear and complete information and instructions regarding TRW Commercial Steering linkage components. Since this is a general service manual, the photographs and illustrations may not look exactly like the components being serviced. The procedures, therefore , must be carefully read and understood before servicing.

If inspection or testing reveals evidence of abnormal wear or damage to TRW linkage components or if you encounter circumstances not covered in the manual, STOP - CONSULT THE VEHICLE MANUFACTURER'S SERVICE MANUAL AND WARRANTY. DO NOT TRY TO REPAIR OR SERVICE ANY LINKAGE COMPONENT WHICH HAS BEEN DAMAGED OR INCLUDES ANY PART THAT SHOWS EXCESSIVE WEAR UNLESS THE DAMAGED AND WORN PARTS ARE REPLACED WITH ORIGINAL TRW REPLACEMENT AND SERVICE PARTS AND THE UNIT IS RESTORED TO TRW'S SPECIFICATIONS FOR THAT SPECIFIC COMPONENT.

It is the responsibility of the mechanic performing the maintenance, repairs or service on a particular TRW linkage component to (a) inspect components for abnormal wear and damage, (b) choose a repair procedure which will not endanger his/her safety, the safety of others, the vehicle, or the safe operation of the vehicle, and (c) fully inspect and test the linkage components and the vehicle steering system to ensure that the repair or service of the component has been properly performed and that the component and system will function properly.

Patents

TRW Commercial Steering Systems linkage components are covered by several United States and foreign patents, either issued or pending.

Section 2 On-Vehicle Inspection

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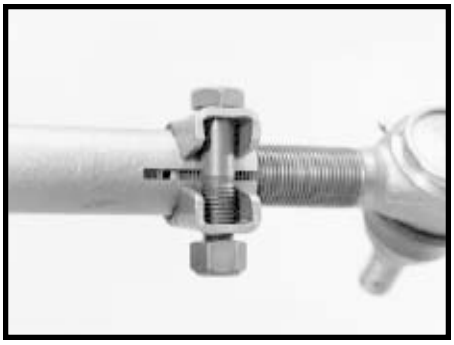
Visual Inspection
(Draglinks, Tie Rods, Tie Rod Ends, Pitman Arm, Seals)

Cracks, breaks or bends

1. Visually inspect linkage components for broken clamps and gouges on tubes (from rubbing parts). Check for a bent steering arm.

Incorrect Components

2. Check manufacturer's specifications to ensure the correct pitman arm and steering arm are installed.



Misadjustments

3. If you can see the end of the socket threads through the slot in the tube the drag link or tie rod must be adjusted or replaced. It's either the wrong size, or the misadjustment was used to compensate for another problem on the vehicle. (e.g. If the toe in was adjusted to compensate for bent tie rod arms.)

   Relocated steering gear (with the use of spacers, etc.)

Grease Zerks

4. Missing or damaged grease zerks must be replaced.

Seal Damage

5. Any form of tear or improper sealing requires seal replacement.

Wear

6. Check for wear on the socket throat, and excessive lash in the socket assembly.

Missing Pins

7. Check socket connections for missing cotter pins.

Tie Rod End Lash

What creates movement in tie rod ends?

In a TRW tie rod end, the compressive force of the spring creates resistive torque by applying a constant load on the bearing and stud.

As wear occurs on the components, the spring creates less resistive torque. With less torque, you no longer have the precise joint needed for optimum steering, but you do still have a safe linkage. When all compression is lost, its time to replace the linkage.

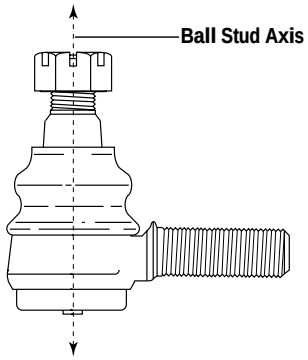
This wear can be caused by impact, lack of lubrication and normal wear.

Inspection Station Criteria

Follow the procedures listed below for inspecting TRW tie rod ends. Measure any movement, detected by hand, with a scale for in and out motion on the ball stud axis.

If movement is 1/8" (3 mm) or more, the vehicle should be taken out of service, and the tie rod end replaced immediately.

If movement is less than 1/8" (3 mm) replacing the tie rod end is strictly a maintenance issue.



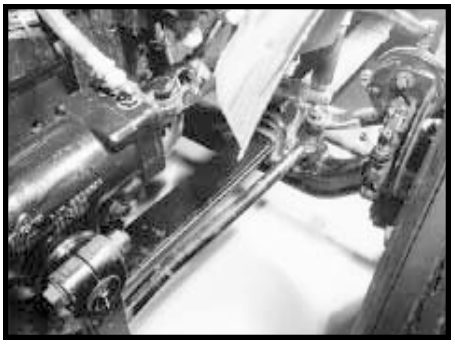
1. With vehicle engine on, lightly rock the steering wheel while checking for looseness in any threaded joint, or any movement of the stud nut. Any looseness requires repair.

2. With the engine off and wheels straight ahead, push and pull the socket in and out by hand in the direction of the ball stud axis. If no movement is detected, the socket is safe. Any movement detected by hand requires replacement of the socket.

⚠ WARNING

Do not use a wrench or other object to apply leverage when inspecting sockets. Applying leverage can give skewed results, and damage components. Component damage may ultimately result in loss of steering control.

Loose Connections and Adjustment Areas



Tighten nuts

1. Make sure nuts are tightened at:
   - drag link to pitman arm connection
   - drag link to steering arm connection
   - tie rod to tie rod arm connections
   - clamps at drag link and tie rod adjustable areas