

Retain This Manual
for Future Reference

SINGLE AXLE RUBBER SUSPENSION SYSTEM

Suspension Codes: M06-02, M06-05, M06-06, M06-07, M06-21,
M06-22, M06-25 (Chevrolet P-30)
M06-23, M06-24 (John Deere)
M12-01, M12-05 (Ford E350)
M12-03 (Iveco)

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SECTION I

DESCRIPTION

The MOR/ryde Rubber Suspension System is a unique and technologically advanced suspension. The uniqueness of the MOR/ryde suspension is in its:

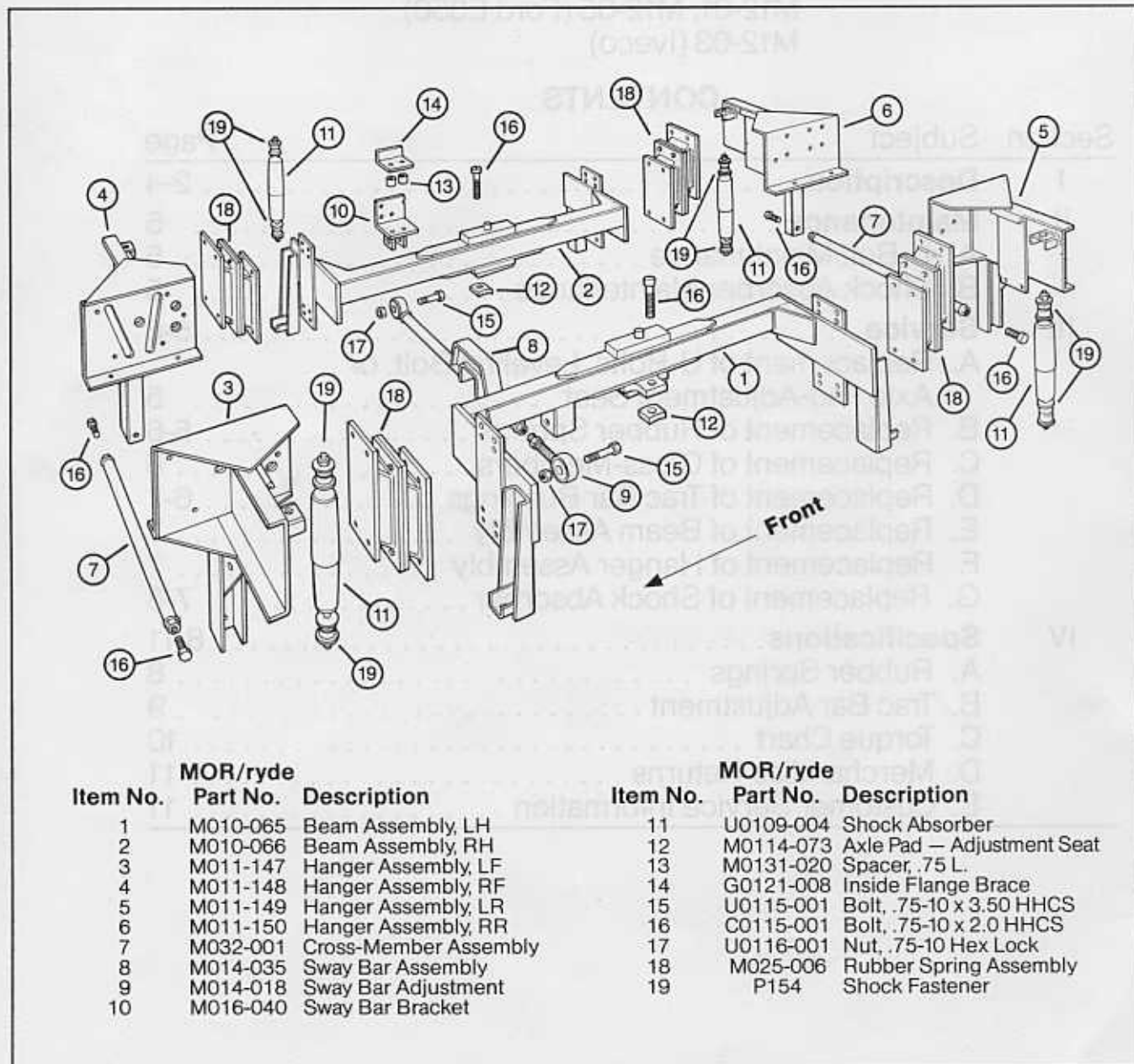
1. 100% Natural Rubber Springs
2. 13-inch Wider Spring Center
3. Frame Attachment, Fore and Aft the Drive Wheels Without a Slip Joint
4. Side-to-Side Adjustability to Compensate for Unequal Cross-Vehicle Loading

The MOR/ryde suspension system with its rubber

springs provides three (3) distinct advantages:

1. Smoother Ride and Improved Passenger Comfort
2. Improved Braking
3. Improved Handling and Greater Driver Control

Routine preventive maintenance is critical to insure a MOR/ryde suspension will provide thousands of safe and trouble-free miles of performance. This Service Manual will provide information regarding routine maintenance and service instructions.



Item No.	MOR/ryde Part No.	Description
1	M010-065	Beam Assembly, LH
2	M010-066	Beam Assembly, RH
3	M011-147	Hanger Assembly, LF
4	M011-148	Hanger Assembly, RF
5	M011-149	Hanger Assembly, LR
6	M011-150	Hanger Assembly, RR
7	M032-001	Cross-Member Assembly
8	M014-035	Sway Bar Assembly
9	M014-018	Sway Bar Adjustment
10	M016-040	Sway Bar Bracket

Item No.	MOR/ryde Part No.	Description
11	U0109-004	Shock Absorber
12	M0114-073	Axle Pad — Adjustment Seat
13	M0131-020	Spacer, .75 L.
14	G0121-008	Inside Flange Brace
15	U0115-001	Bolt, .75-10 x 3.50 HHCS
16	C0115-001	Bolt, .75-10 x 2.0 HHCS
17	U0116-001	Nut, .75-10 Hex Lock
18	M025-006	Rubber Spring Assembly
19	P154	Shock Fastener

Figure 1 — MOR/ryde Single Axle Suspension System (Chevrolet P-30 Chassis)

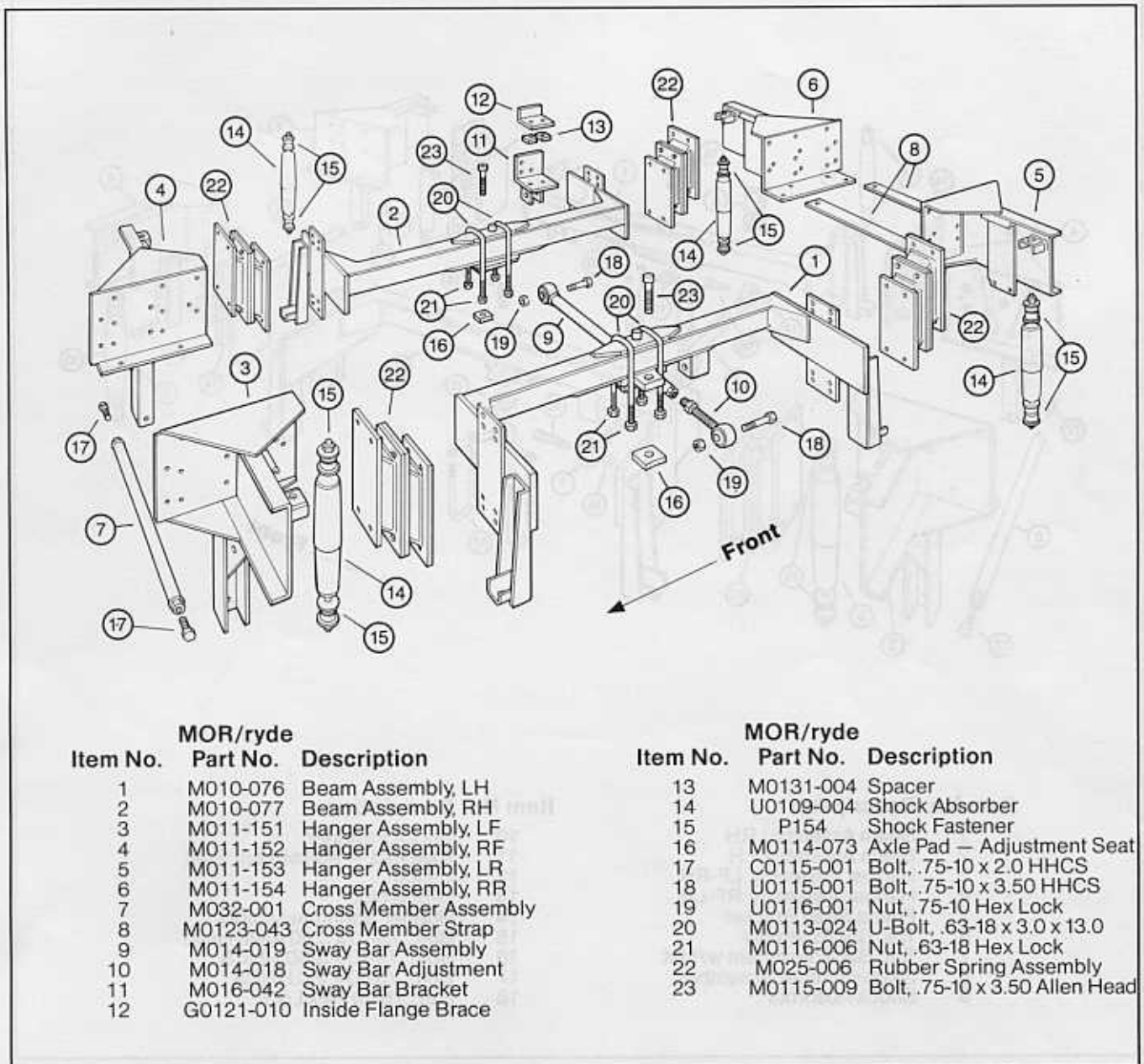
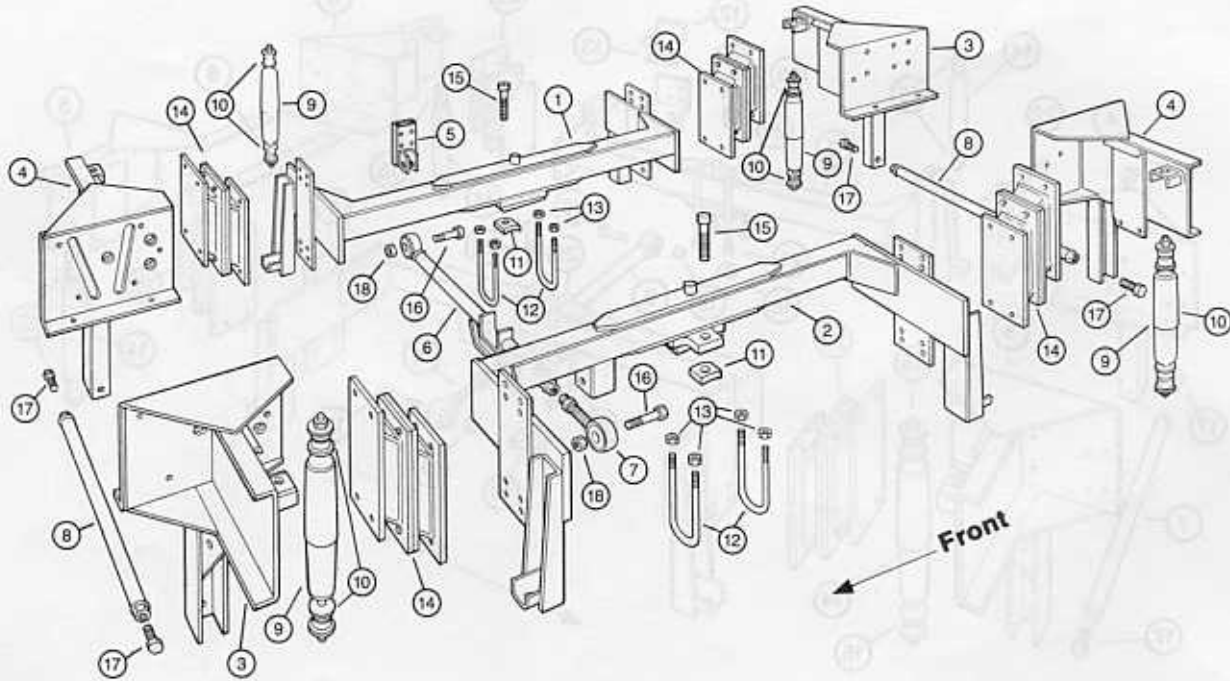


Figure 2 — MOR/ryde Single Axle Suspension System (John Deere Chassis)



Item No. Description

- 1 Beam Assembly, RH
- 2 Beam Assembly, LH
- 3 Hanger Assembly, LF-RR
- 4 Hanger Assembly, RF-LR
- 5 Frame Sway Bracket
- 6 Trac Bar Assembly
- 7 Trac Bar Adjustment w/Nut
- 8 Cross-member Assembly
- 9 Shock Absorber

Item No. Description

- 10 Shock Fastener
- 11 Axle Pad — Adjustment Seat
- 12 U-Bolt
- 13 U-Bolt Nut
- 14 Rubber Spring Assembly
- 15 Bolt; .75-10 x 3.50 Allen Head
- 16 Bolt; .75-10 x 3.50 HHCS
- 17 Bolt; .75-10 x 2.0 HHCS
- 18 Nut; .75-10 Hex Lock

Figure 3 — MOR/ryde Single Axle Suspension System (Ford E-350 Chassis)

SECTION II

MAINTENANCE

NOTE:

ALL MAINTENANCE PROCEDURES MUST BE PERFORMED WITH THE VEHICLE SUPPORTED AT THE FRAME WITH SAFETY STANDS, THE FRONT WHEELS BLOCKED, AND THE SUSPENSION HANGING UNSUPPORTED.

Since the MOR/ryde Rubber Suspension requires no lubrication, maintenance is limited to periodic inspections to insure specified torque values are maintained (see Torque Chart in Specification Section) and leveling bolts and pads are in place and tight. If leveling bolts and axle pad-adjustment seat are loose or missing, refer to Section III-A, "Replacement of U-Bolts, Leveling Bolt or Axle Pad-Adjustment Seat," for proper procedure.

II-A. U-BOLT MAINTENANCE

In order to insure long-term, safe and trouble-free performance of the MOR/ryde Rubber Suspension, it is imperative that the U-bolt nuts be retorqued at the intervals listed below. This applies to both new vehicles and to vehicles on which U-bolts have been replaced for any reason.

1. The U-bolts must be retorqued after the vehicle has operated **under load** for 1,000 miles or three (3) months, whichever occurs first.
2. Thereafter, the U-bolt nuts should be checked for

proper torque every 5,000 miles or at regular preventive maintenance intervals.

During all U-bolt torquing procedures, utilize the torque sequence shown in Figure 4.

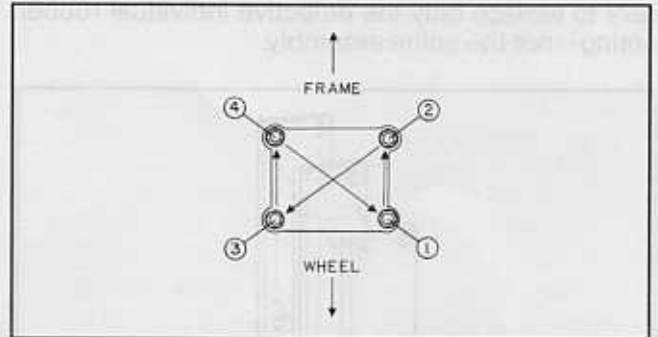


Figure 4 – U-bolt Torque Sequence

II-B. SHOCK ABSORBER MAINTENANCE

The shock absorbers used on the MOR/ryde Rubber Suspension are of the sealed, hydraulic type and require no periodic maintenance. Shock absorbers of this type should be checked every 10,000 miles to make sure they are functioning satisfactorily, bushings are not worn, and the dust cover has not been damaged by flying stones or debris from the road. If a shock absorber is leaking, fails to operate, or develops an unusual noise, the complete unit should be replaced. See Section III-G for replacement procedure.

SECTION III

SERVICE

III-A. REPLACEMENT OF U-BOLTS, LEVELING BOLT, OR AXLE PAD-ADJUSTMENT SEAT

1. Make sure vehicle is elevated and chassis is supported with safety stands, the front wheels blocked, and the suspension hanging unsupported.
2. Tighten U-bolt nuts to 50 ft.-lbs. of initial torque.
3. Tighten leveling bolt on side of beam assembly into axle pad-adjustment seat that sits on top of axle. Torque to 75 ft. lbs.
4. Tighten U-bolt nuts utilizing the torque sequence until 150 ft.-lbs. of final torque is achieved. Refer to Figure 4.

NOTE: Torque values must be verified with a torque wrench. A calibrated pneumatic impact wrench is NOT an acceptable substitute.

III-B. REPLACEMENT OF RUBBER SPRINGS

MOR/ryde Rubber Springs are made of a special

formulation of natural rubber. The rubber springs are vulcanized (bonded) to steel plates. There are two (2) unlikely problems that may occur with MOR/ryde rubber springs:

1. The first type is a bond failure. This condition is apparent when the rubber separates from the metal plate.
2. The second type is a rubber failure that is due to a compounding problem during the manufacturing process. This condition is apparent when the rubber tears or delaminates and generally occurs in the middle of the rubber spring between the metal plates.

Either of the conditions described above would not always necessitate replacement of the rubber spring. If there is a question about the integrity of a marginal rubber spring, a 3" wide object (such as a 3" putty knife) can be used to probe the rubber spring in the affected area. If the probe penetrates the crack or separated area .75 inch or more, the spring should be replaced.

SECTION III

REMEMBER:

The rubber spring assembly is actually two (2) individual rubber springs with the 5.0 x 11.0 or 6.50 x 11.0 steel plates bolted back-to-back (Figure 5). If only one spring in the assembly is defective, it is necessary to replace only the defective individual rubber spring—not the entire assembly.

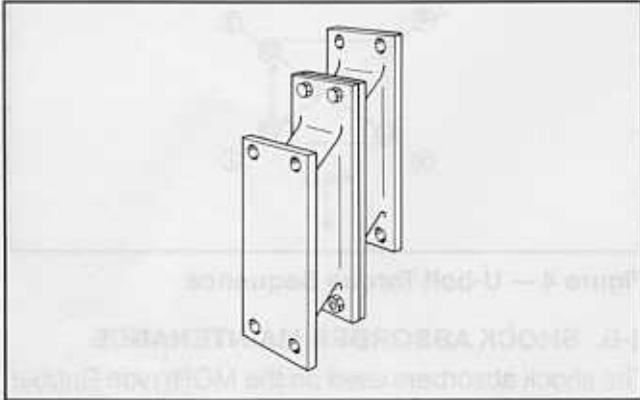


Figure 5 – Rubber Spring Assembly

To replace a rubber spring:

1. Make sure vehicle is elevated and chassis is supported with safety stands, the front wheels blocked, and the suspension hanging unsupported.
2. Remove 3/8" bolts securing the rubber spring assembly to beam assembly and to frame hanger assembly.
3. Rubber spring assembly can now be removed by pulling downward and out. (Spring assembly **cannot** be removed by forcing upward.)
4. Install new spring assembly by pushing spring assembly upward (either by hand or with jack) between the beam assembly and frame hanger assemblies until the bolt holes are aligned (Figure

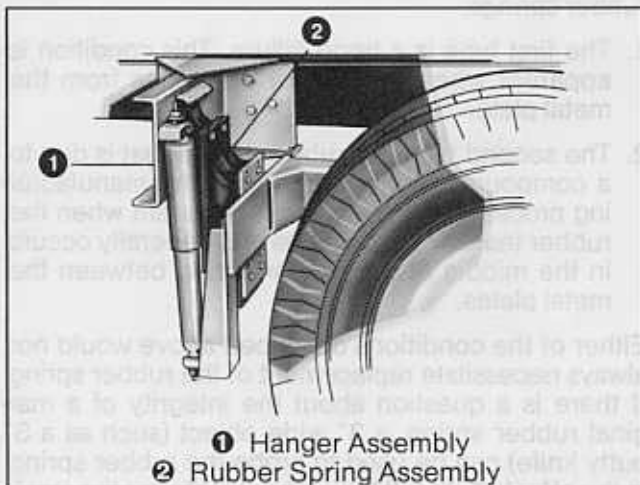


Figure 6 – Rubber Spring Assembly and Hanger Assembly

6). Secure spring assembly with 3/8" x 7/8" Grade 8 bolts. Torque bolts per torque chart in Specification Section.

III-C. REPLACEMENT OF CROSS-MEMBERS

The Cross-Members utilized on the MOR/ryde suspension are very critical parts in assuring the integrity of the suspension system. The purpose of these cross-members is to keep the bottoms of the MOR/ryde hangers from spreading apart. Failure to repair broken or loose cross-members will **always** result in the fracture of the MOR/ryde hangers and/or the chassis side-members. Most cross-member failures are due to the attaching bolts not being properly torqued.

To replace a cross-member:

1. Make sure vehicle is elevated and chassis is supported with safety stands, the front wheels blocked and the suspension hanging unsupported.
2. Remove defective cross-member.
3. Install new cross-member.
4. Torque bolts per Torque Chart in Specifications Section.

III-D. REPLACEMENT OF TRAC BAR BUSHINGS

The MOR/ryde suspension utilizes a trac bar (Figures 7 and 8). Its purpose is to keep the drive wheels parallel with the center line of the vehicle which minimizes lateral instability and provides improved handling. There have been two different designs of trac bars used. The original design was used through January, 1982, after which the design was changed and is still current. Refer to Figures 7 and 8.

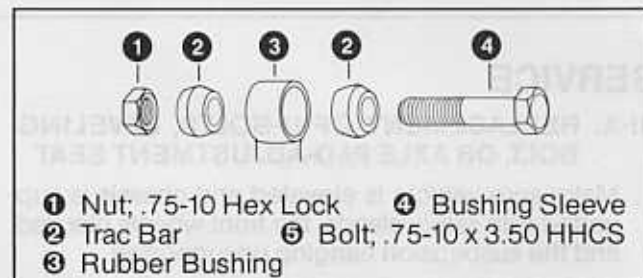


Figure 7 – Trac Bar Assembly
(Used Prior to February, 1982)

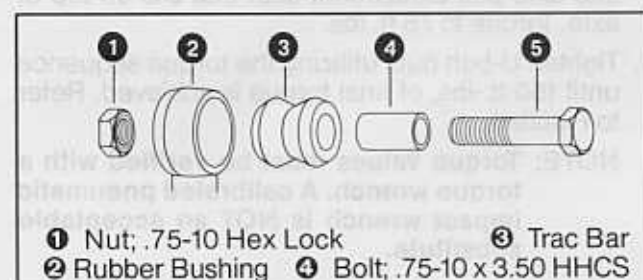


Figure 8 – Trac Bar Assembly
(Used from February, 1982 to Present)

SECTION III

To replace bushings in trac bar assembly:

1. Remove 3/4" bolts from either end of trac bar.
2. Remove trac bar.
3. Replace bushings.
4. Reinstall trac bar.
5. Torque 3/4" bolts per Torque Chart in Specification Section.

III-E. REPLACEMENT OF BEAM ASSEMBLY

The beam assembly utilized on the MOR/ryde rubber suspension supports one side of the rubber springs forward and rearward of axle, the bottom of the shock absorbers, and is located on the axle in the same position the steel leaf springs would have been (Figure 9). The beam assembly is attached to the axle through U-bolts. The proper torquing procedure in attaching the beam assembly to the axle is **extremely** important to suspension reliability.

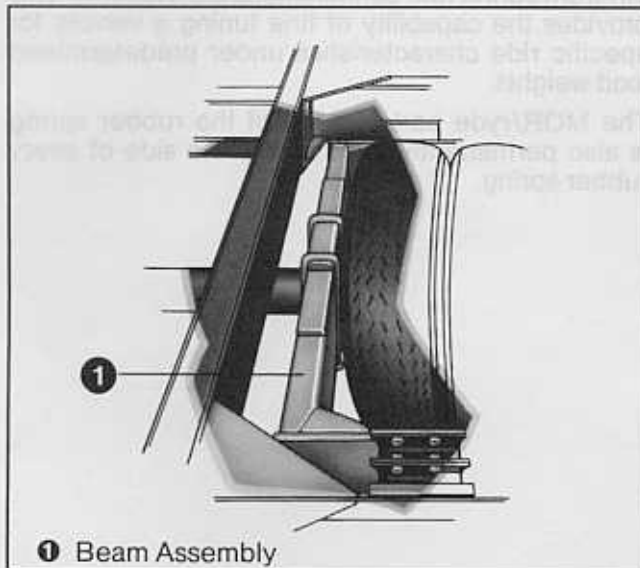


Figure 9 – Beam Assembly

To replace a beam assembly:

1. Make sure vehicle is elevated and chassis is supported with safety stands, the front wheels blocked, and the suspension hanging unsupported.
2. Remove tires and rims from the drive axle on side of vehicle to be repaired.
3. Support axle housing with floor jack.
4. Remove shock absorbers.
5. Remove rubber spring assemblies from beam assembly per Section III-B.
6. Remove U-bolts.
7. Remove beam assembly from axle.
8. Place new beam assembly on axle utilizing new U-bolts and nuts.
9. Torque U-bolt nuts to 50 ft. lbs.

10. Tighten leveling bolt on side of beam into axle pad-adjustment seat. Torque to 75 ft. lbs.
11. Tighten U-bolt nuts utilizing torque sequence until 150 ft. lbs. of final torque is achieved. Refer to Figure 4.

III-F. REPLACEMENT OF HANGER ASSEMBLY

As illustrated in Figure 6 (see page 6), the hanger assembly utilized on the MOR/ryde rubber suspension attaches the rubber spring assemblies to the chassis side-members and also supports the top of the shock absorbers. Failure of the hanger assembly is generally the result of the cross-members being loose or broken (See Section III-C).

To replace a hanger assembly:

1. Make sure the vehicle is elevated and the chassis is supported with safety stands, the front wheels blocked, and the suspension hanging unsupported.
2. Support axle housing with floor jack.
3. Remove shock absorbers.
4. Remove the rubber spring assembly from the affected hanger assembly per Section III-B.
5. Remove cross-member(s) attached to affected hanger assembly.
6. Remove hanger assembly from chassis side-member.
7. Before attaching new hanger assembly to chassis side-member, make sure the contact area is clean and free of any foreign material and metal shavings.
8. Install new hanger assembly on chassis side-member.
9. Reattach cross-member(s).
10. Torque all hanger assembly bolts first; then torque cross-member bolts per Torque Chart in Specifications Section.
11. Reinstall rubber spring assemblies per Section III-B.
12. Reinstall shock absorber per Section III-G.

III-G. REPLACEMENT OF SHOCK ABSORBER

The shock absorbers are made by Monroe with special valving specifically designed for the MOR/ryde rubber suspension. Refer to Figure 10 (see page 8). These shock absorbers are **not** available through any Monroe aftermarket dealers. Consult MOR/ryde, Inc. for replacements.

To replace a shock absorber:

1. Remove fasteners.
2. Remove shock absorber.
3. Install new bushings on new shock absorber per exploded illustration on next page.
4. Install new shock absorber.
5. Torque fasteners per Torque Chart in Specifications Section.

SECTION III

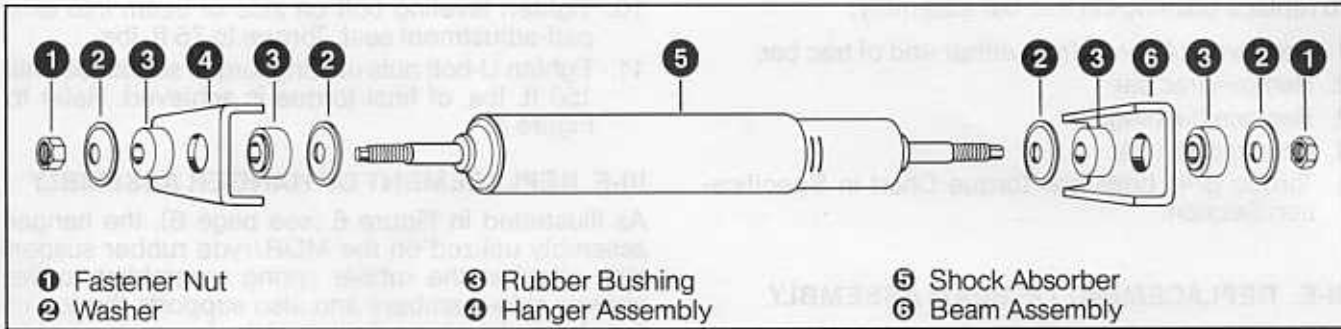


Figure 10 – Shock Absorber and Shock Fasteners

SECTION IV

SPECIFICATIONS

RUBBER SPRINGS

The springs in the MOR/ryde suspension are a special formulation of 100% natural rubber. The rubber springs are vulcanized (bonded) to steel plates.

MOR/ryde springs are shear-type springs which exhibit straight-line load deflection characteristics. Through the use of different spring widths and different rubber

compounds during the manufacturing process, many different spring rate combinations are available. This provides the capability of fine tuning a vehicle for specific ride characteristics under predetermined load weights.

The MOR/ryde part number of the rubber spring is also permanently molded into the side of every rubber spring.



Figure 9 – Rear Assembly

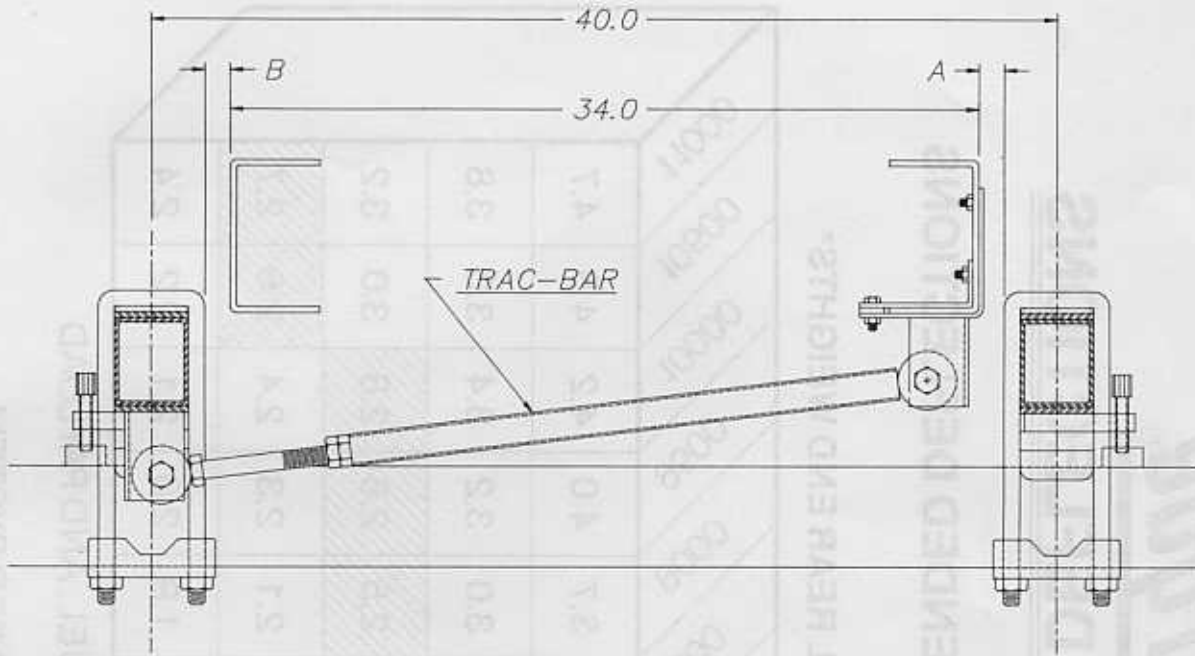
REPLACEMENT OF SHOCK ABSORBER

The shock absorbers are made by Monroe with special lining specifically designed for the MOR/ryde suspension. Refer to Figure 10 (see page 8) for shock absorber part numbers. Through any Monroe distributor, contact Councils MOR/ryde for replacement.

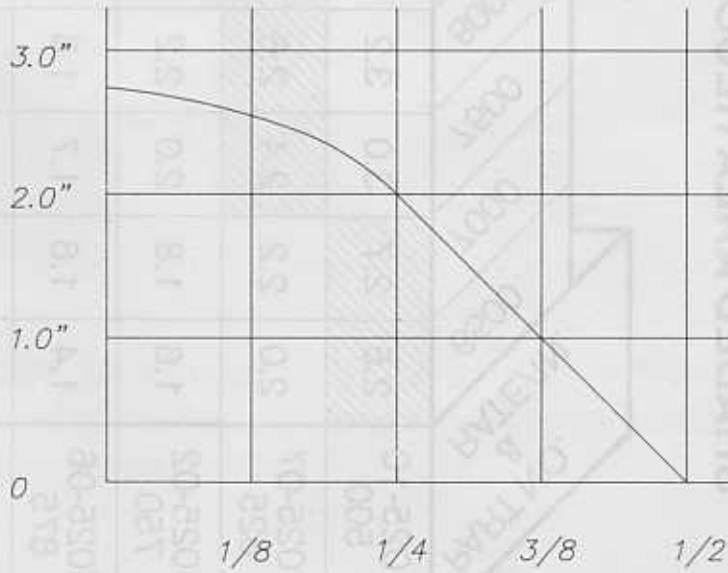
1. Remove fasteners.
2. Remove shock absorber.
3. Install new bushings on new shock absorber per exploded illustration on next page.
4. Install new shock absorber.
5. Torque fasteners per torque chart in Section 4.

1. Raise and level vehicle and chocks in suspension.
2. Remove fasteners from front wheel hub and remove wheel and tire from drive side on side of vehicle to be worked.
3. Support axle assembly with floor jack.
4. Remove shock absorber.
5. Remove rubber spring assembly from beam.
6. Remove U-bolts.
7. Remove beam assembly from axle.
8. Place new beam assembly on axle utilizing new U-bolts and nuts.
9. Torque U-bolts to 50 ft. lbs.

TRAC-BAR ADJUSTMENT



RUBBER
SPRING
DEFLECTION



AMOUNT DIMENSION A IS GREATER
THAN DIMENSION B WHEN
ADJUSTING TRAC-BAR



M03-M14 SPRING DEFLECTIONS

SHADED AREA RECOMMENDED DEFLECTIONS

PART NO. & RATE/IN.	TOTAL REAR END WEIGHTS*										
	6500	7000	7500	8000	8500	9000	9500	10000	10500	11000	
M025-10 500	2.5	2.7	3.0	3.2	3.5	3.7	4.0	4.2	4.5	4.7	
M025-07 625	2.0	2.2	2.4	2.6	2.8	3.0	3.2	3.4	3.6	3.8	
M025-02 750	1.6	1.8	2.0	2.2	2.3	2.5	2.6	2.8	3.0	3.2	
M025-06 875	1.4	1.6	1.7	1.8	2.0	2.1	2.3	2.4	2.6	2.7	
M025-03 1000	1.2	1.4	1.5	1.6	1.7	1.9	2.0	2.1	2.2	2.4	

*FULLY LOADED W/WATER, FUEL, AND PAYLOAD

NOTE: 4 M025 - SPRINGS PER SYSTEM

ASSUMED: 1500# NSPRUNG

TORQUE CHART

USE THESE TORQUE VALUES UNLESS OTHERWISE SPECIFIED ON PRINT.

<u>Bolt Size</u>	<u>Torque Ft. Lbs.</u>	
	<u>Grade 5</u>	<u>Grade 8</u>
3/8"	24	35
7/16"	30	45
1/2"	45	69
5/8"	90	135
3/4"	150	222
7/8"	227	355

U-Bolts

5/8"	—	150
3/4"	150	225

Note: Torque values must be verified with a torque wrench. A calibrated pneumatic impact wrench is not an acceptable substitute.

MERCHANDISE RETURNS

All goods to be returned to MOR/ryde, Inc. must have a return authorization number assigned prior to their being returned. This will enable MOR/ryde to have better control of parts being returned for replacement or credit.

A return authorization form will be sent out with any parts that are ordered for warranty replacement. In the event that new parts are not sent but there is a need to return parts, please provide MOR/ryde with the proper information before returning the parts. A return authorization form will be mailed to accompany the parts to be returned.

Returned parts, such as rubber springs, are tested in the MOR/ryde laboratory upon their receipt. If, after testing, the parts are determined not to be defective, they will be returned to the customer, freight collect, and credit will not be issued.

All return authorizations will be void after 60 days from the date of issue and the account **will be debited** accordingly.

CUSTOMER SERVICE

If you have any questions about servicing the MOR/ryde Rubber Suspension system or wish to order parts, please call the MOR/ryde Customer Service Department. You may telephone (574) 293-1581 between 8:00 a.m. to 4:30 p.m. EST, Monday through Friday.