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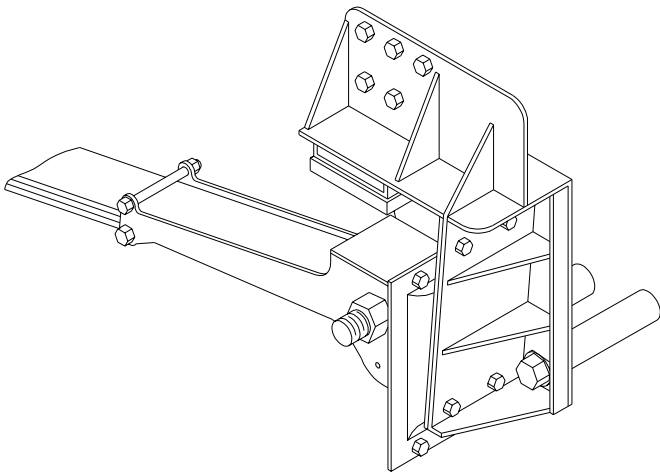
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## The MOR/ryde Steer and Drive Axle Suspension Systems

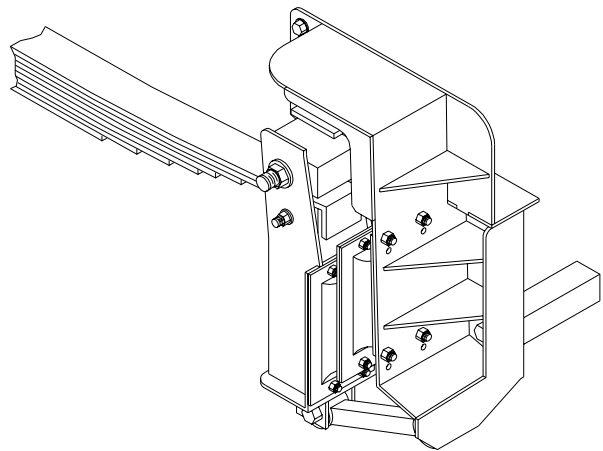
*The suspension system to protect your vehicle and passengers from today's rough roads*

### MOR/ryde Steer Axle Suspension



(Major components and functions identified in following pages)

### MOR/ryde Drive Axle Suspension



(Major components and functions identified in following pages)

## WHAT IS IT?

MOR/ryde Suspension Systems are patented Rubber Shear Spring Suspension Systems that work in conjunction with a chassis steel leaf spring suspension. The MOR/ryde systems replace the rear leaf spring hanger, and/or hanger and shackle, with a MOR/ryde *Frame Hanger*, a *Spring Carrier*, and *Rubber Shear Springs*. The MOR/ryde *Hangers* bolt into the existing spring hanger holes on the chassis frame rail, providing for a secure attachment that serves the same function as the leaf spring hanger. In place of the leaf spring shackle or slipper set-up, MOR/ryde uses a *Spring Carrier* that is attached to the leaf spring, and the MOR/ryde *Rubber Shear Springs*. The *Spring Carrier* serves as the connection between the chassis leaf spring and the MOR/ryde *Rubber Shear Springs*. The heart of the MOR/ryde system is our solid *Rubber Shear Springs*, that serve to isolate and absorb road shock, and also provide for increased dynamic axle travel. MOR/ryde *Rubber Shear Springs* possess a linear spring rate, making performance very predictable at all load ratings and are very effective at isolating and absorbing road shock. A wide range of rubber shear springs are available in differing spring ratings, durometers, and/or physical size. This allows each MOR/ryde system to match the axle rating on whatever type of vehicle the system is installed. The MOR/ryde system does not alter the gross axle weight ratings supplied by the chassis, or final stage manufacturer.

## WHAT DOES IT DO?

MOR/ryde Suspension Systems work in conjunction with the steel leaf springs of the chassis to absorb road shock. The rubber springs are “in shear” as they deflect in response to the road input. Our systems increase the dynamic axle travel of the suspension. This allows the suspension to better absorb road inputs (i.e. potholes, railroad crossings, speed bumps, etc.). The relative increase in dynamic axle travel provides for:

- a smoother ride
- greater driver and passenger comfort
- better protection of the vehicle from damaging road shock

MOR/ryde Suspension Systems provide improvements under light load conditions, as well as full load conditions. This makes the MOR/ryde systems especially effective on applications where the load conditions may vary, or not reach gross axle weight ratings. In addition, equipment and components are better protected from damaging road shock.

## MOR/ryde Suspension Vs. Air Suspension

### HOW DOES IT COMPARE?

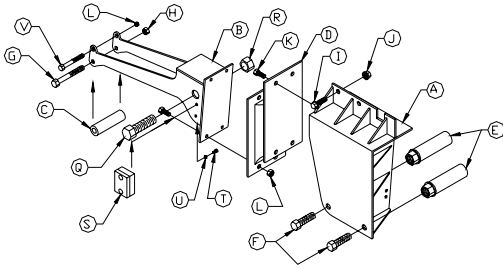
When comparing a MOR/ryde Suspension System to an air suspension, MOR/ryde systems offer several distinct advantages.

- 1. MOR/ryde Suspension Systems fit within the current space envelope of existing OEM steel leaf springs.** The systems can be retrofitted easily onto existing vehicles without major modifications to the chassis or body. Also, body manufacturers do not need to be concerned about special designs to accommodate alternative suspension components.
- 2. MOR/ryde Suspensions are 100% mechanical.** There are no electrical components or air-lines that need inspection or repair. This means less down time and less maintenance costs.
- 3. MOR/ryde Rubber Springs do not leak or puncture.** The rubber shear springs are solid rubber and do not leak or puncture.
- 4. MOR/ryde Suspensions bolt into existing holes in the frame.** Installation time is significantly less due to the use of existing holes in the chassis frame.
- 5. MOR/ryde Suspensions do not alter driveline angles or change pinion angles.** Because we do not remove the OEM steel leaf spring, and our systems are designed to match OEM ride height, drive line and pinion angles remain the same.
- 6. There is little or no maintenance associated with a MOR/ryde Suspension.** Because the rubber shear springs do not leak and there are no electrical or mechanical devices to circulate air, maintenance is minimal.
- 7. MOR/ryde Suspensions are a fraction of the cost of an air suspension, and other alternative suspension systems.** Air suspensions can be extremely costly to install. The MOR/ryde Steer or Drive Axle Suspension Systems range from \$595 to \$750, and can be installed in 2 to 6 hours depending on the application.

# MAJOR COMPONENTS AND THEIR FUNCTION

## MOR/ryde Steer Axle Suspension

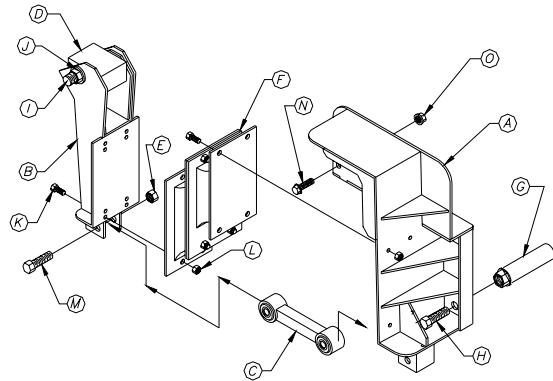
TYPICAL STEER AXLE SUSPENSION COMPONENTS		
ITEM	DESCRIPTION	QTY
A	FRAME HANGER ASSEMBLY (LH)	1
	FRAME HANGER ASSEMBLY (RH)	1
B	SPRING CARRIER ASSEMBLY	2
C	4.00" SPACER SLEEVE	2
D	RUBBER SPRING	2
E	X-MEMBER TUBE ASSEMBLY	2
F	B-.75-10 x 1.5 HHCB	4
G	B-.50-13 x 6.0 HHCB	2
H	N-.50-13 HEX LK	2
I	B-.50-13 x 1.5 FHCB	8
J	N-.50-13 FL LK	8
K	B-.38-16 x 0.88 HHCB	16
L	N-.38-16 HEX LK	16
M	RUBBER BUMP STOP	2
N	B-.25-20 x 1.50 HHCB	2
O	N-.25-20 HEX LK	2
P	.25 ID FLAT WASHER	2
Q	B-1.25-7 HEX	2
R	N-1.25-7 FIN HEX	2
S	WEAR PAD ASSEMBLY	2
T	B-.31-18 x 1.00 HHCS	4
U	.31 ID LOCK WASHER	4
V	B-.38-16 x 5.50 HHCS	2



Patent No. 6176478

## MOR/ryde Drive Axle Suspension

TYPICAL DRIVE AXLE SUSPENSION COMPONENTS		
ITEM	DESCRIPTION	QTY
A	FRAME HANGER ASSEMBLY (LH)	1
	FRAME HANGER ASSEMBLY (RH)	1
B	SPRING CARRIER ASSEMBLY (LH)	1
	SPRING CARRIER ASSEMBLY (RH)	1
C	TORQUE ARM ASSEMBLY	2
D	2.0 x 4.0 SPACER BLOCK	2
E	NUT - .75-10 FL LK	4
F	RUBBER SPRING ASSEMBLY	2
G	CROSS-MEMBER TUBE ASSEMBLY	1
H	BOLT - .75-10 x 2.0 HHCB	2
I	BOLT - 1.00-8 x 5.5 HHCB	2
J	NUT - 1.00-8 FL LK	2
K	BOLT - .38-16 x 0.88 HHCB	16
L	NUT - .38-16 HEX LK	16
M	BOLT - .75-10 x 3.50 HHCB	4
N	BOLT - .50-13 x 1.75 FL LK	6
O	NUT - .50-13 FL LK	6



Patent Pending

**Frame Hanger** - provides attachment to chassis rail using existing holes in the chassis. No alteration is made to the chassis rail to accommodate the frame hanger. The frame hanger is designed specifically for the chassis type (International 3800, Bluebird TC 2000, etc.).

**Spring Carrier** - serves as an attachment between the steel leaf springs and the MOR/ryde Rubber Shear Springs.

**Wear Pad Assembly** - serves as a lateral motion limiter for the Spring Carrier.

**Torque Arm (drive axle)** - maintains stability of rubber shear springs.

**Cross Member** - provides lateral connection between frame hangers. Serves to prevent unnecessary movement of frame hanger and reduce stress on chassis frame.

**Rubber Shear Spring** - MOR/ryde Rubber Shear Springs work to isolate and absorb road shock.

MOR/ryde systems do not fundamentally alter or change the function of the chassis steel leaf springs. The chassis suspension continues to function as designed. The addition of a MOR/ryde system enhances the ability of the chassis suspension to effectively deal with today's rough roads. Should a MOR/ryde *Rubber Shear Spring* experience premature failure, the chassis suspension system continues to function, allowing the vehicle to continue to be driven. A total failure of a MOR/ryde *Rubber Shear Spring* would not render the vehicle immobile or un-drivable, as the chassis suspension will continue to function. This occurs when the Mor/ryde *Spring Carrier* contacts the top horizontal hat portion of the Mor/ryde *Frame Hanger*. This horizontal hat section of the *Frame Hanger* serves as a safety stop in the event of a *Rubber Shear Spring* failure, but also as a vertical jounce stop to limit the upward motion of the Mor/ryde *Spring Carrier* from contact with the underside of the floor.

# Current Users and Applications

Currently MOR/ryde Suspension Systems are being widely used by the Transit Bus, and most recently, School Bus industries. Several States and Agencies have written the MOR/ryde Suspension Systems into state specifications for Transit Buses and Mobility Vans. Following are a few of our many satisfied users, and states currently listing MOR/ryde systems in specifications:

- **California**
- **Texas**
- **Arkansas**
- **Alabama**
- **Florida**
- **Virginia**
- **West Virginia**
- **Kansas**
- **Michigan**
- **MARTA - Atlanta, GA**
- **Access Services - Los Angeles, CA**
- **Bi State Development - St. Louis, MO**
- **Corpus Christi RTA - Corpus Christi, TX**
- **Luddington Mass Transit - Luddington, MI**
- **CATA - Lansing, MI**
- **Outreach and Escort, Inc. - San Jose, CA**
- **Ocean County - Toms River, NJ**
- **Trans Express - Brooklyn, NY**

Additional states to follow pending spec release



School Districts currently outfitting buses with MOR/ryde Suspension Systems include:

- **Willis ISD - Willis, TX**
- **Vidor ISD - Vidor, TX**
- **Spring ISD - Spring, TX**
- **Katy ISD - Katy, TX**
- **IOSCA-RESA - Oscoda, MI**
- **Rhodes Transportation - Ambridge, PA**
- **Lumpkin County Schools - Dahlonega, GA**
- **Graves County Schools - Paducah, KY**
- **Hunterdon Central Schools - Flemington, NJ**
- **White Pigeon Schools - White Pigeon, MI**



MOR/ryde Suspension Systems are now available for OEM or aftermarket installation on a wide range of chassis including...

**Chevrolet** ◆ **Freightliner** ◆ **Dodge** ◆ **International** ◆ **GMC**  
**Oshkosh** ◆ **Ford** ◆ **Workhorse** ◆ **Bluebird**



**MOR/ryde International**