

Why Dampers are Important to You

DAMPERS: A QUICK HISTORY

In the early 1900's cars were still evolving from horse drawn carriages.



Vehicles had solid axles and carriage leaf springs with no dampers. These vehicles bounced nearly out of control over the rough unpaved roads. As cars got faster the situation got worse.

Then some innovative automotive engineer decided a suspension damper would be a good idea. A suspension damper could keep the car from bouncing, making the car easier to control and the ride more comfortable. The first dampers were friction dampers that rubbed leather together to create damping. While this was an improvement over no dampers, these early dampers left a lot to be desired.

Here is a picture of a friction damper on a Ford Model T that used leather between metal discs for the friction damping.

In 1918 Gabriel introduced the first hydraulic suspension damper. This was the beginning of the tubular dampers we know today.

MODERN DAY DAMPERS

Today's dampers are complex devices that are used for many purposes. The damper's primary purpose is to keep the sprung mass (body) and the unsprung mass (suspension) damped and under control. While springs support the weight of the body or sprung mass of the vehicle and the combination of springs and anti-roll bars control the ultimate dive, pitch and roll of the car, the dampers control the *rate* of bounce, heave, pitch and roll.

Springs and anti-roll bars react differently than dampers. Springs and roll bars create force based on displacement. The more you push on a spring or twist an anti-roll bar the more force it creates. So, the springs and anti-roll bars control weight transfer.

Not so with a damper. Dampers generate force based on the *speed* or *velocity* the damper shaft is moving. The dampers control the *rate* of weight transfer.

Today, we use dampers to do much more than simply keeping the vehicle from bouncing out of control. We also use the dampers to *control* the heave, pitch and roll of the body, and to assist *handling motions* like roll during turn-in, front dive during braking and rear squat during acceleration.



WE EXPECT OUR DAMPERS TO DO A LOT

- ◆ Control the motion of the body or sprung mass.
- ◆ Control the bounce of the suspension or unsprung mass.
- ◆ Assist handling by controlling the *rate* of weight transfer.
 - ◆ Pitch.
 - ◆ Roll.
 - ◆ Squat.
- ◆ Keep the tire patch in contact with the track.
- ◆ Maximize tire grip.

SO, KEEP YOUR DAMPERS IN TOP SHAPE

For maximum vehicle performance it is essential to keep your dampers well maintained and performing properly. Here are some tips:

- ◆ Gas charge the dampers each day you run the car.
- ◆ Protect the dampers from damage, especially the shock rods.
- ◆ Inspect the dampers regularly for rod damage and excessive oil leakage. A slight oil film on the rod is normal.
- ◆ Have your dampers performance tested annually.
- ◆ Rebuild your dampers every 30 hours.

It's a bit shocking to learn how much our dampers do for us. And, it's just as shocking to realize how easily we take them for granted.

Keep 'em in shape. It doesn't take much.

Dampers could just make the difference getting you in Victory Lane.

