

IT'S ONLY A SPRING

Odds are good that if you own a Mustang and have considered modifying it, you've thought about changing the "factory springs." You start to research the best "spring" purchase, when confusion quickly enters the picture. What's so confusing? Well, there are at least 10 components that act as springs between the road and the driver. These "springs" affect each other and collectively provide energy management for your vehicle as you travel down the road. This system of springs includes coil springs, control arms, bushings, body structure, tires, wheels, struts, shocks, sway bars, and jounce bumpers. If you change one component of the system, you will affect other components. Let's look at how the suspension system components "play" together:

COIL SPRINGS:

Coil springs allow you to set your Mustang's ride height and control suspension travel when in motion. They are usually described by spring rate and coil height to define how "stiff" your Mustang ride can be (the higher the spring rate, the stiffer the ride). Coil height along with spring rate gives an indication of how the overall ride height will be affected. The primary function of coil springs is to manage loads during bumps, dips, fast turns, stops, or acceleration and is therefore the "primary" spring in the system.

CONTROL ARMS:

Control arms are the stampings or castings that "connect" the wheels to the body. They moderate the lateral or side-to-side movement of the front wheels and allow the wheels or axle to move vertically when a bump or dip is encountered. Under extreme conditions, the control arms will flex or bend for an instant then return to their normal state. During this bending, the control arms manage energy thereby behaving as a spring.

BUSHINGS:

Bushings are mounted in the interface area between the control arms and the body, or the sway bars and the body. They are designed to absorb harsh "impact" loads from these mounting areas and minimize noise that would otherwise be transferred from the wheel/tire to the vehicle body. Because bushings are usually made of rubber or urethane, they contribute a small spring effect in the overall system.

BODY STRUCTURE:

Most people don't realize the body of the car performs many functions, including the often over-looked energy management. The stock Mustang body will actually bend slightly as loads are transferred from the road to the suspension. To minimize this bending motion, a popular vehicle modification is to add strut tower braces and frame rail connectors to your Mustang. These components help to manage the up and down body movement so that the coil springs can do most of the ride handling work.

TIRES:

Tires cushion the ride, give firm support to the vehicle, provide traction, and act as a spring component. The higher the tire is inflated, the stiffer this spring becomes. The stiffer

the side wall construction, the stiffer this spring becomes. And finally, the shorter the sidewall, the stiffer this spring becomes. Tires are key ingredients in defining your overall ride and handling characteristics.

WHEELS:

As you travel over bumps or corner extremely hard, your Mustang wheels deflect slightly, absorbing energy and making them a small spring in your vehicle system.

STRUTS/SHOCKS:

Struts and shocks are key ingredients to your suspension performance. They really are not springs, but do interact with the spring to dampen reactive forces. With out a dampener, the springs would compress and rebound back and forth like pogo sticks. Said another way, the dampeners control the rate at which the load is enacted on the springs. A strut/shock with high rates of dampening gives you a firmer and harsher ride, which is why some high end aftermarket struts and shocks are adjustable so you can set the dampening firmness for performance driving, then adjust them softer for every day driving.

SWAY BARS:

Sway bars or stabilizer bars are really torsion bar springs. Their primary function is to distribute load from one side of the car to the other when cornering or when significant changes in the road surface occur.

JOUNCE BUMPERS:

Jounce is a term used to describe the vertical motion when the tire/wheel is pushed up into the wheel well cavity. The jounce bumper is usually made of rubber or urethane. It is positioned to stop the vertical travel of the suspension before it travels so far that a metal portion of the suspension contacts a metal portion of the body (referred to as a metal to metal contact).

As you can see, there are many components providing a spring function to your car. When you change one aspect, you need to consider the effect on the others. If you take a systematic approach to selecting springs you will have a very predictable and satisfying result.

Picking the right spring set-up begins by both understanding how "spring systems" work on your Mustang and defining what you want to accomplish in modifying your suspension setup.



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