Sway Bars...

There is a very good chance you have experienced the effects of body roll during the course of your normal driving. It happens during almost every turn when one side of the car lifts, causing the entire vehicle to "lean" toward the outside of the turn.

The cause of body roll is simple physics: an object in motion tends to stay in motion until acted upon by an outside force. So in practical terms, as you drive ahead in a straight line, you allow over 2300 pounds of vehicle, fluids, and passengers to build momentum in a straight line. Suddenly, through input at the steering wheel, you tell everything to change direction. But even though the front tires may change direction, thanks to the mechanical advantages of the steering system, the momentum of the vehicle, fluids, and passengers continues in the original direction. The tires are the only element capable of generating an outside force that can act against this momentum and change its direction.

At this point, one of two scenarios is most likely to occur. If enough momentum exists in the original direction, and the tires lack enough grip to act against the original forward energy, then the vehicle will slide out of the turn as the tires loose traction. However, if the tires have enough grip at the road surface, then instead of sliding, the vehicle's traction at the road surface will overwhelm the original forward momentum and act upon the original forces to induce a change of direction. Hence, a cornering maneuver.

But what happens to that energy? Even though we may have had enough grip to hang-on through the turn, we know that the momentum of the vehicle mass will continue in the original direction. The result is a weight transfer toward the new outside edge of the vehicle – the same direction as the original forward momentum. If enough energy is behind the weight transfer, then this energy will cause the outside suspension (in this case, the spring and strut assembly) to compress while the other side lifts and extends. An engineer-type likes to describe this by saying that one side moves into "jounce" while the other moves into "rebound." The rest of us call it "lean" or "body roll."

We often hear that preventing body roll is "so important" that we all must rush out and buy "this" product or "that" product in order to prevent it. And many enthusiasts have consequently accepted that body roll is therefore "bad." But what exactly does body roll do to negatively affect vehicle handling?

For starters, it disrupts the driver. This is probably the effect that most drivers can see and feel during their own driving experiences. And while this is not the most important negative effect of body roll, it is true that the car does not drive itself – no matter how many aftermarket parts you install. So keeping the driver settled, focused, and able to concentrate on the task of driving is a foremost priority for spirited vehicle handling.

However, the most often misunderstood effect of body roll upon vehicle handling is the effect of body roll upon camber - and the effect of camber changes upon tire traction. Put simply, the larger the contact patch of the tire, the more traction exists against the road surface, holding all else constant. But when the vehicle begins to "lean" or "roll" to one side, the tires are also forced to "lean" or "roll" to one side. This can be described as a "camber change" in which the outside tire experiences increased positive camber (rolls to the outside edge of the tire) and the inside tire experiences increased negative camber (rolls to the inside edge of the tire.) So a tire that originally enjoyed a complete and flat contact patch prior to body roll must operate only on the tire edge during body roll.

The resulting loss of traction can allow the tires to more easily give away to the forces of weight transfer to the outside edge of the vehicle. When this happens, the vehicle slides sideways – which is generally a "bad" thing.

LETS ALL LEARN HOW TO PREVENT BODY ROLL

By definition, body roll only occurs when one side of the suspension is compressed (moves into "jounce") while the other extends (moves into "rebound.") Therefore, we can limit body roll by making it harder for the driver side and passenger side suspension to move in opposite directions.

One fairly obvious method to achieve this is through the use of stiffer springs. After all, a stiffer spring will compress less than a softer spring when subjected to an equal amount of force. And less compression of the suspension on the outside edge will result in less body roll. However, stiffer springs require the use of stronger dampers (struts) and have an immediate and substantial effect on ride quality. So even though handling is improved, they may not be the easiest or most cost-effective way to achieve the objective of reducing body roll.

For many enthusiasts, the use of anti-sway bars – also known as "anti-roll" bars, "roll" bars or "sway" bars – provides a more cost-effective reduction in body roll with minimal negative impacts upon ride quality.

HOW AN ANTI-SWAY BAR WORKS

Put simply, an anti-sway bar is a "U-shaped" metal bar that connects to both wheels on opposite sides of the car at the ends and connects to the chassis in the middle. Essentially, the ends of the bar are connected to the wheels while the center of the bar is connected to the body of the car.

In order for body roll to occur, the suspension on the outside edge of the car must compress while the suspension on the inside edge simultaneously extends. However, since the anti-sway bar is attached to both wheels, such movement is only possible if the metal bar is allowed

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JIM SILVERMAN
Chairperson for the Driving Events

Phone: 508.584.8848

50/50 Drawing, Goodie Bags, Dash Plaques, Awards at 4pm. Bring the family. More information, call Jerry 985.774.6341; email fine66@bellsouth.net; visit www.northshoremustangclub.com.

OCTOBER 27 ZACHARY, LA

All Ford Show and Shine hosted by Baton Rouge Mustangers Inc. at Superior Ford. Event 9:00 a.m. - 4:00 p.m. Check-in 9:00 - 11:00 a.m. Registration $20. Awards 2:00 p.m. Mustangs, Trucks, Special Interest, Modified, and Dealer's Choice. (Ford-powered vehicles only). Door prizes! Lunch provided for participants. Donations benefit Alzheimer's Services of the Capital Area. Bring the family, and join the fun at Superior Ford! For more information, call Kathy at 225.677.5490; email wootkp@aol.com; call Jim at 225.622.2305; email jfreyder@cox.net; or visit www.brmustangers.org.

OCT 27 HOUSTON, TX

14th Annual All Ford Car Show hosted by the Mustang Club of Houston at Freeway Ford 6445 Southwest Freeway. Rain date November 3rd. Registration is from 8:00 a.m. - 12 Noon. Judging starts at noon. Contact Les Blankenship at 281.463.4245 or Pete Sigwardt at 281.392.1814.

OCT 27-28 LAS VEGAS, NV

Freemont Street Bright Lights City Cruise Hosted by Mustang Club of Las Vegas at Freemont Street Experience Under the Canopy. Event 7:00 a.m. - 5:00 p.m. Check-in 7:00 -10:00 a.m. Registration $35 ($35 before October 20). MCLV's Biggest Event for the year. Show your Mustang under the bright lights of Freemont Street For more information, call Larry Gareffa at 702.636.0707; email lgareffa@cox.net; call Jim Matthews at 702.987.3226; email jim@musclecarsofamerica.com; or visit http://www.mustangsoflv.org.

OCT 28 PANAMA CITY, FL

12th annual show Fabulous Fords car show hosted by Bay Mustang Club at Cook Whitehead Ford. Event 10:00 a.m. - 4:00 p.m. Registration $20, ends at 12 Noon. ($15 before October 15). This is an all-Fords event. For more information, call Rick Venable at 850.774.1864; email rick.venable@knology.net; call Fred Miller at 850.235.0863; email cdfemiller@knology.net; or visit http://clubs.hemmings.com/frameset.cfm?club=baymustang.

OCT 28 SAN ANTONIO, TX

Fall Charity Car Show hosted by San Antonio Mustang Club at Bass Pro Shops Outdoor World. Event 11:00 a.m. - 4:00 p.m. Check-in 8:00 -11:00 a.m. Registration $25 ($20 before October 13). Charity car show to benefit Dare to Love, a local children's charity. 13 classes for all makes/models/years. Vendors welcome. Many area shops and restaurants. More information, call Anton Gerhard at 210.566.2150; email starduster_1@hotmail.com; call Paul Govoni at 210.696.9640 or visit http://www.samustang.com.

NOV. 17 OCEAN SPRINGS, MS

Fall Celebration hosted by Mississippi Coast Mustang Club at Wal Mart Supercenter, 3911 Bienville Blvd. (Hwy 90 East). Event 8:00 a.m.- 4:00 p.m. Check-in 8:00 - 11:00 a.m.. Registration $20. Open Car Show. For more information, call Donna Kisner at 228.255.9522; email kisner@cableone.net; call David L. Dedeaux at 228.255.7936; or email dmdedeaux@bellsouth.net.

NOV 18 WESTMINSTER, CA

The Sunset Showdown hosted by Beach Cities Mustang Club at Sunset Ford. Event 10:00 a.m. - 3:00 p.m. Check-in 7:30 - 8:45 a.m. Registration $30. The last show of the SoCal Car Season! Classes for Mustangs & all Ford vehicles. Beautiful glass awards, food, vendors, music and more. For more information, call Jon Schultz at 562.498.BCMC (2262);email ss@bcmc.net; or visit http://www.bcmc.net.

NOV 18 BRADENTON, FL

16th annual Super Sunday Mustang and Ford Show hosted by Mustang Club of West Central Florida at De Soto Mall, US 41. Event hours are 8:00 a.m. - 4:00 p.m. Check-in 8:00 - 10:00 a.m. Registration $22 ($20 before November 11). Awards will be presented 3:00 p.m. Dash plaques to first 100 vehicles. Car corral and vendors. First, Second and Third place awards based on points Proceeds benefit TideWell Hospice and Southeastern Guide Dogs. For more information, call Duke Clancy at 941.371.1942 (days); 941.927.7284 (eves); email mustangnuts@verizon.net; or call Lola Baker at 941.351.3789.

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to twist. (One side of the bar must twist upward while the other twists downward.) So the bar's "torsional stiffness" – or resistance to twist – determines that bar's ability to reduce body roll. Less twisting of the bar results in less movement into jounce and rebound by the opposite ends of the suspension – which results in less body roll.

FACTORS THAT DETERMINE SWAY BAR STIFFNESS

There are two primary factors that determine an anti-sway bar's torsional stiffness: the diameter of the bar and the length of the bar's "moment arm" (more commonly known as the amount of leverage that the vehicle is able to apply against the twisting motion of the bar.)

Diameter is generally the easiest concept to grasp, as it is somewhat intuitive that a larger diameter bar would have greater torsional rigidity

However, in addition to the diameter of a bar, there is another very important factor that determines an anti-sway bar's torsional rigidity. This factor is known as the "length of the moment arm" – or in common terms, the amount of leverage between the vehicle and the bar.

Because an anti-sway bar is shaped as a "U," the ends of the bar that lead from the center of the bar to the end-link attachment serve as a lever. As the distance from the straight part of the bar to the attachment at the end link becomes longer, the torque applied against the bar increases – making it easier for a given amount of energy to twist the anti-sway bar. As this distance is reduced, torque is reduced - making it more difficult for a given amount of energy to twist the anti-sway bar.

It is the lever law that is applied during the design of an adjustable anti-sway bar. By using multiple end link locations, the distance from the point of attachment to the straight part of the bar can be altered. Or in engineers' terms, the length of "the moment arm" can be increased or reduced in order to make more or less torque against the bar. Using a setting further from the center of the bar increases the length of the moment arm, resulting in more torque against the bar, allowing more twisting motion of the bar, creating more body roll. Using a setting closer to the center of the bar reduces the length of the moment arm, resulting in less torque against the bar, allowing less twisting motion of the bar, creating less body roll.

So, in summary, less twist = less deflection = less body roll.