SOUTHERN OREGON CORVETTE ASSOCIATION, LLC
WWW.SOVETTE.COM
P.O. Box 865 • Medford, Oregon 97501
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# Newsletter
## October 2018

**2018 Directors**

**President:** Ron Howard
**Vice-President:** Tony Herrera
**Secretary:** Paul Mitchell
**Treasurer:** Carol Misner
**Sergeant-at-Arms:** Patrick Smith
**Past President (2017):** Tony Herrera

**Appointed Positions**

**Historian:** Group Effort
**Photographer:** Group Effort
**Sunshine:** Sandee Anderson
**Activities:** David Allen
**Event Reminder:** Pat Dobson
**Membership:** Robert Thiel
**Webmaster:** Cathy York & Sharon Hook-Martino
**Parade Coordinator:** Dora Moore & Sheron Leigh

**October Birthdays**

| | | | |
|---|---|---|---|
| 4th | Milton Reaser | 16th | Lucien LeBlanc |
| 7th | Jim Roarty | 17th | Bill Whitlock |
| 9th | Luis Brito | 23rd | Gary Masters |
| 9th | Kathy Dennis | 24th | Steve Sunseri |
| | | 29th | Pat Dobson |

**October Anniversaries**

| | | | |
|---|---|---|---|
| 9th | Luis & Heidi Brito | 18th | Bill & Georgia Whitlock |
| 15th | Gary & Kellie Vancour | 20th | Dale & Dee Yellin |
| 18th | Bob & Yolanda Bruton | 24th | Ken & Judy Axling |

**SOCA Logo Apparel**
Contact Tony Herrera at (541) 538-9706

**Next Club Social**

October 20: SOCA Social. Drive & Dinner. Detail TBA

***Please RSVP to Pat Dobson at:***
pdobson0503@icloud.com **or (541) 664-4506**

**Why Join SOCA?**

- **Promote esprit-de-corps among Corvette enthusiasts.**
- **Create interest in the Corvette as a true dual-purpose sports car.**
- **Provide a means of technical information and service to members.**
- **Encourage dealer and manufacturer cooperation.**
- **Organize and promote events of a social nature and provide social gatherings for enthusiasts with common interest.**
- **Sponsor or participate in activities to benefit the community through recognized charities as selected by the members of the Association.**

**Upcoming Meetings**

**General Membership Meeting**, November 7, 2018, 7:00 PM
Rogue River Community Center, 132 Broadway St., Rogue River
**Visitors are always welcome!**


**SOCA Members' Corvettes at the *World of Speed* in Wilsonville**

October 6: 28th Annual "Sea Cruise" Car Show in Crescent City, CA … details TBA

October 20: SOCA Social … details TBA

November 7 Club meeting

November 20: SOCA Social … details TBA

December 1: Grants Pass Christmas Parade … details TBA

December 8: 6:00 PM - SOCA Christmas Party … Taprock Northwest Grill restaurant, Grants Pass, in the Evergreen room … details TBA.

For additional events, information and links … go to the S.O.C.A. website "Events Page:"

https://www.sovette.com/events

**Having fun at the *World of Speed* in Wilsonville**

## Anti-Sway Bars: A Primer - By Brian Ferrari - July 19, 2004

How do sway bars work, and how can you use them to tune your car's suspension? Most performance people know stiffer rear sway bars reduce the understeering tendencies of a vehicle, but if you ask them exactly why this is - they generally draw a blank. Usually they know the results, but not the reasons behind chassis tuning. This article is intended to answer those questions, as well as give readers a better understanding of what goes on in your suspension when you take a corner. First, let's get an understanding of what "lateral weight transfer" is, because this will help you understand exactly how sway bars work to tune the balance of the chassis.

"Lateral weight transfer" is a function of three things:

- Overall weight of car
- Height of the Cg (center of gravity)
- Track width (this is the distance between the vertical centerlines of each tire on an axle, and many times track width is different on each axle)

So the first thing to notice here is "spring rate" IS NOT a primary determinate in how much weight is transferred laterally on a car for a given amount of steering input. This is something many people have a hard time swallowing, but nevertheless it is true. All the springs primarily do is determine how much the suspension will compress or expand due to this weight transfer.

**Body Roll -** One thing that's really important to understand is the difference between "body roll" and "weight transfer." Although weight transfer is not a function of suspension setup, body roll very much is. Basically, how much the body rolls when going into a corner is originally a function of suspension design, and it only resisted through spring rates and anti-sway bars. This revolves around the concepts of suspension roll centers and the roll axis, which are beyond the scope of this article but important to just be basically aware of. So remember that body roll and weight transfer are not directly related, you can have weight transfer without body roll if things are set up just so.

So why is "body roll" bad? Two reasons:
#1 - it screws up the camber angle of the tires to the road, plus throws off other suspension settings
#2 - it unsettles the driver

Next, you need to know the principle way you control body roll is through spring rates. And here's where we encounter the problem of not being able to change the static spring rates between cornering maneuvers and just going straight. To show a quick example of this: - Say the amount of body roll during a corner is 10 degrees for a spring rate of 500 lbs. If you wanted to halve this amount of roll, you would need to roughly double the spring rate to accomplish it. Now we already know that limiting body roll can improve handling (depending on circumstances and suspension setup), but running a spring that stiff will cause the car to be so bouncy that the tire will rarely be in good contact with the ground, unless the road is perfectly smooth. So how can we selectively increase spring rates only under cornering so that our straight line stability & tire to road contact is not compromised by really stiff springs? The sway bar is the answer.

Now it should be stated here what sway bars essentially do, even though I know you may already know this. What a sway bar does is counteract the action of body roll during cornering by transferring spring rate from the inside wheel to the outside wheel in a corner. This means that you don't actually get any added spring rate; you just subtract it from one side and add it to the other. This has the ultimate effect of transferring load from the inside tire to the outside, which has the visual effect of compressing the suspension on the inside of the turn and expanding the suspension on the outside of the turn (thus limiting body roll). This is good mainly because it smoothes the speed of weight transfer during quick transitions and also limits the camber change experienced at the corners of the car through suspension travel. And of course, using this concept one can dial in the amount of total loading on the outside tire by varying the effectiveness of the sway bar (stiffer bars equal more transfer). And the beauty of all this is that it mostly only occurs during cornering, so our straight line spring rates are not affected. Ok, so hopefully now you understand this concept. This is the most important part though, so if anything is still fuzzy read this again until you get it. Also, here's an example of how this works:

For this example we will use a sway bar with a roll stiffness of 250 lbs.

Left front static load: 1000lbs

Right front static load: 1000lbs

- <u>Lateral weight transfer</u> in a right hand turn
  Left front: + 500lbs
  Right front: - 500lbs
  Total weight transfer: 1000lbs

- <u>Load transfer of sway bar</u> (which is 250lbs):
  Left front: +250lbs
  Right front: - 250lbs
  Total weight transfer: 1000lbs

- <u>Total effective cornering load</u> for this example:
  Left front: 1000 + 750= 1750lbs
  Right front: 1000 - 750= 250lbs

- <u>Without sway bar</u>
  Left front: 1000 + 500= 1500lbs
  Right front: 1000 - 500= 500lbs

Alright, now we are coming into the home stretch of this learning curve. You need to know although you cannot control the total amount of lateral weight transfer during cornering (as I stated earlier), you CAN have some control over how it is distributed on each axle. Looking at the above example, you see with or without the sway bar involved, the total weight transfer change is always 1000 lbs. You can't change this amount, but you can re-distribute it along the axle. And this is a function of spring rates entirely, which we now know is best controlled during cornering through the use of sway bars.

So how does one control the balance of a car when armed with this knowledge? It's actually very simple at this point, if you understand increasing tire loading adds to the total amount of traction available from it, but this relationship is NOT linear. The more load on the tire, the more traction available, but *the amount of traction gained diminishes as load increases*. So at first it's almost a direct "you add 250lbs of load, you get 250lbs of extra traction", but at 1000lbs of load, you might only get 800lbs of extra traction. Knowing this, look at the example I gave of the sway bar at work. Since it transfers load away from the inside tire, you lose traction there. Although it transfers this load to the outside tire, it is already quite loaded and therefore the 250lbs of load will not increase overall traction by 250lbs. More like maybe 150lbs. Now the inside tire, being much less loaded, could have gained more like 220lbs or traction from the 250lbs of load. So look at what we have in the end: although the outside tires already do most of the work, *adding a sway bar actually lowers the total amount of traction available at this end of the car by increasing the difference in load distribution.* And the stiffer that sway bar is, the more it will limit the total traction available at that end.

So what we end up with is: the knowledge that weight transfer ultimately lowers the total amount of traction available at each end of the car. This is why *the more we can limit total weight transfer* (by increasing track, lowering the Cg height, or lowering overall vehicle weight) *the more total traction will be available.* But for the purposes of this article, we are explaining how *sway bar sizing* (which directly reflects its roll stiffness amount) *cures an unbalanced car*. If a car is understeering, it's because the rear end has more total traction than the front. If you put a big sway bar on the rear suspension to limit the total amount of traction available there (by maximizing the amount of load transfer to the outside wheel), you can dial it in to match the front suspension's total available traction. And when we get really smart, we start to match the front & rear bars to one another to achieve the best balance through the largest possible range of suspension movement

**Note:** This is a *primer* on the vehicle dynamics governing roll stiffness and its effects on cornering balance, NOT a purely scientific explanation of this. Some forces at work have been left out for simplicity. The point with this article is to gain a basic understanding of what's going on when you enter a corner, not be able to design your own suspension system.

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