



INSIDE THIS ISSUE	
Rocky Mountain Muscle Car Classic	1
Corvette Suspension Modifications	2, 3, 4
Tune Up Your VETTE For Summer	3
Jaco BBQ Pics	5
Calendar	6



May 30, 2009

Pikes Peak International Raceway

Southern Colorado Corvette Club

Mailing Address:
9 Ibis Lane
Pueblo, Co 81005

We meet every 3rd
Tuesday at the
Pueblo Public
Library
100 E Abriendo Ave
7:00 P.M.

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16th Annual Southern Colorado Mustang and All-Ford Roundup
5th Annual Southern Colorado Mopar Festival
The 1st Rocky Mountain LX Meet
The 1st Southern Colorado All-GM Show

FEATURING:

DriveTech
Colorado Vintage Oval Racers

Schedule

Friday Evening: Cruise-In event, So-Cal Speed Shop, Pueblo, CO at 6 PM
Saturday: Registration (7 AM) and Show & Shine (9 AM to 3 PM) at Pikes Peak International Raceway - Awards will be presented at 3 PM.
Sunday: Cruise from Pueblo and Colorado Springs to the McCandless State Veterans Home in Florence, CO. Show & Shine, and a cookout for the residents and all participants. Cruise starts at 8:30 AM, distance is approximately 25 miles each way from either city.

CORVETTE SUSPENSION MODS, by Kevin Koch

Trivia #1

The Vette didn't start life with the power it has now. What was the horsepower of the first Blue Flame?



A few months ago the newsletter contained an article about the basics of vehicle suspension alignment and handling. This month I would like to extend that theme a bit and talk about one of the most straightforward (and possibly least expensive) ways to affect the handling characteristics of your Corvette. As discussed in the previous article camber settings may be used as a simple method to enhance cornering ability. More negative camber in the front suspension can decrease understeer. More negative camber in the rear suspension can decrease oversteer or increase understeer, and more negative camber at both ends of the car can increase overall mechanical “grip”. But changing camber settings on a car driven primarily on the street must be done with care. A setting of more than about 0.5 degree negative can result in accelerated tire wear on the inside ribs and make the car seem nervous when traveling along longitudinal ruts or pavement transitions.

An alternative strategy would be to add a sway bar or replace the existing sway bars with ones of larger diameter. A sway bar is simply a torsion bar that connects the two sides of an independent suspension. Figure 1 shows a C4 sway bar out of the car and Figure 2 shows how it is bolted to one of the lower control arms of the front suspension.

Trivia #2

The 1953 Vette came in White. What 3 colors were added in 1954?



Cont. on page 3

Its purpose is to reduce body roll during cornering maneuvers and to distribute the weight transfer during cornering. It is easily intuitive that when you pitch your Corvette into a turn, weight is transferred from the inside tires to the outside tires. The reasons this happens and the details of how it occurs are beyond the scope of this article but for now we will accept that lateral weight transfer is a reality that can affect the handling of your vehicle. When this weight transfer occurs the car's chassis, riding on springs, tends to roll towards the outside of the turn. There are a couple of reasons why we would want to control the roll angle. The first reason is that the larger the roll angle the more time required for the chassis to reach steady state equilibrium after you have entered a corner or lane change. A car with greater roll angles feels (and is) less responsive. This is especially significant during quick transient maneuvers such as a double lane change or a slalom section at an autocross. If the roll response falls "behind" the steering input the lateral weight transfer can become excessive and result in real stability problems. The second reason to limit body roll somewhat is to reduce the effects of camber gain and bump steer. You may remember from the previous suspension article that as wheels of an independent suspension move up and down relative to the body/chassis, camber angles of those wheels will usually change. This change can be beneficial or detrimental depending on suspension design. The steer angles of the wheels (both front and rear on a C2 and newer Corvette) can also change during suspension deflection. These dynamic steer angles, referred to as bump steer can also degrade stability and ultimate cornering performance. Usually camber gain and bump steer characteristics are not easily changed on a street vehicle. One obvious way to limit their effects is to also limit roll angles. Cont. on page 4.

Trivia #3

There was no 30th Anniversary for the Vette. How many pre-production 1983's were built?



Trivia #4

Until it reappeared in 1986. What was the rag-tops last year on the Vette?



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Corvette Suspensions, cont.

Roll stiffness can also be increased by using stiffer springs. But springs are harder to replace (especially in many Corvettes) and there is more of a penalty to be paid in ride quality. In general a stiffer spring package significantly reduces the suspension compliance compared to larger sway bars. This reduced compliance can even degrade handling on anything other than a very smooth surface.

Sway bars can also be used to change the front to rear balance of the car (remember understeer and oversteer). As weight is transferred from inside to outside tires in a turn the sway bars as well as the springs control the distribution of that load transfer between the front and the rear tire pairs. Higher roll stiffness results in more weight transfer between inside and outside tires. More weight transfer generally means greater loss of overall lateral grip for a pair of tires at either end of the car. This is the reason that replacing the front sway bar with a larger one will usually result in more understeer or the addition of a rear bar will reduce the understeer. So you can see here the possibilities for affecting your vehicles handling characteristics by using sway bars. When going to larger diameter sway bars at both ends of the car, however, especially for a car that is already pretty well balanced (like many Corvettes), it is always a good idea to keep the same size proportion between bars. In other words if the original rear bar had a cross sectional area of about 50% of the front, the larger pair of bars should keep the same basic relative proportion. Some care must be taken here, however, because some bars on newer vehicles are hollow (or tubular) instead of solid.

Now let's look at an example of how one might work through the complexities of completing a sway bar upgrade on a Corvette. During the years of 1984 to 1996 there was a large variety of suspension hardware available on C4 Corvettes. The suspension options that were the most performance oriented were the 1990 Z51 and the 1991 Z07 both of these options used a 30 mm (1.18 in.) solid front and 26 mm (1.02 in.) solid rear bar along with 659.5 lb./in. front springs and 326.6 lb./in. rear springs. This combination was also used on the 1990 "R9G" cars that were prepared for the final year of the short lived Corvette Challenge Series. You can be pretty sure that if Corvette engineers selected this combination for race cars it should provide good handling characteristics. In later years of the C4, however, the Z51 and Z07 handling options came with softer springs and smaller sway bars probably in an effort to tame some of the ride harshness. One way to build some roll stiffness back into one of the later year C4's and maintain pretty good balance would be to try the 30 mm front and 26 mm rear bars. Maybe you could be lucky enough to find them in a Corvette salvage yard but you could also look for aftermarket bars that are approximately the same diameter. For reference the GM part numbers are:

30 mm Front Bar – 10165302

26 mm Rear Bar – 10098181



Jaco's Host BBQ

Burt and Sharon Jaco were kind enough to let the SC3 invade their home for a BBQ which couldn't have turned out any better. Mother Nature provided us beautiful weather and **Smokin Sage BBQ** provided the food. GOOD FOOD, GOOD COMPANY – What else could you want.



SC3 Calendar - April 2009

			1	2 CSCC Meeting	3 SC3 Sonic Night	4
5 April Fools Rally	6	7	8	9	10 FAAST Friday	11
12	13	14	15	16	17	18 NASA Track Day
19 Autocross School NASA Track Day	20	<u>21</u> <u>SC3</u> <u>Meeting</u>	22	23	24	25 Autocross & Driving School
26 Autocross & Driving School	27	28	29	30		

May 2009

					1 SC3 Sonic Night	2 Ruth Swindale Car Show
3	4	5	6	7 CSCC Meeting	8	9 Fun In The Car Show SCCA Autocross
10 SCCA Autocross	11	12	13	14	15	16 Abbey Car Show NASA Track Day
17 NASA Track Day	18	<u>19 - SC3</u> <u>Meeting,</u> <u>BBQ &</u> <u>PHOTO</u>	20	21	22 Big Sky Meet	23 SCCA Autocross
24 SCCA Autocross	25	26	27	28	29 SC3 Sonic Night	30 - Rocky Mt Muscle Car Classic Show