SC3 VETTE VIBES

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Southern Colorado Corvette Club

Mailing Address:
9 Ibis Lane
Pueblo, Co 81005

We meet every 4th Tuesday at the Pueblo Public Library,
100 E Abriendo Ave. @
7:00 P.M.

Come join us.

Drag Racing or a Wash Out?

By Jason Keshishian

The SC3 planned the 1st Drag Racing event of the year for June 11th. The event had been planned for several months as excitement was mounting leading up the THAT date in June. We had many confirmed members that were going to show their stuff on that Friday and let off some steam after the intense RMMCC show the weekend prior. But wait . . .

Mother Nature had other ideas. A major thunder storm blew through the area late that Friday afternoon and it was still sprinkling when a few of us diehards showed up at the track that Friday. Here are the crazy four of us:

Front row: Jason's WRX, Bob's 2000
Back row: Rick's 2008, Rik's 2005.

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Trivia #1

The 2010 Vette has 8 exterior color options. How many color options are at an extra cost?

Trivia #2

The C-6 Corvette is the most aerodynamic Vette ever. What is it's coefficient of drag?

Drag Racing or a Wash Out?

Racing did finally start about an hour and 45 minutes late, but the track was in terrible condition. It was very slick and we were all running about a full second slower than the usual numbers. Bob and I had a friendly bet going leading up that night to see if my WRX would be faster than his Vette. Fortunately for one of us, we never got the chance. We were lined up twice and never raced each other. First time was the track crew's fault. The second time will be discussed later. We all got in three to four runs, with both Rick and Rik getting loose down track and having to regain control of their cars. Then came the fatefull event. Bob and I lined up, ready to go, and talking smack. WELL. . .

A few match ups prior to our run another car lost control at about the same place that Rick and Rik had lost control, but the outcome was not the same, he spun and hit the inside retaining wall. We all huddled around and decided that the incident on the track was an omen that we should heed; we packed up and headed home. Bob and I still have our friendly challenge in front of us.

Bob's 2000 in front, Jason WRX back left,
Ricks 2008 right rear

Note the home made C-3 in the far back left part of the picture.

Tires, Part 3 – Mechanics

By Kevin Koch

In the past two issues we have covered some basic information about automotive tires. In this issue, the last article in the series, we will touch on some basics about tire mechanics.

A tire can easily be thought of as something like a doughnut shaped air spring. The higher the internal pressure the higher the spring rate and the more load the "spring" can support. Actually the volume of air a tire contains and the pressure of that air controls the load the tire can support. Since there are some practical limits to the air pressure an automotive tire can safely contain, volume becomes the controlling factor. At a given pressure the larger volume will permit less deflection as the tread rolls through the contact patch. Less deflection results in less heat generation in the tire shoulder area and better durability (remember those belt edge separations).

Which brings us to advantages and disadvantages to changing the tire size for your Corvette. There are well-understood gains to be made in handling characteristics by switching to wider and lower aspect ratio tires (remember last month's notes on aspect ratio). A lower aspect ratio provides more lateral stiffness at a give inflation pressure, usually resulting in quicker cornering response and higher cornering force (often referred to as lateral force) generation.

Trivia #3

What is the highest performance Corvette convertible?

Trivia #4

What year introduced the paddle shift automatic transmission in the Corvette?

Tires, Part 3 – Mechanics

But when switching to a lower aspect ratio tire it is always a good idea to maintain the same internal volume or increase it slightly. It is also best to keep the diameter (and rolling radius) close to the original. Suspension geometry will not be compromised and your speedometer will remain relatively accurate. For example if you have a car that was originally fitted with a 215/65-15 the section width would be 8.50 in. and the diameter would be 26.02 in. Appropriate upgrades might be either a 235/60-15 (section width 9.25 inches and diameter 26.10). If there was a desire to go with an even smaller aspect ratio and a 16 inch rim, a 255/50-16 would provide lots of extra section width (10.04 inches), at a diameter of only 26.06 inches. There is one important thing to keep in mind with a significant reduction in aspect ratio. A shorter sidewall means a higher vertical tire ”spring” rate at a given inflation pressure. This usually translates into a harsher ride. Something to be prepared for.

Approved rim widths for a particular tire size can have a considerable range. There is, however, a “best” rim width that was used when the tire was initially designed. This rim width gives the tire its optimum shape when inflated properly. A good rule of thumb to follow when trying to decide on rim width is that it should be about 80% to 90% of the tread width. The correct rim width fixes the beads in the proper relationship to the tread shoulders and gives the sidewall optimum stiffness when asked to produce lateral forces.

Now for a few final notes related to how tires produce horizontal (cornering, braking and traction) forces.

Two of the most important variables that affect cornering force generation are slip angle and the magnitude of the downward force (often called normal force) or weight on the tire. You may remember that in a previous issue there were some comments on slip angles. When cornering, the carcass of the tire does not directly line up with the direction that it and the car is moving. Slip angle refers to the angle created between the line perpendicular to the rolling axis of the tire and direction that the tire is actually going. See Figure 1. As cornering force builds the slip angle grows larger. The effectiveness of a tire to enhance vehicle handling depends in large part on the relationship between slip angle and cornering force. If tire **A** produces 2,000 pounds of lateral force at a lower slip angle than tire **B,** a vehicle will usually be more responsive with the **A** tires mounted. Unfortunately this variable is a little difficult to compare for various tires Cont on page 5.

Tires, Part 3 – Mechanics

because the manufacturers seldom make slip angle versus lateral force plots generally available.

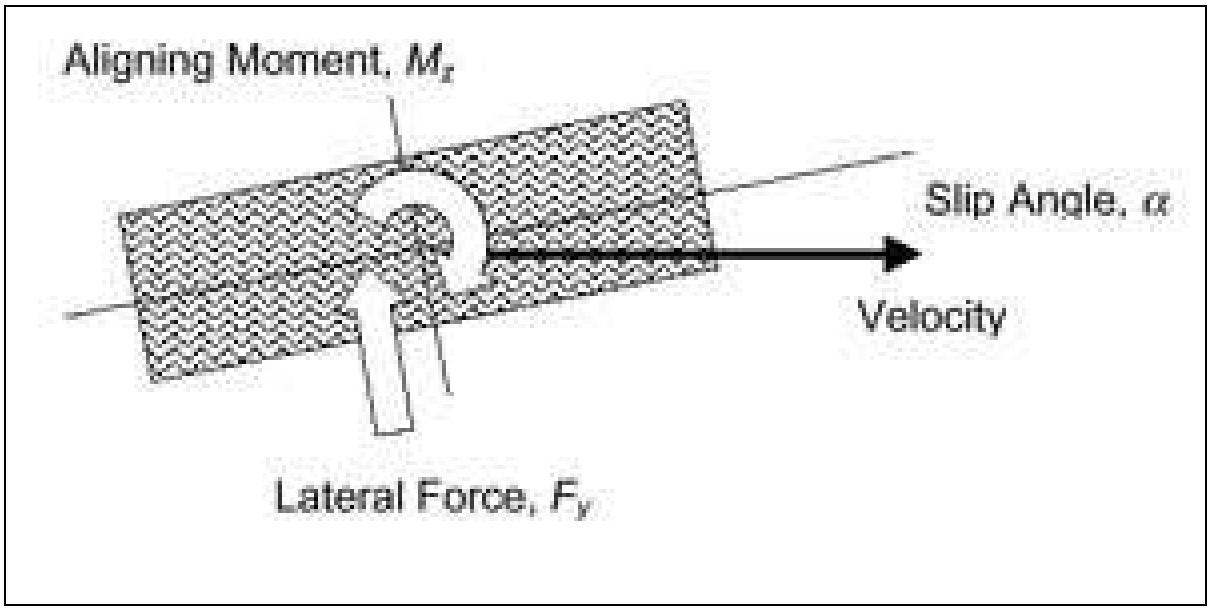

Figure A – Slip Angle

The capability of a tire to produce horizontal force in any direction (traction, cornering, or braking) also increases as the level of normal force applied increases. This is why as you accelerate out of a corner you would like significant weight to transfer to the rear tires (for a rear wheel drive car such as a Corvette that is). This is also why front brakes have more capability than rear brakes. As a car quickly decelerates under braking weight is transferred to the front pair of tires and they can handle more of the braking force than the rears. Unfortunately the increase in cornering power versus normal load relationship for a tire is not exactly linear. The result is that as a vehicle negotiates a corner and weight transfers from inside tires to outside tires the total lateral force produced by a pair of tires (let's say the front pair) actually decreases slightly. As the outside tires gain cornering force capability the inside tires are losing capability. For the better "performance" tires, the amount of decrease in total lateral force capability by a tire pair is minimal. But again this type of technical information is not widely distributed by tire manufacturers, so comparisons may be difficult.

Con. On page 6.

Tires, Part 3 – Mechanics

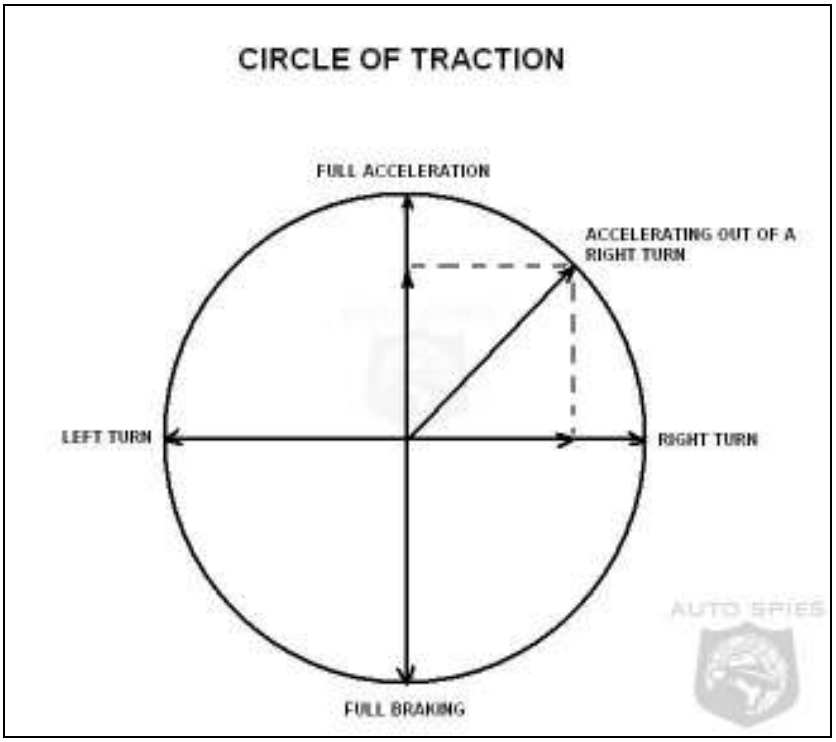

Figure 2 – Traction Circle

The last "tire mechanics" concept to touch on is the infamous tire traction circle. It has been shown that, for a given normal force or weight on a tire, it can generate force parallel to the pavement that is basically equivalent regardless of direction. In other words the maximum braking force available when applied alone is similar to the maximum traction force applied alone and also similar to the maximum lateral or cornering force possible. See Figure 2. But if we ask a tire to produce forces in two directions at once (say cornering and acceleration) the combination of those loads as a vector (sorry, one of those darned engineering words) cannot exceed the force that the tire can produce in a single direction. The arrow that is at an angle in Figure 2 indicates this total vector force. The reduced force available in the acceleration and right turn directions are indicated by the shorter of the arrows. As an example the application of acceleration force to a tire while it is in a turn will reduce the maximum lateral force available. The ramifications for us during "limit adhesion" conditions are significant whether on an autocross course or driving on hard packed snow. If for example if you are in a corner with your Corvette (rear wheel drive) asking the tires to give all of the cornering force they can and apply a bit of throttle, the car may just decide to swap ends on you. But…, if the shock package is set up well, there may be just enough weight

Cont. on page 7.

Tires, Part 3 – Mechanics

transferred to the rear tires under acceleration to allow those rear tires to gain enough force generating capability and make it all work without disaster. Whew!! This is getting too complicated and we have run out of space! And there has not even been any mention made of tread compounds, tread designs or run flat technology. But hopefully this has been enough information to convince that there is much more to a tire than something that is round, allows you to show of those nice wheels and keeps your car to roll while keeping it off of the ground.

BIRTHDAYS AND ANNIVERSARIES

MEMBER BIRTHDAYS

Richard Campbell – 3 August
Scott Rapp – 4 August
Julie Lewis – 15 August
Rocky Mangini – 21 August
Bill Clason – 31 August

MEMBER ANNIVERSARIES

Lucky & Jannett Schneberger – 8 August
Burt & Sharon Jaco – 9 August
Doc & Paula Stricca – 17 August

CLUB ANNIVERSARIES (July)

Larry & Kelly O'Cana

SC3 Calendar

August 2010

1 – CSCC Woodland Park picnic and Hill climb	2	3	4	5 – CSCC Club Meeting	6	7-CWC PC Car Show, DCA Circle Track
8 – CSCC Breakfast	9	10	11	12	**13 – SC3 Sonic Night**	14
15 – CWCC Autocross	16	17	18	19	20	21–CSCC Car Show, Harkelroad Car Show
22 – CWC Autocross, Harkelroad Car Show	23	**24 – SC3 Club Meeting**	25	26	27	28
29	30	31				

September 2010

			1 – CSCC Club Meeting	2	3	4 - CWC Casper Round-Up
5 – CWC Casper Round-Up	6	7	8	9	**10–SC3 Sonic Night**,NCCC Nat Gov Mtg	11–NCCC Nat Gov Mtg,CSCC PC Show, Pikes Peak Kar
12 – CSCC PC Show, Pikes Peak Kart Racing	13	14	15	16	17	18
19	20	21	22	23	24	25 – DCA High Speed Autocross
26-DCA Autocross, CWC Autocross	27	**28 – SC3 Club Meeting**	29	30		