

**September 2000**

## **WELCOME**

This newsletter is a free service intended to benefit racers and enthusiasts by offering answers to chassis questions. Selected questions will be presented, at my discretion. Readers are invited to submit questions by mail to: 155 Wankel Dr., Kannapolis, NC 28083; by phone at 704-933-8876;

by e-mail to: [markortiz@vnet.net](mailto:markortiz@vnet.net)

Mark Ortiz

## **WHEEL ALIGNMENT**

I run an open-wheel mod (2400 lbs, asphalt). When squaring the chassis, is it best to align the right front to the right rear, or the left front to the left rear, and why? Our car is one inch wider in the front.

You really shouldn't use the front wheels as a reference at all. If you change your front end settings, your wheel offsets, or your axle lateral position, you've lost the ability to recover your rear wheel alignment setting. Not good.

Instead, you need a way to align your rear wheels with respect to the frame. Preferably, you should directly measure the alignment of both wheels – not one wheel, not the axle. That way, you are never caught out by a bent axle.

To do this with string, you need to make yourself a set of stringing bars which let you run two parallel strings down both sides of the car. I buy two pieces of aluminum angle, clamp them together to form a "T", and match-file notches in the edges at the base of the "T". The spacing of the notches needs to be slightly greater than the width of the car.

I set the bars on jack stands in front of and behind the car so the strings are about hub height, weight each end of each string with a nut, bolt, and pair of washers to hold them taut, make sure they lie in the filed notches so they're parallel, and measure from the strings to the wheel rims.

On an asymmetrical oval track car, you have to pick a method of positioning the parallel strings relative to the frame – i.e. you have to decide what you call "straight ahead". I like to do this by measurement from two marked positions on a frame rail, preferably the left one since it gets bent less often. I pay attention to any existing marks or methods, and try to make my definition of "straight ahead" consistent with those.

Once you've gotten to this point, you have a way of checking alignment of all four wheels that will not be thrown off by changes to front end settings, wheel offsets, axle position, or other

tuning variables. One other advantage: if you ever race cars with independent rear suspension, you'll be right at home.

Having said all this, I can tell you one thing about how the two methods you mention compare to each other for your car – assuming the axle is straight, and assuming you don't change anything else on the car. If you string on the left, the car will end up with more right rear lead than if you string on the right. That will tighten the car under power. Effect when braking depends on brake bias, driving style, and nuances of language. Many people report a looser car, especially those who mainly slow the car with the rear wheels.

If your car were wider in back than in front, you would get more right rear lead by stringing on the right instead.

Some people consider me an old lady on this wheel alignment stuff, but cars are extremely sensitive to rear wheel alignment. Undetected rear wheel alignment problems are a leading cause of mysterious handling quirks.

## **CASTER**

We run asphalt tracks, 1/3 to 1/2 mile, with a 2800# car. I am looking for a little more front end bite to be able to "cut under" a competitor, starting at the center and coming out of the turn.

The very first inch of contact on the inside and outside of the RF tire seem to run 10 to 12 degrees hotter than the rest of the tire (157/145/155). We run caster settings of 1.5 degrees left/3.5 degrees right. Would raising the caster to 2.0/5.5 help? The driver steers the front wheels about 5 to 6 degrees to take these turns. Will we get too much caster-induced camber?

I'd try more caster. You don't need 3 1/2 degrees split, unless you like the steering to pull left, which has nothing to do with making the front tires stick. I'd try 5 degrees both sides, or use whatever split the driver is comfortable with.

Based on your tire temperatures, the RF could use some more air. As for camber, many people will tell you that near-equal right and left shoulder temps mean your cornering camber is perfect. However, clients of mine who have measured tire temperatures while the car is running say that, as a rule of thumb, when the left and right shoulders of an oval track car's RF tire read similar in the turns, the left shoulder reads about 10 degrees hotter than the right in the pits after a run. So I don't think you'll end up with excessive camber. The car may even want a little more static camber. Try leaving it unchanged, and see what temps you get with more caster and more air.

Changing caster always changes bump steer, so you will need to check that.