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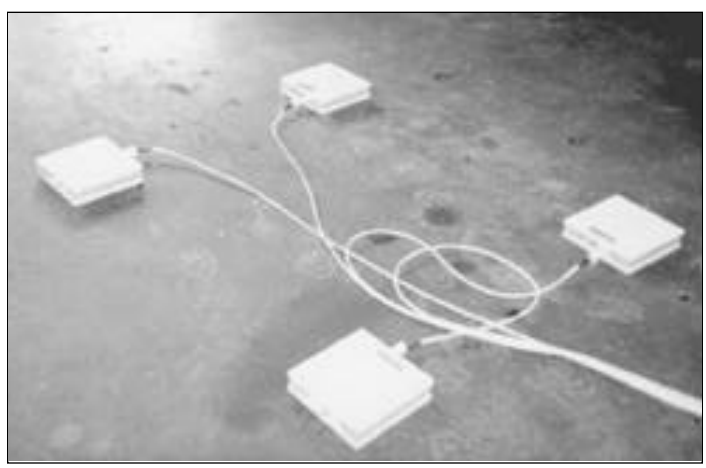
CHASSIS SET UP FOR DIRT RACING

BY JOHN DAVIS
01 Racing

Dirt racing here in the Pacific Northwest can be a challenge, even for the most experienced at setting up chassis configurations. It takes a lot of trial and error to find what works best for varying conditions.

For instance, take Willamette Speedway in Lebanon, Ore., the site for the 4-cycle Speedway Grand Nationals this past July. On the morning of the first practice day it rained for a couple of hours and the track looked like a big mud hole. Several racers were convinced that no one would be on the track until Tuesday, and this was the Sunday before the race. Within an hour after it stopped raining, the track opened for practice and was wet and tacky. By the end of the first practice session there was a nice blue groove on the track. Now that's a major track change! These track changes can greatly effect the handling of any chassis so it is vital to have a good understanding of what your chassis can and cannot do before even leaving the garage.

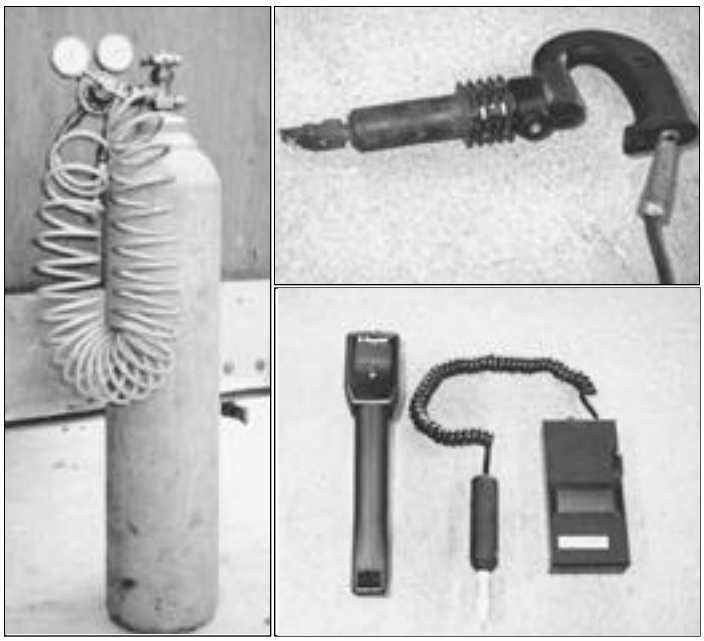
It is very important to get your basic chassis setup before heading to the track. You can make this easier with a good set of scales, keeping accurate records and taking the time to do it right. Bathroom scales will work, but they are not as accurate as electronic scales that are specifically designed for this type of scaling. Longacres, among others, design scales specifically for karts. The electronic scales have a read out box that gives the individual corner weights and percentages all at once.



Top: This chassis scale was designed specifically for karts and is giving a reading without a kart on the scale.
Bottom:The scales can be placed anywhere as long as you have enough room to put the kart on it.

Before setting up the scales, find a level and clean space. You can also use a scaling stand with adjustable legs for easy leveling. Before weighing the kart, check the tire pressure and stagger. Stagger is the circumference of the tire. This may be altered by adding or subtracting air from the tire, or ultimately using a different size tire. Set the toe for the amount of bite desired and camber/caster. Toe and camber/ caster are all terms that refer to the front wheels and tires. Toe is the angle in which the wheel and tire is positioned on a left to right basis. Example: Toe-in, tires are angled in towards the nose. Toe-out, the tires face out away from the nose of the kart. Caster and camber relate to the top and bottom angle of the tire. The kart is ready to scale when it is ready to race, with all the pre-race maintenance done, tire pressure set, etc. A good point to start with is 40 percent of the weight on the front and 60 percent on the rear. (Junior classes might try less rear weight.) Try starting with an eight to 10 pound split across the rear, heavy on the left. Keep the front weight distribution as even as possible, no more than three to five pounds of difference.

This view gives you a readout of the kart's weight distribution.


Left:Nitrogen is used to fill tires because it expands less than air.
Top:This device is recommended for sipping the tires to get lasting usage.
Bottom These small tools are easily portable and allow you to test the tire temperature anywhere in the pits or on the grid.

Spend the time trying different settings. Move the right front tire in on the spindle as far as you can. Write down the tested figures. Move the same tire out a little at a time, keeping track of the changes in a notebook. Set the camber and caster at different angles and make note of the changes made. With the rear track width, the distance between the two rear tires, as narrow as it will go, widen out a little at a time, note the changes. A good chassis will respond to each change.

Keeping good notes when working on the scales will save time at the track when making a chassis change. Having spent countless hours on the scales, we know just what tire stagger, track width and front-end setup will do with each change we make.

When adding weight to the kart, do not put it just anywhere. Locate the areas on the kart that give you the figures you are trying to achieve. If adding weight just to make the overall total higher, locate the polar moment of the kart. The polar moment is the balancing point of the kart and is what allows the overall total to go up without changing the individual corner percentage.

After spending all that time with the setup, it's time to head to the track.


Camber/Caster adjustment.

Learning how to read the track and make the right changes will make the difference between finishing up front or at the tail-end of the pack. An example: Last December at the IKF Holiday Classic in Phoenix, Ariz., I was running my STAR kart at the speedway race track, which is a lot like racing at my home track, Willamette Speedway. I finished second the first heat and won the second heat. This put me on the pole for the main event. The kart was a little loose in the sec-

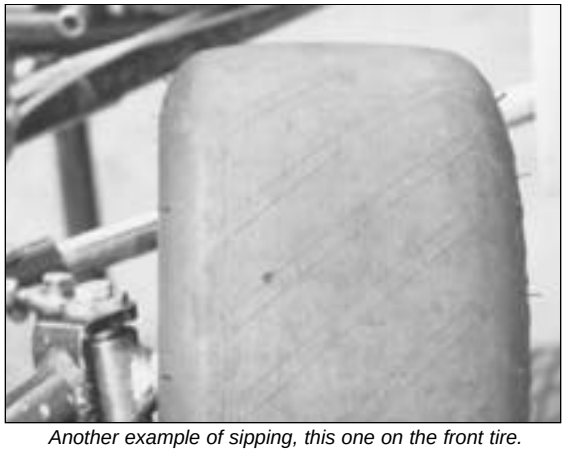
ond heat, so I put in one half turn of bite, tightening the kart up. Unfortunately my thinking that this was the right setup for the main was incorrect. The race track had more rubber laid down throughout the course of the day than I thought and that half turn was the wrong thing to do. When more rubber is laid down on the track it gets stickier. I should have loosened the kart.

This is a rear tire sipping pattern suggested for use in this application of dirt racing.

The kart developed a real bad push early in the race. I went from first to third within a few laps. I ended up finishing second with a little luck. After thinking about it, what I should have done is taken bite out. This would have loosened the kart up thus allowing it to roll freer through the corners. With all the rubber on the race track, the kart would have naturally tightened up.

Going out for the first practice laps session, all I am looking to do is make sure the motor is running right, getting the brakes set (front) and watching the track to see if any rubber is lying down.

The second practice session, go out and see what the kart will do. Is it too tight? If the kart is pushing now, it is only going to get worse as the day goes by. Take one turn of bite out (if your kart is equipped with a weight screw), or widen the rear end out a little, or add some stagger. Whatever change is made, only do one thing at a time and be sure to write down all the changes made. With a loose kart, put in a turn of bite. Next, check the tire stagger and adjust with air pressure. Narrow the kart up a little at a time. Remember not to get the kart too tight, because if the track is laying down good rubber, the kart will naturally tighten.



Another example of sipping, this one on the front tire.

Most dirt tracks in the Pacific Northwest change throughout the day. If the kart starts to push in the middle of a race, change the weight screw or try adding more rear brake. I personally prefer using the front brakes. It seems less distracting to me to adjust the brake balance bar rather than turning the weight screw. If the kart gets loose, add front brake until the kart just starts to push, then take out one turn of front brake.

The trick is to guess your setup and what the race track might do. If you're lucky, no adjustment will need to be made. After running the heat, check the tire temperatures. With a kart that is handling right, the left rear tire will read cooler on the outside and increase on the inside. Right rear will be colder in the inside and increase on the outside. If the center of the tire is the coolest, add one pound of air at a time until you get the temp readings you are looking for. When the center is hot, remove one pound. In the front, look for even temps across the tire. The right front tire should be hotter than the left due to the load this tire carries. Again, it may take a couple of heats to find the right air pressure.

With good records, it will be easier to find the right air pressure to use at each race track.

Another critical area to pay attention to is tire wear. On the hard track surfaces around our area, a dirt slick is the tire of choice. Start with a softer compound on the inside. Depending on the track and class, it is a good idea to have three or four compounds to choose from. A wet, tacky track will need a tire with a soft side wall. The softer side wall will allow the tire to roll giving more side bite. Put eight to 10 pounds of air in the tire. Running on a track as hard as asphalt, use a tire with a hard side wall and run 12 to 15 pounds of air.

On hard tracks when using compressed air, the tire can grow by as much as three pounds of air pressure. This can cause the chassis to change late in the race. The way to stop this is to use nitrogen. Nitrogen does not expand like compressed air because it has no moisture in it which is what makes the tire pressure grow. Again, do not be afraid to try different tire com-

binations and remember to keep good records and notes.

If a tire begins to feather or wear badly, put a harder compound of tire on that corner. If a tire shows none or little wear, it may be too hard of a compound for that corner. Many racers cannot afford several sets of tires and wheels so it's important to make what you have work for you.

When one set of tires has to last all year long, try sipping the tires. This may be done with the hot end of a tire groover blade turned around. Cutting the grooves in the tire surfaces allows the tire to heat faster and grip the track surface better. Try it...it really works.

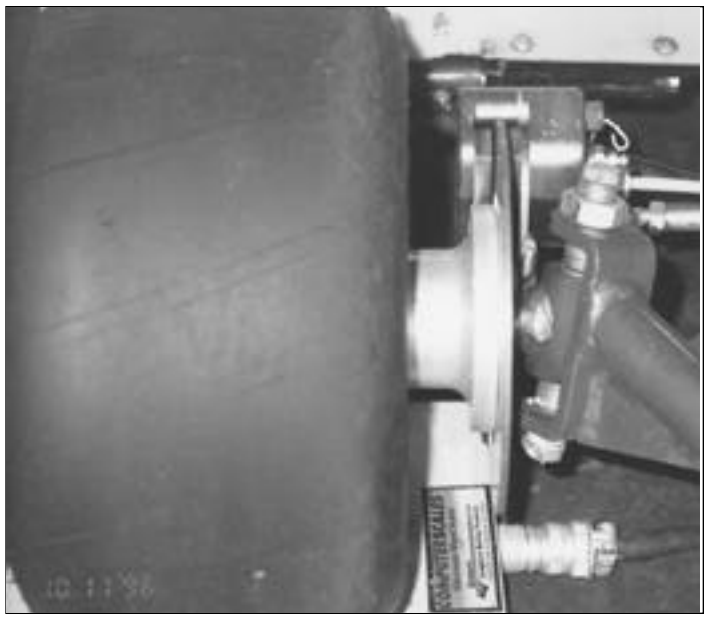
Another trick is to try rotating the tire on the wheel. Make this part of the weekly maintenance on the kart. This will allow the tires to wear even and last longer.

When coming across a setup that really works, go back to the shop and re-scale the kart. Write down every little detail, recheck notes from the race for any changes. This will allow you to reset the kart right back to the same place for this track. Running at different tracks that require different setups, the chassis needs to be close before hitting the dirt. This way only fine tuning adjustments need to be made. When fine tuning the chassis, only make small adjustments. Changing too much at once can take away all the time spent getting the perfect setup.

Heavy feathering occurs when a tire has too soft of a compound for the track conditions. Notice the ripple effect that has occurred.

Manufacturers make many options and add-ons that will help in tuning your chassis. Take Nelson Manufacturing in San Jose, Calif. They build and sell Invader Karts in which they have a dirt model that comes standard with eight degree front spindles. Nelson has front spindles ranging from six to 12 degrees, standard and lowered ride heights. This enables the racer to try different front-end setups. Lowered and offset rear bearing cassettes are also available.

They allow for different axle locations. By putting an offset bearing cassette on the left rear, moving the axle head will give the kart rear steer. This will help the kart roll through the corner. Call your local dealer or kart manufacturers for any optional chassis tuning devices they have.



Martin Custom Products front brakes are mounted on the spindle.

If you have problems with the chassis and nothing works the way it should, try talking to other racers. They might have experienced the same problems and be able to shed more light on the situation. If nothing seems to help, it might be time to update the chassis with a newer one.

Hegar front brakes are assembled inside the wheel.

There are no deep dark secrets to good chassis set up. Although each chassis may differ, stick to the basics, keep good records and do not be afraid to experiment. You won't run the same exact setup at each race track you run at, but if you stick close to what works, you will not be far off.