Phantom Racing Chassis

#TechTipTuesday

Stagger

Stagger is the difference in circumference of the left and right side tires. More specifically, front stagger and rear stagger. For example, if the LF measures 32-1/2", and the RF is 34", then you have 1-1/2" front stagger. If your LR is 33" and the RR is 34", you have 1" rear stagger.

Rear Stagger Rear stagger allows the rear axle of the kart to roll through the corner of a given radius with no scrub or drag caused by the two tires being on a live axle and turning at the same RPM, but each being on different corner radii. When the kart is traveling at any other arc than that one which perfectly matches the rear stagger, then the stagger creates either or both: drag and/or turning force. In layman's terms: more rear stagger = more turnability. Less rear stagger = less turnability. Fine tune rear stagger with chassis setup whereas very little steering input is required from the driver (especially coming off the corner). If the kart is turning too well, decrease rear stagger. If the kart is not wanting to turn, increase rear stagger.

Front Stagger
Front stagger pertains more to ride heights and crossweight than anything mentioned above with rear stagger. Most karters run around 1-1/2" front stagger and leave it (which is what we recommend).

How to Get Stagger
It is extremely important to get all four tires the proper size. Most karters prefer to keep both right side tires the same size, so they can be interchanged if needed. So, we recommend trying to keep all of your right side tires close to the same circumference. So, all you will have to do is keep your left sides properly sized. In order to do that, you must either "stretch" or "shrink" your tires.

Stretching Tires
When stretching tires, you will balance three factors: air pressure, time, and heat. Stretching a tire will always mean more air pressure. More pressure will cause the tire to stretch. More time will cause it to stretch more, and more heat will allow it to stretch more. If you only need the tire to stretch a small amount (1/8" or so), you can try setting the air at 30-40 psi and let it sit for an hour. After the hour, let the air back down to your normal race pressure and let it sit for a few minutes. Reset the pressure, then check the rollout. If it measures correctly, great. If not, it's time to incorporate heat. The best way I've found to stretch tires (more than 1/8") is to set a hot box at 150 degrees. Let the box get to temperature. Measure the tire that needs to be stretched at a standard race air pressure (4-7 psi). With the measuring tape still wrapped around the tire, fill the tire with air until it reaches the exact measurement you'd like it to be. Put the tire in the hot box for 15 minutes, then let it cool naturally with the added air. Once cool, check the size. If it still needs to be stretched, repeat the process. If you do not have access to a hot box, use a torch. An easy way to evenly heat the tire (and not wear your arm out) is to place it on one of your front hubs on the kart and tighten it down. Spin the tire and evenly distribute the heat from the torch across the

the kart and tighten it down. Spin the tire and evenly distribute the heat from the torch across the tire. Again, more air and more heat will mean more stretching. Just be careful not to surpass the manufacturer's recommended air psi commonly found on the tire's sidewall, and do not get the tire too hot where it could ruin the tire.

Shrinking Tires

Shrinking tires is always done with no air in the tires. The same thought process holds true for shrinking as it does stretching... for a small increment (1/8" or so), remove the valve core from the tire and let it sit for an extended period of time. If more shrinking is needed, you will need to incorporate heat. If you have a hot box, set it at 150 degrees and let it get to temperature. The longer you let the tire roll in the box, the smaller it will get. Normally, 10-15 minutes will shrink the tire 1/4", 20-30 minutes will shrink 3/8" and so on. Be sure to always remove the valve core when shrinking tires. Once the tire has completely cooled (without the valve core), replace the valve core and air it to your normal race pressure, then check the circumference. If it's correct, great, if not repeat the process. If you do not have a hot box, you can use the same process as stretching tires with a torch... by placing the tire on your kart and spinning it. Be sure to remove the valve core! Some karters will also use water in the cooling process to help the tire cool quicker. This will "shock" the tire going from hot to cold, and can cause the tire to shrink even more. If using water, be sure to replace the valve core before putting the tire in the water.

Remember, different manufacturer's tires will stretch and shrink differently. Some will stretch/shrink easily, and some won't.

Periodically check your tire sizes throughout the week. They will sometimes grow and shrink sitting on the rack. Also, check your stagger every time you bolt a set on your kart. Once you form a good process of tire sizing, it will be an easy part of your weekly routine.