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## TALKIN' IN CIRCLES – PART 1

### FIRST A LITTLE BACKGROUND...

It seems that there's always a story behind the story and I just couldn't start writing my new tech column for *Speedway USA* without filling you in on some of the details behind how this segment began. Ole' Rob Howden and I have known each other for some time now. I can still remember when he was a Senior Writer at *National Kart News* with his own columns, writing many feature articles on everything from race reports to company profiles.

During this time, I made it a point to read most of his works simply because he seemed to be one of the few "professional writers" that was interested in the oval karting market. After he departed employment at NKN, I was surprised to discover that he had started his own magazine. I wasn't surprised so much that he had launched his own magazine but instead that he had focused his new venture on something other than oval racing. Rob launched "*Shifter Kart Illustrated*" and from what I understand, it is a great magazine. But I just assumed that with the interest he had shown to the oval market that he would surely pursue this industry over any other.

I cannot remember exactly when I discovered Rob's move but I do remember the first time I came face-to-face with him after he did. It was just after we had pulled the ropes (started the engines) for the 1999 Briggs & Stratton 300. I was walking back across the infield and Rob trotted up beside me and struck up a conversation. I had seen him running around with a camera all weekend, but I didn't really know why.

I greeted him with something like:

"What are you doing here at this red-neck oval race? Aren't you supposed to be out chas'n that European crap?"

That's when he told me he was starting "*Speedway USA*" and that he needed my help. Yep, I should have seen it coming right there but I didn't. Rob told me all about his plans to produce a top-quality oval magazine and that in order to make it happen, he'd need the support of advertisers - and that since I'd been hounding him about doing it for some time, I shouldn't have a problem putting three or four ads in the premier issue. He wasn't that forward but we did discuss a little business before he strolled off just prior to the dropping of the green flag.



As he walked away he shouted back "Oh yah, I need someone to write some tech articles, too. Can I count you in?"

"Free advertising?", I replied.

It was then that I saw my first "Canadian dumb look."

I didn't give it much thought at the time since I kind of figured that he was just joking. But after he asked me a few more times, I began to take him more seriously. I surely don't have to tell you what a polished writer Rob Howden is, but I now hope that he is equally as good at editing

## SIMPLE... RIGHT?

Let's get right to it with the first installment of '*Talkin' in Circles*'. I know that every one of us has stopped at the gas station on the way to the track to fill up the truck and get a bag of ice only to get stopped by a curious person posing that age-old question... "*What's in the trailer?*" When you inform them that you're hauling a go-kart, they usually reply with something like "*I had a go-cart when I was fifteen. We put a chain saw motor on it, nitrous and wheelie bars and took it to the drag strip. It ran 105 MPH.*" Don't laugh now; if you haven't run across the 'go-cart drag racing dare-devil', I know you've met the guy that got a go-cart for Christmas. It's the same deal.

The point I'm trying to make is that go-karts (with a 'k') are often trapped under the stereotype of go-carts (with a 'c'). I don't need to tell you that karts, as I normally call them, are hi-tech racing machines that are becoming more and more hi-tech every day. In years past, you could buy a kart and go racing on ovals, road courses, street races or whatever. But over the years, technology has produced chassis designs that are specific to certain types of racing. We now have dedicated enduro karts, sprint karts and oval karts, etc.

So far I haven't told you anything new, have I? But what I have done is set the theme that brings us to the real focus of this article. Every year I go to the Briggs & Stratton 300 and I see numerous "dirt dobbers" (no offence, it's just a figure of speech - I race dirt too) in the pits trying to make the field with their karts just like they left them following last Saturday night's feature at Dust Bowl Speedway. I can see the editorial reply letters pouring in right now after that last point - "*I'm a 'dirt dobber' and I made the field... I even out ran you!*" I'm not poking fun at anyone here; I'm trying to make a serious point on the state of the sport so please, bear with me for a minute.



What I'm aiming to make clear is that Speedway Pavement racing has developed to a level that has made it nearly impossible to find success if you simply wash the mud off of the kart and go asphalt racing. Sure, you can do it that way and yes, you may be successful but more often than not, it won't be that simple.

## WHAT'S THE DIFFERENCE?

You're going to notice as you read more of my writings or watch any of my videos that I put a lot of emphasis on the 'total package' as opposed to specific things. I would say that 20% of the kart racers out there are more interested in cross weight than the rest of their setup combined. I hate to say it, but those 20% are the ones that you'll likely see from 12th to 16th place on the racetrack. The approach that they use is simply off the mark.

If you're going to be a consistent frontrunner in Speedway Pavement racing, you have to mold your entire effort around it. You can't just alter a few things from your dirt program. Everything from your tire program to your driving style has to "fit the bill" in order to be consistently successful. I cannot cover every detail in this article but I will hit a few of the major ones regarding this topic. If you will put a little thought into it and really read between the lines, I think you should be able to work out the rest.

Let's start with the tires. For the most part, it should be a given that you can't run the same tires on both dirt and asphalt. But let's talk about a few of the reason why this is to help begin distinguishing the difference between the needs of dirt and asphalt programs.

Before I go much further, I need to set the record straight on something. Most of the suggestions, recommendations and advice that I give here are targeted at the "higher-end" racer. Much of the 'do's and don'ts' that I discuss in this article could likely be overlooked in a successful local level program. Racing at a local level is normally a little less competitive than let's say, the WKA Pro Kart Tour. Local club racing is the backbone of our sport and what I don't want to do is mislead some readers into thinking that all levels of Speedway Pavement racing are this technical. With under a second covering the 40-kart field at Charlotte, this is where the best of the best face-off. It is very likely that there will be a wider gap of experience, talent and speed at any given local track, so the points we will hit on in this article will not be as crucial for success. If they are implemented however, the results should be very substantial. Remember, knowledge is power.



Now, where were we? Oh ya, tires. Like I stated earlier, it's a given that you can't run the same tires on both dirt and asphalt. It doesn't matter whether you're racing dirt or asphalt, you're still looking for the right amount of grip and it's the way these tires interact with the racing surface that is important. A good set of asphalt tires will become sticky as they become hot. Simple, right? Well, it is true that the key is to get your tires to become sticky fast enough to get the kart up to speed quickly but you need to make certain that they do not get too sticky as laps go by - eventually slowing you down.

What does that have to do with running your tires on dirt? Once a tire has been run on dirt, the dirt will "dry out" the tire. The tire will lose some of the oils and other chemicals that make the tires sticky. Now, this doesn't mean that the tire will not become sticky at all, but it does mean that the tire will have to become somewhat hotter before it does. In other words, if you have two tires of the same brand and compound (one that's been run on dirt and one that has not), at the same given temperature, the tire that has not been on dirt will be considerably stickier and provide more grip than the one that has.

What does this mean on the track? Tires that have been on dirt will go out and slide around for the first part of the run and then once they get good and hot, they will 'lockdown'. This is usually when I hear something like, *"My kart feels good for the first few laps. It's good and free but then it just locks down."* Then I usually hear something like, *"I have gone from 49% to 62% cross and nothing helped."* I'm not just poking fun here; I'm telling you the truth.

While we're on the subject, this same thing can happen if your tires are too hard or too soft. I know you understand the 'being too soft' part, but how can it do that if your tires are too hard? You see, it's like this... a kart is an "over-tired, under-horse powered vehicle." Translated, that means a kart has more tire than it can ever use with the horsepower it has at its disposal. Even if you have a tire that is too hard, it will only slide around for a few laps before it overheats. Once it overheats, the grip will shoot through the roof and you'll go from being too loose to being too tight in a matter of a few laps.

With this stated, the objective is to find a set of tires that is soft enough to provide enough grip in the first few laps so that the driver will not slide them around and build excess heat. Then it's up to the crew to have dialed in a good set-up and the driver to use his or her driving to prevent the tires from building up so much heat that they overbite and slow down (or at the very worst, start to blister).

I would like to relate to you some suggested brands and compounds but because there are so



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many different situations and factors, I cannot. Each tire manufacturer can provide you with a chart of the available compounds with their specs, however. I would suggest starting there and then ask a few of your fellow competitors at your track what works for them, keeping in mind what you have learned here.

## DON'T FORGET, A TOTAL PACKAGE!

Granted, tires have become the most important factor in karting whether it's dirt or asphalt; but like I stated earlier, a total package is required to be a consistent winner. Once you have your tire program underway, it's time to look at your chassis and your setup. Many racers try to do this the other way around - meaning that they try to make chassis adjustments while their tires are still the problem. This usually makes for a lot of busted knuckles and not much improvement. That's why it's important not to get the "cart before the horse." Oops! I mean the 'kart before the tires'.

Let's refresh on the topic of tires quickly before we continue on. Remember what I said about the tires and a good setup? Find a tire combination that will "bite-up" early and then work on your setup so you don't burn them up. You'd probably like me to tell you what I mean by that. To put it bluntly, experienced asphalt racers are normally able to run softer tires than those who are less-experienced simply because they are able to work their setups so they do not burn up their tires. Again, don't take that offensively... hear me out.

There are several differences between a dirt setup and an asphalt setup that can be seen right off the bat. One of the most visible is the size of the left side tires. Asphalt racers almost always run a smaller left rear than dirt racers. The biggest reason for this approach is to help free-up the kart in the center of the turn. Like I said earlier, tires on asphalt become sticky as they get hot, which causes them to bite more. Running a smaller left rear reduces the contact patch and the amount of left rear bite, which in turn will free-up the kart in the center of the turn when the tires become hot.

Having said that let me contradict myself. The smaller tire also adds some "timely" and very necessary bite. A smaller tire will heat up faster than a larger one. I said earlier that it's important that the tires get enough bite early in the run so that the driver will not slide the kart around and overheat the tires. Since the smaller left rear tire will come up to operating



temperature quicker than a larger one, this will help get the kart going in the early laps. In other words, a smaller tire will get sticky faster and will give the kart the bite it needs during the first handful of laps.

You're probably questioning the possibility that the small left rear will overheat on the long runs because of its size. It won't if the other factors are in line. We all know that since we run in a circle that the outside tires take the bulk of the abuse and heat. With that in mind the left side tires should never build the heat that the right sides do unless we have a major problem. By that I mean that if the chassis and the setup do their jobs, the left side tires will only build a certain amount of heat. Once the tires become hot and start to bite more, the chassis will transfer some of the weight off of the left side, which will prevent the left side tires from 'over-working'.

So that brings us to the last piece in the puzzle for today... dynamic weight transfer. This concept deals with how the chassis transfers weight when it is put into motion. We all weigh our karts out on scales (static weight) to provide a starting point, but after the kart is put into motion (dynamic weight) all of those numbers go out the window. There are many factors that affect dynamic weight transfer of a chassis, such as track configuration, track temperature, driving style and tire grip. Since we've been talking about tires earlier in the article, let's focus on that and save the other three for another time.

We've established that we want to run a soft-tire combination and use a setup that will preserve the tires for the duration of the race. We also established that the softer tires will become sticky as the run goes on. So what do we look for in a setup that will preserve the tires? Proper weight transfer! As the tires build heat they will also build grip, which means that the kart will pick up more bite. As the bite increases, the dynamic weight transfer will also increase. In English this means that the kart will start to build more side bite. As the side bite increases, the kart may feel like it wants to get up on to the outside wheels and do what some racers call "bicycle." In this situation, the kart is transferring too much weight to the right side due to the high grip. If something is not done to correct this problem, you will burn-up your right side tires. A majority of the dirt racers that are visiting a pavement event will likely start using drastic measures at this point to loosen the kart. They will want it to slide a little, but we've already established what will happen if we start sliding the tires - more tire heat, which in turn equals more bite. This example provides an excellent look at the different approach needed for pavement racing as an experienced asphalt racer will start taking measures to use that bite and turn it into speed.



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What are those measures? Well, if the kart is transferring too much weight to the right side (dynamic transfer) than the first logical fix is to decrease the amount of right side weight that the kart starts with (static weight). In English, add more left side weight. Adding more static left side weight will offset the amount of dynamic weight that is on the right side in the turn. When you reduce the dynamic right side weight you will also save the right side tires - and hey, that's what we said we wanted to do in the first place!

Another way of reducing dynamic weight transfer is to adjust your Vertical Center of Gravity (VCG). I'm not going to go into all the how's, what's and why's of VCG in this writing but VCG is more or less the height of your weight transfer. I know that I will get some flack about that statement but that's all it is. A higher VCG will transfer more weight than a lower one. There are formulas to figure the VCG of a chassis but I rarely ever use them. The most important thing is to know what VCG is and what it affects.

The three major factors that determine your VCG are the driver's build and position in the kart, the motor position and the ballast weight that is added. Simply put, the higher these three things are, the higher the VCG is. Because there is no perfect VCG for everyone, your actual VCG number is not as important as knowing whether you need to increase or decrease yours.

If you'll give it a little thought and start looking at the chassis of some of the faster guys, you will see what I am talking about. You will see that their chassis are most likely the same as what you run on dirt but most of the accessories and bolt on items are mounted much differently. Asphalt racers will use things like motor position, seat position, catch cans and tachometers to offset weight transfer.

## LET'S WRAP THIS ONE UP...

You're probably saying to yourself right now, "That's it, that's all he's going to tell us?"

Remember, this is the first installment of this series and I've only laid the groundwork. It's very important groundwork, though. If you go back and read what I've written, it ain't that simple. I know you wanted me to start spitting out compounds, percentages and such but everyone who reads this article is in a different situation. I firmly believe that there are no right or wrong



# Tech

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answers in racing... although there are good and bad theories. I try to assist people by providing them with knowledge they can use each and every time they go to the track rather than just supplying them with the answer to the question at hand. I want to do the same with articles in *Speedway USA*.

For those of you that made it all the way through this article without falling asleep, you can probably see why we titled this column "Talkin' in Circles?" I don't guess Ole' Rob need worry about losing his job... huh?

Until next time... Keep'm turn'n left!!!

*Column written by Harrill Wiggins of Phantom Racing Chassis and appeared in the Winter 2001 volume of Speedway USA Magazine. Article reproduced with permission.*

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