

Technically Speaking - Understanding the Left Rear Tire

Understanding the Left Rear Tire

Technical Article by Frank Ashe Tires - that's what it's all about. There are theories to the effects of cutting, chemicals, wheels widths, compounds, and literally hundreds of other factors that make a chassis fast on race day. One commonly overlooked factor when it comes to new racers is the left rear tire. It was generally thought years ago that the left side tires had little effect on the chassis and therefore the left sides were left on their own to do nothing more than hold up the left side of the chassis. Today's chassis are more sophisticated and require a more precise balance and that's why the left rear tire choice becomes so critical. We set out to determine what effects occur when we swap out left rear tires. It was time for a test session designed to raise the racer's awareness of the left rear tire what effects it can make on a chassis by changing nothing more than the compound, wheel width, harness, chemical and cut. We contacted DWT (Douglas Wheel Technologies) and Goldspeed USA, importer of Maxxis tires and identified seven different tires we'd like to test under different circumstance. We chose DWT wheels due to the superior quality and consistency of their wheels to provide a firm baseline for the Maxxis rubber to operate on. Goldspeed USA provided us with three separate Maxxis compounds to base our tests on and determine how each of the seven tires affected the chassis. The baseline equipment used was a 2007 Elite Edition Phantom Icon chassis set up in Stock Medium configuration with an Ogles Racing Engine Briggs & Stratton Raptor engine. All data was gathered using an AIM Sports Mychron4 with their latest firmware. For the right side and the left front tire, we chose the Maxxis HT3 compounds with the right sides trued for consistency and all tires were balanced and mounted on new DWT Q+ wheels to keep our test consistent. Once we received the tires and wheels from Goldspeed USA/Maxxis and DWT, the first step was to mount each tire. Consistency is the name of the game, so all components were new. Each tire was set at five pounds of air pressure and left to sit for a day. Each tire was then measured and it was determined that four of the seven tires' circumference was 32-3/4" and so we set our baseline for the left rear tire at that measurement. The tires that were marked for cutting were put on our lathe and cut to the proper depth (we'll go into those specifications shortly) and the tires were measured again. After a few sessions of shrinking and growing, all left rear tires were exactly 32-3/4" in circumference. We were very meticulous in our tire measurements so that there were no variables to change the Icon's crossweight or rear tire stagger when we swapped out left rear tires. Once all tires were identical in size, each was balanced and marked in accordance with their duty and prepared for the test. Conditions were set the test the seven tires after the Saturday night race at Atoka Raceway Park to provide a night test session. ARP is a 1/8-mile oval with almost flat turns, a sand and dirt mix that can get hard and fast. The left rear tire choice at ARP is critical and served our purposes for the test very well. The track was also made available the following day once the track had some sunlight and heat in the surface for a day test session. Driving the Phantom Icon was local driver Brent Rowell. Brent had proven himself as a very good test pilot since he had a great feel for a chassis, was a consistent driver, and won many feature races and had several championships to his credit. His accurate feedback was critical to the test and, not surprisingly, he performed admirably. With the Saturday night races over for the night, promoter Danny Davis and the ARP racers (who normally get a little track time after the event) allowed us exclusive access to the track — thanks to all for the support. The Icon was outfitted for the test as follows: - Crossweight — 60.5% - Nose weight — 46.5% - Left side weight - 57% - Front stagger — 1-1/2" - Rear stagger — 1-1/4" - Air pressure (right side) — 6 psi - Air pressure (left Side) — 5 psi - Gear ratio — 14-67 - Rear track width — 38-3/4" Brent made a couple dry runs to shake down the kart and tune it to his liking and then the test began with a baseline run. The baseline was to determine how much, if any, the track's lap times would fall off during the test and would again be run at the end of the test for comparison. Once a baseline was established, test one began with LR-1 (Left Rear, test tire One) bolted on. Dennis Rowell, Brent's dad, took charge of air pressure and regulated the right side tires to maintain a consistent pressure to ensure air pressure increases did not affect stagger and handling characteristics. Night test — 11:45 pm June 16, 2007 Baseline test run — The baseline test run showed the track had slowed considerably since the races ended a half hour or so earlier. Brent gave us a consistent run for the baseline and adapted to the kart quickly. Brent did not know the left rear tire's properties that were going on the kart before each run to avoid any expectations on his part and give us better feedback. Here are the baseline times according to our Mychron4: Lap 4 - 12.50 seconds Lap 3 - 12.51 seconds Lap 2 - 12.52 seconds Max RPM - 6,738 LR-1 — Uncut with no chemicals introduced to the tire. Maxxis HT3 6.0-6 on a DWT Q+ 8-3/4" wheel. Durometer reading — 54. This was a tire mounted on an 8-3/4" wheel which is normally a 1/2" wider than what we traditionally race at ARP. With no chemicals in this tire, it was up to the tire to perform with no chemical help. After the run, the Mychron4 read the three fastest laps: Lap 4 - 12.52 seconds Lap 3 - 12.55 seconds Lap 2 - 12.57 seconds Max RPM - 6,771 The kart appeared stable and easy to drive with this tire on. "The kart just floats through the corner. It goes in loose and stays free through the whole corner," said Brent as the next tire was being mounted on the kart by crewmen Brewer Rowland and Brandon Bridges. Rear track width was checked since the wheel width was different on this tire than all the rest in the test. With the next tire on, Dennis checked the air pressures and Brent went back onto the track. LR-2 — Uncut with no chemicals. Maxxis HT3 6.0-6 on a DWT Q+ 8-1/4" wheel. Durometer reading — 54. Back to a traditional wheel width at 8-1/4", this tire/wheel combo was close to the same lap times as the wider wheel, but it lacked the consistency of the wider wheel. The max RPM was almost identical to LR-1 — both on the tire's fastest lap. Lap 4 - 12.56 seconds Lap 2 - 12.63 seconds Lap 3 - 12.80 seconds Max RPM - 6,778 "The kart was free on entry but it picked up a push on exit and got worse. It definitely tightened up the kart on exit," Brent noted. LR-1 and LR-2 were identical with exception of the wheel width. Changes were then made for LR-3. LR-3 — Cut and trued with the tire's wear holes almost completely gone. No chemicals were used. Maxxis HT3 6.0-6 on a DWT

Q+ 8-1/4" wheel. Durometer reading – 56. The change from LR-2 to LR-3 was simply that this tire had been cut and rubber was removed that caused the durometer reading average to change a by two making it slightly harder than the previous tires. "The tire started like the first tire (LR-1) but it gradually got tighter and started to push a little," Brent observed. The MyChron4 told the story of the push as it worsened: Lap 2 - 12.57 seconds Lap 3 - 12.62 seconds Lap 4 - 12.66 seconds Max RPM - 6,825 The lap times showed the kart was better in an early run but gave up as the run went on. Now it was time to switch compounds again. LR-4 – Uncut with no chemicals. Maxxis HT5 6.0-6 on a DWT Q+ 8-1/4" wheel. Durometer reading – 60. The surprise here was the supposedly softer HT5 was actually harder than the HT3. What changed was that the HT5 was softer after the run sticking a duro reading of 48 after the run. It had softened from the heat of the run. Once off the track, Brent remarked, "At first I thought it was going to tighten up on me and it did but the harder I ran it, the freer it got. So, even though it tightened up, I could drive it harder and the kart would still drive around the corners." From the MyChron4: Lap 2 - 12.57 seconds Lap 5 - 12.62 seconds Lap 4 - 12.68 seconds Max RPM - 6,797 The HT5 performed almost the same as LR-3 but seemed to prefer a more aggressive driving style. LR-5 – Cut and trued with wear holes almost completely gone. No chemicals used. Maxxis HG3 6.0-6 on a DWT Q+ 8-1/4" wheel. Durometer reading - 62. Another switch in compound, this one to the HG3 – a proven tire classic. The HG3 compound had a lot of rubber on it and when we went to cut the tire, we had to cut a lot to knock the rubber down. It went on and here's what Brent said about this compound, "The right sides are as good as when we started but this tire (LR-5) caused the kart to push from the center off. It was definitely getting tighter. It pushed and got worse as it went." Lap times showed this tire didn't work as well as the others had. The MyChron4 showed: Lap 2 - 12.77 seconds Lap 4 - 12.85 seconds Lap 3 - 12.93 seconds Max RPM - 6,750 The RPM drop increased by an average of 400 RPMs during each lap and the tire temp came up very quickly. This tire may have been harder with very low rubber, but the Icon didn't like this tire under these conditions. Under the right conditions, this tire may be the one that will win a race for you. Recently, a racer won three classes at an event with the Maxxis HG3 on all the way around. It was a cold day and the tire's temperature came up quickly and ran hotter as the run went on and that aided in his wins. LR-6 – Uncut. Goat P was used to soften the tire. Maxxis HT3 6.0-6 on a DWT Q+ 8-1/4" wheel. Durometer reading - 30. Here's when the softer tire came into the test. This tire was softened with Goat P and when it went on, we pretty much knew what to expect since this tire was overly soft. "The tire 'chirped' on me and it was like it never came in, it never worked. It was free off and it felt like it never picked up the left rear. It wasn't tight in and it was never tight. It never bit," Brent explained. "It felt like it never went to the left rear and wouldn't bite and drive off the left rear." The tire was so soft that it never gained grip but the lap times were inconsistent and slowed as the run went on. It gave the deceptive feeling that the kart was free but it was neither fast nor consistent – this can be fooling to a new driver with limited experience. The MyChron4 confirmed Brent's feel of the tire: Lap 2 - 12.75 seconds Lap 4 - 12.78 seconds Lap 3 - 12.82 seconds Max RPM - 6,715 LR-7 - Uncut. Hot Lap II was rolled from the inside and applied outside. Maxxis HT3 6.0-6 on a DWT Q+ 8-1/4" wheel. Durometer reading - 52. Hot Lap II has won many races but now we were going to see what it did on this given night. With the way the Icon was responding, we could see what was coming. Brent confirmed, "It was free at the beginning, but it started to push from the center off and it got worse and the kart fell off." The MyChron4 read: Lap 2 - 12.74 seconds Lap 4 - 12.76 seconds Lap 5 - 12.82 seconds Max RPM - 6,723 The test took 25 minutes from LR-1 to LR-7. The baseline showed the track fell off by 0.12 seconds from the beginning to the end of the run. The night test ending-baseline run was as consistent as the beginning run. With that, we packed up and pulled out just after midnight and headed home to return and get on the track by 10:30 am the next day.

Day Test – 10:30 am June 17, 2007 We were in a little trouble with wives and kids this morning for scheduling this on Father's Day so we were anxious to see what we'd learn about this day test and rolled onto the track to set the baseline. The track was faster this morning than it was last night but with the lack of karts on the track, it was still not up to normal daytime lap times that for a Stock Medium can be in the high 10 second range. We dropped a tooth on the rear gear to give us a 14-66 gear and get the engine back into it's power band of around 6,800 RPMs and then Dennis came up on the air pressure by a half-pound all the way around and we were ready to go. LR-1 – Uncut with no chemicals. Maxxis HT3 6.0-6 on a DWT Q+ 8-3/4" wheel. Durometer reading – 54.

The first run with this tire was similar to last night's. "It was free – not loose or tight. The kart was neutral," said Brent. The kart looked stable once again and Brent liked the way the wider left rear tire felt off the corner. MyChron4 readings: Lap 4 - 11.80 seconds Lap 3 - 11.86 seconds Lap 2 - 11.92 seconds Max RPM - 6,816 LR-2 – Uncut with no chemicals. Maxxis HT3 6.0-6 on a DWT Q+ 8-1/4" wheel. Durometer reading – 54. Then we went back to the same tire but with a half-inch narrower wheel. After the run, Brent had this to say, "In turn three, the kart kind of tightened up and in turn four the tire broke loose from the center off. After the tire got some heat into it, it came in and was better but still a little tighter. This tire was tighter than the LR-1 tire." Even though the kart was a little tighter to Brent, the Icon tuned a faster time than the LR-1 tire but it did start to fall off the longer he ran. MyChron4 times: Lap 4 - 11.71 seconds Lap 5 - 11.71 seconds Lap 6 - 11.79 seconds Max RPM - 6,862 LR-3 – Cut and trued with wear holes almost completely gone. No chemicals used. Maxxis HT3 6.0-6 on a DWT Q+ 8-1/4" wheel. Durometer reading – 56. This was the tire we expected to be fast. Being a lower rubber tire with no prep the conditions were right for the tire to free up the chassis and get a better run off the corner with little rolling resistance. Brent's times confirmed what we believed we'd see. "It allowed me to run the kart harder and still be in the line. It got faster the whole time. It didn't tighten up or free up any. It was the best tire so far." The MyChron4 told us it allowed the engine RPMs to climb so we could have probably dropped a tooth

and gotten more speed out of it. In addition to that, the RPM drop was almost 300 RPMs lower in the corners than the previous two tires. Lap times: Lap 5 - 11.51 seconds Lap 3 - 11.59 seconds Lap 2 - 11.77 seconds Max RPM - 6,905 LR-4 – Uncut with no chemicals. Maxxis HT5 6.0-6 on a DWT Q+ 8-1/4” wheel. Durometer reading – 60. From the driver’s point of view, “It was good from the start and the kart started to push off the corner a little. So, it tightened up a little as we went. It was real good on the start.” The HT5 was a little harder initially but softened after heat got into the tire. This tire might be something we use on qualifying day because it turned the fastest lap of the day. The MyChron4 also told us that we could have dropped another tooth and it could have been faster. Times: Lap 4 - 11.39 seconds Lap 5 - 11.50 seconds Lap 6 - 11.51 seconds Max RPM – 6,903 LR-5 – Cut and trued with wear holes almost completely gone. No chemicals used. Maxxis HG3 6.0-6 on a DWT Q+ 8-1/4” wheel. Durometer reading - 62. “The kart was tight. Not pushing, but it was tight and locked it down and made it inconsistent,” Brent noted. The MyChron4 showed the RPM back down into the power band and the times were inconsistent. Lap times: Lap 5 - 11.51 seconds Lap 2 - 11.53 seconds Lap 3 - 11.64 seconds Max RPM - 6,828 LR-6 – Uncut. Goat P was used to soften the tire. Maxxis HT3 6.0-6 on a DWT Q+ 8-1/4” wheel. Durometer reading - 30. The Goat P tire was too soft. “The kart just bit and pushed and the tire was all wrong for the track. The track’s getting faster the hotter it gets and the kart just didn’t like that soft of a tire on the left rear,” said Brent. The soft tire really had a strange effect on the kart. With the track hard and fast the tire was so soft it was the wrong tire for the conditions even though it ran a fast lap it would not hold up under a long run. The MyChron confirmed that with the max RPMs were just barely past 6,800. Lap times: Lap 2 - 11.51 seconds Lap 3 - 11.62 seconds Lap 4 - 11.75 seconds Max RPM - 6,802 LR-7 - Uncut. Hot Lap II was applied inside and outside. Maxxis HT3 6.0-6 on a DWT Q+ 8-1/4” wheel. Durometer reading - 52. Right off the track, Brent commented about the Hot Lap II tire, “The kart was okay for two laps and then it went away. The tire got faster then it just felt weird.” The RPMs stayed in the power band so that told us it was going as fast as it was going to go unlike the harder tires that raised the RPMs into the power band prompting us to take a tooth off the rear gear and improve lap times. At night, we’ve won races with an entire set of tires Hot Lap II conditioned – but not under these specific conditions. MyChron4 times: Lap 4 - 11.54 seconds Lap 3 - 11.64 seconds Lap 2 - 11.73 seconds Max RPM - 6,821 In our test sessions, the track during the day got faster even though our test only took 27 minutes to complete from baseline to baseline run. The track picked up over a half-second during the day test and during both tests there were no other karts on the track to alter the conditions – track temperature was the only factor. Through this testing, we found that a likely candidate for the left rear tire would be a cut and trued 6.0-6 Maxxis HT3 on an 8-3/4” wheel. Why? The wider wheel was more consistent but the cut and trued tire was faster. We theorize that the wider wheel with a tire of less rubber might be the ticket on a Saturday night race. And you bet we’ll try it. For the daytime, we might be back on the cut and trued 6.0-6 Maxxis HT3 on an 8-1/4” wheel. Why? Because we see the RPM climb on that particular wheel/tire combo and realize that even though it faster with the gear we had on, there was potential for more speed. So next race day, we’ll be looking at starting off with this tire and 14-65 gear. But all of this depends on the conditions of the track and what our notes tell us on that particular day. Summary This is not a fix-all test to tell you if you put X-Tire on your kart you will get faster. What we are trying to demonstrate here is that the left rear tire is a critical element to getting everything out of your kart. The key is to determine which left rear tire you should have on the kart and when. For example, if the tire is too soft it may cause the kart to push if the track is generating a lot of bite. On the other hand, if the track is of the wet and slick variety that tire might win the race. If the tire is too hard for the conditions, it will likely be loose but if the track gains bite as the evening wears on, it might come to you and be the right tire. Bottom line is that you need several left rear tires that fit the needs of your track ready at a moments notice as track conditions warrant. It will make the difference between running in the back and winning – and that’s a proven fact. Be smooth. Thanks to all who made this test possible: Phantom Racing Chassis and the Icon chassis, Ogles Racing Engines, AIM Sports’ MyChron4, Goldspeed USA for the Maxxis tires, DWT for the Q+ Wheels, Danny Davis and the racers at Atoka Raceway Park, Brent Rowell for his driving duties, and Dennis Rowell, Brewer Roland, Brandon Bridges, Franklin Ashe IV, and Frank “Pops” Ashe for the outstanding pit support.

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