

Wahlracing.com Feature: Build a Formula 340/500 Race Sled!



Our candidate to be a Formula 340 racer: This 1980 Polaris Indy 340.

The high cost of a modern Champ racing sled can be prohibitive to a lot of young potential talent out there. Many people involved with oval ice racing have been pondering a way to get our future World Champions started in a class where they can be competitive and can afford.

This is no easy task when you consider all the potential pit falls.

Thankfully, John Hooper of Hooper Racing and some others have hit upon an idea that sounds very promising. He calls it 'Formula 500'. Formula 500 will be run in the USSA circuit this coming winter, and eligible sleds will also be able to run in the 440X class with the vintage guys at S.L.E.D.S. racing.

The proposed rules for Formula 500 class can be found [here](#). Basically you can run any 1989 to 1992 Polaris Indy 500 with a mostly stock suspension, pipes & motor, but you can do anything you want to make it comfortable to drive and look cool.

The Wolf Lake Outlaw vintage racers in Alexandria, Minnesota, had earlier come up with an similar class for the 2006 season – 'Formula 340'. Only slightly different from the Formula 500 class, the Formula 340 class will have a special place to run at Wolf Lake as well as being eligible for the 340 SnoPro class with the S.L.E.D.S group.

We thought it would be cool to show you how easy one of these sleds can be built, and how inexpensive they can be. Our sled is being built for the Formula 340 class, and as we go through we will point out the differences in the classes. The first obvious difference is that Formula 340 only allows a 340cc Polaris Indy motor, while the Formula 500 class allows a 500cc Polaris motor.

We know what your thinking– why only Polaris? Well, John Hooper has done the research. There are simply tons of Indy's available (cheap!) and parts are plentiful and inexpensive. Having everyone start with the same basic sled means it will be much more focused on driver skill then the machinery. Using one basic chassis & motor also makes it easy on the various associations to police the class. You can discuss more about the rules on the Snowmobilenews.com discussion boards.

We found our candidate within a day. A 1980 340cc Indy, intact and mostly functional – Price? Just \$100, thanks to Mike Maegher of the VSCA. Please note this sled is eligible for the Formula 340 class, but the Formula 500 class requires a 1989-1992 Indy chassis. Here's the parts we took off and won't be re-using.

Step one: Tear it down to the bare chassis.

Our sled was in a pasture for several years, rusted like an old tank and in serious need of tender loving care. It had a ton of dirt, leaves, grease and debris stuck to it. A bunch of bolts had to be drilled or ground off. If your chassis is as old as this one, make sure you have a portable grinder, a good drill and an impact wrench handy. A really big can of Sea-Foam rust remover or an equivalent can also be very handy. If all else fails, you may need a torch.

Step two: Decide what you want to keep or discard.

We ditched the skis, hood, pan, tank, seat, airbox, footrests, belt, bearings and hoses.



Here's the parts we took off and won't be re-using.

Optionally, we threw out the track, heat exchangers & trailing arms. If your track is in excellent condition, you can use it. But be careful - this is a major safety issue. If that track looks at all weak or worn, simply order a new one as we did.

The heat exchangers are required in Formula 500, so you'll want to test them for leaks, clean them up and keep them. We chucked the trailing arms because they were bent, and because we happened to find a nice, slightly newer set at salvage for just \$35.

The chassis needs to have the paint removed. A word of caution: It will be tempting on these older ones to send the chassis out to be sand blasted to remove the paint. The tunnel will require serious work to bring back to life if you blast it. Instead, use Aircraft grade paint remover in a well ventilated area. This is nasty stuff, so make sure you read the directions carefully and keep it off your skin. Do it in small 6" X 6" patches, and cover it with plastic so the paint remover can work before drying out.

When you are finished, you will have a tunnel that looks baby fresh and is a real pleasure to work with.

Next up: Build that front end!

Sled: \$100.00

Track: \$550.00

Paint Stripper: \$25

Trailing Arms (optional): \$35

Total cost of the project so far: \$710.00



Naked Indy.

Step three: Clean & Weld

We started out by thinking we'd strip the paint. Before we could get started, Vance Elfering of RIP Racing (Reproductions In Plastic) stepped up and volunteered for the job. We've had Vance help with this before and he does such a good job in such a short time that it was well worth it to let him have at it.

After stripping the chassis, vance used a small amount of light sand paper to remove the really stuck paint, then 00 grade steel wool, followed by a quick run with 0000 grade steel wool. That gets the tunnel near polished, but doesn't make it look over done. We'll do a little more clean up on the tunnel, but it's looking pretty good for now.

Next we welded up all the cracks. This old Indy had plenty of them - 10 in all. We also had to do a little pounding on the running boards near the front, as they were pretty badly dented. We also carefully fitted the rear mounts for the trailing arm and added a curved

brace that we will rivet to the tunnel. There is not much supporting the trailing arm after you remove the original foot rests, so you will need to do this. Removing the foot rests is legal in both the 340 & 500 classes.

We also cut the handlebar off and welded a mount for the Aluminum Handlebar clamp. Once these pieces were done, all of them, plus the pipe went off to the powder coater to get blasted, painted and powder coated. You could just as easily save the money and blast & paint these parts yourself. We'll have pictures when the parts come back from powder coat. I opted for the Wahl Oval bars with the straight left side.

Step four: Build That Front End

Next came the beginning of the work on the front end. We started with the radius rods and tie rods, using 6160 aluminum. A standard 1980 Indy is only 36" wide. The 1992's are 38" wide, and the rules state you can only be 38", carbide to carbide. In Formula 500 only, your 38" can have a 1" offset. I first tried just replacing the rods with newer ones from another Indy - that will not work. You have to make them if your sled is as old as mine. Please note I don't know if these measurements are correct for the newer model chassis. NOTE: As of today (8/11/05), the rules for the Formula 500 class have changed and the front end can be as wide as 45"!

Radius and Tie Rod Measurements 1980 Indy:

Formula 340 45" stance, 1" offset

Recoil side Radius Rods: 16.5"

Clutch side Radius Rods: 15.5"

Recoil side Tie Rod: 18"

Clutch Side Tie Rod 17"

Torsion Bar 36" long, 7/8" O.D.\



The start of the new front end. Note the 'holy' chaincase - not legal in Formula 500, but it is allowed in Formula 340.

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Looking at my 20 year old tie rod ends, I decided to replace those as well. I don't think this was optional - they were rusted, sloppy and beat. I ordered 4 of the 03-342 ends, 1 of the 03-336 ends, 1 of the 03-338 ends, 2 of the 03-348 ends and 2 of the 03-316's.

I also ordered 4 new bearings, 2 for the chaincase, 2 for the shafts. No point in messing with 20+ year old bearings.

The old shocks didn't look real good, so I called up the local Polaris dealer: New shocks for a 92 Indy are just \$24.95 (part number 7041144), so I got those and the upper and lower retaining rings. Note that replacing the stock shocks with newer "rebuildable" shocks is not legal in either class.

Up next: A motor and some powder coated parts!

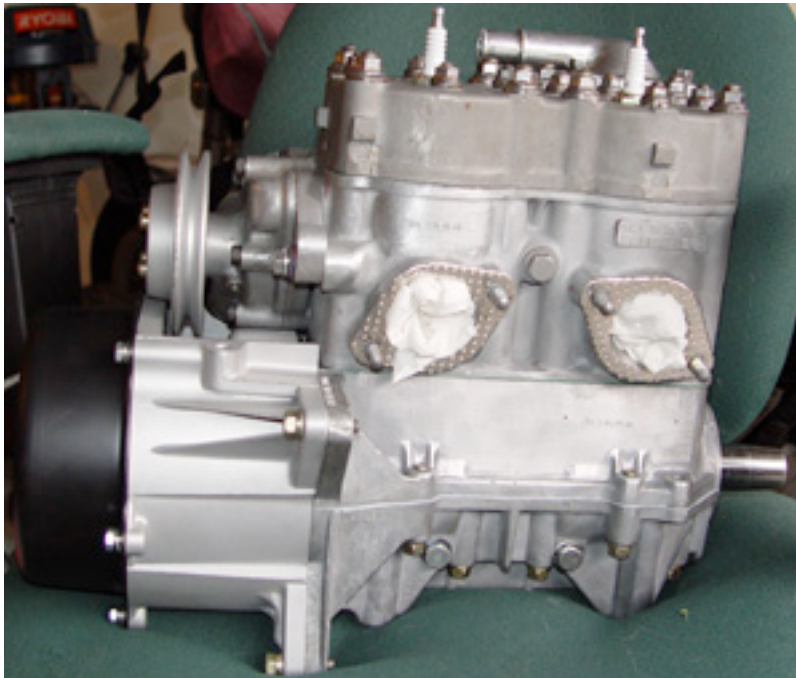
Sled:	\$100.00
Track:	\$550.00
Paint Stripper:	\$25.00
Trailing Arms (optional):	\$35.00
Tail light:	\$28.00
Radius Rods:	\$88.00

Tie Rods: \$28.00
Rod Ends: (10) \$127.75
Spindles: \$119.98
Skis: \$270.00
Bearings: \$60.00
New Shocks: \$68.14
Handlebars: \$45.00

Total cost of the project so far: \$1,544.87

Before I get started on today's update - I have to comment on the weather. It has turned cloudy, colder and beautiful. When I walk out into the shop now, my pace picks up a step or two. That's because I can feel fall, and thus winter are in the air. Race day draws near. I have tons of work left to do, but now it's getting really fun.

I should take a moment to mention that the Wahl Brothers are not building this sled - as incorrectly reported by one of my favorite magazines - merely they are giving me the space on this web site and offering me the tips, tricks and years of experience as I, an udder beginner racer, build my first race sled with Independent Front Suspension. I have built a number of race sleds - rather I should say I have restored a good number of original race sleds, but this is the first one I've done from the ground up with the intention of beating the snot out of it. If you have questions or comments about the build, feel free to email me or Joel Howard at Wahl Brothers.



340 Motor - nearly ready.

Let's talk first about the motor. In tearing down the original Indy, we found the motor to be in very good condition, but a little worse for wear. First all the parts were cleaned very carefully. I then elected to take the bottom end and the crank shaft to Recreational Engineering. There, the crank was given new bearings and a good checking over to make it sure it's in balance and the tolerances are as good as we can get on shoestring budget for racing. Recreational Engineering also drilled the crankcase and added an additional impulse nipple so we can run the slide lubers from a fuel pump. We left the cylinders alone as the rules require. We did make sure the carb boots and exhaust Y-Pipes did match up to the cylinders nicely, but made no significant modifications.

Once that was done, we assembled the motor. We used new pistons, rings, wrist pins, bearings and gaskets. I wanted to try and re-use something out of that pile, but there really wasn't anything there that looked like it would last a whole race let alone the whole race season. As of this writing, we had not received the water pump belt, but that's easy to install when the motor is in the chassis.

Step Five: Painted Parts

We talked about these in the last update, but now that they are painted, I got some photos. First we added a small piece of curved tube to the trailing arms. It was welded to the trailing arm support, then welded to a piece of flat steel just big enough for the tube, and the 4 rivets used to attach it to the tunnel. Without this, I really didn't think there was enough support for the trailing arm, and they had broken at that point from the years of trail riding. I also repainted the handlebar hoop, the handlebars and some other small parts. I didn't have to paint the trailing arms, as they were already powder coated. A little scratched up, but they look pretty good. I also used a couple of small, thin aluminum plates with straps to hold on my new gas tank. I mounted the old, original tach, throttle and handlebar grip. I got a newer style brake from a scrap yard and fitted the calipers into the chaincase, the same way they came out from the original Indy. One note of caution: My old Indy chaincase was broken, so I got one from, I think, a 1978 TX out of a salvage yard. The larger (better) Indy style brake caliper did NOT fit that older chaincase (even though they look exactly the same!) so I had to do a little more carving on my 'holy' chaincase to get it to fit.



Trailing arms supports were added.



Installed Handlebar Mount and Handlebars.



An important addition to the front suspension is this metal retainer bolted in front of the lower radius rods and riveted to the bulkhead. It will help keep those bolts from breaking

Step Five: Get a Hood to Fit

I started with the standard Wahl Champ Polaris hood. You are required to keep the motor in the stock position. This makes the motor stick up through the hood - right in the middle of where the windshield attaches to the hood. It would have worked had the motor stuck out in front of, or behind the windshield, but I could not picture it working, nor looking to good, going through both. You want to make sure the hood fits with the carbs, pipes and clutch guard in place. I finally decided to go retro, and ordered a 77 Polaris SnoPro hood. Remember, in both Formula 500 & 340, anything goes as far as the hood, seat, handlebars and gas tank - so make it look good!

Clutch Close-off

We fabricated this RXL style belly pan and the rear of the clutch guard and covered it all with safety belting.

I copied, as much as I could, the bulkhead from a 78 RXL. This meant getting some thin aluminum sheeting, and some square tubing. It was all very inexpensive from my local farm supply store. I cut the pan pieces on either side to match the Indy chassis, riveted them on, then riveted on the square tubing around the edge, all the while trying the hood to check that I had it all straight and square.

Addendum to Part 2

The rules changed on both the Formula 500 class and the Formula 340 class. Both now allow your front end to be 45" wide from the outside edge of each ski, with a 1" offset. That means all the measurements from our 2nd installment of this build are NOT correct. For the 1980 Indy Chassis, I had Wahl Brothers build a 36" torsion bar from 7/8" Chrome Moly tube. The outside (recoil side) Radius rods are 16.5" and the inside ones measure 15.5". The outside tie-rod is 18" long, and the inside one is 17" long.

What's next?

Sled: \$100.00
Track: \$550.00
Paint Stripper: \$25.00
Trailing Arms (optional): \$35.00
Tail light: \$28.00
Radius Rods: \$88.00
Tie Rods: \$28.00
Rod Ends: (10) \$127.75
Spindles: \$119.98
Skis: \$270.00
Bearings: \$60.00
New Shocks: \$68.14
Handlebars: \$45.00
Pistons \$105
Rings \$60
Wrist Pins \$35
Piston Clips \$1.50
Exhaust Gaskets \$19.48
Gasket kit \$44.95
Water pump belt \$19.99
Clutch Gaurd Safety Belting \$12.00
Hood \$299.99
Crank Rebuild* \$195.00
Cigars** \$14.95
Total cost of the project so far: \$2,337.78

*This can be a lot more, depending on the condition of your crank.

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