Preparing Your Car for a Track Day

Getting Your Car Ready for a High Performance Driving Event (HPDE)

(Copied from www.nasaproracing.com)

By Michael Quan

Now that you have signed up for the HPDE, you need to get your car ready. The first thing you should do is read the School Technical Inspection Information. While on line, you should also get a copy of the School Technical Inspection Form.

The 'information' page will tell you where & how to get your car inspected. The 'inspection' form will tell you the minimum number of things you need to check before getting your car inspected at one of the approved tech locations.

Preparing Your Car for the Inspection

The technical requirements for the HPDE are just common sense checks to make sure your vehicle is in good, safe working order. It is important for you to check out your car before trying to get it inspected. You and the shop only want to do it once per event. Here I will go over the different categories of the technical form with some short explanations.

WHEELS & TIRES – The wheels should be round without any dents or damage to the mounting surface. The tires should be in good condition. The tread should be above the wear bars. No cords or belts should show. Flat tires repaired with plugs should not be used as these could fail under the high stress of track conditions. Hubcaps or beauty rings should be removed. They can come off causing a dangerous situation for you & other students.

STEERING & SUSPENSION – Check the wheel bearings by grabbing the tire & trying to move the wheel from side to side. There should not be any play or clunking sounds. The front wheels should move when you turn the steering wheel. There should not be any excess play.

ENGINE – The engine should not have any leaks that will allow liquids to fall onto the track. These fluids will cause slippery conditions on the track. This includes radiator fluid (antifreeze) which is very slippery. The battery should be secured with two (2) bolts. The battery terminals should be covered to prevent any arcs in case of accidental contact.

BRAKES – The brake system should be in good working order with no leaks in the system. The brake lines should not have any cracks. The brake fluid should be clear & at the maximum level. The pads should have plenty of life left in them, as the high speeds on the track will wear them out faster than the street. The brake lights should function properly.

SAFETY EQUIPMENT – Seatbelts must be in good condition. Factory seatbelts are OK. Cars without fixed roofs are required to have roll bars. Natural fibers are recommended for clothing. Minimum allowable clothing is jeans, a T-shirt & closed toe shoes. You will be required to wear a helmet when on the track. The minimum rating is SNELL 1990 (SA1990 or M1990). Newer helmets with a SA rating are recommended. Eye protection is required (face shield, goggles, safety glasses). The more and better the safety equipment you have & use, the safer you will be.

MISCELLANEOUS – There should be no exposed wires. The car should have a good gas cap that seals. The seats should be bolted in tightly.

At the Track

Now that you made it to the track there are still a few things to do. You will want to take out everything you can. Remove your spare tire & jack. Take out all the floor mats. Any more loose stuff in there? Take it out. Next apply some wax to a portion of your door or quarter panel. When it dries to a haze, leave it there. Take some racer's tape (colored duct tape) & put your "numbers" on top of the waxed portion. Now wipe off the rest of the haze. When the end of the day comes, you will be able to remove your numbers without doing damage or leaving a residue on your paint. Clean your front & back windows with glass cleaner. There will be less glare & you will be able to see your reference points easier. Fasten any unused seatbelts. You don't want the buckles flying around. Apply some white shoe polish from the most outward tread block to around the shoulder of your tires. By checking the shoe polish after a run, you can tell if your tires are rolling over onto the sidewall. Most people need to increase the tire pressure from what they normally use on the street. How much will depend on your tires. When you come off the track after a run, use a block of wood to keep our car from rolling. Don't use the parking brake. That will trap the heat that could cause your rotors to warp. Keep the engine running for a couple of minutes with the hood up. This will allow your engine to cool down & help circulate the hot fluids.

Things to Bring

Here are a few things to bring that will help make your HPDE more enjoyable. The list can be changed to suit your region & climate/season.

For the car: glass cleaner, wax, and a quart of oil, rags, white shoe polish (applicator bottle type), a battery operated air compressor, a tire gauge, a tarp to put all the stuff you took out on, and some basic tools.

For you: a change of clothes, suntan lotion, drinks (WATER!), a cooler, folding chairs, a shade canopy, a camera, and friends to enjoy the driving with.

What to Expect on Your First Track Day

(Copied from www.nasaproracing.com)

My First Day at the Track

After much prodding from my friends I finally committed to going to my first HPDE at Thunderhill. Not only was this my first HPDE, it was my first time ever on a road course. I've been to a couple autocrosses but that's it. Other than that, I've had no real racing experience. So, this being my first time, I was really nervous.

To prepare for the track I went to several websites and message boards and asked others of their experiences and what they did to prepare. Basically, for the car, I was told to change the oil, make sure the brakes had at least 50% of the pads left, bleed the brakes and clutch, check all fluid levels and anything else that could potentially be a problem later at the track. So I also lubed my sway bar bushings, double-checked bolts and nuts and stuff like that. Also get the correct Snell rated helmet allowed for the track. It is best to do this stuff a few days prior to the event so you are not rushing around the night before getting things ready.

For myself, I, again, used the 'net to find out how to prepare myself for the track. At the top of the list was: "**Have lots of fun!**" But stay within your means. Don't go overboard on your first time out. I had the urge to go fast but since I didn't know the track I didn't want to wreck my car! Plus I'd end up in the wrong lines to take the correct apex. (Bad thing!) Just take your time and go at your own pace. Remember that you are still learning so you have to take it one step at a time. Speed will come later when you learn how to drive. Believe me, there are so many things to be aware of on the track that speed will take a backseat! Don't forget to get a good night's rest the night before. I made the mistake of getting only three and a half hours of sleep the night before and I missed one session because I fell asleep waiting for the next run. Oops! Better to fall asleep in the pits then in your car!

However, the best thing you can do to learn how to drive is through the Mentor Program, which is free through the NASA website. A friend recommended it to me. Through this program, you will get personalized help before, during and after the event. I was lucky enough to get two people to help me, Dev and Barry! Barry is my mentor and Dev was my instructor for the day since Barry couldn't make it. Before the event, I e-mailed Dev and Barry back and forth asking them numerous questions, like how to prepare and so on. Their help proved to be invaluable. It was because of them I felt I was thoroughly prepared for what to expect.

Once at the track, be prepared for sensory overload. Throw out everything you think you know from driving on the streets and open up your brain to learn how to race for real. Since I was new I was in Group 1, so an instructor is required or if you have a Mentor, you will meet up with him/her. Before my run group I got to ride with Dev in his Pro 7 RX7 racecar. To be honest with you, I was getting motion sickness from, I'm assuming, all the g-forces going around the track. But it gave me a chance to see the layout of the course before going out myself, which was also invaluable to learning the track. It also gave me a chance to see what a real racecar can do. Lots of fun, even after getting sick!

While on the track you need to be aware of so many things all at once. I found this hard to do! You need to be aware of all the cars around you, what lines to take, the apex, flag

stations, color of the flags, shifting, steering, braking, throttle, etc., just to name a few! Looking far ahead is also very important! That way you can see where you need to set yourself up to hit the right racing line and apex, or, if you need to avoid an accident ahead of you, or watch for flags. But don't be intimidated by this. Remember that everyone on the track has gone through the same thing you and I are. It's a learned skill and you will get better as the day goes on. I'll be the first one to tell you that I still don't have that down. But as Dev and Barry told me, that stuff will become second nature with more track time.

After each run it is also good to go over with your instructor how you think the run was. From there, your instructor can critique your driving and tell you where you need to improve. This is very helpful since the instructors know the track inside and out. If you really want to get better, you'll listen to them.

At days end, you will have bettered yourself as a driver both on the course and on the streets. A lot of what you learned can be taken back to everyday driving, like looking at what's ahead and being aware of your surroundings! You will also have an idea of just what your car can do when pushed to the limits. In other words, you will learn just what your car was made of and where you may need to improve the car to handle the track and street better. Although I can't go all the time, I am definitely going to go again! It was just so much fun! Auto-crossing was fun too but there is nothing like driving on a real road course and learning about you as a driver! Consider me addicted!

- Gary Lee

Learning the Line

(*Copied from www.nasaproracing.com*)

By Dev Clough

The “racing line” is the path around the track, that when driven at the limit, will yield the fastest lap time.

The line through any particular corner is accomplished using a “connect the dots” approach. There is a specific “turn in”, or “corner entry” point, which is the point where you begin turning the wheel. At the approximate middle of the corner is the “apex” which is the point in the turn where the inside wheels are closest to the inside edge of the pavement. At the end of the turn is the “corner exit”, which is the point where the car is no longer turning, and the wheel is straight.

Going quickly requires that you learn the line and drive it consistently and precisely. One of the biggest stumbling blocks to learning the line is overdriving the car while trying to learn the line. (Particularly at corner entry).

If you are going slower than the traction limits will allow, you can place the car exactly where you want to. If you are going too fast, the car will be controlling you, and you will be forced to follow the line established by the speed of the car.

Racing drivers are all aware of the adage “In slow, out fast”. The most important goal of most corners is to carry as much speed as possible onto the straight following the corner. It has been said that the race winner is not the guy who goes fastest around the corners, but the guy who gets between the corners fastest.

The proper line can often be felt. Some things to look for:

At the “turn in” point, the car should be as close to the outside edge of the track as possible, this will allow the car to travel the arc of the greatest radius through the corner. At the “apex”, the car should be as close as possible to the inside edge of the track, and at “corner exit” the car should be all of the way to the outside edge of the track again. Many turns have “berms” (Usually a concrete curbing) at the apex and corner exit. Racing drivers commonly drive on the berms to increase the radius of the turn by another few inches. I don’t advocate that in a street car, but I ask my students to try to just “feel” the edge of the berm, to know they have used the whole width of the track. Note: It can be helpful in learning the line to look at where the rubber has been left on the berm by the race cars.

Hot tip: You will know when you are on the correct line when you turn in at corner entry and do not have to change the wheel position again until you begin to “unwind” (straighten) the wheel about 50-75% of the way through the corner. You must hit your apex, and wind up at the outside edge of the track for this to be meaningful.

This is what you will want to feel: At corner entry the car should turn in easily. The car will lean on its suspension, and “take a set”, when it does you should gently begin to apply a small amount of throttle (the car is more stable under throttle than if just rolling free). Gently increase the throttle, feeling how much the car can take, if the car begins to go wide (remember, you must hit your apex!) either stop increasing throttle application, or lift very gently. Lifting quickly will probably spin the car if you are anywhere near the limit, but

lifting gently will just point the car in to the apex. As you pass your apex point you should be able to gradually apply more throttle, as you do you will feel the car tell you it wants to go straighter (because you are going faster) and you will have to unwind the wheel. This unwinding should carry you all of the way out against the edge of the track at your corner exit point. If the entire corner felt smooth, and felt like the car was developing a consistent “G” force from the beginning to the end of the corner, you probably nailed it. Remember, none of this means anything if you do not “connect the dots”!

Most drivers use visual reference points to establish where they apply their brakes, the turn in point, the apex and corner exit points. It is the easiest way to be consistent, particularly when learning a new track. Look for objects that will always be there, and that won’t move. Cones are a bad idea, a missing chunk of pavement is a good idea. When establishing a braking point, be conservative. First, because of “slow in, fast out” and secondly because as the day progresses you will probably be exiting the previous corner faster, and therefore carrying more speed into the braking zone.

Hot tip: While learning the line, if you find yourself running out of pavement at corner exit, move your turn in point closer to the turn. If you have pavement left over at corner exit, move it back. You must hit your apex for this to work!

Passing in a HPDE

(Copied from www.nasaproracing.com)

By Dev Clough

The first thing to remember, is that HPDE is not a race. The goal in HPDE is to improve and develop driving skills. Since passing is the most likely time to have contact, and since the consequences of having contact are severe, the first rule is, “If in doubt, back out!”

It is your responsibility to know the rules pertinent to passing in your group. They will be covered in the drivers meeting. They are not complicated, but you must understand them. If you are on the track, contemplating a pass, but aren’t sure if it complies with the rules, remember “If in doubt, back out”. After the session, clarify the situation with your instructor, or at the download session.

The following statements are only a guideline. The actual rules will be spelled out at your drivers meeting. What is said at that meeting supersedes anything stated here.

Group 1 and 2 passing rules allow passing only on specified straights. All passes must start after the car has clearly left the corner leading onto the passing straight, and must be complete before the braking zone of the following corner. Sometimes there are specific reference points on the track, such as “the pass must be complete by the end of the pit wall”.

If you are being passed, a “point by” is strongly encouraged. This tells the passing driver you are aware they are coming by, and tells them where you expect them to pass. The “point by” is accomplished by pointing to the side you want to be passed on. As the driver being passed, part of your responsibility is to make the pass easy for the overtaking car. This means be predictable. Do not do anything erratic.

Here’s the scenario:

For the last few turns a car has been following you, so, as you enter the passing zone, you give the following driver a “point by”. Do not jerk the car off line, but smoothly give him a clean lane to make the pass. Do not hit your brakes to help him get by. If your car has more or equal horsepower, do not use full throttle. Don’t leave the passing car hung out into the braking zone. The safest passes are complete long before you get near the braking zone. Being smooth and predictable are the keys to safe passing. Also, just because you point by on the left doesn’t mean the overtaking car won’t go by on the right, and it doesn’t mean the other driver has to make the pass. The point by is a recommendation only.

If you are making the pass, keep this rule in mind. It is the same rule as applies in racing. It is the responsibility of the overtaking driver to complete a safe pass. Do not pressure someone in non-passing areas in order to encourage them to let you by. Keep a reasonable distance between you and the car you want to pass, until you enter the passing zone. You should be close enough to let them know you want by, without being intimidating.

Here’s the scenario:

For the last few turns you have been following a car. As you enter the passing straight, move up closer to the car you wish to pass, and off to the side you would like to use to

pass. This should put you squarely in their side mirror. Look for a point by from the driver. Pass on the side they point to, if at all possible. If you don't get a point by, look for some recognition that they are aware of your presence, eye to eye contact in their mirror as an example. If you get neither, a pass can still be made, but is at your risk, the driver may not know you are there. Always be aware of cars that may be behind you, before you pull out for the pass. If you pull out to make the pass, but the car you are passing has equal or greater acceleration, remember you must complete the pass as described earlier. If you are not sure you can complete the pass properly, remember, "if in doubt, back out". Because you receive a point by does not mean you are obligated to pass, it is simply a courtesy from the other driver.

Group 1 & 2 sessions are not intended to teach passing skills. These sessions are intended to teach the basic skills involving driving the line and some beginning car control techniques. Passing skills begin in group 3 and are really developed in group 4. Passing in group 1 & 2 is necessary because of the differences in the capabilities of the cars and drivers.

Passing etiquette in group 1 & 2 includes letting faster cars go by easily. If you drive a powerful car, it is quite easy to keep less powerful cars behind you, since they are only allowed to pass in the straights. If you blast away down the straight, but that little rice rocket is all over you again 2 turns later, let them go in the next passing zone. You might learn something by observing why the guy is so much faster than you through the corners. You will also be much less likely to receive a black flag, followed by a lecture from an official.

If you do get held up by someone who won't let you by, or if you are ready to go a little quicker, but there is a big knot of traffic in front of you, you can pull onto pit road, and wait for an open space on the track. The official feeding traffic onto the track will signal you when there is a big gap. You can also use pit road this way if you notice several cars stacking up behind you..

The blue flag (with yellow diagonal stripe) is the passing flag. It is given to let a slower car know a faster car is catching them. If you are given this flag, you should already be aware that a faster car is approaching. You should let the car (or cars!) by in the next passing zone.

Although passing is not taught in group 1 and 2, the basic skills necessary to allow safe passing begin here. First is the awareness of other cars on the track. Second is conditioning your reactions to allow or make a pass safely, by not doing anything erratic, and by being predictable. Although it is the overtaking drivers responsibility to make a safe pass, the driver being passed must be aware of cars around them, leave a clear passing lane, and not force the pass to be made late in the passing zone.