

COMMON SENSE HIGH SPEED DRIVING

High speed driving can be an extremely satisfying, but potentially dangerous experience. This information is designed to help you create a safer, more satisfying experience. Please read it before coming to the track.

The Porsche is one of the few cars that can be taken off the showroom floor and driven safely at high speeds, but a few recommendations are in order.

A GOOD TUNE UP: You will be placing much more stress on your car than a typical supermarket run. A well-tuned car will have an easier time and will probably result in a trouble free event. It is recommended that you top off the oil system at the track that day to insure adequate oil supply under hard cornering. On all four-cylinder engines, it is a good idea to overfill by one-half quart. Oil supplements and heavier or racing grade oils should not be needed. All entrants are encouraged to bring extra oil to the track.

TIRES: Tires are your only contact with the road. Get good ones, such as those with a VR or ZR rating and good tread. They should be balanced and mounted on good rims. Tire pressure varies, but should generally be in the 30 to 40 PSI range and be checked frequently. Tighten lug nuts before the first run of the day. A torque wrench is recommended especially for magnesium lug nuts. Do not tighten lug nuts after a session on the track. The result will be over-tightening upon cooling.

RACE TIRES: If you plan to use them only one or two times a year, save your money. For optimum performance, they required a different suspension setting and driving technique, which cannot be mastered with minimal practice. Used racing tires can be very dangerous, since they "take a set" from the rotation and stress of the corner they are on, which will not be duplicated on your car. Old racing tires also dry out with time and will give little or no warning of breakaway, which leads to crumpled fenders and 5-mph bumpers. Invest in a good set of VR or ZR rated street radials. You will be happier, safer and probably faster for it. Tires should have a minimum of 1,000 miles on them before driving on the track.

MALFUNCTIONS: If you feel you have a malfunction in your car, get some help. Don't go out on the track to see if it's "true". You may be right. There will be a lot of knowledgeable people around who will gladly help you. Ask one of the instructors, if they can help you or help you find someone who can.

CONDITIONING: High speed driving demands total concentration, split second timing, and fully coordinated muscle involvement to handle the hundreds of intricate movements involved. If a driver is bothered with muscle aches and pains, is uncomfortable, or is overly tired, it is impossible to deliver optimum performance. If you start to feel fatigued, pull into the pit. A tired driver makes mistakes and is a hazard to him/herself and others. For high speed driving, everything has to be tuned for maximum handling performance, including the driver.

NO ALCOHOL: Obviously, no alcohol or drugs should be consumed before or during this event, as this will result in immediate dismissal from the event.

CLOTHING: Comfortable, well fitting garments are recommended. Driving in short pants, sandals, bulky or loose fitting footwear or bare feet is prohibited. Long sleeves and long pants of natural fibers (or driving suit) are mandatory no matter how hot it is! No nylon jackets.

Shoes: No platform heels please. Choose a good tennis or street shoe with a crepe sole.

Helmet: To quote an old proverb. "If you have a ten dollar head, buy a ten dollar helmet." Snell SA2000 or better helmets are required. MA rated helmets are not permitted. If you are a new student and don't have a helmet, you will need to make arrangements to borrow a helmet BEFORE THE EVENT. **There are no official loaner helmets available from our club.**

SEATBELTS: Those supplied with new cars are adequate. Weak, frayed or those with poor attachment points should be replaced before the event. If you plan on doing this driving event frequently, consider buying a harness system, which includes lap belt, shoulder harness, and sub belt. **Students in an instructor's car or instructors in a student's car must have available the same restraint system as being worn by the driver, including the seats.**

DRIVING POSITION: The driver must be able to reach the pedals and shift lever with ease. If unable to do so, he/she is unconsciously making some compensation, which decreases concentration. The driver should not be bracing him/herself against the door to stay in the seat. If possible the seat belts should be tightly cinched. All open cars must have a roll bar or hoop extenders mounted at least two inches above the driver's helmet (pass the "broomstick test") and their instructor's helmet in the passenger seat. For late model Porsche convertibles (996/997), a factory hardtop is considered adequate rollover protection (pop-up rollover system is de-activated with hardtop attached).

TECHNIQUES OF HIGH SPEED DRIVING: There are several general rules for novices, which should not be compromised if you want to stay in control:

1. Check your mirrors.
2. Braking, shifting and hard acceleration should only be done when the wheels are in a straight line.
3. Never lift your right foot unless your wheels are in a straight line.
4. Check your mirrors again.

STRAIGHT-AWAYS: After exiting the last corner, you will have a little time on your hands. Use it well. First check your mirrors again to make sure everyone is where you thought they were. Establish your line on the straight and stick with it. Erratic lane changes tend to confuse drivers behind you.

Wave by any faster cars, indicating by pointing to the side on which you wish them to pass. Usually, faster cars should be on the outside of the track. Don't try to beat a faster car into the corner; if he doesn't pass you on this straight, he will on the next. You might as well let him by now and concentrate on your own driving. When being passed, maintain your line and ease off the gas to facilitate the pass. The car passing you may be much faster than you in the corners, but may not be able to get around you in the straightaways unless you slow down.

Check your instruments. Know the normal position of the gauges so you can recognize immediately when the figures are other than normal. Check your mirrors again and start planning your strategy for the next corner.

CORNERS: Probably the largest difference between a mediocre and excellent driver is the manner in which they execute the corners. The most important part of the corner is the short distance, which comprises the approach, or “set up” before you even start turning the wheel. **The line** is the route taken into, through, and out of the corner. It will vary slightly for different cars and drivers, but the basics are the same. We will break the corner into parts: approach, entrance, and exit.

Approach: The car is positioned on the extreme outside of the track, wheels straight. All braking and downshifting are done here before the wheels are turned. (Use your brakes, not your gearbox to slow down; brakes are easily replaced, while gearboxes are not.) The purpose of downshifting is to be in the proper gear when the power comes back on. Braking should always precede a downshift. Double clutching is never necessary in a Porsche. You should be in the proper gear and at the correct speed to enter the corner. No further braking or shifting should be done once the turn is started. Your entry speed into the corner should be well below that at which you can negotiate the corner. With experience, this speed can gradually be increased.

Corner Entrance to Apex: Approach sequence complete, turn the wheel to the apex. The apex will be defined as a part of the road, which is the innermost part of the radius of the turn. It is the point where you are the farthest into the corner; the point where you stop entering and start exiting. The point is not a dot, but can be 4-5 feet in length; the center of that line is the true apex of the corner.

Ask your instructor to point out the apexes if they aren't marked out by pylons; have him explain the relative merits of an early or late apex. In general, an early apex is good for an expanding radius corner or where you are going to set up for an immediate successive corner turning in the same direction. It has a big disadvantage in that you will more quickly run out of road in the exit phase; it is therefore more dangerous. Late apex corners are good for tight hairpins and corners where you will immediately set up for a corner in the opposite direction. Late apexes will bring you out in the middle of the road, and are therefore much safer. **If in doubt and given a choice, use the late apex.**

Once a wheel is turned, it should be a smooth arc from the entry point to the apex. As the wheel is turned to the apex, the slip angle of the tires is established, it is the theoretical maximum speed at which the car can negotiate this segment. If you are near the maximum speed, any further turning of the wheel to the apex will result in oversteer, since it will be increasing the slip angle. Any increase or decrease in speed or power will result in understeer or, especially in a rear engine Porsche, oversteer. (Oversteer is the tendency for the rear end to want to come around. This is a characteristic of rear engine cars.) Therefore, it is very important that until the proper line to the apex is mastered, the speed should be kept well below maximum to allow for corrections.

It is very important, especially in rear engine Porsches, **never to lift your foot off the accelerator when cornering**. A sudden decrease in power to the wheels and its resulting understeer will send you sliding or spinning off the track. It is better to keep and

even throttle to the apex even if your speed is a bit too high. You will be able to correct with your steering wheel. Your corner will be sloppy & slow, but you will survive. If you find that you really goofed, and cannot make it around the corner, it is better to drive off the course with the wheels straight and the car under control than to fight it to the point of spinning. For those of you who have ignored all of the previous information and find yourself violently spinning, the only recourse is to lock up all the wheels, depress the clutch and wait until you come to a complete stop (both feet in). Then proceed to the pits, have your car inspected, and contact an instructor about the incident.

Exit from the Corner: Generally, the first part of a corner is sharper (has a smaller radius) than the second half, and is therefore taken at a slower speed. The second half, with a larger radius, allows you to straighten out the wheel and accelerate through the track-out. This results in a smaller slip angle and a higher possible speed. If the approach and entry to the apex are correct, the exit will be easy, fun, and fast. With the reduced slip angle, the throttle can be opened smoothly to keep the car at the theoretical maximum speed during the exit. This obviously will result in a higher exit speed than a corner taken at a constant radius, and since speed will multiply itself down the straight, a much higher speed will be achieved at the end of the straightaway.

The total procedure can be summed up very simply, and the summation should be repeated five times out loud every night before going to bed.

1. Concentrate
2. Brake and downshift in a straight line
3. Turn the wheel using even throttle (turn-in)
4. Apex
5. Accelerate out, using all the road (track-out)

Go slowly enough so you can be smooth. With smoothness and consistency, speed will automatically follow. If you insist on flogging your car around the track at the beginning, you will find yourself doing the same thing at the end. The only difference being that you will be waving everyone else by.

BRAKES: Keep in mind that track driving is very tough on brakes because you are constantly using them hard and there is not sufficient time to cool them. Do not put your emergency brake on after you run. The brakes may be hot enough to fuse the pads to the drum.

“Why do street cars run out of brakes?” The first thing that happens is that the brake fluid boils, the pads become glazed and the drums and/or rotors may become warped. This syndrome is often referred to as the brakes going away or getting spongy. The solution to the problem is to change to heavy-duty brake fluid, which has a much higher boiling point (550 F), and to install heavy duty or competition brake pads and shoes.

If a car is locking one wheel, you will see a puff of smoke when the wheel is turned. A bad caliper can cause this.

If brakes lock up in a straight line, there is probably a major brake problem.

HINTS FOR GREEN LEVEL DRIVERS

How to get the most from PCA Drivers Education

One of the most time consuming processes in drivers education events, besides learning the proper driving line around the track, is showing students how to “unlearn” bad driving habits they have developed over their years of street driving. The following is a list of new habits that you can practice on the street. A little “homework” that will help you prepare to learn the most during your drivers education.

YOUR SEAT: Improper seat position can cause discomfort, fatigue, and in some cases, could prevent you from controlling the car quickly enough to avoid a problem on the track (or the street). First, slide the seat forward so your left leg is slightly bent when pushing the clutch all the way to the floor. Then, adjust the seatback so your wrists touch the top of the steering wheel when your arms are fully extended in front of you. The seat height can be adjusted for comfort, but remember, on the track your helmet will require an additional 1 to 2 inches above your head. Put the seat in this position now and you will be comfortable by the time you get to the track.

YOUR FEET: The most difficult aspect of high speed driving is learning to handle the car smoothly. Any jerky movements tend to upset the suspension, resulting in less tire adhesion and therefore less potential speed. While you won't be traveling anywhere near the limit of adhesion of your tires in our school (**or you shouldn't be**), working on smoothness now will improve your overall performance.

Training your feet to be smooth is not easy and requires quite a bit of concentration at first. The key is to always think “SQUEEZE AND UNSQUEEZE” the pedals. **Never** stab or release the pedals abruptly. Squeeze on the gas and unsqueeze when you get off the gas. Squeeze on the brakes and unsqueeze when you release the brakes. Squeeze on the clutch and unsqueeze when you release the clutch. Your ultimate pedal pressure will be the same, but the transition will be much smoother. A mental image that may help is to imagine your car is half full of water. Drive so smoothly that you don't spill any liquid out the windows. Start to practice this on the street today.

One common bad street habit is placing your left foot on or near the clutch pedal when you really have no intention or need to shift. The only time your foot should touch the clutch pedal is when you are actually shifting gears. At all other times, your foot should be resting on the floor to the left of the pedal. This will allow you to use your left leg to brace your body in the seat during hard cornering. Resting your foot on the clutch, even lightly, will wear the throw-out bearing prematurely. Porsche clutches are not cheap to replace!

YOUR HANDS: On the street you can drive with one hand on the wheel, elbow out the window, talking on the cell phone, and usually get away with it. Traveling at high speed on the racetrack requires quite different hand habits. You must be in full control of the car to be able to quickly and safely avoid any potential problems. This means both hands must be on the wheel **at all times** unless shifting gears. **Don't use the gearshift as a hand rest!**

The best hand position for most drivers is left hand at 9:00 and right hand at 3:00. This position automatically gives you the widest possible range of steering input. (It also keeps your hands

out of the way of the airbag.) In most race cars the steering ratio is so tight that the driver can turn full left to full right without moving his hands on the wheel. Street vehicles have a much wider ratio so we don't go off the road when we sneeze! Therefore, you will find some corners that require a greater rotation of the wheel than you can manage without moving your hands. For these corners you can use a technique called "walking the wheel".

When approaching a sharp corner remove your "turning" hand (left corner-left hand, right corner-right hand) from its normal position and grab the wheel at 12:00. Turn the wheel by pulling down with that hand (pulling the wheel down gives your arm more control than pushing it up and over). At the same time, release the other hand allowing the wheel to slip through. When the wheel has turned $\frac{1}{4}$ rotation, your hands will once again be at the 9:00 and 3:00. Grip with both hands and turn the corner. Reverse the sequence after the corner to get back to normal. Some very tight corners, like a hairpin, might require doing this twice as much.

The objective of the technique is to have both hands gripping the wheel at 9:00 and 3:00 at the apex or center of the turn. This gives you the best chance to provide quick corrective steering input in either direction, if needed. This is another easy technique to practice on the street. Note that smoothness counts with steering inputs as well as pedal inputs. Never jerk the wheel. Anticipate the turn-in point and the exit. And turn the wheel smoothly.

YOUR MIRRORS: Although it may be hard to imagine, there will probably be cars on the track that will be faster than you. Therefore, it is critical that you are always aware of the traffic behind you. The best way to do this is to have our rear view mirrors positioned correctly.

On the track, your instructor will move the passenger mirror so he or she will have a clear view of the rear. However, when you are alone on the track or on the street, try adjusting your mirrors as follows:

1. The inside mirror should be centered to see directly behind the car.
2. Position the two outside mirrors to cover all the remaining areas behind the car. Most people set these so they can see the sides of their car on the inside edges of the mirrors because they think they need a reference point. This is not the best position because unless the outside mirrors are quite curved, there will be two blind spots just off the rear fenders.
 - Set the outside mirrors so you must move your head at least 2 inches to the left or right of your normal driving position to see the edge of your car in the respective mirror.

With this set up, you will never lose sight of an overtaking car. It will appear first in your center mirror, then in the outside mirror as it gets closer, and then in your peripheral vision as it gets beside your door. An additional benefit of this mirror position occurs when driving at night. You will see the lights of the cars in your center mirror only, the one with the nighttime glare reduction. When a car pulls out to pass, you will immediately see their headlights in the outside mirror at full strength. This will get your attention!

YOUR ATTITUDE: PCA driver's education events strive to be **SAFE** and **FUN**. Even though the event is held on a racetrack, **IT IS NOT A RACING SCHOOL**. It simply provides an opportunity for owners of high performance cars to learn to drive them in a high performance manner in a much safer environment than on the street. There are strict rules on where, when, and how you may pass other cars and how close you can get to another car.

There are no trophies or prizes. No lap times are recorded. Any drivers disregarding the rules and driving beyond their capabilities are endangering themselves and others. **THEY WILL BE ASKED TO LEAVE WITHOUT A REFUND!** The only thing they have to gain is a black flag and dismissal from the event.

On the positive side, if you come to the event with an open mind, a great attitude and a small ego, you will have more fun and learn more about yourself and your car than you ever thought possible. In addition to the wonderful time, the skills you learn could save your life and others.

By the way, it's OK to be a little nervous, but don't worry, no one expects you to be a Mario Andretti. Be assured that you will not be asked nor expected to drive, any faster than you feel comfortable. We want you to have fun and come back again.

All of our instructors are looking forward to helping you and your car along that road of excellence.

THE TRACK IS NOT THE PLACE TO LEARN HOW TO DRIVE YOUR CAR... & OTHER VERY IMPORTANT TRACK TIPS

If you have a brand new car or your car is a recent purchase, take the month or more before this event making your car an extension of you.

1. Check tire pressures frequently. Torque lug nuts properly before first run of the day.
2. Be in the pre-grid area ready to go 15 minutes before run time. Be belted in your car, helmet on, and engine warm 5 minutes before run time.
3. Know the flags and watch the flag stations. They can know what is around the next corner.
4. Run the first lap or two at a reduced speed. Take the time to warm up your tires and your wits. Don't tailgate the car in front of you. You cannot concentrate on your own driving if you are worried about his. Drive your own line; don't follow someone else's mistakes.
5. In the event of rain, slow down to at least half your normal speed. The oil and rubber on the track mix with water and make things very slippery until the track gets washed off. Speed can be increased as the track is washed off and your feel for the new conditions is established. A wet track will show who is consistent and who is not. It's a great teacher. Respect and learn from it.
6. After the checkered flag, slow down and proceed to the pits. When returning to the pit from the track, reduce speed and stay to the inside of the last turn. Stick your left arm out the window, straight up, to signal the drivers that you are turning in. Be on the inside of the track. Don't make up your mind at the last minute and try to pull sharply into the pits. You may find out what T-boning is.
7. **PIT & PADDOCK SPEED IS 10-mph.** Speeding or unsafe driving in the pit or paddock will result in expulsion. STRICTLY ENFORCED!!!
8. **WATCH YOUR MIRRORS AT ALL TIMES.**
9. Keep in mind that track driving is very tough on brakes because you are constantly using them hard and there is not sufficient time to cool them.
 - Do not put your emergency brake on after you run. The brakes may be hot enough to fuse the pads to the drum.
 - If a car is locking one wheel, you will see a puff of smoke when the wheel is turned. A bad caliper can cause this.
 - If brakes lock up in a straight line, there is probably a major brake problem.
10. Leave the track in better shape than you found it. Remember we are responsible guests of the track and we do not want to wear out our welcome. Please clean up as you go!