



DRIVERS SCHOOL

Skidpad Instruction

At Summit Point, we have the great fortune of having a skidpad facility available for use at our drivers' schools. The skidpad allows us to teach you car control in a safe, controlled environment. At your forthcoming school, you will be scheduled for skidpad instruction during each school day. To ensure maximal use of the limited time we have, we have established a specific skidpad curriculum with specialized instructors. This guide describes what you will be doing and why we believe skidpad training is crucial to your driver education.

Driving Mechanics vs. Car Control

On the track, we teach *driving mechanics*. Mechanics are the skills you acquire for braking, turning, and accelerating properly. As you approach a corner on the track, you use *threshold braking* to slow your car maximally, you turn smoothly and precisely onto *the line*, the path of largest radius around the corner, and you apply throttle progressively to accelerate out of the turn. Repetitive practice of these mechanics produces highly skilled drivers.

What such practice does **not** give you is *car control*, the ability to detect and recover from loss-of-adhesion situations. Unless it is raining at your school, you will most likely never experience a loss of control on the track. The suspensions and tires of most cars are so good, and the corresponding limits of adhesion are so high, that most students never exceed those capabilities except in extreme circumstances. Therefore, we must provide an artificial environment to allow you to develop car-control skills. That environment is provided at the skidpad.

The Importance of Car Control

Modern cars are so forgiving of student mistakes that many students reach an "advanced" level without really learning much more than how to drive very fast. Cars continue to cover driver mistakes until a particularly egregious mistake overloads the suspension and tires beyond their ability to compensate. The resulting loss of adhesion occurs at such a high speed that the driver has little time to recover. Such recoveries must be experienced and practiced beforehand so that they become instinctive, and the driver can draw upon them in an emergency.

The purpose of skidpad training is to provide low-speed exercises that demonstrate common errors made while driving and to learn the car-control skills that allow you to overcome such mistakes. Cause and effect may be safely demonstrated, and proper correction may be learned and practiced in a safe environment. We have developed a curriculum that promotes skill building in a series of measured stages.

No one skidpad session will impart all of the skills you will need to become an accomplished driver, but each session will build upon your prior efforts. To achieve what we consider perfection of skill will generally require scores of sessions, which is why we consider each session important, regardless of your current skill level. At the end of each session, you will be a better, safer driver than you were before.

The Danger of Complacency

It is important to understand that driving only on the track leaves a *critical gap* in your driving skills. As you drive faster and faster on the track, the danger of that gap increases. At the skidpad, we can measure your car-control skill level accurately. That skill level, coupled



with your on-track speed, is a good predictor of your likelihood of surviving an on-track “incident” unscathed.

It is equally vital to recognize that *driving-mechanics skills are not a predictor of car-control skills*. Good mechanics and high on-track speeds can easily lull you into a false feeling of mastery. That mastery is rarely borne out in extremity, and it shows at the skidpad. Indeed, an unfortunate number of the students who get into trouble on the track believed that such trouble would never happen to them because of their good mechanics skills.

That is why your skidpad sessions are so important. Most drivers’ schools do not have such a facility or cannot make it available to their students. You have an extremely rare and valuable opportunity to develop your car-control skills, one which most of your fellow students attending other schools do not. By reading through this guide, you will be able to maximize your benefit from the limited time we can give you.

What You’ll Learn at the Skidpad

For the novice student, skidpad training will introduce you into the behavior of your car at its limits of adhesion and will train you to master the control of your vehicle under those conditions. You will learn how adhesion loss occurs, why your instinctive reactions to that loss are almost always wrong, what the correct inputs are, and perhaps most importantly to *think through* loss-of-control situations. Rather than being passive during incipient trouble, you will begin taking an active role in minimizing or eliminating the problem. The skills you acquire may well allow you to prevent that future accident on the Beltway.

For the intermediate student, more progressive training will allow you master *understeer* (loss of adhesion by the front tires) and *oversteer* (loss of adhesion by the rear tires) and relate their control to safer on-track driving. You will learn how the inputs you make to your vehicle control its attitude, how you can get yourself *into* trouble on the track, and how you can get yourself *out* of trouble.

For advanced students, we work to hone your control skills to such a fine degree that you will be able to cope with any threatening situation you might encounter either on the track or off. In addition, precise

control of your car’s attitude on the track will allow you to maximize your cornering speeds and safely use all of your car’s performance.

For all students, it is imperative to realize that a gap exists between your perceived skill level and your actual skill level. Virtually every student initially overestimates his or her car-control ability, which engenders a dangerous feeling of security on the track. We have documented this gap in the slightly over one thousand students we have seen at the skidpad. If you learn nothing else at the skidpad, understanding the limits of your abilities will lead to a safer school experience as you leave more of a margin for error on the track.

Skidpad Construction

Our skidpad is an asphalt “doughnut,” with an outer diameter of 300 feet and an inner diameter of 240 feet. This provides a driving surface that is a bit over five “Interstate lanes” wide. To reduce the speeds involved and the wear on modern, sticky tires, we operate with the skidpad surface wet. The second and third lanes from the inside are painted to retain water at the pavement surface. In addition, the white lanes form a “visual barrier.” For our purposes, we assume that the white lanes represent a road bordered by guardrail or concrete walls. Controlling your vehicle within this imaginary constraint is equivalent to controlling it within the confines of a two-lane public road such as those you encounter going to and from the track.

Because of the watering system employed, your car will get a bit dirty from running on the skidpad. However, the car-control skills you acquire will far outweigh any minor cleanup required. A car wash is far cheaper than a trip to the body shop!

The Skidpad Curriculum

We have divided the process of acquiring car-control skills into a series of staged goals and have constructed driving exercises to enable students to achieve these goals. Ideally, each student would start with the first exercise, and proceed to the next in sequence as mastery of each had been attained. To do so, however, would take approximately ten to fifteen



hours of practice *per student*, which is clearly impractical for a school of forty to sixty students. Moreover, you will hone the various tools of your car-control skills (steering, acceleration, and perception) at different rates.

Our approach, then, is to have each student perform one or more of the exercises at the current school and to *record* each student's progress, so that we may continue the process at the next school. This allows us to build your skills progressively at every school you attend. Note that this means that students within your group may all be doing different exercises. Additionally, while we will generally work with you toward these goals sequentially, we may apply exercises within a goal out-of-sequence as needed by the pace of your learning, the responses of your particular car, the degree of wetness of the skidpad, etc.

Here is a brief description of each of our target goals, in the sequence in which we teach them:

- *Initiation of understeer*—Driving so that your front tires begin to lose adhesion with the pavement. Detection of the onset of understeer via visual, audible, and tactile cues. Most on-track problems in *dry* weather begin with understeer.
- *Recovery from understeer*—Applying inputs to your steering and throttle to regain front-end adhesion. Earliest possible detection and correction with minimal inputs to maximize recovery effectiveness.
- *Initiation of oversteer*—Driving so that your rear tires begin to lose adhesion with the pavement. Detection of the onset of oversteer via visual, audible, and tactile cues. Most on-track problems in *wet* weather begin with oversteer.
- *Recovery from oversteer*—Applying inputs to your steering and throttle to regain rear-end adhesion. Earliest possible detection and correction to maximize recovery effectiveness.
- *Progressive correction*—Driving to provoke *and correct progressively* an understeering or oversteering attitude. Using proportional steering and throttle inputs in correction to minimize disturbance of your car's balance. Note that the application of large throttle and steering inputs can cause over-correction of the original problem, resulting in a worse situation. When you reach this

level of achievement, you will be able to correct most driving mistakes that otherwise would cause a loss of control on the track or highway.

- *Unstable balance*—Driving to provoke *and maintain* an oversteering attitude. Balancing your car in an unstable attitude requires detection and correction of minute deviations in your car's position. The very high skill levels required will allow you to cope with nearly any situation that can happen on the track or on the street.

For each goal, we employ these exercises:

Initiation of Understeer

- Establish a constant-radius path around the skidpad.
- Accelerate smoothly with no additional steering input until the front tires begin to lose adhesion. Mild understeer is heard audibly as a “chatter” of the front tires and felt as “light” or “greasy” steering, more so than detected visually.
- Detect understeer as soon as it occurs. Learn to fight your initial instinct, which is to add more steering, because that makes the understeer *worse*.

Recovery From Understeer

- Correct understeer by reducing throttle until the front tires regain adhesion.
- Correct understeer by decreasing steering angle until the front tires regain adhesion.
- Hold a constant steering angle (the instructor holds the steering wheel) and control understeer by use of the throttle alone. Try to drive at the maximum speed allowed by front-tire adhesion, slowing as necessary.
- Hold a constant speed (turn on your cruise control, if your car is so equipped) and control understeer by use of the steering wheel alone. Try to drive the tightest circle allowed by front-tire adhesion, running wide as necessary.

Initiation of Oversteer

- From a constant radius and a constant speed, accelerate sharply to provoke power oversteer.



- From a constant radius and a constant speed, decelerate sharply to provoke trailing-throttle oversteer.
- From a constant radius and a constant speed, understeer onto an area of drier pavement. As the front tires dry out and gain adhesion, the nose of your car will pull sharply to the inside, and your car will rotate into oversteer.
- Detect oversteer as soon as it occurs. Learn to fight your initial instinct, which is to delay momentarily before taking corrective action, because that delay rapidly decreases your chances of a successful recovery.

Recovery From Oversteer

- Correct power oversteer by smoothly retarding the throttle (to allow the rear tires to regain adhesion) and apply steering to counter the rotation.
- Correct trailing-throttle oversteer by smoothly increasing the throttle (to transfer weight to the rear tires) and apply steering to counter the rotation.
- Prevent oversteer due to pavement transitions by removing the undesirable steering input to cancel the understeer before transitioning.

Progressive Correction

- Drive around a series of cones on the skidpad, arranged as the points of a pentagon, in the least time possible. This requires control of wheel locking under braking, control of understeer on turn-in, and control of power oversteer on exit. It also requires *progressive correction*, i.e., correction spread over the distance between cones, or between the cone and the edge of the skidpad, to minimize loss of time.
- A similar exercise is run without cones. This is substantially harder, as we have removed the visual reference that the cones provide. Instead, you must continually scan, then lock your vision on a distant feature of the pavement or landscape to achieve progressive correction.

Unstable Balance

- Provoke power oversteer, allow the car to rotate between 30° and 45°, and apply corrections suffi-

cient only to *maintain* that attitude, rather than correct or exceed it. Work on minimizing steering and throttle inputs. To do so, not only will you have to sense small attitude deviations and apply corrections as early as possible, but you must also “read” impending changes in the pavement to anticipate corrections that will be needed. Note that this level of skill is extremely rare among drivers and requires a very large amount of time and effort to achieve.

You will note that our program begins with mastery of understeer and then proceeds on to mastery of oversteer. This sequence frustrates some students who find the exploration of oversteer to be more thrilling or interesting and who want to start with oversteer. While understeer exercises may be less glamorous, there are two very important reasons we have adopted this order.

First, detection of the onset of oversteer is substantially harder than detection of understeer, and it is very difficult to develop the rapid recognition of your car’s attitude change that is necessary for successful mastery of oversteer. However, that recognition is much easier to acquire and hone when practicing understeer recovery. Understeer mastery is therefore crucial in developing your “feel” for your car that you will need to successfully correct oversteer.

Second, as noted above, most dry-weather problems begin as understeer. As most of the drivers’ schools you attend will be dry, concentration on understeer first gives you the tools you will need to overcome the majority of the troubles you will encounter on the track.

The success of this sequence of instruction has been borne out by our experience with the slightly over one thousand students we have seen at the skidpad. Indeed, we have found that many students to whom we gave insufficient initial understeer training frequently were unable to master oversteer, because they never could detect the onset of oversteer soon enough. Remedial understeer work corrected their problems, but they lost valuable skidpad time in the process.

So, if you believe that understeer work is dull, and you cannot wait to begin oversteer, please bear with us. You are building a solid foundation for more advanced work, and ultimately you will build your overall skills more rapidly with this sequence.



Your Skidpad Session

You will be scheduled for one or two skidpad sessions per school day, depending on the run group you are in and the particular exercises we plan to use. One run per day gives students a “double-length” session to practice, whereas two “single-length” runs per day gives students the opportunity to implement during their second runs suggestions from their instructors after their first runs. Please let us know on your *Instruction and School Evaluation* form how well your particular scheduling worked out.

Every student will have a skidpad instructor, regardless of prior experience. Our skidpad instructors are *experts* at car control, and they are thoroughly familiar with our skidpad curriculum. Your skidpad instructor will explain general skidpad driving techniques (where to be driving on the skidpad, what gear to use, where to place your hands on the steering wheel, how fast to go—typical skidpad speeds are 30-35 MPH—etc.). All skidpad instructors will have a record of your previous skidpad achievements, if you have attended skidpad sessions with us before. We will be able to tailor your instruction to your exact needs.

Just before you go out, your instructor will discuss what you are to do while on the skidpad, how your car will react, what to expect, and what corrective inputs will be required. If you have any questions regarding your pending session, please feel free to ask your instructor; we are here to help.

While driving on the skidpad, your instructor will help you identify impending loss of adhesion and help you apply the correct input in response. While it is certainly safe to do so at the skidpad, our goal is *not* to have you “spin” your car. A spin results from an uncorrected mistake. Rather, we seek to have you *prevent* the spin by applying proper recovery techniques before you lose control.

At the conclusion of your skidpad run, your instructor will review your progress and suggest ways you can improve your recovery skills. If you have any questions regarding your performance, please ask.

Terminology Used at the Skidpad

The following items constitute a brief list of terminology used by the skidpad instructors. It is important that you understand these terms to maximize your productivity while at the skidpad:

- *Understeer (also called “push”)*—In a turn, the condition where your front tires lose adhesion with the pavement while your rear tires remain in contact. Your car tends to “run wide” of the turn (i.e., travel straight ahead, even though you are turning the wheel). Turning the steering wheel more is ineffectual and indeed will exacerbate the condition. Proper correction involves reducing speed and/or reducing the amount the steering wheel is turned.
- *Oversteer (also called “looseness”)*—In a turn, the condition where your rear tires lose adhesion with the pavement while your front tires remain in contact. Your car tends to turn more into the turn (i.e., rotate about its axis). Turning the steering wheel more will exacerbate the condition. Proper correction involves reducing speed and turning the steering wheel in the opposite direction; this applies a force to counteract the rotation.
- *Rotation*—A change in attitude, i.e., a change in the direction your car is *pointing*, though not necessarily in the direction your car is *traveling*.
- *Rotation rate*—How fast your car is rotating. To effect a correction, you must stop your car’s rotation; the inputs you apply must be proportional to your car’s rotation rate.
- *“Tighten” or “steer”*—A command to increase the amount of steering you are applying in a turn, i.e., make the turn sharper by turning the steering wheel more. When tightening the steering wheel, you should progressively and smoothly add steering; do not “jerk” the wheel, as that action upsets your car’s balance.
- *“Unwind” or “straighten”*—A command to decrease the amount of steering you are applying in a turn, i.e., make the turn easier by turning the steering wheel less. As with tightening, unwinding should be applied smoothly.
- *“Both feet in”*—Simultaneously depressing the clutch and the brake to the point of incipient wheel



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lockup to stop your car as quickly as possible. Used in response to a loss of control. Your instructor will issue this command in order to bring your car to a rapid and safe stop on the skidpad surface.

Summary

We think you will find your skidpad sessions rewarding and highly instructive, regardless of your skill and experience level. We firmly believe that thirty minutes of skidpad time will give you far more skills and make you a far better, safer, and more comfortable driver than will any ten days of driving on the track. Your skidpad sessions are crucial to your development as a driver, and we want to do everything within our power to maximize your skill acquisition while you are at the skidpad. Please let us know how we did and how we can improve your experience by filling out the appropriate questions on your *Instruction and School Evaluation* form which you will receive during morning registration at the track. See you at the skidpad!