

BMW CCA NEW YORK CHAPTER, INC.

DRIVER SCHOOL MANUAL

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Preface

It is important that you thoroughly read this Manual since it contains information about preparation for and conduct of the event. Therefore, you should be familiar with its contents well before leaving for the track. Previous NY Chapter Driver School attendees should also review the Manual carefully to ensure that the requirements are still clear and that you are familiar with changes in rules and requirements which are contained in this revision

Purpose and Scope

The BMW CCA New York Chapter, Inc. Driver School curriculum in conjunction with Skid Pad training (when a Skid Pad is available) have as goals to educate drivers about vehicle dynamics and develop transferable skills to both routine and emergency conditions on public roads. These goals will be accomplished through a combination of classroom lectures, track walks, and practicum at speed on the track and on the skid pad. In addition to these academic objectives, the Chapter equally strives to present the program in a manner that provides the participants a venue for a gratifying day of performance driving of their "Ultimate Driving Machines" the way they are meant to be driven (read: some good ol' fashioned clean fun).

Now that you know the intent of the Event Organizers, it should be emphasized that this is not a race driver school and **absolutely no competitive activities are permitted**. If you plan to use any of our events as a practice session for "the race next weekend" or are just looking for a lapping day of track time, you will be disappointed in how we run the Driver School and we strongly recommend that you do not attend. However, if working with an experienced Instructor to improve your knowledge and skills about car control is what you are after, then look forward to an enjoyable event with dozens of friendly folks with the same idea.

Assumption of Risk

Performance driving, in a similar manner to skiing, is a hazardous sport. However, both sports can be enjoyed safely in light of the risks involved. BMW CCA Driver Schools are conducted on race tracks and even though there are many controls built into the curriculum to promote safety, performance driving at high speed with its inherent risks is an aspect of these events. Therefore, it is important that you consider the physical, financial and property risks involved prior to participation.

In order to protect the sport and those who organize events, each participant must sign a waiver form. A copy of this waiver is included for your review as part of Appendix B. *READ IT CAREFULLY*. The waiver form acknowledges the dangers involved and describes the rights that you relinquish.

The sponsoring Chapter purchases insurance in conjunction with BMW CCA driving events. However, coverage is limited to a focus on bodily injury, disability and medical expenses. Coverage for damage to your automobile, regardless of the cause or circumstances is excluded.

You should also understand, the rules that apply to public roads do not apply on a race track. The waiver form that you must sign to participate will preclude recovery from another participant or his/her insurance company.

If you carry collision insurance, your personal automobile insurance coverage will pay for the damage to your automobile in most cases. Please be aware that you must rely on either your personal insurance or your checkbook to pay for any damage sustained in an accident on the track. Also, if your automobile insurance or other policies include coverage for medical expenses, your policy(s) will respond on a primary basis for the cost of an injury. Coverage for medical expenses included in the policy provided to BMW CCA respond in excess of other available insurance.

Participants assume all risk of injury and property damage during the event. This includes the times when an Instructor drives your car. Since you assume the risk, you should be satisfied with the manner in which the Instructor handles your car. If you are not satisfied with how your Instructor respects your car, promptly contact the Track Steward, School Chairman or Chief Instructor.

Drivers are responsible for any additional costs the Chapter incurs due to their conduct on the track and throughout the Facility. The participants are responsible for damage to the track and its facilities arising from abuse or misuse of those facilities. The Chapter will bill participants after the event for charges incurred due to damage to infrastructure, cleanup of fluids spilled on the track, fire extinguishers, guardrails, etc. Non-payment will cause the individual to be dropped from the Chapter invitee list.

If these considerations represent a risk beyond an acceptable level for your current personal/financial situation, perhaps you should elect not to participate.

Instructor Requirements

- X Make safety your highest priority and convey it to the Students.
- X Attend the Instructors Meeting.
- X Treat the Student cars with respect.
- X Strictly enforce the passing regulations.
- X Promptly notify the Track Steward, School Chairman or Chief Instructor of any Student deemed to be driving in an unsafe manner.
- X Provide a helmet communicator.
- X Driving with Students as passengers is an element of the learning process, and it is expected that Instructors shall ride with passengers as often as possible. Non-registered persons are *not permitted* as passengers.
- X Submit all assigned Student Evaluation Forms.
- X Establishment of the Instructor Corps for each event is prioritized by experience, from the pool of personnel who apply. Selection for a past event does not guarantee acceptance in the future. Those individuals not selected shall be given an opportunity to register for the Advanced Run Group.

Run Group and Instructor Assignments

Each Student is assigned an Instructor and placed in the appropriate Run Group with consideration given to his/her experience at a given circuit, skill level and car capability. The Run Groups are organized as follows:

<u>RUN GROUP</u>	<u>COLOR</u>
Advanced	Green
Intermediate	Yellow
Novice	Red
Instructor	Black

Learning should always be an attribute of the event, it is recommended that you work with your instructor and set a few goals for the day.

Instructors will meet their Students in the hot pit lane at the start of each Run Group and locate them by car number. Car numbers are provided in the registration packet.

Students are encouraged to evaluate Instructors and provide feedback to the Chapter via the Event Critique Form. During the event, if you find your Instructor unsatisfactory, please consult with the School Chairman or Chief Instructor.

Driver Requirements

Valid Driver License

Drivers must be at least 18 years of age and possess a driver license that is not suspended or revoked. No Junior licenses or Learner Permits are accepted.

Medical Conditions

Drivers with any pre-existing medical conditions, who are taking medication(s), or who have any reason to be concerned about the degree of stress while driving at speed on a race circuit should consult with their physician prior to the event.

Helmets

Participants are required to bring their own helmets; helmets will not be provided. All Drivers must wear a minimum Snell 2000 rated helmet at all times while on the track. For those Drivers who will be purchasing helmets, we suggest you purchase a Snell 2005 rated helmet. It is recommended, but not required, that Participants purchase SA type helmets, although M type helmets are acceptable. It is strongly recommended that all Drivers also wear a neck brace. The use of a neck brace in conjunction with a helmet shell made of carbon fiber is recommended as the optimum head and neck protection. The use of carbon fiber as opposed to fiberglass results in a helmet with less mass, thereby reducing the forces subjected to the head and neck in the event of an incident. The neck brace further reduces the possibility or severity of injury. With respect to cost, the difference in expenditure to upgrade to carbon fiber and obtain a neck brace is well worth the benefit in additional safety. Use of these devices will not eliminate the possibility of injury but can significantly reduce the risk.

Clothing

Drivers must wear appropriate attire for driving on a race circuit A light pair of sneakers is good driving footwear. You may wish to consider driving shoes. Sandals, cleated shoes, heavy boots, and shorts are not permitted. It is required that all Drivers wear long sleeve cotton shirts or jackets. It is recommended that Drivers refrain from wearing synthetic clothing. Many Drivers find the use of driving gloves beneficial on the track.

Log Books

All Participants will be issued a Logbook at their first event with the Chapter. It will be used a record of attendance and progress as a Driver. We encourage you to have this book signed at other track events by the Chief Instructor or an authorized Event Organizer. **All Participants who have previously received a Logbook and fail to bring it to the track will be charged a \$10 replacement fee.**

Car Requirements

The track is the wrong place to confirm that you have mechanical problems. Thoroughly check out and correct any deficiencies prior to driving on the track. Lost track time due to mechanical problems is your responsibility and you will not be compensated.

Tires and Wheels

Considering the anticipated amount of track time and your distance from home, it is highly recommended that you ensure your tires are in very good to excellent condition. **Snow or recapped tires are not allowed.** Performance tires (shaved or slicks) are permitted. Higher than normal inflation pressure (36-42 psi) is recommended for street tires. This is more accurately measured before you leave for the track while the tires are cold. No cuts, bruises, ply separations, or body rubbing on the sidewall are allowed. Tires on prepared cars must be suitable for expected speeds and cornering loads. Wire wheels will be rejected if they have more than two adjacent loose spokes or more than three total on a wheel loose. Other wheels must be free from bends or cracks; hubcaps and trim rings must be removed. All lug nuts must be in place and torqued to OEM specifications with a torque wrench; recheck tightness before your first Run Group and periodically during the day. Do not tighten lug nuts after a Run Group while the wheels are still hot; they will be over-tightened on cooling.

Brakes

Brakes must be capable of stopping a car in a straight line. Brake dust shields must be removed. Brake fluid reservoir must be full. The brake fluid must be **changed** no more than four weeks prior to the event. Cars with obviously discolored brake fluid in the reservoir will automatically fail tech inspection and not be allowed on the track.

Suspension

Suspension must be suitable for high speed cornering and handling. Loose, soft or worn shock absorbers, soft springs or sloppy ball joints are grounds for rejection of the car. Steering gear and linkage should have minimal play. Wheel bearings must have minimal play.

Special Caution Regarding Ball Joint Failures in E30 and E36 M3 Vehicles

A pattern that indicates E30 M3 ball joints are at high risk to fail under load has been emerging. There have been several instances where a total loss of the vehicle has occurred, one involving a minor injury to the driver. This failure appears to be pronounced in cars with significant mileage and/or use on the race track with performance tires, i.e., Goodrich R1, Yokohama A008RS, etc. Until more information becomes available, the following should be given serious consideration before subjecting your car to the g forces achievable on the racetrack:

1. As part of your required Tech Inspection, the car should be put on a lift, and thoroughly inspected by a qualified mechanic with careful attention given to the integrity of the ball joints and corresponding sub-frame mounting sockets. While on the lift, ball joints should also be inspected for free play; worn ball joints should be replaced immediately. **Note:** The lack of obvious signs of wear does not necessarily indicate integrity of the ball joint. It will not reveal insidious cracks that can only be seen by sophisticated nondestructive testing, i.e., x-ray or magneflux.
2. In at least one instance, it was reported that there were no prior visible signs of wear on a ball joint that subsequently failed at speed.
3. Any E30 M3 driven 20 or more "dry" track days on performance tires should have the lower control arms replaced.
4. Cars driven with street tires are probably at a significantly lower risk of early ball joint failure due to lower maximum sustainable g forces. Likewise, cars driven by inexperienced drivers on performance tires are at lower risk.
5. Both the inner and outer ball joints are suspect to fail.
6. It appears that the E36 M3 also uses a ball joint with the same physical dimensions and these cars may also be at risk.
7. Until more quantitative information is known, E36 M3 owners should consider following the same maintenance recommendation in Item 3.

Engine Compartment

Engine Compartment should be clean with no oil, water or gas leaks. No worn hoses or lines will be allowed and must all be properly clamped. All wires must be connected and unfrayed. Fan belts should be in good condition. Exhaust systems must be firmly mounted.

Automobile Exterior

Cars should be generally neat, clean and suitable for the event. It is recommended that exposed headlights, parking lights and side markers be covered with duct tape. Passenger side mirror is required.

Windows, Doors, Sunroof

Driver and passenger side windows must be completely down while on the track. Doors must be unlocked, sunroof must be closed/latched.

Window Tinting

Cars with aftermarket window tinting that significantly reduce or occlude visibility will not be permitted on the track.

Fuel, Oil, Air and Garage Space

You should arrive at the track with a **full** tank. There is no gas available at the track. An oil and filter change just prior to the event is recommended. Top off your oil reservoir with an additional half quart of motor oil when you arrive at the track to ensure an adequate oil supply during hard cornering. Bring some extra oil to the track because some cars will use a little throughout the day. Oil supplements and racing grade oils are not necessary. It is recommended that you fill your tires prior to entering the track; air can be bled down as necessary. Air is available at the Tech Shed. No other mechanical services are available at the track.

After Market Restraint Systems

Three point OEM restraint systems are adequate at a minimum. In all cases, questionable or frayed seat belts should be replaced. **If you plan to use after market restraint systems you must have an equal restraint system for both driver and passenger seats. Anyone who does not provide equal restraints must remove the aftermarket appliance before accessing the track.**

Open Wheel Cars

No open wheel cars are permitted.

Convertible Cars

No convertible cars are permitted.

Pre-Event and On-site Tech Inspections

It is the responsibility of each Participant to follow the safety inspection guidelines shown in both Appendix A and in your Logbook. The vehicle must be inspected by a qualified person to ensure it is in proper condition for the event. In addition to the pre-event inspection, the Chapter will give all cars a Tech Inspection for obvious safety deficiencies on the morning of the event. The event organizers reserve the right to refuse any car from participation for any failed or questionable item found in the onsite Tech Inspection. **A failed on-site Tech Inspection does not entitle the Participant to a refund.**

Arrival at the Track

You can arrive at 7 am but no later than 7:30am. Go directly to the garage area (we have access to 32 twin bay garages) and completely unload your car. It is a good idea to bring a tarp, blanket or piece of plastic to cover your things. There can be no loose objects in the trunk, glove or passenger compartments.

Proceed IMMEDIATELY to Tech Inspection in the east end of the garage area. A pre-event tech inspection was mailed to you prior to the event, you must bring this completed form to Tech Inspection. After completion of Tech Inspection report to the Registration desk with your Logbook to sign the event Release and receive your registration packet. We will not hold up the event for any individual(s) who are unable to arrive on time for any reason. There is very little time to complete Tech Inspection and Registration before the event, so BE ON TIME. Tech Inspection opens at 7:15am and closes at 8:15 am. No exceptions!

Drivers Meeting

All participants are required to attend the Drivers Meeting/Safety Orientation. Punctual attendance is MANDATORY and there will be a roll-call. If you do not know the meaning of the word PUNCTUAL or MANDATORY, you risk being ejected from the event.

Instructors Meeting

The Chief Instructor will hold a brief meeting with the Instructor Corps to review the day's objectives and make any special announcements. All Instructors shall attend.

Novice Vehicle Checkout

To verify the safety and track-worthiness of all first time Novice Student vehicles, the assigned Instructor shall drive the car for two laps during the initial Novice Run Group.

Classroom Sessions

Each Run Group will be scheduled for a classroom sessions. The exact time and location will be included in the detailed schedule in the registration packet.

Track Rules

Instructor Driving

It is required that an Instructor drive the first time Novice Student cars in the first Run Group for exactly two laps. This is to allow an experienced Driver to evaluate the condition of your car for safety and demonstrate proper maneuvers. At your discretion, the Instructor can be requested to extend the number of laps driven if additional demonstrations are desired.

Consumption of Alcohol or Drugs

Consumption of and/or any attempt to participate in the event under the influence of alcohol, illegal drugs or controlled substances is strictly prohibited. Consumption of alcohol by anyone present at the event is prohibited until the event ends at 6:00 pm, including lunch. Violators are subject to immediate expulsion. Moderation or preferably abstinence from alcohol the night before the event is strongly recommended. Prescription and nonprescription drugs that could impair your performance should not be used either before or during the event; please consult with a physician for advice. Concentration and exactitude are necessary for the safety of everyone.

Restricted Areas

During the event all personnel shall remain behind all safety fences and barriers. Except for the Corner Workers, at no time is anyone else allowed beyond the fencing behind the flag stations or in the hot pit lane. The Corner Workers are responsible for keeping the spectators out of Restricted Areas around their flag stations. No spectators are permitted inside the perimeter of the Hot Pit.

Passengers

Registered Students who have paid the tuition fee are permitted to ride with Instructors when it will not conflict with the classroom schedule. No other persons are permitted as passengers under any circumstances. Passengers are NOT permitted in Student cars. **NO EXCEPTIONS.** Violators will be ejected.

Food

The Chapter does not provide food for students. A cafeteria for food and drinks is available at the track. It is a good idea to bring a cooler with water and other beverages.

Driving Rules

General Requirements

Safety and courtesy toward other Drivers should be your number one and two priorities. Anyone deemed driving in an unsafe manner is subject to ejection. **No racing.** If rain occurs, slow down to a speed such that you can safely drive in the wet. Check the condition of your brakes and tires frequently. Check your oil level before each driving session.

Entering the Track during the Session

Pull up to the end of the pit lane and follow instructions of the Pit Marshall. Stay to the far left of the track and check your mirrors to see if you are being overtaken before you attempt to move right into the normal driving line.

Exiting from the Track

To exit from the track into the hot pit, as you come out of the last corner before the pit entrance, extend your left fist upward as high as possible. Stay to the far left side of the track. Enter the pit lane slowly. You should not exceed 25 mph in the pit lane.

Passing

Passing is regulated by very strict rules. Failure to follow these rules will result in deprived track time and/or ejection from the event!

Passing shall always be executed off line and only after a signal has been given by the slower vehicle. The car being overtaken must explicitly direct the faster car toward the off line side of his/her car. If you "think" you saw a signal, **you didn't! Do not execute the pass.** The signal is given with a point-by out the driver side window.

The first car behind the lead car in a group gets the first opportunity to pass the slower car, even if the cars behind are faster. Each car must individually be given a signal; just because the car in front of you was allowed to pass does not mean that you also have permission. One car at a time and every passing car must receive a point-by from the car being passed. Three-wide passing is **absolutely forbidden.**

Never attempt to pass near the end of the Straight or anywhere but the appropriate passing zone. Be sure you have plenty of time and space to complete the maneuver before the next corner. Failure to do so will subject you to disciplinary action or ejection from the track depending on the flagrancy of the infraction. Drivers who pass in an unsafe manner, without a signal, or in locations other than those specified for a given Run Group will be Black Flagged and given a warning. **Never pass another vehicle unless given the signal.**

The obligation for a safe passing maneuver falls primarily on the faster car attempting to pass. The car being passed should never do anything unexpected that might interfere. Do not block faster cars; do not group together. If you find yourself running in a pack pull into the hot pit and let the group disburse; that way you can concentrate on your driving and not have to worry about how close other cars may be. If you do not take the initiative to separate, you may be shown the Passing Flag. Drivers of high horsepower cars that may be slow in the corners should allow cars that are faster in the corners to pass them by not accelerating.

Passing Zones:

Passing zones will be discussed at the morning driver's meeting.

Four Wheels Off

Four wheels off the paved surface will result in the car being Black Flagged so that the Driver will return to the hot pit for a brief safety check of the vehicle.

Track Incidents

In the event of an incident in which a Participant's vehicle sustained physical damage, the Event Organizers will require that the vehicle undergo an additional Tech Inspection. That vehicle may be disallowed continued participation unless and until satisfactory repairs are made.

Recommendations in Case of Trouble

Put "both feet in" (brake and clutch). Do not make the typically futile attempt to return to the track since this usually results in the car sliding sideways and then flipping over; your chance of escaping unscathed is much better if you drive your car straight off under control while continuing to brake.

If you experience or suspect mechanical problems, turn on your four way flashers, drive off line, and return at reduced speed to the hot pit. If you become stranded on or off the track, turn on your four way flashers, get out of your car and move far away from the roadway until the session ends. **IT IS FORBIDDEN TO ATTEMPT REPAIRS WITH CARS AT SPEED ON THE TRACK.**

Timing

This is NOT a racing school; timing for competitive reasons is NOT ALLOWED.

Drive in Control

The Event Organizers reserve the right to eject any individual from the event who in the organizers' sole opinion is creating a dangerous situation for themselves or other participants. No refunds will be granted.

A Few Words About High Speed Driving

The following material is designed to familiarize you with proper high speed driving techniques. Understanding these fundamentals will increase and enhance the totality of the high speed performance driving experience.

Car Preparation

The Driver School will subject your car to much more stress than average street driving. A well-tuned car will result in more pleasurable driving.

Driver Preparation

High speed driving demands total concentration, split second timing and fully-coordinated muscle involvement. A Driver who is not in good health, has muscular aches and pains, is uncomfortable or is overly tired, etc., cannot perform at his/her maximum, makes mistakes and is a hazard to him/herself and others.

Vehicle Problems/Malfunctions

Seek knowledgeable assistance if you think there is a problem with your car. Do not take the car on the track to test your perceptions; you may be sorry you didn't investigate first. There are plenty of mechanic types at the event who will be eager to help you, or ask one of the Event Organizers, the Chief Instructor, or the Chief Tech Inspector to provide or obtain assistance.

About the Flags and Flagging

Safety at any high speed event depends on proper use of signal flags which are displayed at significant locations around the track to communicate track conditions to Drivers. On a typical road course there can be many types of hazards which a Driver needs to know about. For example, there may be a car off the track, a slippery surface or deer; these conditions can change from lap to lap. Therefore, it is important that Drivers note the location of all flag stations and carefully observe flags displayed at every station on every lap.

The flags used are as follows:

GREEN NORMAL DRIVING CONDITIONS

There are no problems or obstructions on the track. Passing is permitted in designated passing area(s). If no flags are displayed at a station, green flag conditions are assumed.

YELLOW

CAUTION! PROBLEM (AND POSSIBLY DANGER) AHEAD

The problem may be a car off the track or spun out on the track, deer in the immediate area, etc. The severity of the problem is indicated by how vigorously the flag is being waved. A standing yellow will generally indicate trouble ahead, while a waving yellow is very close to the scene. Proceed with extreme caution at a reduced speed (DO NOT slam on your brakes!). NO PASSING is permitted under yellow flag conditions; any Driver who is observed passing under a yellow flag will be Black Flagged and given a warning by Control.

RED

STOP - SERIOUS PROBLEM ON THE TRACK

Waved simultaneously at all stations at the direction of Control. All cars must stop as quickly and safely as possible. Pull off-line and come to a complete stop. Remain stopped at the edge of the roadway just off the pavement until the Red flag is withdrawn or replaced with a Yellow or Black flag.

YELLOW/RED STRIPE

SLIPPERY TRACK SURFACE

The road surface is slippery due to oil, antifreeze, sand, water, etc. Use caution and be prepared to alter your line to avoid the problem. NO PASSING.

BLACK

DRIVER OR MECHANICAL PROBLEM

Come into the hot pit area; Control wants to talk to the Driver or Instructor. The Corner Worker will point the flag at the intended car as it passes the station. The Driver should acknowledge with a hand signal, complete the lap and come into the hot pit area. Failure to respond to a Black Flag signal, or extreme careless or unsafe behavior may result in the Driver being ejected from the event at the sole discretion of the event organizers.

WHITE SLOW MOVING VEHICLE ON THE TRACK

There is a slow moving vehicle up ahead moving at less than track speed, e.g., a disabled car, tow truck, etc. Proceed with extreme caution. Also used at Pit Out to warn cars already on the track that a car has entered from the pits and may not yet be up to speed.

BLUE WITH YELLOW STRIPE

FASTER CAR(S) BEHIND YOU

Let them pass when you enter the next passing zone. Failure to do so will result in a Black Flag.

CHECKERED

END OF THE SESSION

Only displayed at the Tower (Start/Finish). Complete a cool-down lap at reduced speed as soon as you see the checker; this will allow the brakes, motor, tires, fluids and Driver to cool off. Review your progress with your Instructor during the cool-down.

Proper Driving Position and Technique

Seating

The Driver must be able to reach the pedals, steering wheel and shift lever with ease. If unable to do so, the unconscious compensation will lessen concentration. The correct seating procedure is as follows:

Dig yourself into the seat by pushing with your feet. Don't sit on the seat; sit in it, become part of it. Adjust the distance so that you can reach the most distant part of the wheel. Your arms should be slightly bent. Check the reach of the shift lever. You should not have to lean forward; adjust the rake of the seat forward if necessary. You should be able to depress the pedals without leaning forward, and your knees should not interfere with the steering wheel. Snug the seat belt, when adjustable, as tightly as possible without impairing circulation or causing discomfort. Performance restraint systems keep you in the seat, behind the wheel, ready to control the car instead of being thrown about by the g forces. They also contribute a significant measure of additional safety to the Driver.

Holding the Steering Wheel

This is like catching a baseball: one hand for the "bush-leaguers" and two hands for the pros. Hands are held in the nine-and-three o'clock or ten-and-two o'clock positions. The wheel should never be gripped tightly. Don't hold the wheel with the palm of your hand; it is not as sensitive as the fingers. If a sharp turn is expected, the hand that corresponds to the direction of the turn should be moved to the twelve o'clock position before the corner. This gives the driver more leverage to turn the wheel and overcome the g forces under hard cornering. Always turn the wheel smoothly. Each time you turn the wheel you increase the tire resistance and lose speed. Never "saw" at the wheel.

Pedals

Accelerator, brake and clutch are the three pedals everyone is familiar with, yet BMWs and many other high performance cars have a hidden "fourth" pedal. The secret pedal is the dead or brace pedal, positioned on the far left of the others. It is used to provide lateral support while cornering. Try planting your left foot there while cornering; you'll be surprised how much it can improve your driving ability.

Shift Lever

The shift lever must be treated as though it were made of thin glass. Although the big plastic shift knob and thick shaft look sturdy, they are connected to delicate, breakable internal parts of the transmission. Speed shifting or slamming the shift lever home is a foolish bit of exhibitionism and a waste of time. The shift lever is not held in the hand; rather, it is cupped in the palm. The lever is used smoothly, delicately, precisely and slowly. If it's not going into gear or if it's grinding a gear, there is a reason. Don't force it. Be sure the clutch is in all the way and the engine revs are right. With practice and a light touch, shifts will come very quickly and effortlessly. When you are not actually shifting, keep your hands off the shift lever and on the steering wheel. Riding the shift lever is a NO-NO.

Braking

Most people think of engines when you mention power; however, the most powerful part of your car is actually not the engine but the brakes. Just think of how many feet it takes to come to a complete stop from 50 mph. Can you accelerate from 0-50 in the same distance? Most drivers use only 20-30% of their braking capacity in routine driving. High performance driving demands that you use the brakes firmly and decisively.

DO NOT slam on the brakes. Sudden hard braking transfers weight to the front wheels, putting all the braking effort there. It also throws the car out of balance and is to be avoided. The correct braking procedure is as follows:

Touch the brakes lightly to be sure they are there. Continue application, increasing pressure. Squeeze the brakes gently but very firmly. Compared to normal braking this will feel as if you are standing on the pedal. Under high performance driving conditions, you may hear a faint squeal from the tires, not a loud screech. This is probably due to a locked wheel which has lost traction and braking efficiency, and cannot be steered. This results in a skid and consequent loss of control. The brake pedal should be hard and firm, and you may feel slight pulsing. Develop a sensitive brake touch so that you can keep the brakes on hard and not lock them up. In performance driving, if you are required to use the brakes, **use them hard over as brief a time as possible.**

Downshifting

In order to quickly accelerate out of a corner, the car must be shifted to the appropriate lower gear before the corner. Naturally, this should be done as late as possible, preferably at the same time as braking for the corner.

This presents a small problem. If you are braking and shifting, the right foot is on the brake and the left foot is on the clutch. The engine rpms will drop quite low and when you let the clutch out you will pop or jerk the rear wheels. This acts as an additional brake, but could cause the rear wheels to exceed their traction limit and cause a skid, to say nothing of potential damage to the drive-train. The solution lies in heel-and-toeing and double clutching at the same time. This technique during downshifting helps achieve smoothness, while eliminating possible clutch slippage and extending the life of the transmission syncro rings.

This technique is one that should be thoroughly practiced until it becomes second nature. Do not attempt this for the first time during an event. Here's how it goes:

As you begin braking, depress the clutch with your left foot, moving the shift lever into neutral, and let the clutch out. The ball of your right foot should remain on the brake pedal, and the heel (or small toe, whichever is more comfortable) of the same foot should blip the throttle to raise the rpms by at least 2000 revs. This matches gear speeds, so you are now ready to shift into a lower gear. Declutch rapidly at peak rpm and shift into lower gear. If you matched gear speeds correctly, the gear shift will fall into place easily with no blocking action from the synchromesh. Once into gear, engage the clutch quickly! Engine speeds are best judged by the sound, as the tach needle tends to overshoot when blipped.

Techniques

It takes little skill to get into a car, depress the accelerator, and "drive" the car as fast as it will go in a straight line. The true test of a skillful high-speed driver is how quickly he/she can get through a corner. If a car is to corner as quickly as possible, it must be kept at its limit of adhesion from the moment it enters a corner until it has left the corner. For a given radius curve this limit cannot be exceeded if the car is going to stay in control. This means that if a car is being driven around a corner at the maximum permissible speed (its limit of adhesion) it cannot be accelerated until it has reached the end of the corner.

At this point it is useful to discuss the concept of traction limit. The maximum traction capability of a tire is called the traction limit. It is the same in all directions, meaning it will take the same force to pull a locked wheel forward, backward or sideways. It also means that when we place a combination of loads on a tire while braking in a curve, we are using up more of the total available traction. If the sum of these forces is greater than the traction limit, the tire will slide. At this point you will hear it "screech" loudly.

The fastest way around a corner to produce the highest exit speed is called a drift. This is the state of equilibrium between rolling and sliding. A car is drifting when the front wheels are turned into the turn and the car is sliding out of the turn. Drifting a car into a corner is never a comfortable feeling at first. Just hearing the tires screech is enough to scare some people off. Nonetheless, learning to set up and control a drift at high speeds is a skill that experienced Drivers can concentrate on with their Instructors.

The largest difference between a mediocre and an excellent Driver is the manner in which one executes corners. Here are a few guidelines which will help you master the technique of high-speed cornering:

Get the car "set up" for the corner. Hard braking should be done while the car is traveling in a straight line. If you need to downshift, be sure to use your heel-and-toe technique to equalize the rpms and avoid a sudden jerk. The wheel should be turned in a smooth, continuous motion. If you turn the wheel too sharply you will end up with an understeer or oversteer condition. As the rear wheels begin to slide, gently accelerate. This will result in a weight transfer that will keep the rear wheels from sliding out any further. As you begin to accelerate, gradually begin to turn the steering wheel out of the turn. If you are in a state of equilibrium (neither under-nor-oversteering) you should need little or no steering correction. As you approach the apex, start applying full throttle. If you are not accelerating at or near the limit of traction at this stage, then you have entered the beginning of the turn too slowly and should increase your entry speed next lap. Continue to apply full throttle through the exit of the corner.

Directions to Watkins Glen

Please visit www.theglen.com

Accommodations at Near Watkins Glen

You can stay at the Seneca Lodge which is located about 5 miles from the track.

Seneca Lodge (607) 535-2014

<http://www.senecalodge.com/directions.html>