

Class 5

Basic Maneuvers in a Low-Risk Environment

Natural Laws and Traction

Fact Sheet 6.1
Content Information

Physical Laws that Affect Car Crashes

Inertia - the law of motion. A property at rest wants to remain at rest.

Body in motion – keeps moving until something stops it. The object remains traveling at the same speed until acted upon by an outside force. When in a crash, the front of the car absorbs energy. This absorption slows down the rest of the car, but the occupants inside the car continue moving at the same speed until they strike the steering wheel and windshield or other objects in the vehicle. Inertia is one reason why safety belts are so important for they tie the occupants to the vehicle during a crash.

G – a standard unit of acceleration or deceleration. This force is experienced in car crashes, causing injury.

Extending the time of impact – is the basis for keeping people safe in a crash. It is the reason for airbags and crumple zones in vehicles and crash cushions and breakaway utility poles on our highways. It is also why some crashes cause severe injuries and some crashes cause minor if any injuries.

Car size and weight

When two vehicles of the same size and weight collide the occupants would experience the same deceleration, this would be the same as a single vehicle crashing into a rigid barrier.

In a collision of two cars with different weights and size (unequal mass), the more massive car would drive the less massive car backward during the crash, causing a greater speed change in the lighter car than the heavier car. The different speed changes occur during the same time so the occupants of the lighter car would experience much higher forces than the occupant of the heavier car. This is one reason why lighter, smaller cars offer less protection to the occupants than larger, heavier cars.

Larger size helps you in all kinds of crashes.

Weight is primarily an advantage in a crash with another vehicle.

Energy – the ability to do work (the stuff that makes things move)

Kinetic energy – the energy an object possesses due to its motion, the rapid transfer of kinetic energy is the cause of crash injuries. Managing kinetic energy is what keeping people safe in car crashes is all about.

Natural Laws and Traction

Fact Sheet 6.1
Content Information

Crashworthiness

Crashworthiness – the protection a car offers its occupants during a crash. Involves many aspects of vehicle design, including the structure and the restraint system.

- **Good crashworthiness** – the safety cage or body of the car remains intact after a crash, all the damage confined to the front end and occupant compartment slows down at a gentler rate.
- **Poor crashworthiness** – the safety cage or body of the car is collapsed and driven backwards, the damage is not just confined to the front end of the vehicle. Even when the occupants of the vehicle have safety belts and air bag on they are at a significant risk of injury.
- **Controlled deformation** – the frame or body of the car is designed to “give” or “collapse” on impact in a controlled manner to maintain the integrity or structure of the passenger compartment.

Natural Laws and Traction**Fact Sheet 6.1**
Content Information**Road Surface and Traction****Traction**

The adhesion, friction or grip between the tires and the road surface. Without traction, a driver cannot steer, brake or accelerate. A loss of traction may cause a loss of control that can result in skidding.

Traction varies

Traction varies with the vehicle's speed, tire condition and roadway surface. Drivers control the vehicle's speed and tire condition, but they have no control over the road surface or its condition, so drivers must learn to recognize conditions that may indicate a change in traction, which will require a change in speed, position, or direction.

Conditions that can affect traction:

- **Surface materials** – concrete, asphalt, brick or polished concrete, dirt, gravel, new pea stone, sand over hard surface. Ranked in order, from the greatest traction to the least.
- **Substances on the road** – sewer covers, paint, vinyl strips, tar, wet leaves, sand, loose gravel or mud. Reduce the level of adhesion or traction available.
- **Surface conditions** – rippled surfaces or potholes, wet, icy and snow-packed roadways, bridge surfaces, overpasses and shaded areas may freeze before other road surfaces. All of these contribute to a loss of traction.
- **Roadway design** – banked or crowned roads, uneven shoulders.
 - **Banked roadway** – usually found at a curve, is higher on one edge than the other.
 - **Crowned roadway** – road that is higher in the middle than at the sides.
 - **Shoulders** – frequently provide the only escape path in an emergency, shoulders of most highways provide less traction than the road surface. Some shoulders may be wide and paved but most are narrow and gravel. They can be rough or soft, covered with loose materials or littered with broken glass, debris or other waste and often are uneven with the road surface. Drivers must be prepared to “drive” on the surface that is available.

Natural Laws and Traction

Fact Sheet 6.1 continued
Content Information

Natural Laws and Traction

Inertia

Traction is affected by inertia. Inertia means an object in motion continues to move straight ahead until acted upon by some outside force. This force creates problems when a driver changes a vehicle's direction too suddenly.

As the car travels around the corner, inertia tends to keep the car moving forward in a straight line, rather than allowing the car to follow the curve or turn. Unless traction is great enough to overcome the force of inertia, the car will slide to the outside of the curve or turn.

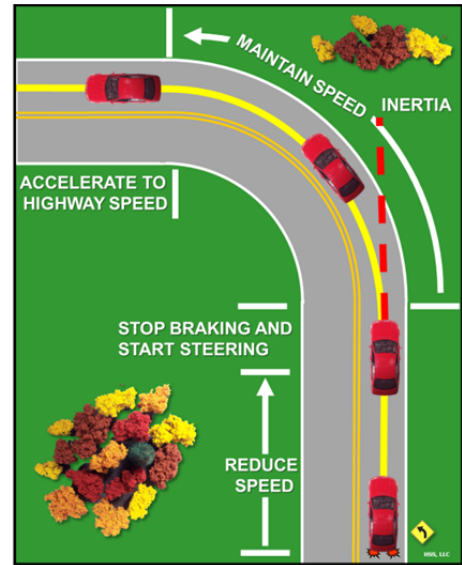
Factors influencing the effects of inertia:

1. Sharpness of the turn or curve
2. Speed
3. Size, height, weight and load of the vehicle
4. Roadway slope or crown
5. Roadway surface condition

Gravity

The invisible force that pulls all things to earth. This force also affects vehicle traction and performance. Gravity's downhill pull affects a driver's ability to accelerate and maintain speed on hills.

- **Driving uphill** – A driver must accelerate to keep a constant speed and overcome the force of gravity. On a slippery hill, acceleration may result in a loss of traction.
- **Driving downhill** – The force of gravity tends to boost speed, increasing the stopping distance.



Natural Laws and Traction

Fact Sheet 6.1 continued
Content Information

Vehicle Suspension, Balance and Traction

Single-vehicle crashes

More than 50 percent of occupant fatalities occur as a result of single-vehicle crashes. Basically, the driver loses control and the vehicle leaves the roadway and strikes a fixed object or overturns. These crashes normally involve improper steering or braking which can upset a vehicle's balance.

Balance

Refers to the distribution of the weight of the vehicle on the chassis or the frame, wheels and body of the vehicle. A transfer of weight from one point of the vehicle to another occurs when the driver accelerates, brakes, turns, or performs a combination of these actions.

Weight distribution

When a car is in balance, the vehicle's weight is distributed equally over the front and rear tires. However, the vehicle's weight can be shifted from the center of the chassis to a position where the weight is concentrated over the front, rear, left or right tires. When the vehicle is stopped or traveling straight at a constant speed, its suspension and traction are stabilized.

When weight is transferred to or from a tire, the size of its contact patch will change. A tire's contact patch is the area of tire rubber that is in contact with the pavement at any time.

The larger a tire's contact patch, the more traction that tire has on the road surface. The average size of a tire's contact patch is approximately equal to the surface area of an adult human palm.

Natural Laws and Traction

Fact Sheet 6.1 continued
Content Information

Vehicle Suspension, Balance and Traction

Changing vehicle suspension load

- **Front to rear** – when a driver accelerates, the vehicle weight or center of mass shifts to the rear. The rear suspension compresses, and the rear tires' contact patches increase in size, while the front tires' contact patches decrease in size. If acceleration is aggressive, there will be a noticeable rise of the vehicle's front and a drop of the rear.
- **Rear to front** – when a driver decelerates, the vehicle weight or center of mass is transferred to the front. If braking is hard, there is a noticeable drop of the vehicle's front and a rise of the rear. Occupants will feel forward movement. Apply too little brake pressure, and the vehicle will not stop at the desired point or within the distance available. Apply too much pressure, and the wheels may lock up, resulting in loss of traction and directional control.
- **Side to side** – When turning, the vehicle's weight will shift in the direction opposite the turn. When turning right, the vehicle's weight will shift to the left, causing the vehicle to lean to the left. When turning left the shift and lean will be to the right.

Maximizing traction

To maximize traction and minimize the chance of traction loss:

- Avoid sudden input when accelerating, braking or steering.
- Focus on executing one input at a time – brake, then steer, then accelerate.

Seating position

Drivers should sit in a comfortable, upright position directly behind the steering wheel to control vehicle balance and help maximize the driver's view of the driving environment.

Intersections

Fact Sheet 6.2
Content Information

Approaching and Entering Intersections

Approaching intersections

1. Search all corners for traffic controls, pavement markings, highway users, and areas of limited visibility.
2. Check mirrors for presence and actions of following traffic. Remember that over 30% of reported crashes are caused by rear-end collisions.
3. Make sure the driver is in the correct position and in the proper lane.
4. Be alert for traffic close to intended path.
5. Adjust speed to allow more time to search the area and to smoothly stop if necessary.
6. Remember, many people do not stop for signs and traffic signals.
7. If the driver has a restriction to the line of sight, the driver may need to change lane position and reduce his/her speed.

Entering intersections

1. Before entering a signalized intersection, look to the front, left, right and left again for approaching vehicles and/or crossing pedestrians and bicyclists.
2. Whether a driver is first in line or in a line of vehicles, drivers should develop the habit of checking traffic and counting to three before moving. This brief wait provides some protection against drivers who fail to stop for the red signal or drivers ahead who suddenly brake to a stop.
3. Do not move into the intersection until there is space ahead in the next block.
4. Drivers may continue through the intersection if the traffic light is green or the intersection is clear.
5. If stopped, look to the front, left, right and left again before entering the intersection.

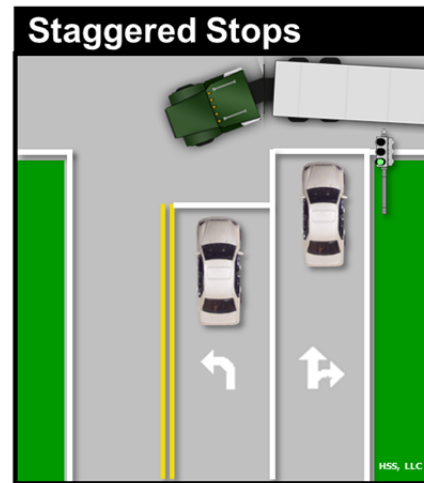
Intersections

Fact Sheet 6.2 continued
Content Information

Stopping at Intersections

Drivers may have to stop at an intersection if there is a yellow or red traffic light, a stop sign, a yield sign, or something moving into their intended path of travel. As soon as the driver identifies a reason to stop at an intersection, begin braking. If there is a vehicle behind, drivers should tap the brake pedal a few times so that the driver behind knows the front car is stopping.

- **Staggered stops** - Staggered stops are designed to keep traffic staggered to allow for larger vehicles (tractor trailers and buses) to complete turns. They can be identified at intersections with multiple lanes where the left lane stop line appears a greater distance from the intersection than the right lane stop line.



- **Double stops** - When approaching an intersection with a stop sign, stop line or crosswalk, it may be required or necessary to stop where visibility is totally or partially blocked. The driver must then pull ahead slightly, after stopping at the legal position behind the stop line, crosswalk, or sidewalk (unmarked crosswalk) and stop again where visibility is improved.

Intersections

Fact Sheet 6.2 continued
Content Information

Where to Stop at Intersections

When required to stop because of a sign or signal, drivers must stop behind the stop line, crosswalk, sidewalk (unmarked crosswalk) or behind the stop sign or signal.

Crosswalks - Define the area where pedestrians may cross the roadway. If there is a crosswalk, the vehicle with a bumper or vehicle with wheels must stop with the front bumper or front wheels behind the nearest crosswalk line. Drivers must yield to pedestrians entering or in a crosswalk.



Stop line – White line found at most intersections. Sometimes there is a crosswalk and a stop line. Should there be a stop line and a crosswalk line the stop line must be obeyed first



Sidewalks - On streets that have sidewalks, but no painted crosswalks, remember that the crosswalks are still considered to be there (unmarked crosswalk). Handle these situations just as if the crosswalk were painted. Sometimes a driver will be leaving a driveway, alley, or building area such as a gas station or drive-in. It is required that the driver stop just as if there were a stop sign. The stop is made behind the sidewalk, and the driver must yield the right-of-way to all persons approaching from either side on the sidewalk and to all approaching traffic. When the way is clear, the driver may turn left or right, unless pavement markings or signs prohibit such a maneuver.



No pavement markings (curb line) - If there are no identifying pavement markings and the sign or traffic control device says stop, then the stop must be made with the front bumper or front wheel behind an imaginary curb line, which stretches from curb to curb closest to the driver. If there are no curbs present, then it must be imagined where they would be, and the stop completed at that imaginary curb line. Remember the vehicle must not slow or impede the flow of cross traffic.



Intersections**Fact Sheet 6.2 continued**
Content Information**Turning at Intersections****Turning at intersections:**

1. Approach the intersection by checking for the following: oncoming and cross traffic, other highway users, traffic control devices, roadway condition and areas of limited visibility.
2. Check mirrors for presence and actions of following traffic.
3. Signal intent to turn at the intersection 3 to 4 seconds in advance or 100 feet before the turn.
4. Position the vehicle for appropriate turn.
5. Steer into proper lane.
6. Tap brake pedal to alert following driver.
7. Adjust speed as necessary, stopping if required.
8. Recheck cross and oncoming traffic. Remember that 90 % of drivers do not stop for stop signs in residential areas.
9. Check mirrors.
10. Identify a safe time/space gap in cross traffic.
11. Look through turn to farthest possible point.
12. Steer into proper lane using hand to hand (push/pull/slide steering).
13. Adjust speed as appropriate.
14. Check mirrors for traffic to the rear.

Turning left

When turning left at an intersection, make sure you are in the correct lane if there are multiple lanes and pull into the intersection to be ready to turn left. Keep a traffic light in your upper vision if present. Before turning left across oncoming traffic, look for a safe gap in the traffic. Prior to turning search right, front, and left to be sure there are no vehicles or pedestrians in the travel path or approaching from either side. Before turning, search in the direction of oncoming traffic. Be sure you turn into the correct/legal lane. In some states the left turn on red is allowed. Check your state law.

Turning right

Before turning right, make sure that there is no traffic approaching from your left and no oncoming traffic turning left into your path. Do not begin turning without searching for approaching pedestrians. Where there is more than one right turn lane, exit and enter the corresponding lane and be alert for drivers crossing lanes while making the turn. Remember when turning right on red, drivers must first stop and yield right-of-way to any vehicles, bicycles or pedestrians in your path of travel.

Intersections

Fact Sheet 6.2 continued
Content Information

Multi-lane Intersections

- The procedures for crossing or joining traffic at higher speeds on multi-lane roadways are similar to those employed for basic intersection maneuvers; however, these maneuvers takes more time and are more dangerous.
- Drivers must understand the increased risk of crossing multi-lane traffic at intersections controlled either by stop signs or traffic signals. While the procedures remain consistent, gap requirements increase substantially whether crossing or turning left or right.
- Turning on multiple lanes, with drivers cutting across lanes, is another problem associated with traveling on multi-lane, higher speed roadways on which new drivers must learn to be alert.

Changing Lanes**Fact Sheet 6.3**
Content Information**Changing Lanes**

Changing lanes involves a movement either to the left or to the right. It involves steering actions and, generally, a change in speed. Drivers are required to signal in advance to alert other drivers of their intentions. Drivers need to pay close attention to the actions of other drivers before changing lanes. Drivers must check for traffic in the lane they want to enter and behind their vehicle.

Changing lanes:

1. Maintain safe following interval.
2. Check highway and traffic conditions ahead, to the sides and behind.
3. Select a safe gap in traffic.
4. If clear, signal.
5. Check mirror blind spot in direction of lane change.
6. Adjust speed and steer into lane.
7. Cancel signal.
8. Adjust speed to flow of traffic.
9. Check mirrors for following traffic.

Problems associated with changing lanes

- **Not using turn signals** – Do not forget to use the turn indicator to signal the driver's intention to change lanes. Drivers need to form the habit of using turn signals before changing the vehicle's position.
- **Slowing down** – Maintain speed when lane changing, unless slowing down for a slow-moving vehicle or a traffic light ahead, for example.
- **Not selecting a safe gap** – Make sure there is a large enough gap in traffic before changing lanes.

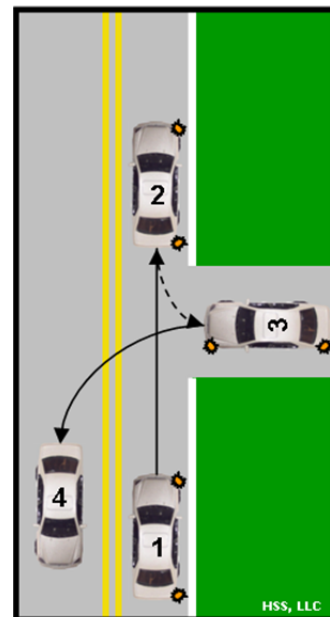
Turning Around

Fact Sheet 6.4
Content Information

Turning Around to the Right and Left

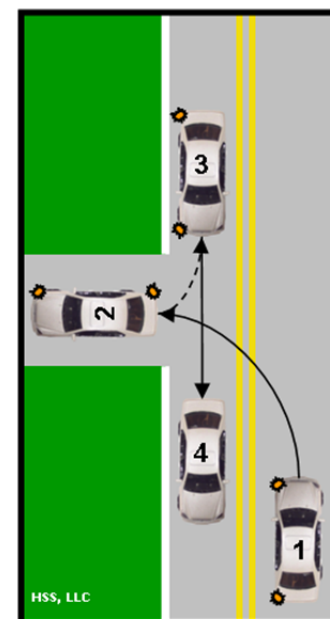
Turning Around by Backing into an Alley or Driveway on the Right (Right two-point turnabout): The numbers below match the numbers of the cars to the right.

- 1a. Check traffic to rear and tap brake pedal to alert following drivers
- 1b. Signal intention to turn right and check to make sure the driveway/alley is clear
- 2a. Stop with rear bumper of vehicle in line with the far edge of the driveway/alley
- 2b. Check traffic to sides and rear
- 2c. When safe, back slowly, turning steering wheel rapidly all the way to the right
- 3a. As vehicle centers in driveway/alley, straighten wheels
- 3b. Continue backing straight until front of vehicle clears the curb
- 3c. Stop, turn on left signal and shift to drive
- 3d. Check traffic and pedestrians in both directions
- 4a. When safe, turn left into proper lane and accelerate as appropriate
- 4b. Check traffic to the rear



Turning Around by Heading into an Alley or Driveway on the Left (Left two-point turnabout):

- 1a. Select a driveway/alley on the left that is clear of obstacles and where visibility will not be blocked when backing into street
- 1b. Check to rear and tap brake pedal to alert following drivers
- 1c. Signal intention to turn left
- 2a. When safe, turn into driveway/alley as close as possible to the right side
- 2b. Stop as rear bumper clears curb or edge of roadway
- 2c. Signal a right turn and shift to reverse
- 2d. Check in all directions for vehicles and other highway users
- 3a. When safe, move slowly back, turning steering wheel rapidly all the way to the right
- 3b. Check left front while backing to make sure there is a clear space as you turn
- 3c. As vehicle centers in nearest lane, straighten wheels, stop and shift to drive
- 4a. Cancel right turn signal and accelerate smoothly
- 4b. Check traffic to the rear

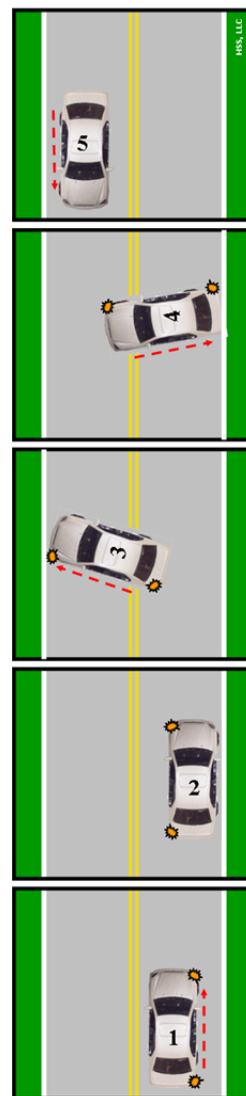


Turning Around**Fact Sheet 6.4**
Content Information**Three-point Turnabout**

The three-point turnabout results in the vehicle being stopped and blocking a complete lane. It should only be used when the traffic is the lightest traffic and when no other option is available. Never attempt this maneuver near a hill or curve, or anywhere where sight distance is limited.

- 1a. Check oncoming traffic and traffic to rear
- 1b. Signal right and stop as close as possible to the right edge of the roadway or curb
- 2a. Check once again for traffic, for this turn will require 15 to 30 seconds to complete.
- 2b. Signal a left turn before you begin and check your blind area over the left shoulder.
- 3a. While moving slowly forward, steer tight all the way to the left.
- 3b. While your vehicle is still moving slowly forward and when the front wheels are about 5 feet from the curb or pavement edge, slowly roll to a stop just before the right front tire reaches the curb or road edge.
- 3c. Quickly check for traffic coming from the left and right.
- 3d. With your foot on the brake pedal, shift to Reverse.
- 4a. Back slowly and steer tight to the right.
- 4b. When your rear wheels are about five feet from the road edge or curb, look over the left shoulder and keep looking back while rolling slowly. Stop just before the left rear tire touches the curb or road edge.
- 5a. Check traffic, shift to Drive and steer into the proper lane, adjusting speed as appropriate.

On narrow roadways, it may be necessary to repeat steps 3 and 4 to complete the maneuver



Turning Around**Fact Sheet 6.4**
Content Information**U-turns**

This method of turning around can be done in mid-block or at an intersection if legal. Check your local laws and follow road signs to be sure U-turns are permitted. If making a U-turn at an intersection, you must yield to all other traffic. At busy intersections, this type of U-turn is generally prohibited by a sign. If you decide to make such a turn mid-block, select a spot with little traffic. Be sure that your field of vision is clear and the car is not near a curve, intersection or the crest of a hill. Be sure other drivers can see your vehicle well in advance. Avoid locations where children are playing or pedestrians are present.

**Performing a U-turn**

1. Be sure no other vehicles are following you
2. To alert other drivers that you are slowing, tap your brake pedal lightly and turn on your right signal
3. Stop as close as possible to the right curb or the edge of the pavement, in order to provide maximum space to execute your turn
4. Check for traffic to your front and rear. If all is clear, turn on your left turn signal
5. Before you proceed, check a second time for traffic over your left shoulder and to your rear.
6. Steer tight to the left, moving your vehicle slowly until it faces in the opposite direction. If the roadway is narrow and without curbs, your right front wheel may move onto the shoulder of the road.
7. When the turn is nearly complete, straighten the wheels, position your vehicle properly in the traffic lane and adjust your speed as appropriate.

Parking

Fact Sheet 6.5
Content Information

Hill Parking

Leaving traffic

1. Search ahead for a legal parking space
2. Check following traffic
3. Signal
4. Release accelerator
5. Tap brake pedal to alert following drivers
6. Press brake pedal to point of resistance
7. Steer gently toward curb
8. Apply firm, steady pressure for smooth stops

Parking up or downhill without a curb and downhill with a curb:

1. Before securing vehicle, turn wheels sharply right, toward the edge of the road
2. Let leading edge of front tire touch road edge or curb



Parking uphill with a curb:

1. Before securing vehicle, turn steering wheel sharply left, away from the curb
2. Let vehicle roll back slowly until rear edge of tire gently touches curb



Parking

Fact Sheet 6.5
Content Information

Angle Parking

Entering an angle parking space:

1. Identify space to be entered
2. Signal intention to turn left or right
3. Position vehicle 5 to 6 feet from rear of parked vehicles
4. Move forward slowly until the driver can look straight down the painted line that marks the near side of the space the driver plans to enter. This line of sight is the reference point to begin turning.
5. Turn steering wheel sharply left or right as appropriate. The danger points are the front corner on the right side and the rear corner on the left side of the parking vehicle, shown below.
6. As vehicle is centered in the parking space, straighten wheels; determine the forward reference point to place the front of the bumper even with the curb or parking line.
7. Move forward to the front of the parking space, stop and secure vehicle



Exiting an angle parking space:

1. With engine started, foot on brake, signal direction of turn
2. Check in all directions for vehicle and pedestrian traffic
3. When safe, shift to reverse
4. Move straight back until back of front seat/door post is in line with rear of vehicle on side of turn
5. Turn steering wheel in direction of the angle. Check front bumper/corner clearance on side opposite direction of turn (front danger point)
6. Continue backing into travel lane. When vehicle centers in lane, straighten wheel
7. Stop, shift to drive, adjust speed as appropriate

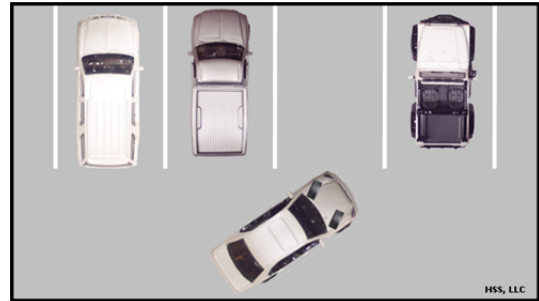
Parking

Fact Sheet 6.5
Content Information

Perpendicular Parking

Entering a perpendicular parking space:

1. Identify space to be entered
2. Signal intention to turn left or right
3. Position vehicle 8 to 9 feet from rear of space driver wishes to enter
4. Move forward slowly until the driver can see straight down the line marking the near side of parking space to be entered
5. Look to the center of the parking space
6. Move forward slowly, turning the steering wheel sharply left or right as appropriate
When parking between vehicles, the danger points are the front corner on the far side, and the rear corner of the vehicle on the near side of the space.
7. As vehicle centers in space, straighten wheels
8. Move forward to the front of the parking space until the driver sees the front line or curb edge just under the left or right side mirror. Seeing the line under the mirror is the reference point. Stop and secure vehicle (Note: this technique can also be useful when approaching intersections where you must stop at a stop line or crosswalk line.)

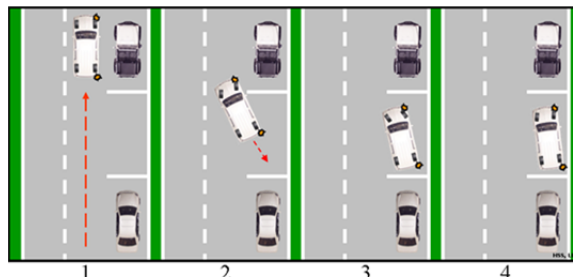


Exiting a perpendicular parking space:

1. With engine started, foot on brake, signal direction of turn
2. Check in all directions for vehicle and pedestrian traffic
3. When safe, shift to reverse
4. Move slowly back until windshield (window post) is in line with rear of vehicles parked on either side
5. Turn steering wheel slowly in direction you desire to back out. Check front bumper clearance on side opposite direction of turn (danger point)
6. As the front bumper of vehicle clears vehicle on side opposite of turn, turn steering wheel sharply to avoid striking vehicle parked in opposite row
7. Continue backing into travel lane. When vehicle centers in lane, rewind to straight
8. Stop, shift to drive, adjust speed as appropriate

Parking**Fact Sheet 6.5**
Content Information**Parallel Parking****Entering a parallel parking space:**

1. Identify legal parking space
2. Check following traffic
3. Tap brake pedal and signal intentions
4. Stop with back of front seats/center door post aligned (for shorter vehicles align rear)
5. Shift to reverse, check traffic and look in direction of intended movement
6. Back slowly, turning steering wheel tight and quickly left or right as appropriate
7. Back until back of front seat/center door post is in line with rear bumper of vehicle parked in space ahead
8. Back slowly while rewinding steering wheel to straight
9. Check front to make sure wheels are straight
10. Back slowly until front bumper has cleared rear bumper of vehicle parked in space ahead
11. Move slowly back, turning steering wheel tight and quick left or right as appropriate
12. Stop before touching vehicle parked in space to the rear (develop reference points to know your distance from the vehicle behind you)
13. Shift to drive, move slowly forward turning wheels to straight
14. Stop centered in space, within 12" of curb/edge of road and secure vehicle

**Reference points for parallel parking**

As drivers gain experience in parallel parking, they may continue to use the reference points, which are the center, back of front seat and the rear corner of the vehicle.

Exiting a parallel parking space:

1. Foot on brake, start engine and shift to reverse and release parking brake
2. Check vehicle behind, move slowly back, straighten wheels if turned for hill parking
3. Stop and shift to drive
4. Signal intentions
5. Check mirrors and blind spot for vehicles and other highway users
6. Select safe gap, move slowly forward steering tight left or right as appropriate
7. Check front bumper for clearance of rear bumper of vehicle parked in space ahead
8. When back of front seat/center door post is in line with rear bumper of vehicle parked in space ahead
9. Steer to center of lane and accelerate to appropriate speed
10. Cancel turn indicator
11. Check traffic to rear

Passing and Being Passed

Fact Sheet 6.6 Content Information

Passing

Passing and head-on collisions

Head-on collisions, typically involving a passing maneuver, annually account for approximately 5,500 or nearly 14% of all traffic fatalities. While some crashes occur due to impatience, or illegal actions, many occur due to lack of knowledge regarding time/space gap requirements. Impatience, errors in timing and poor judgment of space contribute to head-on collisions.

Illegal to pass

There are a number of instances when it is illegal to pass:

- **Solid yellow line** - When there is a solid yellow line on the driver's side of the center line or a sign indicates a no passing zone.
- **Oncoming vehicles** – Anytime there is an oncoming vehicle approaching you should not pass until the other lane is clear.
- **Hills and curves** – Anytime your view is blocked by a curve or a hill, you should assume that there is an oncoming vehicle just out of sight.
- **Intersections** – It is dangerous and illegal to pass where a vehicle is likely to enter or cross the roadway. Do not pass in intersections and avoid passing at other intersecting points such as parking lot entrances and alleyways.
- **Lane restrictions** – Before passing look ahead for road conditions and traffic that may cause other vehicles to move into your lane position.
- **Highway-railroad grade crossings and bridges** – You should not pass if there is a railroad grade crossing or bridge visible to you.



Passing and Being Passed**Fact Sheet 6.6 continued**
Content Information**Passing****Learning to estimate passing gap needs**

A four lane divided or undivided highway can also be used to practice identifying space gap needs when passing a vehicle on a two-lane roadway. Traveling 40 m.p.h. a driver is going to make a flying pass of a vehicle traveling 30 m.p.h. If the driver makes all of the visual checks, signals intentions, and starts the pass from an interval two seconds behind the vehicle ahead, it will take about 13 seconds to complete the pass. At 50 and 40 m.p.h. about 16 seconds and at 60 and 50 m.p.h. about 19 seconds. If the passing maneuver is started from three seconds back with both vehicles traveling the same speed, the passing driver will have to accelerate to a speed 15 m.p.h. faster than the vehicle to be passed to complete the pass in the same time limits.

To estimate the time and distance the oncoming vehicle is from the driver:

- Begin counting, one-thousand and one, one-thousand and two, one-thousand and three, etc.
- When an oncoming vehicle is spotted continue the count until the driver passes the oncoming vehicle in the opposite lane. Drivers should keep trying until they are accurate at estimating the time they will need.
- Although if you can see a vehicle in the opposite lane approaching you it is not safe to pass.

Using headlights at all times

Passing is one more situation in which the use of headlights during daytime hours is critical. The combined distance traveled by the passing and oncoming vehicle at 60 m.p.h. is 38 seconds or 3,344 feet. Without headlights on, an approaching vehicle may not become visible until it is within 2,200 to 2,500 feet. This is in contrast to about 4,500 feet with headlights or daytime running lights illuminated. This difference in visibility can be critical.

Passing and Being Passed**Fact Sheet 6.6 continued**
Content Information**Passing Procedures****Prepare to pass**

- Position the vehicle 2 to 3 seconds behind the vehicle to be passed
- Check mirrors and oncoming traffic
- Check ahead for safe passing distance
- Signal left

Overtake the ongoing car

- Accelerate and move into passing lane
- Accelerate quickly to the legal speed
- Concentrate on the path ahead
- Check mirror for following vehicles

Return to lane

- Check inside rear-view mirror for the front of the vehicle being passed
- Signal right
- Change lanes, steer to center of lane and maintain speed
- Cancel turn signal

Being passed

Being passed also places demands on the driver of that vehicle. The law specifically prohibits a driver who is being passed to increase the speed of the vehicle. Move to the right side of the lane when being passed. Check state law for giving right-of-way to a passing vehicle.

Passing on the right

In some states it is legal to pass on the right of another vehicle waiting to make a left turn provided it can be done safely and without leaving the traveled portion of the roadway. Passing on the right should be done cautiously and safely when multiple lanes are available. Crossing the white line that marks the right edge of the road, or driving onto the paved shoulder or gravel shoulder is illegal.

