

Risk Environments

16

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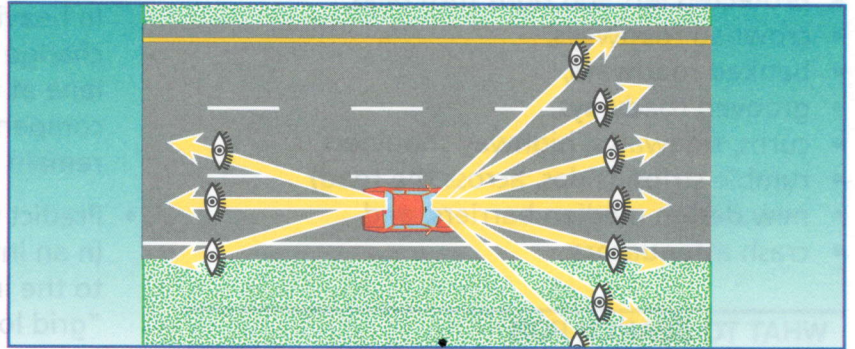
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In this chapter you will learn to apply the visual and critical-thinking skills of the SIPDE System to interacting with other road users in different risk environments. Intersections, curves, and hills present restrictions to your line of sight. You must adapt to the special problems they create.

A wide variety of other road users share the driving environment. Applying the SIPDE system and cooperating with other road users to reduce the risk as much as possible is a must.

The nucleus of safety in the HTS is the driver, his/her driving skills, the level of their experience, as well as their ability to apply the SIPDE system (visual searching, processing information, critical thinking, and risk-reduction decision-making).



AFTER COMPLETING THIS CHAPTER, THE STUDENT MUST BE ABLE TO RECOGNIZE RISK AND APPLY RISK REDUCTION STRATEGIES TO:

- establish roadway position, vehicle speed, and communicate.
- approach intersections, curves, and hills.
- select and execute space/speed adjustments in risk environments.
- select and safely execute space/speed adjustments for passing maneuvers.

16-A

Characteristics

A Most any driving situation can be classed as a low, moderate, or high risk environment depending on the volume of traffic, the appearance of hazards, changing weather, visibility or road conditions (except the high speed environment - Chapter 17).

A low risk environment is limited to speeds

under 40 mph, having uncontrolled and controlled intersections in urban, suburban, and rural settings. Traffic flow is minimal, which allows time for the novice driver to identify and to adapt to risks from changes in line of sight and path of travel. Two-way, one-way, and multi-lane roadways are present in this environment.



A moderate risk environment occurs in the same settings as above with speeds limited to 60 mph. Traffic flow is moderate, which still affords time for the novice driver to adapt to changes in risk (line of sight, path of travel, etc.).

SURVIVAL FEATURES

The features which are incorporated into highway design to enhance road user safety are called survival features.

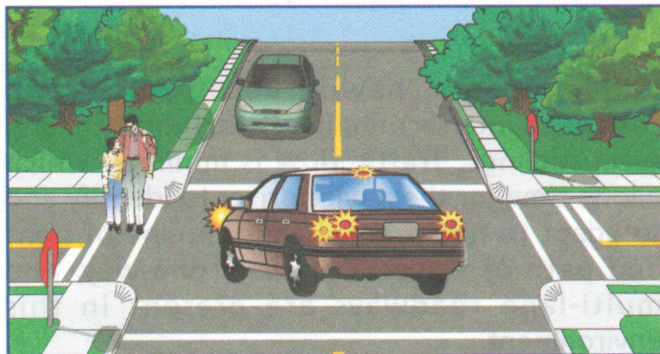
Survival features that are present in the low risk environment are:

- wide, clearly-marked lanes,
- break-away sign support posts,
- new design guard rails,
- protected left and right turn bays,
- crowned roadways,
- banked roadways,
- grooved roadways,
- curbs, sidewalks, highway shoulders
- rumble strips, (sides, across the road)
- new design median barriers, and
- crash attenuators.

WHAT TO SEARCH FOR

When driving in any risk environment, the SIPDE Space Management System should be applied to evaluate the level of risk present and how to adapt. However, you should be alert to the possibility of the following situations.

- Identify other road users on foot on or near the roadway (pedestrians, elderly, and especially children and the visually impaired) and adapt your speed and lane position to minimize the risk.



- Yield to oncoming traffic and pedestrians in the crosswalk when turning left. Search for pedestrians prior to turning to avoid having to stop in the path of oncoming traffic.
- Identify streets as one- or two-way and adapt accordingly (search pattern).
- Anticipate possible lane blockages and select the lane that allows you to move with the least conflict (the lane of least resistance).
- Identify when there is no gap in which to perform a lane change. Do not force your way into the lane. Adjust speed and communicate to create a space into which you can move.
- Plan ahead if you need to turn. Position your vehicle in the correct lane as early as possible. In heavier traffic, it is frequently difficult to change lanes. Plan to move into the proper lane at least a city block in advance to compensate. Identify your path of travel and remain within it.
- Predict traffic stoppages that could trap you in an intersection. Anticipate and stop prior to the intersection in order to avoid creating "grid lock."
- Identify multi-lane roads, reversible lanes, and shared left lanes and use or adapt to them in complete safety.
- Identify that frequently turns are permitted from more than one lane. In multi-turn lane situations, position your vehicle to reduce risk from other turning vehicles.
- Move with the flow of traffic while remaining within the posted speed limit. Any speed more than 5 mph slower or faster than that of the surrounding vehicles tends to cause disruptions in the flow of traffic.
- Your visual eye-lead-time of 20 to 30 seconds translates to from one to one-and-a-half blocks ahead depending on your speed. This will help you search and identify road configurations, pedestrians on or near the road, parked vehicles, vehicles waiting to turn, and the lane of least resistance.



INHERENT RISKS

Risk (the possibility of a conflict that results in a collision) is inherent to using the HTS. The only way to completely avoid the risks involved in driving is to never get into a vehicle at all.

Drivers sometimes do not recognize risk because on every previous occasion, no problem occurred. This results in them becoming comfortable and perhaps taking a "chance" again - driving too fast, or some other negative behavior.

Risks you should search for:

- Line of sight restrictions caused by buildings, trees, shrubs, billboards, etc.



Intersections

A traditional intersection is a place where two or more roadways meet and two or more roadway users may wish to occupy the same space.

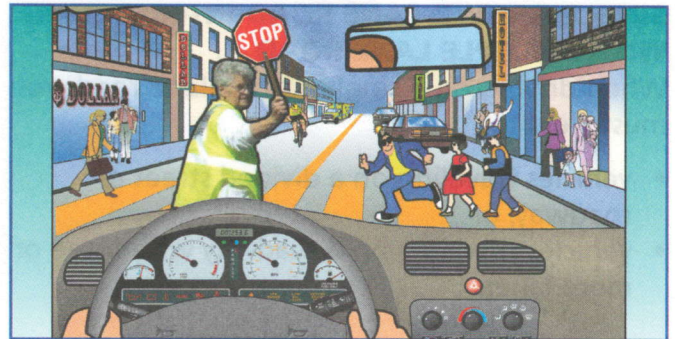
A non-traditional intersection is a place where two or more roadway users meet and cross at a point, but does not necessarily have intersecting roadways (a turnabout, driveway, or railroad crossing).

TRADITIONAL INTERSECTIONS

- Uncontrolled intersections
- Intersection roads with lesser or greater number of lanes.
- Intersection roads with different pavement surfaces
- T-intersections
- Intersecting public road with a private road.

NON-TRADITIONAL INTERSECTIONS

- Railroad grade-crossing
- U-turn
- 2-point turn
- 3-point turn
- Driveway intersecting with street.



- Path of travel restrictions caused by parked vehicles and other road users (school buses, children playing in the street, animals, etc.).
- Special areas - school zones, parks, recreational centers, etc.
- Increase in the type or flow of traffic that changes the risk environment.

RIGHT-OF-WAY

Right-of-way is a privilege not a right. The law specifies who must yield; not who must go first.

Right-of-way is determined by a set of rules and guidelines as listed in the law for intersections, merges, and special conditions. **Failure to yield is one of the leading causes of crashes in Texas.**

Safety comes before right-of-way. **The prime directive requires you to yield when necessary to avoid a collision**, regardless of the rules of right-of-way.



SINGLE OR TWO-LANE ROAD INTERSECTING WITH MULTIPLE LANE ROAD

When driving on a single or two-lane road, you must yield to:

- vehicles traveling on a divided street or roadway, or
- vehicles traveling on a roadway with three or more lanes.

UNPAVED ROADS INTERSECTING WITH A PAVED ROADWAY

Driving on an unpaved road intersecting with a paved road, you must yield the right-of-way to vehicles on the paved road.

INTERSECTIONS NOT CONTROLLED BY SIGNS AND SIGNALS, MULTI-LANES, OR PAVEMENT

When approaching an intersection of this type, you shall yield the right-of-way to any vehicle which has entered the intersection or is approaching the intersection from your right (close enough to be a hazard).

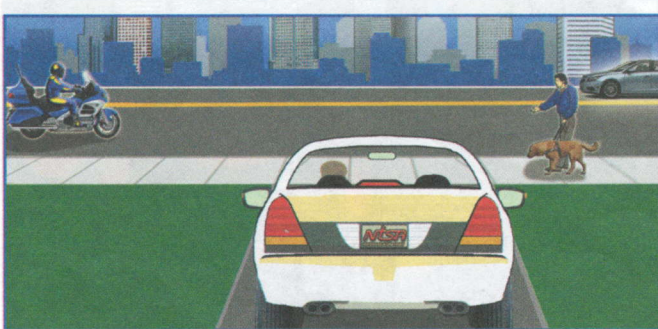
If the road to your right is clear, or if approaching vehicles are far enough from the intersection to allow you to cross safely, you may proceed.

However, since there are no traffic controls at this intersection, you must make sure there are no approaching vehicles from the left (even though they should yield the right-of-way to you). You may legally have the right-of-way, but you should make sure that the other driver yields to you before you proceed. **Safety comes before right-of-way.**

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PRIVATE ROADS AND DRIVEWAYS

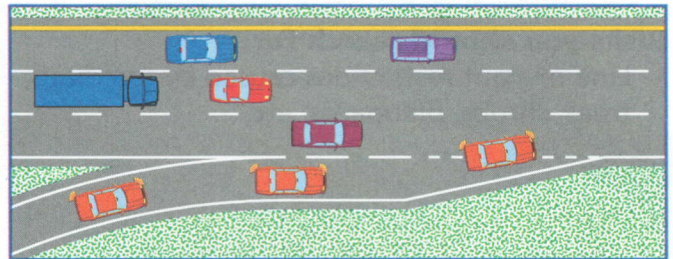
When entering or crossing a road, street, or highway from a private road, alley, or driveway,



you must stop prior to the sidewalk. Before entering or crossing, you must yield the right-of-way to all approaching vehicles, pedestrians, etc. that are close enough to constitute a hazard.

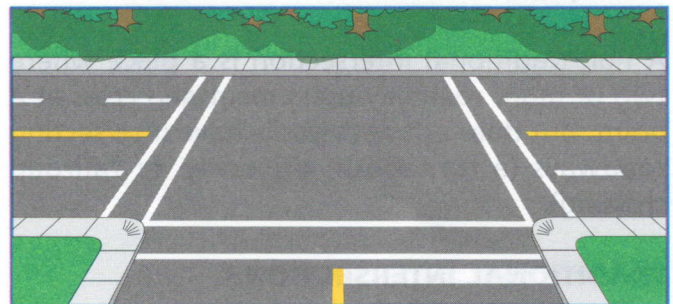
CONTROLLED-ACCESS HIGHWAY

When driving on an access or feeder road (frontage road) of a controlled-access highway, you must yield the right-of-way to any vehicle entering or about to enter the road from the highway, as well as leaving or about to leave the road to enter the highway.



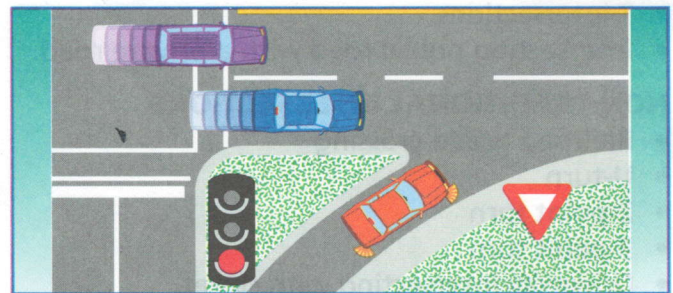
T-INTERSECTIONS

When approaching an intersection of a through street while driving on a street that ends at the intersection (a T-intersection), first you must stop. Then you must yield the right-of-way to any vehicles on the through street that are close enough to constitute a hazard.



CONTROLLED INTERSECTIONS

When signs or signals control traffic at an intersection, you must obey them (see Chapter

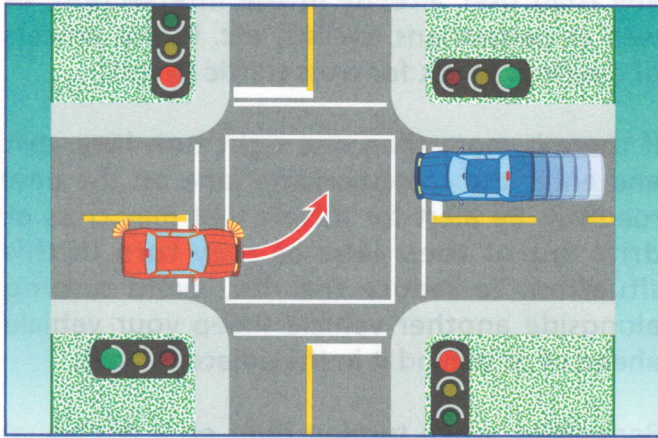


2). When traffic at intersections is controlled, this is an indication that there is heavier traffic flow - higher risk.

Before entering an intersection controlled by traffic signals, check again for oncoming traffic signaling a left turn, for pedestrians, and for any cross traffic (make sure it is stopped).

TURNING LEFT

When turning left, you must yield the right-of-way to any oncoming vehicles proceeding straight. You must also yield to any road user already present in the intersection, as well as pedestrians, cyclists, etc. in the process of crossing.



Frequently, a driver intending to turn left (left turn signal activated) will enter the intersection on a green signal (as in the diagram above), only to find that it is necessary to stop (with wheels pointed straight ahead), and wait for the signal to turn yellow (sometimes red) before the maneuver can be completed safely.

It is important to remember that prior to entering an intersection, the law requires that a driver ascertain that space is available in the street to be entered (left cross street, in this case). Failure to check before entering frequently results in being unable to clear the intersection, which may lead to a traffic citation for blocking traffic (**grid lock**).

If there is more than one left turn lane (often a left turn bay and another lane), turn and enter the corresponding lane on the new roadway. Be alert for drivers that may cross or drift out of

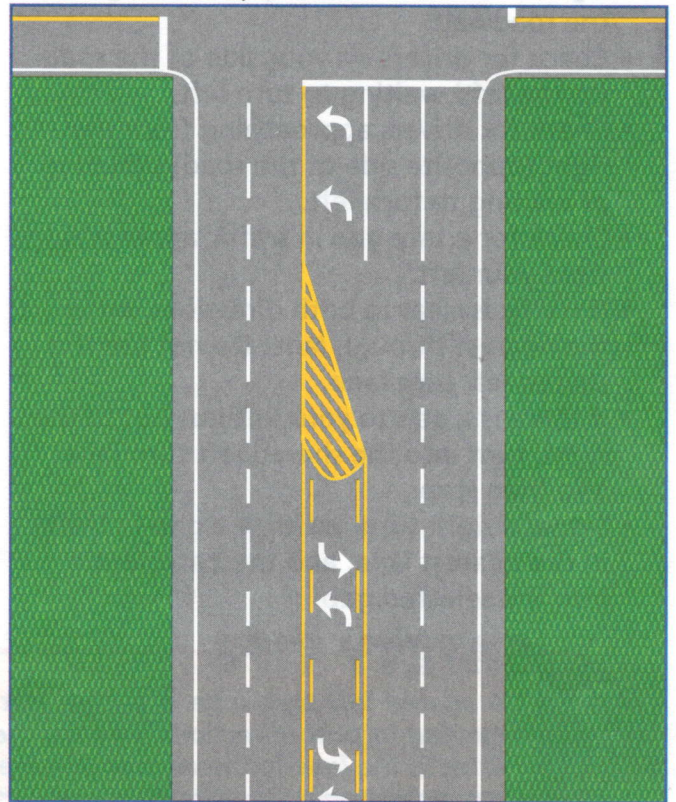
their lane as they turn left in this situation. To reduce the risk, avoid turning alongside another vehicle (keep your vehicle ahead of or behind it in the adjacent lane).

SHARED LEFT TURN LANES

You may often hear the expression center turn lane used to describe the situation illustrated below. (Note the unique lane markings on the center lane - a solid and a broken yellow line on either side of the lane.) The usual term used on signs is the two-way turn lane. Either term refers to the same roadway variation which can be found in rural, highway and many urban environments.

The center lane may be used to turn left for traffic in both directions, as well as by drivers turning left onto a congested street from alleys, driveways and parking lots (**not at intersections**) (turn into the lane and wait for a gap to enter traffic).

This presents one of the dangers of using this lane. Since traffic can enter from various direction to turn left, **you must check carefully before entering**. Is an oncoming vehicle about



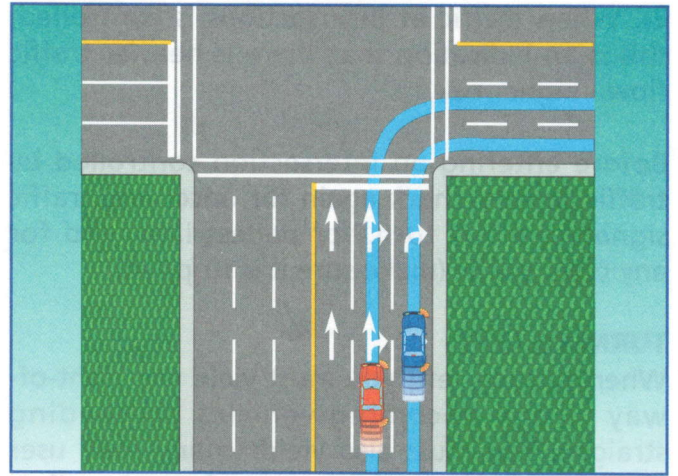
to enter the lane? Is any vehicle about to enter from a driveway on the left or on the right? Did a vehicle behind you enter the lane and is now overtaking you?

For your safety, **yield the right-of-way** to the lane to any vehicle that has already entered or is signaling the intention of entering the lane. Once you are certain it is safe, signal, then check again prior to entering the lane. Do not drive in this lane for a long distance (200 to 300 feet would be a suggested maximum distance). Stop in the lane (with the front tires straight ahead) while waiting for a sufficient gap in oncoming traffic to complete your left turn maneuver.

At an intersection, the ideal setup is the situation depicted in the diagram on page 16.5. The lane markings have changed to delineate a left turn lane or bay (this is not always the case). You must check before entering the turning lane; other drivers may enter the lane too soon and illegally drive over the zebra stripes (diagonal yellow lines) to enter the turn lane.

When you intend to use a shared left turn lane to enter a street from a driveway, you should:

- Signal a left turn and stop at the edge of the roadway.
- Check for drivers on your side of the road (to the left) waiting to turn left.
- Check for drivers approaching from the right (opposite side of the road) signaling or waiting to turn left.
- Check for a safe gap in traffic approaching from your left.
- If traffic is clear in both directions, enter the nearest through lane. Do not use the shared left turn lane.
- If there is a gap to your left but not to the right, turn into the shared left turn lane and then stop.
- Signal a right turn, wait for a gap in traffic in the nearest lane, and then accelerate into the selected gap.



TURNING RIGHT

When turning right, yield the right-of-way to any road user already in the intersection, as well as pedestrians, cyclists, etc. in the process of crossing. Check for cross traffic as well.

If there is more than one right turn lane, exit and enter the corresponding lane on the new roadway. Be alert for drivers that may cross or drift out of their lane as they turn in this situation. To reduce the risk, avoid turning alongside another vehicle (keep your vehicle ahead of or behind it in the adjacent lane).

Remember, when turning right on a red signal light, **you must first stop** and then yield the right-of-way to any vehicles, bicycles, or pedestrians in your intended path of travel or close enough to present a hazard.

ROUNDAABOUT INTERSECTIONS

The purpose of a roundabout is to reduce traffic congestion (keep traffic moving) and calm traffic at the intersection of two or more roadways.

The characteristics are pedestrian crossings are prior to the roundabout (separate hazards); entry is angled to the right (slowing traffic); and right turn exits eliminate cross traffic. The results are collision severity is lessened and fuel

SAFETY TIPS



A shared left turn lane is a high risk environment because it is used by heavy traffic moving in both directions. Reduce the risk. Check carefully before entering and do not drive in the lane for more than 300 feet.



consumption and air pollution are reduced because vehicles do not have to stop.

Reduce speed and be prepared to yield to vehicles already in the roundabout. When no traffic is approaching (or far enough away not to constitute a hazard), you may enter the roundabout and proceed. Remember to signal your intentions and to use the appropriate lane.



SAFETY TIPS



Roundabouts have been proven to reduce collisions without reducing the volume of traffic in the intersection. Pedestrians cross at pedestrian corridors prior to the intersection - thus removing one risk. Approaching drivers are directed along a curved path which lends itself to speed reduction, and must then yield to traffic in the roundabout. Once engaged, they must be given the right-of-way by traffic approaching.

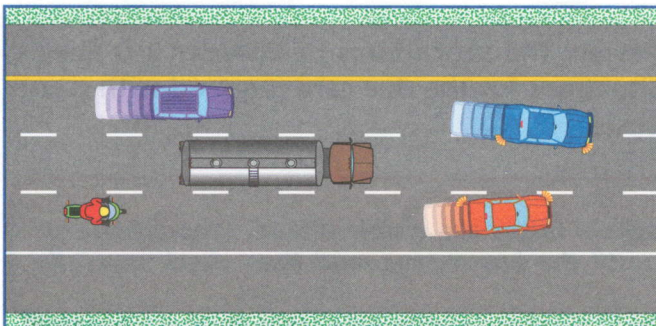


Special Situations

A low risk environment requires you to share the roadway with a wide variety of other road users in a multitude of different situations. An increase in the volume of traffic can quickly change a low risk environment into a moderate or high risk environment.

DRIVING ON MULTI-LANE ROADWAYS

On a one-way roadway divided into three or more lanes, a vehicle entering a lane of traffic from a lane to the right (moving toward the left - the red vehicle below) must yield the right-of-way to any vehicle entering the same lane from a lane to the left (changing lanes toward the right - the blue vehicle).



RAILROAD GRADE CROSSINGS

Texas law requires obedience to a signal indicating the approach of a train. You must stop **within fifty (50) feet but not less than fifteen (15) feet from the nearest rail** if:

- A clearly visible railroad signal warns of the approach of a train;
- A crossing gate is lowered or a human flagman warns of the approach or passage of a railroad train;
- The driver is required to stop by other law, a rule adopted under a statute, or an official traffic control device or signal;
- A train approaching within fifteen hundred (1,500) feet of the highway crossing emits a signal audible from such a distance, and such engine, by reason of its speed or nearness to such crossing, is an immediate hazard;
- An approaching train is plainly visible and in hazardous proximity to such crossing.

A person who fails to obey the law with respect to railroad grade crossings is subject to



a fine of not less than \$50. nor more than \$200.

The driver of a vehicle required to stop at a railroad grade crossing as provided by this law shall remain stopped until the driver is permitted to proceed and it is safe to proceed. Review the procedures in Chapter 2-E - Railroad Crossings.

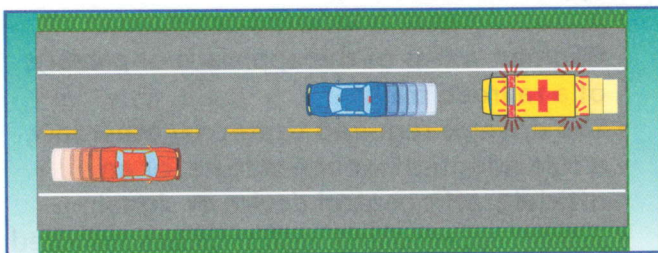
EMERGENCY VEHICLES

You must yield the right-of-way to police cars, fire trucks, ambulances, and other emergency vehicles which are sounding a siren or bell, or flashing a red light. You must move to the right edge of the roadway and stop. In the event traffic is so congested as to prevent you from safely moving to the right edge of the roadway, you must slow down and leave a clear path for the emergency vehicle.

You must not follow within 500 feet of a fire truck answering an alarm or an ambulance when the flashing red lights are in operation.

Do not drive into or park in the block where a fire truck has answered an alarm. Do not park your vehicle in such a manner or place that it may interfere with the arrival or departure of an ambulance at the scene of an emergency. Review Chapter 2-D Special Situations for the due care required with emergency vehicles and the Texas Move Over Law.

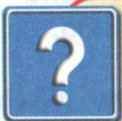
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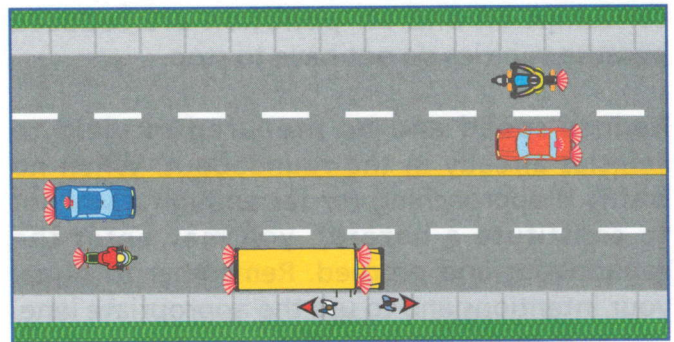
SCHOOL BUSES

Drive with care when you near a school bus. If

SAFETY TIPS



Reduce speed and search carefully when school buses are visible ahead. Stop whenever the school bus signals are flashing. Wait until the bus moves, and then check carefully that the children are safe before moving.

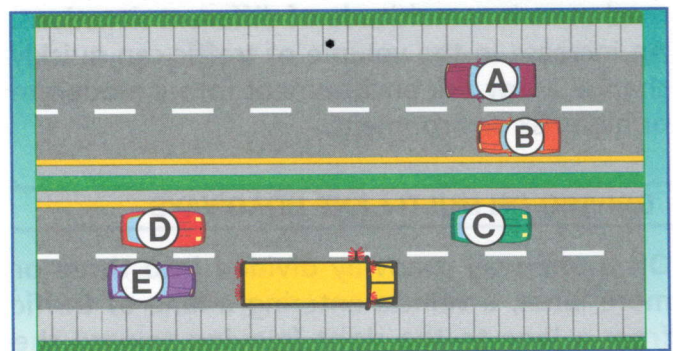


you approach a school bus from either direction and the bus is displaying alternately flashing red lights, **you must stop and not pass until:**

- the school bus has resumed motion,
- you are signaled by the driver of the school bus to proceed, or
- the red lights are no longer flashing.

You are not required to stop (though you should still proceed with caution) when meeting or passing a school bus which is:

- on a different roadway, or
- upon a controlled-access highway where the school bus is stopped in a loading zone and pedestrians are not permitted to cross the roadway.



In the diagram above, vehicles A, B and C are not required to stop (A and B because they are on the opposite side of a median, and C has already passed the bus).

Review the procedures in Chapter 2-D Special Situations for the due care required with school buses.





Statistics

In 2013, there were 4,735 pedestrian fatalities in the United States. On average, a pedestrian was killed every 2 hours and injured every 8 minutes. DOT HS 812 124
In 2014, 486 pedestrian fatalities occurred in Texas. (Crash Highlights 2014 TXDOT)

PEDESTRIANS

Your vehicle is potentially a deadly weapon for pedestrians and other vulnerable road users. Search and identify people on foot. Statistics demonstrate that a high percentage of collisions occur at intersections, especially those involving pedestrians. Drivers must yield to pedestrians in the following situations.

Uncontrolled intersections

At an uncontrolled intersection (no traffic signs or signals), if the pedestrian has entered the crosswalk, you, the driver, must yield the right-of-way.

Controlled intersections

If the pedestrian has a "WALK" signal, you must yield. If no pedestrian control signals are posted and the signal light is green, you must yield to the pedestrian. If the light changes after the pedestrian has already entered the crosswalk, you should still yield the right-of-way to the pedestrian.

Always yield to pedestrians - the most vulnerable of road users!

Review the procedures in Chapter 2-D Special Situations for the due care required with pedestrians.

URBAN / RURAL COMPARISON

A **city** can be an exciting environment; however, crowded streets, heavy traffic, and a multitude of traffic signals can make driving a difficult challenge to the uninitiated. This is especially true for novice drivers.

Characteristics to be wary of:

- a multitude of intersections
- rows of parked vehicles
- off-road parking
- school buses
- school and playground zones
- changing speed limits
- traffic jams
- numerous traffic signals
- city buses, delivery vehicles and other vehicles that stop frequently

Driving in **rural areas** is less hectic and more relaxing, however, you must adjust to higher speeds, a variety of road conditions, and traffic patterns. Crashes are fewer but more serious.

Particular dangers:

- slow-moving vehicles
- oncoming vehicles especially large ones that produce air turbulence
- off-road vehicles
- crossings- animals, trucks, etc.
- railroad crossings
- wild animals
- hidden intersections
- winding roads and hills
- unpaved shoulders and no shoulders
- unpaved roads
- narrow bridges

In 2013, in urban areas, there were

- **14, 026 fatal crashes (47%)**
- **resulting in 14, 987 fatalities (46%)**
- **declined by 15 % since 2004.**

Head-on = 9 % of urban fatal crashes.
Most pedestrian and pedalcyclist fatalities occur in urban areas.

In 2013, in rural areas, there were

- **15, 998 fatal crashes (53%)**
- **resulting in 17, 696 fatalities (54 %)**
- **declined by 30% since 2004.**

Head-on = 17 % of rural fatal crashes.
Occupant fatalities more likely to have been ejected from the vehicle (27%).





Maneuvers

Vehicle movements that are utilized in a low risk environment are moving forward, stopping, lateral maneuvers, turning, and backing. Also, several may be combined to perform parking and turnabout maneuvers.

Each vehicle maneuver has procedural steps to follow to complete the maneuver safely and properly. The driver performances that these maneuvers are based on are:

- Approach
- Communication
- Target areas
- Speed changes
- Lane position
- Visual reference points
- Steering
- Line of sight
- Path of travel
- Courtesy

MOVING FORWARD

When moving forward, you should anticipate lane blockages and select the lane placement that allows movement with the least conflict (the lane of least resistance). You should not look at the conflict you are trying to avoid (you tend to steer in the direction you are looking), but rather target the open space (your intended path of travel).

A visual eye-lead-time of 20 to 30 seconds (one to one-and-a-half blocks ahead) helps to identify the better lane placement. Identifying double-parked vehicles, backing vehicles, or turning vehicles well in advance provides the time needed to make a lane change.

UNCONTROLLED INTERSECTIONS

Before entering an uncontrolled intersection, you should check for oncoming vehicles signaling a left turn and look for pedestrians in the crosswalk, bicyclists, and cross traffic to make sure that they are stopped before you continue to move forward.

Do not enter the intersection until there is space in the next block so that you can exit the intersection in complete safety.

INTERSECTIONS WITH TRAFFIC SIGNALS

Before entering a signalized intersection, check again for oncoming vehicles signaling a left turn and look for pedestrians in the crosswalk, bicyclists, and cross traffic to make sure that they are stopped before you start to move.

Whether first in line, or in a line of vehicles, you should develop the habit of using the **count of three technique** (counting 1 - 2 - 3) for front space control and checking the traffic while doing so. This will provide some protection against drivers who fail to stop for a red signal (run the yellow light), or drivers ahead of you who start off and then suddenly brake to a rapid, unexpected stop.

Do not enter the intersection until there is space in the next block so that you can exit the intersection in complete safety.

AT STOP/YIELD SIGNS

Entering or crossing a street at an intersection controlled by a stop or yield sign requires you to make critical time-space judgments. At a brisk rate of acceleration, crossing a two-lane road 30 feet wide requires a gap of six or more seconds (see next page Time/Space...).

MIRROR USAGE

Anytime an object, condition, or area of limited visibility in, or adjacent to, your path of travel indicates the need to adjust speed or position, you need to be aware of the location, size, and speed of any vehicles to the sides and/or rear.

It is equally important to remember that while a vehicle is in motion, mirror usage is intended to assist in detection and not intended for gathering detail. You cannot afford to divert attention from your path ahead for more than a partial second at a time. **Three short quick**



glances can answer the following questions:

- Are there vehicles present?
- Where are they located?
- What are their relative speeds?

PREDICT TRAFFIC STOPPAGES

You should position your vehicle so that a traffic search 20 to 30 seconds ahead will enable you to spot conditions and determine whether an intersection can be cleared without conflict, or when a signal light might turn red (stale green).

If you notice that the front path of travel is closed, you can save fuel if you stop accelerating and use the energy of your vehicle's momentum instead.

DRIVING AT THE COMMON SPEED

You should drive at the speed of traffic in order to establish and maintain a safe space around your vehicle. However, you should avoid exceeding the speed limit. As a novice driver, you should not drive on any street where you do not feel safe maintaining the speed limit.

Any speed that is more than five mph slower or faster than the flow of traffic tends to cause disruptions in traffic.

STOPPING

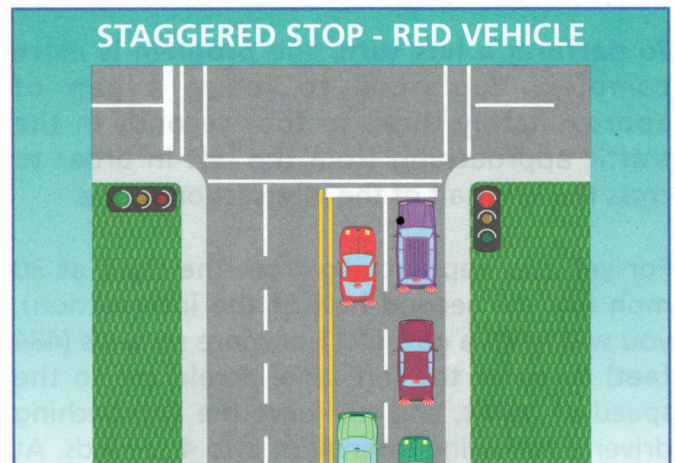
Whenever you prepare to stop, before applying the brake pedal, you should check in the rear-view mirror, and then flash the brake lights (tap the brake pedal) to alert the drivers behind you. Then apply the brake pedal to stop at least one car length from the stop line or vehicle ahead (stopping in a position to see the rear tires of the vehicle ahead making contact with the road, provides room to steer around a stalled vehicle).



Divide your attention to the rear-view mirror until another vehicle or two have stopped behind you. Dividing attention on the rear-view mirror and allowing extra space ahead will increase your ability to steer out of the lane if it becomes apparent that a vehicle, closing from the rear, is traveling too fast to stop in time. Once stopped, you can ease off the brake pedal and allow your vehicle to slowly move forward. If stopped behind another vehicle, retain the safe distance.

STAGGERED STOP

When your vehicle is in the left lane or in a single lane situation, and there is no vehicle in front of you at an intersection, stop one half a car length before the line in order to maintain control of your front space area. This staggered stop technique will eliminate the possibility of a vehicle turning left (from the right on the cross street) sideswiping your vehicle.



VEHICLE OPERATING SPACE

You must search 20 to 30 seconds ahead along your intended path of travel, and 12 to 15 seconds to the left and right frontal areas to identify planned and alternate paths of travel. At all times, you must establish a vehicle operating space that will offer you the least risk possible (reduced-risk decision-making).

TIME / SPACE JUDGMENT

At intersections controlled by stop signs and yield signs, it is vital that you are able to judge the length of the gap in traffic that would be required to enter, to cross, or to join traffic



safely. The width of the roadway, the time to perform the maneuver, and the speed of the traffic are the factors that must be taken into account.

Crossing a two-lane roadway (30 feet wide) at a brisk rate of acceleration requires a gap of at least six seconds. A vehicle approaching on the cross street at 30 mph will travel 264 feet (about one half a block) in that time. At 60 mph, the same vehicle would travel 528 feet. If the road is wider, the gap required would increase in proportion to the width.

When turning right into traffic traveling at 30 mph, a gap of eight or more seconds is required so that you can complete the maneuver and still leave the driver approaching from the left a following interval of 3 to 4 seconds. This works out to 352 feet. At 55 mph, a gap of eleven seconds (880 feet) is required.

To perform a left turn, the problem is more complex. You need to judge a gap of approximately three to four seconds in the traffic approaching from the left in order to cross the first half of the intersection safely.

For vehicles approaching from the right at 30 mph (on the second half of the intersection), you will need a gap of 11 or more seconds (484 feet) to enter the left lane, accelerate to the speed of traffic, and still leave the approaching driver a following interval of 3 to 4 seconds. At 55 mph, 14 seconds (1,130 feet) is needed.

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When turning left at or crossing a divided roadway, it may be necessary to cross the first half of the intersection, and then stop to yield to the traffic on the second half, before completing your maneuver.

While the procedures for crossing or joining traffic traveling at higher speeds on multiple lane roadways are similar to those employed for basic intersection maneuvers, it is important to realize that the risk can increase substantially and the space required as well. It is for this reason that expressways are built with interchanges (not normal intersections).

DRIVING THROUGH CURVES

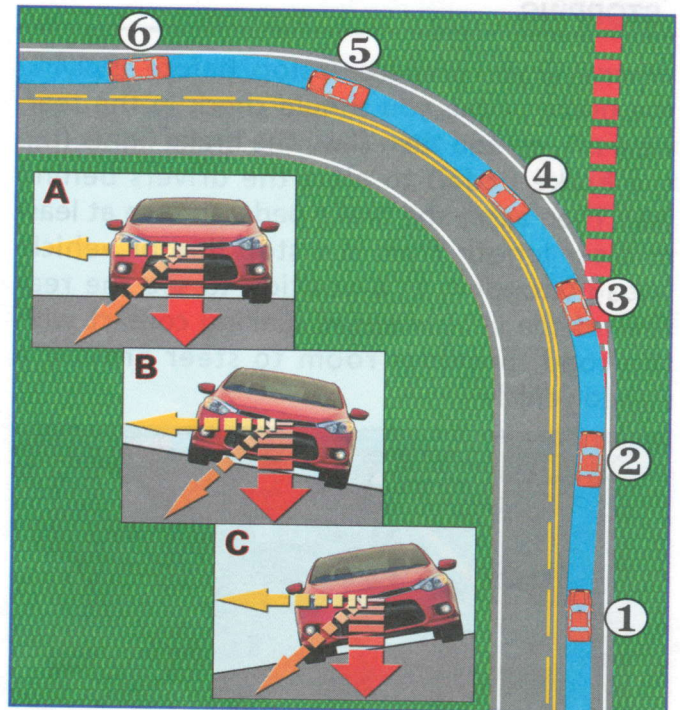
Searching as far ahead as possible and identifying the existence of a curve provides more time to evaluate and control the level of risk. You must determine the best speed and lane position to negotiate the curve.

You should ask the following questions:

- Which direction is the curve?
- What is the sharpness of the curve?
- What is the lane width and shoulder condition?
- What is the posted/suggested speed?
- What is the traffic volume?
- Is the curve on a grade?
- Is the road flat, banked, or crowned?
- Is my field of view restricted?

Answering these questions and checking the traffic to the rear will enable you to determine the best speed and lane position to negotiate the curve safely.

As you approach the curve (1-2), reduce your speed while traveling in a straight line (this will eliminate dividing up the available tire traction by braking and steering). Position your vehicle in the opposite lane position to the curve - left lane position for a right curve, right lane position for a left curve (2-3).



When you enter the curve **(3)**, you should release the brake pedal and apply a slight pressure on the accelerator (to balance the vehicle) as you begin turning the steering wheel. Target the apex of the curve (the mid-point of the curve) in the opposite lane position from which you entered. It is preferable to choose a late apex which will permit you to accelerate out of the curve sooner.

As you pass the apex **(4)**, accelerate as you start to unwind the steering wheel (at this point you can target the road out of the curve). Increase speed smoothly as you straighten the steering wheel **(5-6)**.

Return to your cruising speed (do not exceed the posted speed limit) and move your vehicle into the lane-center position (unless the situation requires otherwise).

On narrow rural roads with limited traffic and limited visibility, curves to the right present special problems since oncoming drivers are more apt to drive over the center line. Under such conditions, with headlights on, approach the curve in the left lane placement to maximize the probability of being seen, as well as establishing your line of sight and target.

SPEED AND BRAKING

The slope of the road (**A**- flat, **B**- banked or **C**-crowned), the pavement, your line of sight, signs, sharpness of the curve, etc. are all factors. It is preferable to enter a curve more slowly, you can always accelerate. **If you enter too fast, a loss of control will be inevitable.**

HAZARDS

Oncoming vehicles that may cross the center line, a closed line of sight, and too much speed are hazards in every curve. Look ahead into the curve. Plan ahead to avoid braking on a curve! Braking puts extra stress on the front tires

(weight transfers to one front corner); a blowout or loss of control could result.

HILLS

On hills, gravity affects the movement of your vehicle - uphill reduces speed and shortens the braking distance; downhill increases speed and lengthens the braking distance. When it is quite steep, a warning sign may be posted.

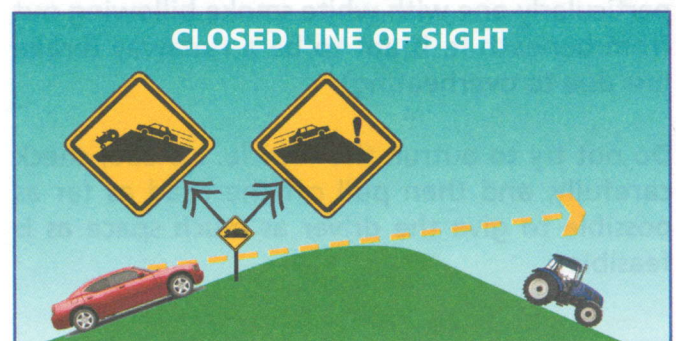


SHIFTING GEARS

Uphill, shift to a lower gear (even with an automatic transmission) to make the engine turn faster and develop more power to climb more easily. Downhill, also shift to a lower gear (without pressing the accelerator), and the engine compression will help control the speed so that you will not have to press the brake pedal firmly and continuously.

VISIBILITY AND SPEED

Approaching the crest of the hill, your front line of sight is closed. Keep your vehicle positioned



SAFETY TIPS



When negotiating a curve is one more situation where driving with headlights on during the daytime **helps reduce the level of risk** since your vehicle will be **more visible to oncoming drivers.**



to the right in your lane (lane position 3). Check traffic to the rear and reduce speed prior to the crest in order to be in a better position to respond appropriately if some object is blocking your path of travel on the downgrade (not visible until you crest the hill).

BRAKE FAILURE OR OVERHEATING

Uphill, the transmission and the engine are both working harder than normal, especially if you don't downshift. (On shorter hills, with an automatic transmission, the "kickdown" - quick hard pressure on the accelerator - may suffice to climb without over-straining.) This excessive straining will cause both the engine and the transmission to overheat, and can lead to a breakdown.

Check the brakes by tapping on the brake pedal prior to any downgrade. If they malfunction, you can stop before gravity will increase the danger. Moreover, continuous braking on steep slopes (if you don't downshift) causes the brakes to heat up and brake "fade" may occur. Pressure on the brake pedal will not result in normal speed reduction.

TRAVELING DOWNGRADE

When driving down long, steep grades (6 degrees or greater), it is even more vital to control your vehicle's speed. Moreover, you should check your rear-view mirror about every five seconds for the presence of any large vehicles. Any rapidly approaching large vehicle, particularly one with white smoke billowing out from beneath it, is apt to be a runaway (brake loss due to overheating).

Do not try to outrun the vehicle. Instead, check carefully, and then pull off the road as far as possible to give the driver as much space as is feasible.



MANAGING RISK

You can manage risk in any environment by using risk reduction techniques such as:

- Applying your knowledge and understanding of Texas traffic laws.
- Utilizing driver preparation procedures.
- Utilizing occupant protection devices and making sure your passengers utilize occupant protection.
- Utilizing vehicle operation and control techniques.
- Targeting your line of sight and path of travel.
- Searching the environment and evaluating your space areas.
- Utilizing vehicle movement procedures.
- Utilizing vehicle reference points.
- Maintaining vehicle balance.
- Utilizing driver readiness techniques.
- Timing multi-tasking and divided attention tasks.
- Managing distractions.
- Applying a space management system that includes information processing (the SIPDE System).

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SAFETY TIPS
When negotiating a curve is one more situation where driving with headlights on during the daytime helps reduce the level of risk since your vehicle will be more visible to oncoming drivers.





Passing

Passing is one of the most dangerous driving maneuvers. Before passing, you must decide whether it makes sense under the existing road, traffic and weather conditions. Your speed, the speed of the other vehicle, and the speed limit are major factors.

Whether or not passing is permitted by law, your line of sight, and the situation ahead should be considered. When the vehicle ahead is driving at least 10 mph slower (than the speed limit), and the maneuver can be performed safely and legally, you might decide to pass.



GOOD JUDGMENT

Considering the multitude of factors involved, the passing driver requires good judgment (SEARCH - EVALUATE) in order to assess the

situation. The last thing you need is impatience; hasty decisions are rarely safe or accurate.

RAPID DECISION MAKING

When passing, an oncoming vehicle in the passing lane is closing the gap at a combined speed well over 100 mph.

You must mentally prepare an "out" - have predetermined options ready in case any "worst case scenario" develops - and be ready to implement them.

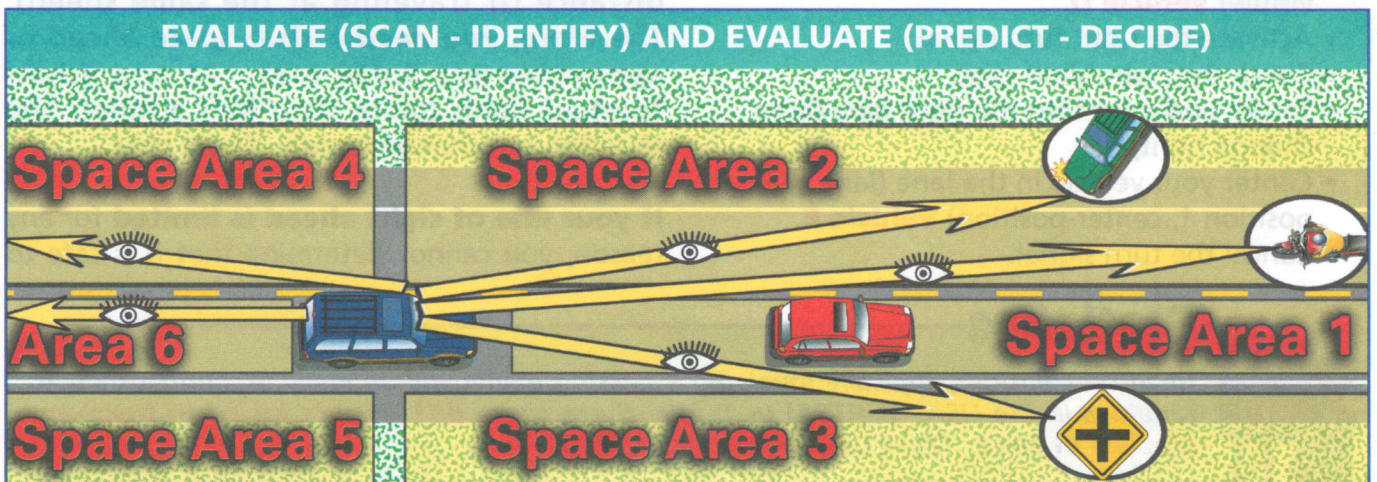
EVALUATE

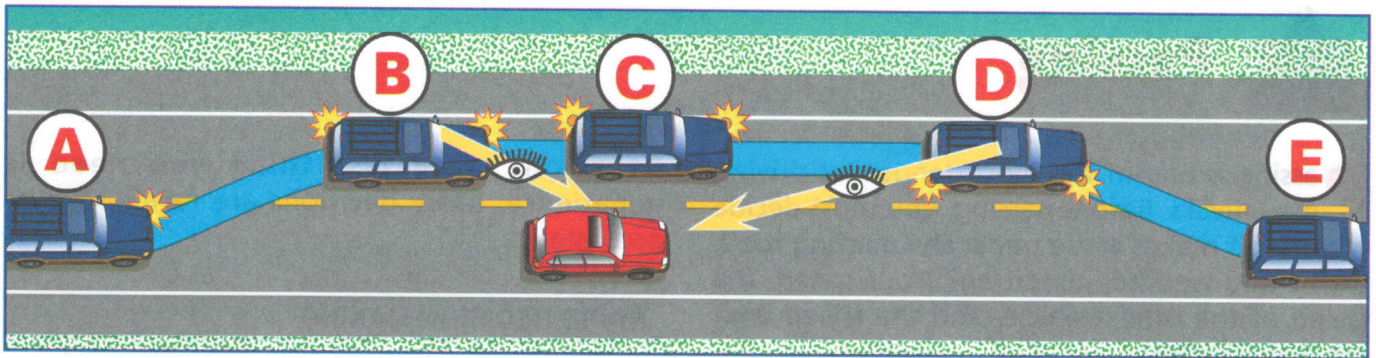
- Is passing permitted (pavement lines, no passing signs, hill, curve, intersection, bridge, etc.).
- Check the situation ahead in space areas 3, 1 and 2 (at right- signs, intersection ahead, off-road SUV entering, oncoming vehicles).
- Check your mirrors and left blind spot - space areas 4 and 6 (vehicles behind passing or about to pass).

IS IT SAFE TO PASS?

PREPARE

- Activate the left turn signal.
- Signal your presence and intention to the driver ahead (honk-Texas law-or flash the





high beams) **Vehicle A**.

- Accelerate - running start (15 mph speed superiority) (automatic - kickdown; standard - select a gear that provides power to pass).
- Recheck the situation ahead in space areas 3, 1 and 2.
- Recheck the mirrors and the left blind spot (space areas 6 and 4).

EXECUTE

- Target and steer into the passing lane (change lane left).
- Check the space ahead and behind (space areas 1 and 6) **Vehicle B**.
- Glance at the left front tire of the vehicle you are about to pass (be prepared to abort at this point).
- Occupy lane position 2 (lane-left position) **Vehicle C**.
- Firmly maintain speed and lane position while moving by the red vehicle you are passing.
- Check the rear-view mirror (both front tires of the vehicle you have passed should be visible) **Vehicle D**.
- Activate the right turn signal.
- Check the right blind spot.
- Target and steer into the right lane (lane change right).
- Center your vehicle in the lane (lane position 1, center-position) **Vehicle E**.
- Cancel the turn signal.

- Maintain speed until you have a safe interval (space cushion) behind your vehicle then ease off the accelerator (return to normal cruising speed).

WHEN PASSING, NEVER PASS MORE THAN ONE VEHICLE AT A TIME!

HIGH RISK SITUATIONS

When you are driving on a two-way roadway and you are considering passing the vehicle ahead, there are several situations, though not technically illegal, that you should recognize and decide not to perform the maneuver.

If the vehicle ahead is driving at or near the speed limit, the distance and time required to complete the pass will be much longer than normal. For example: if you are driving at 60 mph and the other vehicle is traveling at 55 mph, **you will need 19 seconds** to complete the passing maneuver. In that time you will travel 1,672 feet (88 feet per second). An oncoming vehicle will travel the same distance (if traveling at the same speed). Therefore, **you need a clear space ahead of approximately 3,450 feet** - 11 and a half football fields (more than half a mile). The situation can change rapidly. **Don't pass.**

If your line of sight ahead is limited for any reason, you cannot determine that it is safe to

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Statistics



Head-on collisions, typically involving a passing maneuver, annually account for 8,000 fatalities in the USA. (NHTSA) In Texas, there were **581 people killed in head-on crashes in 2014**. (2014 Crash Highlights TXDOT).





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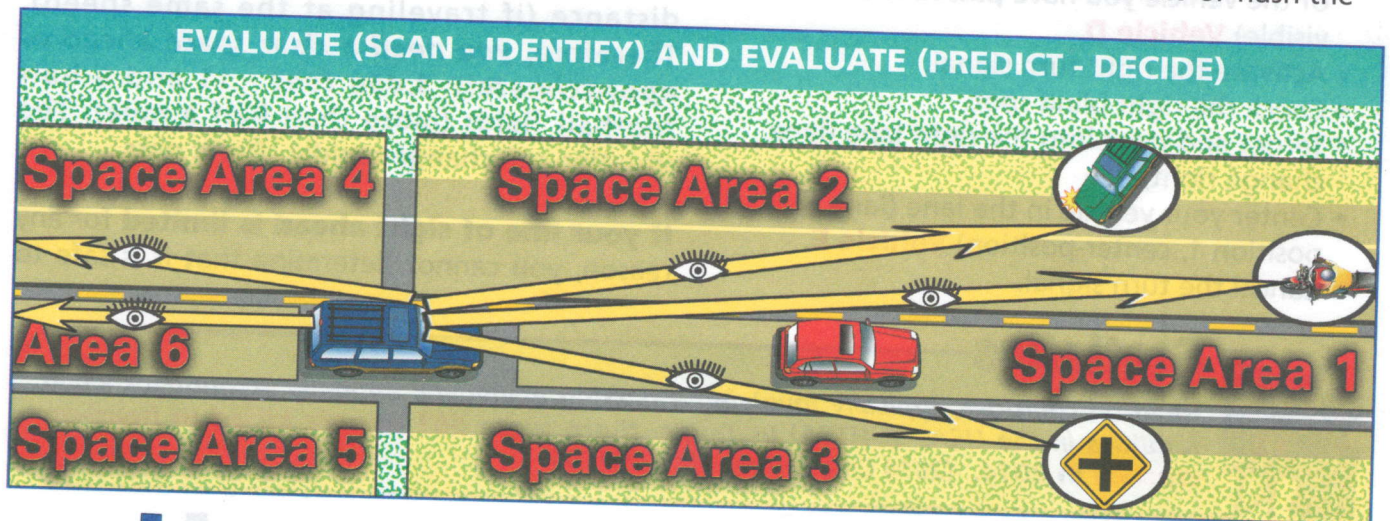
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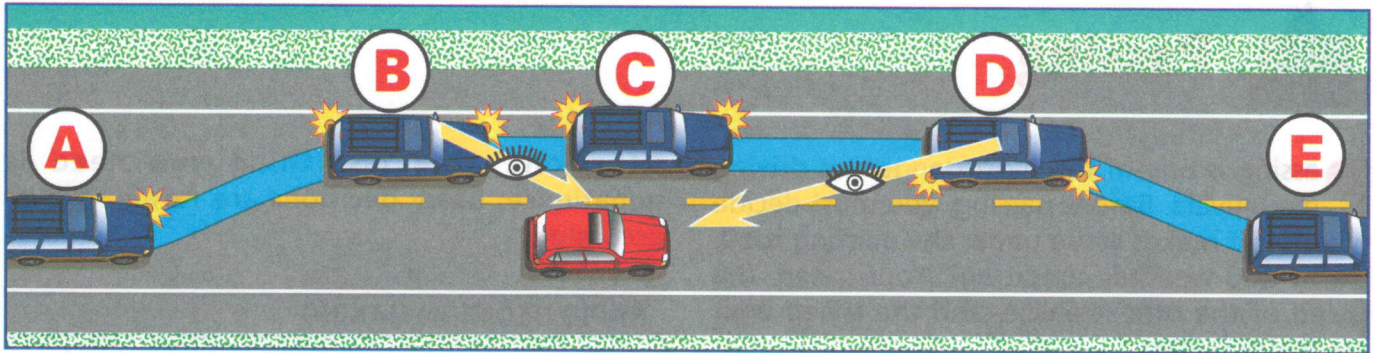
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pass. Never pass when an oncoming vehicle appears to be too close (you need a safe margin).

If the vehicle ahead is preceded by a **long line of other road users**, you may not be given a gap to return to the right lane. It is also difficult to know what these drivers intend; they may plan to stop or turn just as you pull out to pass. A "No Passing Zone" ahead limits the distance available, it may not be long enough to pass safely.

One of the most common errors is to drive right up to the vehicle ahead, reduce speed, and then try to decide whether or not to pass. At this point, your forward line of sight is obstructed by the vehicle. You have lost your minimum following distance (in case you have to brake), as well as any **speed superiority (running start)**.

REDUCING THE RISK

Instead, as you approach, move into lane position 2 (lane left-position) to see past the preceding vehicle. Evaluate the situation, and prepare to pass without reducing speed. Predict all possible scenarios and pre-plan responses.

If you decide to pass, move into the passing lane while increasing speed (speed differential). The point of final decision (**to abort or proceed**) must be just prior to reaching the rear of the preceding vehicle that you are about to pass.

Apply these concepts, as well as the steps for passing safely outlined earlier, and you will learn to pass safely and quickly. Never forget to apply all of the concepts to any passing situation. Passing is one of the most dangerous maneuvers; **only you can reduce the risk**.

ONCOMING VEHICLE PASSES

You must avoid a head-on collision at all costs. Immediately begin an emergency stop - by



reducing speed, you reduce the force of impact (if you cannot avoid the crash). You also give yourself more time for an evasive maneuver; as well as maybe giving the oncoming driver time to recover.

Honk and flash the high beams, if possible. Choose the safest "**OUT**" (the shoulder of the roadway, off the road completely), then ease off the brake and steer toward the selected path of travel.

PASSING AND THE LAW

You may not pass another vehicle on the left side of a two-lane road or in the center lane of a three-lane road, unless the lane is clearly visible and is free of oncoming traffic for a sufficient distance to pass safely (without interfering with an oncoming vehicle or the vehicle overtaken).

Passing on the left is prohibited when:

- you must cross a solid yellow line;
- a "No-Passing" sign is posted or the triangular "No-Passing Zone" sign is posted on the left;
- approaching a hill or curve where your view ahead is obstructed;
- within 100 feet of a bridge, viaduct, or tunnel (except on a one-way road);
- oncoming traffic is too close; and also
- you cannot see ahead clearly.

SAFETY TIPS



Passing is a high risk maneuver - requiring excellent judgment and risk-reduction decision-making. A major part of the judgment required involves evaluating the gap available to pass. You must learn to determine a safe passing gap at various speeds.



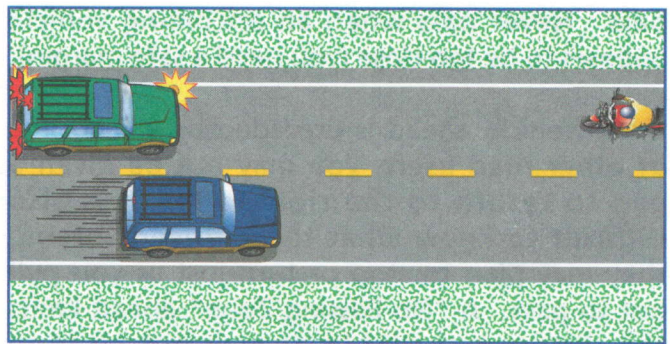
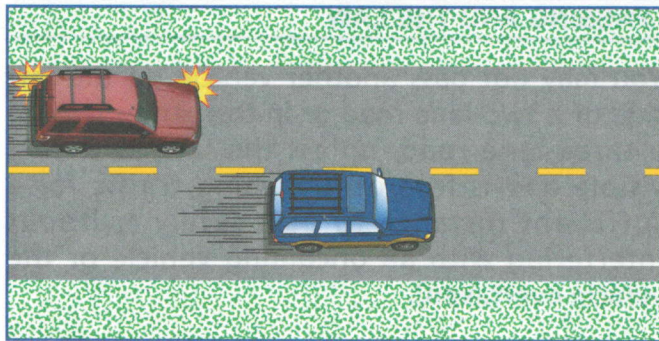
PASSING ON THE RIGHT

On a one-way road or divided highway, passing other vehicles on either side is permitted. When driving in the right lane, passing should be done cautiously, as the other driver does not usually expect vehicles to pass on his/her right. It is possible the vehicle may move into your lane without the driver having checked properly (blind spot).

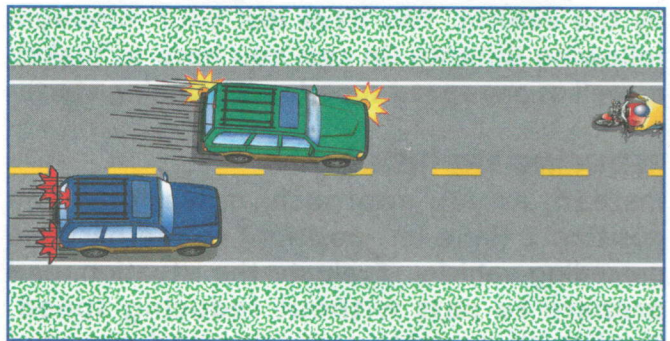
It is legal to pass on the right of another vehicle waiting to turn left, provided it can be done in complete safety without leaving the pavement or traveled portion of the roadway. Crossing the white line that marks the right edge of the road onto the shoulder, even if the shoulder is paved, is illegal.

BEING PASSED

When another vehicle is passing you on the left, you must cooperate. **Your safety depends on it.**



If the passing driver suddenly decides not to pass (**starts braking** - see above) because of an oncoming vehicle, accelerate to create space behind your vehicle in order to help him/her re-enter the lane behind you.



If he/she continues to complete the passing maneuver, apply the brakes to help him/her re-enter the lane in front of you (see above).

As a last resort (your **OUT**), move onto the shoulder.

You should:

- refrain from increasing speed;
- move to the right on audible signal;
- check for an "OUT" to the right; and
- be prepared to adjust speed.

SAFETY TIPS



When another road user passes your vehicle, cooperate as your safety is at risk. Be prepared, have an escape route planned (your "OUT"). If something goes wrong, allow the passer to decide and then execute your prepared decision for that scenario.

