Chapter Five: Defensive Driving Strategies

Speed Control and Speed Limits

In order to drive safely, you have to be able to maneuver your car safely. This requires a good understanding of your car’s capabilities and limitations. Two of the most important controls that a driver has over the vehicle are:

- **Speed Control**
  - Acceleration - the rate at which your vehicle increases in velocity
  - Deceleration - the act or process of reducing speed

- **Traction**
  - Friction - the force that resists the motion of one surface against another.

Road conditions also affect traction.

- Wet surfaces provide less traction than dry surfaces because water creates a barrier between the tires and the road.
- Bumpy roads also reduce traction.
- On uneven surfaces the tires must move up and down rapidly to maintain contact with the road. Worn or defective shock absorbers may cause tires to lose contact with the road.

Factors that Reduce Traction

There are two elements that are critical to maintaining high levels of traction.

- The condition of the vehicle.
- The condition of roadway.

**Poor Car Condition**—traction and control are generally better in newer vehicles.

**Shock Absorbers**—good shock absorbers help create traction.

**Tires**—worn or slick tires are the leading cause of lost traction.

**Poor Roadway Surfaces**—a vehicle driven on a flat, straight, and dry roadway is operating at the highest level of traction and control.

- Traction is reduced if the same vehicle is driven on wet, snow-covered, or rough roadway.
- Adjust speed to road surface condition.

Checking Traction—a driver should reduce speed to maintain traction when roadway conditions are poor. Use these three steps to check traction on a particular surface.

1. Make sure that there are no vehicles immediately behind your vehicle.
2. Brake gently to see how your vehicle responds.
3. If your vehicle does not respond well, reduce speed.

**Curves**—as a vehicle’s speed increases the energy of the motion of the vehicle also increases. As a result, a vehicle will try to continue in a straight line through a curve.
Hydroplaning—is when a tire loses contact with the road by rising up on top of water on the road surface. The factors that contribute to hydroplaning are standing water, speed, and tire condition. Take these two steps to avoid hydroplaning.
   1. Reduce speed.
   2. Use properly inflated tires with good tread.

Stopping Distance—is the total distance a vehicle travels when coming to a complete stop. The factors that contribute to stopping distance are:

   - speed,
   - perception time,
   - reaction time, and
   - road conditions.

Centrifugal Force—is the force that tends to push a vehicle in a straight line on a curve.

Factors that Affect Vehicle Control in Curves

Speed—a driver cannot control how sharp a curve is, but the driver can adjust the vehicle’s speed. Adjust speed before entering a curve.

Sharpness of a curve—the sharper the curve, the more traction is needed to grip the roadway at a given speed. Use slower speeds for sharp curves.

Bank of a Curve—the bank of a curve is determined by how high the outside of a curved road is compared with the inside of the curve.

Load—the amount of load that is carried in the vehicle will affect the vehicle’s ability to negotiate curves. Never exceed the G.V.W. (Gross Vehicle Weight) of the vehicle.

Force of Impact

Momentum—is the energy that builds up in a moving vehicle. When a car collides with an object, it hits that object with a calculated force of impact. The faster the car is traveling, the greater the force of impact.

Kinetic Energy—a moving object acquires energy. This force is called kinetic energy. The faster a vehicle travels the more kinetic energy it stores.

Speed Limits

Why do we have speed limits?

All drivers are required to obey posted maximum and minimum speed limits.
   - Limits are designated to provide for the orderly flow of traffic under normal driving conditions.
   - Heavy traffic, incremental weather, low visibility, or other poor driving conditions, requires adjustments in speeds.
Is speeding really a safety problem?

The obvious answer is yes speeding really is a safety problem. Speeding reduces the time drivers have to avoid crashes and lengthens the time required to stop.

- Speeding increases the likelihood of being involved in a crash and the severity of crashes when they occur.
- Speeding is reported to be one of the most prevalent factors associated with crashes.
- Speed is a factor in 31% of all fatal crashes.

There is an average of 1,000 Americans killed every month in the United States. In 1995, more than 13,000 people died in speed-related crashes. The N.H.T.S.A. estimates the economic cost of speed related crashes to be more than 29 billion dollars each year. Health care costs alone are about 4 billion dollars each year.

Facts about higher speed collisions!

- High speed collisions compromise the integrity of the vehicles, safety belts, air bags, and child safety systems.
- High speed reduces a driver’s field of vision. The higher the speed the less ability the driver has to gain a full view of the big picture. Peripheral vision is also decreased (High speeds increase reaction-perception distance once a hazard is recognized.
- High speeds increase the stopping distance once a hazard is perceived.

Who speeds most?

Young drivers speed more often than older drivers. In a study of drivers, on limited access highways, high-speed drivers were most often identified as male and younger than 30. Studies on California highways have reported that the rate of speeding violations per mile traveled is at least three times higher among drivers 16-19 years old as it is among drivers age 30 and older.

Regardless of age, male drivers are more likely than female drivers to be involved in speed-related fatal crashes.

Right of Way

Intersections—are places where roads come together or cross one another. It is dangerous to pass another vehicle in an intersection or at crossroads, railroad crossing, or shopping center entrances. At intersections, drivers must yield to each other. Remember that in every situation, right of way is something to be given, not taken. Intersections that might involve yielding the right of way are:

- Controlled Intersections—are intersections that have some type of indication as to what the driver should do and when to do it. It may be in the form of a sign, a signal, or a traffic officer.
**Uncontrolled Intersections**—have no indicators to control the flow of traffic. For this reason, uncontrolled intersections can be deadly.

- **Four Way Stops**—the driver first arriving at the intersection has the right-of-way.
- **Two Vehicles At The Same Time**—when two vehicles reach an intersection at the same time the vehicles on the right has the right-of-way.
- **Entering the Intersection with Other Vehicle**—yield! It does not matter who had the “right of way” if you are dead.
- **Pedestrians and Intersections**—always yield to pedestrians.
- **Parking Lot or Driveway Intersections**—when entering a street from a parking lot or driveway, yield to all traffic on the street.
- **Emergency Vehicles and Intersections**—emergency vehicles always have the right-of-way.
- **Freeway Intersections**—freeway intersection are called on-ramps and off-ramps. Freeway traffic has the “right of way.”

**Avoiding Collisions at Intersections**

**The LRL Rule**—after a red light turns green, before entering the intersection,

- look left to see if all vehicles approaching from the left are coming to a full and complete stop.
- Next, slowly turn your head to the right scanning ahead of you to see if all vehicles across the way are still stopped.
- Then slowly move your head left again and check if any vehicle is trying to beat the red light. Checking to the left a second time is a good idea.

**Proper Turning**—making proper turns depends on good visual habits, speed control, and good steering control. Scan ahead when approaching a turn.

**Right Turns**—here are some simple rules on making safe right turns.

- Get in position. Be in the right lane well ahead of the intersection.
- Signal at least 100 feet before intersection.
- Turn from the right lane to the right lane on the cross street.
- Check the blind spot to the right to make sure no smaller vehicle are in that space.
- Yield the right of way to pedestrians or vehicles in the intersection.

**Left Turns**— here are some simple rules on making safe left turns.

- Get in position. Be in the appropriate lane to turn.
- Signal at least 100 feet before the intersection.
- Yield the right of way to traffic and pedestrians from all directions.
- Keep wheels pointed straight when stopped waiting for traffic to clear.


**Signs and Signals**

Traffic signs and signals help provide orderly movement of traffic. Drivers must obey signals except when an officer is directing traffic. Drivers must obey traffic officers at all times, even if he is directing a driver to do something which is ordinarily considered against the law.

**Traffic Signs**—here is a list of important signs.

- **Stop Signs**—probably the most recognizable sign while driving. It is a red octagon. This shape is unique to a stop sign.
- **Yield Signs**—are either yellow and black or the international scheme of red and white. The equilateral triangle shape is unique of a yield sign.
- **Warning Signs**—alerts the driver to hazards ahead that would otherwise be difficult to see. Warning signs may indicate road hazards, changes in directions, or other situations that are important to know about. These signs are diamond shaped and are most times yellow or orange.
- **Guide and Information Signs**—help drivers identify route. Generally guide and information signs are green.
- **Regulation Signs**—regulates the speed and movement of traffic. Signs are either black with white trim or white with black trim.
- **Railroad Warning Signs**—indicate that the driver is approaching a railroad crossing. If there is more than a one track to be crossed, the sign will indicate the number of tracks. The advanced warning sign is a yellow circle with a black X. The crossbuck signs are cross boards that are white with black letters.

**Note:** Always slow, look, listen, and be prepared to yield the right of way to an approaching train. Never try to beat a train! In a collision with a train, the train always wins!

- **Flashing Yellow Light**—indicate that the driver should approach the intersection with caution and can proceed if it is clear and safe to enter the intersection.

**Judging Speed and Distances**

Drivers must learn to estimate the size and shapes of objects at various angles and distances. The ability to accurately estimate size and shape comes with practice and experience behind the wheel.

**Passing**—can be very dangerous. One of the major causes of head-on collisions is improper passing techniques.

**Where is it illegal to pass another vehicle?**

**Passing a Stopped School Bus**—is illegal. Drivers may not proceed until

- the school bus resumes motion,
- the operator is signaled by the bus driver to proceed, or
- the visual sign is no longer activated.

**Basic Safety Rules When Passing on the Left or Right**

**It is not always safe to pass**—the driver should be patient and wait until the time is right to pass.

- Make certain the way is clear.
- Give the proper signal.
- Tap the horn if necessary.
- Avoid cutting in too quickly.
How to Pass on a Two-Lane Road

On two-lane roads—it is important to observe the following safe passing practices.

**Before attempting to pass** a care make sure to;
- Stay well back of the car ahead so that the road ahead is in clear view.
- Check well ahead for “No Passing Zones” and oncoming cars.
- Make sure there is enough time and space to overtake and return to the right lane before an approaching car comes within 200 feet.
- Check rear-view and side-view mirrors.
- Turn and look back as another car might be attempting to pass at the same time.

**When passing** make sure to;
- Signal with the left turn signal.
- Tap the horn if necessary to alert the driver ahead.
- Pass on the left and does not return to the right lane until safely clear of overtaken vehicle.
- Wait until the car just passed is visible in the rearview mirror.
- Signal with the right turn signal before returning to the right lane.
- Turn off the turn signal.

**Passing on the Right**

**Passing on the right**—in Texas, and many other states, a driver may pass on the right if the conditions permit and it is safe to do so, under the following circumstances.
- The road is clear of parked vehicles or other obstacles, and the road is wide enough to permit two or more lanes in each direction.
- When driving on a one-way road.
- Passing on the right on a paved shoulder is permitted when a vehicle being passed is slowing or stopping on the main travel portions of the road or highway, regardless of whether the vehicle being passed is preparing to make a left turn or is disabled.

**Do not pass on the right by driving off the paved portion of the highway!**

**When Being Passed**

**Being passed**—is a maneuver that requires as much attention as passing a vehicle. It is important to practice the following when being passed by another vehicle.
- Do not increase speed.
- Maintain lane position.
- When being passed on the left where the lanes are not marked, move to the right as far as safety allows.
- Make it as safe and easy as possible for other drivers to pass.

**Blind Spot Driving**

Don’t drive in another driver’s “blind spot.” Either pass the other driver or drop back. When passing a car, go through the blind spot as quickly as possible. Approach cars ahead with caution but once alongside the car being passed speed up and go by quickly.
The ABC Method of Safe Passing

First of all ask is the pass necessary? If it is not necessary to pass drivers are putting themselves and the occupants in their vehicle in an unnecessary and risky situation.

It is important to:

- **Assess & evaluate** whether passing is safe and needed. When it is decided that the pass is both safe and legal then practice safe passing methods.
  - Maintain proper following distances.
  - Signal with the left turn signal
  - Look ahead.
  - Look behind.
  - Check the blind spot.

- **Be** careful and merge left into passing lane.
  - Increase speed.
  - Honk if necessary.
  - Check the blind spot again.
  - Signal with the right turn signal before moving again to the right.

- **Complete** the pass.
  - Move right.
  - Cancel the turn signal.
  - Return to the proper speed.

Avoiding Head-on Collisions

Of all the collision that occurs on road and highways, the head-on collision is the most frequent and the most deadly.

**Poor driving habits**—lead to a head-on collisions.

- Poor judgment about when to pass.
- Speeding around curves.
- Improper left turns.
- Loss control of vehicle.
- Excessive speed.
- Impaired driving.

**Hazards**—that causes vehicles to cross the center line.

- Tire blowouts.
- Weather conditions.
- Joggers, cyclists, or pedestrians in traffic.
- Construction hazards.
- Road debris.
- Road conditions (potholes, chug holes).
S is for Survival

Scan the road ahead.
Slow down to provide an extra cushion of space between vehicles providing more time to react to on-coming traffic.
Steer to the right.
Shoulders equal survival when it comes to avoiding a head-on collision.

Emergency Decisions: Choosing the Paths of Least Resistance

Note: always choose the path of least resistance.
- Why would we drive right instead of left?
- Why would you not want to lock the brakes?
- When a collision is unavoidable, choose a soft target.
- Choose to hit a stationary object rather than an on-coming vehicle.
- Hit object off center if possible.

Off Road Recoveries

Off road emergencies—are made worst when the driver panics.
- Maintain control of the steering and reduce speed.
- Do not over-correct when returning to the road.
- Do not slam on the brakes.
- Remain calm, check the mirrors, and adjust speed.

The best thing to do is to:
- ease off the accelerator,
- maintain a firm grip on the steering wheel,
- steer to the right so that the right rear wheel is also off the pavement,
- slow down and check rear view mirrors,
- activate the left hand signal,
- and slowly steer the vehicle to the left back onto the pavement.
Collision Traps

Collision traps can occur behind, to the sides, and in front of the vehicle. A defensive driver always allows a “cushion of space” between his or her vehicle and the other vehicles.

Minimizing Effects of a Collision

At some point during a driver’s career, he or she may be involved in a collision. It is important to know in advance how to react as by doing so a driver can lessen the effects of a collision.

Side impact collisions—take these evasive steps to avoid or lessen the affect of a side collision.
- Accelerate or brake quickly as needed.
- Sound the horn to alert the other drivers.
- Change lanes or swerve away from the impact; however it is important to be aware of other traffic so as to not swerve into other lanes and other possible collisions.

Rear-end collisions—although a driver is nearly defenseless against this kind of collision, it is important that drivers be aware of following traffic by constantly checking the rear view mirror.
- Flash brake lights to alert the driver of the danger.
- Check for open space that may allow an escape.
- If the intersection is clear, accelerate to give the other driver more space to stop. If the path is not clear, turn right.
- If a collision is unavoidable, release the brakes before the collision occurs.
- Brake immediately after the collision to avoid being pushed into other lanes of traffic.

If you have a collision—these are the proper steps to take.
- Stop immediately as failure to do so is a serious offense.
- Immediately take measures to warn other traffic of the collision (turn on hazard flashers).
- Help anyone who may be hurt.
- If there is an injury or death or $1000.00 in property damage, the collision must be report to the Department of Public Safety.

Proper Following Distances

One of the main causes of rear-end collisions is improper following distances. The average driver’s reaction time is approximately ¾ of a second. This means that once a hazard is recognized it takes ¾ of a second for the driver to move his or her foot from the accelerator to the brake pedal. During this time the vehicle is still moving down the road.

Simple reactions—is defined as actions taken by a driver that does not involve cognitive thought.
Complex reactions—is defined as actions taken by a driver that does involve cognitive thought in response to a variety of circumstances recognized as hazards.
Perception distance—is defined as the distance traveled by a vehicle once a danger is recognized.
Reaction distance—is defined as the distance the vehicle travels during the ¾ of a second required for the driver to move his or her foot from the accelerator to the brake pedal.
Braking distance—is defined as the distance the vehicle travels once brakes are applied. This distance can be affected by weather conditions, tire conditions, brake conditions, and road conditions.
At 55 miles per hour—
- Perception distance is approximately 140 feet.
- Reaction distance is approximately 60 feet.
- Braking distance is approximately 144 feet.
- Total stopping distance is approximately 344 feet.

At 65 miles per hour—
- Perception distance is approximately 160 feet.
- Reaction distance is approximately 70 feet.
- Braking distance is approximately 200 feet.
- Total stopping distance is approximately 430 feet.

**The 3 Second Method**

**3 Second Method** is a simple technique used when calculating correct following distances.

**3 Second Plus Method**—safe defensive drivers add extra following distances when circumstances and adverse driving conditions call for greater stopping distances.

**Special Situations: Interaction with other Road Users**

**Tractor Trailer Rigs**

**Blind spots**—on tractor-trailer rigs are huge.
- Stay far enough behind the rig so that the driver can always see you in his or her rear view mirror.
- When passing a tractor-trailer, do it quickly.
- Do not cut trucks off by coming back too soon after passing and slowing down.

**Turning characteristics**—of tractor-trailers are different than other vehicles.
- Be aware of the turning characteristic and limitation of large tractor-trailers.
- Many tractor-trailers must make wide swings to clear curbs.
- Wide swings will often take the rig into other lanes of traffic.

**Stopping distances**—are very different than those of an automobile.
- There is no comparison between the stopping distance of a vehicle of 80,000 G.V.W. and a vehicle of 3500 G.V.W.
Trains

**Railroad Crossings**—approximately 400 people are killed each year in vehicle-train collisions in the USA.

- Never drive around crossing barriers.
- Never race a train.
- If a vehicle stalls on tracks, get out of the vehicle.
- Scan for trains before proceeding across tracks.
- Remember it takes a train a long time to stop.
- The mass of the train is much larger than the mass of a vehicle; as a result, cars never win in train collisions.

Pets, Wildlife, and Livestock

**Animals**—can represent serious hazards to drivers.

- Scan for possible hazards. Animals are unpredictable and may dart out in front of vehicle at any time.
- Look for posted signs that indicate wildlife or cattle crossings.
- It is better to run over or collide with an animal than it is to swerve out-of-control and roll the vehicle.

Other Road Users

Slow-moving vehicles may be road equipment, farm equipment, or wide loads. Slow-moving vehicle should display an orange equilateral triangle indicating that the vehicle maximum speed is 25 mph.

**Motorcycles** are highly vulnerable vehicles as they:

- are **smaller** and **harder** to spot in traffic;
- make **fast** and **unpredictable** moves in traffic; and
- require **more scanning** by drivers.

**Bicycles**—like motorcycles, are highly vulnerable, they are slow moving, and often operated by children. Nevertheless bicycles:

- need to follow same rules as automobiles;
- and should be given plenty of room.

**Pedestrians**—also share the same space as traffic and since sooner or later, we all become pedestrians, we need to be thoughtful and careful when encountering pedestrians.

- **Uncontrolled intersections.** If a pedestrian enters a cross walk, drivers should yield the right-of-way.

- **Controlled intersections.** At these intersections the driver must yield the right-of-way to the pedestrian. If the light changes after the pedestrian has already entered the crosswalk, drivers should continue to give the pedestrian the right-of-way.