



Class 4

Vision and Space Management

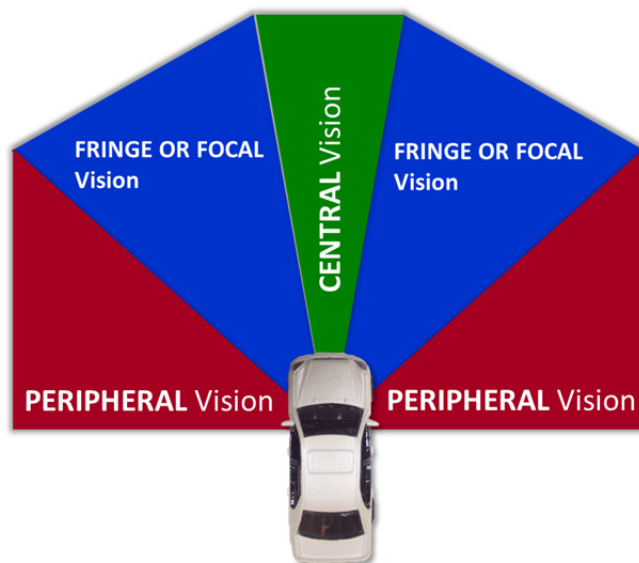
The Importance of Vision

Effective use of vision is critical to safe driving. No human sense is more important to the driving task. Thus, it is useful for drivers to know about the different types of vision, the type of information that can be obtained from each, and how to develop effective visual habits.

Visual functions - 60% of the human brain is devoted to vision.

There are three basic ways in which a driver gains information through the eyes.

1. **Central vision** is the five-degree cone that makes up only three percent of a driver's total visual field. It provides detail of objects and conditions and is the primary visual function employed in targeting. Direct your central vision to your target area and front zones.
2. **Fringe or focal vision** is used to judge depth and position. It provides information about objects close to the travel path and lane position. Use your fringe vision to check reference points and detect changes in your rearview and side view mirrors.
3. **Peripheral vision** is conical in shape around the other vision fields. It detects changes in color and object movement, providing you with information about moving or stationary objects that could be threats along the intended path of travel. Peripheral vision is strongly affected by fatigue, drugs, and speed of travel. It often gives the driver an initial warning of a changing or closed space area.



Vision and Perception Requirements**Fact Sheet 5.1 continued**
Content Information**Vision and Perception Requirements****Establishing visual lead**

A novice driver will need to develop a visual lead in order to keep steering reversals to a minimum. With very little free play in new vehicle steering mechanisms, it becomes critical to limit wheel movements to the left and right of the path of travel. Keeping eye focus farther away from the vehicle will allow the driver to take more time to make decisions.

A **visual lead** is an area 20 to 30 seconds of travel time to the front of the vehicle. Various driver systems have methods designed to keep eye focus centered in the path of travel at a distance that is 20-30 seconds away from vehicle. This is critical in gaining as much information as possible in the driving scene ahead. Good searching sets up good sightlines and good peripheral fields for seeing changes and identifying alternate paths of travel.

Search process

An organized searching process will need to start from the visual lead area. Eye focus and eye movements from the path of travel in an organized pattern describes a visual search process. The search for traffic flow information and potential risks is the function of a visual search process.

Maintaining an open line of sight

This is the ability to see the center of the driver's path of travel. When you drive you must have a clear field of vision to gather information and guide a motor vehicle effectively. Good visibility depends on the distance you can see ahead and to the sides. It consists of your line of sight and field of view.

Line of sight is the imaginary line that extends from your eyes to the point of focus. The line of sight can be blocked by a curve, hill, tree branches, buildings, large vehicle, etc. To maintain an open line of sight you will have to make changes in speed and position. When sightlines are blocked, a speed adjustment is needed until the area is visible or the sightline is restored. Blind intersections, for example are high risk areas and speed/lane position should be adjusted before proceeding into the intersection.

Field of view is the entire area of the highway and surroundings that you can see at any given moment.

Path of travel is the space into which you can safely direct your vehicle with the lowest possible risk. Selecting the path of travel is a combination of line of sight, standard visual references, and guided experiences. Gathering information about your path of travel and alternate paths of travel is critical for driver performance.

Vehicle Operating Space

Fact Sheet 5.2
Content Information

Space Cushion Around The Vehicle

At all times, you will need adequate operating space in front of, to the sides of, and to the rear of the vehicle. It is important to maintain open space in these areas so that you can move the vehicle there, if necessary. Operating space can be thought of as a space cushion, extending in each direction from the vehicle.

- **Space ahead**

You must always share the road with other roadway users. The more distance between your vehicle and other roadway users, the more time you have to react. This space is a large space cushion designed for your protection. Always maintain a safe space cushion around your vehicle.

- **Following distance** – the distance between your vehicle and the vehicle ahead, which gives you more space between vehicles, in case of an emergency.

The distance for steering is much shorter than the distance for stopping. Response time with the hands is close to 1/2 second, while response time with the foot is normally 3/4 second. This does not take into account any lag in perception time due to fatigue, drugs, a distraction or inattention. Another concern to note is the ability to stop when following vehicles of different weights.

- **2 seconds** permits a driver time to steer out of problem areas at all listed speeds on a dry surface and braking out of problems at speeds less than 35 mph.
- **3 seconds** permits a driver time to steer out of problem areas at all listed speeds on a dry surface and braking out of problems at speeds to 45 mph.
- **4 seconds** permits a driver time to steer out of problem areas at all listed speeds on a dry surface and braking out of problems at legal speeds to 65 mph.

Vehicle Operating Space

Fact Sheet 5.2 continued
Content Information

Space Cushion Around The Vehicle

You should keep a minimum of 3 to 4 seconds following distance behind another vehicle during ideal conditions.

To determine your following distance:

- Pick out a fixed object at the road side: a road sign, light post or other fixed object along the road ahead.
- As soon as the rear of the vehicle ahead of you passes the fixed object, start counting “One-thousand-one, one-thousand-two, one-thousand-three,” etc.
- When the front of your car reaches the fixed object, stop counting. If you reach the fixed object before you finish counting three to four seconds, you are following too closely.

There are certain situations where you would need more space in front of your vehicle. As speed or road conditions change, the need for a change in following distance is apparent. Your vehicle needs more distance to stop. You should increase your following distance to at least 5 seconds:

- When roadways are slippery
- When visibility is poor due to weather conditions
- When driving at night
- When driving at higher speeds (50 mph or more)
- When following large vehicles
- When you anticipate dealing with an in-car distraction

Vehicle Operating Space**Fact Sheet 5.2 continued**
Content Information**Space Cushion Around The Vehicle**

- **Space to the sides**

The space to your sides should be enough to provide for errors in judgment and an escape path or way out. Therefore, you should have at least one car width of space to one side of your car at all times. When practical, it is best to have space (at least 8 feet) on both sides. Most cars range in width from 5 to 7 feet. Since traffic lanes usually are 9 to 12 feet wide, you should have little trouble identifying an adequate travel path.

To maintain space on both sides of your vehicle:

- Avoid driving next to other vehicles on multi-lane roads. Increase or reduce your vehicle speed to stay clear of other vehicles that may be trying to enter your lane or space.
- Keep as much space as possible between your vehicle and oncoming vehicles. Drive in the center of your lane so you can move your vehicle left or right to avoid a potential problem. When multiple lanes are available drive in the right portion of the lane to increase the space between you and oncoming vehicles.
- Keep extra space between your vehicle and parked cars by moving to the left portion of your lane without crossing the centerline.
- When a vehicle is passing you, especially a large vehicle, leave a little space by moving to the right portion of your lane.

- **Space behind**

This distance is more difficult to control. You can help keep the driver behind you at a safe distance by keeping a steady speed, signaling in advance, and keeping more space to the front of your vehicle before reducing speed or changing position.

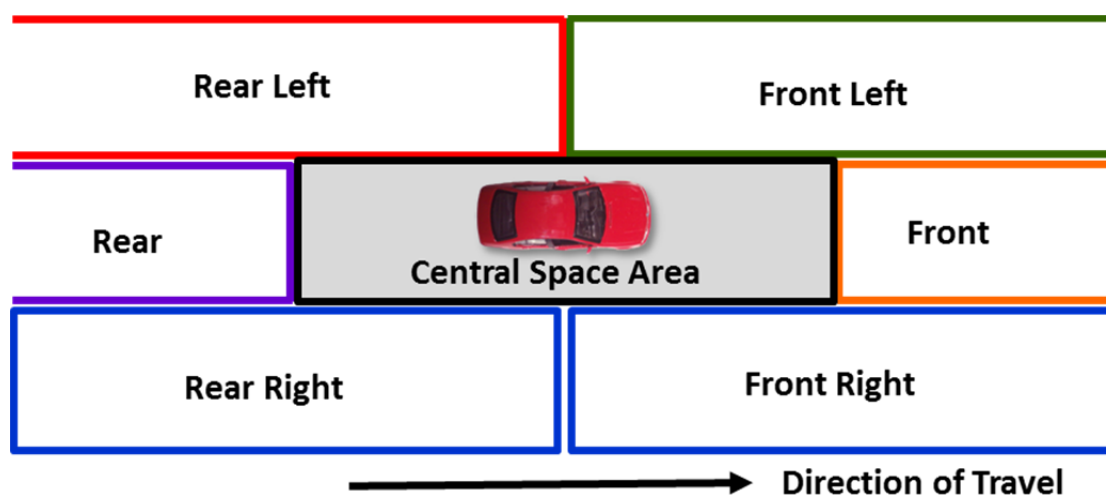
When cars follow too closely (tailgate), allow more distance ahead and maintain an escape route to at least one side. Encourage a tailgater to pass by slowing gradually and moving to the right side of the lane or roadway.

Vehicle Operating Space

Fact Sheet 5.2 continued
Content Information

Vehicle Operating Space

There are seven basic areas of operating space around a vehicle. The diagram below shows the six areas or spaces surrounding the car that are visible to the driver. The vehicle occupies the central area, which includes the driver and the space occupied by the vehicle that is not visible to the driver.



The areas or spaces around the central space area may have the following conditions:

- **Open:** Space or area to operate within that is without restrictions to the line of sight or path of travel.
- **Closed:** The space or area that is not available for the car's path of travel or there is a restriction to the driver's line of sight. An alternative path of travel must be identified.
- **Changing:** A space or area condition in which the level of risk is increasing. It is often an open space or area that is changing to a closed line of sight or path of travel or a closed space or area with additional traffic conflicts or changes.

Vehicle Operating Space**Fact Sheet 5.2 continued**
Content Information**Vehicle Operating Space****Increase in speed**

As speed increases, the operating space required also increases, especially space to the front of the vehicle. As you travel faster, having additional space will allow you more time to respond to a situation.

Miscalculating space

If you incorrectly judge the amount of space needed to operate a vehicle in a given situation, the possible outcomes range from a minor fender bender to a destroyed vehicle with potential for serious injury. Adjustments in speed and position must be made in direct proportion to the space around your vehicle. Speed and space adjustments must be made to closing space. The closing space could be a danger to the driver (oncoming vehicle) or a danger to other roadway users (pedestrians/bicyclists).

Seeing what you expect to see

The more driving experience you have, the more likely it is that you will become a victim of seeing what you expect to see and not seeing what you don't expect. A typical driving expectancy is a mental set that makes a driver think things are not as threatening as they actually are.

As a result, the driver continues to maintain a constant speed/path of travel when conditions dictate that an adjustment in both or either is needed. This means that the driver should do something to the speed or path of travel of the vehicle to position it in the most controllable space.

Stopping Distance

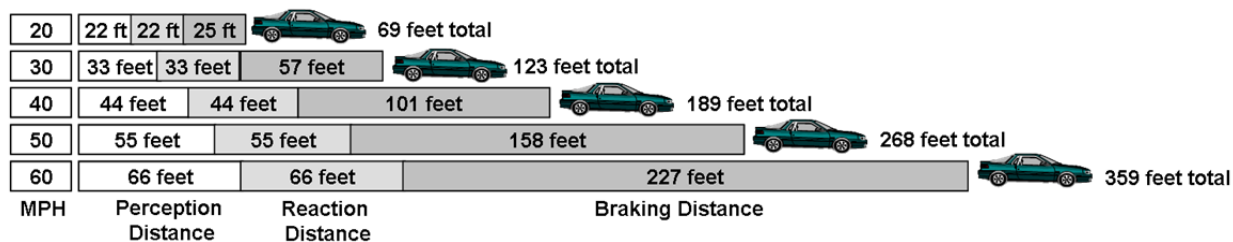
Fact Sheet 5.3
Content Information

Stopping Distance

You need to ensure that you have enough time to bring your vehicle to a stop and enough space between you and the vehicle ahead. For safety, a vehicle must have a clear path ahead equal to the minimum-stopping distance necessary for the speed traveled.

- **Perception distance** is how far your vehicle travels, in ideal conditions; from the time your eyes see a hazard until your brain recognizes it (seeing the situation). Certain mental and physical conditions can affect your perception distance. The average perception time for an alert driver is $\frac{3}{4}$ second to 1 second.
- **Reaction distance** is how far your vehicle continues to travel, in ideal conditions; before you physically apply the brakes, in response to a hazard seen ahead (moving foot to brake pedal). The average driver has a reaction time of $\frac{3}{4}$ second to 1 second.
- **Braking distance** is how far your vehicle will travel, in ideal conditions; while you are braking (pushing down on brake until the vehicle comes to a stop).
- **Total stopping distance** is the total minimum distance your vehicle has traveled, in ideal conditions; with everything considered, including perception distance, reaction distance and braking distance, until you can bring your vehicle to a full stop.

A three to four second following distance is the minimum you should allow between your vehicle and the vehicle ahead of you. This will provide you time to stop quickly if it is safe to do so. If it is not safe to stop, you will have time to steer into an identified open path of travel. Following closer may restrict your field of vision and limit your ability to take action.



Space Management System (SEE)

Fact Sheet 5.4
Content Information

SEE - Space Management System

The SEE space management system is a three-step process that can help you understand what is going on in traffic and allows for planning and implementing a course of action.

The three steps of SEE are:

1. **SEARCH for objects or conditions** – Look for other roadway users or conditions in or adjacent to the projected path of travel that could increase the level of risk.
2. **EVALUATE the projected path ahead for alternate paths of travel** – Check to the sides and rear for speed and lane position options and make predictions as to what other drivers may do.
3. **EXECUTE appropriate adjustment(s)** – Change speed, change position and/or communicate.

These three steps must be actively practiced to develop them into a decision-making process. During the practice sessions, all three steps will be used for any one situation. When there is more than one hazard, SEE will be used over and over. Once the driver deals with the most critical hazard and it has been eliminated, the driver must use SEE to deal with the next critical hazard.

The most important goal is to achieve the very best use of speed control, lane positioning and communication. Since "best" is a comparative term, space management sets the guidelines for the most appropriate decision in any given situation.

Space Management System (SEE)

Fact Sheet 5.4 continued
Content Information

Searching

To be a safe driver, you must know what is happening around your vehicle. You must look ahead, to the sides and behind the vehicle. While your intended travel path is your main area of focus, searching the roadside gives you additional traffic clues. Keeping your eyes active helps you resist distractions, reduces inattention and prevents a fixed stare.

- **Search ahead**

- The distance you look ahead is your **visual lead**. This is an area 20 to 30 seconds from the front of the vehicle. Having a good visual lead and using good searching skills helps you see changes in your travel path and identify alternative paths of travel.
- To develop a visual lead, pick out a fixed roadside object well ahead and begin counting, “one-thousand-and-one, one-thousand-and-two, etc., until you reach the object. The number of seconds you have counted is the number of seconds ahead that you were looking.
- Searching helps you to see problems ahead that may cause you to change speed or roadway position. When searching ahead you should look for road and surface characteristics, traffic control markings and devices, and other roadway users. This will help you identify potential dangerous situations in your path of travel.

- **Search to the sides**

- Concentrating on any one object or situation interferes with your ability to detect other potentially dangerous conditions. You should search to the sides to make sure other roadway users will not cross your travel path. You must make a conscious effort to maintain wide-ranging eye movements.
- Before entering an intersection, look to the front, left, right and left again for approaching vehicles and pedestrians.
- Make sure the travel path is clear beyond the intersection before entering so you will not block it if you have to stop in a line of traffic.

- **Look behind**

- Developing skills to check traffic behind you will help avoid collisions when conditions change suddenly.
- Check your rearview and side mirrors to see if anyone is following too closely, approaching fast or preparing to pass.
- Look over your left or right shoulder to check a blind spot, the areas around the vehicle that you cannot see from the driver’s position or any of your mirrors.
- Use your mirrors to check behind you when you slow down.

Space Management System (SEE)

Fact Sheet 5.4 continued
Content Information

Searching

To search effectively, drivers need to know where to look, when to look, how to evaluate if a potential problem could lead to a good or poor situation and what to look for.

1. **Where to search** involves moving the eyes from the instrument panel and mirrors, to 20 to 30 seconds ahead of the vehicle to identify objects or conditions that could increase your level of risk.
2. **When to search** involves timing and direction of the search pattern. When to search requires consciously looking to determine conditions all around the vehicle before initiating any maneuver.
3. **How to search** involves looking in a systematic pattern of far ahead to near, as well as to the left, right and rear of the vehicle and making efficient use of both central and fringe vision. Always concentrate on your path of travel with quick glances to other areas by turning your head.
 - **Searching 20 - 30 seconds ahead** - By searching ahead 20 to 30 seconds you can identify potential problems.
 - **Searching 12 – 15 seconds ahead** – By searching ahead 12 to 15 seconds you can identify objects that could require a change in speed or direction.
 - **Searching 8 – 12 seconds ahead** – By searching ahead 8 to 12 seconds you can identify alternate paths of travel and stopping zone in advance, giving you more time and space to exercise options.
 - **Searching 4 - 8 seconds ahead** - The 4 seconds ahead represents your following distance and the 8 seconds provides a safe stopping zone under most conditions.

Space Management System (SEE)

Fact Sheet 5.4 continued
Content Information

Searching

4. **What to search for requires forethought and planning** - To be effective when searching the highway and traffic scene, the driver must look for specific categories of information.
- **Signs, signals and pavement markings** - Warning, regulatory, directional and informational. Provide information about the road environment and what to expect up ahead.
 - **Roadway characteristics** - Road and lane width, lane markings, roadway surface, shoulder condition and slope, curb type and height, hills and curves, intersections and interchanges, areas of limited visibility, location and type of structures adjacent to the roadway. These can affect your ability to control your vehicle.
 - **Motorized vehicles** - Automobiles, SUV's vans, pickup trucks, motorcycles, mopeds, recreational vehicles, large trucks, buses, construction vehicles/farm tractors and other slow moving equipment. These vehicles have different capabilities, sizes and limitations.
 - **Non-motorized highway users** - Pedestrians, bicyclists, horse drawn equipment, pets and/or wild animals. They are the least protected and sometimes the least predictable in terms of giving cues to risky behaviors.

Space Management System (SEE)

Fact Sheet 5.4 continued
Content Information

Searching

5. Eye habits for vehicle control – The following are guidelines for improving your eye habits for vehicle control. These are basic to the development of effective search habits.

- **Picture intended path of travel**

- Define a safe path of travel toward which to steer. Therefore, you should get a good picture in your mind of where you intend to go.
- Imagine a pathway the width of your vehicle, stretching ahead of you.
- It should be wide enough and long enough to permit the safe movement of your car.

- **Look down middle of path**

- Guide your vehicle along an imaginary line down the middle of your intended path of travel.
- We tend to steer where we look. Thus, drivers who use the right edge of the roadway or the centerline as a main point of reference, usually end up with poor lane positioning and low-aim steering.
- You can use these as a quick reference for your lane position, but you should always get your eyes back to the center of the path ahead of you.

- **Look far ahead**

- Have a visual lead of at least 20 to 30 seconds when conditions permit it. You need space and time for controlling your vehicle and for making decisions.

Space Management System (SEE)

Fact Sheet 5.4 continued
Content Information

Searching

6. Searching habits for identification – We can focus our attention on only one thing at a time for perceiving, but we can shift our eyes quickly from one event to another. Constant searching helps prevent both fixed and blank stares; it also reduces fatigue and helps us resist the many distractions.

- **Search the scene ahead and to the sides** – This is the first visual habit to improve your identification skills.
 - Look up and down your travel path.
 - When behind cars, look over and around them to the second and third vehicles ahead.
 - When behind trucks, move to one side of the lane for a better view ahead.
 - The key is to search out as far as possible and to identify the clues that enable the driver to make safe and efficient decisions.
 - Search from side to side by moving your eyes from the center of the intended path to other areas and back again. Make these a quick glance.
- **Search the road surface** – This is the second visual habit to improve your identification skills.
 - Using quick glances, watch the road surface for the pavement markings and changes in width or conditions.
 - Make a habit of observing the pavement under parked cars for clues to pedestrian actions.
 - Observe the pavement beside a moving car to help judge its speed or change in position.
 - The road surface provides a good reference point in relation to determining the speed and position of other vehicles.
 - Be sure not to focus your attention too long on anyone area.
- **Scan the mirrors and dash** – This is the third visual habit to improve your identification skills.
 - Check your mirrors the instant you observe a conflict ahead. Also, see if your signals are being noticed.
 - Make these checks at least every five seconds in urban areas and every ten seconds in rural areas.
 - Specific times for mirror checks are: any type of lane change, approaching an intersection, exiting an intersection, when anticipating a speed or position adjustment.

Space Management System (SEE)

Fact Sheet 5.4 continued
Content Information

Evaluating

Once you have identified the hazard(s), the next step is to quickly determine if they could affect you. Ask yourself, “what if?” Think about how hazards can interact to create risks for you. Anticipate potential problems and have a plan to reduce or eliminate the risk. Think about the dangers around your vehicle and what adjustments you must make within speed or lane position to maintain your safety. You must leave yourself time to react if a dangerous situation occurs.

As soon as you identify an object, condition or area of blocked vision that could cause a problem, you must decide what to do. You should choose the action that involves the lowest possible level of risk. What actions will make the situation more manageable? Maybe you should change your speed or position, increase your visibility or sound a warning. You may combine several of these actions for good risk management.

- **Potential and critical risks**

Many driving situations offer limited choices, so sometimes deciding what action to take is simple, such as when encountering highway control devices and design features, you either conform to them or ignore them and accept the consequences.

Other more complex traffic situations may call for more difficult decisions that require you to make critical judgments about your speed and path of travel. You must decide what to do and when. Drivers face increased risk because of roadway conditions, their own actions, the actions of other users or vehicle malfunctions. Your most important decisions will involve how to manage available time and space to minimize risk.

- **Selecting the best path of travel**

One of your tasks as a driver is to identify your intended path of travel, defined as the space into which you can safely drive your vehicle with the lowest possible risk. Selecting a path of travel is a continual process of deciding which options are best. Depending on your circumstances, the shoulder of the roadway may sometimes be the best choice. When selecting your path of travel ask yourself:

- Which path offers maximum visibility?
- Which path provides clear space ahead?
- Which path provides the clearest space to the side?
- Which path provides the smoothest flow of traffic?
- Which path provides the best roadway surface?
- What traffic laws apply?

Space Management System (SEE)

Fact Sheet 5.4 continued
Content Information

Evaluating

Using the basics

The structure of the space management system can give a rapid response to a number of variables. There are many ways a driver can be involved in a crash. Most crashes result from a change in the driver's ability to control sightline, or travel path and driving into a threatening situation.

Examples of changes:

- A red traffic light is a closed area front travel path.
- A hill crest is a closed front sightline.
- A parked car on the right is a closed right front sightline and travel path.
- A bicyclist on the right is a closed right front path.
- An oncoming car or truck is a closed left front travel path.
- A car traveling in the left mirror blind space area is a closed left rear travel path.
- A motorcycle in the right mirror blind space area is a closed right rear travel path.
- A truck following closely is a closed rear sightline and travel path.

After searching and seeing a changing or closed space area, drivers need to evaluate the conditions of the opposite space areas before making a decision. After evaluating the related space areas, act on selecting the best speed, lane position and/or communication tool.

New conditions are always presenting themselves when driving. A driver must constantly question the present conditions. What speed is most appropriate for each situation? What is the legal speed limit? What should the lane or lane position be? What is a good speed for this situation? What would be a high risk or poor speed selection, with little to gain? Each situation has different and changing conditions.

These are some of the processing evaluations that a driver would make for any driving situation. The speed and lane position selected are usually based upon what the legal limitations are, what the destination is, and what is best for the driver.

Whatever the choices for speed and position, the space management system recommends visualizing how the group of ongoing conditions could cause less control over **line of sight** and/or **path of travel**. In other words, watch for changes in the space areas around the vehicle.

If drivers are able to watch for slight changes, make minor adjustments for best speed control and lane position, and use effective communication—they very seldom will be surprised by the actions of others that would require a critical high stress or evasive response.

Space Management System (SEE)

Fact Sheet 5.4 continued
Content Information

Executing

This part of the SEE system involves carrying out your decision. What you are going to do and how you are going to do it. To create more space and minimize any harm from hazards:

1. Adjust your speed by accelerating, slowing or stopping.
2. Adjust your position and/or direction.
3. Communicate your presence and intentions with lights and/or horn.

1. Adjusting your speed

A reasonable and proper speed for any set of conditions is one that provides the driver a safe path of travel. The ideal speed provides time and space to brake or steer to a safe alternative path **4 to 8 seconds ahead** if an emergency develops.

If you drive too fast for conditions, then you will not be able to stay on your intended path of travel or stop in time to avoid crashing. Traveling too fast for conditions also makes it difficult for other drivers and pedestrians to predict your actions.

- **Adjusting your speed in response to risk or danger** – Your decision to make an adjustment in your speed can result in a variety of actions.
 - **Decelerate** – At times the action you take will be to decelerate. The amount of braking needed will vary with the situation. Always check behind you before decelerating or braking in any manner. For example, if a vehicle ahead of you comes to a sudden stop or makes a turn.
 - **Accelerate** – Other times the action you take will be to **accelerate**. For example, when another vehicle is about to hit you from the side or from behind and there is room to the front to get out of danger.

Space Management System (SEE)

Fact Sheet 5.4 continued
Content Information

Executing

- **Adjusting your speed in response to traffic conditions**
 - **Reduce speed and keep pace with other traffic flow traveling within the legal limits.** If you are going faster than traffic flow patterns, you will have to pass other roadway users. Each time you pass one another, there is a chance for a collision.
 - **If you have to drive slower than the flow of traffic, drive in the right lane or pull over and let other vehicles pass.** Driving more than 15 mph slower than the traffic flow pattern can be just as dangerous as excessive speed.
 - **When merging with traffic, try to enter at the same speed that other traffic flow is moving.** Multiple lane highways generally have an acceleration lane to provide time to build-up vehicle speed.
 - **When using a deceleration lane, do not slow down until you have moved onto the deceleration lane.** In heavy traffic, it is important to know where your exit is because it is difficult to change lanes. Plan to get into the proper lane about one-half mile before the exit.
 - **When a right lane ends near the city limits plan the left merge early.** Most drivers wait until the last minute to merge when a lane is ending. At the edge of town or in a construction zone a driver should plan the merge early and stay in the lane with a proper following distance.
 - **Reduce speed in crowded spaces**, such as during rush hour or in shopping centers.
- **Adjusting your speed in response to roadway conditions**

There are road conditions, where to travel safely, you must reduce speed, such as reducing speed before a sharp curve, when the roadway is slippery or when there is water or loose sand on the roadway.

 - **Curves** - Reduce speed prior to entering the curve, maintain a safe speed through the curve and follow posted warning signs with and without advisory speeds.
 - **Slippery roads** - Reduce speed at the first sign of rain, snow or sleet. Roadways are most slippery when it first starts to rain, snow or sleet as the water will mix with dirt, oil and other substances on the roadway. You should reduce your speed about 10 mph to allow for additional stopping distance and potential traction loss while steering.
 - **Water on the roadway** - When you go faster than 35 mph, the steering tires will start to ride up on any pooled water on the roadway, similar to the action of water skis. This loss of roadway contact is called “hydroplaning.” The best way to avoid traction loss due to hydroplaning is to slow down in the rain or when the road is wet with pooled or standing water.

Space Management System (SEE)

Fact Sheet 5.4 continued
Content Information

Executing

- **Adjusting your speed in response to vehicle balance**

Single-vehicle crashes occur when a vehicle leaves the roadway and hits a fixed object or overturns. These crashes usually involve improper steering, improper braking or a combination of the two, which can upset a vehicle's balance and lead to a loss in traction and an unintended path of travel.

A transfer of weight from one point of the vehicle to another occurs whenever the driver accelerates, brakes, turns or carries out a combination of these actions.

- **Accelerating** - when a vehicle accelerates, its weight shifts to the rear. If acceleration is aggressive, there will be a noticeable rise of the vehicle's front and a drop of the rear.
- **Braking** - when the brakes are applied, the vehicle's weight 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. 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.
- **To maximize traction and minimize the chance of traction loss**, avoid sudden inputs when accelerating and braking. For example, applying the brakes when cornering too fast will slow the vehicle very little and may cause a skid because of severe weight shift.
- **Focus on executing one input at a time** – brake, then steer, then accelerate. Performing smooth inputs one at a time will help maintain maximum traction.

Space Management System (SEE)

Fact Sheet 5.4 continued
Content Information

Executing

2. Adjusting your position and/or direction

In order to change your position within your lane, you will steer to the right or left. A greater change of direction might require a lane change. When you decide to steer away from a possible conflict, execute just the right amount of steering input. Over steering can cause you to lose control of your vehicle, especially at higher speeds. Higher speeds also require more space for the maneuver, but very minimal steering. Under steering can also present a problem. Try to steer just enough to avoid a conflict without making jerky or sudden movements. Drivers who keep a proper space cushions around their vehicle usually have an escape path to steer into, thus reducing the risks.

- **Adjusting your position and/or direction in response to risk or danger**

In most cases, you can steer the vehicle quicker than you can stop it. You should consider steering as the first response to avoid a collision. Make sure you have a firm grip with both hands on the steering wheel. Once you have turned or changed lanes, you must maintain vehicle control. Some drivers steer away from one collision only to end up in another. Always steer in the direction you want the vehicle to go.

- **Adjusting your position and/or direction in response to traffic conditions**

- **If your vehicle is being followed too closely** by another driver and there is an empty lane, move to the empty lane and allow the following vehicle to pass.
- **Avoid driving next to other vehicles on multi-lane roads.** Being very alert to the position of a vehicle in an adjacent lane can reduce the possible side swipe crash. Someone may try to change lanes and pull into your lane space.
- **Keep as much space as possible between your vehicle and oncoming vehicles.** On a two-way, single lane roadway, do not crowd the center line marking. In general, it is safest to drive in the center of your lane, so your vehicle can move left or right to avoid a potential problem. On a multi-lane roadway it is best to drive in the right traffic lane leaving a full traffic lane between you and oncoming traffic.
- **Make space for vehicles entering a multi-lane, limited access roadway.** Traffic could enter from the right or the left. If there is not heavy traffic in the lane next to you, move over a lane, away from the entrance ramp to allow for more space for the entering vehicles.
- **Keep extra space between your vehicle and parked cars by moving to the left portion of your lane space without crossing the centerline.** Other roadway users could open a car door, step out from a parked vehicle, appear from between vehicles or pull away from the curb.
- **Provide extra space at driveways and intersections.** If a left lane is available and free of traffic, move over one car width or if a lane is not available, move over at least half a car width, or as close to the center of the roadway as possible.

Space Management System (SEE)

Fact Sheet 5.4 continued
Content Information

Executing

- **Adjusting your position and/or direction in response to roadway conditions**

- **Curves** - Always try to position your vehicle so you have the best view when entering the curve, this position change allows others to see you more readily.
- **Slippery roads** - By following the tire tracks left by the driver ahead, you can get a little better traction.
- **Water on the roadway** - If you must drive through deep water that is just over the rims of your tires, try to drive on the higher portion of the lane, or more to the center of the road.
- **Gravel roads** - Loose gravel on roads can act like marbles under your tires and cause skids. Well-packed wheel paths usually form on heavily traveled gravel roads. Drive in these paths for better traction and control. If you need to move out of the wheel paths, slow and hold your steering wheel firmly.

- **Adjusting your position and/or direction in response to vehicle control**

A transfer of weight from one point of the vehicle to another occurs whenever the driver accelerates, brakes, turns or carries out a combination of these actions.

- **Turning** – when turning, a vehicle's weight will shift in the direction opposite the turn. For example, when turning right, the vehicle's weight will shift to the left, causing the vehicle to lean to the left side. The degree of weight shift depends on speed, traction, and the amount and speed of steering input.
- **To maximize traction and minimize the chance of traction loss**, brake smoothly and avoid sudden inputs when steering.
- **Focus on executing one input at a time** – brake, then steer, then accelerate. Performing smooth inputs one at a time will help maintain maximum traction.

Space Management System (SEE)

Fact Sheet 5.4 continued
Content Information

Executing

3. Communicating Your Intentions

Crashes often happen because one driver does not see another driver, or when one driver does something the other driver does not expect. It is important that you let other roadway users know where you are and what you plan to do. When you do communicate, you must do it early enough so other users understand your intentions. Drivers use signaling devices to send most messages. However the communication is performed, it should involve eye-to-eye contact for best results. Communicate by using the following:

- **Headlights** - Always use your headlights, even during the day, to help other roadway users see your vehicle more clearly. You can also flash your headlights on and off to warn other users you are there. Especially use your headlights during times of reduced visibility and at night. At night you can switch between low beams and high beams and back when vehicles are approaching. Some states require headlight use anytime wipers are needed.
- **Brake lights and taillights** - These are mounted on the rear of your vehicle. Your brake lights come on when you apply the brakes and inform other drivers that you are slowing or stopping. Taillights come on when you use your headlights and make your vehicle more visible to other users. When stopping or reducing speed at a place where another driver may not expect it, tap the brake pedal three or four times lightly to warn other users.
- **Turn signals** - Communicate to other users when and which way you are turning. You should signal prior to changing direction or position (turning left or right, passing, making lane changes and merging). Signal as early as possible for the maneuver. Signal 3 to 5 seconds before making any change in direction. After any maneuver requiring a signal, make sure the turn signal goes off.
- **Hazard flashers (4-way)** - Warns other users of a problem or to increase awareness of the presence of a vehicle. If your vehicle is disabled or if you must drive slowly because of roadway, weather or traffic conditions turn on your hazard flashers (state laws may differ).
- **Reverse lights** - White back-up lights let others know you are backing up. They come on automatically when you put the vehicle in reverse. Look for back-up lights on vehicles in parking lots and along a parking lane where vehicles may be preparing to parallel park.
- **Horn** - Your vehicle's horn can get other users attention if they do not see you. A light tap is usually enough for a warning. In an emergency, a loud blast may be necessary.

Lane Positions and Making Safe Lane Position Choices

Fact Sheet 5.5
Content Information

Lane Positions

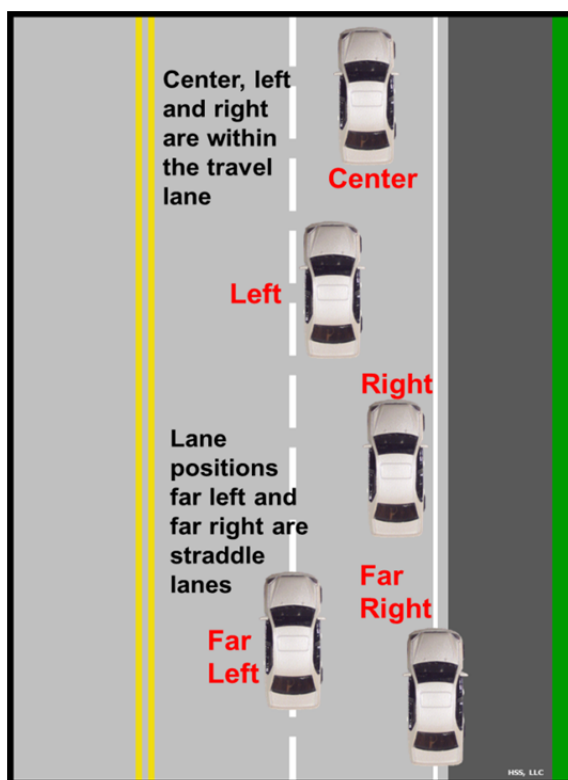
Controlling space to the front - There are three ways to control space to the front. The driver can time his arrival at a given point by 1.) Adjusting speed, 2.) Placement of the vehicle when stopping, and 3.) Applying proper following distance.

Lane selection and positioning - The lane selection and position options described below are dependent upon open, changing and/or closed sightlines and paths of travel front/left and front/right and/or rear/left or rear/right as they apply in any given situation.

Lane positions:

There are five choices for lane position within a lane. Most cars are less than 6 feet wide, while highway lanes are 10 to 12 feet wide. This leaves 4 to 6 feet of space to the sides without having to change lanes.

- **Lane positions center, left and right** are positions within a given travel lane.
 - Lane position center is the center of the lane, lane position left is the left portion of the lane, and lane position right is the right portion of the lane.
- **Lane positions far left and far right** involve moving the vehicle so that the left or right wheels are straddling the lane line markers.



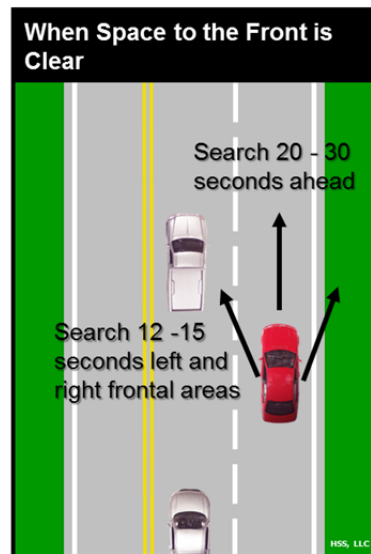
Lane Positions and Making Safe Lane Position Choices

Fact Sheet 5.5 continued

Content Information

Making Safe Lane Position Choices

When space to the front is clear - When traveling in the center lane position, search 20 to 30 seconds ahead along the planned path of travel and 12 to 15 seconds to the left and right frontal areas to identify planned and alternate paths of travel. Continually reassess the immediate path 4 to 8 seconds ahead. If an object or condition adjacent to the projected path of travel reduces space to either side, check to the rear and side and move to the left or right lane position as appropriate.



When more than one object or condition adjacent to path of travel poses a possible threat - Having identified that the planned path of travel is open, determine which object or condition poses the greater risk and decide on change of speed and/or position appropriate to the situation. Take one threat at a time. Depending on which object represents the more serious consequences, a reduction in speed and movement to the left or right lane position is typically sufficient.

When the planned path of travel is closed, but alternate paths are open - Identifying alternate paths of travel 12 to 15 seconds ahead, and maintaining an area into which steering is possible on at least one side, provides more time to reassess traffic to the side(s) and rear and to communicate intentions prior to adjusting position and speed.



Lane Positions and Making Safe Lane Position Choices

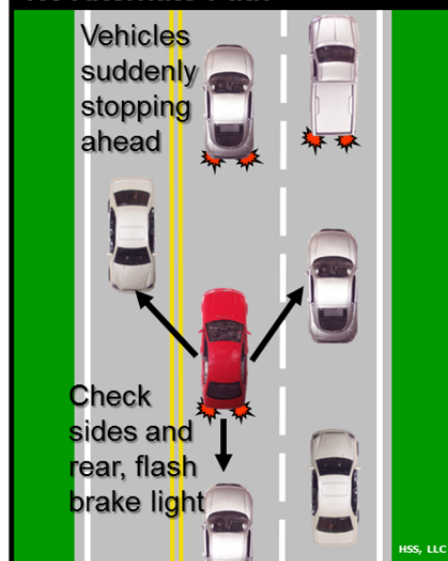
Fact Sheet 5.5 continued

Content Information

Making Safe Lane Position Choices

When the planned path of travel is closed and there is no alternate path - Having determined when searching 20 to 30 seconds ahead that there is no alternate path available 12 to 15 seconds ahead, the driver should immediately check to the side(s) and rear to detect the presence, location, size and speed of any following vehicles. If a vehicle is following, flash brake lights to alert the following driver and begin to apply the brakes. Attempt to maintain forward motion at a slower speed to open up the space ahead. If the distance ahead cannot be increased, brake to a stop while maintaining a gap to the rear.

When the Planned Path of Travel is Closed and There is No Alternate Path



When There is No Following Traffic



When there is no following traffic - The absence of traffic to the rear provides the maximum level of control to the rear and permits quicker and more abrupt changes of speed and/or direction in response to changes in ongoing and oncoming traffic or by other roadway users.

Divided Attention / Multi-tasking**Fact Sheet 5.6**
Content Information**Divided Attention / Multi-tasking**

Divided attention or multi-tasking means being able to operate a motor vehicle while using operator controls and devices and scanning the roadway, mirrors and the dashboard all at the same time.

- **Operating controls and devices while driving**
 - You should become familiar with the location and operation of devices.
 - You should practice using the instruments and controls while the vehicle is parked so you can locate, reach and use them without having to search and take your eyes off the road ahead for more than a few seconds at a time.
 - It is important that you know the location, purpose and operation of the various controls, safety, comfort and convenience devices when driving a motor vehicle.
 - However, it is essential that you understand the increased risk associated with directing your attention to a task other than driving, which lowers one's level of alertness directed to driving and typically has an adverse effect on steering.
- **Scanning the roadway, mirrors and dashboard while driving**
 - Keeping your eyes active helps you resist distractions, reduces inattention and prevents a fixed stare.
 - There are specific times when it is very important to check your mirrors, such as any type of lateral maneuver, such as a lane change, approaching an intersection, exiting an intersection, and when anticipating a speed or position adjustment.