

UNIT F - SAFE DRIVING

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UNIT F- SAFE DRIVING

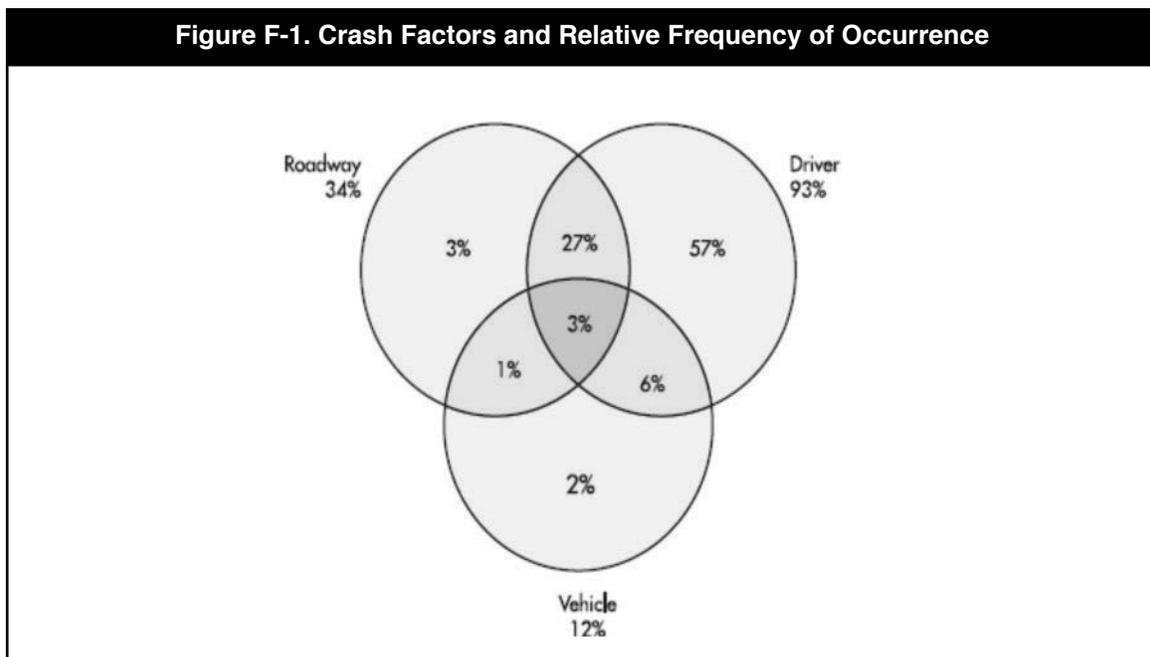
INTRODUCTION

The social and economic cost of traffic crashes in the United States is tremendous. Over the last few years, the country has experienced millions of reportable crashes per year in which thousands of persons have been killed and millions injured. These are not just statistics; the numbers represent real people who are our families, friends and co-workers. The economic loss is estimated to be in the billions every year.

One piece of good news is school bus transportation is the safest mode of ground transportation. In Pennsylvania, for example, school bus crashes account for less than a ½ percent of the total number of vehicular crashes. In striving for the elimination of all crashes involving school buses, there needs to be an understanding of what causes them so that we can implement better, safer driving techniques as countermeasures. One way to understand crashes is to identify three primary contributing factors to crashes:

- The driver;
- The vehicle; and
- The road and its environment.

According to police crash reports, the following diagram represents these factors and the relative frequency of their occurrence.

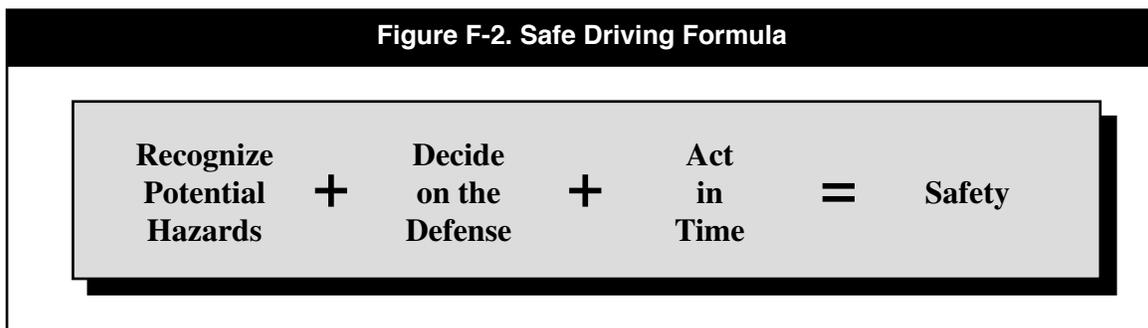


As shown, driver error is the cause of most crashes, followed by road condition, and vehicle defect or malfunction. A human factor may be speeding while operating a vehicle. In fact, Pennsylvania school bus crash statistics show the top five driver actions implicated when the school bus was the prime unit in the crash were: failure to stop; improper turn; speeding; tailgating; and other improper driving. “Distracted driving” and “careless backing” were other significant factors. All of these are human factors.

Vehicle factors may be mechanical failures, such as bad brakes or tires. Road-related factors can be limited sight distance, poorly marked roads or missing road signs, or sudden changes in roadway width. Weather is also a major factor affecting road conditions. Too often, drivers fail to consider wet roads or fog when they drive. Pennsylvania school bus crash statistics indicate school bus drivers were more likely to be noted for driving too fast for conditions in crashes occurring in rain-fog conditions and especially snow-sleet conditions, than in clear weather conditions. Remember: Safety first, schedule second!

When you consider road transportation as a system, it is clear that as school bus operators, you can directly control some factors, but not others. For example, you can control driver factors (how you operate a vehicle), and to a certain extent vehicular factors (practicing good preventive maintenance techniques as discussed in Unit E). On the other hand, as a school bus operator there is not much you can control in the roadway environment. You cannot engineer a roadway to eliminate shoulder edge drop-offs, nor can you control the weather. However, you can learn how to safely operate your bus, if you encounter dangerous roadway conditions.

Therefore, safe driving techniques can be applied to counteract many crash causes, especially those involving driver error and even some involving roadway and vehicular issues. Crashes can be reduced through the knowledge and practice of safe driving techniques. Learning safe driving procedures and techniques designed to help you, the driver, avoid getting yourself, your vehicle, and your passengers into hazardous situations are a critical part of your job as a school bus operator. A number of short courses on the basics of defensive driving are offered throughout the state. You should consider enrolling in one of these courses to improve your driving skills and to become aware of your limitations as a driver. There is nothing new or magical about the concept of defensive driving. The formula is simply:



This unit considers how you can apply these steps to the following types of normal and unusual conditions you must face while driving a school bus.

This unit will focus on safe driving techniques for school bus operators geared towards reducing the number of crashes in the categories listed previously in this unit. It will focus on:

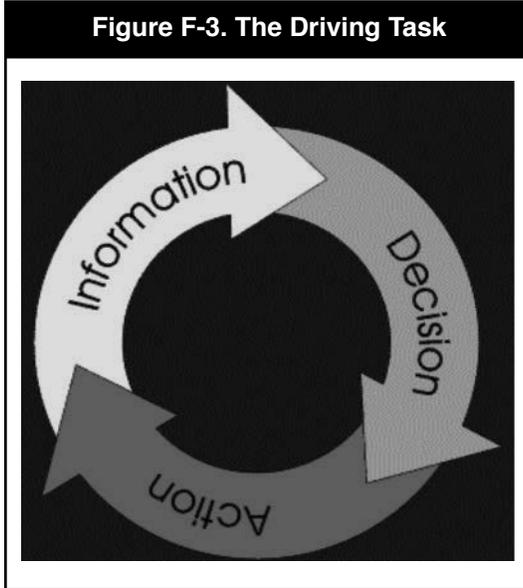
- The driving task;
- Your condition to drive (Driver);
- The condition of your vehicle (Vehicle);
- The weather and road conditions (Environmental and Roadway); and
- Road construction, pedestrians and other obstacles (Other).

Note that Unit H (Crash and Emergency Procedures) covers procedures and techniques for emergency and crash situations where the driver did not or could not avoid a potential hazard.

THE DRIVING TASK

Although most of us take it for granted, driving is hard work because it requires us to do several things at the same time. This is especially true for school bus operators who have additional responsibilities, such as student

Figure F-3. The Driving Task



management and discipline; loading and unloading students; monitoring traffic, etc. When you drive a bus, you control the vehicle: slowing down, speeding up, and turning; anticipating what other road users might do; and deciding whether evasive actions are necessary. These tasks are to be accomplished simultaneous to steering the vehicle to get from where you were to where you need to be. Unfortunately, there are limits to how much information you can process at a time. When there is too much information to accurately and safely process, mistakes can happen.

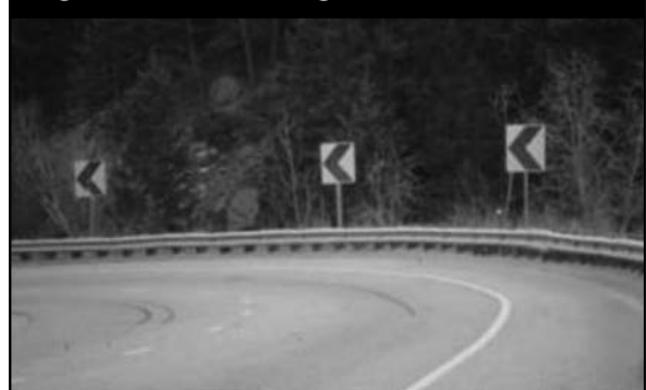
There are three distinct phases to the task of driving: information, decision and action. Roadway information leads the bus operator to decide to do something and take action. The results of that action provide more information, which then starts the process over again. This can be shown graphically in Figure F-3.

INFORMATION

School bus operators, indeed ALL drivers, need good information to perform the driving task safely. In this fashion, operators can properly PERCEIVE the information and RECOGNIZE its meaning. As the following points indicate, how drivers get information is important to safety:

- Signs have standardized shapes and colors to help drivers easily recognize their message. Most agencies rely on the Manual on Uniform Traffic Control Devices (MUTCD) for information on sign design and messages. For example, studies on human factors have shown most drivers can read only three or four familiar words at a glance, so signs are designed and installed to avoid overloading drivers with information. They also consider information needs of both older and novice drivers. If there are confusing sign messages, report them to your supervisor who can follow up with the appropriate entity responsible for traffic control devices in the area.
- Signs should be placed at locations where drivers expect them and can see them. Often the message is repeated for emphasis. As a school bus driver, pay attention to these messages that relay critical safety information. For instance, using chevron signs along the outside of a curve can reinforce a curve warning sign. Learn about the basics of traffic control devices so you can readily absorb and react to the information provided.
- Engineers avoid designing roads with sharp curves just over hillcrests to improve sight lines for drivers. Similarly, they use consistent design curve radii so drivers are not surprised by curves that are too sharp or too gradual.

Figure F-4. Chevron Signs on Outside of Curve



DECISION

As a school bus driver, you combine the information you gather with your driving experience to make driving decisions. It takes skill and experience to make the right decision. You must pay attention so you can process several information messages at once, and ignore what you do not need. These are skills that novice drivers are still learning and older drivers sometimes find difficult to process.

Hopefully, information and decision points are spread at sufficient distances on the roadway. It is easier to make several simple decisions, one after the other, than it is to make one complex decision in a hurry.

ACTION

Action happens when you make a decision and act on it. The results of the action provide more information, which, as indicated above, starts the process over again.

For your trip to be a safe one, you need time to respond to different conditions. Reaction time is the time it takes for you to notice a condition, decide what to do about it and then act on it. The more information you must process, or the more complex the decision required, the longer it takes you to react. This concept is discussed in detail below.

While a perception-reaction time of 2.5 seconds is commonly used in highway design, driver response times can range from 1 second for a simple decision like initiating a panic stop to 15 seconds for a complex decision like choosing the correct exit in a convoluted highway interchange.

Further complicating the task of driving for the bus operator are distractions inside and outside the vehicle. Maybe you hear a cell phone ring or students are being unruly on the bus. Maybe you get a call on the radio from your dispatcher. Perhaps a student is talking to you or pointing out something of interest along the roadside. Maybe you are a bit behind schedule, and your students are slow to get onto the bus and get seated. Maybe the trip must be made during a severe rain or snowstorm. Possibly it is just a beautiful day to drive through a scenic area, and you are tempted to focus on something other than the road.

Whatever it is that draws your attention from the road, it is clear that driving a school bus requires the operator's full attention. This will be discussed later in this unit.

"Better late than never" is an old saying that applies to all drivers. You can't rush and drive cautiously at the same time. Establish a pattern for driving cautiously and stick with it, late or not. Drive according to the motto "Safety first...schedule second." Plan your schedule, so you always have plenty of time.

DRIVER CONDITIONS

Human factors refer to people and the things they do, or fail to do, that can cause a crash. Human factors cover drivers whose attention is distracted, are tired or ill, (and may have taken medication that makes them drowsy), or use alcohol or drugs. Age also affects a driver's ability to be safe on the roadway. For example, older drivers often have vision problems at night, while younger drivers tend to take more risks on the road.

Therefore, you must be mentally and physically prepared to drive every minute of every trip. Your general attitude toward driving, whether you look upon driving a school bus as a privilege and high responsibility or as a chore to be done in as little time and with as little effort as possible, will determine, more than anything else, your safety record. Some temporary conditions, such as anger, worry or fear, can take your mind off of the road. A tendency to daydream can be just as dangerous, because driving requires concentration at all times.

Before operating a school bus, take mental stock of yourself: Are you mentally and physically ready to drive? Safe drivers are aware of their own deficiencies and constantly strive to overcome them. YOU are in control of these elements.

KNOWLEDGE

Your experience in driving automobiles can provide a basis for learning to drive a school bus. Automobile and bus operation require similar knowledge, including rules of the road and general safe driving habits. The skills needed to operate the steering, transmission, lights, wipers, and other mechanical components of a bus are similar to those for an automobile. There is usually, however, a difference in scale. Most differences between automobile and bus operation are due to the relatively large size and weight of the bus. Always remember a bus has a longer stopping distance, slower acceleration, wider turning radius, and higher and wider clearances. Another difference is while school bus drivers sit higher and have a better forward view, there is much more reliance on mirrors for adequate rear and side viewing.

Evaluate your knowledge of state and local driving rules and regulations, driving fundamentals, emergency procedures, and defensive driving habits. If you are uncertain or have questions, ask before it's too late. As described above, school bus drivers need good information to operate their vehicles safely. Since much of the information is communicated through traffic control devices, learn about traffic control devices and methods by which they communicate information.

Also, state laws applicable to all drivers (both cars and school buses) are not described in this manual. For information on these laws, check the following references:

1. Pennsylvania Driver's Manual (Publication 95), available at www.dmv.state.pa.us.
2. The Pennsylvania Vehicle Code (Title 75), available at www.dmv.state.pa.us.
3. Commercial Driver's Manual (Publication 223), available at www.dmv.state.pa.us.
4. Chapter 71 of Title 67 – Transportation (Pennsylvania Code), available at www.pacode.com.
5. Chapter 104 of Title 67 – Transportation (Pennsylvania Code), available at www.pacode.com.
6. Chapter 171 of Title 67 - Transportation (Pennsylvania Code), available at www.pacode.com.

EXPECTANCY

As all drivers gain experience, they expect things to happen as they always have. For example, you would expect a green light on a traffic signal will be followed by a yellow light. Another example would be you adjust your speed as you perceive an upcoming curve, because it looks similar to other curves you have driven, and your experience tells you that you need to slow down. This is called expectancy. If a signal changes from green to red, or a curve becomes suddenly tighter halfway through, your expectancy is violated, and you may react in an erratic or incorrect way.

The more experienced you become, the greater the level of expectancy, which leads to quicker and more accurate reactions as long as your expectancy is met. A sudden change in road conditions, which violates your expectancy tends to increase your reaction time and increases the likelihood of you making an error because you take longer to understand the situation and respond to it. If extra time is not available, the result may be a crash. That is why expectancy violations cause problems, and removing expectancy violations helps improve safety.

Keep in mind, however, not to become complacent. Most likely you are on the same route day after day, and it can be easy to become complacent regarding driving habits. Defensive driving techniques and anticipating hazardous conditions is critical.

SKILLS

If you need practice in driving maneuvers, operating safety equipment, or other driving-related skills, ask your certified school bus driver instructor or supervisor for help, then practice with your supervisor or on your own. If you have been involved in a crash, some school districts and/or employers will require you to complete remedial training with an instructor. Always practice in an empty bus rather than in one filled with students. Unit G and H provide you with descriptions of the many skills you will need to acquire to safely operate a school bus.

HEALTH

Check yourself for fatigue, sickness, deficient eyesight, and deficient hearing. If you have any of these health problems, you should not drive until cleared by health services or your doctor.

For example, if you have problems with judging distance, or you know your depth perception is not as good as it might be or used to be (this is a normal eye-aging condition), it does not mean you may have to give up driving. You must be aware of the problem, however, and adjust your driving to it.

Illness

Once in a while, you may become so ill you cannot operate your bus safely. If this happens to you, you must not drive. However, in case of an emergency, you may drive to the nearest place where you can safely stop.

DRUGS AND DRIVING: ALCOHOL

Alcohol and drugs affect the driver and make them unfit to drive. Driving under the influence of alcohol is a serious violation of state law and a very dangerous mistake. People who drive under the influence are involved in crashes resulting in over 20,000 deaths every year. As a school bus driver, your personal decisions affect the lives of many others. You should know:

- How alcohol works in the human body;
- How alcohol affects driving;
- Laws regarding drinking and driving;
- Note that Pennsylvania has zero tolerance for drug and alcohol use by school bus and school vehicle drivers. Refer to Sections 1612, 1606 and 3802 of Title 75; and
- Legal, financial, and safety risks of drinking and driving.

If you have questions about the law, ask your supervisor to provide clarification.

The Truth about Alcohol

There are many dangerous ideas about alcohol use. The driver who believes in these wrong ideas is more likely to get into trouble. Here are some examples:

TABLE F-1. Statements About Alcohol	
FALSE	TRUE
Alcohol enhances your ability to drive.	Alcohol is a drug that will make you less alert and reduce your ability to drive safely.
Some people can drink a lot and not be affected by it.	Everyone who drinks is affected by alcohol.
If you eat a lot first, you won't get drunk.	Food will not keep you from getting drunk.
Coffee and a little fresh air will help a drinker sober up.	Only time will help a drinker sober up; other methods just don't work.
Stick with beer – it's not as strong as wine or whiskey.	A few beers are the same as a few shots of whiskey or a few glasses of wine.

What is a Drink?

It is the alcohol in drinks that affects human performance. It doesn't make any difference whether that alcohol comes from "a couple of beers," two glasses of wine, or two shots of hard liquor. All of the following drinks contain the same amount of alcohol:

- A 12-ounce glass of 5 percent beer.
- A 5-ounce glass of 12 percent wine.
- A 1½-ounce shot of 80 proof liquor.

HOW DOES ALCOHOL WORK?

Alcohol goes directly from the stomach into the blood stream. A drinker can control the amount of alcohol he or she takes in by having fewer drinks or none. However, you cannot control how fast your body gets rid of alcohol. If you have drinks faster than your body can get rid of them, you will have more alcohol in your body and your driving will be more affected. The amount of alcohol in your body is commonly measured by the Blood Alcohol Concentration (BAC).

WHAT DETERMINES BLOOD ALCOHOL CONCENTRATION (BAC)?

BAC is determined by the amount of alcohol you drink (more alcohol means higher BAC), how fast you drink (faster drinking means higher BAC) and your weight (a small person doesn't have to drink as much as a large person to reach the same BAC).

HOW DOES ALCOHOL AFFECT THE BRAIN?

Alcohol affects more and more of the brain as BAC builds up. The first part of the brain that is affected controls judgment and self control. One of the bad things about this is it can keep drinkers from knowing they are getting drunk. And of course, good judgment and self control are absolutely necessary for safe driving.

As blood alcohol concentration continues to build up, muscle control, vision, and coordination are affected more and more. Eventually, a person will pass out. Alcohol can increase the effects of other drugs.

HOW DOES ALCOHOL AFFECT DRIVING?

All drivers are affected by drinking alcohol. Alcohol affects judgment, vision, coordination, and reaction time. It causes serious driving errors, such as:

- Slower reactions to hazards;
- Driving too fast or too slow;
- Driving in the wrong lane;
- Running over the curb;
- Weaving;
- Straddling lanes;
- Quick, jerky starts;
- Not signaling, failure to use lights;
- Running stop signs and red lights; and/or
- Improper passing.

All of these increase the chances of a crash, losing your driving privilege, or injuring or killing yourself and/or others. Crash statistics show that the chance of a crash is much greater for drivers who have been drinking than for drivers who have not.

DRUGS AND DRIVING: OTHER DRUGS

Besides alcohol, other legal and illegal drugs are common in our society. Laws prohibit you from possessing or using certain drugs while on duty. These same laws prohibit you from being under the influence of any “controlled substance,” including amphetamines, such as “pep pills” and “bennies,” narcotics, or any other substance that can make you unsafe.

While illegal drugs are always unlawful to possess and use, you should be aware that many medicines, prescribed and over-the-counter (e.g., cold medicines), can affect your eyesight, hearing and judgment. They may make you drowsy or otherwise affect your safe driving ability. While possession and use of a drug given to a driver by a doctor is permitted if the doctor informs the driver it will not affect safe driving ability, you should always read the labels on patent medicine bottles to check for possible side effects. Ask your doctor or pharmacist about prescriptions or over-the-counter medications you are taking to get a clear understanding of their effects and whether they will impair your ability to perform the task at hand. Also, keep in mind the interactions of different drugs can cause impairment. Ask your doctor or pharmacist.

The safest rule is not to mix drugs with driving at all. Mixing the use of alcohol and drugs while operating a school bus can lead to crashes resulting in death, injury and property damage. Drug abuse can lead to arrest, fines and jail sentences in addition to the loss of a person’s driving privilege.

CONCENTRATION AND ATTITUDE

Being under emotional stress from home or work will often affect your ability to control the students on a loaded bus, so you will have to be extra cautious as you drive. You may be tired, dejected or depressed, making it hard to cope with a bus full of young, spirited children. During times of stress, ordinarily good drivers may miss stop signs and red lights, and may fail to yield the right-of-way. Under normal conditions, they would be less likely to commit these serious errors.

You must be alert to your own attitude. If you are under emotional stress and are unable to concentrate on your driving, or fear you cannot control your temper under stress, don’t drive. Under normal day-to-day stresses, your attitude can affect your good driving judgment. You must be aware of your attitude so you can be alert, think positively, keep yourself under control, and keep your mind on the job at hand.

It is extremely important you remain alert and attentive at all times. Even the shortest lapses into daydreaming or inattention can cause severe crashes to occur. Always be aware of what is happening in your surroundings and anticipate what other drivers will do and what road conditions will be in order to act appropriately.

Aggressive Driving

One component of driving with the right attitude is not to engage in aggressive behavior while operating your bus. Speeding and other aggressive driving behaviors are among the leading causes of highway crashes and fatalities in Pennsylvania. However, many motorists don’t realize they in fact, aggressive drivers. Here are some questions to help you determine if you are an aggressive driver:

- Do you speed excessively?
- Do you tailgate slower vehicles?
- Do you race to beat red lights or run stop signs?
- Do you weave in and out of traffic?
- Do you pass illegally on the right?
- Do you fail to yield the right of way to oncoming vehicles?

If you answered yes to any of these questions, you may be an aggressive driver and are putting yourself, your passengers, and other people on the road with you at increased risk of a crash.

While a driver must commit two or more of the following 16 offenses to be categorized as an aggressive driving violation and/or crash, ANY of these behaviors is aggressive and not acceptable for school bus operators:

1. Making an illegal u-turn;
2. Improper/careless turning;
3. Turning from the wrong lane;
4. Proceeding w/o clearance after stop;
5. Running a stop sign;
6. Running red light;
7. Failure to respond to other traffic control device;
8. Tailgating;
9. Sudden slowing/stopping;
10. Careless passing or lane change;
11. Passing in a no passing zone;
12. Making improper entrance to a highway;
13. Making improper exit from a highway;
14. Speeding;
15. Driving too fast for conditions; and
16. Driver fleeing police (Police chase).

As illustrated by Pennsylvania school bus crash data, any of these behaviors is unacceptable when operating a school bus.

- For example, Pennsylvania school bus crash data indicated drivers involved in rear end collisions are very likely to be noted as tailgating.
- In fact, drivers noted as tailgating were 61 times more likely to be involved in a rear-end collision than drivers involved in collisions who were not noted as tailgating.
- Similarly, drivers noted as failing to stop were 33 times more likely to be involved in an angle collision than drivers who were not. (An angle collision occurs when two vehicles approaching from non-opposing angular directions collide.) These typically result from one vehicle failing to either stop or yield right of way from a Stop or Yield sign, running a red light, or not clearing an intersection when the conflicting movement's signal turned green.

The line is aggressive driving leads to a higher risk of crashing.

To mitigate this, follow these guidelines:

- **Plan ahead** – Allow yourself enough travel time to prevent a time crunch. Safety first, schedule second.
- **Concentrate** – Don't allow yourself to become distracted by students. Do NOT talk on your cell phone, eat or drink while driving.
- **Relax.**
- **Drive the posted speed limit** – Fewer crashes occur when vehicles are travelling at or about the same speed. Driving too fast can lead to “bottle-necking,” bringing traffic to a standstill and frustrating drivers.
- **Be late rather than unsafe** – Obviously schedule is important, but just be late, if safety will be compromised.
- **Set an example for younger passengers** – Children are keenly observant. Educating them at an early age through your actions will teach them the importance of being courteous.

While many people associate aggressive driving with road rage, they are two different behaviors. Road rage, which is a criminal offense, is often the result of aggressive driving behavior escalating into an assault with a vehicle or other dangerous weapon. NEVER take your anger out on someone else on the road. Sometimes incidents of road rage are caused by simple misunderstandings between drivers. One driver may make a momentary error in judgment that another driver sees as aggressive, though none was intended.

ATTENTION AND MONITORING

As mentioned earlier, there are many things you must be aware of when you are driving a school bus. You must be able to divide your attention between the students, the road, other vehicles, and your own bus. At each point on your trip, you must focus your attention on the most important factor at that time. For example, you must carefully focus on the students crossing the street at loading and unloading zones.

First, determine what you need to observe, inside and outside the bus, while driving the bus. Inside the bus, you must be aware of the students and their behavior, the dashboard, your inside mirror, and the steering wheel. Outside the bus, you must observe other traffic, pedestrians, your outside mirrors, the road in all directions, and the surrounding area.

Next, prioritize your monitoring and attention. For example, it is critical to monitor student behavior especially when they are misbehaving, and before and after student pickup and dropoff as described in detail in Unit C. If behavior is taking too much attention away from your driving, stop the bus, and get control of the students.

On the dashboard, you must check the fuel gauge, oil gauge, temperature gauge, and speedometer. It is best to look at the gauges carefully at the start of the trip, and occasionally during the trip, especially if there seems to be a problem with the bus. The speedometer should be monitored throughout the entire trip to maintain a safe speed.

There is usually one inside mirror you must monitor, although a rearview mirror may be present on some Class C buses. The interior mirror is used to monitor the students, most frequently when there are behavioral problems. If you have a rearview mirror, monitor it frequently throughout the trip to watch the behavior patterns of the traffic behind the bus.

You should always be aware of and monitor your hand position on the steering wheel. As indicated in Unit G, your hands should be placed on opposite sides of the wheel, and the hand-over-hand method or the push-pull method should be used for turning.

Constantly monitoring the traffic in front of the bus is a necessity. Your eyes should move back and forth across the road, scanning the activity. Always be on the lookout for pedestrians, especially at intersections, near parks, houses, and parked cars. Use efficient eye scanning habits and a systematic search pattern to search for conflict situations.

There are many ways to pay attention to your surroundings while driving the bus. Use the method that is most comfortable to you and allows you to be more aware of everything around you. For example, when stopped at a bus stop and loading passengers, you should concentrate on the students outside the bus. Most of your time should be spent focusing on the cross view mirrors and directly at the students through the front and side windows, while monitoring other traffic through the side mirrors. When the bus is in motion, your attention is focused less on the cross view mirrors, and more on the road in front of the bus. Your view must alternate between the front window of the bus, the side mirrors, the rearview mirror (if present), the interior of the bus, and the dashboard. While looking at each of these in a systematic order, it is important you always remember to check everything.

More attention is needed on areas more critical for student's safety. It may be helpful to follow the guidelines presented in the following table for how often you should check things.

TABLE F-2. Attention and Monitoring Guidelines		
How Often?	While Driving	At a Bus Stop
Constantly	Other traffic; road in front of the bus.	Side mirrors; crossover mirrors; road in front and to the side of the bus; students loading the bus.
Frequently	Side mirrors; rearview mirrors; interior of the bus; area near road for pedestrians.	Interior of the bus; surrounding area.
Occasionally	Speedometer; controls on dashboard.	Control on dashboard.

Watching all of your mirrors, controls and surroundings is a lot to remember. Distractions while driving can affect your attention. The most common thing that will distract your attention is the students riding the bus. Be prepared for this, and be sure to know the guidelines for managing students discussed in Unit B. The road conditions also affect your ability to concentrate; however, drivers usually will concentrate better on days when the weather is bad. Remember, the highest rate of injury in Pennsylvania school bus crashes involved crashes where drivers were speeding and distracted, or speeding and tailgating. Pay attention and monitor your behavior.

Don't forget to pay careful attention when the weather is good, too; others will be enjoying the nice weather and may not be paying attention either. Surprisingly, Pennsylvania school bus crash data reveals head-on, backing, angle, and hit fixed object crashes are more likely to occur with no adverse weather conditions and on dry pavement than in adverse weather conditions. It appears from this that data drivers may be complacent in better weather. It is important to pay attention and be vigilant at all times.

DRIVER FATIGUE

Illness, exhaustion or weariness from hard work or lack of sleep also can rob a driver of the extra edge of alertness necessary for greatest safety in driving. If you feel you are unable to operate the school bus safely, do not drive, and ask your supervisor for a replacement.

Statistics from the National Highway Traffic Safety Administration (NHTSA) estimate there are over 100,000 fatigue-related crashes each year in the United States. In most cases, these driving fatigue crashes occur because drivers don't recognize the dangers of drowsy driving.

According to research by NHTSA, the sleep-wake cycle determines when we get tired. In spite of individual variations, a specific amount of uninterrupted sleep is necessary for each 24-hour period, usually about eight hours, and subsequent alertness will be compromised without that amount of sleep. Additionally, sleeping less than four consolidated hours can impair performance for tasks requiring strict vigilance, like driving. When we begin to get drowsy, our reaction time slows, and it takes us longer to process information. As a result, fatigue can result in impaired performance for basic tasks needed for driving, and could ultimately lead to a driver veering off of the road or into oncoming traffic.

Note that because of the body's natural rhythms, there are two periods of maximal sleepiness in a 24-hour day—one roughly from 3 a.m.–5 a.m., and a second, less pronounced period, from 3 p.m.–5 p.m.

Warning Signs of Driver Fatigue

The National Sleep Foundation warns there are numerous signs of driver fatigue including:

- Your eyes feel heavy;
- You blink and yawn frequently;
- You become less attentive to the road (miss your exit, don't activate your eight-ways when approaching a bus stop, etc.);
- Your head feels heavy, and you have trouble keeping your head up;
- You can't remember the last few miles driven;
- You drift from your lane or hit a rumble strip;
- You experience wandering or disconnected thoughts;
- You have difficulty focusing or keeping your eyes open;
- You tailgate or miss traffic signs; and
- You have to jerk your vehicle back into the lane.

At-Risk Groups

Several groups are more likely to be involved in driving fatigue crashes, according to NHTSA. Men under the age of 30, shift workers and people who are chronically sleep deprived are more likely to drive drowsy and suffer driver fatigue injuries. Many school bus operators have second jobs. If fatigued from the first, it could lead to problems when operating a bus.

Avoiding Consequences of Driving While Fatigued

There are ways to prevent driver fatigue, starting even before you get behind the wheel:

- Get a good night's sleep. While this varies from individual to individual, the average person requires about eight hours of sleep a night;
- Be alert and recognize early warning signs of fatigue;
- Avoid alcohol and medications (over-the-counter and prescribed) that may impair performance;
- Don't rely on your students, the radio or opening a window to keep you awake;
- Eat sensibly and avoid heavy meals; and
- Remember not to use any drug that hides fatigue - the only cure for fatigue is rest.

Clearly, your physical condition affects your ability to drive safely. Be sure to get plenty of sleep and only drive the school bus if you are in good physical and mental health. Finally, be as familiar with the route as possible. The better you know the roads, the more time you will be able to spend concentrating on the important things.

CELL PHONES AND TEXTING WHILE DRIVING

Cell phones have grown enormously in popularity in the past decade, and research continues to quantify how cell phone calls and texting contribute to crashes. For example, a study conducted by the Insurance Institute for Highway Safety found motorists who use cell phones while driving are four times more likely to get into crashes serious enough to injure themselves. Along the same lines, according to the Human Factors and Ergonomics Society, drivers talking on cell phones are 18 percent slower to react to brake lights and take 17 percent longer to regain the speed they lost when they braked. A Virginia Tech study* looked at the relative levels of distractions caused by various cell phone tasks and found the following:

TABLE F-3. Relative Levels of Distraction Caused by Various Cell Phone Tasks	
CELL PHONE OR OTHER RELATED TASKS	RISK OF CRASH OR NEAR CRASH EVENT
Light Vehicle/Cars.	
Dialing Cell Phone.	2.8 times as high as non-distracted driving.
Talking/Listening to Cell Phone.	1.3 times as high as non-distracted driving.
Reaching for an Object (i.e. electronic device, other)	1.4 times as high as non-distracted driving.
Heavy Vehicles/Trucks	
Dialing Cell Phone.	5.9 times as high as non-distracted driving.
Use/Reach for Electronic Device.	6.7 times as high as non-distracted driving.
Text Messaging.	23.2 times as high as non-distracted driving.

It is clear driver inattention is a leading cause of crashes, and talking on the phone and texting behind the wheel lead to distraction. In fact, anything your cell phone can do – hands free, texting, downloading music, navigation, etc., is distracting. The primary responsibility of the bus driver is to operate their bus safely. As described above, the task of driving requires full attention and focus. Using a cell phone can distract drivers from this task, risking harm to themselves and others. Available research indicates whether it is a hands-free or hand-held cell phone, the cognitive distraction is significant enough to degrade a driver's performance. This can cause a driver to miss key visual and audio cues needed to avoid a crash.

* Information on the Virginia Tech Study can be found at:

http://www.vtti.vt.edu/pdf/7-22-09-VTTU-Press_Release_Cell_Phonesand_Driver_Distraction.pdf

As of March 8, 2012, it is illegal in Pennsylvania to use a wireless communications device to send, read or write a text-based communication while driving and while the vehicle is in motion. The law allows drivers to be pulled over and cited just for the texting offense and the penalty is a \$50 fine plus other costs. In addition, the use of hand-held mobile telephones for all drivers engaged in the operation of a commercial motor vehicle is prohibited in Pennsylvania except when it is necessary to communicate with law enforcement officials or other emergency services. Both the ban on texting for all drivers and the ban on cell phone use for commercial vehicle drivers were enacted by the Federal Motor Carrier Safety Administration in 49 CFR 392.80 and 392.82 and have been adopted in their entirety in Pennsylvania through 67 Pa.Code 231.

In summary, at times when the distractions are the greatest, you will need to find ways to maintain your concentration. Listed below are a few suggestions that may help. Your own methods for keeping your mind on safe driving or methods you learn from other drivers may work just as well.

- Observe traffic defensively — always be on the lookout for what the other driver might do;
- Visualize the route and what you are going to do;
- Make a concentrated effort to keep extra space between you and the vehicle ahead of you;
- Have a systematic pattern of mirror checks you always follow;
- Keep watch to maintain a safety circle around the bus;
- Remind yourself of the responsibility you have transporting students;
- Drive mindfully, not mindlessly — keep tuned in to the bus, all the sounds it makes and how it feels;
- Count the students as they get off the bus, and watch where they all go. Make sure the same number reach safe zones before proceeding; and
- Do not talk/text on your cell phone while driving.

VEHICLE CONDITIONS

You must be aware of vehicle conditions before driving and constantly monitor your vehicle as you drive. This is discussed in detail in Unit E. Identifying a problem with your vehicle quickly can prevent a failure, which can result in a crash.

PRE-TRIP CONDITIONS

The purpose of a pre-trip inspection is to identify problems that could cause a crash or breakdown. Each school district or contractor may have unique methods or procedures for completing and documenting a pre-trip inspection, so work with your supervisor to review system-specific policies and/or checklists. The key for you, the operator, is to complete your pre-trip inspection the same way each time to identify potential problems. Be sure you can adequately answer the following questions:

- Is the school bus you are assigned to drive in safe operating condition?
- Will it respond instantly and effectively to all controls?
- Have you checked it over?
- Did you report deficiencies to your supervisor and have they been corrected?

You are the driver and are responsible for the vehicle you are driving. Refuse to drive an unsafe bus. Remember, if these reported deficiencies are not corrected, you can report them to the area supervisor, school principal, school superintendent, state board of education, or state police.

You have to use and take advantage of all vehicle components. It is your responsibility to see they are complete, operational and safe. Correct deficiencies before your route, or if you are suspicious of a potential mechanical problem, report it, and have it checked.

ON-THE-ROAD CONDITIONS

Mechanical problems that will create potentially hazardous conditions may develop during your route. Safe drivers use all their senses to constantly check the mechanical operation of the bus.

- Sight – Constantly check all gauges for proper readings, check lights, and watch for smoke or fire.
- Smell – Constantly check for telltale odors of smoke, exhaust fumes, gasoline, oil, and burning rubber.
- Sound – Listen for unusual noises, such as engine knocking or clashing gears.
- Touch – Often you will feel the first sign of trouble. Be alert for loss of steering, brakes, transmission, power, or other vehicular functions.

If you identify a mechanical problem during your route, be prepared to act. If you are at all uncertain whether the problem constitutes a safety hazard, stop the bus, call your supervisor and follow school district guidelines or procedures.

ENVIRONMENTAL AND ROADWAY CONDITIONS

During the course of a school year, you will face a variety of environmental and roadway conditions demanding alert and skillful action. These conditions may include rain, ice, snow, mud, fog, flood waters, bright sun, and high winds, as well as potholes, edge drop-offs, missing or malfunctioning traffic control devices, and roadside hazards. While these conditions rarely cause crashes by themselves, they can make driving more hazardous than normal, especially when combined with human and/or vehicle factors.

Most likely, you will be driving over the same route twice a day during the school year. You'll become thoroughly acquainted with the route and, after a short time, may begin to take the road for granted. But conditions change rapidly: potholes develop during the spring thaw; grades can wash away; shoulders can become soft; railroad crossing approaches appear different depending on the time of day; loose gravel can accumulate; and slick spots can develop through accumulations of snow and ice, or oil deposits. Conditions are different each day, and you must be alert to detect these changes so as not to be caught unaware. Road conditions do not generally cause crashes by themselves. However, crashes related to road conditions often occur because drivers fail to adjust their driving behavior to road conditions. Your responsibility is to be ready for changing conditions, anticipate problems and adjust your driving behavior to match conditions.

SCANNING AHEAD

To be a safe driver you need to know what's going on all around your vehicle.

All drivers must scan ahead and search for potential conflicts or hazardous conditions. Use a systematic search pattern and efficient eye scanning habits to identify conflict situations. To properly scan ahead:

- Have a clean windshield and properly adjusted mirrors;
- Develop the habit of scanning 360 degrees around the bus – front, sides and rear;
- Don't stare too long at a particular object, as you will be less aware of clues from your larger field of indirect vision; and
- Focus farther ahead as your speed increases, and slow down if your view becomes limited by hills or curves.

Importance of Scanning Ahead

Because stopping or changing lanes can take a lot of distance, knowing your vehicle and what traffic is doing on all sides of you is very important. You need to look far enough ahead to make sure you have room to maneuver your bus safely.

Know How Far to Scan

You should look 12 to 15 seconds ahead. That means looking ahead the distance you will travel in 12 to 15 seconds. At lower speeds, that's about one block; at highway speeds, it's about a quarter of a mile. If you're not looking that far ahead, you may have to stop too quickly or make quick lane changes. Looking 12 to 15 seconds ahead doesn't mean ignoring conditions that are closer. You need to shift your attention back and forth, near and far.

Look for Traffic

Look for vehicles coming onto the highway, coming into your lane or turning. Watch for brake lights from slowing vehicles. By identifying these conditions far enough ahead, you can change your speed or change lanes, if necessary, to avoid a problem.

Check Mirrors

When using your mirrors while driving on the road, check quickly. This means about 3 to 5 seconds of scanning time. Look back and forth between the mirrors and the road ahead. Check your mirrors every 5 to 8 seconds. Don't focus on the mirrors for too long. Otherwise, you will travel quite a distance without knowing what's happening ahead. Refer to Unit E for more information on mirror positioning and usage.

The use of your mirrors will greatly extend the view outside and around the bus. For example, the side mirrors allow you to see the traffic approaching from behind your bus and those passing you, in addition to the surroundings at loading and unloading zones. The crossover mirrors also allow a further view in front of the bus, most often at a loading or unloading zone. Carefully checking and rechecking these mirrors for students that may be in front of the bus during loading or unloading is essential.

You must be alert to all hazards. The key to your defense is timely recognition and avoidance. Always try to leave yourself an escape route.

DRIVING ON SLIPPERY SURFACES

A roadway condition drivers often encounter is a slippery road surface. This may be the result of rain, snow, ice or even wet leaves, or standing water on the roadway. Expert drivers can safely control a vehicle on slippery surfaces. Also, by following proper procedures before, during and after your trips, you can help keep your vehicle in the best condition to operate as safely as possible on slippery surfaces, and maintain control while driving.

Before Your Trip

- Start on time, but adjust driving to conditions; safety first...schedule second; and
- Ensure chains are secure for snow and icy conditions, if applicable.

While on the Road:

- Use windshield wipers at all times in rain, snow, sleet, and heavy fog;
- Use of headlights is mandatory;
- Check brakes immediately after driving through deep puddles or standing water. If they fail to work properly, pump the brakes to help dry them while the vehicle is moving. For air brakes, cautiously apply steady pressure;
- Set a regular speed, and drive slower than posted speed limit or what you would normally drive in dry road conditions, especially on bridges and in tunnels;
- Start the bus in the lowest appropriate gear for better traction, if ice or wet snow is on the driving surface. Loss of traction due to spinning the wheels during starting may cause the drive wheels to become stuck even more firmly. If on a crowned road or hillside, the bus may start to slide or fishtail off of the road under these conditions;
- To avoid getting stuck or spinning the wheels, try to keep the bus moving slowly and steadily forward in gear. If the wheels start to spin, let up slightly on the accelerator to allow them to take hold. If the bus stops, do not continue to spin the wheels in the hope of pulling out. In mud and soft sand, this will only dig the wheels in deeper;
- When approaching intersections and when stopping, pump the brakes once or twice so the wheels won't lock on the ice. With air brakes, use gentle, but steady pressure. Make turns smoothly and avoid applying the brake;
- Avoid skidding;
- Plan ahead for expected hazardous areas of the route. These include: icy bridges, stretches of road that have been slippery in the past, uphill stops, and intersections;
- For buses with manual transmissions, do not disengage the clutch until the bus is almost completely stopped;
- Maintain a greater than normal safe following distance from other vehicles; and
- When pulling onto the highway, allow for longer acceleration time required for school buses.

Estimate depth and extent of standing water partially or totally covering the roadway. When driving on snow- or ice-covered highways, judge the effect of traffic and temperature on road surface friction by noting whether other vehicles are skidding. Remember, bridges freeze before the road surface. If ice is melting on the highway, be alert for ice patches near underpasses, tree-lined areas, buildings or other shaded areas. Note spots where direct sunlight may have accelerated melting, and look for additional ice patches ahead on the highway.

You must drive slower to be able to stop in the same distance as on a dry road. Wet roads can double the stopping distance of your bus. Reduce speed by about one third (e.g., slow from 55 mph to about 35 mph) on a wet road. On packed snow, reduce speed by one half or more. If the surface is icy and impassable, stop driving as soon as you can safely do so and call for assistance.

Black Ice – Black ice is a thin layer clear enough you can see the road underneath it. It makes the road look wet instead of icy. Any time the temperature is below freezing and the road looks wet, watch out for black ice.

Hydroplaning – In some weather, water or slush collects on the road. When this happens, your vehicle can hydroplane. Hydroplaning occurs when a layer of water builds between the rubber tires of your bus and the road surface, leading to the loss of traction, and thus preventing the vehicle from responding to steering, braking or accelerating. It becomes, in effect, an unpowered and unsteerable sled. It does not take a lot of water to cause hydroplaning. Hydroplaning can occur at speeds as low as 30 mph, if there is a lot of water. Hydroplaning is more likely, if tire pressure is low or the tread is worn. (The grooves in a tire carry away the water; if they aren't deep, they don't work well.) Be especially careful when driving through puddles. The water is often deep enough to cause hydroplaning.

Remember to inspect your tires as outlined in Unit E for a tread depth of 4/32" on the front tires and 2/32" on the rear tires as per Section 171.36 of Title 67, and avoid standing water.

After Your Trip:

- Sweep water or snow from the bus, including the steps;
- Clear mud or snow from windows, mirrors, lights, roof, and reflectors; and
- Don't forget to complete your post-trip inspection procedures.

REDUCED VISIBILITY

Weather Conditions

When you think of bad weather you probably think of slippery road conditions, but rain, snow, fog, and smog also reduce visibility. Adjust your driving accordingly, and take the following precautions:

- Follow local pre-trip inspection guidelines;
- Keep the windshield clear. If snow or ice builds up on front or rear windows, stop the bus and remove it; and
- Don't hesitate to leave the roadway at a safe spot to sit out a heavy shower, snow squall or thick fog. However, always remember to keep in contact with your supervisor.

Bright, Glaring Sunlight

While bright sun or glare may not be considered bad weather, they can create serious hazards for motorists. Don't be caught unprepared. Take the following special precautions for safe driving in bright sun:

- Carry sunglasses and use them when necessary;
- Adjust visors to block out direct sun;
- Avoid looking directly at the sun, bright reflections, or glare since they can affect your vision for several seconds; and
- Clean the windshield inside/outside.

Night Driving

When examining national crash data for ALL vehicles, about half of traffic fatalities occur at night, although only about one quarter of travel occurs after dark. Although intoxication and fatigue contribute to the high rate of nighttime crashes, nighttime driving is inherently hazardous because of decreased driver visibility.

In Pennsylvania, approximately 6 percent of crashes involving a school bus occurred at night. While most of your trips as a school bus operator occur during daylight hours, there may be several times when you will be driving during hours of darkness. These may be during field trips or special events, or just early morning routes

during the winter. As nighttime hours increase, so does your exposure to the perils of night driving. Unlike the temporary hazards associated with snow and ice, the dangers of night driving exist all winter and, to a lesser extent, all year.

Why is night driving particularly challenging? The challenges are greater than during the day because many of the visual cues necessary for safe driving, such as warning signs and pavement markings, are harder to see. In addition, even drivers with the best visual acuity have reduced visual efficiency at night. Namely, your peripheral vision is sharply reduced, your depth of field is reduced and the low light makes it more difficult to focus on objects. Further, artificial light can't compare in efficiency to natural light, and the narrow beams of light from headlights give you an automatic case of tunnel vision. Daytime visual cues, such as colors, are nearly worthless at night.

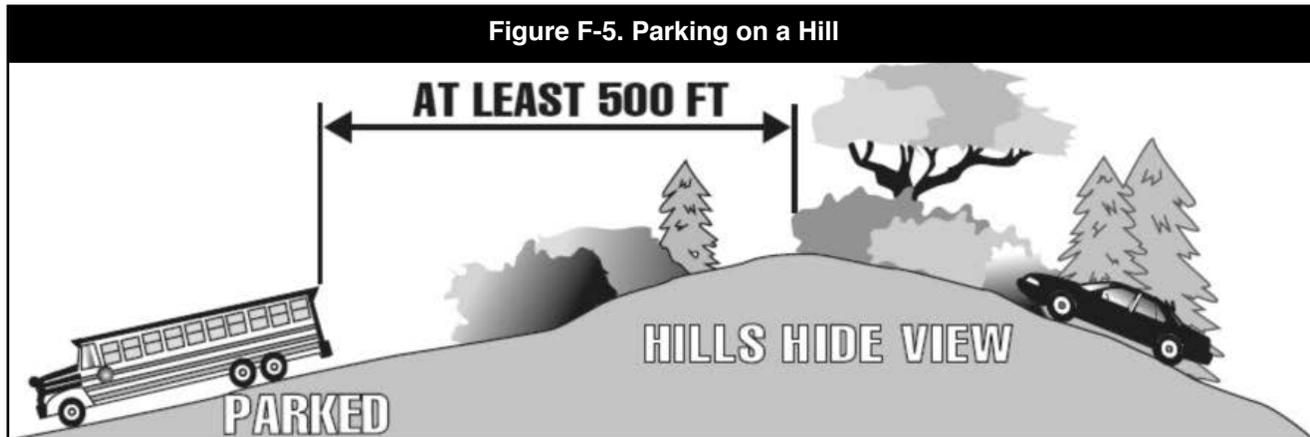
At night, take the following driving precautions:

- **SLOW DOWN.** Just because the speed limit is 40 mph, it doesn't mean you have to drive that fast. Remember, the speed limit is an indication of the maximum safe speed during optimal driving conditions.
- Change other driving techniques. For example, don't overdrive your headlights. If you are driving at 55 mph, it will take you up to 300 feet to stop, while the average headlights will illuminate only 250 feet ahead.
- Increase your following distance behind the vehicle in front of you because distance perception is more difficult to judge at night.
- Exercise caution. It takes time for the average eye to adjust to night vision. Drive with special caution during this critical adjustment period. Avoid highway hypnosis caused by prolonged and forced staring.
- Don't look directly at oncoming lights. Visibility is affected considerably by oncoming headlights at distances of 3,000 feet or more. Staring at oncoming headlights will also distort your vision for up to seven seconds. That translates to a distortion lasting a distance of 565 feet when traveling at 55 mph.
- Don't look off into the darkness, because your eyes will have trouble adjusting to the road lights again. You may be able to learn to steer by the side light cast by cars ahead of you.
- Use pavement markings and delineators as guidance devices. Often, they form a corridor of reflected light in which a stalled car or pedestrian will show up as a blank spot.
- Your eyes need to adjust to night lighting and driving in dark conditions. If you are exposed to bright sunlight during the day, it will take your eyes longer to adjust, and it can impair your night vision considerably. Therefore, wear your sunglasses, if exposed to bright sunlight during the day.

EQUIPMENT ADJUSTMENTS

- Keep headlights clean and make sure your windshield is clean inside and outside. Any reduction in the amount of light available to your eyes reduces your night vision.
- Always use low beams on sharp curves and when traffic is approaching. Your bright lights can blot out the warning glow of cars coming around the curve toward you. Also, keep headlights on low beam in cities or towns, and in fog or haze.
- Keep your instrument panel lights dim. If too bright, they produce unnecessary glare and distraction.
- If oncoming drivers fail to dim their lights, don't blind them with your high beams. This creates a hazard to yourself and your passengers.
- Don't tailgate.

- If it is necessary to stop the bus on the shoulder of an open highway, choose a spot visible for at least 500 feet to oncoming and following traffic (see Figure F-5). Turn off the headlights, but leave parking lights and/or hazard warning lights on.



HEAVY WIND

While loss of traction and limited visibility are the most common roadway and weather-related problems you will face, you should also be aware of and ready for potential hazards caused by heavy wind. Because of the height of a vehicle, the side of the bus acts like a sail, and a strong crosswind at the top of a hill or at the end of a tunnel, or even gusting winds on an open straight section of highway, can cause an unprepared driver to lose control of the bus. Passing large vehicles also may expose you to a sudden burst of a crosswind. Large vehicles can cause drafts; be careful when driving near them on the open highway.

HIGHWAY HAZARDS

The shape, surface and roadside conditions of the highways you drive on each day can cause potential hazards. Whether you drive on major highways, country roads, city streets, or some combination of these, you must be prepared for potential hazards arising from these conditions.

You should be able to identify potential hazards arising out of the interaction between vehicles and highway. Any point in the highway where drivers are confronted with decisions represents a potential point of conflict. For example, a vehicle starting to exit from a freeway may suddenly return to the freeway, or drivers unfamiliar with route signs may be in the wrong lane and change lanes suddenly as two major routes split. A point where the highway becomes narrower also represents a potential source of conflict. At points where four lanes become two, other vehicles may change lanes suddenly.

Road Geometry

The geometry of a highway describes features that affect or relate to its operational quality and safety. These features, which are visible to the driver and affect driving performance, include: roadway curvature; intersections and interchanges; number of lanes and lane width, presence of shoulders and curbs; channelization and medians; and other miscellaneous elements like driveways and bridges.

As a driver, pay attention to the shape of the road and the potential for unseen hazards around curves, over hills or in dips. By scanning the road ahead, and watching and heeding road signs and pavement markings, good drivers can detect and plan ahead, for such roadway geometric changes by slowing down to get a better view. When entering a curve or down shifting for a long downgrade, increase your following distance and travel at a reduced speed. Reduce speed and keep to the right when approaching the crest of hills and at highway dips.

Intersections and Right of Way

School buses often come into conflict with other vehicles and pedestrians because their intended courses of travel intersect, and thus interfere with each other's routes. This occurs at points where roads and streets join, meet or cross — intersections.

Pennsylvania school bus crash data indicate over 60 percent of crashes, school bus the prime unit, occurred at intersections. One factor that might explain this is navigating through an intersection requires careful driving technique and experience, especially in a larger vehicle like a school bus. Another fact is simply there are many conflict points at an intersection, so your exposure is much higher.

Intersections can be different sizes and shapes depending on the angle(s) by which the roadways meet. Be prepared to stop each time you approach virtually any intersection.

The general principle establishing who has the right to go first at an intersection is called "right-of-way." This concept legally establishes who has the right to use the conflicting part of the road and who has to wait until the other does so. Right-of-way laws are designed to prevent collisions by prescribing what vehicle must move last. The law only names the vehicle that must yield right of way; it never states any vehicle expressly has the right to proceed.

In terms of right-of-way, there are basically two types of intersections: regulated and unregulated. Regulated intersections have traffic control devices, such as a signal or sign. Unregulated intersections have no traffic signals or signs. Use caution, even if a signal or a stop sign controls other traffic. Remember the clearance your bus needs, and watch for poles and tree limbs. Know the size of the gap your bus needs to accelerate and merge with traffic. When pulling out, never assume other drivers will brake to give you room.

Unregulated Intersection

When approaching an unregulated intersection, you are required by law to reduce speed, check traffic to see you can proceed and continue to move only when others have yielded right of way to you. If another vehicle is already in or very near the intersection, you must yield right of way to that vehicle. When two vehicles arrive at an unregulated intersection at the same time, the vehicle on the left always yields right of way to the vehicle on the right.

Regulated Intersection: Yield Control

Because of the restricted visibility, slow acceleration and length of a school bus, you must use extreme caution as you approach a yield sign. Approach the intersection where you must yield at a speed reasonable for the existing conditions, but slow enough to allow you to stop the bus and yield right of way to another vehicle in the intersection or to avoid a collision.

Regulated Intersection: Stop Control

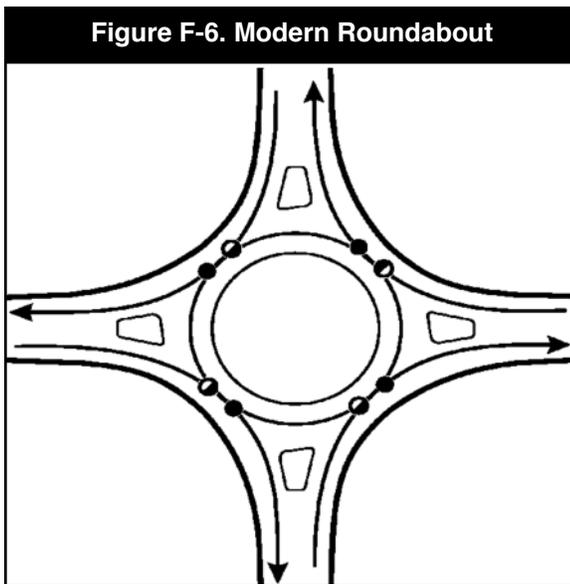
Drivers' responsibilities at stop-controlled intersections are stated in Section 3323(b) of Title 75, The Pennsylvania Vehicle Code. This section states "Duties at stop signs -- Except when directed to proceed by a police officer or appropriately attired persons authorized to direct, control or regulate traffic, every driver of a vehicle approaching a stop sign shall stop at a clearly marked stop line or, if no stop line is present, before entering a crosswalk on the near side of the intersection or, if no crosswalk is present, then at the point nearest the intersecting roadway where the driver has a view of approaching traffic on the intersecting roadway before entering. If, after stopping at a crosswalk or clearly marked stop line, a driver does not have a clear view of approaching traffic, the driver shall, after yielding the right-of-way to any pedestrian in the crosswalk, slowly pull forward from the stopped position to a point where the driver has a clear view of approaching traffic. The driver shall yield the right-of-way to any vehicle in the intersection or approaching on another roadway so closely as to constitute a hazard during the time when the driver is moving across or within the intersection or junction of roadways, and enter the intersection when it is safe to do so."

Simply put, you must completely stop at every intersection where there is a stop sign for your lane of traffic. Stop at the stop line or four feet in advance of the crosswalk. If neither are there, stop at the point nearest the intersecting roadway where the driver has a view of approaching traffic on the intersecting roadway before entering the intersection. Enter only when you have the best line of sight and can move the bus without interfering with the movement of another vehicle. Before proceeding you should look in all directions at least twice to check for approaching traffic. If the intersection is clear, proceed to move ahead or turn with caution.

Regulated Intersection: Traffic Signals

Approach each traffic signal expecting it could change color at any moment. Always obey the color of the traffic signal:

- **Red light** – Stop completely at the stop line and wait for the green light before proceeding. Consult your district guidelines and procedures regarding making the “right on red”. This is a legal maneuver in Pennsylvania, but it might not be the safest to make in a school bus.
- **Yellow light** – Prepare to stop for the red light that will follow.
- **Green light** – Check to be sure approaching traffic is stopped and proceed with caution.
- **Flashing yellow light** – Slowly proceed with caution.
- **Flashing red light** – Stop completely, check for approaching traffic and proceed with caution when it’s safe to move (same as stop sign).



Circular Intersections

Circular intersections, such as the modern roundabout, are becoming more common on Pennsylvania highways.

Here are a few tips for travelling through circular intersections:

1. Slow down as you approach the intersection.
2. Keep to the right of the painted or raised island separating entering traffic from exiting traffic. There may be a truck apron on which you may operate your bus.
3. Look left for traffic approaching in the circle.
4. Enter the roundabout (circle) by turning right when there is a safe gap in traffic approaching from your left. Yield to traffic already in the roundabout. If there is no traffic approaching, you may enter without stopping.
5. Do not pass bicyclists or other vehicles when in the roundabout.
6. When in the roundabout, do not stop (except to avoid a crash) – you have the right-of-way over entering traffic.
7. Use your right turn signal to indicate where you plan to exit the roundabout. Turn it on after you have passed the exit just before the one you plan to use.
8. If you miss your exit, just continue around the circle until you reach it again.
9. As you exit, yield to pedestrians who are in the crosswalk or are waiting to cross the exit lane.

Uniformed Police Officer

A uniformed traffic officer always has authority above regular traffic signs and signals. You must follow the officer's instructions regardless of the regular traffic devices. When an officer is directing traffic, there is usually a specific problem or hazard. There could be a crash ahead, malfunctioning traffic signal or missing sign. Always obey the officer's instructions, even if the regular traffic devices appear to be functioning properly.

Private Drive

When leaving a driveway, you must always yield right of way to the approaching vehicles on the roadway where you are entering. Check for approaching traffic and proceed with caution when it's safe to move (same as stop sign). Whenever possible, never back out of a driveway onto a highway.

Crossing Main Highways

Use extreme caution while crossing or entering a major highway. When moving from a complete stop, a school bus normally requires at least six seconds to cross and clear an average two-lane highway. Multi-lane highways, especially divided highways, require even more time. An automobile traveling at 55 mph can move 485 feet in six seconds. Before you move the bus onto a highway be certain you have enough time to safely clear the intersection. Always **check and recheck for approaching traffic**, before entering or crossing any road. Look first to the left, where the hazard of approaching traffic is closer. **The slogan for the school bus driver must be: "The school bus driver never has right of way."**

While driving the bus you must never take a risk. You should be a courteous driver, and remember the law requires you and all drivers to yield right of way to pedestrians and vehicles on narrow bridges, on the roadway, at intersections, and in any hazardous situation.

Road Surface

Another type of potential highway hazard is the road surface. Always scan ahead for changes in surface conditions that may require evasive maneuvering to avoid the loss of steering or braking control. The three most common problems are loose, rough and slippery surfaces.

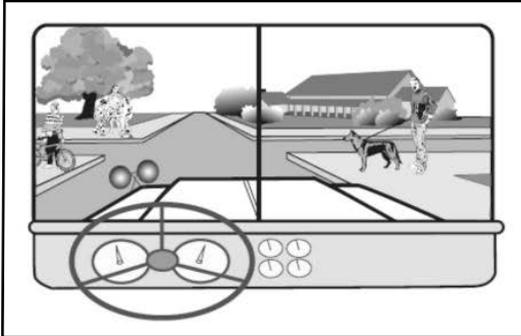
- **Loose Surfaces** – Slow down for loose surfaces such as gravel, soft sand, soft shoulders, and wet leaves.
- **Rough Surfaces** – Detect surface irregularities on asphalt and concrete, such as potholes or cracked pavement. On a wooden surface, look for holes, bumps, cracks, loose boards, and slippery spots. Approach metal bridges slowly, as they tend to reduce steering control.
- **Slippery Surfaces** – Slippery surfaces were discussed earlier. Anticipate the smoothness of concrete or asphalt road surfaces at intersections, or other steering or stopping areas. Recognize areas of the highway soaked with oil or grease. Remember, the early part of a rainfall is the most dangerous.

Roadside Conditions

Another type of potential highway hazard is caused by conditions on the side of the road. Physical features of the roadside include: barriers (e.g., guiderail); obstacles (e.g., noise barriers, trees, utility poles, signs), and other miscellaneous features (embankment slopes, ditches, etc.). Under normal driving circumstances, these should pose no problem. They should, however, be included in your scanning as you drive and they should be evaluated for potential hazards, if you leave the highway suddenly.

PEDESTRIAN HAZARDS

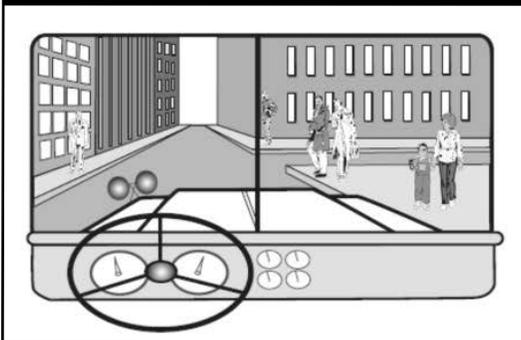
Figure F-7. Rural Pedestrian Hazards



The presence of pedestrians, bicyclists, roller skaters, skateboarders, and animals on or near the highway increases the need for vigilant scanning. School bus stops are particularly dangerous areas as outlined in Unit C - approach them cautiously and alertly. When near playgrounds, residential areas and schools, be alert for children playing or darting into the path of your bus from behind vehicles, structures, or trees and bushes.

When driving on side streets, be alert for pedestrians entering or crossing your path from any direction. When making left and especially right turns at intersections, check carefully for pedestrians crossing the street into the path of the bus and for vehicles making right turns on red lights.

Figure F-8. Urban Pedestrian Hazards



Be alert for animals that may cross into the path of the bus. Animals are much like children in their unpredictable behavior along roads. Wherever possible, slow down to avoid hitting animals; do not swerve to avoid them unless they are working horses pulling a buggy. Such action may cause partial or complete loss of control of the bus. (See Figures F-7 and F-8)

VEHICLE HAZARDS

In general, when sharing the road with other vehicles, observe the driving behaviors of the other drivers. Scan 360 degrees around your bus for clues to any potentially hazardous conditions.

Drivers in a Hurry

Drivers may feel your school bus is preventing them from getting where they want to go on time. Such drivers may pass you without a safe gap in the oncoming traffic, cutting too close in front of you. Other drivers entering the road may pull in front of you in order to avoid being stuck behind you, causing you to brake quickly. Be aware of these situations, and pay particular attention to drivers who are in a hurry.

Losing Control

Recognize clues indicating another driver may lose control of their vehicle. Surface conditions that are slippery, or have loose gravel, ruts, or deep snow might reduce the oncoming driver's control (as well as your own).

Notice movements of the other vehicles. For example, you notice if an oncoming driver turns too sharply after an off-road recovery, or a driver approaching too fast from the side to stop or turn. Movements of your bus or another vehicle also may affect other drivers (such as stopping too quickly to allow a following vehicle enough time to stop).

Lack of Communication by Other Drivers

Look for clues to situations where the driver of another vehicle may execute a maneuver without signaling:

- A vehicle slowing down may be about to turn;
- A parked car with a driver in the driver's seat, engine running, or turned wheels may be about to pull out from the curb;
- A parked car with a driver in the driver's seat may be getting ready to exit his vehicle; and
- Pickup and delivery vehicles with backup lights on may be about to back into another street or driveway.

When another driver does signal, check other clues to verify it is the proper signal because a turn signal may have been left on from a previous maneuver. This is especially true of motorcycles.

Remember you, too, can fail to communicate. Always signal your intentions.

Failure of the Other Driver to Observe

Watch for clues another driver has not observed the bus and therefore may not be prepared to yield the right-of-way. These clues include the following:

- Other driver not responding to an upcoming intersection or to your signals;
- Other driver not looking at the road or what is in front of him/her (distracted by something in their own vehicle);
- Dirty windows, posts, trees, buildings, bright sunlight, or other objects obscuring or restricting the other driver's view; and
- Other driver's vehicle being detectable to you only by reflection, headlight glow or dust cloud.

Inadequate Adjustment by the Other Driver

Look for indications another driver is not adjusting properly to a situation. Be aware of hazardous situations arising when another driver fails to adjust for the following:

- Obstructions;
- Surface conditions;
- Pedestrians;
- Other vehicles; and
- Shape of the road.

Failure to adjust for these conditions may cause another driver to make potentially hazardous maneuvers. Know areas of your route where these situations are likely to occur, and exercise caution in these places.

Aggressive Driving by Other Motorists

NEVER take it personally when someone cuts you off or pulls in front of you. People don't want to be caught behind the school bus, so expect people to pull in front of you. Just let it go, and ignore it. If you encounter an aggressive driver, here are a few tips:

- Get out of their way and do not challenge them;
- Stay relaxed, avoid eye contact and ignore rude gestures;
- Don't block the passing lane, if you are driving slower than most of the traffic;
- Put your pride in the back seat and DO NOT RETALIATE. Do not challenge them by speeding up or attempting to hold-your-own in your travel lane. It is a serious distraction to focus your attention on a "contest" with another driver. You are less able to respond to traffic signals, signs and the actions of other vehicles or pedestrians as needed to avoid a crash;
- Do not try to teach another driver a lesson and do not insist on being right, even if you are right;
- Wear your seat belt as required by Section 171.144 of Title 67 and federal law in 49 CFR Section 392.16 (Use of Seat Belts). It will hold you in your seat and behind the wheel in case you need to make an abrupt driving maneuver, and it will protect you in a crash;
- Report aggressive drivers to the appropriate authorities by providing a vehicle description, license number, location and, if possible, driver and direction of travel;
- If you have a cell phone, and can do it safely, pull to the side of the road and call the police and/or your supervisor – many have special numbers (e.g. 911); and
- Do NOT discharge any students, if an aggressive driver pursues you. Call for help.

While many people associate aggressive driving with road rage, they are two different behaviors. Road rage, which is a criminal offense, is often the result of aggressive driving behavior that escalates into an assault with a vehicle or other dangerous weapons.

Slow-moving or Stopped Vehicles

Watch for indications another vehicle is slowing or may stop suddenly. Examples of slow-moving vehicles are farm vehicles, under-powered vehicles, horse-drawn vehicles, and trucks on hills. Frequently stopping vehicles include: buses, trucks carrying flammables at railroad crossings, garbage trucks, and postal and other delivery vehicles. Also watch for vehicles engaged in turning, exiting or entering the roadway, merging with other vehicles, or approaching controlled intersections or railroad crossings.

Amish buggies are dark in color and difficult to see in poor light and bad weather. After stopping, a horse and buggy often roll backward. When you pass a horse, do not drive too fast or blow your horn, as this may spook the horse. Also, to avoid scaring the horse after passing, leave enough space between your vehicle and the horse before pulling back into the right lane.

Multiple Vehicle Hazards

You should be able to recognize clues in a traffic pattern that may indicate potential conflict. Vehicles entering the highway from side roads, driveways, ramps, or parking spaces may cause another driver to change lanes or stop suddenly. A vehicle slowing or stopping may prompt another driver to steer around it. One vehicle may limit another's visibility, allowing the other driver to enter a potential conflict, as when an oncoming driver turns left.

Work Zones

Whenever people are working on the road, it is a hazard. Road construction may cause narrower lanes, sharp turns or uneven surfaces. Other drivers are often distracted and drive unsafely. Workers and construction vehicles may get in the way. Drive slowly and carefully near work zones. Use your four-way flashers or brake lights to warn drivers behind you.

There should be traffic control devices to help you navigate through work zones. These devices are typically repetitive in nature, especially signing practices. For example, in a typical road work sign series, the first sign, ROAD WORK AHEAD, is a general warning to motorists. The second sign, ONE LANE ROAD AHEAD, alerts drivers what exactly they should expect. The third sign, FLAGGER AHEAD, tells what they need to do.

Motorcycles

One vehicle you should pay particular attention to is the motorcycle. They are smaller and more narrow than a car, can be hard to see, and can hide in a blind spot. Keep these simple rules in mind:

1. Look for motorcycles...then look again. Look twice at intersections, especially when turning left;
2. Respect motorcyclists' rights. Motorcycles have all the privileges of any vehicle on the road. Give motorcycles a full lane, and treat them with courtesy and respect;
3. Anticipate a motorcyclist's maneuvers. Motorcyclists may change lane positions in response to road conditions, weather or other factors. Anticipate evasive actions. Small objects in a road you may not need to avoid in a bus may require evasive action by a motorcycle;
4. Allow plenty of following distance. Allow an extra second of following distance and room to respond to conditions on the road. Slow down in poor driving conditions; and
5. Check your blind spot. Make a visual check for motorcycles in your mirrors and check your blind spot before changing lanes.

CONTROLLING SPEED

Driving too fast is a significant cause of crashes. Pennsylvania school bus crash data indicates speeding and tailgating are listed as factors in 18 percent of crashes involving school buses as the prime vehicle. In addition, the highest fatality rates for school bus incidents were associated with crashes involving the combination of speeding and other improper driving action, and driving on the wrong side of the road (often associated with speeding). Not surprisingly, the highest rate of injury in school bus crashes involved crashes where drivers were speeding and distracted, and speeding and tailgating. The common theme here is speeding.

You must adjust your speed depending on driving conditions. These include: traction, curves, visibility, traffic, weather conditions and hills. Data shows school bus drivers in crashes were more likely to have speeding indicated as a factor during adverse weather conditions than if there were no adverse conditions. You must make adjustments when you drive – different conditions require different techniques. Similarly, bus drivers in rear-end crashes are significantly more likely to be noted as tailgating. Rear end collisions involving a bus tend to be associated with a high number of injuries per crash.

You must drive safely when operating your bus and that means not driving too fast for conditions.

FOLLOWING DISTANCES

Knowing the stopping distances required for different road conditions and speeds will help you determine safe following distances when driving. You must keep adequate distance between you and the vehicle in front of you. A good general rule for determining a safe following distance on the highway is to allow an absolute minimum of four seconds between the bus and the vehicle ahead under normal conditions. For each additional adverse condition, add another second. So, add a second if:

- You are traveling over 40 mph;
- You are driving on a wet or loose surface or other poor roadway condition;
- You are following motorcycles or large vehicles;
- You are following another school bus;
- You are driving at night;
- You are driving in adverse weather conditions; and
- You are being tailgated.

To adequately judge this, select a fixed object on the road or roadside ahead. When the vehicle ahead of you passes that mark, start counting until you reach that same spot. If you reach the same spot before your count is complete, you are following too closely.

Also keep in mind that in a large vehicle, it's often hard to see whether a vehicle is close behind you. You may be tailgated:

- **When you are traveling slowly** – Drivers trapped behind slow vehicles often follow closely, and
- **In bad weather** – Many car drivers follow large vehicles closely during bad weather, especially when it is hard to see the road ahead.

If you find yourself being tailgated, here are some things you can do to reduce the chances of a crash:

- **Avoid quick changes** – If you have to slow down or turn, signal early and reduce speed very gradually;
- **Increase your following distance** – Opening up room in front of you will help you avoid having to make sudden speed or direction changes that could surprise the driver behind you. Leaving room ahead also makes it easier for the tailgater to get around you;
- **Don't speed up** – It's safer to be tailgated at a low speed than a high speed; and
- **Avoid tricks** – Don't turn on your tail lights or flash your brake lights. Follow the suggestions above.

STOPPING

Stopping a school bus smoothly and within the limits of safety is the sign of an expert driver. Good drivers have their vehicles under control at all times and know braking distances increase greatly as speed and vehicle weight increase. In addition to knowing the distance required to safely stop their bus under all driving conditions, skillful drivers use correct stopping procedures, which increase bus life and lower maintenance costs.

STOPPING DISTANCE

Three components comprise total stopping distance:

- Perception Distance;
- Reaction Distance; and
- Braking Distance.

It is important to note that for buses equipped with air brakes, there is additional brake lag distance to account for. This makes the formula:

$$\begin{array}{r}
 \text{Perception Distance} \\
 \text{Reaction Distance} \\
 \text{Braking Distance} \\
 + \text{ Brake Lag Distance} \\
 \hline
 \text{Total Stopping Distance}
 \end{array}$$

Briefly, these components are:

- **Perception Distance** – The distance your vehicle travels from the moment your eyes see a hazard until your brain recognizes it. For an alert driver, that moment occurs in about three fourths of a second. The distance traveled in that three fourths of a second varies directly with the vehicle's speed of travel. For example, a vehicle moving at 55 miles per hour travels about 60 feet in three fourths of a second. Therefore, the average perception distance for an alert driver moving at 55 mile per hour is 60 feet.
- **Reaction Distance** – The distance traveled from the time your brain decides what to do and tells your foot to move from the accelerator until your foot pushes the brake pedal. The average, alert driver has a reaction time of about three fourths of a second, which also translates to 60 feet at 55 mph.
- **Braking Distance** – The distance it takes to stop once you have pressed the brake pedal and engaged the brakes. Assuming good brakes in normal driving conditions (dry pavement, level roadway, etc.), a bus moving at 55 mph usually will require about 170 feet of braking distance (over 4 and a half seconds).
- **Brake Lag Distance** – For vehicles with air brakes, there is approximately a half second delay in brake response time from the moment when you press the brake pedal to the point when the brakes engage. At 55 mph, this translates to 32 feet.

This braking distance is higher than what you experience in a car. The reason for this is a heavy vehicle requires more braking power to stop than a lighter one because the heavier vehicle creates more friction and heat for the brakes to absorb. The brakes, tires, springs and shock absorbers for heavy vehicles are designed to work best when the vehicle is fully loaded.

Looking at the above figures, the total stopping time at 55 mph is at least six and a half seconds under the BEST conditions. More significantly, the total stopping DISTANCE is about 322 feet at 55 mph.

Perception Distance	60 feet
Reaction Distance	60 feet
Braking Distance	170 feet
<u>+ Brake Lag Distance</u>	<u>+ 32 feet</u>
Total Stopping Distance	322 feet

In other words, your bus will easily travel the length of a football field in this time. If you double your speed, it will take about four times as much distance to stop. The vehicle will also have four times the destructive power in a crash.

By slowing down, you can greatly decrease the stopping distance of a school bus, and greatly increase the safety of pupil transportation.

The bottom line is whenever you are driving, plan to keep enough space in front of you so you can stop quickly, if necessary. If brakes and/or tires are not in proper working order, the braking distance, and thus the stopping distance, will be greater. Because stopping distance increases as speed increases, you must leave more space at faster speeds. Adverse weather conditions also increase stopping distance. Stopping a vehicle on roads covered with ice or sleet requires a distance at least five times greater than required in dry conditions. When driving in bad weather, further increase your following distance to compensate for increased stopping distances.

SPEED AND TRAFFIC FLOW

When you're driving in heavy traffic, the safest speed is the speed of other vehicles. Vehicles going the same direction at the same speed are less likely to run into one another. Drive at the speed of the traffic, if you can do this without going at an illegal or unsafe speed. Keep a safe following distance.

The main reason drivers exceed speed limits is to save time. But anyone trying to drive faster than the speed of traffic will not be able to save much time. The risks involved are not worth it. Going with the flow of traffic is safer and easier. If you go faster than the speed of other traffic:

- You'll have to keep passing other vehicles. This increases the chance of a crash.
- It is more tiring. Fatigue increases the chance of a crash.

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