

UNIT FOUR - DRIVING SAFELY

BASIC DRIVING LAWS

Lane Lines - Yellow and white broken and solid lines are to aid you in lane driving and passing. Following is a description of the differences in lines and their purposes.

- A broken yellow line marks the center of a two-way, two-lane road. Drive on your half of the road and pass with care.
- A broken white line separates traffic lanes on a one-way street or roadway of a divided highway. Observe lane-use rules and change lanes only when it is safe to do so.
- A solid yellow line on your side of the road or a double solid yellow line in the center of the road marks a no-passing zone. Do not pass when the solid yellow line is in your lane.
- A double-solid yellow line may also mark the center of a two-way, two or four-lane street. Do not drive to the left of this centerline.
- Two separate sets of double-solid yellow lines represent a dividing strip on a very wide street or highway where there is not a physical separation of two-way traffic. Do not drive to the left of the solid yellow lines.
- A solid white line (fog line) marks the outside edges of far left and right traffic lanes.
- Crossing a painted center line or painted center island is allowed for a left turn into an alley, private road, or driveway when such movement can be made safely.

Refer to the current revision of the Colorado Drivers' Manual.

Highway Signs - There are three sign classifications:

1. Warning
2. Regulatory
3. Guide

Diamond shape is used to warn of existing or possible hazards on roadway or adjacent areas. Vertical rectangles are generally used for regulatory signs, which tell you what you must do. Horizontal rectangles are generally used for guide signs, which show location, direction or other special information.

Right-of-Way - At an uncontrolled intersection, the vehicle on the right has the right-of-way. Left-turn traffic must yield to all other traffic except when a left turn arrow is present.

When going around a curve, check your mirrors to be sure the rear of the vehicle is tracking correctly in your lane and not encroaching into the other lane.

Traffic Signals and Signs - Pay attention to traffic signals and signs. If a light has been green for a long time (stale green) it will probably change before you get there. Start slowing down and be ready to stop. Traffic signs may alert you to road conditions indicating the need to change speed or lanes.

Lane Changes, Turns, Merging and Tight Maneuvers - A minimum of 6 mirror checks should be performed during lane changes, turns, merges and tight maneuvers. Check both left and right outside mirrors prior to, during, and at the completion of the maneuver.

Types of Mirrors - Colorado Minimum Standards Governing School Transportation Vehicles, 1 CCR 301-25.

68.02 Exterior Mirrors: Each school bus shall be equipped with a system of exterior mirrors, (as defined in FMVSS 111).

This system of mirrors shall be easily adjustable but be rigidly braced so as to reduce vibration.

School buses may be equipped with different types of crossover mirrors but should have the same make on the same bus. Everything appears smaller and farther away in convex type mirrors. It is important to make proper allowances when using this type of mirror. School bus mirrors must be adjusted properly to ensure the driver has visibility in the critical areas surrounding the bus. See Unit Two for mirror adjustment grid.

Hazards of the Road - A hazard is any road condition or road user (driver, bicyclist, pedestrian, animal) that may create a danger. Recognizing a hazard allows you time to be prepared and ready to react if an emergency develops. Establish a minimum four-second following distance from the vehicle in front of you (see Managing Space, "Space Ahead" in this unit). Following are examples of hazards to be aware of:

- **Work zones** - Work zones with construction vehicles and workers require caution and courtesy on your part. Lanes may be narrow and uneven. Use 4-way hazards lamps to warn drivers behind you of the need for caution.
- **Drop offs** - Uneven pavement and the shoulder of the road present a road hazard. If the tires of your vehicle drop off the edge of the pavement, it could cause your vehicle to tilt, hitting roadside objects. It may also be difficult to steer the vehicle back on to the roadway.
- **Fallen objects** - Avoid objects that have fallen onto the roadway. Hitting an object may cause damage to, or loss of control of, the vehicle.

- **Obstructed views** - Be alert for drivers of vehicles with the rear window blocked. Their view may be limited or obstructed.
- **Parked vehicles** - Parked vehicles can be a hazard. Watch brake lights, backup lights, exhaust fumes, front wheels turned to the traffic side of the road and other clues that might indicate the driver is about to move the vehicle. Passengers of parked commercial vehicles may cross in front of or behind the vehicle and not see oncoming traffic.
- **Confused drivers** - A slow, confused driver often changes direction suddenly or may stop without warning. Tourists may be unfamiliar with the area near freeways or major intersections. Hesitation, driving very slowly, frequent use of brakes, or stopping quickly may indicate the driver is looking for a street or house number.
- **Drivers in a hurry** - Drivers in a hurry may feel your school bus is preventing them from getting to their destination on time. They may pass you without leaving a safe gap in the oncoming traffic or they may cut too close in front of you, causing you to brake suddenly. Drivers of step vans, postal vehicles and local delivery vehicles are often in a hurry stepping out of their vehicle or re-entering the flow of traffic.
- **Impaired drivers** - An impaired driver may be sleepy, ill or under the influence of drugs, alcohol or medications. Some of the signs to look for are weaving, erratic speed and inappropriate stops.
- **Disabled vehicle** - Be especially alert when approaching a disabled vehicle stopped along the roadway. Drivers changing a tire or checking the engine may not pay attention to roadway traffic.
- **On/off ramps** - Many freeway and turnpike on and off ramps have posted speed limit signs. You may want to travel at an even lower speed in a large vehicle. Use special caution on downhill and curved parts of the ramp. Entrance and exit ramps may be very short. Some ramps are to the left instead of to the right.
- **Distracted people** - People who are distracted in some way present a hazard for drivers. Pedestrians and bicyclists may be distracted by wearing portable stereos with head sets, having their back to the traffic, looking elsewhere, or hurrying to get out of the inclement weather. Drivers or pedestrians talking on cell phones, or to someone with them, may not be paying attention.
- **Animals** - Wild animals or domestic livestock may be on or next to the roadway and are very unpredictable. Swerving to avoid

them can cause loss of control of your vehicle. Ninety percent of deer/vehicle collisions occur between dusk and dawn.

- **Children** - Children may not be looking for traffic, creating a hazard. They see traffic from a very different perspective. Always expect the unexpected.
- **Shopping areas** - People in and around shopping areas are often not watching closely because they are looking for a certain store or looking into store windows. They may be carrying packages, talking to a companion, or supervising one or more children.
- **Crash scenes** - People involved in a crash are distracted and may not be observant of oncoming traffic. Often times at the scene of a crash, people run across the roadway without looking, while passing motorists tend to slow down or stop suddenly. You must also be alert for emergency vehicles and equipment arriving at the scene.
- **Conflicts** - Conflicts are a hazardous condition. You are in conflict when you have to change speed and/or direction to avoid hitting other vehicles. Conflicts occur at intersections where vehicles meet, at merge areas (such as on and off ramps) and where there are forced lane changes, (such as the end of a lane, forcing a move to another lane of traffic). Other situations include slow moving or stalled traffic in the roadway, and crash scenes. Watch for drivers who are in conflict with others. Depending on the way they react to the situation, it may put them in conflict with you.

Always Have a Plan - A professional driver is constantly looking for hazards. Many hazards turn into emergencies. Being watchful and prepared to act will give you time to plan a way out of an emergency.

COMMUNICATING

Signaling - Other drivers do not know what you are going to do until you tell them. Therefore, signaling is important for safety. Situations that require signaling include turning, lane changing, slowing, stopping, passing and parking.

Directional Signals - Directional signals are used to communicate with surrounding traffic when you are going to perform a maneuver that requires a change in your path of travel. Three good rules for using turn signals are:

1. Signal early - Signal well before the maneuver you are about to execute. It is the best way to keep others from trying to pass you. The signal should be activated at least 100 feet before the maneuver, but not so early as to confuse traffic. Activate turn signal 200 feet before the turn if traveling over 40 mph.

2. Signal continuously - You need both hands on the wheel to complete the maneuver safely.
3. Cancel signal - When you have finished the maneuver and established your desired path of travel, cancel the signal.

Lane Changes - Activate your turn signal before changing lanes. Change lanes slowly and smoothly. This may give a driver you didn't see a chance to honk his/her horn or avoid your vehicle.

Passing - Whenever you are about to pass a vehicle, pedestrian, or bicyclist, assume they don't see or hear you. They could suddenly move in front of you. Tap the horn lightly or at night, flash your headlights from low to high beam and back. Drive carefully to avoid a crash.

When It's Hard to See - At dawn or dusk, or in rain or snow, you need to make your vehicle more visible. If you are having trouble seeing other vehicles, other drivers may have trouble seeing you. Leave the headlights on low beam; high beams can bother people in the daytime as well as at night.

Slowing Down - Warn drivers behind you when you need to slow down. A few light taps on the brake pedal to flash the brake lights will warn drivers behind you. Use the 4-way hazard lamps when you are driving less than 25 mph or are stopped. Warn other drivers in the following situations:

- **Trouble ahead** - The size of your vehicle may make it hard for drivers behind you to see hazards ahead. If you see a hazard that will require slowing down, warn the drivers behind by flashing your brake lights.
- **Tight turns** - Most car drivers don't know how slow you have to go to make a tight turn in a large vehicle. Give drivers behind you warning by braking early and slowing gradually.
- **Stopping on the road** - When stopping on the road for any reason other than student stops, warn drivers behind you by activating your brake lights, turn signals, or hazard lights. Do not stop suddenly.
- **When parked at the side of the road** - After pulling off the traveled portion of the road and stopping, activate the 4-way hazard lamps. This is very important at night. Don't trust the tail lights to give warning. Drivers have crashed into the rear of a parked vehicle because they thought it was moving normally. If you must stop on a road or the shoulder of a road, place the reflective triangles appropriately as soon as possible. See Unit Five, Emergencies.

Driving Slowly - Drivers often do not realize how fast they are catching up to a slow moving vehicle until they are very close. In Colorado, if you

are a traffic hazard, such as stopping at a railroad crossing, traveling under 25 mph, or parked, you may use the 4-way hazard lamps to alert other drivers. Do not use the hazard lamps otherwise. (Laws regarding the use of hazard lamps differ from one state to another. Check the laws of other states where you might drive.)

Horn - Use of the horn can let others know you're there and may help to avoid a crash. Use your horn when needed. However, it can startle others and could be dangerous when used unnecessarily.

Eye Contact - By establishing eye contact, you have a better indication that the other driver or pedestrian sees you. Do not rely on eye contact alone.

Do Not Direct Traffic - Some drivers try to help others by signaling when it is safe to pass or to pull out into the traffic lane. You should not do this. Doing so may cause an accident and you may be held liable.

EMERGENCIES

Emergencies - Traffic emergencies occur when a collision is imminent. Vehicle emergencies may occur when tires, brakes, or other critical parts fail. Following the safety practices in this manual can help prevent emergencies. If an emergency develops, your chances of avoiding a crash depend upon taking appropriate action.

Steering to Avoid a Crash - Stopping is not always the safest action to take in an emergency. When you do not have enough room to stop, you may have to steer to avoid a crash. Remember, you can almost always steer to miss an obstacle more quickly than you can stop. An evasive maneuver may be needed to avoid a collision. However, be aware of the consequences of swerving, one of which is rolling over. (See Unit Six, Mountain Driving, for exceptions.) Doing frequent mirror checks will allow you to be aware of your options.

Grip the Wheel Firmly with Both Hands - Do not apply the brake while you are turning. Locking your wheels while turning may cause the vehicle to skid out of control. Turn just enough to clear what is in your way. The sharper you turn, the greater the chance of a skid or rollover. Be prepared to "counter-steer" that is to turn the wheel back in the opposite direction once you have cleared whatever was in your path. Think of emergency steering and counter steering as a two-part action.

Where to Steer - If an oncoming vehicle has drifted into your lane, it is safest to move to the right. The driver may realize what has happened and respond by returning to his/her own lane. Using mirrors allows you to know which lane is empty and can be safely used. Moving right onto the shoulder may be the only available escape route. Care should be taken to determine that the shoulder is strong enough to support the weight of a large vehicle. Try to avoid using the brakes until your speed has dropped to 20 mph, then brake gently. Always check traffic in the mirrors and signal

what you intend to do. If possible, keep one set of wheels on the pavement, which helps maintain control.

Leaving the Road - In some emergencies, you may have to drive off the road. This option could be less risky than facing a collision with a larger vehicle. However, a head-on collision with a small vehicle may be preferable to facing a drop-off next to the road.

Returning to the Road - If you are forced to return to the road before you stop, use the following procedure. Hold the wheel firmly and turn sharply enough to get right back onto the road safely. Do not try to edge gradually back onto the road as the tires might grab unexpectedly, causing you to lose control. When both front tires are on the paved surface, counter-steer. The two turns should be made as a single “steer-counter-steer” movement.

Stopping Quickly and Safely - When someone suddenly pulls out in front of you, the natural response is to apply the brakes. This may work if there is enough distance to stop. The correct use of brakes is necessary. You should brake in such a way as to keep your vehicle in a straight line and allow you to turn if necessary. The best method for maximizing braking is “Threshold Braking” for stopping in the shortest distance. This is true whether the bus is equipped with anti-lock braking systems (ABS) or not.

When using the threshold braking method, apply the brakes up to the point of locking the wheels. Keep the steering wheel movements small. If you need additional steering, or if the wheels lock, back off the brakes lightly until the wheels are rolling again. In vehicles with ABS, apply the brakes the same way. If the wheels do lock, the ABS system will release and reapply the brakes very quickly. Releasing and reapplying (pumping) the brakes will cause the ABS system to fail. Never pump or “stab” the brakes.

Brake Failure - Brake failure occurs on long hills if there is loss of pressure or over-heating. Brakes kept in good condition rarely fail.

Hydraulic Pressure - When the system does not build up pressure, the brake pedal will feel spongy or go to the floor. If possible, downshift to the next lowest gear. Pumping the brakes may generate enough hydraulic pressure to stop the vehicle. If needed the park brake may be used.

Loss of Air Pressure - If the low air pressure warning comes on, stop and safely park the vehicle as soon as possible. Enough air may be in the system to make a smooth stop. Controlled braking is possible only while air remains in the system. The spring brakes will activate when air pressure drops into the range of 45 to 10 psi. Depending on the roadway surface, large vehicles may skid even at speeds under 20 mph if spring brakes activate. It is safer to stop while there is enough air in the system to operate the service brake.

Find an Escape Route - While slowing the bus, look for an escape route such as an open field, side street, or escape ramp. Take care that the bus does not roll backward after stopping. Find an obstacle to stop the bus if possible.

Brake Failure on a Downgrade - Escape ramps may be used, should it become necessary. Also, soft gravel resists the motion of the vehicle and turning uphill may stop the vehicle.

MANAGING SPACE

To drive safely, you need space all around your vehicle. When things go wrong, space gives you time to think and to take action.

Having space available when something goes wrong, requires managing space. While this is true for all drivers, it is very important for drivers of large vehicles. Large vehicles take up more space, and require more space for stopping and turning.

Space Ahead - Of all the space around your vehicle, it is the area ahead of the vehicle (the space you're driving into) that is most important. You need space ahead in case you must stop suddenly. According to accident reports, the vehicle that buses most often run into is the one in front of them. The most frequent cause for this type of crash is following too closely. Remember, if the vehicle ahead of you is smaller than yours, it can probably stop faster than you can.

When stopped at an intersection behind another vehicle, allow extra space between vehicles by waiting two seconds before you start out.

How much space should you keep in front? You need at least one second for each 10 feet of vehicle length at speeds below 40 mph. At greater speeds, you must add one second for safety. For example, if you are driving a 40-foot bus, you should leave four seconds between you and the vehicle ahead (five seconds if traveling over 40 mph).

To know how much space you have, wait until the vehicle ahead passes a shadow on the road, a pavement marking, or some other clear landmark. Count off the seconds like this, "one thousand-and-one, one thousand-and-two" and so on, until your front bumper reaches the same spot. Compare your count with the rule of one second for every 10 feet of length. If you are driving a 40-foot bus and counted up to two seconds, you're following too close. Drop back a little and count again until you have four seconds of following distance (five seconds, if you're traveling over 40 mph). After practicing, you will know how far back you should be. Remember, adverse road conditions increases stopping distance.

Space Behind - You can't stop others from following too closely. In school buses, it's often hard to see a vehicle that is close behind you. You may be tailgated when you are traveling slowly. Drivers trapped behind slow vehicles often follow too closely.

Many drivers in cars follow too closely during adverse weather. If you are being tailgated, here is how 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. It 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 at a high speed.
- Avoid tricks. Don't turn on your tail lights or flash your brake lights.
- If a heavy load is slowing you down, stay in the right lane if possible. Activate hazard lights if under 25 mph.
- When traveling uphill, do not pass another vehicle unless you can get around quickly and safely.

Space to the Sides - School buses are wide and take up most of a lane. Safe drivers will manage what little space they have. You can do this by keeping the vehicle centered in the lane, and avoid driving alongside others.

Some dangers when traveling alongside other vehicles are drivers changing lanes suddenly and being trapped when you need to change lanes.

Find an open spot where you aren't near other traffic. When traffic is heavy, this may be difficult or even impossible. If you must travel near other vehicles, keep as much space as possible between you and them. Drop back or pull forward so you are sure the other driver can see you.

Strong winds make it difficult to stay in the lane. Lighter vehicles may have more difficulty than heavier ones. Strong winds can be especially bad coming out of tunnels or after crossing bridges. It is best to avoid driving alongside others whenever possible.

Space Overhead - Hitting overhead objects is a danger. Make sure to always have overhead clearance. Don't assume that the heights posted at bridges and overpasses are correct. Ice or packed snow may have reduced the clearances since the heights were posted. **Know the height of your bus.** This changes when vents and roof hatches are added and opened.

- If you are uncertain whether there is adequate space to pass under an object, take another route.

- Warnings are often posted on low bridges or underpasses, but not always.
- Some roads can cause a vehicle to tilt. If there is a problem clearing objects such as signs or trees along the edge of the road, drive a little closer to the center of the road.
- Before backing into an area, get out of the vehicle and check for overhanging objects, such as trees, branches or electric wires. You may not see them while you are backing. (Also check for other hazards at the same time.)

Space Below - Many drivers forget about the clearance space under their vehicles. Under storage compartments may lower the clearance of the vehicle. Drainage channels and other depressions across roads can cause the long rear overhang of school buses to drag. Cross such depressions carefully.

CONTROLLING SPEED

Driving too fast to control the vehicle is a major cause of fatal crashes. You must adjust your speed to driving conditions. These include traction, curves, visibility, traffic, and hills.

Stopping Distance - There are three things that add up to total stopping distance:

$$\text{Perception Distance} + \text{Reaction Distance} + \text{Braking Distance} = \text{Total Stopping Distance}$$

Perception Distance - This is the distance your vehicle travels from the time your eyes see a hazard until your brain recognizes it. The perception time for an alert driver is about 3/4 second. At 55 mph, you travel 60 feet in 3/4 second.

Reaction Distance - The distance traveled from the time your brain tells your foot to move from the accelerator until your foot is actually pushing the brake pedal. The average driver has a reaction time of 3/4 second. This accounts for an additional 60 feet traveled at 55 mph.

Braking Distance - The distance it takes to stop once the brakes are put on. At 55 mph, on dry pavement with good brakes, it can take a heavy vehicle about 170 feet to stop, about 4 1/2 seconds. For vehicles equipped with air brakes, allow an additional half-second for the air to flow through the lines to the brakes. At 55 mph, this equals 32 feet. This is known as “**air brake lag distance.**”

Total Stopping Distance - At 55 mph it will take about five seconds to stop and your vehicle will travel about the distance of a football field.

Hydraulic Brakes - (PD + RD + BD) 60 + 60 + 170 = 290 feet.

Air Brakes - (PD + RD + BD +LD) 60 + 60 + 170 + 32 = 322 feet.

Effect of Speed on Stopping Distance - Whenever you double the speed, it takes about four times as much distance to stop, and the vehicle will have four times the destructive power if it crashes. High speeds increase stopping distances greatly.

By slowing down a little, it will reduce your braking distance a lot.

Speed and Curves - Drivers must adjust their speed for curves in the road. If you take a curve too fast, two things can happen. The wheels can lose traction and continue straight ahead, causing the vehicle to skid off the road, or the wheels may keep their traction causing the vehicle to roll over. Tests have shown that vehicles with a high center of gravity can roll over at the posted speed limit for a curve.

- Slow to a safe speed before you enter a curve. Braking in a curve is dangerous.
- Slow down as needed. Don't ever exceed the posted speed limit for the curve. To help maintain control, be in a gear that will allow a slight acceleration through the curve.

Reminder – *The posted advisory speed normally is set for cars not buses.*

Speed and Distance Ahead - You should always be able to stop within the distance you can see ahead. Fog, rain or other conditions may require a slower speed to enable you to stop within that distance. At night, you can't see as far ahead with low beams as you can with high beams. When using low beams, slow down.

Speed and Traffic Flow - Drive at the speed of the traffic if possible, without traveling at an illegal or unsafe speed. Maintain a safe following distance.

A common reason drivers exceed the speed limit is to save time. 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 faster than the speed of other traffic results in:

- Frequently passing other vehicles, thus increasing the chance of a crash.
- Fatigue, which also increases the chance of a crash.

Recommendation: When driving on a highway with a posted speed limit of 75 mph, the bus should be 5 – 10 mph below speed limit.

Speed on Downgrades - Traveling at an appropriate speed is most when thing in descending long, steep hills safely. If you do not go slowly enough, overuse of the brakes can cause them to become so hot they won't slow you down. Shift the transmission to a low gear and check the brakes before starting down the grade. Pay attention to signs warning of long downhill grades ahead. Descending steep hills safely is discussed more in Unit Six, Mountain Driving.

Proper Braking Technique - Remember: The use of brakes/retarder on a long and/or steep downgrade is only a supplement to the braking effect of the engine. Once the vehicle is in the proper low gear, apply the retarder, if equipped. The following is the proper braking technique:

1. Downshift the transmission. Be in the proper gear.
2. Apply the brakes/retarder just hard enough to feel a definite slowdown.
3. When speed has been reduced to approximately 5 mph below your “safe” speed, release the brakes. (This brake application should last for about 3 seconds.)
4. When your speed has increased to the “safe” speed, repeat steps 2 and 3. For example, if the “safe” speed is 40 mph, you would not apply the brakes until the speed reaches 40 mph. You now apply the brakes hard enough to gradually reduce the speed to 35 mph and then release the brakes. Repeat this as often as necessary until you have reached the end of the downgrade.

DRIVING AT NIGHT

Driving at night creates a greater risk for drivers. Hazards are not as visible as during daylight hours, so there is less time to respond. Drivers caught by surprise are less able to avoid a crash. Three factors that effect night driving are: the driver, the roadway, and the vehicle.

Driver Conditions - People can't see as sharply at night or in dim light. Also, the eyes need time to adjust to seeing in dim light. Most people have noticed this when walking into a dark movie theater. Drivers can be blinded for a short time by bright light. Some drivers are especially bothered by glare. People have been temporarily blinded by the high beams of an oncoming vehicle. It can take several seconds to recover from glare. Even two seconds of glare blindness can be dangerous. A vehicle going 55 mph will travel more than half the distance of a football field during that time. Avoid experiencing glare blindness by looking to the right side of the road when someone coming toward you has very bright lights.

Fatigue and lack of alertness may increase at night. The body's need for sleep is beyond a person's control. Most people are less alert at night, especially after midnight. This is particularly true if you have been driving for a long time. Drivers may not react as quickly to hazards, increasing the chance of a crash. When you are sleepy, the only safe cure is to get off the road and get some sleep. If you don't, you are risking your life and the lives of others.

Other Motorist Conditions - Motorists under the influence of drugs or alcohol are a hazard to themselves and to you. Be especially alert around the closing times for taverns. Watch for drivers who have trouble staying in

their lane, maintaining speed, stopping without reason, or showing other signs of being under the influence of alcohol or drugs.

Roadway Conditions - In the daytime there is usually enough light to see well. This is not true at night. Some areas may have bright streetlights; others will have poor lighting. On most roads, you will probably have to depend entirely on your headlights.

Less light means you will not be able to see hazards as well. Road users who do not have lights are hard to see. There are many crashes at night involving pedestrians, joggers, bicyclists, and animals.

Even when there are lights, the road scene can be confusing. Traffic signals and hazards can be hard to see against a background of signs, shop windows, and other lights. Use a slower speed when lighting is poor or confusing so you are able to stop within the distance you can see ahead.

Vehicle Conditions - At night, your headlights will usually be the main source of light enabling you to see and for others to see you. Visibility is not nearly as good at night with your headlights as in the daylight. Low beams allow you visibility of about 250 feet while high beams allow about 350-500 feet. Adjust your speed to keep stopping distance within sight distance, i.e., ability to stop within the range of your headlights.

Night driving can be more dangerous if you have problems with your headlights. Dirty headlights may give only half the light they should. This cuts down your ability to see, as well as making it harder for others to see you. Make sure all lights are clean and working properly. Headlights can be out of adjustment. If they don't point in the right direction, they don't give you a good view and can blind other drivers. Have a qualified person make sure they are adjusted properly.

In order for you to be seen easily, the following must be clean and working properly.

- Reflectors
- Turn signals
- Clearance lights
- Taillights
- Headlights
- Brake lights
- Reflective tape

At night, your turn signals and brake lights are even more important for communicating to other drivers what you intend to do. Make sure they are clean and working properly.

It is essential at night to have a clean windshield and mirrors. Bright lights at night can cause dirt on the windshield or mirrors to create a glare of its own, blocking your view.

Most people have experienced driving toward the sun just as it has risen or is about to set and found that they can barely see through a windshield that appears alright in the middle of the day. Clean the windshield on the inside and outside for safe driving at night.

Night Driving Procedures

- Make sure eyeglasses are clean and not scratched. Do not wear sunglasses at night.
- Do a complete pre-trip inspection of the vehicle. Pay attention to checking all lights and reflectors and cleaning those you can reach.
- Avoid blinding others. Glare from your headlights can cause problems for drivers coming toward you and for those going in the same direction if the lights shine in their rearview mirrors.
- Dim the lights before they cause glare for other drivers; within 500 feet of an oncoming vehicle and within 500 feet of a vehicle in front of you.
- Use high beams when you can. Some drivers make the mistake of always using low beams. This seriously cuts down on their ability to see ahead. Use high beams when it is safe and legal to do so.
- Light inside the vehicle makes it harder to see outside. Keep the interior light off and adjust the instrument lights as low as possible and still be able to read the gauges.
- Avoid glare from oncoming vehicles. Do not look directly at lights of oncoming vehicles. Look slightly to the right at a right lane or edge marking if available. When other drivers fail to dim their lights, do not get back at them by putting your high beams on. The action creates glare for them and increases the chance of a crash.
- Stop driving if sleepy. People often don't realize how close they are to falling asleep even when their eyelids are falling shut. If you can safely do so, look in a mirror. If you look sleepy, or just feel sleepy, stop driving! You are in a very dangerous condition. The only safe cure is to sleep.

TIRE FAILURE

It is very important that tire failure be recognized and necessary safety procedures be acted upon immediately. It is also important that the actions taken do not create an additional unsafe condition.

Proper inflation of the tires is important. Low inflation or lack of tread increases the effect of hydroplaning, reduces cornering ability, and

increases the chance of a blowout. Stopping distance is increased from poor contact with road surface. Over-inflation increases the chance of tread separation and tire failure.

Recognize Tire Failure - Quickly knowing you have tire failure allows you more time to react. Having just a few seconds to remember what you are supposed to do helps you control the situation. Major signs of tire failure are:

- **Sound** - The loud “bang” of a blowout is easy to recognize. Because it can take a few seconds for your vehicle to react, you might think it was some other vehicle. Any time you hear a tire blow, assume it was yours.
- **Vibration** - If the vehicle thumps or vibrates heavily, it may be a sign that one of the tires has gone flat. With a rear tire, that may be the only sign you get.
- **Feel** - If the steering feels “heavy,” it is probably a sign that one of the front tires has failed. Sometimes failure of a rear tire will cause the vehicle to slide back and forth or “fishtail.” However, dual rear tires usually prevent this.

Safety Procedure - Any of the above mentioned signs is a warning of possible tire failure. You should:

1. **Hold the steering wheel firmly** - If a front tire fails, it can twist the steering wheel out of your hand. The way to prevent this is to keep a firm grip on the steering wheel with both hands at all times.
2. **Stay off the brake** - It’s natural to want to brake in an emergency. However, braking when a tire has failed could cause loss of control. Accelerating slightly may help with control. Unless you’re about to run into something, stay off the brake until the vehicle has slowed down. Then brake very gently, pull off the road and stop.
3. **Check the tires** - After coming to a stop, get out and check all the tires, even if the vehicle seems to be handling properly. If one of the dual tires goes out, the only way to know it is to get out and thump it.

SKIDS

A skid happens whenever the tires lose their grip on the road. This is caused in one of four ways:

1. Over-braking and locking up the wheels. Skids also can occur when over using the retarder on a slippery road. Rapid deceleration by engine braking can also cause the drive wheels to skid.
2. Over-steering the wheels more sharply than the vehicle can turn, especially on curves.
3. Applying too much power to the drive wheels causing them to spin.

4. Driving too fast. Most serious skids result from driving too fast for road conditions. Drivers who adjust their driving to conditions, don't over-accelerate and don't have to over-brake or over-steer from too much speed.

Rear Wheel Skids - Rear wheel braking skids occur when the rear wheels lose traction. Since sliding wheels have less traction than rolling wheels, the rear wheels usually slide sideways in an attempt to "catch up" with the front wheels. In a bus, the vehicle will slide sideways in a "spin out."

A rear-wheel braking skid can be corrected by:

- **Releasing the brakes** - This will let the rear wheels roll again, and keep the rear wheels from sliding any further.
- **Turning quickly** - When a vehicle begins to slide sideways, quickly steer in the direction you want the vehicle to go.
- **Counter-steering** - As a vehicle turns back on course, it has a tendency to continue turning. Unless you turn the steering wheel quickly the other way, you may find yourself skidding in the opposite direction.

Learning to stay off the brake, turning the steering wheel quickly, pushing in the clutch, and counter-steering in a skid takes a lot of practice. The best place to get this practice is on a large driving range or "skid pad."

Excessive acceleration can also cause a rear wheel skid. Skids caused by acceleration usually happen on ice or snow. Taking your foot off the accelerator can easily stop a skid.

Front-Wheel Skids - Driving too fast for conditions causes most front-wheel skids. Other causes are lack of tread on the front tires, and insufficient weight on the front axle. In a front-wheel skid, the front end tends to go in a straight line regardless of how much you turn the steering wheel. On a very slippery surface, you may not be able to steer around a curve or turn. A front-wheel skid can only be corrected if you:

- Let the vehicle slow down.
- Stop turning and/or braking so hard.
- Slow down as quickly as possible.

DRIVING IN HOT WEATHER

Bleeding Tar - Tar in the road pavement frequently rises to the surface in very hot weather. Spots, where tar bleeds to the surface, are very slippery.

Go Slow Enough to Prevent Overheating - High speeds create more heat for tires and the engine. In desert conditions, the heat may build up to the point where it is dangerous. Excessive heat increases the chance of tire failure, fire, and engine failure.

ADVERSE DRIVING CONDITIONS

You cannot steer or brake a vehicle unless you have traction. Traction is friction between the tires and the road. There are some road conditions that reduce traction and require lower speeds.

Slippery Surfaces - It will take longer to stop and be harder to turn without skidding when the road is slippery. You must drive slower to be able to stop in the same distance as on a dry road. Wet roads can double stopping distance. Reduce speed by about one third (e.g. slow from 55 to about 35 mph) on a wet road. On packed snow, reduce speed by one half, or more. If the surface is icy, reduce speed appropriately and follow local policy.

Identifying Slippery Surfaces - Sometimes it's hard to know if the road is slippery. Here are some signs of slippery roads:

- **Shaded areas** - Shady parts of the roads will remain icy and slippery long after open areas have melted.
- **Bridges** - When the temperature drops, bridges freeze before the road does. Be especially careful when the temperature is close to freezing (32 degrees F).
- **Melting ice** - Slight melting makes ice wet. Wet ice is much more slippery than ice that is not wet. Be cautious of packed snow or icy roads when the outside temperature is near the melting/freezing point (32 degrees F).
- **Black ice** - A thin layer clear enough so you can see the road underneath it. It makes the road look wet. When the temperature is below freezing and the road looks wet, it could be black ice.
- **Rain** - After it starts to rain, the water mixes with oil and road grime left on the road by vehicles. This makes the road very slippery. If the rain continues it will wash the oil away.

Tire Chains - Colorado's chain law with rules and regulations were adopted by the Colorado Department of Transportation and became effective November 1, 1996.

- The chain law applies to every state highway, federal highway and interstate throughout Colorado. When the chain law is in effect, drivers will see signs along the roadway indicating which vehicles should chain up. In some areas of the state, lighted variable message signs will also alert drivers to the chain information.
- Metal chains must consist of two circular metal loops, one on each side of the tire, connected by not less than nine evenly spaced chains across the tire tread.

- Approved alternative traction devices (ATD) may be used instead of chains. These include wheel sanders (vehicle must carry enough sand to negotiate the hill), or pneumatically-driven chains which, when engaged, spin under the drive wheels automatically as traction is lost.
- Drivers of commercial vehicles who ignore the chain law can be fined for not putting chains on their vehicles when required. A driver can be fined if the vehicle is not chained when the law is in effect, and as a result blocks the highway.
- There are two levels of the chain law, level one and level two. Level one does not apply to school buses. When level two of the chain law is in effect, chains are required for ALL commercial vehicles. This includes buses or vehicles that are designed to carry 16 or more passengers.

Level two may be implemented any time there is snow covering the entire traveled portion of the pavement on an ascending grade, or when, in the discretion of the highway maintenance supervisor (or designee), road, weather, or driving conditions make this restriction necessary to protect the safety of the traveling public or minimize occurrence of road closures.

- Colorado Department of Transportation or law enforcement personnel may control the re-entry of vehicles from the chain inspection stations to the state highway to assist and enhance the flow of traffic, and assure the safety of the traveling public.
- The chain law shall cease to be in effect where designated by a sign or when bare pavement is encountered on a descending grade.

Remember - Colorado's weather can change dramatically and quickly. Drivers need to be prepared. Call ahead for road conditions and chain information for Colorado's major highways.

- Suggestions for the use of automatic chains - Automatic chains are activated by a switch in the driver area providing a quick and easy traction device. Automatic chains should be activated and deactivated when the bus is in motion to prevent damage to the chains. Recommended maximum traveling speed while chains are activated is 30 mph. Automatic chains are ineffective in deep snow.

Potholes - Potholes can develop quickly, especially in the spring. Hitting potholes may cause loss of steering control and damage to the bus.

Reduced Visibility - Weather - When drivers think of adverse weather conditions, they usually think of the condition of the road. Don't overlook the fact that visibility is also affected. No matter how good your eyes are, you will not be able to see as well during a storm. Adjust your driving accordingly.

Water on Roadways - Water entering brake drums will reduce braking efficiency. Avoid driving through a large amount of water whenever possible.

- If you must drive through water, reduce your speed before you get to it. A slight application of the brakes when running through water will reduce the amount of water admitted to the brakes and shoes. During excessively wet conditions, or after passing through deep water, test your brakes for operation. It may be necessary to apply the brakes slightly for a short distance to dry them out and restore normal braking.
- If water is flowing over the roadway, do not attempt to cross since the roadway may be washed out.

Hydroplaning - When water or slush collects on the road, the vehicle can hydroplane. It is like water skiing, tires lose their contact with the road and have little or no traction. You may not be able to steer or brake. You can regain control by releasing the accelerator. This will slow the vehicle and let the wheels turn freely. If the vehicle is hydroplaning, do not use the brakes to slow down. If the drive wheels start to skid, shift to neutral or depress the clutch to let the wheels turn freely.

- It does not take a lot of water to cause hydroplaning. Hydroplaning can occur at speeds as low as 30 mph and with less than 1/8 inch 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 are not deep, they do not work well.) Be especially careful driving through puddles. The water is often deep enough to cause hydroplaning.

Reduced Visibility - Sunlight - Although bright sunlight may not be considered adverse weather, it can create serious hazards to motorists. Don't be caught unprepared! Take your sunglasses and use them (don't wear them for night driving). Adjust visors to block out direct sun. Avoid looking directly at the sun, bright reflections, or glare as this can affect your vision for several seconds.

Wind - While loss of traction and limited visibility are the most common weather related problems a driver must face, you must also be aware of and be ready for potential hazards caused by wind.

- The side of a school bus acts like a sail. A strong cross wind at the top of a hill, or even a gusting wind on an open straightaway, can cause loss of control if the driver is unprepared. Be alert.

Compression Lock - Compression lock is a potentially dangerous situation that can happen on steep downgrades in extremely slick conditions. If you are in too low of a gear, the engine compression can prevent the rear wheels from turning fast enough to maintain traction. The weight of your vehicle will push the affected wheels in the direction of the

fall line (straight downhill). Acceleration will pull you out of the slide, but you are now traveling at a higher speed. Select a higher gear and lightly apply your brakes.

Hints and reminders for driving in adverse weather:

- Check road conditions prior to departure.
- Road shoulders are softer and provide better traction than the slick roadway.

Caution: *Plow blades can overshoot the road shoulder, leaving a “false shoulder” of snow with nothing underneath.*

- Speed should be conservative when conditions are less than perfect. Keep your speed down to a pace from which you can stop quickly in the event of the unexpected.
- The unexpected happens often.
- Know your limits and the bus limits. You can always stop and wait for more favorable conditions.
- Test traction conditions and braking ability on a straight road section before you need to know. Do this in a safe location when no other traffic is present.
- Mud can be just as slick and more treacherous than ice or snow.
- Different types of snow provide different qualities of traction. From dry granular snow, to cold packed snow, to wet snow over icy snow packed, to melting packed snow or ice. Traction is reduced as temperatures rise and is at its worst at or near the freezing/melting point.

Caution - *Leftover sand or gravel on dry roads can affect the vehicle’s ability to turn and/or stop. It can cause loss of traction.*

- To maintain traction, chains may be necessary to descend a grade that could be climbed without them.

PROCEDURES FOR RTD LIGHT RAIL TRACKS

General Information - The Regional Transportation District (RTD) light rail tracks, in and around the Denver Metro area, are points of extreme danger. School transportation vehicle operators must exercise the utmost care when approaching, traveling alongside, and crossing light rail tracks.

The RTD light rail tracks are not a distance away from the road like most railroad tracks. They are in most cases, a part of the same street motorists drive on. The light rail tracks run parallel to traffic, traveling in the same direction as traffic, or against the traffic flow. There are several locations where the RTD light rail tracks cross major streets.

Light rail vehicles (LRV) may approach from either direction. Pay attention to all sets of tracks. Even though a train may have left the crossing on one track, another train may be approaching on another track. They are very quiet and appear to be traveling slower than they actually are. Each car weighs 40 tons and is equipped with a bell, an emergency siren, and three bright lights that can be seen two to three blocks away. Two of the lights are in the “normal” headlight positions, and the third is in the middle, at the top of the LRV. LRV have turn signals to indicate which direction they are turning.

In most cases, there are no physical barriers such as curbs or medians separating the vehicle traffic from the LRV rails. The rails are set in concrete and are a lighter color than the asphalt on the street. Certain weather and light conditions will reduce the visibility of this subtle difference.

In some areas the tracks are close to parking areas. Motorists can become confused as to where to park.

Warning Signs - A yellow, diamond shaped warning sign with a black symbol of a streetcar indicates the location of the LRV tracks. At the intersections or by the tracks, these signs have a black bi-directional arrow below the streetcar symbol. Before intersections, these signs have the term “AHEAD” below the streetcar symbol.

Procedures for Light Rail Crossings - Treat light rail crossings as a railroad crossing except for the use of the hazard lights. Use the hazard lights only when necessary, as they are not recommended or required.

1. Instruct passengers to be quiet when stopping at a LRV crossing. Turn down the radio.
2. Flash the brake lights if required to stop.
3. Stopping on the tracks is unsafe and against the law.
4. Always observe the “Stop Here on Red” sign and the white safety strip (stop line) location.
5. Traffic light controlled intersections govern both the motorist and the LRV. Treat these locations like any other traffic light controlled intersection. Look and listen in the appropriate directions for LRV, motorists, and pedestrians before crossing the tracks.
6. At stop-sign-controlled intersections, CDE recommends that a school bus operator, when stopped, open the driver’s side window and the service door. Look and listen in the appropriate directions for LRV, motorists, and pedestrians. Close the service door before proceeding across the tracks.
7. Never cross the light rail tracks until the entire vehicle’s length can safely clear the tracks.

8. Never back across the light rail tracks.

CDE recommends that school transportation operators do not park their vehicles near a light rail track or crossing. When parking, always consider the safest loading/unloading position for school passengers.