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INTRODUCTION
Unit F provided you with some basic safe driving techniques for school bus operators geared towards reducing the number of crashes related to driver error, vehicle failure and hazardous roadway conditions. As you well know, operating a school bus requires additional, often specialized knowledge and skills to transport your students safely and efficiently to and from their destinations.

In addition to learning a pattern of special driving skills, you must practice each skill correctly until it becomes a habit. If you can minimize and eliminate crashes resulting from driver error, safe student transport will continue to be a hallmark of the school bus mode of transportation. The following procedures have been developed to assist you in driving a school bus safely. Remember, as a professional school bus operator, you are entrusted with the lives and safety of human cargo that cannot be measured in financial terms. Study, learn and practice the techniques.

PREPARING TO DRIVE
As mentioned in previous units, your experience in driving automobiles can provide a basis for learning to drive a school bus. However, there is a significant difference in scale. To help prepare for this, you must recognize the differences in your vehicle and prepare to operate your vehicle BEFORE you pick up any student and remember safety is first and schedule is second.

VEHICLE TYPES
One factor as to why school buses are the safest means of ground transportation in the United States is the stringent vehicle body design and construction standards they are built under and must adhere to. School buses are built so they sit above the crash line, are compartmentalized with high seat backs with padding to absorb full body impact, and have emergency exits to provide added safety. As a school bus operator, you do not need to become an expert on the construction of the vehicle you operate, but a general working knowledge of how your bus is built and the standards it must meet will give you a greater understanding and assist you in answering questions from the general public concerning “how safe” your passengers really are.

TYPES OF SCHOOL BUSES
Type A (Cutaway Van)
A Type A school bus is a school bus converted from or having a body constructed upon a van-type truck or front-section vehicle chassis, with a left side driver’s door and the entrance doors behind the front wheels. This definition includes two classifications: Type A1, with a Gross Vehicle Weight Rating (GVWR) less than or equal to 10,000 pounds; and Type A2, with a GVWR greater than 10,000 pounds.

Type B (Integrated)
A Type B school bus is a school bus constructed utilizing a stripped chassis with the entrance door behind the front wheels. This definition includes two classifications: Type B1, with a GVWR less than or equal to 10,000 pounds; and Type B2, with a GVWR greater than 10,000 pounds.

Type C (Conventional)
A Type C school bus is a school bus constructed utilizing a chassis with a hood and front fender assembly without a left side driver’s door and with the entrance door behind the front wheels.
**Type D (Transit Type)**
A Type D school bus is a school bus constructed utilizing a stripped chassis with the entrance door ahead of the front wheels.

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.

In preparing to drive, refer to Unit E; “Preventive Maintenance” procedures for a detailed review of the pre-trip inspection. Getting the bus ready for your daily run is an important part of safe driving. Always check your vehicle for safety defects or problems. State law and regulation require passengers and drivers in vehicles equipped with seat belts to wear them whenever the vehicle is in motion.

In summary:

- Complete your pre-trip inspection;
- Adjust your mirrors;
- Adjust your seat; and
- Fasten your seat belt.

**REFERENCE POINT DRIVING**
A reference point is some fixed object or point on your bus that when lined up with points outside the bus will give you consistent reference to judge when to turn, move, stop, line up your bus, or judge the amount of space available around your bus. Any point on the bus such as the door, outside mirrors, windshield center post, bus hood, front and rear bumpers, etc., can be used as a reference point. These points are easily detectable and readily seen by you in the driving position. The distance or guidelines outside the bus are then predetermined by direct measurement or observation before you use your bus for the first time. Once these points are determined and you are comfortable with the understanding of what each reference point is telling you, these points should remain constant.

Here are a few simple steps for determining reference points on your bus (get some help at first, if possible):

1. Position yourself comfortably in your driver's seat;
2. Pick an easily observable point on the hood or windshield of your bus;
3. With the help of someone outside your bus (if possible), on a conventional style bus, find the point on the ground where the edge of the hood lines up with the point on the ground directly in front of it. For a transit style bus, use some point on the windshield to mark your point on the ground in front of the bus;
4. Once you determine this point, note it in your mind and remember it for future reference; and
5. Remember to do this in your own bus, since the point of reference may change from bus to bus depending on the height of the driver's seat and the model of the bus.
For example, if the distance from your reference point to your front bumper measures 18 feet, you will know that whenever you are sitting in the driver’s seat, the point on the ground you see directly in front of the hood of your bus is 18 feet from the front bumper. This will be helpful for determining the proper distance to stop at railroad grade crossings.

For determining reference points to the side or rear of your bus, make sure you are seated comfortably in your seat with seat belt attached. Then, mark points on the various outside rear view mirrors on either side of your bus.

To determine the point directly below your rear bumper, use a point in your left (or right) rear view mirror that lines up directly over the bottom of your left rear wheel well and your rear bumper. Now measure the distance from this point on the ground to the edge of your rear bumper. Remember this distance. You should use reference points on both left and right rear mirrors.

This rear reference point can be helpful when estimating the distance from your rear bumper to some point on the ground and can be especially helpful at a railroad grade crossing when determining the distance of your rear bumper from the track.

Finally, remember these measurements should be made and will only be applicable on level ground. Adjust your front and rear measurements when your bus is stopped on a sloped surface.

**KNOW YOUR ROUTE**

You’ll be more confident and be a safer driver when you become completely familiar with the route you drive. You must know what to do with hazards on your route. For example, some intersections are more hazardous due to limited sight or an area with poor drainage that floods.

Follow the local policy and procedures for reporting hazardous stops/routes. If possible, come up with a solution to the problem. Changing the bus route or bus stop location might solve the problem. The township road supervisor might be able to make some changes to the roadway to correct the problem. You could designate a place for your students to stand when the snow is piled up.

There are some hazards that are unavoidable. By being aware of the potential hazards on your route, you will be better prepared for the challenge.

On the route schedule you keep in your bus, make notes of the route hazards, so if there is ever a substitute bus driver on your route, they will have this knowledge, too.

**FIELD TRIP / ATHLETIC TRIP CONCERNS**

Field trips can present some new situations you haven’t experienced, if you are a new driver. Particular situations that might arise could include the following:

- Wondering if the bus will fit (on a street, in a parking area);
- One-way streets;
- Fueling;
- Tolls;
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- Parking areas;
- Loading/unloading areas;
- Food and rest room availability;
- Security of area to park bus;
- Weather;
- Chaperones;
- Discipline;
- Medical problems and first aid;
- Terrain;
- Nighttime driving;
- Directions;
- Low clearance;
- Weight limit on bridges;
- Laws in other states; and
- Break downs.

If you are traveling out of state, make sure you have the proper credentials. This includes that you be at least 21 years of age, have the U.S. DOT physical (if employed by a contractor), and carry your log book (if applicable).

Here are some steps to help you be prepared for the field trip/athletic trip.

1. Become familiar with the route.
   a. Look at a map, take a map with you, ask other drivers who have previously made the trip.
   b. Drive the route in a car prior to the trip.
   c. Find out if there are any detours or closed roads. You can call 511, which allows you to instantly access updated road and weather conditions, traffic information, and construction reports for specific routes, regions and cities. Also, refer to www.511pa.com.
   d. Plan an alternate route.
2. Know where parking is and ensure it is secure.
3. Have a full tank of fuel.
4. Make sure you cover the emergency evacuation procedures with students and chaperones.
5. Keep aisles and exits clear of baggage and equipment.
6. Carry emergency phone numbers for school personnel.
7. Know what to do and who to call, if you break down or have an emergency.
8. Communicate with the person in charge of the trip.
   a. Get the name of the person in charge and their cell phone number.
   b. Give the person in charge your name and cell phone number.
   c. Agree on loading and unloading places and times.
   d. Make sure you and the person in charge know how to get in touch with each other.
   e. Make sure the person in charge knows where the bus will be parked.
STARTING AND OPERATING A DIESEL VEHICLE

Guidelines for starting and driving your diesel bus, as well as proper gear shifting techniques are detailed in The Commercial Driver’s Manual (Publication 223). Refer to this manual when practicing and refining your techniques. Keep in mind that smoothness in driving is one key to safe driving and good relations with your students. Gear shifting requires knowledge, skills and practice. You must learn the best range of speed for changing gears upward and downward, and you must shift gears without losing your view of the road. Over the course of your driving experiences, you may be required to shift gears in vehicles with standard transmissions and vehicles with automatic transmissions. No matter what transmission type you have, remember to always engage your parking brake when your vehicle is not in use.

DIESEL-POWERED MOTOR VEHICLE IDLING ACT: ACT 124 OF 2008

Diesel vehicles are a significant source of emissions that contribute to elevated ozone and fine particulate concentrations in Pennsylvania. Diesel exhaust from school buses poses a health risk, particularly to children and drivers. Diesel exhaust contains small particles as well as smog-forming and toxic air pollutants. Exposure to diesel exhaust can cause lung damage and respiratory problems and can exacerbate asthma and existing allergies. Buses that idle outside schools can pollute the air inside the school building as well as outdoors.

In 2008, Act 124 (Diesel-Powered Motor Vehicle Idling Act) was passed, which reduces unnecessary idling of the main propulsion engine in diesel-powered motor vehicles, including trucks and buses. Essentially, Act 124 prohibits the owners and drivers of any diesel-powered motor vehicles with a gross weight of 10,001 pounds or more engaged in commerce from allowing the engine of the vehicle to idle for more than five minutes in any continuous 60-minute period. However, 35 P.S. Section 4603(c)(10) allows a school bus to idle a total of 15 minutes in a continuous 60-minute period to provide heat or air conditioning to students. This section also allows school buses transporting students with special needs to idle for an unlimited amount of time when it is necessary to maintain a safe temperature.

Keep in mind that while Act 124 preempts and supersedes local anti-idling ordinances or rules, more stringent idling restrictions imposed by counties of the first and second class (Allegheny and Philadelphia counties), continue in full force and effect, provided they are not amended, suspended or rendered invalid. Here are a few good tips:

- As a general rule, buses should be moving whenever the engine is on;
- The engine should be turned off as soon as possible after arriving at loading or unloading areas;
- The school bus should not be restarted until it is ready to depart; and
- Limit idling time during early morning warm up to what the manufacturer recommends (generally no more than five minutes).

PEDAL MISAPPLICATION

Pedal misapplication occurs when the bus operator applies the accelerator instead of the brake. This error can result in serious crashes. The school environment presents a unique risk with respect to unintended acceleration from pedal misapplication. A typical loading or unloading operation at the school involves multiple vehicles and many children. Often, the children line up, wait or congregate near the buses exposing them to possible danger. Every bus at the loading area can introduce an opportunity for pedal misapplication, and the large number of children represents a potential increase in the severity of the outcome should pedal misapplication and unintended acceleration occur.
There are a few things you can do to help prevent pedal misapplication.

1. Become familiar with your vehicle. Be sure you practice operating your bus before picking up and dropping off students. This will give you familiarity with the location of your accelerator and brake. This is especially important if you are operating a bus that is not your regular bus. If you are unfamiliar with the pedal configuration of an alternate bus, practice first.

2. The National Transportation Safety Board (NTSB) recommends that at locations where you are boarding a large number of students at once (like a school), start your bus only after loading is complete.

STEERING AND TURNING YOUR BUS

You must know the proper techniques for steering a school bus and must be able to make all turning maneuvers correctly and smoothly.

STEERING TECHNIQUES

Proper steering requires the proper positioning of your hands on the steering wheel. Grip the wheel securely with both hands, putting your hands on opposite sides of the wheel. For example, this may mean placing your hands at the ten o’clock and two o’clock positions. One hand on the wheel is less than half as safe. Your hands should be on the outside of the steering wheel with your thumbs on the front of the wheel.

Two steering methods are recommended for school bus drivers. In the push-pull steering method, one hand pulls, and the other hand pushes. The hand-over-hand method also may be used, but you should be careful not to catch your thumb on the safety chain of your wristwatch, bracelet or clothing while steering. Never palm the steering wheel or turn it with a finger or thumb. If you have to steer quickly or jerkily, you are going too fast – slow down.

TURNING PROCEDURES

To drive your school bus you must use the steering techniques described above while executing a number of different turning maneuvers. These maneuvers include rounding curves, and making left and right turns. The average speed limits on freeways and other roads on your route force you to use practiced skills and judgment to perform these maneuvers properly and safely. This includes being aware of the pivot or turning point of the bus while following the various turning procedures. For large school buses, the pivot point is located at the rear axle. The procedures described below are applicable in most driving situations. You always need to be aware of traffic around you before you make your turn.

Rounding Curves

Judge beforehand if you will be able to negotiate an upcoming curve at your present rate of speed. If you must brake, do so before entering the curve. Never plan to brake in the middle of a curve as this can cause skidding and loss of control. Use the following procedures when steering through curves (see Figure G-1):

1. Slow down, and look ahead for the sharpest point in the curve;
2. Brake, if necessary, before getting into the curve;
3. For curves to the right, move as close to the center line as is safe, and use the width of the lane while rounding the curve. This will help to smooth out the curve;
4. For curves to the left, enter the curve from the right edge of your lane; and
5. When you reach the midpoint of the curve, resume power and accelerate through the remainder of the curve.
Making Left and Right Turns

The procedures listed below will enable you to prepare for and make turns and to reenter the traffic pattern while maintaining proper lane positions. When making either a left or right turn, start signaling at least 100 feet before turning, if you are travelling at speeds of 35 mph or less, and at 300 feet if you are travelling at speeds over 35 mph. (See Figures G-2 and G-3.)

WHETHER MAKING A RIGHT OR LEFT TURN, BE AWARE THAT THE REAR OF YOUR BUS WILL PROJECT OUTWARD AS YOU ARE MAKING THE TURN. BE CAREFUL WHEN MAKING A LEFT OR RIGHT TURN WHEN YOU ARE NEXT TO ANOTHER VEHICLE OR OBJECT.

Keep in mind that Pennsylvania school bus crash statistics show improper turning was indicated as the third most common driver action in crashes when the school bus was the prime unit. Data also indicates that 38 percent of school bus prime unit crashes were angle crashes, which most commonly occur at intersections.

Left Turn Procedures

Left turns in a school bus are generally not as difficult technique-wise to make as right turns, but they are more dangerous. Left turn collisions at intersections tend to be severe crashes. Be sure you have adequate gaps in opposing traffic to make your maneuver. Acceleration rates are different in a school bus than for a passenger vehicle, and you are driving a longer vehicle.

1. Get into the proper lane well in advance of the turn.
2. Give left turn signal early (at least 100 feet away, if you are travelling at speeds of 35 mph or less, and at 300 feet, if travelling at speeds over 35 mph).
3. Reduce speed and downshift to the proper gear needed to execute the turn. The speed through the turn will depend on the geometry of the intersection as well as traffic conditions.
4. Check traffic conditions to the front, rear and sides.
5. Position the bus to the left edge of the traffic lane.
6. Because you do not have the right-of-way (unless at a protected left turn phase at a signalized intersection), re-check traffic signals, signs, pedestrians, or vehicles for a clear right-of-way. Use both outside mirrors and check especially for vehicles attempting to pass the bus on the left side.
7. If you must stop before making the turn, keep the front wheels straight and the brake pedal pressed. This stopping procedure will prevent your bus from being shoved into the path of oncoming traffic, if you are struck from the rear. Also, leave a space of a few feet between your bus and the vehicle in front of you. You should be able to see the rear wheels of the vehicle in front of you. If not, you are too close.
8. Check your left mirror and execute the turn smoothly without strain on the engine. Enter the highway in the left-most lane available. If multiple left-turn lanes exist, be mindful of proper lane usage, and stay in your lane as you make the turn. Steer wheels back into position; do not let the steering wheel spin wheels back.

9. After completion of turn, ensure that your turn signal is off.

10. After completing a left turn onto a multilane highway, pick up speed and move into the right lane as soon as possible.

Right Turn Procedures

Right turns are more difficult because of the length of the bus and require practice. Knowing the pivot or turning point (located at the rear axle) of the bus is critical for right turns. This responsibility is the bus operators.

For right turns:

1. Get into the proper lane well in advance of the turn.

2. Give right turn signal early (at least 100 feet away, if you are travelling at speeds of 35 mph or less, and at 300 feet, if travelling at speeds over 35 mph).

3. Reduce speed and downshift to the proper gear needed to execute the turn. The speed through the turn will depend on the geometry of the intersection as well as traffic conditions.

4. Position the bus to the right edge of the traffic lane about four feet from the curb. The bus should not be far enough away from the curb to allow a vehicle to pass on the right between the bus and the curb.

5. Check for traffic signals, signs, pedestrians, and vehicles to determine clear right-of-way. Be sure to check for vehicles between right side of the bus and the curb. Use your mirrors!

6. Check your right mirror and execute the turn smoothly without strain on the engine. This is accomplished as soon as the front wheels pass the corner, turn wide to the right, swinging over the center of the side street (if necessary) in order for the rear wheels to clear the curb. Never shift gears during a turn. Keep an eye on the right mirror while turning. Be mindful of any pedestrians who may be standing at or near the curb. Also, watch out for parked cars.

7. Enter the right-most lane available, but leave enough room to make your turn. If your bus must cross into another lane in order to make the turn, make the lane crossover in the road that you are entering.

8. Steer wheels back into position; do not let steering wheel spin back.

9. Ensure your turn signal is off.

While Pennsylvania law allows all vehicles to make “right turn on red,” unless otherwise designated, this maneuver may not be recommended when operating a school bus because of the size of the vehicle and its acceleration characteristics. Check with your contractor or local school district guidelines and procedures.
BACKING

Because you cannot see everything behind your vehicle, **backing is always dangerous, even in the best circumstances**. This is supported by Pennsylvania school bus crash data, which indicates backing is a crash cause in over 5 percent of crashes involving school buses as the prime vehicle. This seems high considering the number of times backing is required, which supports the notion it is a dangerous maneuver. Pennsylvania school bus crash data shows backing crashes are four times as likely to occur in clear weather conditions as in adverse weather conditions. This may indicate drivers are complacent with this maneuver when weather conditions are good. ANY time you have to backup, be careful and follow the recommendations below.

Avoid backing whenever you can and avoid backing a bus from a side road to a main road. Unfortunately, there may be situations where backing is necessary, such as when you are at the end of your route and there is no better designated turn around area, or if you get lost on a road and encounter a bridge weight limit. If you know of a better area to turn around that would avoid backing, talk to your transportation coordinator about modifying your route.

School buses are also most often parked by backing into their location. When you park, try to park, so you will be able to pull forward when you leave. When you have to back, follow these rules:

1. **Keep Students on the Bus** – Keep all students on the bus. State regulation (Section 104.3(d) of Title 67) requires that if backing is required at or near a loading or unloading zone, all students must be seated on the bus during the backing. Never back a bus when students are outside, so either back up before drop-off or after-pick up. Be particularly aware of students who may be late and running to catch the bus.

2. **Back and Turn Toward the Driver’s Side** – Plan your maneuver. Whenever possible, back toward the driver’s side, so you can see better. Backing toward the right side is very dangerous because you can’t see as well. If you back and turn toward the driver’s side, you can watch the rear of your vehicle by looking out the side window and in the mirror.

When backing a bus, turn the top of the steering wheel toward the direction you want to go. This may take practice.

3. **Look at Your Path** – Look at your line of travel to be sure you know what is behind you before you begin. Don’t take chances. Sometimes you can’t see enough with your mirrors; it’s much safer to get out and look, even if it means walking to the rear of the bus to determine whether the way is clear. By so doing, you may prevent a serious incident. If you need to walk to the rear of the bus, set the parking brake, turn off the motor and take the keys with you. Walk to the rear of the bus to determine whether the way is clear. Also check your clearance to the sides and overhead both in and near the path your vehicle will take. Then reenter the vehicle, check your mirrors and start backing.

4. **Back Slowly and Smoothly** – Always back as slowly as possible so you may make corrections before you get too far off course. Go slowly, so you can correct any steering errors more easily before you get too far off course. Going slowly means you can also stop quickly, if necessary.
5. Use a Helper Whenever Possible – If possible, have an adult (not a student) stationed on the driver’s side rear of the bus, so you can see him/her at all times in your mirror to warn traffic and act as your guide. If a helper is available:
   • Agree on hand signals ahead of time, especially “Stop”;
   • Position the helper out of the travel path, so you can see the helper and the helper can see the path of travel;
   • Back slowly; and
   • Stop immediately, if you lose sight of your helper.

Verbally communicate with the helper before you begin and while backing.

6. If No Adult Helper is Available – It may be necessary to use portable emergency warning devices to block off the lane of traffic the vehicle is backing into. Use the following procedure:
   a. Stop the bus in the correct position to back and activate the four-way hazard warning lights. If the bus does not have automatic back-up signals, use the horn. Remember, approaching traffic may not know you are backing, so using the four-way hazard lights and blowing the horn will help alert them to your maneuver;
   b. Signal for quiet on the bus;
   c. Using mirrors, ensure the way is clear to the rear and sides;
   d. Put transmission in reverse; and
   e. Using mirrors, back slowly and smoothly.

MAKING A TURN-AROUND

Most bus routes are planned to eliminate turn-arounds and backing because they are extremely hazardous maneuvers. Unfortunately, there may be situations where turning around is necessary. Much like with backing, if you must turn your bus around at a loading zone, always load passengers being picked up before making the turn-around, and always unload passengers being discharged after making the turn-around. If at all possible, make a turn-around in twilight or darkness when an adult helper is present to stop traffic on any roadway used for the maneuver.

Because backing the bus is an extremely dangerous procedure, the safest way to turn around is to avoid backing and use a forward turn-around. Ideally, a turn-around should be made by selecting an adequately sized, safe area away from the road, such as a parking lot, where you can slowly move the bus forward in a wide circle to turn around. Otherwise, a turn-around should be made in the following manner (see Figure G-4):

1. Activate the four-way hazard warning lights at least 200 feet before your stopping point;
2. Stop the bus in the proper position on the highway, which is one full bus length ahead of the area into which you are backing;
3. Check traffic to the front and rear, as well as roadside obstacles such as poles, trees, mailboxes and culverts. Clearance on all sides of the bus is important. You should have traffic visibility for at least 500 feet in either direction;

4. Use all mirrors and look carefully in all directions to observe traffic and obstacles, back slowly and cautiously into the designated area (see backing information above); and

5. Make sure to check traffic both ways, reenter the highway, deactivate the hazard warning lights, and proceed with extreme caution.

**STOPPING**

Unit F included detailed information on stopping requirements for school buses. 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.

**Anti-lock Braking Systems**

The U.S. DOT requires that anti-lock braking systems be on air brakes vehicles, (trucks, buses, trailers, etc.) built on or after March 1, 1998 and hydraulically braked trucks and buses with a gross vehicle weight rating of 10,000 lbs or more built on or after March 1, 1999. Many buses built before these dates have been voluntarily equipped with ABS. Your school bus will have a yellow ABS malfunction lamp on the instrument panel, if it is equipped with ABS.

**How ABS Helps You**

When you brake hard on slippery surfaces in a vehicle without ABS, your wheels may lock up. When your front steering wheels lock up, you lose steering control. When your other wheels lock up, you may skid or even spin the vehicle. ABS helps you avoid wheel lock up and maintain control. You may or may not be able to stop faster with ABS, but you should be able to steer around an obstacle while braking, and avoid skids caused by over braking.

**Braking With ABS**

ABS is designed to help the driver maintain control of the bus during emergency braking situations, not make the bus stop more quickly. ABS may shorten stopping distances on wet or slippery roads, and many systems will shorten stopping distances on dry roads. On very soft surfaces, such as loose gravel or unpacked snow, an ABS system may actually lengthen stopping distances. In wet or slippery conditions, you should still make sure you drive carefully, always keep a safe distance behind the vehicle in front of you, and maintain a speed consistent with the road conditions.

When you drive a vehicle with ABS, you should brake as you always have. In other words:

- Use only the braking force necessary to stop safely and stay in control; and
- Brake the same way, regardless of whether you have ABS on the bus.

However, in emergency braking, do not pump the brakes on a bus with ABS.

As you slow down, monitor your bus and back off of the brakes (if it is safe to do so) to stay in control.
Braking if ABS is Not Working
Without ABS, you still have normal brake functions. Drive and brake as you always have. Vehicles with ABS have yellow malfunction lamps to tell you if something is not working. The yellow ABS malfunction lamp is on the bus’s instrument panel. As a system check on newer vehicles, the malfunction lamp comes on at start-up for a bulb check and then goes out quickly. On older systems, the lamp could stay on until you are driving over five mph. If the lamp stays on after the bulb check, or goes on once you are under way, you may have lost ABS control at one or more wheels. Remember, if your ABS malfunctions, you still have regular brakes. Drive normally, but get the system serviced soon.

Safety Reminders
- ABS does not compensate for bad driving habits, such as driving too fast, following too closely or driving less carefully;
- ABS won’t prevent power or turning skids – ABS should prevent brake-induced skids, but not those caused by spinning the drive wheels or going too fast in a turn;
- ABS won’t necessarily shorten stopping distance. ABS will help maintain vehicle control, but not always shorten stopping distance;
- ABS won’t increase or decrease ultimate stopping power – ABS is an “add-on” to your normal brakes, not a replacement for them;
- ABS won’t change the way you normally brake. Under normal brake conditions, your vehicle will stop as it always stopped. ABS only comes into play when a wheel would normally have locked up because of over-braking; and
- ABS won’t compensate for bad brakes or poor brake maintenance.

Remember: The best vehicle safety feature is still a safe driver.

Remember: Drive so you never need to use your ABS.

Remember: If you need it, ABS could help to prevent a serious crash.

Remember: If your bus is equipped with ABS, do not pump the brakes in emergency situations.

GENERAL STOPPING TECHNIQUE
Use the right foot for all normal braking. A school bus is much heavier than smaller vehicles and requires the driver to begin braking sooner in order to stop smoothly. Feather the brake by reducing pressure on the brake pedal slightly just before the wheels stop rolling. This creates a smoother stop and happier passengers. A good driver anticipates stops as much as possible. This increases the margin of safety and helps save brake shoes. Avoid sudden stops.
STOPPING PROCEDURES FOR STANDARD TRANSMISSIONS
Different procedures are required for stopping at low and high speeds or on an upgrade or downgrade. If you stop the bus for more than several minutes in a non-traffic situation, turn off the engine. This not only conserves fuel, but eliminates the possibility of poisonous carbon monoxide exhaust fumes entering the bus.

Low Speed Stopping
When you are in a low gear or are traveling 10 mph or less, use the following stopping procedures:

1. Release the accelerator and when speed decreases to 3 to 5 mph, press the clutch pedal;
2. Apply the brakes gradually by increasing pressure;
3. To prevent the bus from jerking, reduce the brake pressure slightly, but not completely just before coming to a stop;
4. Place the gear shift lever into the neutral position; and
5. Release the clutch and remove foot from the clutch.

Stopping at Speeds Greater than 10 MPH
When traveling in a higher gear, the procedure for stopping is as follows:

1. Release the accelerator and press the brake pedal;
2. When you reach the minimum speed for the next lower gear, downshift to that gear. Using the lower gear will reduce the buildup of heat and avoid excessive brake wear. This is also the case for automatic transmissions; and
3. Downshifting can be very effective and smooth if you use third gear for the slowing action in five-speed transmissions, and second gear in four-speed transmissions.

Stopping on an Upgrade
When coming to a stop on an upgrade, you should:

1. Be aware of the traffic behind you;
2. Apply pressure on the foot brake lightly for a smooth stop;
3. Press clutch with left foot; shift into neutral;
4. Hold bus with hand brake, if necessary. Don’t use the clutch as a brake; and
5. Allow an extra safety margin of space between the bus and the vehicle ahead.

Stopping on a Downgrade
When coming to a stop on a downgrade, stop as you would on an upgrade, except downshift to reduce speed as necessary. If the downgrade is quite long and/or steep, use the “snub” braking technique discussed later in this unit.

CHECKING OVERHEAD CLEARANCE
Hitting overhead objects is a danger. A typical school bus is not more than 12 feet in height, so make sure you always have enough room overhead. This not only includes on-the-road hazards, such as low hanging wires, overhanging branches, etc., but overhead hazards in your bus storage location such as wash bays and garage entrances. The clearance requirement for wires over a roadway is 18 feet, but over driveways is only 15 feet. This is a significant difference and one to be aware of if you have to turn a bus around, especially if the wires appear to be hanging low.
A few other points to keep in mind:

- If you aren’t sure you have safe space to pass under an object, go slowly and watch carefully. This will allow you to stop, if you cannot make it. If you doubt you can make it, take another route. Pay attention to warnings posted in advance of and on low bridges or underpasses. These should be posted where the vertical clearance is less than 14’6 feet. A typical school bus is not more than 12 feet in height, so pay attention.

- Don’t assume the heights posted at bridges and overpasses are correct. Repaving or packed snow may have reduced clearances since heights were posted.

- Some roads are narrow and are crowned such that it can cause a vehicle to tilt. This may result in problems for the bus clearing objects along the edge of the road, such as signs or trees. Where this is a problem, drive a little closer to the center of the road as long as you keep adequate side clearance from the center of the road. You do not want to sideswipe a vehicle travelling in the opposite direction with your mirrors or bus body.

- If you have to turn a bus around and back into an area, get out and check for overhanging objects, such as trees, branches or electric wires. It’s easy to miss seeing them while you are backing. Also check for other hazards like culverts or mailboxes at the same time. Remember to turn off the bus and remove the keys from ignition, if students are on board.

- If you notice low overhanging branches along your route, consider reporting them to your supervisor who can notify the proper entity responsible for removing them. This can be important, especially with dead limbs overhanging the route, which are typically the ones to fall on the roadway after the first snow/ice storm.

- Know the height of your vehicle, including roof hatches and strobe lights.

### APPROACHING RAILROAD CROSSINGS

Crossing railroad tracks represents one of the greatest hazards in terms of mass injuries and fatalities for students riding in school buses. Planned safety procedures for vehicles crossing railroad tracks can help eliminate these crashes. Practice the procedures discussed below until they become automatic actions. At the same time, don’t let repetition create a false sense of security.

Trains cannot stop quickly as its response is limited by its size, weight and the engineer’s view down the track. A train cannot swerve to avoid a school bus. Also, due to their large size, trains appear to be moving more slowly than their actual speed. Drivers often mistakenly judge they have enough time to safely cross before the train reaches the crossing. Be aware of this fact and, whenever in doubt, wait for the train to pass. You have a number of young lives depending on you; always use extra caution when making decisions at railroad crossings.

### WHEN A BUS MUST STOP AT A RAILROAD CROSSING

State law (Section 3342 of Title 75, the PA Vehicle Code) requires all school buses, whether carrying passengers, to stop at all railroad crossings. The exceptions are:

- Crossings controlled by a police officer or flagman;
- Crossings regulated by a functioning highway traffic control signal transmitting a green light;
- Any crossing marked by the former rail operator with a “tracks out of service” sign; and
- An industrial or spur line crossing marked with an “exempt” sign.
PROCEDURES FOR STOPPING AT A RAILROAD CROSSING
When you must stop your bus at a railroad crossing, Pennsylvania regulations (Section 71.4(2)(ii)(B) of Title 67) require you to always follow these procedures:

1. When approaching, activate 4-way hazard lights;
2. Stop between 15 and 50 feet from nearest the rail;
3. Apply parking brake, transmission in neutral;
4. Open door and window;
5. Look and listen;
6. Close door;
7. If clear, put in gear and release parking brake;
8. Proceed across tracks without shifting gears; and
9. Deactivate four-way hazard lights after crossing tracks.

What follows is a more detailed discussion of these steps.

Prepare to Stop
1. Request complete silence from passengers, so you have minimal distractions. If necessary, turn off heaters to further reduce noise;
2. Turn off any AM-FM, 2-way or CB radios, or any other noise emitting devices not necessary for the safe operation of the bus;
3. As you approach, get the big picture: check traffic control devices; visibility of the crossing, tracks, terrain, and roadways on either side of the tracks; volume, type, and position of other traffic; sight distance down the tracks; and the amount of space on the other side of the track should you have to stop your vehicle shortly after crossing the track; and
4. Activate four-way hazard lights 100 to 200 feet in advance of the tracks.

Stop the Bus
1. Follow stopping procedures described earlier in this unit;
2. Stop in a position permitting you to have a clear view of the tracks in both directions. The front bumper must be clear of tracks, at least 15 feet away and at most 50 feet away from the nearest rail;
3. Pull up, so you can see the tracks in both directions, if needed;
4. Remember to allow extra distance at any railroad grade crossing since trains overlap the track by about three feet.
5. Apply the parking (emergency) brake and shift into neutral.

Look and Listen
1. Open service door and driver's window; make sure that you do not activate the eight-way light system;
2. Turn off any AM-FM, 2-way or CB radios, or any other noise emitting devices not necessary for the safe operation of the bus;
3. Look and listen through the open door and window; and
4. Never leave a bus to check for a train.
No Approaching Train
If you see and hear no signs of an approaching train, do the following:

1. Close service door;
2. Put the bus in low gear and release the parking (emergency) brake;
3. Look and listen a second time;
4. If clear, proceed across the track without shifting gears; and
5. Deactivate four-way hazard lights after clearing the tracks.

Approaching Train
A train cannot stop quickly. Trains always appear to be moving slower than they actually are. Follow these procedures when a train is approaching the crossing:

1. Hold bus in position and use the parking (emergency) brake;
2. After the train passes, proceed across the tracks as described above.

Multi-Track Crossings
At crossings with more than one set of tracks, do the following:

1. Check the crossbuck for a sign indicating the number of tracks at the crossing, if there is more than one;
2. Make sure no train is approaching on any of the tracks;
3. Only make one stop – not one stop per track; and
4. After a train passes, wait until other tracks become visible before proceeding. A second train may be approaching from the opposite direction.

OTHER POINTERS FOR DEALING WITH RAILROAD CROSSINGS
Here are a few additional safety tips to learn when driving over railroad grade crossings:

1. Learn about the various types of highway/rail grade crossing warning devices. Not only are you risking arrest, if you fail to respond properly to these devices, you are risking your life and the lives of your passengers. For example,
   a. The “crossbuck” is a passive or “non-active” sign identifying a rail crossing. Always use extreme caution when passing over a crossing. You may proceed across a railroad highway/rail grade crossing only after a train has passed and/or you determine no train is approaching.
   b. At multiple-track crossings, the number of sets of tracks governed by the crossing device is indicated by a number under the crossbuck sign. If there are multiple tracks, there will be a number to indicate how many sets of tracks will be crossed.
2. **REMEMBER**, no person shall drive any vehicle through, around or under any crossing gate or barrier at a railroad crossing while such gate or barrier is closed or is being opened or closed. If you encounter a situation where an automatic flashing light signal with gate is operating and no train has arrived after an extended period of time, report the lowered gate immediately, check for an alternate route or wait for assistance. No student can exit the bus to lift the gate.

3. Always follow directions of a police officer or flag person directing traffic at any highway/rail grade crossing.

4. Cross the tracks only after the train has cleared a position to cancel any warning devices activated, or at crossings with no automatic warning devices.

5. The drivers of manual transmission buses should place the gear in low starting gear. The driver should close the service door, look again in both directions, check for flashing signal lights, and then proceed across the tracks without stopping or changing gears.

6. The drivers of automatic transmission buses should proceed over the tracks using the normal driving gear. A good rule of thumb is to proceed in the lowest gear until you are clear of the tracks. This prevents the gear from changing while crossing the tracks.

7. Never drive onto a railroad track until you are certain there is adequate room ahead for your ENTIRE vehicle to clear the tracks completely. Know the length of your bus. It can be life threatening to begin to cross a set of tracks only to find you must stop your vehicle for traffic before you have completely cleared the tracks.

8. Never stop and backup the bus while crossing the tracks.

9. Hazard lights need to be activated approximately between 100 and 200 feet before and after stopping at the highway/rail grade crossing. Cancel your hazard lights when you have completely cleared the tracks, and your vehicle has traveled at least 100 feet from the tracks.

If for any reason your bus should become stalled on the tracks and a train is approaching, **IMMEDIATELY EVACUATE** your bus. The quickest method of evacuation would be the front- and rear-door method. The driver should assign a responsible student in each group to keep the children together. The driver must be able to see both groups of children. Students should be instructed to move away from the bus in a direction toward the train, but at a right angle to the train. (This is important, since upon impact, the bus and debris will be pushed down the track.) If the bus is stalled on the tracks and no train is in sight, the driver should evacuate the children from the front or back of the bus. The children should move to a safe place at least 200 feet away from the bus. They must not cross the tracks. All evacuation procedures need to be cleared by the district personnel.

## CROSSING DRAWBRIDGES

School buses are required to stop at drawbridges without a signal light or traffic control attendant at the gate. Stop at least 50 feet before the draw of the bridge. Look to make sure the draw is completely closed before crossing. After stopping, proceed when it is safe to do so. It is recommended you cross in low gear, so there will be no necessity for changing gears while traversing the drawbridge. Therefore, like railroad crossings, do not shift gears while crossing the draw span of any draw bridge.

You do not need to stop, but you must slow down and make sure it’s safe when:

- A traffic light on the bridge is showing green; and
- The bridge has an attendant or traffic officer who controls traffic whenever the bridge opens.
ENTERING AND EXITING THE FLOW OF TRAFFIC

While driving, you will frequently leave one traffic stream and become part of another or cross through a second stream of traffic. This may occur at intersections, or even simply picking up or discharging your students. In many cases, your vehicle movements will be regulated by traffic signs or signals. In other cases, the merging points will be controlled by your good judgment.

GENERAL

Observe the following procedures when entering the flow of traffic:

1. Turn on the appropriate turn signal well before the point of entry;
2. If appropriate, stop just before the point of entry. In many cases you will already be stopped. If you are on a freeway acceleration lane marked with a yield sign, see the next section on ramps;
3. Check your mirror to ensure all passengers are seated;
4. Ensure no pedestrians are in the path of the bus;
5. Look left and right to see if there are any moving vehicles on the road you will enter;
6. Check all mirrors for clear space around the bus including behind you. If necessary, turn your head to check blind spots;
7. Yield the right-of-way to vehicles already on the road;
8. Look for a suitable gap in traffic and, with reasonable safety, accelerate smoothly into the roadway as quickly as possible; and
9. Turn off the turn signal after you are safely in your lane.

Observe the following procedures when exiting the flow of traffic:

1. Turn on the appropriate turn signal well before the point of exit;
2. Look left and right to see if there are any moving vehicles on the road you will be merging onto, especially if it is a deceleration lane;
3. Check all mirrors for clear space around the bus, including behind you. If necessary, turn your head to check blind spots;
4. Decelerate smoothly and, remember, school buses will take longer to stop; and
5. Turn off the turn signal after you have safely exited.

ENTRANCE AND EXIT RAMPS

Observe the following procedures when driving on entrance or exit ramps. A school bus is slower to respond to changes in acceleration and deceleration, so you will need to adjust your driving habits accordingly. Enter or exit the expressway as safely and quickly as possible while accelerating or decelerating to the flow of traffic as needed.

1. Check and re-check the traffic ahead when entering the driving lane on an entrance ramp. Look specifically for vehicles stopped or slowing down.
2. When driving on a long entrance ramp with an acceleration lane marked with a yield sign, check the traffic ahead, and, if possible, allow the vehicles ahead to leave the acceleration lane before attempting to merge into the roadway. Use the acceleration lane to match speed with the main stream of traffic before entering a suitable gap.
3. Always use turn signals when merging.
4. If you are entering the main roadway from an entrance ramp without an acceleration lane or one with a stop control, stop before merging. Through the side window, observe the main stream of traffic and do not proceed until you detect a gap large enough for accelerating and merging safely and smoothly.

5. When approaching and entering an exit ramp, observe the speed of traffic and adjust your speed appropriately. Remember, posted speed limits for off ramps and on ramps are for automobiles, but may not be safe for larger vehicles. Watch for other vehicles that may be stopped or waiting in line at the end of the exit ramp.

6. Be prepared to stop.

**USING LANES AND POSITIONING ON THE HIGHWAY**

Changing lanes, being passed by other vehicles, and passing other vehicles are maneuvers you will execute often while driving a school bus. The size of a school bus and the safety of your passengers require the use of proper procedures when executing these maneuvers.

**GENERAL**

Follow these procedures:

- Always drive in the lane of traffic giving you the best maneuverability for your route (especially when making turns) and allows you the best defensive position for weather, traffic, and road conditions;
- Stay within one lane for normal driving; do not straddle lane markers;
- To maintain proper lane position, get the “big picture” of the road ahead. Always aim high in steering; don’t use white lines or other steering guides too close to the bus. Activate your four-way hazard warning lights when your speed is below the posted speed on open highways;
- Use parking lane for stopping and parking only;
- Where there is more than one lane for traffic in the same direction, travel in the right-most lane unless you intend to pass or turn left. Do not drive in the parking lane; and
- Drive at a safe following distance from other vehicles. A discussion of safe following distances can be found earlier in this unit.

**CHANGING LANES**

When you drive a school bus in an urban/suburban area, you may have to change lanes frequently. Changing lanes with a school bus requires greater concentration and more careful use of mirrors than changing lanes with a car. If a lane change is necessary, always use extreme care.

On highways and streets with multiple lanes of traffic in the same direction, use these procedures to change lanes:

- When changing lanes, always signal your intention to change lanes with your turn signal. You must always use your turn signals at least 100 feet before turning, if you are driving less than 35 mph. If you are driving 35 mph or more, you must signal at least 300 feet before turning. Look for traffic approaching from behind you in the new lane.
- If your vision in the mirror is obscured by a blind spot, move your head and look up and down (vertically) or back and forth (horizontally) until you can see around the blind spot. If it helps, turn your head to view any possible blind spots at your side and rear.
- On multilane roads, look for vehicles in your lane and adjacent lanes about to enter the lane you wish to enter. Note their speeds, and be sure you can execute your lane change maneuver safely.
Continually check your mirrors.
Remember to disengage your turn signal.

**BEING OVERTAKEN AND PASSED**
State law (Section 3345 of Title 75, the PA Vehicle Code) prohibits motor vehicles from passing a school bus when the bus has their red four-way flashers activated. Refer to Unit C. However, school buses are often overtaken and passed by other vehicles while operating on a roadway. In this situation, keep the following in mind:

- When there is no potential hazard, stay in right-hand lane and maintain your speed. Shadow the brake pedal and be prepared to stop quickly, if a hazardous situation arises from the passing vehicle.
- When on a narrow road, if following traffic builds up and a regular stop is not close by, you can consider pulling completely off of the road, using the right turn signal, and stop. Allow vehicles to pass, but never signal for them to pass. Keep your four-way flashers off. When traffic has passed and there is a sufficient gap to reenter the flow of traffic, use your left turn signal and resume your position on the road. If you cannot pull completely off of the highway, use this procedure only in legal passing zones.

**DON’T DIRECT TRAFFIC**
Some drivers try to help out others by signaling when it is safe to pass. You should not do this; you could cause a crash.

**OVERTAKING AND PASSING**
Usually you won't have to overtake and pass other vehicles, and school bus drivers should avoid passing other vehicles as much as possible. A driver usually will gain very little or nothing at all by passing, because any vehicle moving more slowly than a school bus is not likely to go very far before turning off. But, when it is necessary, use extreme caution and follow these procedures:

1. Observe the traffic ahead, and do not pass, if the lead vehicle is signaling a left turn, changing lanes in order to pass another vehicle, or passing pedestrians, cyclists, or animals;
2. Wait until your view of the road ahead and behind is clear and there is an acceptable gap in traffic;
3. On a two-lane road, check to be sure there is no oncoming traffic, and check traffic signs and road markings to determine, if passing is allowed;
4. Turn on the left turn signal at least 100 feet before turning, if you are driving less than 35 mph. If you are driving 35 mph or more, you must signal at least 300 feet before turning;
5. It is most dangerous to pass at night because you cannot see as far ahead, and it is more difficult to accurately judge distances and speed of approaching vehicles. If you can only see the headlights of an oncoming vehicle, you are likely to think it is further away than it really is. When clear, pull smoothly into the passing lane;
6. After moving past the vehicle at a safe speed, turn on the right turn signal, and then move back into the right lane when you are at least one and one-half bus lengths ahead of the passed vehicle; and
7. Turn off the right turn signal.
MOUNTAIN DRIVING AND STEEP DOWNGRADES

In mountain driving, the force of gravity plays a major role. If you have a heavy load, you will have to use lower gears and go slower to climb hills. In coming down steep hills, gravity will tend to speed you up. You must go slow enough your brakes can hold you back without getting too hot. If the brakes become too hot, they may start to “fade.” This means you have to apply them harder and harder to get the same stopping power. If you continue to use the brakes hard, they can continue to fade until you can’t slow down or stop at all. You can avoid these dangers by going slow when going downhill.

BEFORE STARTING THE DOWNGRADE

Two key elements for your driving procedures before you start the downgrade are:

1. Downshift as necessary to help control engine speed; and
2. Test your brakes by gently applying the foot brake to ensure they are functioning properly.

USING GEARS GOING DOWNHILL

Use Lower Gears When Going Downhill

No matter how big your vehicle is, going down long, steep grades can cause your brakes to fail, if you go too fast. Using lower gears will help you keep from going too fast. Lower gears allow engine compression and friction to help slow the vehicle. This is true whether you have an automatic transmission or a manual transmission.

Be in the Right Gear Before Starting Downhill

If you have a large vehicle with a manual transmission, don’t wait until you have started down the hill to shift down. You might get hung up in neutral and lose the benefit of engine braking. You would find yourself coasting, which would be illegal and dangerous.

YOU MAY HAVE TO USE LOWER GEARS GOING DOWN A HILL THAN WOULD BE REQUIRED TO GO UP THE HILL.

With older buses, a rule for choosing gears is to use the same gear going down a hill you would need to climb up the hill. However, new buses have low friction parts and streamlined shapes for fuel economy. They may also have more powerful engines. This means they can go up hills in higher gears and have less friction and air drag to hold them back going down hills. Find out what is right for your bus.

Be Observant When Going Downhill

As your bus moves down the grade, continue checking traffic in all directions and stay in the right-most lane. Don’t forget to increase your following distance. Based on your observations of existing conditions, select a safe speed for going downhill based on the weight of your bus, length and steepness of grade, weather and road conditions. To maintain that speed, refer to the braking section below.
PROPER BRAKING
When going downhill, brakes will always heat up. They are designed so brake shoes or pads rub against the brake drum or disks to slow the vehicle, which creates heat. Brakes are designed to take a lot of heat. However, brakes can be made to fail from excessive heat by attempting to slow down from too high a speed too many times or too quickly. Brakes will fade (have less stopping power) when they get very hot, and they can get to the point where they will no longer slow the vehicle.

The right way to use your brakes for long downhill grades is to go slow enough (use your gears) that a fairly sparing use of the brakes will keep your speed from increasing. If you go slowly enough, the brakes will be able to get rid of the heat, and they won’t get too hot.

Forceful, intermittent braking (snubbing) is safer than light, continued braking. Letting up on the brakes from time to time will allow them to cool enough, so they don’t become overheated. Light, continued pressure causes hot-spotting and in general makes the brakes run hotter, leading to increased probability of brake fade. Light, continued pressure also causes the brakes to wear faster, which is both a safety problem and a maintenance problem.

Therefore, select the right gear, go slow enough, and use forceful, intermittent braking (snubbing). This can be summarized in the following steps:

1. Select the right gear;
2. Go slow;
3. Apply the brakes just hard enough to feel a definite slowdown;
4. When your speed has been reduced to approximately 5 mph below your “safe” speed, release the brakes; and
5. When your speed has increased to your “safe” speed, repeat steps 1 and 2. This is also known as “snub” braking.

USING RUNAWAY TRUCK RAMPS
Runaway truck ramps have been built on many steep mountain grades. These ramps are made to stop runaway vehicles safely without injuring drivers and passengers. Runaway truck ramps use a long bed of loose, soft material (pea gravel) to slow a runaway vehicle, sometimes in combination with an upgrade.

Know runaway truck ramp locations on your route. Look for signs indicating where ramps are located and use them if you lose your brakes. Also see the section “Loss of Brakes” in Unit H (Crash and Emergency Procedures).