

# **Safe Braking on the School Bus**

## **Advanced Braking Techniques and Practices**

*Reference Guide and Test*

by

Video Communications

## **Introduction**

Brakes are considered one of the most important items for school bus safety. So what if the brakes fail on the school bus? What techniques can be applied when using the brakes on inclines and hills? How do you recover from a skid? And what techniques can be applied to stretch the life-span of brakes?

The video covers these questions and much more. Our host throughout the video is Martin Ward, C.E.O. and Safety Instructor at Mid-Placer Public Schools Transportation Agency. The purpose of this video is to make school bus drivers aware of how to use brakes in the safest manner possible, while operating a school bus. The video is divided into three sections.

*Part 1: Emergency Braking Techniques*

*Part 2: Brake Failure Issues and Techniques*

*Part 3: Additional Advanced Braking Issues*

## **Part 1: Emergency Braking Techniques**

1) Every school bus driver understands the importance of personal responsibility when operating a school bus. The job of the driver is to deliver students to and from home safely. Another key consideration that the driver must be aware of, are the vehicles surrounding the bus. ***The video poses these questions:*** What can drivers do if they are faced with sudden stops? What type of emergency maneuvers and techniques can be implemented if an emergency situation were to occur? And that is the primary topic of this first section.

2) It is extremely important that you *practice emergency braking techniques in a controlled environment*. That way you will be prepared when an emergency situation takes place. And whenever you have any doubts about how to handle the braking system on your bus, go to your supervisor and get your questions answered.

3) Here's another point to remember - As a school bus driver, you must realize that if an emergency does happen, your chances of avoiding an accident and keeping your passengers safe will depend upon how quickly and effectively you take action. Stopping quickly and safely is a safety technique that drivers should practice and understand. For example, if you get cut off by another vehicle, it will cause you to react.

4) School bus drivers must understand the effect that ***proper steering wheel control*** has when braking the school bus. In order to stop quickly or slow the bus down rapidly in order to maneuver out of danger, **both hands must be kept on the steering wheel at all times.**

5) If another driver suddenly pulls out in front of you, your natural response is to apply the

brakes. This is the correct response if there's enough distance to stop or slow the bus down to avoid an accident. First, you must remember that in most cases you are driving a vehicle that is up to 40 feet long and can weigh as much as 14 tons. Driving a vehicle that long and heavy poses many challenges. And that is why there are braking methods designed to help the driver maintain control of the bus. This becomes particularly important when it's necessary to stop the bus quickly.

**6) You should always try to brake in a straight line.** Making sure the bus stays in a straight line will allow the driver to maintain better control of the bus.

7) In the video, Martin takes the driver to a controlled area so she can practice emergency braking. Also, this is for the driver to get an idea of what it would feel like if she was ever faced with making an emergency stop. The driver starts down the hill and reaches approximately 30 M.P.H. Then she presses on the service brake firmly, and holds it in place. In the video, the bus makes a sudden stop causing the driver's window to close and the driver's armrest to fall forward.

8) Martin explains that when braking in a bus with anti-lock brakes, the driver must firmly apply the service brake and hold. Anti-lock brake systems are designed to adjust brake pressure so the wheels do not skid. In a bus without Anti - lock brakes, the driver must recognize when the wheels lock up and when to release pressure on the brakes.

**9) *If you do have to utilize emergency braking on a school bus With A.B.S. or Without A.B.S you should:***

**a) Keep steering wheel movements very small** to avoid losing control or skidding.

**b) If you do need to make a larger steering adjustment, or if the wheels lock up, you should release the brakes and reapply them as soon as you can.** This type of braking allows you to keep control of the bus when sudden stops occur.

**c) Don't Jam on the Brakes!** Emergency braking does not mean pushing down on the brake pedal as hard as you can. That will only keep the wheels locked up and cause a skid. If the wheels are skidding, you cannot control the vehicle.

**d) Make sure that all loose items are secure before driving the bus.** Loose items around the driver's compartment can slide forward and become an obstruction to the brake or acceleration pedal.

**10)** It is important for bus drivers to understand and take whatever time is necessary to practice these potentially life saving methods. You never know when you may have to use them. And be sure to bring up any questions that you may have to your supervisor.

## **Part 2: Brake Failure Issues and Techniques**

1) Brakes that are kept in good condition rarely fail. *Brakes are designed so brake shoes or pads rub against the brake drum or discs to slow the vehicle.* Braking creates heat and brakes are designed to take a lot of heat. However, **brakes can fade or fail from excessive heat caused by using them too much and not relying on the braking effect of the engine.**

2) **Excessive use of the service brake results in overheating and can lead to brake fade.** *Brake fade* results from excessive heat which causes chemical changes in the brake lining and expansion of the brake drums. As the overheated drums expand, the brake shoes and linings have to move further to contact the drums. Continued overuse may increase brake fade until the vehicle cannot be slowed or stopped at all. Martin explains this to the driver in the video.

3) **Brake fade is also affected by adjustment.** To safely control a vehicle, every brake must do its share of the work. *Any brakes out of adjustment will stop doing their share of the work much quicker than brakes that are properly adjusted.* Brakes can get out of adjustment quickly, especially when they are hot. Therefore, brake adjustment must be checked frequently.

4) **Driving on steep hills or inclines** can be a reason for brake fade to occur. The use of brakes on a long or steep downgrade is only a supplement to the braking effect of the engine.

5) Martin explains to the driver that following speed laws set by large trucks will give you a good idea of the speed you should maintain in a bus while traveling downgrades. He then explains to the driver about **maintaining the proper target speed** and the options that can be used to reduce brake fade on the school bus:

a) You can first **use gears with a steady, smooth application of the service brake** to minimize the effect of brake fade on the bus.

b) A second option is to **engage the retarders and and slow the bus down by using compression.**

c) another option to minimize brake fade is to use the **"stab braking" method.**

### **"STAB BRAKING METHOD"**

6) In the video, Martin explains to the driver how to use the "stab brake" method to slow the bus while traveling downgrades. *This method is utilized to reduce the chance of brake fade or failure on steep downgrades.* **Here are the steps to properly use this braking technique:**

- a) Once the vehicle is in the proper low gear, the driver should **apply the brakes just hard enough to feel a definite slowdown.** *This brake application should last for about three seconds.*
- b) When your speed has been reduced to approximately 5 mph below your "safe" or "target" speed, **you should release the brakes.**
- c) Then when your speed has increased to your "safe" speed, you should repeat steps a and b.

7) The video gives an example of this demonstration with the driver's target speed set at 55 M.P.H. on a nice open downgrade. She applies the brake to bring the bus's speed to 50 M.P.H. then releases the brake. She repeats these steps as often as necessary until reaching the end of the downgrade.

8) Take the time to practice this technique. It will not only reduce the chance for brake fade but it is also a way to prolong the brake's life-span.

### **BRAKE FAILURE ISSUES**

9) If complete brake failure occurs, you should find an escape route. While attempting to slow the bus, look for an escape route— such as: an open field, side street or escape ramp.

10) Turning uphill is also a good way to slow and stop the vehicle. But make sure the vehicle does not start rolling backward after you stop. You can put it in low gear, apply the parking brake and if necessary, roll back into some obstacle that will stop the vehicle.

11) Keep in mind that **with hydraulic brakes, the emergency brake is separate from the hydraulic system.** Therefore, it can be used to slow the vehicle.

12) If the brakes do fail, you are going to have to look outside your bus for something to stop it.



**Your best hope of doing so is to locate an escape ramp.** If one is nearby, there will be signs telling you about it. So make sure to use it. Many drivers avoid accidents by using this technique.

**13) If no escape ramp is available, take the least hazardous escape route you can** - such as an open field, or a side road that flattens out or turns uphill. **Make the move as soon as you know your brakes don't work.** It is important that you think fast and be prepared to take action immediately. *The longer you wait, the faster the vehicle will go and the harder it will be to stop.*

**14) Remember, school buses are extremely heavy.** So taking the necessary steps to stopping them under extremely dangerous circumstances, is critical for the safety of everyone on the bus, as well as motorists that may be in front of or behind the bus.

### **Part 3: Additional Advanced Braking Issues**

1) As a school bus driver, you not only have to stay focused on everything that is happening on and around the school bus, but you also have to have good instincts and the ability to react quickly when faced with a dangerous situation. And skidding is one of the most serious situations that can occur on the bus.

#### **SKIDDING CONTROL AND RECOVERY**

**2) Skids happen when the tires lose their grip on the road.** Skidding can be caused by a number of different things: *Over-braking, oversteering, over acceleration and simply driving too fast.* By far, the most common skid is one in which the rear wheels lose traction through excessive braking or acceleration.

**3) Braking skids occur when the rear drive wheels lock.** And because locked wheels have less traction than rolling wheels, the bus will slide sideways in a "spin out." In the video, Martin explains this to the driver on a whiteboard.

**4) Here is a procedure that can be applied when faced with a skid:**

**a) First, stop braking.** This will let the rear wheels roll again and keep the rear wheels from sliding any farther.

**b) Second, turn quickly and efficiently.** When a vehicle begins to slide sideways, you should quickly steer in the direction the vehicle is traveling down the road. **You must react quickly when you feel the bus starting to skid.**

**c) And finally, you can counter-steer.** As a vehicle turns back on course, it has a tendency to keep on turning. And unless you turn the steering wheel quickly the other way, you may find yourself skidding in the opposite direction.

5) Remember to always **point the front wheels in the direction that the bus is traveling** when in a "skid" or a "spinout."

### **DRYING OUT THE BRAKES**

6) When driving in heavy rain or standing water, your brakes will get wet. Water in the brakes can cause the brakes to be weak, to apply unevenly, or to grab. This can cause lack of braking power, wheel lockups or pulling to one side or the other.

7) Try to always avoid driving through deep water and never drive through flowing water. If you must drive through water on the roadway, you should:

- a) Be sure to slow down before reaching it by placing the transmission in a low gear.
- b) Then gently put on the brakes while slowly accelerating through the water. *(This presses linings against brake drums or discs and keeps mud, silt, sand and water from getting in.)*
- c) You can then slowly increase the engine's R.P.M. and cross the water while keeping light pressure on the brakes.
- d) When you make it out of the water, maintain light pressure on the brakes (while accelerating) for a short distance to heat them up and dry them out.
- e) Make a test stop when safe to do so. Check your mirrors to be sure no one is following, then apply the brakes to be sure they are working. If not, dry out further as we have just described. Be careful not to overheat the brakes while using this technique.

### **CLOSING**

Throughout the video, we covered several issues for advanced braking techniques in the school bus. We went over emergency braking techniques as well as using brakes on downgrades. The video also gave demonstrations on how a driver should react if the bus were to start skidding. In addition, we have shown techniques and procedures for drying out brakes. We have also introduced techniques that can be applied if you are faced with sudden brake failure.

It is important that you use the information in this video to guide you through the necessary steps when faced with one of these situations. It is important that you talk with your supervisor about any questions you may have concerning: The type of brake system that is present on the bus, basic inspection of the brakes, brake tests or any techniques that could ultimately be a life saver for the precious cargo you are carrying each school day.

## TEST QUESTIONS

1) It is not important to take the time to practice emergency braking techniques because you are already a safe driver.

**TRUE or FALSE**

2) Keeping both hands on the steering wheel is key if faced with an emergency braking situation.

**TRUE or FALSE**

3) You should always try and brake so the bus stays in a straight line.

**TRUE or FALSE**

4) When using emergency braking for any reason on an **A.B.S. or non-A.B.S.** bus, you should \_\_\_\_\_

**a) Keep steering wheel movements at a minimum.**

**b) Slam on the brakes**

**c) none of the above**

5) *Brake fade* results from \_\_\_\_\_

**a) Excessive braking**

**b) brakes that are out of adjustment**

**c) not relying on the braking effect of the engine**

**d) all of the above**

6) Going down hills and inclines are a reason for brake fade or brake failure to occur.

**TRUE or FALSE**

7) You can use this technique to apply the Stab Braking method on the school bus.

**a) Developing a target speed.**

**b) Selecting gears.**

**c) A brake application that lasts approximately 3 seconds**

**d) All of the above.**

8) Turning uphill is a good way to slow and stop a vehicle that may be experiencing brake fade.

**TRUE or FALSE**

9) You should point the front tires in the direction that the bus is traveling when experiencing a braking "skid" or "spinout."

**TRUE or FALSE**

10) You can slowly increase the engine's RPM and cross water while keeping light pressure on the brakes to keep out debris.

**TRUE or FALSE**

## ANSWER KEY

1) **FALSE**

2) **TRUE**

3) **TRUE**

4) **a**

5) **d**

6) **TRUE**

7) **d**

8) **TRUE**

9) **TRUE**

10) **TRUE**