

UNIT IV

VEHICLE CARE, INSPECTION AND USE

GOAL: TO INCREASE SCHOOL BUS SAFETY AND EFFICIENCY THROUGH GREATER DRIVER PARTICIPATION IN VEHICLE INSPECTION AND PREVENTIVE MAINTENANCE.

| Reference Code | Concept | Objectives | Major Instructional Points |
|-----------------------|--|--|--|
| 4.1 | Maintenance and the program | The driver will describe the importance of a regular maintenance program in school bus transportation. The driver will explain the significance of reporting all vehicle defects promptly and in written form to the driver's immediate supervisor. | Close driver/mechanic cooperation Annual inspection |
| 4.2 | Pre-trip inspection | The driver will be able to perform a complete pre-trip inspection and accurately record all deficiencies in writing. The driver will report any detectable problems with their assigned vehicle to the maintenance department. | Check lights Emergency Equipment Gauges, tires, brakes Body (by company policy) |
| 4.3 | Enroute vehicle Sensory detection | The driver will list those items that should be checked during a daily on-road check. The driver will know how each should be checked. The driver will itemize four methods to detect impending vehicle defects via the use of physical senses. | Check brakes – Service & parking Steering Gauges Sensing trouble |
| 4.4 | Driving abuses | The driver will list several common driving errors or abuses that cause excessive vehicle wear. | Shifting Clutching Use of brakes |
| 4.5 | Post-trip | The driver will be able to perform a correct and thorough post-trip inspection and accurately record all deficiencies in writing. The driver will report any detectable problems on their assigned vehicle to the maintenance department | Check for students Vehicle and mechanical deficiencies. |

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Before it is put into operation for a day's run, each school bus must be pre-trip inspected. Such an inspection will help ensure the safety of both the pupils and the driver. This practice also decreases the maintenance costs of the pupil transportation program. The daily inspection must become a matter of routine and the few minutes invested may pay rich dividends in the saving of lives and property.

Regardless of the engineering skill or workmanship incorporated in a school bus, it cannot continue to deliver maximum safety, economy and dependability unless it is properly maintained.

Every driver must have a basic knowledge of the school bus systems in order to know generally how these systems will affect the bus's operation. There will be times when this knowledge will be useful to the driver in diagnosing trouble while on their route. Proper diagnosis of mechanical trouble will increase the efficiency and economy of the entire operation.

Every school district or contractor must formulate a workable maintenance and inspection program. It must include provisions for daily driver reports, both written and verbal. It must provide a method for daily inspections and reporting to maintenance personnel. It must include a specific procedure for checking out driver complaints and it should provide for a specific inspection and maintenance procedure to ensure every item is completed. This manual, particularly section 4.2, will help contractors and school districts create their inspection programs and forms.

Minnesota school buses are inspected annually by the Minnesota State Patrol – MN. Stat.169.451.

4.1 MAINTENANCE and INSPECTION

- o A school bus that operates properly is more responsive and enables the driver to devote more of their attention to other important safety factors involved in safe operation of the bus - such as road and weather conditions, safe driving habits, traffic signals, other motorists and pedestrians.
- o Your safety, the safety of your passengers, and the safety of others you share the road with are all at stake. Because minor malfunctions could develop into major ones if not discovered, and they may also affect other systems in the vehicle, all problems, no matter how big or small, must be reported promptly.
- o The driver is the person responsible for safe operation of the school bus under all operating conditions, and the driver is the most likely person to notice faulty or abnormal operations. Consequently, the maintenance personnel must count heavily on the driver to detect and report defects on their bus.
- o The driver's relationship with maintenance staff is important. When something is wrong with a vehicle the driver must report it – even if the driver does not know what is causing the problem. The maintenance department is responsible for diagnosis and correction of the problem.
- o A thorough daily school bus inspection must be performed. It should consist of three distinct parts: (1) a pre-tip inspection before the vehicle is driven, (2) an operational inspection while the bus is being driven and (3) a post-trip inspection at the end of the day.
- o Drivers must carry a completed copy of a pre-trip inspection form indicating that the vehicle they are driving is free from any defects that would interfere with the safe operation of their school bus. Mn. Rule 7470.1300 - See Appendix for an example of this form.

4.2 PRE-TRIP INSPECTION PROCEDURE - MN. Rule 7470.1300

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| RECOMMENDED CDL Manual | |
| RESOURCES: Inspecting Your School Bus | Vol. 1 MN. DDS |
| Pre-Trip for Your School Bus | Coastal Training |
| School Bus Brake Systems: Air Brakes | Coastal Training |
| School Bus Brake Systems: Braking Techniques | Coastal Training |
| School Bus Brake Systems: Intermittent Pressure | Coastal Training |
| School Bus Brake Systems: Steady Pressure | Coastal Training |
| School Bus Mirror Systems | Coastal Training |
| Dual Air Brake Training Video | Video Communications |
| Undercarriage & Component Parts | Video Communications |
| Component Parts of the Undercarriage of a School Bus | Video Communications |
| Vehicle Inspections | JJ Keller |

A. Pre-trip Inspection:

- o Take a good look at the bus.
- o From the inside of the bus, check the operating condition of dash-mounted turn signal indicators, high-beam indicator, eight-light indicator, instrument panel light and step well light.
- o From the outside of the bus, check left and right directional signals, four-way hazard lights, eight-light system, marker lights, brake lights, headlights, back-up lights, license plate light and operation of stop-arm lights. When checking the lights, watch for the intensity of the lights, condition of the lenses and dark spots on the sealed beam unit.
- o Check for current registration being displayed.
- o Ensure school bus is displaying a current inspection decal.

B. Interior Equipment Inspection:

- o Emergency equipment must be held securely in place while remaining removable.
- o Check the contents of the first aid kit and body fluid clean up kits.
- o Note the pressure gauge indicator on the fire extinguisher. The needle should always indicate full charge (green area).
- o Check for the presence of three triangle reflectors.
- o Check the driver's seat belt.
- o Check operation and adjustment of the driver's seat.
- o Check operation of the horn.
- o Check the windshield wipers and washers.
- o Check the interior cleanliness of the windshield.
- o Check the condition and operation of the wiper blades.
- o Check the wiper motor and linkage operation.
- o Check the operating condition and visibility of all gauges. Note that attention should be given to these gauges for their proper function at all times when the engine is in operation.
- o Buses manufactured after January 1, 1995, must have the following items in addition to the above listed items:
- o Seat belt cutter if seat belts are present, and 2-way communication.

C. Under the hood:

- o Open the hood and make sure that safety latch and hinge are in holding position.
- o Check oil level (this is the most logical time, as all the oil has drained to the crank case and an accurate reading can be made). Keep the oil above the "add oil" line: be certain the oil level is not overly high as this may indicate a foreign substance in the oil.
- o Remove the radiator cap and check the level of the antifreeze.
- o Check the power steering pump to see that it is securely mounted, the belt tension is good and the hoses are in good condition.
- o Check the power steering sector to see that it is securely mounted and free of oil leaks.

- o Check the pitman arm to see that it is securely mounted.
- o Check the drag link to see that it is securely mounted.
- o Check the shock absorber to see that it is securely mounted and free of oil leaks.
- o Check the tie rod and tie rod ends for looseness.
- o Check the belt for proper tension, cracks and frayed edge. Most belts will operate efficiently if not more than 1/2" of give is maintained. A run down battery is traced in most cases to a loose fan belt and/or a driver's failure to observe his or her instrument panel occasionally.
- o Look over the engine for any loose wires and/or fluid leaks.
- o Check all hoses for leaks, for excess wear and bulges.
- o Check the underside of the bus for fluid leaks.
- o Close the hood.

D. Tires and Wheels:

- o Check the tires for inflation and general condition.
- o Lug nuts must be checked visually for tightness. Rust dust around the edge of the bolt or nut is a good indicator of a loose lug nut.
- o Check tire tread depth (4/32 front; 2/32 rear).

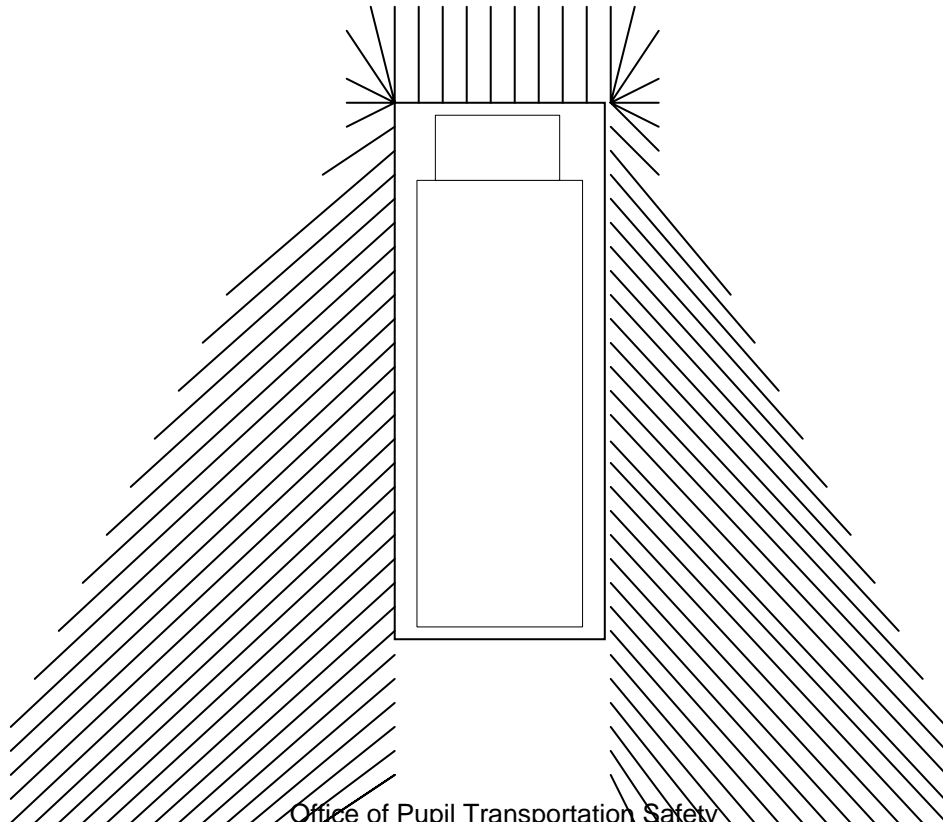
E. Emergency Exits:

- o Check the opening and closing of all emergency exits and doors to see that the emergency buzzers are operating smoothly.
- o Check emergency handles / latches mechanism for smooth operation.
- o Check for proper seal and gaskets on the emergency openings.

F. Mirrors:

- o Check for cleanliness, cracks, breaks, flaking and securement. Good visibility should always be maintained by keeping windows clean.
- o Adjust mirrors according to the diagram below.

Critical area of vision for school bus



G. Windows:

- o Check for cleanliness.
- o Check for chips and cracks.
- o Check for operability.
- o Check for moisture in the thermal pane. The thermal pane should be clear with no fogging.

H. View Underside of Bus:

- o Check for oil or grease leaks.
- o Check springs and hangers. There should be NO cracked or broken leaves.
- o Check exhaust pipes and hangers.
- o Check shock absorber for secure mounting and the absence of oil leaks.
- o Check u-bolts for looseness; rust is a visual indicator of looseness.

I. Body:

- o Check for general conditions of the body, noting any scratches. Verify that all bus markings are legible.
- o Check for protruding or sharp edges on the body, both of which pose a threat to entering / exiting passengers and pedestrians

J. Brakes:

1. Hydraulic brakes:
 - o The electrical brake motor must be heard with the brake applied and the key off.
 - o If the brake motor is not heard, do not operate the vehicle until the brake system is serviced.
2. Air brakes:
 - o Start the engine and fully charge the system.
 - o Pull forward and stop the vehicle with the service brake.
 - o Apply parking brake.
 - o Attempt to pull forward with the parking brake on.
 - o Turn off the engine and allow the pressure to stabilize, turn key to "on" position.
 - o Check one-minute air loss with the brake released.
 - o Check one-minute air loss with the service brake applied.
 - o Pump the service brake until low-pressure warning signal comes on at 60 psi.
 - o Continue to pump the brake until the emergency brake system comes on at 20 – 40 psi. Start the engine and try to pull away.
 - o Allow the air pressure to build up to fully charge the system.
 - o Depress the foot pedal and listen for air leaks.
 - o Depress the foot pedal and watch the air loss. A 10-psi airdrop indicates that the brakes need adjustment.
3. Vacuum brakes:
 - o Test the system with the engine turned off.
 - o Pump the brakes several times.
 - o Keep the brake pedal depressed.
 - o With the brake pedal depressed, start the engine and the brake pedal should push up to the natural position if the system is working correctly.

K. Bus Cleanliness:

- o Keep the step well free of ice and debris.
- o The bus must be swept daily. Students should be taught not to throw trash on the floor.
- o All windows and mirrors should be kept clean. Remember, clean windows mean clear visibility. In case of a crash, the driver can be cited for vision obstruction.

- o The outside of the bus should be washed as often as necessary. Do not allow road dirt to accumulate. Very often just wiping with a dry cloth will remove road dirt if it is not allowed to harden.
- o The condition of the seats should be checked each time your bus is unloaded. Padding must cover all frame structures so that you cannot feel the frame when it is inspected. A driver that maintains a clean bus inside and out will have the respect of the students he or she transports, and the students will also take pride in helping to keep a clean bus. Daily inspections will help the driver more effectively pinpoint the cause of bus seat damage.
- o Check the condition of the seats and floors.
- o Check for wetness around the heaters on the floor.
- o Check for writing on seats and inner skin of the body.

4.3 VEHICLE CHECK

A planned vehicle check, performed before you leave the parking area, will give you a chance to evaluate the steering, suspension, clutch, transmission, drive line and other components. You also can determine whether the engine performs properly under load, and if the brakes provide you with adequate stopping power. The following is a suggested procedure for checking the vehicle. It can be accomplished on the way out of the parking area.

Testing the parking brake: Always check and release the parking brake before starting or parking the school bus. Driving with the parking brake “on” is the most frequent cause of parking brake failure or fire. Report failure of the parking brake to hold the bus stationary or properly release to maintenance personnel.

Transmission operation: - With the transmission in either a forward or reverse position, the bus should start out smoothly in response to depressing the accelerator pedal and the transmission should not produce any unusual metallic noises. An automatic transmission should not “slip” and a manual transmission should allow for easy and smooth gear changes throughout the entire shifting range. Report any unusual noises or shifting difficulty to the maintenance supervisor.

Note: DO NOT EXCEED THE MANUFACTURER’S RECOMMENDED ROAD SPEED FOR EACH SPECIFIC GEAR RANGE: EXCEEDING THE SPEED RECOMMENDATIONS COULD DAMAGE THE TRANSMISSION OR REDUCE ITS SERVICE LIFE.

Steering: - Is it responsive? Does there appear to be too much “play” or jerking in the steering system? Is the power steering quiet? Does the bus steer easily? Does it go precisely where you steer it? Is the steering steady in turns and when going over bumps? Report any unusual or substandard steering conditions.

Suspension: - Is there excessive “bounce” or does the bus “bottom” when going over bumps or chuckholes? Does it “weave” or “sway” excessively when turning corners or on curves? It may be due to broken springs or faulty shock absorbers. Report any unusual ride or handling characteristics.

Engine: - Be alert to any unusual engine noises, vibrations or lack of normal response. Be sure to report any unusual engine behavior to the maintenance team. Never race a cold engine. Instead, increase speed slowly so that all parts may be properly lubricated. Never exceed the maximum engine speed recommended by the manufacturer.

Brakes: - Continue to monitor brakes. Test them at low speed, bringing the bus to a complete stop. Your bus should stop in a “straight line” without skidding, swerving, or pulling to one side. The brakes should not grab or lock or make excessive noise. Report any excessive pedal pressure, abnormal or unusual braking behavior. If the condition prevents safe braking, do not operate the bus until the condition has been repaired. Note the air pressure, brake warning light, or vacuum gauge periodically to be sure that adequate pressure is maintained.

Clutch: if applicable - The clutch should engage easily and smoothly without jerking, slipping excessively, or “chattering.” Never ride the clutch pedal. Once the shift has been made, the foot should be removed from the clutch pedal. A properly adjusted clutch should have some “free play” when the pedal is fully released. Report any unusual clutch pedal operation to your maintenance supervisor. While changing gears, an experienced driver will carefully control the speed of the engine so that the shift may be completed without jerking or excessive clutch slippage. Erratic or careless shifting of gears wears out the clutch and reduces its service life.

Condition of bus: - An alert driver should recognize unusual or abnormal handling characteristics. Not all drivers have (or will ever have) the ability to spot every problem. Bus school bus drivers should make a thorough pre-trip, operating and post-trip inspection of their bus every day, knowing that the condition of the bus can change as the day progresses. To them, “inspection” should become an integral part of “driving” and they should always be alert to any warning signals which tell them something is wrong. This continued alertness will permit them to spot trouble and act accordingly, before that trouble causes serious damage or contributes to a breakdown or crash.

Use of senses:

A. Listening for trouble:

- o Sharp knock when picking up speed.
- o Light knock when engine is running at idle speed.
- o Dull regular knock.
- o Clicking or tapping.
- o Continuous or intermittent squeal.
- o Loud exhaust noise.
- o Engine backfiring, missing, popping, spitting or overheating.
- o Steaming and hissing.

B. Feeling for trouble:

- o Excessive vibration (engine, steering wheel, and/or drive line).
- o Low or high speed shimmy.
- o Hard or wandering steering.
- o Lack of power.

C. Looking for trouble:

- o Sudden drop in oil pressure.
- o Low oil pressure.
- o No oil pressure.
- o Excessive oil consumption.
- o Smoke coming from under the dash.
- o Smoke coming from under the hood.
- o Scuffed tires or spotty wear.

D. Smelling trouble:

- o Odor of fuel (gasoline, LP or diesel).
- o Odor of burning rubber.
- o Odor of burning oil.
- o Odor of burning rags.
- o Odor of brake lines.
- o Odor of hot electrical wires.
- o Exhaust fumes.

NOTE: IF ANY OF THE ABOVE EXISTS, THE VEHICLE SHOULD NOT BE DRIVEN UNTIL CORRECTED.

4.4 UNACCEPTABLE DRIVER AND VEHICLE PRACTICES

A. Engine (motor) abuse:

- o Engaging starter too long at one time.
- o Excessive acceleration of cold engine.
- o Stopping engine without cooling period or idling after hard drive.
- o Operating overheated engine.
- o Racing engine.
- o Running excessive rpm in lower gears.
- o Lugging engine.
- o Failure to keep checking instrument panel gauges.

B. Clutching:

- o Slipping the clutch.
- o Riding the clutch.
- o Snapping the clutch.
- o Depressing clutch pedal and coasting.

C. Shifting gears:

- o Starting out in the wrong gear.
- o Rapid acceleration from stops.
- o Failure to return hand to steering wheel.

D. Use of brakes:

- o Failure to fully release hand brake when moving.
- o Abrupt stops.
- o Failure to effectively anticipate stops.
- o Excessive brake applications.
- o Riding brake.

E. Tire care:

- o Operating with flat or under-inflated tires.
- o Driving over curbs, objects and into potholes.
- o Rubbing tires against curbs while parking.
- o Unnecessary spinning of tires on ice and snow.
- o Unnecessary skidding of tires in braking.

F. Driver responsibility:

- o Driving unit even though it needs repair.
- o Failure to write up defects and repairs.
- o Failure to inspect equipment before each trip.

4.5 POST-TRIP INSPECTION

ALWAYS CHECK BUS FOR PASSENGERS LEFT ON BUS!

In a Post-trip Inspection, the following items must be inspected. For further details, refer to section 4.2, "Pre-trip Inspection."

- A. Check for students, personal property, vandalism.
- B. Empty bus policy/sign.
- C. Set parking brake and make sure it is holding—number one item.
- D. Close all windows and roof hatches.
- E. Sweep bus and empty trash if necessary.
- F. Fuel bus as required.
- G. Report any defects.
- H. Visual check of outside for any obvious problems.

SUMMARY:

The safety of our passengers is dependent upon the three vehicle inspections outlined in this section of your training manual. Each driver must be alert for malfunctions and keep in close contact with the maintenance department. Knowing certain noises, feeling certain vibrations, smelling certain odors and noticing the proper function of all gauges and equipment may save the driver from a bus breakdown or a service crash. A school bus inspection is important to the safety of the children being transported by the bus. Without a safe operating bus, and an alert driver, our school children would be in danger.