School Bus Fire Protection

Brian Bragonier
Overview

• Federal interior flammability standards
• State interior flammability specifications
• School bus fire areas of origin
• Fire suppression systems
Current Federal Flammability Standards

• All school buses are required to meet Federal Motor Vehicle Safety Standard (FMVSS) 302
  - Specifies maximum burn rate requirements for interior materials
  - Has not changed since adopted in 1971
Current State Flammability Specifications

- NHTSA allows states to adopt requirements imposing higher performance specifications than federal standards
- In 1990, National Congress on School Transportation adopted a procedure to measure flammability resistance
  - Mandates performance levels exceeding those in FMVSS 302
School Bus Fire Areas of Origin

- Average of nearly one school bus fire each day
- 68% of school bus fires initiate in the engine compartment or wheel area
- Lack of a complete firewall between engine and passenger compartment
Engine Firewall Openings

- Same firewall used in many types of buses
- Openings allow wiring to run between engine and instrument panel
- Unused openings not sealed with fire resistant materials
Engine Firewall Openings

• Same firewall used in many types of buses
• Openings allow wiring to run between engine and instrument panel
• Unused openings not sealed with fire resistant materials
Engine Intrusion

- Some engine blocks protrude into the passenger compartment
- Large portion of firewall is cut out for engine
- Fiberglass cowling placed over this portion of the engine
Automatic Fire Suppression Systems (AFSS)

• Most systems deliver a fire suppressant inside the engine compartment when a sensor is activated

• Use either thermal or optical sensors to detect heat or flame
Automatic Fire Suppression Systems

• Can be installed during the manufacturing process or placed in older buses
• No national standards exist for the installation or performance of suppression systems
• Voluntary system performance testing and certification
Current AFSS guidelines

• Several states allow for installing AFSS in school buses

• Some states require an AFSS on alternative-fuel or special needs vehicles

• Most states have adopted National School Transportation Specifications and Procedures
National School Transportation Specifications

• Fire suppression system nozzles shall be located:
  - Engine compartment
  - Under bus exterior
  - Under driver dashboard
  - Electrical panel

• Not located in passenger compartment

• Alert the driver that system has activated

• Alternate-fueled buses may be equipped with fire detection and suppression systems with interior or exterior detection
Summary

• Federal flammability standards have not changed since 1971
• Fire resistant materials slow spread of fire
• Automatic fire suppression systems can prevent or mitigate school bus fires