National Transportation Safety Board

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School Bus Fire Protection

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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

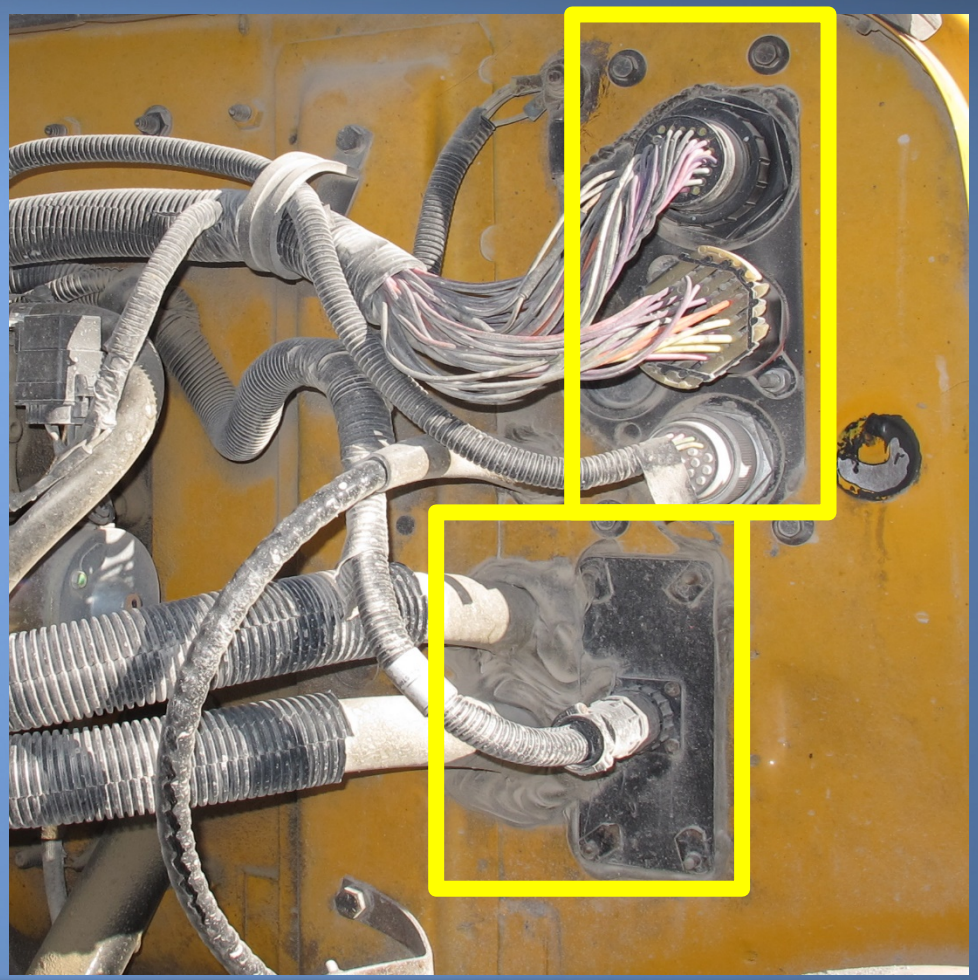
- NHTSA allows states to adopt requirements imposing higher performance specifications than federal standards
- In 1990, National Congress on School Transportation adopted a procedure to measure flammability resistance
  - Mandates performance levels exceeding those in FMVSS 302

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



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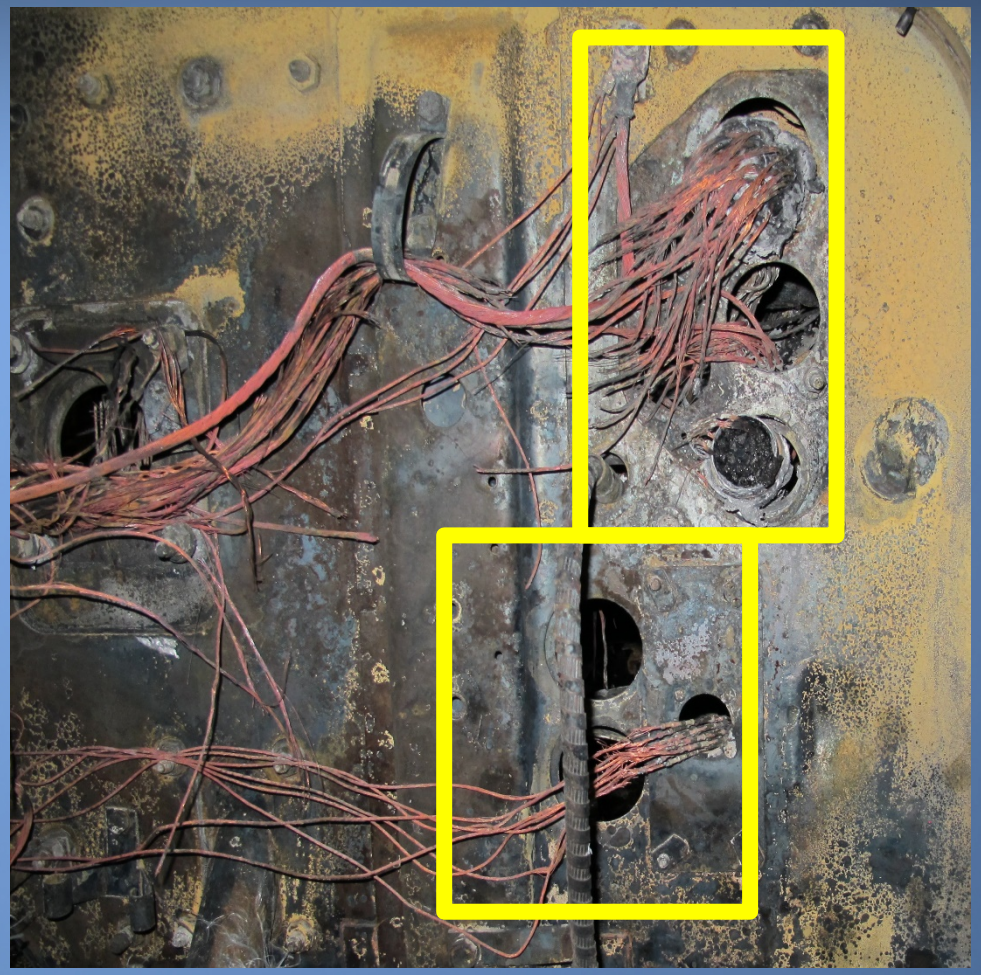
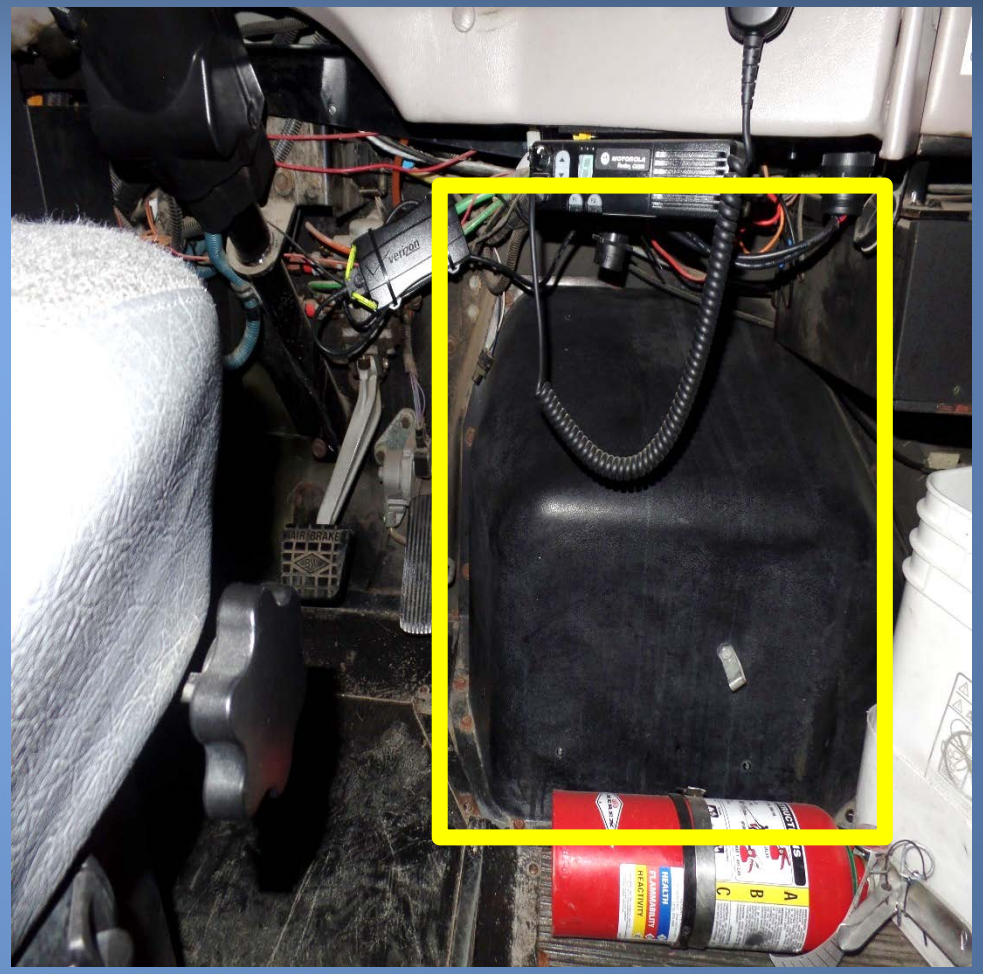


Engine Intrusion

- 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

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