

Recommended Practice for Transit Bus Fire/Thermal Incident Investigation

Approved October 25, 2007
APTA Fire Safety Working Group

Approved May 3, 2008
APTA Bus Safety Committee

Approved October 5, 2008
APTA Bus Standards Task Force

Abstract: This recommended practice is a form for fire/thermal incident investigation

Keywords: fire, incident, detection, fire suppression, bus fire, vehicle fire, investigation

Introduction

(This introduction is not a part of APTA BTS-BS-RP-001-05 Recommended Practice for Transit Bus Fire Safety Shutdown.)

This Recommended Practice for Transit Bus Fire Safety Shutdown reflects the consensus of the APTA Bus Standards Program members on the items, methods, and procedures that have provided the best practice based on the experiences of those present and participating in meetings of the Program Task Forces and Working Groups. Recommended practices are voluntary, industry-developed, and consensus-based practices that assist equipment suppliers, vehicle and component manufacturers, and maintenance personnel in the construction, assembly, operation, and maintenance of transit bus vehicles. Recommended practices may include test methodologies and informational documents. Recommended practices are non-exclusive and voluntary; they are intended to neither endorse nor discourage the use of any product or procedure. All areas and items included herein are subject to manufacturers' supplemental or superceding recommendations. APTA recognizes that for certain applications, the practices, as implemented by operating agencies, may be either more or less restrictive than those given in this document.

This recommended practice provides guidelines for transit bus vehicle systems shut down in conjunction with a vehicle fire. APTA recommends the use of this recommended practice by:

Individuals or organizations that inspect and maintain transit buses

Individuals or organizations that develop specifications for transit buses

Individuals or organizations that build or manufacturer fire suppression systems

Individuals or organizations that contract with others for the inspection and maintenance of transit buses

Individuals or organizations that influence how transit buses are inspected and maintained

Test results must meet or exceed federal, state, or other local regulatory agency requirements if different from the recommendations outlined in this document.

Participants

The American Public Transportation Association (APTA) greatly appreciates the contributions of the Bus Transit Standards Bus Fire Working Group, who provided the primary effort in drafting the Recommended Practice for Transit Bus Shut Down.

Instructions:

- The first and most important function of any investigation is protection of life and property.
- This investigation form does not supersede any applicable local, state or federal regulations or transit property and emergency responder's policies and procedures but is intended to be a standardized tool to assist in the evaluation of such incidents.
- Rapid, accurate, and concise information is critical in determining whether any incident is unique to its own, is a symptom of improper procedures, or has technical implications which may affect other vehicles within the fleet.
- Please complete this form legibly and completely as possible.
- This form begins with the initial investigation. Please note that disassembly, repair, or tampering with the equipment or components should be avoided to the extent possible should further in-depth forensic analysis be required.
- Take and attach photos, including interior and exterior of bus, engine compartment, battery compartment, tire and wheel wells, HVAC compartment, fuel tank and filter area, fire suppression system and the incident scene.
- Collect debris from incident sight.
- Determine if vehicle should be quarantined.
- Collect and or attach the following documents:
 - Operator / Supervisor / Dispatcher Reports and Transcripts
 - Operator Background Information
 - Witness statements
 - Safety Department Report
 - Police Report
 - Fire Department Report
 - Media Reports
 - Maintenance History of Vehicle
 - Third Party Investigative Report
 - Data Logger Information
 - On-Board Video
 - Transit Agency Bus Fire History and Trends

Investigator

Name	
Date	

Service Operator

Transit Property / Shop Location	
Contract Service or Maintenance?	
Service Contractor	
Maintenance Contractor	

Vehicle

Bus Number or ID	
Vehicle Type	
Fuel Type	
Power Train	
Vehicle Mileage	
Mileage since last PM	
Warranties on Vehicle or Components	

Information Regarding Incident

Date & Time of Incident	
Weather Conditions	
Brief Description of Incident	
First Indication of Incident	
Vehicle Location when Detected	
Was Vehicle in Service	
Hours in Service	
Collateral Damage at Scene	
Contributing Causes at Scene	
Were Emergency Exits Used	
Was Debris from Incident Collected	
Was Vehicle Quarantined	

Emergency Services Response

Did Emergency Services Respond	
Did Fire Department Extinguish Fire	
Were Proper Procedures Followed	

Passengers

Number of Passengers on Bus	
Injuries and Type	
Injured Transported	
Number of Fatalities	
Other Injuries / Fatalities	

Investigation

Incident Zone (See Attachment 1)	
Extent of Physical Damage	
Suspected Source or Origin	
Fluid Levels Following Incident	
Tire Pressure/Condition After Incident	
Fluid Levels After Incident	
Battery Voltage/Condition After Incident	
Brake Condition After Incident	
Fuse/Breaker Condition After Incident	

Fire Suppression

Type of System	
Were Indicator Lights Operational	
Did Shutdowns Activate	
Did Alarms Activate	
Suppressant Type	
Suppressant Pressure After Incident	
Sensor Type	
Sensor / Nozzle Proximity to Incident	
Did Fire Suppression Activate	
Was Fire Suppression Manually Activated	
Was Handheld Extinguisher Used	
Was Fire Extinguished	

Follow Up

Bus OEM Contacted	
Fire System Manufacturer Contacted	
Component Manufacturer Contacted	
Internal Safety Department Investigation	
Independent Investigator Secured	
Is Cause a Systemic Problem	
Have Other Vehicles Been Inspected	

Summary

First Responder Procedures Satisfactory	
Reported to NHTSA / DOT / APTA	
Subsequent Actions / Reports	
Recommendations	

Attachment 1

Zone	Location	Potential Sources / Causes
Zone 1	Engine compartment	Electrical, combustible or flammable liquids, solids, gases, hot surfaces, belts, clutches
Zone 2	Exhaust Systems	High temperatures, exhaust leaks, tail pipe fire, turbocharger fire, ignition of exhaust blankets, ignition of vapors, catalytic converter overheat
Zone 3	Battery	Battery overcharge, electrical, flammable liquids, solids, gases, cables, equalizers, circuit breakers, fusible link malfunction, corrosion - high resistance
Zone 4	Wheel Well	Under inflated tire, overheated bearings, leaky wheel seal, flammable liquids, solids, dragging brakes or any high heat in brake area, road debris
Zone 5	HVAC Compartment	Electrical, flammable liquids, solids, gases, high heat
Zone 6	Operator's Work Station	Electrical, flammable liquids, solids, gases, high heat, tobacco smoking, debris build up
Zone 7	Articulated Turn Table	Friction, debris build up, electrical cabling, vandalism, tobacco smoking
Zone 8	Fuel Storage / Filters	Fuel leaks, arcing, debris, PRD activation, filters, regulators
Zone 9	Electrical Junction Boxes	Grounded circuits, high resistance, loose connection, flammable liquids, solids, cables, equalizers, circuit breakers, fusible link malfunction, corrosion, chaffing
Zone 10	Interior	Tobacco smoking, debris, HVAC duct, fluorescent light ballast, corrosion, cabling, chaffing, signage, wire harnesses, vandalism, advertisements

FIRE SAFETY QUESTIONNAIRE:

This questionnaire has been developed by the APTA Fire Safety WG of the Bus Standards Development Program. The purpose of the information here is to gather critical information from source agencies to assist in the development of bus standards related to fire safety. Information gathered through this effort will be used to prioritize efforts, communicate best practices related to fire prevention and mitigation and to provide accurate, current information on the state of the transit industry related to fire safety. Individual questionnaires will not be released. Fax to 202-496-4335 or email to info@aptastandards.com

Please complete one questionnaire for each fire or thermal incident.

General:

Contact information of person completing questionnaire, department, phone and email (Used only for follow-up)

Transit Property Name, Location (Used only for follow-up)

Fleet Size: Transit: _____ Cutaway: _____ Over the road _____ Other _____

Transit Vehicle Zones

- Zone 1 Engine compartment
- Zone 2 Exhaust Systems
- Zone 3 Battery
- Zone 4 Wheel Well
- Zone 5 HVAC Compartment
- Zone 6 Operator's Work Station
- Zone 7 Articulated Turn Table
- Zone 8 Fuel Storage
- Zone 9 Electrical Junction Boxes
- Zone 10 Interior

Fire Information:

- 1) Date of Incident _____
- 2) Model Year _____
- 3) Vehicle Type: (circle one) Transit Coach: Under 30 ft 30 ft 40 ft 45 ft 60 ft
Cutaway:
Over the Road Coach
Other _____
- 4) Bus Configuration (circle one) high floor low floor
- 5) Fuel Type (circle one) Diesel Natural Gas Electric Other: _____
- 6) Hybrid (circle one) Yes No
- 7) Cooling fan type (circle one) hydraulic belt driven direct driven electric
- 8) Zone of Fire Origin, (see chart) (circle one) 1 2 3 4 5 6 7 8 9 10
- 9) Zone(s) of Damage (see chart) (all that apply) 1 2 3 4 5 6 7 8 9 10
- 10) Origin of the Fire _____
(e.g. turbo,)
- 11) Contributing Causes _____
(e.g. fluid leak)
- 12) Fire Detection/Suppression System Type (circle one)
None (skip to question 17) Detection Only Detection/Suppression
- 13) Type and Quantity of Sensors: Thermal _____ (#) Optical _____ (#)
- 14) Locations or Zones of Sensors 1 2 3 4 5 6 7 8 9 10
- 15) Did the Detection System trigger a warning indication? (circle one) Yes No
- 15 a) If no, why? _____
- 16) Automatic Fire Suppression System
 - a. Did system discharge: (circle one) Yes No
 - b. Did system extinguish fire? (circle one) Yes No
 - c. Actuation Method of system (circle one) Manual Automatic
- 17) What other methods were used to extinguish fire? Please List:

- 18) Vehicle damage (circle one) Minor (under \$5K) Medium (\$5K-\$25K) High (above \$25K)
- 19) Location of bus when fire detected? (circle one)
In service Garage/Depot Fueling/Serviceing Layover

- 20) Any additional Comments or Recommendations? Please note any direct injuries or fatalities. Attach pictures, if available.

Please submit questionnaire to:
Fax (202) 496-4335 or info@aptastandards.com

Or mail form to:

**American Public Transportation Association
Bus Standards – Fire Safety
1666 K Street NW, 11th Floor
Washington, DC 20011**