



# EFFECTIVE PRACTICES IN BUS TRANSIT SAFETY

# EMERGENCY RESPONSE

During an emergency, transit agency employees may be responsible for managing incidents, assessing situations, and taking appropriate actions. Crisis management is stressful, so transit agency staff not only need clear procedures to follow, but also training and practice on how to carry out those procedures. From considering emergency response in vehicle and equipment purchasing to exploring new ways to prepare transit personnel for emergencies, there are many opportunities for transit agencies to enhance their ability to respond effectively to any emergency they may face.

In this guide, we discuss some of the most common voluntary recommendations the Federal Transit Administration (FTA) Bus Safety Program has made to bus transit agencies to improve their response to emergencies. These recommendations are intended to help transit agencies reduce safety risk. We also provide examples of effective emergency response practices that transit agencies can adopt to implement the recommendations.

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## WHO ARE WE?

The FTA Bus Safety Program provides technical assistance to the bus transit community to advance improvements in bus safety and support implementation of Safety Management Systems. Through this program, FTA develops relevant guidance materials and tools, and collaborates with industry groups to improve coordination of bus safety efforts. Since 2007, FTA completed over 60 voluntary onsite bus safety reviews at transit agencies of varying sizes and conducted seminars and outreach efforts across the country. This guide contains key safety recommendations based on this experience and examples of effective practices that transit agencies have adopted to improve bus safety.

For more information, please visit the FTA Bus Safety Program website at <https://www.transit.dot.gov/regulations-and-guidance/safety/bus-safety-program> or email us at [FTASafetyStakeholder@dot.gov](mailto:FTASafetyStakeholder@dot.gov).



## 1. DOCUMENT EMERGENCY RESPONSE PROCEDURES

**Recommendation:** Develop, formalize, or expand emergency response procedures and train all appropriate staff on the procedures.

When an emergency occurs, dispatchers, supervisors, and bus operators (also known as drivers) often need to react without hesitation to protect life, equipment, and facilities. They can only do this if they are aware of the transit agency's emergency response procedures, were trained on how to carry them out, and can easily access documentation of the procedures when needed.

Procedures for safety events that occur daily, weekly, or even monthly stay in the forefront of every transit employee's mind. However, when a less common event occurs, transit staff must be just as prepared to respond in a calm, effective, and timely manner. Documented procedures and readily-available checklists help direct and guide bus operators, dispatchers, mechanics, and supervisors on how to respond to different kinds of emergency events. Also, procedures and checklists aid in reducing confusion and creating consistency in supervisor and dispatcher responses to bus operators and other staff during emergencies.

Periodic training on emergency response procedures is critical for transit employees to respond effectively to emergencies. Ideally, this training is a combination of classroom-setting orientations on emergency procedures and on-vehicle, hands-on demonstrations of emergency response skills. All training, including hands-on training should be documented with trainer and trainee signatures and the dates the training occurred.

Bus operators, supervisors, and dispatchers all need to be trained. Bus operators are the first responders to an emergency on their vehicle. Dispatchers may have to direct bus operators in emergency response activities. Supervisors respond to vehicle emergencies and may have to help carry out the emergency procedures, particularly if a bus operator is incapacitated or overwhelmed by the situation on the vehicle.

### EXAMPLES OF EMERGENCY EVENTS THAT RESPONSE PROCEDURES CAN ADDRESS

- Transit vehicle collisions
- Transit vehicle fires
- Transit employee injuries
- Transit passenger falls or injuries
- Transit facility fires
- Transit facility hazardous material release
- Pedestrians struck by transit vehicle
- Dangerous passengers on a transit vehicle
- Dangerous persons in a transit facility
- Dangerous items on a transit vehicle or in a transit facility

### EFFECTIVE PRACTICES

**Post emergency response procedures in dispatch and make them easily accessible to dispatchers.**

Easy-to-use checklists of procedures for various kinds of transit-related emergencies aid dispatchers and make sure that emergency response guidance is consistent throughout the dispatch function. Bomb threat checklists are kept by every phone. An updated binder of emergency procedures is kept within arm's reach of every radio dispatcher. Dispatchers are better prepared to handle emergencies on a moment's notice if they are trained on the procedures and can quickly refer to checklists.

**Post updated emergency call-down lists in dispatch and make them easily accessible to dispatchers.**

Often it is a dispatcher's or supervisor's responsibility to contact employees during a community emergency to help move people out of harm's way. Since these types of emergencies often happen with little warning, up-to-date call-down lists at a dispatcher's fingertips expedite the transit agency's response. Agencies use call-down lists to contact transit leadership, community stakeholders, and request additional employees to participate in the response.

**Establish a plain English emergency verbal code for bus operators and dispatch.**

If a transit agency does not have panic button technology on their buses, it is critical to establish an emergency verbal code. Even if panic button technology exists, the verbal code can play an important backup role. In any case, bus operators could experience a situation on the vehicle where it is not advisable to let a passenger know that dispatch is being contacted. This code means law enforcement is needed on the vehicle, immediately. During such an event, it is important to have a seemingly innocent statement to request help that a passenger cannot interpret and the bus operator and dispatcher understand as an emergency code.



For example, consider a transit agency that does not operate service on Sunday nights. The emergency code this agency chose to use is, "I can't work overtime on Sunday night." When a bus operator calls this in to dispatch, the

dispatcher immediately knows that there is a situation on the vehicle that the bus operator cannot talk about on the radio and law enforcement must be called without delay. Also, passengers will think it is just a regular conversation between the bus operator and dispatcher. Of course, bus operators, supervisors, and dispatchers must be thoroughly trained not only on what the code is, but how to use it and respond to it.

### WHAT IS "FORMAL" TRAINING?

Formal training is structured, planned, documented, and may be classroom-based or on-the-job.

Informal training occurs "on the fly," is not documented, and is usually less comprehensive than formal training.

**Provide classroom, hands-on, and refresher training on vehicle emergency response procedures.**

Transit staff must be trained to effectively respond under stress to crisis situations, including transit bus fires. Hands-on practice on fire and evacuation procedures, rather than simply discussing procedures in a classroom setting, is critical. There is no substitute for "learning by doing" because practicing procedures helps employees become proficient in using them. Hands-on training also may uncover sources of safety risk that are not addressed through an agency's current procedures.

**Provide formal training for supervisors and dispatchers on how to carry out emergency response procedures.**

In an emergency, supervisors and dispatchers direct bus operator response activities and contact transit leadership and emergency services. Although it is important to have documented procedures for supervisors and dispatchers, this is not enough to help these employees perform effectively under high levels of stress. Formal training on how to carry out emergency procedures helps supervisors and dispatchers perform more effectively in stressful situations.

## 2. IMPROVE EMERGENCY RESPONSE READINESS THROUGH TRANSIT VEHICLE PROCUREMENT

**Recommendation:** During transit vehicle procurement, consider vehicle design and configuration options that can enhance the ability of agency staff to effectively respond to on-vehicle emergencies.

Transit agency emergency response capabilities are directly affected by decisions made about transit vehicle design and configuration. When the emergency response impact of vehicle design and configuration is not fully considered, or when operations experts within the agency are not involved in the transit vehicle procurement process, important opportunities to proactively improve safety are missed.

### EFFECTIVE PRACTICES

**Ensure operations and maintenance employees provide input on vehicle configuration.**

Operations, training, maintenance, and safety employees, such as supervisors, bus operators, and mechanics, directly involved in operating or maintaining equipment can provide valuable feedback on vehicle configuration to aid the vehicle procurement process. Agencies may choose to bring a representative from each position into a procurement committee, or specifically request suggestions from operations and maintenance safety committees. Employees also are asked for feedback on previously implemented bus design changes to see if the changes worked as intended.

**Select a rear emergency door instead of a rear emergency window in body-on-chassis vehicles<sup>1</sup>.**

Because engine compartments are located in the front of body-on-chassis vehicles, the right front door can become useless as an evacuation route during an engine fire event. Also, the configuration of body-on-chassis vehicles most often includes a wheelchair lift located at the right side rear door, blocking the use of that door as an

emergency exit when not deployed. This leaves either a rear emergency window or a rear emergency door as the primary evacuation route.

A rear emergency exit door contributes to a more rapid evacuation than a rear emergency exit window. The bus operator cannot be inside and outside the vehicle simultaneously helping passengers out of a high rear exit window and down to the ground. For passengers with mobility impairments, evacuation through a rear exit window may be impossible. However, with a rear exit door, the bus operator first moves passengers to the rear of the vehicle, as far from the fire as possible, and then helps them down while standing outside the vehicle.



**Use Automatic Vehicle Location and Global Positioning System (AVL/GPS) technology, panic buttons, and other methods to alert and assist emergency responders.**

AVL/GPS technology assists transit operations with monitoring on-time performance and providing real-time estimated times of arrival for passengers. This technology also can be used to track a transit vehicle during a safety or security

<sup>1</sup> Body-on-chassis vehicles, also called “cutaways,” are commonly used in rural, demand response, and paratransit services. The vehicles are made of a fiberglass body that is installed onto a heavy truck chassis, such as a 2500 or 3500 model.



event. Panic buttons allow bus operators to covertly notify dispatch of an emergency event. The buttons are installed in the driver compartment within arms-reach of the bus operator and are typically shielded from the passengers' view. Transit agencies also have installed features on some transit vehicles to notify law enforcement and first responders of an event on the bus. For example, bus operators may push a button to change the head sign to display an emergency message or activate a flashing light on the top of the bus to help law enforcement identify the correct vehicle.

**Carefully select the location of wheelchair securements on the vehicle floor.**

Areas for securing mobility devices in a forward position are best located near, but not blocking, one of the principal vehicle exits. To minimize tripping hazards, wheelchair securements and

passenger restraint systems should not obstruct the main aisle. Any type of obstruction in the aisle can hamper passenger evacuation from the vehicle.

**Create space to safely store on-vehicle equipment.**

Safety equipment needs to be readily accessible to the bus operator, but not stored in a way that obstructs the operator's view of the roadway or presents barriers to entering and exiting the vehicle. Storing items in the front right window well of a body-on-chassis vehicle or mounting a radio on the front left "A-post" of a transit bus creates blind spots for the bus operator. Also, improperly stored passenger restraint and wheelchair securement devices can present hazards to passengers in a collision or hard-braking event.

### 3. EQUIP REVENUE VEHICLES WITH SAFETY EQUIPMENT

**Recommendation:** Equip all fixed-route and demand response vehicles with useful safety equipment and develop procedures for using the equipment.

On-board safety equipment can assist bus operators in responding to emergencies, especially if employees are trained on the purpose of the equipment and how to use it. There is no "one size fits all" checklist for the specific equipment an agency should place on their buses. However, one thing all bus operators should do during the pre-trip inspection, no matter the agency, is ensure that all agency-required safety equipment is on board and in optimal condition.

#### EFFECTIVE PRACTICE

**Monitor pre-trip inspections.**

When supervisors or maintenance staff monitor pre-trip activities, bus operators are more likely to follow agency procedures when performing inspections. Properly and effectively carrying out pre-trip inspections helps reduce the possibility of

#### HAS YOUR FIRE EXTINGUISHER BEEN RECALLED?

On November 2, 2017, the Consumer Product Safety Commission issued a recall for over 40 million fire extinguishers with plastic handles manufactured by Kidde. The fire extinguishers can become clogged or require excessive force to discharge and can fail to activate during a fire emergency. In addition, the nozzle can detach with enough force to pose an impact hazard.

Visit <https://www.cpsc.gov/Recalls/2018/Kidde-Recalls-Fire-Extinguishers-with-Plastic%20Handles-Due-to-Failure-to-Discharge-and-Nozzle-Detachment-One-Death-Reported> for more information.

revenue service emergencies caused by vehicle failure, and ensures that safety equipment is accessible and in working order if needed.



**Reflective vest** – makes the bus operator more visible when outside the bus assisting a passenger, alongside the road with a disabled vehicle, or in the bus yard.



**Flashlight** – indispensable during hours of darkness to investigate incidents, or for pre-trip inspections in the early morning or post-trip inspections in the late evening.



**Warning triangles** – alert oncoming motorists to a disabled transit vehicle on the road.



**Web cutter** – when located near a bus operator’s seat, allows the operator to cut his or her own seat belt before assisting passengers.



**First aid kit** – to help treat minor injuries.



**Bio-hazard kit** – at a minimum, used to contain a spill until the bus can be switched out, properly cleaned, and disinfected.



**Fire extinguisher, fully charged** – type AB or ABC needed to protect the exit and curtail a fire, giving the operator and all bus occupants additional time to evacuate.

## 4. TRAIN EMPLOYEES HOW TO EVACUATE TRANSIT VEHICLES

**Recommendation:** Ask local fire department personnel to train bus operators on how to use a fire extinguisher and evacuate a vehicle during a fire or fire risk event.

Seconds count when evacuating a transit vehicle in a fire or smoke emergency. Bus fire simulations show that dense smoke can fill a bus in one to two minutes, seriously reducing visibility.<sup>2</sup> Therefore, it is critical for transit agencies to have formally documented fire and

evacuation procedures and provide hands-on training to bus operators and supervisors on how to quickly evacuate passengers from a vehicle.

A common misconception is that bus operators are supposed to use the fire extinguisher to

<sup>2</sup> Braun, E. Center for Fire Research, Institute for Applied Technology. 1975. *Report of Fire Test on an AM General Metro Bus*. Washington: US Department of Commerce, National Bureau of Standards.



immediately put out a fire on a vehicle. In a smoke or fire situation, always evacuate the vehicle first. The fire extinguisher should only be used as needed to clear or maintain a path in an exit area from which passengers evacuate.

Local fire department personnel may be willing to provide hands-on training to bus operators on properly using a fire extinguisher and evacuating passengers during a fire or smoke event.

## EFFECTIVE PRACTICES

**Provide hands-on vehicle fire event emergency evacuation training using fog machines, mannequins, or other simulation tools.**

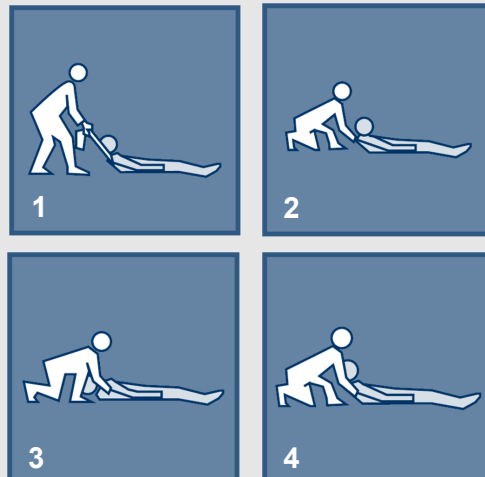
Incorporating the use of a fog-machine into hands-on emergency evacuation training for bus operators and supervisors provides a realistic “smoke” situation. This helps trainees learn first-hand how to evacuate passengers in a reduced visibility fire risk event. Fog machines can be borrowed or rented, or the local fire department may be able to provide this type of hands-on training. Mannequins specifically developed for use in training exercises simulate the size and weight of a human body and provide hands-on experience in dragging a person from a vehicle, evacuating a passenger from a mobility device, and using proper body mechanics to prevent bus operator injuries.

**Partner with ridership or Americans with Disabilities Act advisory groups for passenger education purposes.**

External organizations or groups often are willing to help educate transit passengers, particularly for paratransit operations. They can provide input on how best to evacuate passengers with access and functional needs with or without assistive devices. Their voluntary assistance also could be used to teach passengers how to self-evacuate from a transit vehicle during an emergency. Partnering with groups to provide demonstrations on how to evacuate your agency’s vehicles assists passengers in becoming familiar with the location of emergency exits and different evacuation techniques. This could be particularly important if the bus operator becomes incapacitated and is not able to assist in an evacuation.

### STAY LOW TO EVACUATE IN A FIRE EVENT

During a fire event, smoke and toxic gases rise and can accumulate at the ceiling of a bus. It’s important that operators consider this when deciding whether and how to safely help passengers evacuate a bus. The strap drag method (figure 1) can leave operators more vulnerable to smoke and toxic gas inhalation. With proper body mechanics in mind, operators should be trained to stay low where the air quality is better during a fire event. Clothing drags (figure 2), low shoulder drags (figure 3), and high shoulder drags (figure 4) are examples of drags that can reduce operator and passenger exposure to smoke and toxic gas.



## 5. REQUIRE INCIDENT COMMAND SYSTEM TRAINING

**Recommendation:** Require operations managers, supervisors, and dispatchers to go through basic NIMS ICS training.

When transit agency staff and equipment are mobilized to respond to a major transit or community-wide emergency, they may have to function in roles defined by the National Incident Management System (NIMS) Incident Command System (ICS). This is often mandatory when interacting with emergency management and first responders, so it is important that key transit employees, such as managers, supervisors, and dispatchers, are trained on incident command. Ideally, bus operators also would receive a basic orientation on how incident command works.



The NIMS provides a consistent national approach for federal, state, local, tribal and territorial governments, the private sector, and nongovernmental organizations to work together to prepare for, mitigate, respond to, and recover from domestic incidents, regardless of cause, size, or complexity.

Based on effective emergency management and incident response practices, the NIMS represents a core set of doctrine, concepts, principles, terminology, and organizational processes that enables effective, efficient, and collaborative incident management. The institutionalization of these elements nationwide through training and exercises helps to mitigate risk by improving preparedness. The Federal Emergency Management Agency (FEMA) leads this effort at the federal level.

Incident after-action reports and the NIMS itself

both emphasize that successful implementation relies on a national incident management training program, including comprehensive NIMS training and standardized personnel qualification. NIMS ICS training helps transit employees become familiar with incident command protocols in order to interact effectively with other members of a community during an incident.

FEMA's ICS-100 course introduces ICS and provides the foundation for higher level ICS training. The ICS-200 course is designed to enable personnel to operate efficiently during an incident or event within the ICS and focuses on the management of single resources. The ICS-700 is for personnel who require a basic understanding of NIMS and prevention, preparedness, mitigation, response, and recovery concepts.

### EFFECTIVE PRACTICES

#### **Include basic ICS courses for new hires.**

Sometimes agencies make basic ICS training part of their new-hire curriculum, ensuring that new employees receive the certification.

#### **Make the requirement for NIMS training and certification a priority.**

There are several options for a transit agency seeking to meet the NIMS compliance requirement. The agency can direct employees to take online courses, attend training conducted by local police or fire and rescue personnel, or bring in outside expertise to teach FEMA courses in the context of transit operations.

#### **ACCESS FEMA NIMS TRAINING AT:**

[HTTPS://WWW.FEMA.GOV/TRAINING-0](https://www.fema.gov/training-0)