1. APTA PR-PS-S-001-98
Standard for Passenger Railroad Emergency Communications

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Abstract: This standard establishes the minimum criteria for the provision and use of on-board communications systems for railroad operating personnel with particular focus on communications in the event of an emergency.

Keywords: emergency communications, radios

Introduction

(This introduction is not a part of APTA PR-PS-S-001-98, Standard for Passenger Railroad Emergency Communications.)

This introduction provides background on the rationale used to develop this standard. It is meant to aid in the understanding and application of this standard.

This standard is designed to help individuals and organizations incorporate and apply safety considerations in the emergency communications process.

This standard describes the emergency communications functions and responsibilities of the following groups:

a) Train crewmembers with other train crewmembers;

b) Train crewmembers with operations control or dispatch centers;

c) Train crewmembers with passengers on their trains;

d) Train crewmembers with emergency responders.

This standard is intended for the following:

a) Train crewmembers;

b) Operations control or dispatch personnel railroad operations managers;

c) Individuals or organizations that have a responsibility for maintaining railroad communications equipment;

d) Individuals or organizations that are involved in the design and manufacturing of railroad communications systems.

This standard provides a systems approach to help provide useful means for evaluating and selecting methods of railroad communications in the event of an emergency. Railroads and car builders should carefully identify the skills and training requirements necessary for all railroad personnel that are required to use communications systems to meet emergency evacuation requirements presented in these three standards.

Participants

The American Public Transportation Association (APTA) greatly appreciates the contributions of the following individual(s), who provided the primary effort in the drafting of the *Standard for Passenger Railroad Emergency Communications*:

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Contents

APTA PR-PS-S-001-98
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1. Overview

The standard for emergency communications is divided into four categories:

a)   Train crew-to-train crew emergency communications

b)   Train crew-to-operations control/dispatch center emergency communications

c)   Train crew-to-passenger emergency communications

d)   Train crew-to-emergency responder emergency communications

1.1 Scope

This standard took effect January 1, 2000.

This standard establishes the minimum criteria for the provision and use of on-board communications systems for railroad operating personnel with particular focus on communications in the event of an emergency.

1.2 Purpose

The establishment and execution of communications between train crews, operations control personnel and train passengers are of the utmost importance under normal circumstances. During emergency situations such communications take on added importance in the task of assuring the safety of all involved.

This standard has been designed to assist and guide individuals and organizations in incorporating safety considerations into communications systems.

2. References

This standard shall be used in conjunction with the following publications:

APTA PR-PS-S-002-98, Rev. 2, Standard for Emergency Signage for Egress/Access of Passenger Rail Equipment.

Specific railroad operating rules covering communications.

49 CFR, Part 217, Railroad Operating Rules.

49 CFR, Part 220, Railroad Communications.

49 CFR, Part 239, Passenger Train Emergency Preparedness.

3. Definitions, abbreviations, and acronyms

3.1 Definitions

For the purposes of this standard, the following terms and definitions apply:

3.1.1 dispatch: See: operations control center.

3.1.2 emergency (emergency situation): An unexpected event related to the operation of passenger train service involving significant threat to the health or safety of one or more persons, requiring immediate action. Examples include: derailment, highway/rail grade crossing accident, passenger or employee fatality or serious illness/injury, evacuation of train, or security situation.

3.1.3 hard-wired radio: A radio communications device permanently mounted in a railroad vehicle and permanently connected to an antenna mounted on the vehicle.

3.1.4 intercom: A communications system within a train consist which is keyed into by a train crewmember for transmission/broadcast to/from specific locations within the train and used to provide train crew-to-passenger communication and intra-crew communication.

3.1.5 operations control center (OCC): A central or designated regional location of a railroad with responsibilities for directing the safe movement of trains.

3.1.6 public address system (PA system): A communications system within a train consist used to provide train crew-to-passenger communication and intra-crew communications with speakers located throughout the interior of the rail vehicles, including the vestibules, and optionally on the exteriors of the vehicles. Removable hand microphones are considered part of the system.

NOTE--The system may be equipped with a selector switch to change between PA and intercom broadcast modes.

3.1.7 redundant communications system: A backup system of communications to be used in the event of a failure of the primary communications system. Such redundant systems may consist of a portable radio carried by a train crewmember, a cellular telephone available to a crewmember or multiple hardwired radios in the consist of a train.

3.1.8 tone generator: An inaudible cue, which alerts radio relay stations to activate themselves to allow the transmission of a message.

3.1.9 train crewmember: Railroad employee involved with the train movement of railroad rolling equipment and working together with other train crewmembers as an operating crew. This operating crew unit is under the charge and control of one crewmember, generally the conductor of the train, and is subject to the railroad operating rules and program of operational tests and inspections, as well as governed by the Hours of Service Act.

3.1.10 working radio: A radio that can communicate 2-ways (transmit and receive), with the operations control center (OCC) of the railroad (through repeater stations, if necessary) from any location within the rail system, with the exception of limited segments of territory where topography or transient weather conditions temporarily prevent effective communication.

3.1.11 working wireless communications: A hard-wired radio, portable radio, cellular telephone, or other means of two-way communication, with the capability to communicate with either the OCC or an emergency responder of the railroad from any location within the rail system (with the exception of limited segments of territory where topography or transient weather conditions temporarily prevent effective communication).

3.2 Abbreviations and acronyms

APTA	American Public Transportation Association
CFR	Code of Federal Regulations
FCC	Federal Communication Commission
FRA	Federal Railroad Administration
MARC	Maryland Rail Commuter Service
MBTA	Massachusetts Bay Transportation Authority
NEC	Northeast Corridor
OCC	operations control center
PA	public address system
SEPTA	Southeastern Pennsylvania Transportation Authority

4. Emergency communications

4.1 General procedures

4.1.1 Required types of communications equipment

a) The controlling locomotive, leading multiple unit or cab car shall be equipped with communications systems consistent with the requirements for trains in the *49 Code of Federal Regulations (CFR), Part 220.9, Requirement for Trains.*[1] In the case of joint operations, the communications systems must also be able to communicate with the operations control center (OCC) of the host railroad.

b) A redundant communication system capable of contacting the OCC shall be operable prior to departure from the initial terminal in case of primary radio failure en route. In the case of joint operations, the communications systems must also be able to communicate with the OCC of the host railroad.

c) If the train is so equipped, the public address system (PA)/intercom system shall be tested for operability prior to departure from the initial terminal. If it is not operating, an alternate means of establishing and maintaining contact with

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1 For references in Italics, see Section 2.

passengers and between crewmembers shall be utilized in accordance with the railroad's operating rules and instructions.

d) A train crewmember, generally the locomotive engineer, located in the controlling locomotive, leading multiple unit or cab car shall have a means of communicating orally with a designated train crewmember on the train. In case of failure of this means of communication, the train crew shall establish alternative means.

e) If the train is so equipped, the crew communicating signal system (buzzer or bell) shall be tested to determine operability prior to departure from the initial terminal. In case of failure of this means of communication, the operating crew shall establish alternative means.

f) If the train is so equipped, communication systems designed for use by passengers shall have clear, concise instructions for their usage posted at or near the location of the communications equipment in each rail vehicle. The operating instructions must be legible and clearly marked with photo-luminescent material in accordance with the *APTA PR-PS-S-002-98 Rev.2, Standard for Emergency Signage for Egress/Access of Rail Passenger Equipment*.

NOTE--Usage instructions for communications equipment used solely by train crewmembers are contained in railroad operating rules, timetable or special instructions, and train crews are periodically re-instructed on their proper use (see Section 4.7).

g) A backup power source shall be provided for each hard-wired mode of on-board communication, sufficient for a minimum of 1-1/2 hours of intermittent emergency communication (assuming usage of the PA or radio for 30 seconds at 10-minute intervals).

4.2 Train crew-to-train crew communications

In the event of an emergency, train crewmembers shall communicate with each other through the quickest means available, (i.e., train radios, public address system, or simple voice contact) to assess the severity of the situation.

4.3 Train crew-to-operations control/dispatch center communications

After establishing contact with each other and assessing the situation, a member of the train crew shall contact the railroad's OCC to inform them of the emergency by whatever means necessary. If the hard-wired radio system is not operational, an alternate mode will be used, including a hand-held portable radio or a cellular telephone, depending on the type of redundant communications system the passenger rail operator has selected, and what is operational. The use of station, wayside or block line telephones may be used if accessible and expedient.

If using a radio to establish emergency communication, communications shall be established in accordance with the Federal Railroad Administration (FRA) regulations for emergency radio transmissions as prescribed in *49 CFR, Part 220.47, Emergency Radio Transmissions*. The emergency situation must be described in accordance with the requirements of *49 CFR, Part 220, Railroad Communications*. However, if due to the

nature of the emergency or the condition of the communications equipment as a result of the emergency, the communication by the crew to the OCC is incomplete, the OCC must endeavor to obtain as much information as possible in order to determine the safest, most expeditious response to the emergency.

If using cellular communications, applicable Federal Communications (FCC) regulations must be complied with.

If using a combination of communication modes in the transmission/receipt of emergency communications (e.g., initiating transmission from a radio equipped with a keypad, which directs the call to the OCC telephone), the most restrictive communication protocols shall prevail.

4.4 Train crew-to-passenger communications

After informing the OCC, a train crewmember shall communicate with the passengers on the train by whatever mode possible. If the PA system is not operational or if determined to be only partially operational, train crewmembers shall walk through the train, consist and establish direct communication with passengers. This process shall be repeated at reasonable intervals throughout the duration of the emergency situation.

4.5 Train crew-to-emergency responder communications

It shall be a property-specific determination as to whether or not train crews will directly contact emergency responders after first notifying OCC. However, after the arrival of emergency responders, and upon their establishing command and control, train crewmembers will offer full cooperation (see Annex C).

4.6 Use prohibition of communication modes

If it becomes known that a suspicious package or bomb is suspected or discovered on the train, a designated member of the train crew will immediately notify the OCC by the quickest means available. Upon completion of this transmission, a member of the train crew will announce over the PA system to the passengers that the use of all cellular telephones and portable electronic devices must cease.

No portable radio transmission shall be activated within at least 300 feet of the train. The ranking emergency responder (police, fire department, bomb squad, etc.- consistent with applicable state and local regulations) will determine all further communications and establish command and control at the scene.

4.7 Training of railroad operations personnel in use of emergency communications equipment and procedures

Train crewmembers shall be instructed at intervals specified in the specific railroad's program of instruction on operating rules, or at least every two years by the employing entity.

Instruction shall include the physical use of the different modes of communication systems used within the rail service. It shall also cover proper communication protocols required while operating each of the different modes of communication and communication systems used on the rail property and/or within the rail service. This may include:

a) Radios: portable and hard-wired

b) Hand communication signals

c) Horn, bell or whistle communication signals

d) Wayside and/or block line telephones

e) Cellular telephones

f) Any other communication devices or signals used in the course of duty

In addition to initial and periodic instruction, employees whose duties require them to use communications systems and equipment in connection with railroad operations will be periodically tested for compliance with communication standards and protocols under the FRA requirements in *49 CFR Part 217.9, Program of Operational Tests and Inspections; Recordkeeping*.

Annex A (informative)

Bibliography

[B1] DOT-FRA-ORD 93-24, Federal Railroad Administration/Volpe Center, U.S. Department of Transportation, Recommended Emergency Preparedness Guidelines for Passenger Trains, December 1993.

[B2] 49 CFR, Part 223, Safety Glazing Standards.

[B3] FRA Emergency Order Number 20—Notices 1 and 2.

Annex B (informative)

Peer review of emergency communications in the passenger railroad industry (data gathered in June 1997)

The following is a summary of findings from a peer review of North American passenger railroad operators regarding crew-to-crew and crew-to-operations control center communications.

The following operators were surveyed for this review:

a) Metro-North Railroad, New York, NY

b) New Jersey Transit, Newark, NJ

c) Amtrak Northeast Corridor (NEC), Philadelphia, PA

d) Southeastern Pennsylvania Transportation Authority (SEPTA), Philadelphia, PA

e) Metra, Chicago, IL

f) Massachusetts Bay Transportation Authority (MBTA), Boston, MA

g) Maryland Rail Commuter Service (MARC), Baltimore, MD

h) Metrolink, Los Angeles, CA

i) Tri-Rail, Miami, FL

j) Go Transit, Toronto, ON

The overwhelming majority of crew-to-crew and crew-to-control center communications is accomplished via the use of hard-wired radios. All operators surveyed use radios as their primary mode of communication.

All operating cabs or locomotives have radios, and a number of operators have issued portable radios to their conductors, to ensure that communications can continue in the event that the hard- wired train radios have become inoperative. Other properties assume that the existence of multiple radios in a train consist (i.e., in each multiple unit [MU] or on either end of a push-pull set), will ensure that at least one radio will be operable at any given time, and thus have not issued portables.

Other communication modes include the train public address systems and a private, trainlined intercom line between the engineer and other crewmembers.

The portable radios used by most operators are powerful enough to contact control centers, whether or not the radios have a tone generator. At the few operations where portable radios are not powerful enough to reach control centers, the operators compensate for this by having multiple hard-wired radios in the train set or by supplying

cellular telephones to some crewmembers as an additional mode of communication (see below).

Several operators are now using cellular telephones to aid in communications. A description of these is as follows:

– *MARC*: Conductors on the Camden and Brunswick Lines, which are operated by CSX, a freight carrier, now carry cellular phones. They are to be used to contact the MARC operations center directly, and thus bypass CSX dispatchers for non-operating communications. Phones are pre-programmed with speed dial buttons to contact the MARC operations center or the CSX passenger operations desk, and cannot be used for other phone calls.

– *Metrolink:* Conductors carry cellular phones which have no call blocks, but which are to be used primarily to contact emergency personnel.

– *Metra:* Cellular phones are being installed in locomotive cabs and cab control cars. The phones are preprogrammed with speed dial buttons to various Metra departments, i.e., the mechanical department or the OCC and are blocked from making outside calls.

– *Tri-Rail:* Cellular phones are installed in the locomotive cabs and cab control cars. There are no blocks on these phones.

– *GO Transit:* In the event the portable radios carried by conductors cannot broadcast on a standard regular channel (due to location, etc.), they have the ability to key into an engineering radio channel, from which a cellular phone network can be accessed. The conductor can then directly dial whomever necessary.

Amtrak is in the process of installing a satellite-based communication system called Qualcom, which is being installed on equipment used outside the northeast corridor (NEC). The system consists of a keyboard and display monitor located in the locomotive, with which an engineer can communicate with an Amtrak control center, and bypass the operating railroad dispatcher. The train's conductor can also access the Qualcom system via a portable unit which "taps into" the master unit in the locomotive. The unit in the locomotive must be operational for the portable unit to work.

Bypassing the operating railroad's dispatcher can be beneficial in that doing so avoids burdening the dispatcher with non-operating issues and can also speed up communications since the Amtrak dispatcher must rely on the operating railroad's dispatcher to relay information about emergencies. With Qualcom, Amtrak dispatchers can be notified immediately about emergency situations.

Qualcom is of particular importance outside the NEC where the distance between stops is greater, the operating environment more challenging, and where radios may not reach; e.g., in mountainous regions, tunnels, etc.

Annex C (informative)

Train crew-to-emergency responder communications

APTA does not propose to issue standard language prescribing train crew-to-emergency responder communications at this time as it was regarded as a property-specific decision subject to property-specific guidelines.

In general, however, it is not recommended that train crews have direct radio contact with emergency responders. The reasons for this recommendation are as follows:

a) To do so would cause the crewmembers to have to contact multiple personnel in the event of an emergency, preventing them from performing their primary duties of informing the railroad's OCC and ensuring the safety of the train's passengers.

b) To do so would require the train radios to be equipped with a wide variety of radio channels in order to communicate with the emergency responders in each of the municipalities, counties, states, provinces or other Jurisdictions through which a passenger train may operate.