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APTA Rail Transit Operating Practices
Working Group

Requirements for Safe Operations in Yards and Maintenance Facilities

Abstract: This Rail Standard provides guidance for the safe operation of trains and on-track equipment (OTE) in rail yards and maintenance facilities. It is applicable to heavy, light rail, streetcar, and automated people-mover systems, and provides standards for employees responsibilities for the safe movement of trains and OTE.

Keywords: maintenance facilities, rail transit operations, safe operations, yards, and OTE

Summary: The operation of trains and OTE in yards and maintenance facilities requires coordination of activities to ensure the safety of personnel and the protection of equipment. This document provides requirements for rules and procedures for employee responsibility for the safe movement of trains and OTE in yards and maintenance facilities.

Scope and purpose: This standard establishes the minimum requirements for the safe operation of trains and OTE in yards and in maintenance facilities. It identifies rail transit systems (RTS) and employee responsibilities and specific safety practices that can be adapted for multiple types of RTSs.

This document represents a common viewpoint of those parties concerned with its provisions, namely operating/ planning agencies, manufacturers, consultants, engineers and general interest groups. The application of any standards, recommended practices or guidelines contained herein is voluntary. In some cases, federal and/or state regulations govern portions of a transit system's operations. In those cases, the government regulations take precedence over this standard. The North American Transit Services Association (NATSA) and its parent organization APTA recognize that for certain applications, the standards or practices, as implemented by individual agencies, may be either more or less restrictive than those given in this document.

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Introduction

This Introduction is not part of APTA RT-OP-S-003-02 Rev2 “*Requirements for Safe Operations in Yards and Maintenance Facilities.*”

The Requirements for Safe Operations in Yards and Maintenance Facilities represents a common viewpoint of those parties concerned with its provisions, namely, transit operating/planning agencies, manufacturers, consultants, engineers and general interest groups. The application of any standards or recommended practices contained herein is voluntary. In some cases, Federal and/or State regulations govern portions of RTS operations. In those cases, the government regulations take precedence over this standard. APTA recognizes that for certain applications, the standards or practices, as implemented by individual RTS may be either more or less restrictive than those given in this document.

Note on alternate practices

Individual RTSs may modify the practices in this standard to accommodate their specific equipment and mode of operation. APTA recognizes that some RTS may have unique operating environments that make strict compliance with every provision of this standard impractical. As a result, certain RTS may need to implement the standards and practices herein in ways that are more or less restrictive than what this document prescribes. An RTS may develop alternates to the APTA standards so long as the alternates are based on a safe operating history and are described and documented in the RTS’s system safety program plan (SSPP), or another document that is referenced in the SSPP.

Documentation of alternate practices shall:

- identify the specific APTA rail transit safety standard requirements that cannot be met;
- state why each of these requirements cannot be met;
- describe the alternate methods used; and
- describe and substantiate how the alternate methods do not compromise safety and provide a level of safety equivalent to the practices in the APTA safety standard (operating histories or hazard analysis findings may be used to substantiate this claim).

It must be noted that rail transit is not directly comparable to railroads (e.g. Amtrak, commuter, freight rail, etc.). Rail transit systems differ greatly in the types of service, vehicles and technology employed, with some systems operating fully automated trains on exclusive rights-of-way and others operating on streets mixed with traffic. Rail transit demands a unique approach to solving its problems, and the APTA Rail Transit Standards Program was enacted to accomplish this complex task.

Requirements for Safe Operations in Yards and Maintenance Facilities

1. Background

The operation of trains and on-track equipment (OTE) in yards and maintenance facilities requires coordination of activities to ensure the safety of personnel and protection of trains, OTE, and infrastructure. The adherence to rules and procedures is required for safe operations.

2. Safe operations requirements

“Safe operations” is a term that defines and encompasses all activities necessary for the safe movement of trains and OTE. Safe operations require all employees to be familiar with and comply with the rules and procedures that govern the movement of trains and OTE in yards and maintenance facilities. Communication between RTS staff members of different departments (as required) operating within the yard and maintenance facility is a key component of safe operations and helps ensure coordination among all personnel. Safe operations may also encompass other elements, such as:

- performing inspection, as-defined by the RTS, prior to moving train within the yard or maintenance facility
- conducting a pre-trip/departure inspection (e.g. minimum operating standards equipment list) prior to entering the main line
- operating trains at safe speeds
- checking switches for proper alignment, and
- performing safety stops.

Safe operations mandate that employees perform their respective duties in a safe manner while using proper safeguards and with a general understanding of how their actions may affect others.

2.1 Yard and maintenance facility rule and procedure requirements

The RTS shall develop and implement rules and procedures and/or develop and include a specific element within its roadway worker protection (RWP) program that specifically governs the actions of employees while performing their duties in yards and maintenance facilities. These rules and procedures shall be appropriate for the RTS, taking into consideration safe practices involving:

- operating environment,
- types of equipment used in the yard (e.g. trains and OTE),
- equipment and tools used,
- infrastructure,
- safe train and OTE operating speed,
- geographical location,
- track, switches, traction power, and signals,
- climatic conditions,
- and layout of the yard and maintenance facility.

The RTS's procedures shall also describe specific safety precautions for train operators, OTE operators, and maintenance workers while performing safety-sensitive duties, as well as other individuals in the yard. The RTS shall identify safety precautions associated with energized third rails, energized overhead wires, fueling facilities, and/or train and OTE movement.

The RTS shall develop procedures for ensuring that all trains and OTE are safe and are ready for service. Typically, this includes an appropriate physical inspection of the train or OTE.

2.1.1 Movement authorization

The RTS shall establish rules and/or procedures for the authorization of train and OTE movements within yards and maintenance facilities, as well as movements into and out of yards and maintenance facilities. The level of control required will be determined by the size, complexity and operating practices of the RTS. The RTS shall establish requirements for yard supervisor authorization of movements.

Train and OTE movement authorization must be clearly defined and permission granted by operating rules and/or procedures, operations control center, vehicle maintenance management, or from a yard supervisor. Train movements in the yard may also be controlled by signal, or trains may be operated by line of sight. In the absence of signal protection, the RTS shall develop specific operating procedures to ensure a safe operating environment in the yard. Regardless of the type of control or methodology used, the RTS shall develop clear procedures that inform all individuals of their responsibilities and level of authority.

2.1.2 Track classification

The RTS shall identify all tracks according to their operating classification. This may include categories such as main tracks, running tracks, side tracks, test tracks, storage tracks, yard tracks, maintenance tracks or some other designation appropriate to that particular RTS. The RTS shall also designate the yard limit, determine how yard tracks can be used, and manage yard track access. The RTS shall establish a procedure to restrict access or remove track(s) from service.

2.1.3 Securement of trains and OTE

The RTS shall establish rules and/or procedures for the safe, proper securement of trains and OTE from unintended movement and work to ensure that tracks, trains, equipment, and facilities in the yard are secure and access to these assets is limited.

As determined by the RTS, employees operating trains or OTE in yards are responsible for knowing and practicing the safe and proper securement of a trains or OTE from unintended movement at the completion of a move.

The RTS shall establish a procedure to prevent the movement of a vehicle while individuals are working on or around the vehicle or for other specific requirements. The RTS may consider the use of flag or illuminated light protection of equipment, chocks, de-railers, or other methods of protection.

APTA RT-OP-S-021-15 "*Standard for Train Operator Hours of Service Requirements*" outlines additional requirements for operating and working near OTE. Those RTS requirements include, but are not limited to:

- operating safety,
- inspection documentation,
- operating rules and procedures, and
- pre-work safety briefings.

2.2 Employee responsibilities

The RTS shall establish rules and procedures that pertain to the responsibilities of employees working in the yard and maintenance facility. The RTS shall establish requirements that is the responsibility of all affected employees to know, understand and comply with all rules and procedures associated with the safe movement of trains and OTE in yards and maintenance facilities located within yards and on yard tracks.

The RTS shall take appropriate measures to ensure that employees possess practical knowledge of track layouts, track switches, signals and their locations. It is the responsibility of all employees to report any unusual, dangerous, hazardous or defective conditions. The operator is responsible for the safe operation of a train or OTE while in motion. When personnel are working on or near the tracks, the operator shall operate the train or OTE at a safe speed as determined by the individual RTS's rules and procedures for movement that passes roadway workers.

The RTS shall establish requirements that all yard and maintenance facility moves are properly communicated, executed, and documented. The RTS shall establish requirements for employee actions within the yard and maintenance facility related to awareness of potential train or OTE movement, infrastructure layout, and other operational and physical factors. The RTS shall require employees to maintain a line of sight in the direction they are walking or are moving trains or OTE.

The RTS shall establish a yard and maintenance facility rule that requires employees to be aware that train movement can occur on any track, in any direction, and at any time.

2.2.1 Electronic device usage

The RTS shall establish requirements related to any use or prohibition of electronic devices, in accordance with the requirements of APTA-RT-OP-S-017-11.

2.2.2 Yard operating clearances

The RTS shall establish rules and/or procedures for designating track and signal restrictions due to infrastructure condition, environmental conditions, or other factors that may result in train orders such as speed restrictions or closures of certain locations or the presence of work crews.

2.2.3 Train and OTE inspection and operation

The RTS shall require any employee operating a train or OTE to visually check all cars of the train or the OTE and identify any defects or restrictions to movement that may impact safe operation before movement. The RTS shall require the employee operating the train or OTE to perform all operational tests required by the RTS in the prescribed manner to verify that the train or OTE is capable of safely operating before movement. The employee operating the train or OTE shall sound an audible warning prior to movement in order to warn personnel of train or OTE movement. When coupling or uncoupling cars, the train operator shall understand and comply with RTS coupling and uncoupling procedures, which may or may not be different from mainline tracks and shall properly secure all cars being added or cut from the train. Before moving a train, the operator shall ensure that the train has the correct number of cars assigned.

2.2.4 Safety stops

Safety stops are required in advance of a RTS defined must-stop situation. Where yard moves are controlled by the train operator, the route of an assigned move shall not be changed without positive communications with other train operators, OTE operators, yard supervisors, and any other employee who supervises train movements in the yard.

Requirements for Safe Operations in Yards and Maintenance Facilities**2.2.5 Yard move assignment**

The RTS shall establish requirements for communication of movement assignments between train/OTE operators and any employee responsible for supervising the yard and maintenance facility.

2.2.6 Work zone safety practices

APTA RT-OP-S-004-03 Rev. 2 “*Standard for Work Zone Safety*” outlines additional requirements for safety in the yard and maintenance facility.

2.3 Movement of trains into and out of maintenance facilities

The RTS shall establish procedures for moving trains into and out of maintenance facilities. Where applicable, the RTS shall, at a minimum, address the following:

- clear identifications of who can authorize train movement into and out of the maintenance facility;
- requirements to clearly communicate train moves into and out of the maintenance facility, including use of “safety stops” prior to entering and exiting the facility;
- maximum allowable speeds inside the maintenance facility;
- flagging requirements, to include who is authorized to flag a train into or out of a maintenance facility;
- requirements to respond to and follow various hand signals;
- train operator instructions and requirements on following fixed signals inside the maintenance facility, if equipped;
- requirements to fully open and secure maintenance facility doors;
- safe vehicle operations within the maintenance facility;
- inspections prior to moving a train or OTE shall include:
 - Clear areas around tracks – adjacent facility structures, portable equipment, vehicle doors and panels, etc.
 - Review under (pits) and above (catwalk, cranes, etc.) train for clearance
- requirements to be aware of any train or OTE defects that could affect the safe operation of the train or OTE prior to moving the train or OTE;
- requirements to ensure that propulsion power is available inside the maintenance facility to make the desired move;
- precautions to take to prevent inadvertent and unintended energization of overhead wires or the third rail by bridging two sections of a power distribution system with a train;
- precautions to take to ensure train has a clear path to its destination prior to flagging a train inside the maintenance facility;
- safety requirements for all personnel involved in the movement of trains and on track equipment or those within the safety envelope;
- requirements for the proper securement of trains or OTE at the completion of movement;
- prohibitions of reverse movements, as applicable; and
- requirements for proper use of portable traction power systems (e.g. bugging railcars into and out of a maintenance facility)

2.4 Audible and hand signals

The RTS shall develop rules/procedures for audible and hand signals. These signals shall apply consistently to employees working in the yard and/or maintenance facility. As a minimum, the following audible and hand signals shall be considered:

- Audible signals:
 - Alert for people on the track
 - Acknowledgement or answer to any signal not otherwise provided
 - Call for signals (request for directions)
 - Stand clear, the train is about to move
- Hand signals:
 - Stop or remain standing
 - Reduce speed
 - Proceed
 - Back up
- Radio protocols:
 - Use of radio communications to govern decision to move (where applicable)

The RTS shall determine the appropriate types of signalling (audible, hand, other) based on local environmental conditions at the specific yard/maintenance facility location.

2.5 Roadway worker protection and work zone safety practices

The RTS shall document any additional safety requirements in addition to the existing RTS RWP program and Work Zone Safety Program, which are unique to yard and maintenance rules and procedures or which may be different than mainline RWP requirements.

The RTS shall develop procedures governing the use of job briefings prior to yard and shop work activities. These procedures shall pertain to train movements and activities on or near the yard and maintenance facility.

For additional information on roadway worker protection and work zone safety practices requirements see APTA RT-OP-S-016-11 Rev 1 and APTA RT-OP-S-004-03 Rev 2.

2.6 Training

The RTS shall establish appropriate training for employees with emphasis on yard track movements, yard track fouling limits, and proper personal protective equipment (PPE) requirements.

The RTS shall determine and implement employee training requirements associated with yard maintenance facility rules and procedures. These requirements should include, but are not limited to:

- train and OTE movement in yard,
- train and OTE movement into and out of maintenance facility,
- securement of trains and OTE,
- car wash procedures,
- yard storage,
- use of new or rented OTE,
- equipment and tools fouling track and switches, and

- other applicable requirements as described in section 2.3 of this standard.

The RTS shall establish training requirements specific to the employee's job responsibilities to ensure that the rules and procedures applicable to safe operations in yards and maintenance facilities are maintained. The RTS shall consider using the framework for training established in APTA RT-OP-S-013-03 Rev 1.

2.7 Other yard and maintenance facility rules

2.7.1 Entering and exiting the main line

The RTS shall establish requirements for the movement of trains and OTE entering and exiting the main line.

2.7.2 Assignment of responsibility

The RTS shall assign responsibility for train movement for both the yard and maintenance facility. Some RTSs assign different responsibilities for yard and maintenance facility, and others have it under a single authority.

2.7.3 Limited clearance locations

The RTS shall evaluate locations within the yard and maintenance facility where markings such as striping, signage, or other means are necessary for indicating the clear movement of trains or other OTE expected to travel on the track. The RTS shall provide markings and/or signage, as appropriate.

2.7.4 Personal protective equipment

The RTS shall prescribe PPE requirements for employees and other individuals in yards and maintenance facilities.

2.7.5 Post revenue service inspections

The RTS shall develop requirements for post revenue service inspections related to individuals and locations for performing inspections for purposes of identification of security-related items, suspicious packages, etc. These procedures should be established in coordination with transit police, security, and/or local police.

2.7.6 Railcar cleaning

The RTS shall establish requirements for the safe cleaning of railcars in the yard or maintenance facility, including the transportation of cleaning equipment to the vehicles, the use of electrical extension cords and generators, and the access to and from the vehicles.

2.7.7 Maintenance facility and yard electrical safety

The RTS shall develop methods of verification for status of traction power system in maintenance facility and in the yard.

2.7.8 Track assignment and/or allocation

The RTS shall formally identify how its track allocation process applies to the yard and maintenance facility. Alternatively, the RTS shall develop a track allocation process for the yard and maintenance facility that comports with the requirements for APTA RT-OP-S-020-014 “*Standard for Train Operating Personnel Reporting to Work*”.

2.7.9 Traction power removal and restoration

The RTS shall establish requirements for the removal and restoration of traction power in the yard and maintenance facility for both normal and emergency conditions.

2.7.10 Use of carts

The RTS shall establish requirements for the use of carts in yards and maintenance facilities. Carts may be powered or non-powered. The RTS shall determine if rules and/or procedures should be specific to types of equipment or more general to their operation.

2.7.11 Vehicle status

The RTS shall establish requirements regarding the status of trains in the yard for inspection, repair, revenue service, or other actions.

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2.7.12 Yard towers

If a RTS controls yard operations from yard towers, the RTS shall establish yard tower requirements to govern the safe movement of trains and OTE in the yard.

2.8 Yard and maintenance facility security and design

The RTS shall develop procedures addressing authorized individuals entering and exiting the yard and maintenance facility. The procedures should be established in cooperation with transit police, security, and/or local police. The RTS shall consider the use of access controls for employees such as key cards and identification credential checks. The RTS shall develop procedures for the inspection of yards and maintenance facilities by supervisory and security personnel.

The RTS shall develop minimum requirements for perimeter security hardening, such as fencing, walls, or other methods, to prevent unauthorized entry. The minimum requirements should be established in cooperation with transit police, security, and/or local police.

The RTS shall develop minimum requirements for yard and maintenance facility monitoring, which may include, but not be limited to closed circuit television cameras, video analytics, patrols by security or police personnel, RTS employee reporting of suspicious activities, and other possible methods.

The RTS shall develop appropriate requirements governing the security of the yard and maintenance facility, including, but not limited to: security awareness training for employees, inspections of trains and OTE and facilities for vandalism or evidence of unauthorized access, and any regular use of security and/or transit police to monitor and protect the facility.

Related APTA standards

Requirements for Safe Operations in Yards and Maintenance Facilities contains information that is directly related to other APTA Standards. The following Standards contain information directly related to subjects within this Standard.

- **APTA RT-OP-S-004-03 Rev 2** “*Work Zone Safety Practices*”
- **APTA RT-OP-S-010-03 Rev 2** “*Contractor’s Responsibility for Safety on the Right-of-Way*”
- **APTA RT-OP-S-013-03 Rev 1** “*Standard for Training of Rail Operating Employees*”
- **APTA RT-OP-S-016-11 Rev 1** “*Roadway Worker Protection Program Requirements*”
- **APTA RT-OP-S-020-14** “*Rail Transit Track Allocation Program Requirements*”
- **APTA RT-OP-S-021-15** “*On-Track Equipment Safety Requirements*”

Definitions

For the purposes of this standard, the following terms and definitions apply. The job titles listed below are used in this standard for informational purposes only. It is up to the individual RTS to determine and utilize titles as it finds appropriate.

controller: An employee, usually stationed in the control center, who is authorized and responsible for all rail operations. Duties may include, but are not limited to, train control, train dispatching, train supervision and related field activities.

control center/central control/operations control center: The facility where rail operations such as train control, train dispatching, train supervision and related field activities are accomplished for the entire rail transit system or for specific segments of a system if there is more than one such facility.

employee: An individual who is engaged or compensated by an RTS or by a contractor to an RTS to perform any of the duties defined in this standard.

maintenance facility: The location within defined limits utilized by the RTS for the maintenance and repair of rail transit vehicles.

on-track equipment: A rail mounted vehicle or equipment, including hi-rail vehicles and equipment, that is not used for revenue service but is used to inspect, maintain, and repair the rail system

line of sight: A mode of train operation in which the operator must visually ensure that it is safe to operate a train under various operating conditions and be able to stop the train prior to any obstruction.

rail transit system (RTS): An organization that operates passenger train service and its supporting activities.

safety stops: Stops made to verify the braking capability of a train to enhance safety in advance of an RTS-defined must-stop situation.

storage tracks: Those tracks upon where trains are stored.

train: A rail mounted vehicle that is used or intended to be used in revenue service - any motorcar, locomotive or other self-propelled on-rail vehicle, with or without other cars coupled.

train operator: An authorized onboard employee who controls the movement of a train.

yard: A facility within defined limits that has a system of tracks used for making up trains, storing trains and other purposes. A maintenance facility may be included.

yard supervisor: One who oversees the activity of work or workers in the yard.

yard tracks: All tracks, other than mainline tracks, contained within the limits of the yard.

Abbreviations and acronyms

APTA	American Public Transportation Association
NATSA	North American Transit Services Association
OTE	on-track equipment
PPE	personal protective equipment
RTS	rail transit system
RWP	roadway worker protection
SSPP	system safety program plan

Summary of changes

- a) Changed title to “Requirements for Safe Operation in Yards and Maintenance Facilities”
- b) Modified language throughout to address the “safe operation of trains and OTE” in yards and maintenance facilities
- c) Expanded section 2.2 “Employee responsibilities” to cover securement of trains and OTE, safety stops, work zone safety practices, etc.
- d) Added section 2.5 “Roadway worker protection and work zone safety practices”
- e) Added section 2.6 “Training”

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- f) Expanded section 2.7 “Other yard and maintenance facility rules” to include vehicle cleaning, use of carts, vehicle status, electrical safety, etc.
- g) Added section 2.8 “Yard and maintenance facility security and design”
- h) Referenced related APTA standards
- i) Expanded title and subject matter to include safe operations in maintenance facilities
- j) Document reformatted to a new APTA standard
- k) Sections have been renumbered and moved around
- l) Scope and summary moved to the front page
- m) Updated list of committee members
- n) Minor changes to spelling and capitalization
- o) The definitions section had many changes. This was due to a separate sub-committee initiative where a review was undertaken to ensure that there was consistency among all the operating practices standards and recommended practices. The following are a summary of the changes/clarifications made to definitions in this document:
 - i) Deleted the term SOP as it is not referenced in this standard
 - ii) Deleted the term flag person as it is not referenced in this standard
 - iii) Controller
 - iv) Control Center/Central Control/Operations Control Center
 - v) Deleted the term derail as it is not referenced in this standard
 - vi) Maintenance Facility
 - vii) On-sight/Line of sight
 - viii) Rail Transit System (RTS)
 - ix) Deleted the term restricted speeds as it is not referenced in this standard
 - x) Deleted the term restricted speed as it is not referenced in this standard
 - xi) Safety Stops
 - xii) Deleted the term track cars as it is not referenced in this standard
 - xiii) Train
 - xiv) Deleted the term train controller/supervisor
 - xv) Train Operator
 - xvi) Yard tracks
 - xvii) Yard Supervisor

Document history

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