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Inspection & Maintenance Working Group

Roller Bearing Inspection and Testing on Passenger Rail Equipment After a Derailment

Abstract: This rail standard provides a procedure for the inspection and testing of roller bearings on rail passenger equipment after a derailment.

Keywords: inspection and testing, major derailment, minor derailment, roller bearing inspection and testing, roller bearings, wheelset

Summary: This safety standard describes the inspection and testing tasks to be performed and the circumstances requiring the performance of these tasks. It also lists references that must be on hand or are useful for the implementation of this standard; definitions of terms used in this standard; and acronyms used in this standard.

Foreword

The American Public Transportation Association is a standards development organization in North America. The process of developing standards is managed by the APTA Standards Program's Standards Development Oversight Council (SDOC). These activities are carried out through several standards policy and planning committees that have been established to address specific transportation modes, safety and security requirements, interoperability, and other topics.

APTA used a consensus-based process to develop this document and its continued maintenance, which is detailed in the manual for the APTA Standards Program. This document was drafted in accordance with the approval criteria and editorial policy as described. Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

This document was prepared by the Inspection & Maintenance Working Group as directed by the Passenger Rail Equipment Safety Standards Policy and Planning Committee.

This document represents a common viewpoint of those parties concerned with its provisions, namely transit operating/planning agencies, manufacturers, consultants, engineers and general interest groups. APTA standards are mandatory to the extent incorporated by an applicable statute or regulation. In some cases, federal and/or state regulations govern portions of a transit agency's operations. In cases where there is a conflict or contradiction between an applicable law or regulation and this document, consult with a legal adviser to determine which document takes precedence.

This document supersedes APTA PR-IM-S-015-00, Rev. 1, which has been revised. Below is a summary of changes from the previous document version:

- Document formatted to the new APTA standard format.
- Sections have been moved and renumbered.
- Scope and summary moved to the front page.
- Sections of definitions, abbreviations and acronyms moved to the rear of the document.
- Two new sections added: "Summary of document changes" and "Document history."
- Some global changes to section headings and numberings resulted when sections dealing with references and acronyms were moved to the end of the document, along with other cosmetic changes, such as capitalization, punctuation, spelling, grammar and general flow of text.
- Distance threshold for major derailment has been revised to conform with CFR.
- Section 1.1: Clarified criteria for determining major and minor derailment.
- Section 1.2: Clarified requirements and references for a major derailment
- Section 1.3: Detail has been added regarding movement of passenger rail equipment involved in a minor derailment. A note has been added prescribing the notification to the owner of the equipment when derailment occurs in the hands of a third party.
- Section 1.4 and Appendix A: Added new.

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Introduction

This introduction is not part of APTA PR-IM-S-015-00, "Roller Bearing Inspection and Testing on Passenger Rail Equipment After a Derailment."

This standard applies to all:

1. Railroads that operate intercity or commuter passenger train service on the general railroad system of transportation; and
2. Railroads that provide commuter or other short-haul rail passenger train service in a metropolitan or suburban area, including public authorities operating passenger train service.

This standard may apply to:

1. Rapid transit operations in an urban area that are not connected to the general railroad system of transportation;
2. Tourist, scenic, historic or excursion operations, whether on or off the general railroad system of transportation;
3. Operation of private cars, including business/office cars and circus trains; or
4. Railroads that operate only on track inside an installation that is not part of the general railroad system of transportation.

This standard describes the requirements for inspection and testing of roller bearings on passenger coaches after a derailment.

Scope and purpose

This document is a safety standard for performing the inspection and testing of roller bearings on passenger rail equipment following a derailment and prior to the derailed equipment being returned to service. It provides a set of inspection and testing tasks that shall be performed after a derailment. This safety standard is meant to provide organizations with basic requirements to be satisfied by the inspection and testing process.

Roller Bearing Inspection and Testing on Passenger Rail Equipment After a Derailment

1. Inspection and testing procedures

1.1 Determination of major or minor derailment

Prior to re-railing derailed passenger rail equipment, it is important to classify the derailment as a minor derailment or a major derailment as defined in the Definitions section of this document. A derailment may be categorized as major if:

1. The derailed vehicle was traveling at a speed greater than 10 mph; or
2. The derailed vehicle traveled more than 100 ft from the point of derailment.

If either of these criteria cannot be confirmed, then it must be assumed that the wheelsets in question were involved in a major derailment and must be removed from service.

1.2 Major derailment

Any wheelset that has been involved in a major derailment must be removed and handled in accordance with AAR Rule 41 – Wheels; AAR Section G Part II Wheel and Axle Shop Manual; and the railroad's safety and maintenance procedures. The roller bearings must be removed and reconditioned in accordance with AAR Rule 36 – Roller Bearings and AAR Section H Part II Roller Bearing Shop Manual, S-737.

1.3 Minor derailment

The roller bearings of each derailed wheelset on empty or passenger-loaded rail equipment involved in a derailment at a speed of not over 10 mph and that have not moved on the ground more than 100 ft shall undergo the following after re-railing is completed and prior to movement to a repair facility:

1. In accordance with the railroad's operation and maintenance instructions and safety procedures, visually inspect the roller bearings for any external sign of damage.
2. In accordance with the railroad's operation and maintenance instructions and safety procedures, perform a roll-by inspection to detect any unusual noise indicating internal damage, roughness or catches in the rotation of the wheelset.
3. Any external damage to the roller bearing or any unusual noise, roughness or catches made by the wheelset during the roll-by inspection shall classify the derailment as a major derailment (see Section 1.2). Only once the integrity of the equipment has been verified shall the equipment be moved at a reduced speed, from the minor derailment site to a shop facility for wheelset for additional wheelset inspection, as detailed in Section 1.4.

   NOTE: Any derailment of equipment while in the possession of a third party must be reported to the owner regarding the classification of the derailment and repairs made.

1.4 Repair facility inspection

Once passenger rail equipment that has been involved in a derailment arrives at a properly equipped repair facility, the following procedure must be undertaken before returning the rail equipment to active passenger service:

NOTE: The following procedure was derived from AAR Rule 36.

1. Bearings must be sufficiently clean to permit adequate inspection of all exterior parts.
2. Carefully inspect the outer cup for cracks or breaks.
3. Inspect for loose or damaged front and rear seals.
4. Inspect for missing or loose end cap screws.
5. Inspect for loose backing rings.
6. A railroad may elect to conduct a rotational inspection of bearings in accordance with Appendix A.
7. Check for a bent axle in accordance with AAR Rule 43.E. and the railroad's safety and maintenance procedures.
8. Inspect end cap for cracks, broken ears or nicks, and dents and gouges in excess of ⅛ in. deep.
9. If all of the above checks are satisfactory, continue wheelsets in service in accordance with the railroad's operating procedures for returning equipment to passenger service. Otherwise, the roller bearings must be removed, rebuilt or replaced.

References

In addition to railroad maintenance instructions, original equipment manufacturer instructions, and applicable state and local regulations, this document shall be used in conjunction with the following:

49 CFR, Part 238.17(d), Passenger Equipment Safety Standards, "Inspection of roller bearings on equipment involved in a derailment."

AAR Rule 36 – Roller Bearings

AAR Rule 41 – Wheels

AAR Section G Part II Wheel and Axle Shop Manual

AAR Section H Part II Roller Bearing Shop Manual, S-737

Definitions

major derailment: Any derailment either occurring at a speed in excess of 10 mph or resulting in the derailed truck(s) being dragged on the ground for a distance of 100 ft or more.

minor derailment: Any derailment occurring at a speed of less than 10 mph and resulting in the derailed truck(s) being dragged on the ground for a distance of less than 100 ft.

roller bearing: The general term applied to a group of journal bearings that depend on the rolling action of a set of rollers, in order to reduce rotational friction. The different types are distinguished by the shapes of the rollers and by their arrangement in the bearing. Three types of rollers are in common use at present for car journals: cylindrical, tapered and spherical.

wheelset: A pair of wheels mounted on an axle.

Abbreviations and acronyms

AAR Association of American Railroads
CFR Code of Federal Regulations

Document history

Document Version	Working Group Vote	Public Comment/ Technical Oversight	CEO Approval	Policy & Planning Approval	Publish Date
First published	Nov. 1, 2000	—	—	Jan. 8, 2001	Jan. 8, 2001
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Appendix A: Rotational inspection of bearings

Feel for internal roughness or catches while holding rollers and raceways against each other during complete rotation of both the bearing and the wheel as follows:

NOTE: The following procedure was derived from AAR Rule 36.

1. Push the cup toward the inner raceway, and rotate the cup in one direction for at least two complete revolutions.
2. Pull the cup toward the outer raceway and rotate the cup in the same direction as step 1 for at least two complete revolutions.
3. Roll the wheel one-third of the way around (120 deg.) and then repeat steps 1 and 2.
4. Roll the wheel one-third of the way around (120 deg.) in the same direction and then repeat steps 1 and 2.

NOTE: Noise can be misleading. A clicking sound can result from the normal shifting of the rollers in their cages. Shifting of the rollers can also be felt particularly when the direction of cup rotation is changed. In general practice, neither of these conditions necessarily indicates the presence of a defect. The railroad's safety and maintenance procedures and/or the original equipment manufacturer instructions will govern any decisions.