



## REVIEW OF STANDARDS FOR TRACK INSPECTION AND MAINTENANCE REPORT

### Background

Inspection and maintenance of track are integral for ensuring the continuation of safe passenger rail service in the US. A railroad track structure is a complex system in which all components must be functioning properly for it to perform as intended. On a regular basis, all these components must be inspected to find any defects; if any defects are found or if a component is likely to develop a defect in the near future, maintenance must be performed. This inspection and maintenance process must be continual and can be challenging for transit agencies because of limited time windows for personnel to safely perform the work.

The Federal Transit Administration (FTA) sponsored this research to determine the state of inspection and maintenance practices for rail transit agencies in the US. The research includes (1) determining the causes of previous track-induced derailments, (2) reviewing existing inspection and maintenance standards used by agencies in the US., and (3) surveying transit agencies to determine current inspection and maintenance practices. Gaps in standards or practices were identified, along with recommendations for how FTA can improve rail transit inspection and maintenance in the US through standards or guidelines.

### Objectives

Objectives of the study were to research and develop specifications and guidelines for rail transit track inspection and maintenance, including performing an extensive literature review to summarize and compare current specifications and standards for rail transit track inspection and maintenance in the United States and other countries, including what is being used by agencies in the US; perform a gap analysis to determine deficiencies in current standards; and establishing recommendations to FTA for developing voluntary standards, protocols, guidelines, or recommended practices associated with rail transit track inspection and maintenance.

### Findings and Conclusions

*A comprehensive literature review and survey results revealed needs and gaps in rail transit inspection and maintenance practices and established findings related to the development of voluntary rail inspection and maintenance standards, protocols, guidelines, or recommended practices.*

The Federal Railroad Administration (FRA) database is more comprehensive in assigning a cause to each accident, whereas National Transit Database (NTD) reports often do not list a cause. Relevant National Transportation Safety Board (NTSB) reports typically identify that causes of a derailment include lack of inspection to standards and not because the standards are inadequate or lacking. Industry data collection investigated the use of specifications and standards related to track maintenance and inspection, with findings as follows:

- Lower track speed safety standards (Class 1 track class) result in a higher number of yard accidents, as shown by NTD data. Further investigation is needed to determine specific causes and prevention methods. Policy reviews and possible improvements may reduce non-revenue service operation and vehicle incidents. Based on accident data, it is apparent that a significant number of accidents occur with non-revenue service operations.

- Switch point inspection improvements can be made. Purpose-built gauges to assess wheel/rail contact developed specific to an agency's track geometry will assist in inspections. An FTA or industry project to develop gauges for the range of rail and wheel profile combinations is an option.
- Training for turnout operations can reduce incidents, and APTA could consider revising its recommended practice on turnout inspections.
- The NTD data reporting system does not include derailment cause finding reporting; inclusion of that data definer will assist in future data analysis efforts.
- Vehicle/track interaction plays a large role in derailment incidents. Track maintenance standards can be tailored to agency types and characteristics of vehicles. One standard defining requirements for track maintenance may not fit all agencies due to differences in vehicle types, track gage, wheel profile, wheel back-to-back spacing, and more. Sister agencies that have the same vehicle, track, and operational characteristics may be able to confer and improve their inspection procedures and policies.
- Industry track geometry safety standards and recommended practices exist, including FRA Track Safety Standards (49 CFR Part 213); APTA Inspection and Maintenance Standard (RT-FS-S-002-02, Rev 1), which is similar in scope to 49 CFR Part 213 and directly accounts for a variety of track gages found in transit rail; and APTA RT-FS-S-002-2 Rev 1, Rail Transit Track Inspection and Maintenance, which lists inspections under load. Loaded conditions flex track geometries and increasing the frequency of inspections can reduce incidents.

## Benefits

This study revealed several potential opportunities for improvements in track inspection and maintenance standards, methods, and technologies that may produce improvements in the safety and efficiency of transit operations. New automated inspection technology developments may be worthy of demonstration/ validation, and a thorough review by the industry can improve turnout design with respect to the vehicles and operating speeds used in transit today.

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