Leveraging AAR and FRA Freight Rail Research for the Transit Industry

by

Nicholas Wilson and Dingqing Li
Transportation Technology Center, Inc.
Pueblo, CO 81001
• 50 Square miles
• 100+ Engineers, Scientists and Software Developers
• Test tracks, Laboratories and Support Staff for Freight and Passenger Rail Research and Test
• Operated for FRA by TTCI
Leverage Freight Rail Research by the AAR and FRA for Transit Industry

• Freight rail research by TTCI through funding from AAR and FRA is over $25M per year in the areas of track infrastructure, rolling stock, communication and train control

• Many vehicle and track-related research problem statements submitted for consideration in transit rail research have been similar in nature to the research funded by AAR and FRA

• TCRP D7 - use National Academy of Sciences Transit Cooperative Research Program funds to supplement and leverage freight rail research already performed for AAR and FRA in order to obtain benefit for the transit industry
21 projects have been completed or are in progress under TCRP D-7, and reports/findings available through TCRP website

1. Broken Rail Detection Techniques
2. Transit Switch Design Evaluation, Phase I
3. Rail Welding Techniques
4. Control of Wheel/Rail Friction through the Use of Rail Coatings
5. Transit Switch Design Evaluation, Phase II--Guidelines for An Alternative Transit Switch Design
6. Exothermic Welding of Heavy Electrical Cables to Rail
7. Optimized Wheel/Rail Lubrication
8. Wheel/Rail Profile Optimization and Flange Climb Criteria
9. Review of AREMA Track Standards: Identification of Those in Need of Revision for Public Transportation
10. Acoustic Approach to Broken Rail Detection
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11. Development of Direct-Fixation Fastener Specifications and Related Materials
12. Restraining/Guard Rail Study
13. Performance and Testing Requirements for Portable Track Geometry Inspection Systems
14. Rail Base Corrosion Study
15. Design of Track Transitions
16. Guard/Restraining Rail Study, Phase 2
17. Rail Base Corrosion Study, Phase 2
18. Performance-Based Track Geometry
19. Performance-Based Track Geometry, Phase II
20. Wheel Profile Maintenance Guidelines
21. Performance-Based Track Geometry, Phase III
Examples of TTCI TCRP D-7 Research: Wheel/Rail Lubrication, Profile Optimization and Flange Climb

- Noise control from lubrication

- Wheel flange angle has significant effect on derailment (some transit systems have low flange angle wheel profile from old practices)

- Flange climb derailment from newly trued wheels due to high friction

Graph showing sound level magnitude with frequency in Hertz, indicating quiet and more noise conditions.

- 63 degree angle
- 75 degree angle
Examples of TTCI TCRP D-7 Research: Rail Base Corrosion and Guard/Restraining Rail Design

- Sharp edges from rail base corrosion are very detrimental to rail integrity

- Guard Rail Design Method 1: high rail and guard rail wear out at the same time

- Guard Rail Design Method 2: no flange contact with the high rail under any combination of wear and tolerances
Examples of TTCI TCRP D-7 Research: Performance Based Track Geometry to Improve Ride Quality

Predict ride quality from measured track geometry – Performance Based Track Geometry
Thank You!

Transportation Technology Center, Inc.
55500 DOT Road
Pueblo, Colorado 81001
www.aar.com