Establishing Best Practices for Wheel/Rail Interaction

APTA/AREMA Working Group on Wheel-Rail Interaction

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APTA - AREMA WRI Mission

Mission & Scope

- To facilitate and coordinate the development, dissemination, refinement and maintenance of best practices, recommended practices, specifications and standards associated with wheel / rail interaction
- Original focus on Passenger & Commuter Railroads
- Broadened scope beyond this to include TA’s, Freight
Topics under consideration

- Predicting w/r wear
- Vehicle suspension influence on WRI
- Track geometry error influence on WRI
• W/R Wear Prediction – are we there yet?

Wear Model – Archard’s Wear Equation,

$V_w = k \cdot \frac{N \cdot s}{H}$

Locally applied:

$\Delta z = k \cdot \frac{P_z \cdot \Delta s}{H}$

Where:
- $V_w$ = volume of wear [m$^3$]
- $s$ = sliding distance [m]
- $N$ = normal force [N]
- $H$ = hardness [Pa]
- $k$ = wear coefficient [-]
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• W/R Wear Prediction – are we there yet?
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• Vehicle - Effect of suspension on wheel unloading
  – Effective Vertical Stiffness of Primary Suspension with Radius Arm

\[ K_{\text{Vert Eff}} = 1.5 \text{ to } 1.7 \times (K_z) \]
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- Track – Cyclic geometry deviations & WRI

Space Curve data from Track Geometry Car

Space Curve data from Track Geometry Car before and after selective filtering
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Two Subcommittees, Practitioners & Researchers & Developers

- Practitioners Subcommittee is focused on the challenges of day-to-day operations and on more fundamental and practical information.

- Researchers and Developers Subcommittee is more concerned with probing technological boundaries and demonstrating new potential capabilities.
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Please join us!

- Vice Chairman: Michael Craft, Amtrak
- Secretary: Narayana Sundaram, ENSCO