RAIL

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RSAC

Operating Practices (OP) Train Braking Modernization Task Group

OP Task Group Charter

Opportunity Statement:

Identify operating practices that are detrimental to effective and safe train braking followed by mitigating practices that will enhance train braking to approximate a near equivalent level of performance provided by ECP braking.

Description:

The Task Group (TG) will identify detriments to effective train braking and train handling and identify best practices using FRA Safety Data, qualitative analysis and train energy simulations using TEDS & TOES analytic simulator programs.

TG Team Members:

John Mayser – FRA OP
Ryan Dunn – FRA OP
Michael Alamprese – FRA OP
Byrl McCoy – FRA OP
Nataka Neely – FRA
John Peternel – FRA
Hodan Wells – FRA
Andrew Straatveit – FRA
Aaron Ratledge – BNSF (AAR)
John Remington – BNSF (AAR)
Corey Pasta – BNSF (AAR)
Abe Aronian – TSB
Robert LeBlanc – TSB
Kim Wachs – TSB
Grady Cothen – FRA (retired)
John LaDuc – NYAB
Michael Parisian – NYAB
Jeff Moller – AAR
Mike Wiley – CSX (AAR)
Steve Ammons – CSX (AAR)
James Swichtenberg – CSX (AAR)
Shannon Mason– NS (AAR)
Timothy Adkins – NS (AAR)
John Angel – GWRR
Michael Bachmeier – NTSB
Patrick Richardson – NTSB
Vince Verna – BLET
Alan Humphries – BLET
Christy Smith – BLET
Tim Morgan – BLET
Shane Hubbard – BLET
Jared Cassity – SMART
Jo Strang – ASLRRA
Anand Prabhakaran – Sharma & Associates

Current and Added Objectives:

1. Identify practices that are detrimental to effective and safe train braking such as improper train makeup and train handling.

2. Identify practices that will enhance train braking and handling that can approximate a near equivalent level of performance provided by ECP braking.

3. Determine best practices for stopping trains quickly and with minimum in-train forces in the event of a hotbox detector warning or other similar requirement to stop a train quickly.

4. Determine best practices for securing a train after the train is stopped by normal or emergency braking referencing Wabtec's October 2023 Pneumatic Securement paper and other related papers.

Objective 1. Identify practices that are detrimental to effective and safe train braking such as improper train makeup and train handling.

a.) Determine improper train makeup causes, practices & factors – Completed

1. Topography Considerations that must drive train makeup: River, Undulating & Mountain Grades & Curves

2. EOCC Considerations (Placement and Number)

3. Loads, Empties, and Light Cars:
    a. Big blocks of loads/empties and placement
    b. Individual long-light cars (cars not loaded to capacity)

4. Long car/Short car tonnage & placement

5. DP/Manned Helpers Placement:
    a. Spacing (determine tonnage per DP consist does not exceed maximum tonnage rating of locomotives in DP consist)
    b. Load/Empties ahead of/behind remote consist(s) with more than one locomotive (empty ahead or behind mid DP units)
    c. Long/short placement with respect to DP locations - Continued

Objective 1. Identify practices that are detrimental to effective and safe train braking such as improper train makeup and train handling.

d. Equipment type (e.g., spine cars and EOCC units)
e. Balancing powered axles based on train type
f. DB requirements/limitations

6. Operative Dynamic Brake Axles – Lead Consist:
a. Heavy Grade DB Axle Requirements, (balanced braking)

7. Combining trains and related concerns (e.g., exceeding maximum powered axles per DP consist)

8. Special/Unusual Cars/Equipment (high/wide, windmill blades, M/W equipment, etc.)

b.) Determine improper train handling causes, practices & factors – Completed

Main Considerations:

Railroad Operating Rules should provide guidance for the following considerations:

1. Dynamic Brake (DB) Usage
    a. Too rapid adjustment/application
    b. Excessive DB effort (incl. special conditions like turnouts or disturbed track)
2. Independent Brake Usage
    a. Too rapid application
    b. Excessive effort (number of locomotives in lead consist, speed, prolonged use)
    c. Failing to actuate (bail) when appropriate
3. Automatic Brake Usage
    a. Excessive application, in conjunction with throttle or DB use
    b. Excessive cycle braking
    c. Failure to correctly balance the grade (without maintaining adequate brake reserve)
    d. Not going deep enough on subsequent brake applications, after release
4. Throttle Usage
    a. Too rapid adjustment/application (e.g., starting train on a grade)
    b. Excessive throttle effort (in conjunction w/brakes)
5. Management of in-train forces - Combination of 1, 2, 3, 4 Continued

Objective 1 - Continued

5. Management of in-train forces - Combination of 1, 2, 3, 4 Continued

a. Any combination of the above requires attention to prevent excessive in-train forces. Operating rules should provide further guidance for specific operations such as stopping, starting, unanticipated stops, etc.

6. Distributed Power Usage

a. Synchronous vs. Asynchronous - should account for the territory that the train is operating over
b. Train state-of-slack and topography should be considered when moving from one mode to the other (such as Energy Management (EM) to Manual, Synchronous to Asynchronous, Fence Moves, etc.)
c. Throttle usage may be considered on remote units during air brake applications (Power braking), consistent with in-train force and slack management

7. Energy Management (EM)/PTC Interface Transitions (e.g., EM reverts to manual operation)

a. Train state-of-slack and topography should be considered

8. Handling Unplanned Events (e.g., Undesired Releases, Track Fouling Events, UDEs, Locked Axle, Loss of Engine, Panic Braking, etc.)

c.) Other detrimental causes to effective train braking – Completed

Main Considerations:

1. Brake System Leakage can lead to sub-optimal brake performance such as rollaways, unintended releases, flow and gradient compliance, lower response times, etc.

2. Higher air flows (CFM) particularly for longer conventional trains are associated with slower brake system response and reduced performance

- **a. Higher air flows may be triggered by low outside temperatures or physical leakage in the brake system**

3. Not Conditioning brakes

- **a. Applying brakes to pre-condition them in response to contamination of the wheel-rail and/or shoe-wheel interface, to establish appropriate adhesion/braking parameters**

4. Brake Fade

- **a. Extended application of pneumatic braking at higher speed can lead to reduced brake shoe friction and therefore, reduced stopping power**
- **b. Generally observed in heavy or mountain grade sections -Continued**

Objective 1 - Continued

5. False Gradient (Unexpected variations in local/temporary brake pipe pressure that can lead to unanticipated brake system response, such as unintended releases or stuck brakes)

6. Anomalies in brake system, such as pipe restrictions, vandalism, retainer valve applied, pinched hose, etc.

7. Loss of communication between front and rear of train such as EOT telemetry loss, DPU communication loss

d) Operational Considerations – TBD

This consideration is necessary to address non-technical concerns that affect train makeup and handling and require further review and analysis. Objective 1(d) will be the first order of business at the next TG meeting. Some examples of operational considerations are but not limited to:

-Inaccurate train consist information for departing trains (cars switched improperly, extra cars, missing cars train set concerns, HAZMAT placement concerns etc.)

-Complexity of train makeup rules and crew understanding

-Failure to follow existing train makeup rules at the field level

-Train enroute changes with unplanned for topography considerations

-Differences in train makeup rules at interchange points

Objectives 2, 3, & 4

Objective 2.

Identify practices that will enhance train braking and handling that can approximate a near equivalent level of performance provided by ECP braking.

- Work on Objective 2 will begin after completion of Objective 1.

Objective 3.

Determine best practices for stopping trains quickly and with minimum in-train forces in the event of a hotbox detector warning or other similar requirement to stop a train quickly.

- **Discussion on Objective 3 was started in virtual meetings. More discussion and analysis is required.**

Objective 4.

Determine best practices for securing a train after the train is stopped by normal or emergency braking referencing Wabtec's October 2023 Pneumatic Securement paper and other papers.

- Discussion on Objective 4 was started in virtual meetings. More discussion and analysis is required.

Next Working Group Meetings

-Will be conducted via MS Teams – TBD

-In person 2-day meeting possibly April 2024 – TBD

-Estimating 4 additional months to complete all 4 objectives

Any Questions or Discussions