American Railway Engineering and Maintenance-of-Way Association
Ballot

1. **Committee and Subcommittee: 18**

2. **Ballot Number: 18-22-01**

3. **Assignment:**

4. **Ballot Item: Revisions to Chapter 18 Part 5**

5. **Rationale:**

Revisions to MRE

Chapter 18, Part 5, Rehabilitation/Upgrade of Track and Structures for Handling 286,000-lbs Cars.

5.1.1 b. (1) Develop or update the railroad's operating plan (or service design), based on the expected level of 286k carloads and the expected service requirements including operating speeds.

5.1.2 c Determine the average (and maximum) length and tonnage of trains to be operated and the manner in which the 286k traffic is to be handled: as individual cars, in multiple car blocks, or in unit trains. Also determine the types of cars to be handled i.e., short car/long car combinations, and axle/truck spacing.

d Based on the service design, determine the optimum locomotive assignments to haul the trains. Optimum assignments will depend on train tonnage, desired operating speeds, route profile and alignment (the grades and curvature along the route), and the number and character of locomotives in the fleet: their horsepower and tractive effort, whether four-axle or six-axle, and if equipped with dynamic brakes. Both locomotive assignment and train operation can also be affected by the manner in which the power is employed, as whether distributed power is used and how that power is divided within the train length. With respect to the track, and the requirements for rehabilitation / upgrade, train make-up and power assignment can affect especially the lateral and longitudinal forces to which the track is subjected.

5.1.3 b The site condition inspection ~~should~~ may be conducted by viewing the entire line by hy-rail, periodically inspecting representative segments on foot, by using available technology including satellite imagery and LIDAR inspections, ultrasonic rail flaw detection, geometry testing or a combination of these and other resources. During the condition inspection, a detailed record should be made of the character and condition of the rail, tie plates, fasteners, rail anchors, ties, ballast, subgrade, track surface and alignment, trackside drainage and culverts, track on and approaching bridges, turnouts, and road crossings. For each mile or segment, note: the rail weight and section (with beginning and endpoints); the average number of defective ties per rail length; and locations with skewed ties, plates, or fasteners.

d When assessing tie replacement requirements during the condition inspection, observe the condition and position of fasteners; this will help in identifying ties that are in marginal condition and have little effective remaining life. Track geometry testing can be very helpful with assessing tie conditions if testing has recently been performed. If not, it may be in the projects best interest to have the line inspected.

e Drainage evaluation is best done during and shortly after a rain. All along the route check to see if the complete drainage path is clear and functioning. Follow the drainage path from the track center, through the ballast, to the track ditches, through culverts and other drainage structures to a proper outlet off the right-of-way. One or two days after a heavy rain, dig into the ballast shoulder in

selected spots down to the level of the bottom of the ties and check if the material is relatively dry and not full of fines and fouling material. ~~Poor surface and alignment in locations where tie condition is at least fair may indicate insufficient ballast drainage.~~ Contaminated or fouled ballast indicates inadequate drainage that may have to be addressed to accommodate an acceptable operating and service plan."

5.1.4 DEVELOP THE WORK PLAN AND COST ESTIMATES (2012)

(2) Internal condition: the extent to which internal defects may be present and the likely future susceptibility to internal defect formation if loads and/or speeds are increased (see Article 5.1.3d).

For even small amounts of 286k traffic, rail size should be no less than 90-lb, however, rail sizes smaller than 112-lb must have uniformly solid support to adequately handle 286k loading. If jointed (bolted) rail is to be replaced, the choice between jointed or welded (CWR) replacement rail should also be evaluated. If the tie plates are in acceptable condition, a replacement rail with the same base width as the present rail could allow the tie plates to be re-used. As an example, certain 100-lb sections, 110-lb, 112-lb, and 119-lb rail all have a 5-1/2" base width, which matches that of 115-lb rail, one of the common rail replacement choices. Increasing rail size while retaining existing tie plates can lessen the financial impact.

d. Establish an adequate anchor and spiking pattern. Any increase in axle load, operating speed, or train tonnage as it may ~~likely~~ require greater lateral and longitudinal rail restraint. Inadequate rail restraint will contribute to premature tie deterioration and inadequate gage-holding (narrowing or widening). Adjusting tie spacing is not a practical idea and it would be better to change rail rather than put in more ties.

e. ~~Determine the tie replacement required to provide a track structure that will satisfy the operating plan for the long term. If any of the smaller rail sections (less than 112-lb size) will be retained, consider the practicality of reducing tie spacing to improve rail support. In areas with an excessive number of skewed ties, determine the work that may be needed to ensure that most of the ties will remain attached to the rail during surfacing. Also determine the additional work necessary to prevent skewed ties after the rehabilitation~~.

5.1.5 PROGRESSIVE REHABILITATION/UPGRADE FOR 286K (2012)

a. In many situations, the need for light density and short line railroads to become 286k-capable is progressive as the amount of 286k traffic increases. A full rehabilitation / upgrade may not be justified if the estimated amount of 286k traffic in the near future is insufficient to produce the revenue required to fund the work. Upgrading conditions to handle 286k capability may be accomplished over period of time if properly planned for and in conjunction with increased revenues and ability to pay for the improvement. In such cases, a 286k upgrade might practically be accomplished in stages, with the highest priority work in the plan accomplished first.

b. Tie rehabilitation costs might be spread over several years. Ties installed in stages based on operating needs and available revenue sources will gradually rehabilitate the railroad and, if properly planned, will strengthen the track structure to handle 286k traffic. ~~with Tties installed in stages to gradually rehabilitate the railroad from FRA Excepted Track to FRA Class 1, 2, 3 (in the U.S.) or higher as the traffic volumes increase and the operating plan warrants.~~

c. ~~As rail is the most expensive track component to replace, careful consideration should be given to options that would allow the railroad to begin handling 286k traffic in the near future while completing the rail upgrade over time.~~ Rail is by far the most expensive track component to replace. Careful consideration must be given to the feasibility of operating 286k over existing rail while rehabilitating the track over a period of time. For example, if a railroad were constructed with 112# jointed rail which is in fair condition, it may be possible to start moving 286k traffic at some level while rehabilitating the railroad over a planned period of time that coincides with the service design and operating plan. Another example, if a railroad were constructed with 112-lb control cooled rail which is end-bent and/or has battered joints, it may be practical to consider joint elimination - keeping the rail, but having the ends cropped off and remaining lengths welded together, with pieces added to make up for the cropped footage. Another possibility is cascading rail - replacing all the rail in a critical or high priority segment and relaying the good pieces that were removed in another location. Light rail sections, less than 100-lbs. to the yard, may be impossible to maintain in safe and suitable service for 286k car loadings. Replacement rail and joint bars may be impossible to find. It may be necessary to replace sections of rail with 115-lb or heavier rail to generate adequate replacement of 100 lbs. rail and joint bars for maintenance activities on the territory until such time that all rails can be replaced.