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Sent: Tuesday, June 13, 2023 10:19 AM
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Subject: Make Up Instruction Changes

NORFOLK SOUTHERN CORPORATION OPERATIONS BULLETIN

Atlanta, Georgia March 8, 2023

OB-7

All Concerned:

Reference System Timetable Instructions SP-1, EQ-4, EQ-9, EQ-10, EQ-11, and NS-1 rule A- 31, multiple special instructions are issued below that include additional restrictions and instructions to further improve train operations. The below special instructions address train types, DP requirements (triggers) and DP placement, tonnage distribution and train make-up, double-stack equipment, light car placement, train speed when handling EOCC-equipped cars, and EOTD requirements when LXA-equipped locomotives are used in remote DP consists. Job aids will be developed and distributed to assist with applying the revised instructions.

The special instructions in this bulletin refer to technology used to achieve train make-up objectives and improve train handling. Train Build Optimizer (TBO) and Slack Trailing Tonnage Associated Risk (STTAR) are tools utilized by terminal and NOC personnel to manage train make-up and train handling. Currently, EOCC-equipped cars are identified on the train consist report. Additional car movement restriction messages (CMRM) will be activated to help further identify EOCC-equipped cars. Coupler force limits will be issued and available in advance of these instructions becoming effective.

A brief description of each instruction is provided for each subject addressed. The special instructions are effective **Monday, March 13, 2023, as follows:**

1. Train Type Definitions

In reference to the revised and new train build instructions, new train type definitions for intermodal, loaded bulk commodity unit, and mixed freight are established, as follows:

1. Train Types:

Intermodal - Trains consisting entirely of consisting entirely of TOFC, COFC, Multilevel, Triple Crown and/or stack equipment

Loaded Bulk Commodity Unit – A train made up entirely of loaded bulk commodities, which could contain one or more commodity type. For example, coal, grain, ore, potash, molten sulfur, soda ash, phosphate rock, oil, taconite and/or other bulk commodities.

Mixed Freight – All other trains not meeting the definition of Intermodal or Loaded Bulk Commodity Unit train

2. DP Operations

Instructions for DP Operations are established to prescribe additional DP operations requirements as follows:

- Based on train type, trains must be operated in DP configuration when length and tonnage thresholds are met.
- DP configuration is prescribed based on train type, length, and tonnage.
- Coupler force limits are provided as tonnage thresholds for each district/line segment on train clearances and timetables. Trains must be built with locomotives positioned such that coupler force limits are not exceeded.
- Remote DP locomotive placement is based on train length, 75% tonnage rating, and coupler force limit trailing the remote DP consist.
- Multiple remote DP consists are limited to no more than 2 consists and the placement is prescribed by the train's length for the 1st remote DP consist to be mid-train and the 2nd remote consists to be rear of train.

2. DP Operations

(a) DP Requirements

1. The following trains must operate in DP configuration:

- All trains scheduled to operate with distributed power.
- All trains, based on train type, which exceed the listed length or tonnage threshold in the below table. Trains must be operated in the DP configuration indicated.

Train Type	Length	or	Tonnage	DP Configuration
Mixed Freight	10k ft	or	14k tons	Head - Mid
Mixed Freight	12k ft	or	16k tons	Head - Mid - Rear
Intermodal	12k ft	or	14k tons	Head - Mid
Intermodal	14k ft	or	16k tons	Head - Mid - Rear
Loaded Bulk Commodity Unit	12k ft	or	20k tons	Head - Mid

- All trains with a total tonnage that exceeds coupler force limits for their route.

EXCEPTION: Where designated by Special instructions, trains may operate with a total tonnage that exceeds coupler force limits.

NOTE: When pusher service is planned to assist a train over the most restricted portion of the train's route, the next most restrictive segment's coupler force limits must be applied to the remainder of the train's route for DP requirement and DP placement.

- Solid multi-level trains consisting of greater than seventy (70) cars.

2. Lead and remote DP consists must not vary by more than the equivalent of ten (10) conventional powered axles.

(b) DP Placement

1. For all trains, the maximum length of train between the lead and remote DP consist, and any successive remote DP consists is 8500 feet.

EXCEPTION: Where designated by Special Instructions, the maximum length of train between the lead and remote DP consist and any successive remote DP consists may exceed 8500 feet.

2. Remote DP consists within the train must be positioned as follows:

- Within a range of 50% to 75% of the train's length, unless rear DP is utilized.
- So that the tonnage behind the last remote DP consist in the train does not exceed:

- 1) 75% of the tonnage rating of the remote DP consist's tonnage rating.
- 2) Coupler force limits for the route.

NOTE: When pusher locomotives are used, the coupler force limits for the portions of the route where pusher service is not assisting the train must not be exceeded.

3. When utilizing more than one remote DP consist, the DP consists must be configured and positioned as follows:
 - a. Not more than two remote DP consists may be placed in a train
 - b. The first remote DP consist should be positioned mid-train, as close to 50% of the train's length, as possible.
 - c. The second remote DP consist must be positioned at the rear of the train with no cars trailing.
4. Locomotives assigned to the train for the purpose of providing tractive effort must be positioned in consist as follows:

Total Locomotives	Lead Consist	Mid Train Consist	Rear Consist
3	1	1	1
4	1	2	1
5	2	2	1
6	2	2	2
7	3	2	2

3. Train Placement of Double-Stack Equipment

Train placement instructions are issued to address train placement of double-stack equipment, not just 5-well double-stack equipment. Head-end placement of loaded double stack equipment is required unless the train is entirely made up of double stack equipment.

3. Train Placement of Double-Stack Equipment

Loaded articulated double-stack equipment must be handled on the head end of trains. These instructions do not apply to trains made up entirely of double stack equipment.

4. Light Car Placement

Light car placement instructions are issued to prescribe placement of rail cars weighing less than 45 tons. Care must be used in placing light cars near head end and DP remote locomotive consists in a train. Car movement restriction messages (CMMRM) are active to provide visibility in track inventory and train consist lists for rail cars that meet the light car criteria.

4. Light Car Placement

For trains (originating on NS) with a total tonnage that exceeds 6000 tons, cars weighing less than 45 tons must not be positioned:

- a. Within five (5) cars of a head end locomotive consist equivalent to nine (9) conventional powered axles or less,

- b. Within ten (10) cars of any locomotive consist with greater than the equivalent of nine (9) conventional powered axles.

EXCEPTION: When the train consist does not contain sufficient cars weighing greater than 45 tons, all available cars greater than 45 tons must be distributed evenly immediately adjacent to locomotive consists that require separation from light cars.

5. Tonnage Distribution & Train Makeup

Tonnage Distribution and train make-up instructions are issued to prescribe train placement for proper tonnage distribution and train make-up.

5. Tonnage Distribution & Train Makeup

- a) Trains exceeding 8,000 tons, must not operate with more than 33% of the train's total tonnage in the rear 25% of the train's length.

EXCEPTION: This does not apply to Intermodal trains

- b) Prior to departure from an initial terminal or intermediate work location where yardmasters are on duty to direct movements, trains must be analyzed in the Train Build Optimizer (TBO) application and receive a 'PROCEED' result.

EXCEPTION: This does not apply to:

- 1) local trains built for the purpose of servicing local customers, or
- 2) run through interchange trains.
- c) Unless otherwise published, the system Slack Trailing Tonnage Associated Rating (STTAR) rating is 3800.
- d) No train may depart an initial terminal or intermediate work location with a STTAR score greater than that of the lowest score on their route.
 - 1. Trains that do not receive a 'PROCEED' result in TBO or a STTAR score under the maximum for the route must be rebuilt or reduced to comply with these instructions.
 - 2. TBO results may be improved to obtain a 'PROCEED' result by repositioning assigned locomotives to become remote DP consist(s) in the train and/or positioning more locomotives in remote DP consist(s) than the head end consist, (for example, operating 1x2 rather than 2x1). STTAR ratings may be improved by moving more tonnage towards the head end of the train and moving EOCC-equipped cars to the rear.

EXCEPTION: If the train cannot be built to receive a 'PROCEED' result, the RFE desk can authorize the train to operate with additional restrictions to manage in-train forces.

- e) Blocks of 30 or more cars weighing less than 45 tons must be handled on the rear of trains.
- f) Blocks of 30 or more cars weighing greater than 120 tons must be handled on the head end of trains.
- g) EOCC-equipped cars are indicated by car movement restriction messages (CMRM) on track inventory and train consist lists. Trains must not operate with more than 70 EOCC-equipped cars.

EXCEPTION: Trains made up entirely of multi-levels may be operated with no more than 130 cars and Distributed Power is required when greater than 70 multi-levels are operated.

- h) EOCC-equipped loaded coil steel cars identified with CMRM code *HEAVY EOCC*, must be positioned in trains as follows:
 - 6. No more than 10 EOCC-equipped loaded coil steel cars identified with CMRM code *HEAVY EOCC* may be handled in a train, unless handled in a block on the head end.
 - 7. No more than 30 EOCC-equipped loaded coil steel cars identified with CMRM code *HEAVY EOCC* may be handled by a train, unless operated in a train made up entirely of slab and coil steel loads, with no more than 75 total cars.

6. Speed Restrictions – Cars

Instructions are issued to expand the restricted equipment from empty and loaded multi-levels to empty and loaded EOCC-equipped cars. With this issuance, there are no excepted districts permitted to operate unrestricted when there are 40 or more multi-levels mixed within the train.

This restriction is intended to reduce in-train forces by limiting the number of EOCC-equipped cars within the body of the train, with 39 EOCC-equipped cars being the maximum number that can be positioned within a train, without restrictions. If there are greater than 40 EOCC-equipped cars in the train, they must be positioned in a solid block on the rear of the train, up to the maximum of 70 EOCC-equipped cars total.

Because of their position in the train as a rear end block of EOCC-equipped cars, the in-train forces caused by slack and trailing tonnage are reduced because there are not additional cars behind the EOCC block on the rear.

Here are a few examples:

- Mixed freight train with up to 39 EOCC-equipped cars mixed (not in a single block) in the train and a solid block of 31 EOCC-equipped cars on the rear. Train speed is UNRESTRICTED.
- Mixed freight train with 40 or more EOCC-equipped cars mixed in the train. Train speed is RESTRICTED to 25 MPH.
 - Later, this same train sets off cars and the total EOCC-equipped car count is reduced to less than 40 total (still mixed in the train). Train speed is now UNRESTRICTED.
- Intermodal train with 70 EOCC-equipped cars in a solid block on the rear of the train. Train speed is UNRESTRICTED.
- Mixed freight train with 70 EOCC-equipped cars on the rear that has a DP locomotive positioned behind 50 of the EOCC-equipped cars. The presence of the DP locomotive does not interrupt or reset the block of EOCC-equipped cars; therefore, the train is UNRESTRICTED.

8. Speed Restrictions – Cars

a) 40 or more EOCC-equipped cars (empty or loaded), unless moving in a solid train of EOCC-equipped cars, or in a solid block on the rear of a train.....	MAXIMUM SPEED	25 MPH
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NOTE: Refer to Tonnage Distribution & Train make-up Instructions for maximum number of EOCC-equipped cars permitted in a train and DP requirements.

7. End of Train Device (EOTD)

An EOTD instruction is issued with additional requirements for the operational status of trains using EOTDs when operating with LXA -equipped remote DP consists.

9. END OF TRAIN DEVICE

Trains operating with LXA-equipped locomotives in the remote DP consist must link the EOTD to the LXA-equipped controlling remote DP locomotive for the purpose of EOTD message repeating via the LXA system.

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