RAILWAY OCCURRENCE REPORT

DERAILMENT

CN NORTH AMERICA
CN FREIGHT TRAIN NO. 412-2A-18
MILE 96.75, LAC-SAINT-JEAN SUBDIVISION
LAC ÉDOUARD, QUEBEC
19 OCTOBER 1994

REPORT NUMBER R94Q0054

The Transportation Safety Board of Canada (TSB) investigated this occurrence for the purpose of advancing transportation safety. It is not the function of the Board to assign fault or determine civil or criminal liability.

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Summary

CN North America (CN) freight train No. 412-2A-18, proceeding southward on the CN Lac-Saint-Jean Subdivision, derailed 12 cars at Mile 96.75 near Lac Édouard, Quebec. No one was injured.

Other Factual Information

CN North America (CN) freight train No. 412-2A-18 was proceeding southward with 3 locomotives, 50 loaded cars and 1 empty car. It weighed approximately 4,976 tons and was about 3,482 feet long. It was travelling at approximately 11 mph as the locomotive engineer was increasing the throttle. In the vicinity of Mile 96.20, as the mid-point of the train negotiated a 9.5-degree right-hand curve on a 0.6 per cent descending grade at Mile 96.75, it experienced a train-initiated emergency brake application. After conducting the necessary emergency procedures, the crew determined that 12 cars (the 34th to the 45th inclusive), stretching from Mile 96.59 to Mile 96.75, although upright, had derailed. The derailed cars included seven boxcars and five gondola cars. Six cars were extensively damaged and six sustained minor damage.

When approaching the curve from the north, wheel flange marks on the base and web of the high west rail were evident and the gauge side spikes had been pulled up. The west rail was rolled over under some cars. Wheel flange marks were found on the rail anchors on the low east rail (gauge side). The north siding switch at Mile 96.59 was destroyed. Approximately 850 feet of track was damaged.

A track geometry car evaluated this location on 30 August 1994; wide gauge and a variety of track geometry defects were evident throughout the area. A 10-mph slow order was in effect, from Mile 96.5 to Mile 96.7, as a consequence of the track geometry irregularities. The track was last inspected by Hi-rail on 17 October 1994 by the roadmaster; no further irregularities or rail defects were noted.

Through the derailment area, the track structure consisted of 136-pound jointed rail. The rail was box anchored every tie and secured with six spikes per tie on hardwood ties resting in crushed rock ballast. The authorized timetable speed was 35 mph for passenger trains and 25 mph for freight trains.

The leading wheels (R-1 and R-2 position) on CNA 598617, the first derailed car, were examined by the CN equipment supervisor; no exceptions were noted. Superelevation in the curve was measured after the derailment and determined to be approximately 5 1/4 inches.

The ambient temperature was 10 degrees Celsius with overcast skies and calm winds.

Analysis

As the train negotiated the curve, it was travelling well below the design speed for the curve, producing lateral forces on the low rail. These forces were further increased by the traction effort of the locomotives. This caused the cars to travel tight

to the low rail which, when coupled with an area of wide gauge, at Mile 96.75, allowed the leading wheels of CNA 598617 to slip off the high rail. The derailed wheels quickly rolled the rail over and subsequently derailed the trailing truck of CNA 598617 and the following 11 cars. The train travelled in a derailed condition until the wheels of the first derailed car struck the switch at Mile 95.59, causing train separation and an emergency brake application.

Findings

1. The track structure in the derailment area was found to contain wide gauge and a variety of track geometry defects prompting a 10-mph slow order.

2. The design speed for the curve was 25 mph.

3. As the train passed over the curve, the lateral forces on the low rail allowed the leading wheels of CNA 598617 to slip off the high rail at an area of wide gauge and roll the rail over, derailing the trailing truck and the following 11 cars.

Causes and Contributing Factors

The leading wheels of CNA 598617 slipped from the high rail, causing rail roll-over and the subsequent derailment. Causative factors included a wide gauge situation and lateral forces to the low side of the curve as a consequence of train speed well below curve design requirements and traction effort.

This report concludes the Transportation Safety Board's investigation into this occurrence. Consequently, the Board, consisting of Chairperson, John W. Stants, and members Zita Brunet and Hugh MacNeil, authorized the release of this report on 16 August 1995.