

RAILWAY OCCURRENCE REPORT

DERAILMENT

CANADIAN AMERICAN RAILROAD COMPANY

TRAIN NO. 291-23

MILE 65.97, CP SHERBROOKE SUBDIVISION

LENNOXVILLE, QUEBEC

24 JUNE 1995

REPORT NUMBER R95Q0045

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

At approximately 0945 eastern daylight time (EDT), on 24 June 1995, Canadian American Railroad Company (CARC) train No. 291-23 (train 291), travelling westward on the Canadian Pacific Limited (CP) Sherbrooke Subdivision, derailed seven cars in the town of Lennoxville, Quebec. Three of the derailed cars contained a residue of propane, UN 1075. There was no release of product. Approximately 300 residents were evacuated. There were no injuries.

Ce rapport est également disponible en français.

OTHER FACTUAL INFORMATION

CARC train 291 was proceeding westward at approximately 22 mph with 6 locomotives, 60 loaded cars and 16 empty cars. The train was approximately 6,793 feet in length and weighed about 4,622 tons. While the train was crossing the Lennoxville diamond at Mile 65.97 of the CP Sherbrooke Subdivision with the brakes released and the throttle in position No. 5, a train-initiated emergency brake application occurred, bringing the train to a stop. After conducting the necessary emergency procedures, the crew, which included a locomotive engineer, a conductor and a CARC supervisor of locomotive engineers, determined that the 48th to 54th cars in their train had derailed just west of the diamond.

The local fire department arrived at the scene at approximately 1000 and the Lennoxville Emergency Plan was put into effect. The fire department immediately created a 150-metre security perimeter around the derailed residue propane tanks and about 150 residents of homes within the security perimeter were evacuated. At approximately 1045, the Sûreté du Québec assumed control of the security perimeter. At about 1800, the security perimeter was enlarged to 350 metres from the tank cars, necessitating the evacuation of another 150 residents.

Two of the derailed residue propane tank cars, UTPX 932006 and CGTX 63665, were found to have internal pressures of 44 and 80 pounds per square inch gauge (psig) respectively, due to the extreme temperature (35 degrees Celsius). Railway, government and petrochemical officials decided to flare the residual product before moving the cars.

The flare-off operation commenced at approximately 2345 and ended the next day (25 June) at approximately 1750 without incident. The evacuees were allowed to return to their homes at approximately 1850.

Five of the seven (three loaded and four empty) derailed cars sustained extensive damage and two sustained minor damage. Two hundred and fifty feet of track was destroyed and 500 feet sustained minor damage. Minor tie damage was evident from the crossing at Mile 62.92 to the diamond.

The CARC Sherbrooke Subdivision extends from Mégantic, Quebec, Mile 0.0, to the diamond at Mile 65.97 where it becomes the CP Sherbrooke Subdivision. The CP Sherbrooke Subdivision intersects the CN North America (CN) Sherbrooke Subdivision at the Lennoxville diamond. The maximum authorized speed on the CARC Sherbrooke Subdivision was 45 mph but a slow order of 30 mph was in effect between Mile 45.1 and Mile 65.9 because of track cross-level and gauge variations. Curves

¹ All times are eastern daylight time (Coordinated Universal Time (UTC) minus four hours) unless otherwise stated.

in this area exceeded seven degrees with thick foliage prevalent along both sides of the right-of-way.

CARC train movements were governed by the Occupancy Control System (OCS) of the Canadian Rail Operating Rules (CROR) and supervised by a CP rail traffic controller (RTC) located in Montreal, Quebec.

The rail was a mixture of 39-foot and 78-foot sections manufactured in 1949. It was fastened to eight-foot hardwood ties with three spikes per 12-inch double-shouldered tie plate. The track was box-anchored every third tie. The rail and other track components were in fair condition.

The track in the area of the public crossing at Mile 62.92 was in a six-degree curve with a superelevation of 5 1/2 inches. Poor drainage and mud contamination had diminished the supportive qualities of the crushed rock ballast at both ends of the crossing. Evidence of tie pumping was observed. The south rail mud rail, held in place by asphalt, had moved approximately three inches out from its proper position against the rail at the west end of the crossing. An abrasion was observed on the west end of the mud rail and a mark was observed on the ball of the north rail commencing about 12 feet west of the crossing and continuing westward for approximately 20 feet. Marks were also observed on the rail anchors inside the south rail about 28 feet west of the crossing.

A post-derailment inspection of the derailed cars determined that car UTPX 932006, the 49th car behind the locomotives, a DOT 112J400W specification tank car, was equipped with new wheels in the leading wheel position ("B" end). They had been installed on 07 June 1995 by the Bangor and Aroostook Railroad at Milo, Maine, U.S. Truck component wear was minimal. Side bearing components were lost and no determination of side bearing clearance was possible. The tank shell on this car had sustained a wheel burn measuring approximately eight inches in length in the tank shell, directly above the leading truck trailing wheel at the R-2 location. The leading wheel at the L-1 location had heavy abrasions on the wheel tread and flange.

Empty, torsionally rigid tank cars with worn but not condemnable truck components and excessive side bearing clearances are susceptible to wheel climb derailments. Car UTPX 932006 was empty and proceeding at 22 mph which is within the critical speed range for initiating car body roll.

Inspection results of a track geometry evaluation car on 05 July 1995, 11 days subsequent to the derailment, identified 5 urgent track cross-level defects and 14 priority defects including gauge and cross-level deficiencies in the curve between Mile 62.7 and Mile 63.0, and a 10-mph maximum speed restriction was immediately put in effect.

ANALYSIS

The train was being operated in accordance with government safety standards and railway operating procedures.

Emergency procedures and the regulated product removal were conducted in a timely and professional manner. The evacuation was a prudent reaction to the increased risk posed by the derailed and damaged tank cars.

As tank car UTPX 932006 exited the curve at Mile 62.9, track variations, including gauge and cross-level irregularities, would have initiated car body roll. The car body roll, coupled with the track irregularities at the crossing, produced such circumstances that, when the L-1 wheel struck the loose mud rail near the west end of the crossing, it climbed the rail, causing the wheels to derail to the field side of the north rail about 32 feet west of the crossing. While travelling in a derailed condition, the car body dropped, permitting wheel flange contact with the tank jacket and shell, causing the wheel burn in the tank shell.

When the derailed trucks of car UTPX 932006 (49th car) contacted the diamond and veered from the track, the trailing trucks of the 48th car as well as the 50th to 54th cars derailed.

The curvature and thick foliage along the right-of-way would have restricted the train crew from observing that car UTPX 932006 had derailed at Mile 62.92.

Although the speed restriction of 30 mph between Mile 45.1 and Mile 65.9 brought train speeds down to within that considered safe for the track cross-level variations, the track irregularities and poor conditions at the crossing combined to create ideal conditions for a wheel lift derailment.

FINDINGS

1. The train was being operated in accordance with government safety standards and railway operating procedures.
2. Emergency procedures and regulated product removal were carried out in a timely and professional manner.
3. Poor drainage and mud rail contamination had diminished the supporting qualities of the ballast at the crossing, causing mud rail pumping and cross-level defects.
4. Tank car UTPX 932006 experienced car body roll due to the track variations prior to the crossing which, when coupled with the poor track conditions at the crossing, resulted in the wheel climb derailment of the leading wheels.

5. Car UTPX 932006 continued in a derailed condition until the derailed wheels struck the diamond, derailing the preceding car and the following five cars.

CAUSES

Track irregularities, tank car and poor crossing conditions resulted in the wheel climb derailment of car UTPX 932006.

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 Maurice Harquail, authorized the release of this report on 28 June 1996.