RAILWAY INVESTIGATION REPORT
R00D0098

COLLISION AND DERAILMENT

VIA RAIL CANADA INC.
TRAIN NO. 603
MILE 119.35, LA TUQUE SUBDIVISION
LA TUQUE, QUEBEC
30 AUGUST 2000

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.

Railway Investigation Report

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Summary

On 30 August 2000, at approximately 1400 eastern daylight time, VIA Rail Canada Inc. train No. 603 was travelling westward from Hervey, Quebec. As the train was approaching the station at La Tuque, Quebec, it collided with a dump truck that was on the private crossing at Mile 119.35 of the La Tuque Subdivision. The truck driver lost his life in the accident. The passengers and crew members were evacuated safely. The locomotive and three cars of train No. 603 derailed. The truck was destroyed, and the diesel fuel spilled and caught fire.

Ce rapport est également disponible en français.

Other Factual Information

The train consisted of one locomotive, one baggage car and two passenger cars. It was approximately 325 feet long and weighed approximately 300 tons. There were 22 passengers, 2 locomotive engineers and 1 on-train service manager on board. All the employees were qualified for their positions and met established rest and fitness requirements.

The event recorder indicates that, at approximately 1400 eastern daylight time (EDT),[1] the train was travelling at a speed of 52 mph approaching the La Tuque cautionary limits, the throttle was moved gradually from position No. 6 to position No. 1, and the brakes were released. On approach to the La Tuque Station, one of the two locomotive engineers left the cab to go to the baggage car, passing through the engine compartment. As the access door to the engine compartment stayed half open, the locomotive engineer at the controls turned around to shut it and isolate himself from the engine noise. At the same time, the train was exiting a four-degree left-hand curve at Mile 119.33 and approaching the crossing. When the locomotive engineer shut the door and turned back to pick up the radio handset to make a call as required by Canadian Rail Operating Rules (CROR) Rule 90 special instructions,[2] he noticed a dump truck entering the crossing at low speed southward. The locomotive engineer took shelter behind the control console, and the train struck the truck. The train derailed on the south side and came to rest approximately 515 m (1700 feet) west of the crossing.

The truck driver lost his life in the accident. The locomotive engineer in the engine compartment was slightly burned when the diesel fuel from the truck caught fire and the flames came in through the window and the side door of the locomotive. All the passengers were safely evacuated.

The locomotive and three cars derailed and were damaged. The locomotive had impact marks on the front right side. The south rail overturned, and the track was damaged over a length of approximately 515 m. The dump truck was destroyed. It lost its cargo on the crossing and was thrown northwesterly to the bottom of the railway track embankment, approximately 30 m from the crossing. The truck's fuel tanks were punctured and broke loose from their mounting brackets. One of them was wedged under the traction motor in front of the locomotive, and the diesel fuel spilled and ignited. The other tank was thrown approximately 45 m to the northwest and caught fire, burning the grass and branches on the railway right-of-way. There were no skid marks on the road in the vicinity of the crossing.

After taking the appropriate emergence measures to report the accident, request assistance and protect the track, the crew members extinguished the fire under the locomotive (traction motor and electrical wiring) and had the passengers move to the last car.

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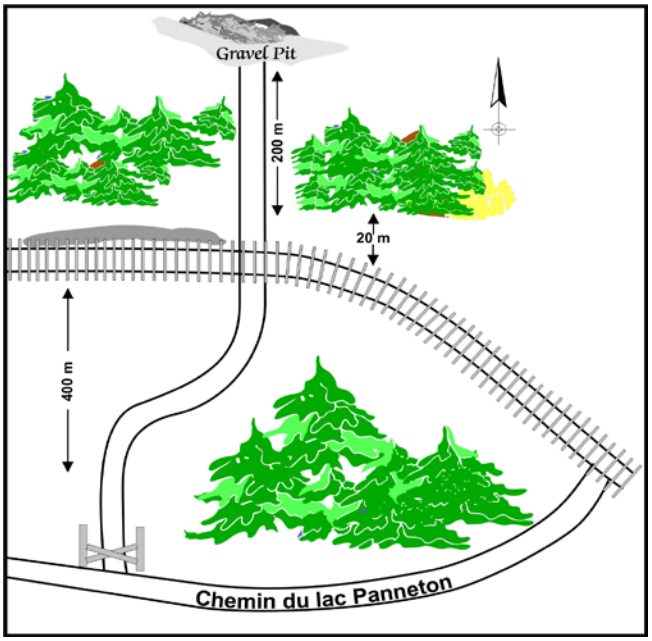
1 All times are EDT (Coordinated Universal Time [UTC] minus four hours) unless otherwise stated.

2 CROR Rule 90 special instructions require among other things that a radio call be made between one and three miles before cautionary limits.

The local police, firefighters and rescue workers arrived on the scene within minutes following the accident. The firefighters put out the fire in the branches and grass while the police and the rescue workers evacuated the passengers.

The dump truck was being used to transport gravel. It was built in 1988 and was not fitted with a memory module to record movements. It was 9 m long with a capacity of 16 tons. It had just been loaded with gravel at a gravel pit located on the north side of the railway track approximately 200 m from the crossing.

The road leading to the crossing is a restricted-access private road beginning at the Chemin du lac Panneton and ending at the gravel pit. It is a narrow winding road that runs for approximately 400 m before crossing the railway track (see Figure 1). On the north side of the track, the road is tangent with a descending grade followed by an ascending grade as far as the gravel pit. The land adjacent to the road is wooded to about 20 m from the railway track. Given the characteristics of the road, the loaded trucks travel at a speed of approximately 7 km/h; at that speed, a truck takes 11 seconds to travel the distance between the end of the woods and the crossing. Based on the number of trips made by the gravel trucks, the road traffic passing over this crossing is estimated at more than 80 heavy vehicles per day.



The truck driver had been employed by the company Charles Morissette Inc. of La Tuque for about three months. He had 18 years' experience as a heavy-truck driver. He was paid at an hourly rate and not according to the number of loads carried.

In the past three weeks, the truck driver had performed approximately 20 round trips per day. On the day of the accident, he had started his shift at approximately 0700 and had had a good night's sleep the night before. A coroner's analysis did not reveal any intoxicants in his system, he did not wear eyeglasses, and he did not have any disabilities that might affect driving the truck.

The driver had not received any training in the specific features of this route, but he had been informed initially of the train schedule. While VIA Rail Canada Inc. (VIA) trains follow a precise schedule for station arrival and departure times, the time of arrival of trains at intermediate points between stations is not fixed. Freight trains, on the other hand, do not operate on a fixed schedule. However, in the case of a fortuitous event, passenger trains can be late and not on schedule; therefore, it is very hard to exactly predict the arrival of trains.

Charles Morissette Inc. had two trucks to transport gravel. The week preceding the accident, the other driver had averted a collision with a train at the same crossing. He had told his colleague to be extra careful at this crossing.

The La Tuque Subdivision runs for 125.4 miles between Cap-Rouge and Fitzpatrick, Quebec. It consists of a single track, is governed by the Occupancy Control System (OCS) under the CROR and is under the supervision of a rail traffic controller stationed in Montréal. The maximum speed in the accident area is 50 mph for passenger trains and 40 mph for freight trains. Near Mile 119.0, the track is tangent westward; then, there is a four-degree left-hand curve over approximately 485 m running between two wooded hills. The crossing is located approximately 30 m from the exit of the curve, on a stretch of tangent track. West of the crossing, the track is laid on an embankment approximately 6 m high.

The crossing at Mile 119.35 had not been used since 1996. It was rehabilitated during the summer of 2000 by employees of Charles Morissette Inc. under the supervision of a CN foreman. Charles Morrissette Inc. has, since 01 May 1997, held a private crossing contract that includes, as an appendix, CN's standard plan for crossings. However, neither the CN foreman nor the Charles Morissette Inc. employees had the CN standard plan for crossings, and no one was familiar with the Transport Canada (TC) guidelines on minimum sight-lines.

There were stop signs on both sides of the track about 2 m from the rails. They were movable and located at a height of 1.35 m, whereas the CN standard plan prescribed a height of between 1.8 m and 2.4 m. The sight-line to the east was approximately 180 m for a vehicle travelling south and approximately 120 m for a vehicle travelling north. The CN standard plan and the draft TC minimum sight-line guidelines indicated that the sight-line should be 230 m for a crossing where there were stop signs and the maximum train speed was 50 mph. In addition, as this was a private crossing, trains did not whistle because train crews were not required to follow CROR Rule 14(l)[3] as for public crossings.

[3] CROR Rule 14(l) requires trains to whistle at least one quarter of a mile from every public crossing (except within limits as may be prescribed in special instructions).

A simulation was conducted at the crossing on 01 September 2000. A truck of the same size but of a different model from the one involved in the collision was used. The dimensions and position of the exterior mirrors relative to the driver were similar. The simulation revealed that the left rearview mirror blocked the driver's view to the east (see Figure 2) when the truck was 8 m from the track (the distance specified in the TC sight-line guidelines); in these conditions, a freight train could be perceived only when it was 14 m from the crossing.

No culverts or gates were installed on each side of the crossing as required by the CN standard plan. However, there was a gate at the entrance from the road. After the rehabilitation of the crossing, no quality control was exercised by CN to ensure compliance with established standards.

TC is the regulatory agency for federally regulated railways. In exercising its responsibilities, TC has instituted a series of policies governing supervision of the railway system and operations, including crossings. Under the TC crossing monitoring program, 5 per cent of crossings are to be inspected annually. The inspections performed under this program are detailed, involving assessing the safety of the crossing, collecting road and rail traffic data and checking factors such as the condition of the roadway and approaches, the road surface, sight-lines, and the condition of signalling systems. The TC regions follow a risk-based approach and therefore assign greater priority to places where accidents have already occurred and to public crossings. Consequently, private or farm crossings are seldom inspected in detail. In a track inspection, the TC infrastructure inspector checks on the condition of the planking and for the presence of vegetation in the immediate approaches of the crossings, but does not measure sight-lines.

The crossing was never inspected in detail and had not received an inspection by an infrastructure inspector since its reopening. When a private crossing is built or reopened, railways are not required to inform or obtain approval from TC.

VIA eliminated the position of conductor in 1997. The conductor's duties were redistributed between the locomotive engineers and the on-train service managers. Baggage handling was assigned to the locomotive engineer not at the locomotive controls. The documentation filed by VIA with TC stipulates that the locomotive engineer not at the locomotive controls is nevertheless not to be absent from the cab when the train is in motion

except when there are equipment problems. The locomotive engineers' additional duties do not require much time in the regular season; however, as passenger trains have to follow a fixed schedule, the locomotive engineer must in general begin preparations for debarking, such as baggage and mail sorting, before arrival at stations so as not to cause delays to trains. This may on occasion create situations where only one person is left on the lead locomotive. As a rule, the operation of trains in Canada requires at least two employees at the front of the train to ensure the safety of the movement; however, the Quebec North Shore and Labrador Railway (QNS&L) obtained authorization from TC to operate trains with only one person on board the lead locomotive after adding safety systems and modifying operating procedures.

Analysis

The train was travelling 2 mph above the permissible speed, but this is a relatively minor speed deviation and had few consequences on the accident. The truck driver's equipment and physical condition did not contribute to the accident. The analysis will therefore focus on the method of operation of the truck, the duties of the train crew and the installation, commissioning and maintenance of private crossings in order to establish the facts that contributed to this accident.

As the sight-line is 180 m and the train covers that distance in 8 seconds, a vehicle like the one involved in the accident, stopped at the stop sign, would take approximately 9 seconds to accelerate and pass over the crossing. Accordingly, if the driver stopped at the stop sign before passing over the crossing, checked to see that the track was free and then drove on, he would have had just enough time to pass over the crossing or the locomotive would have hit the rear of the truck. However, as the truck was struck in the front, as shown by the damage on the locomotive, the driver might have been surprised by the sudden arrival of the train and stopped accelerating while passing over the crossing, or the truck entered the crossing without observing that a train was approaching. On the other hand, the simulation revealed that, at a distance of 8 m from the crossing, the truck driver's left rearview mirror created a blind spot that partly obstructed the driver's view and could have prevented him from seeing the oncoming train. Accordingly, the driver might have looked to his left, not seen the train and therefore continued to advance towards the crossing thinking that the track was free. However, in view of the absence of an event recorder memory module on the truck and of the lack of information about the truck driver's manoeuvres on approaching the crossing, the course of the events leading up to the accident cannot be reconstructed with certainty, and similar accidents thus be prevented.

When the locomotive engineer not at the controls proceeded towards the baggage car, the door between the locomotive cab and the engine compartment remained half open, thereby allowing the noise of the engines to enter the locomotive cab. The locomotive engineer at the controls therefore turned around to shut the door, which diverted his attention as the train was exiting the curve some 30 m before the crossing. Moreover, as his attention was then turned to the radio handset for a few additional seconds, the locomotive engineer scarcely had time to notice the truck a few metres ahead of the locomotive, and his reflex was to protect himself from the impact. The locomotive engineer did not have time to blow the whistle to warn the truck driver passing over the crossing about the imminent danger.

Even if locomotive engineers not at the controls should not leave the locomotive when the train is still in motion, operational constraints, such as following the schedule, require them to begin preparations for debarking before arrival at stations so as not to cause delays to trains. This creates a situation where only one person is monitoring the front of the train, which can reduce the level of attention, affect compliance with some

CROR rules and consequently eliminate the safety defence generally associated with two-person train crews.

The reconstruction of the crossing was not carried out in accordance with the CN standard plan or TC guidelines. The minimum sight-lines were less than the distances prescribed in the TC guidelines and the CN standard plan; the stop signs were approximately 60 cm lower than prescribed, and there were no gates or culverts on each side of the railway right-of-way. After the reconstruction of the crossing, there was no CN inspection to check that it was safe. As a matter of fact, the crossing did not comply with established safety standards and the level of safety was reduced. A quality control program ensuring compliance with established standards would provide an additional mechanism to ensure that some anomalies potentially having an impact on the safety of railway employees and the public are identified and corrected.

Whistling on approaching a crossing not only makes it possible to alert drivers of road vehicles but also requires the locomotive engineer to direct his attention to the front of the train and therefore be in a better position to react. However, as this was a private crossing, the train was not required to whistle, even though the crossing's location at the exit from a curve and its reduced sight-lines posed additional risks to users.

TC also distinguishes between public and private crossings. In fact, TC inspection programs are focussed on public crossings, with virtually no detailed inspections of private crossings. However, as private crossings generally handle relatively low vehicle traffic, the distinction between private and public crossings has few consequences for safety. Reassessment of the risks based on the specific features of each crossing may nevertheless prove necessary, because some crossings, even private crossings, have substantial seasonal traffic fluctuations that may affect safety.

Findings as to Causes and Contributing Factors

1. As the truck was struck in the front, the driver might have been surprised by the sudden arrival of the train and stopped accelerating while passing over the crossing, or the truck entered the crossing without observing that a train was approaching.

2. The attention of the locomotive engineer at the controls was diverted by the activities that he had to perform, and he therefore did not have time to blow the whistle to warn the truck driver of the imminent danger.

3. When only one person is left at the front of the train, the safety defence generally associated with two-person train crews is eliminated, because the level of attention is reduced and compliance with some CROR rules is affected.

4. Considering that this was a private crossing, the train was not required to whistle, even though the crossing's location at the exit from a curve and its reduced sight-lines posed additional risks to users.

5. The reconstruction of the crossing was not carried out in accordance with the CN standard plan or TC guidelines; consequently, the crossing was not complying with established safety standards and the level of safety was reduced.

Findings as to Risk

1. The truck driver's left rearview mirror created a blind spot that obstructed a large part of the field of view and may have prevented the driver from seeing the train approaching.

2. A quality control program ensuring compliance with established standards would provide an additional mechanism to ensure that some anomalies potentially having an impact on the safety of railway employees and the public are identified and corrected.

3. Reassessment of the risks based on the specific features of each crossing may prove necessary, because some crossings, even private crossings, have substantial seasonal traffic fluctuations that may affect safety.

Other Findings

1. The absence of an event recorder memory module on some road vehicles does not advance understanding of accidents and hinders the improvement of safety.

Safety Action

The day after the accident, CN required all trains approaching the crossing at Mile 119.35 of the La Tuque Subdivision to comply with CROR Rule 14(l).

An investigator from the Quebec Commission de la santé et de la sécurité du travail issued an order to Charles Morrissette Inc. forbidding it to use the crossing without first posting a person on the ground having good visibility in both directions, equipped with a two-way radio and able to warn truck drivers of the approach of a train. The crossing was later closed.

The proposed *Grade Crossing Safety Regulations* will be published in the *Canada Gazette* in the spring of 2002. As far as private crossings are concerned, a section of the regulations will clearly define the responsibilities of the railway company, the road owner and, in some cases, the road authority if the private road approach is part of a public road. To this end, any change to a crossing infrastructure, road traffic, speed or type of vehicles passing over the crossing or any other change susceptible to adversely affect safety must be brought to the attention of the railway company.

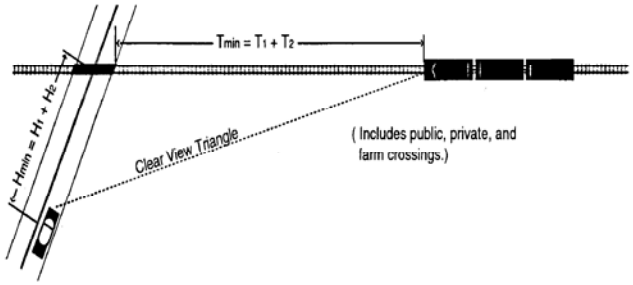
In the summer of 2001, TC implemented an intensive crossing inspection program during which it will pay

special attention to sight-lines. The results have been analysed and meetings between TC and railway companies have taken place to evaluate sight-line practices.

This report concludes the Transportation Safety Board's investigation into this occurrence. Consequently, the Board authorized the release of this report on 26 February 2002.

Appendix A—Minimum Sight-lines at all Crossings without a Warning System

Figure 8-1. Minimum Sightlines - Grade Crossings Without A Road Crossing Warning System



RAILWAY TABLE

Maximum Time Table Speed	Distance "T_1"	
mph	m	(feet)
STOP	30	(100)
1 - 10	45	(150)
11 - 20	90	(300)
21 - 30	135	(450)
31 - 40	185	(600)
41 - 50	230	(750)
51 - 60	275	(900)
61 - 70	320	(1050)
71 - 80	365	(1200)
81 - 90	410	(1350)
91 -100	455	(1500)

ROAD TABLE

Maximum Permissible Road Speed	Distance "H_1"
km/h	m
Pedestrian	5
Stopped Vehicle	8
1 - 20	20
21 - 30	30
31 - 40	45
41 - 50	65
51 - 60	85
61 - 70	110
71 - 80	140
81 - 90	170
91 - 100	200
101 - 110	220

To establish clearing requirements:

1. "H_{Min}" is the minimum distance along the road from which a driver or pedestrian must be able to see the crossing and an approaching train.

   $$H_{Min} = H_1 + H_2$$

   where H_1 = *basic stopping sight distance. See Road Table.*
   H_2 = *additional stopping sight distance, as required by subsection 8.4 (b).*

2. "T_{Min}" is the minimum distance from the crossing that the train must clearly visible by the driver or pedestrian.

   $$T_{Min} = T_1 + T_2$$

   where T_1 = *basic sight distance along the railway. See Railway Table.*
   T_2 = *additional sightline distance along the railway, as required by subsection 8.4 (b).*

3. The full width of railway and road rights of way, including at the property boundaries, must be cleared of brush, trees, and other vegetation within the first 100 feet of the railway right of way and the first 50 feet of the road right of way from the crossing surface.

4. Driver's view is measured from 1.0 m above road surface to 1.2 m above top of rail.