RAILWAY INVESTIGATION REPORT
R99S0071

CROSSING ACCIDENT

VIA RAIL CANADA INC.
PASSENGER TRAIN NO. 71
MILE 101.19,
CANADIAN NATIONAL CHATHAM SUBDIVISION
WINDSOR, ONTARIO
06 AUGUST 1999

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 06 August 1999, at approximately 1315 eastern daylight time, VIA Rail Canada Inc. train No. 71, travelling westward at approximately 50 mph on the Canadian National Chatham Subdivision, struck two wheelchairs and their occupants at a pedestrian level crossing. The train consisted of one diesel locomotive and five passenger coaches. When the two crew members located in the operating cab of the locomotive observed what they thought were two people in wheelchairs stuck on the crossing, they immediately initiated an emergency application of the train brakes. None of the passengers or train crew were injured. Both persons received only minor injuries and were taken to the local hospital.

Ce rapport est également disponible en français.

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1.0 Other Factual Information

1.1 VIA Rail Canada Inc. Train No. 71

On 06 August 1999, at approximately 1315 eastern daylight time (EDT)[1], VIA Rail Canada Inc. (VIA) westward passenger train No. 71 (VIA 71) was travelling on the main track of the Canadian National (CN) Chatham Subdivision at Windsor, Ontario. The train consisted of one General Motors GPA-30 locomotive and five Light, Rapid, Comfortable (LRC) passenger cars, designed for high-speed service and operating daily between Windsor and Toronto. The train weighed 397 tons and was 483 feet in length.

The train had been operating from Toronto to Windsor over the CN Chatham Subdivision for the last 98.5 miles, and the trip was ending at Windsor, Mile 105.6.

At Mile 99.0, approximately two miles east of the pedestrian crossing at Penang Lane (Mile 101.19), the train speed was reduced to 50 mph in preparation for the reduced speed limit which commenced at Mile 101.

There were two locomotive engineers in the locomotive cab. Three on-train service (OTS) crew members were located in the passenger coaches: one service manager (SM) and two senior service attendants (SSA). They were positioned throughout the train and were preparing for their arrival at the Windsor Station. All crew members were qualified for their positions and met established rest and fitness requirement.

1.2 The Accident

Both locomotive engineers initially observed what they thought was someone "playing chicken" with the train. About one-half mile west of the Penang Lane crossing, they realized that there were persons in wheelchairs in difficulty on the crossing. They immediately made an emergency application of the train brakes.

The train entered the crossing at a recorded speed of 3 mph and the locomotive stopped approximately 30 feet west of the crossing. As a result of the collision, one of the persons was knocked south and westward in her wheelchair. The other person became trapped under the locomotive with his wheelchair being tossed into the north ditch. One of the locomotive engineers made an emergency call to the CN rail traffic controller (RTC), requesting the assistance of police and ambulance, then both locomotive engineers detrained, located and attended to the injured.

At 1320, an emergency telephone call was made by the RTC to the Windsor police department, fire department and local ambulance. The response was quick, with the fire department arriving within a few minutes, immediately followed by the ambulance service. At approximately 1330,

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

the Windsor police arrived and started coordinating the rescue efforts by extricating the person who had been trapped under the locomotive. Both of the injured were taken by ambulance to the local hospital for treatment of non-life-threatening injuries.

1.3 The Persons in Wheelchairs

About the time that VIA 71 was approaching the Windsor area, the two persons had left their residence on Forest Glade Road, located in east Windsor, by wheelchair. The residence cared specifically for persons with disabilities. There were no known defects associated with the power-assisted wheelchairs before the accident. Both wheelchairs had been kept in good operational condition.

The two headed north on Penang Lane, towards the park and bicycle path known as the Ganatchio Trail. Penang Lane ended south of the railway tracks, where it became the Ganatchio Trail on the north side of the railway. It was a well-used path and nature trail for local residents.

While crossing over the Penang Lane single-track level crossing, the person in the leading wheelchair became immobilized just beside the south rail, when one of the front wheels fell into the field side of the flangeway. The person in the second wheelchair became immobilized in a similar fashion in the field side of the flangeway of the north rail. Because of their disabilities, they were unable to extricate themselves from their wheelchairs. Both wheelchairs were then struck by the train, with one person being dragged under the locomotive and the other being thrown to the south and clear of the track. The wheelchair of the person who was dragged under the locomotive was destroyed.

1.4 Weather

The weather was warm, with a temperature of 25.2 degrees Celsius, broken cloud conditions and winds from the north-west at 15 km/h. There was no precipitation. Visibility was 19 km.

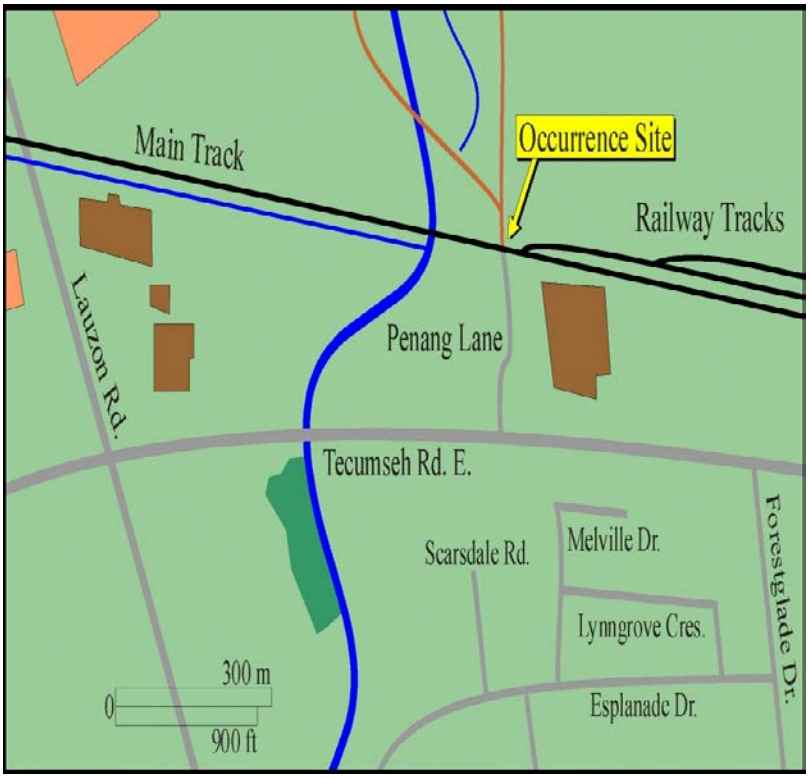
1.5 Event Recorder Data

Locomotive event recorder data (see Appendix A) indicated that, about one and one-half minutes before the accident, at 1313:55, the train was travelling at 68 mph with brakes released, throttle in idle, headlight and ditch lights illuminated and bell and horn sounding. At 1315:01, the bell and whistle were reactivated for about six seconds. From 1314:21 until 1315:05, the train brakes were activated and the speed was reduced to 43 mph. During the next seven seconds, there was a brake pipe pressure drop from 104 pounds per square inch (psi) to 2 psi. The brake cylinder pressure increased from 0 to 110 psi, indicating an emergency application of the brakes. The recorded time the train stopped was 1315:30.

1.6 The Windsor Area

Windsor has a population of approximately 200,000 and is located at the westernmost tip of south-western Ontario. The topography in the area is generally flat. Land in the area surrounding the accident site is a mixture of private dwellings and businesses. Five miles to the east of the VIA terminus at Windsor Station, Banwell Road (Mile 100.61), a two-lane paved roadway, intersects the track at 90 degrees and is protected by flashing

lights, bell and gates. Just west of Penang Lane, Lauzon Road (Mile 101.76), a two-lane paved roadway, intersects the track at 90 degrees and is also protected by flashing lights, bell and gates. Figure 1 shows the area in the vicinity of the crossing.



1.7 The Crossing at Mile 101.9

1.7.1 Crossing Approaches

Penang Lane is a 3.8-m paved laneway south of the railway tracks, which provides access to private residences. It ends at a locked single-arm swing gate at the tracks which prevents motorized vehicle traffic access over the tracks. A space of approximately 1 m between the tip of the gate and a pipe rail guide fence allowed pedestrian, bike and wheelchair access across the crossing and the north side of the tracks into the park. There is a 2.4-m-wide paved nature trail in the park immediately to the north of the tracks, the Ganatchio Trail, which is used by the public for recreational purposes. The trail and public park lands are accessible on a 24-hour basis.

1.7.2 Characteristics of the Crossing

The pedestrian crossing intersected the single main track at 71 degrees and was protected on both sides with standard reflectorized crossing signboards (crossbucks) and a stop sign. The asphalt approach, north of Penang Lane, was uneven adjacent to the planking. The crossing planking was in very poor condition, with missing pieces of splintered wood having created an uneven surface (see Figure 2). The planking extended through the crossing with one plank on each side beyond the field side of the rails.

The crossing planking was located such that it provided a space for train wheel flanges to move safely through the crossing. Transport Canada's (TC) *Railway-Highway Crossing at Grade Regulations* require that a flangeway, with a width of between 65 mm and 120 mm to a depth of between 50 mm and 75 mm, be provided between the gauge side of the running rail and the highway surface. The typical width of front wheels for power-assisted wheelchairs with pneumatic tires is between 45 mm and 50 mm. Figure 3 shows a typical power-assisted wheelchair with a castor wheel in the field side of the rail.

1.7.2.1 Sight-Lines and Use

In the south-east quadrant of the crossing area, a local business had erected a 1.8 m-high wooden fence beside both Penang Lane and the railway tracks. Because this quadrant was critical for anyone approaching the crossing to alert them to approaching trains, stop signs had been installed to ensure that users would stop where they would be afforded a clear view. Although sight-lines in the quadrant were limited on the approaches, the view was clear from where the stop sign was located (approximately 6 m from the nearest rail).

According to a 1997 City of Windsor estimate, between 600 and 1,000 people used the crossing on a typical day, including mostly pedestrians, but also cyclists, roller bladers and wheelchair users.

1.7.3 Crossing History

In February 1968, CN had written to the City of Windsor (the City) proposing the closure of the Penang Lane crossing. Recognizing the inconvenience the closing would cause to property owners using the dirt lane off Penang Lane, CN proposed an alternate route north of the affected property. This would allow access over the railway tracks at the Lauzon Road crossing, protected by flashing lights, bells and gates. In its response, the City acknowledged CN's request and suggested that the construction of a new crossing at Mile 100.61 (Banwell Road)

would obviate the need for the crossings at Mile 101.19 (Penang Lane) and Mile 100.57. These two latter crossings would both be closed when another new crossing at Mile 101.26 was opened. The railway was the junior, in title, at this crossing at Penang Lane[2].

The City agreed to the closure of the Penang Lane crossing, but to motorized highway vehicular traffic only. Its long-term plan for the crossing was to use it to connect with a nature/pedestrian trail within the City park. It made application to and received approval from the Ontario Ministry of Tourism for grants to assist in the development of the Ganatchio Trail and bicycle path. In November 1996, the City initiated discussion with the railway and TC regarding a proposed upgrade to the warning system at Penang Lane due to a heavy increase in pedestrian use. In January 1997, all three parties met and it was agreed, in June 1997, that an upgrade was warranted. They came to an agreement and CN applied to the federal government in September 1997 for a funding grant towards the cost of the warning system. The implementation date of crossing upgrades is typically contingent on obtaining government funding.

Funding approval was given by TC on 01 September 1998. The Grade Crossing Improvement Program, funded under section 12 of the *Railway Safety Act* (RSA), is designed to provide up to 80 per cent of the capital cost of a crossing improvement project. The application for a crossing improvement project must compete against other applications for the funds based upon the seriousness of the safety problem, and the potential to avoid fatalities, injuries and damage.

The 06 August 1999 accident was the first recorded accident at this crossing.

1.8 The Chatham Subdivision

The Chatham Subdivision extends from Komoka, Mile 7.1, to Windsor, Mile 105.6. Train movements on the CN Chatham Subdivision are governed by the Occupancy Control System (OCS) authorized by the Canadian Rail Operating Rules (CROR) and supervised by the RTC located in Toronto. Normally, there are six freight trains and eight passenger trains per day on the Chatham Subdivision. A portion of the Chatham Subdivision, from Mile 63.9 to Mile 99.22, is owned by VIA, but maintained and inspected under agreement by CN. CN owns from Mile 7.1 to Mile 63.9 and from Mile 99.22 to Mile 105.7, including the track over the Penang Lane crossing, at Mile 101.19. For westward LRC passenger trains approaching Windsor, the permissible train speed becomes 50 mph about one-fifth of a mile east of Penang Lane, at Mile 101.1.

The single main track at the accident location consisted of 115-pound continuous welded rail, manufactured in 1978. The rail was secured to hardwood ties with four standard spikes and four rail anchors per tie, placed at 60 ties per 100 feet in a crushed rock ballast roadbed. Track components were in good condition.

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[2] Titles at railway crossings are junior and senior. An organization with a senior title means that the organization's right-of-way existed before the junior's. A larger proportion of responsibility for construction and maintenance of crossings is usually apportioned to the organization with the junior title.

1.9 Wheelchair and Crossing Standards

1.9.1 Wheelchair Standards

Health Canada has the legislated authority to regulate the safety of wheelchairs, but has not exercised that authority, preferring to have companies adhere to voluntary standards, such as those which are in the ISO 7174 series. These standards focus on performance characteristics related to stability, braking distance and climbing ability. There is no guideline for tire design.

The front wheels of four-wheel and six-wheel power-assisted wheelchairs are normally a type of castor, which swivel according to the behaviour of the large set of driving wheels, the latter being controlled by the occupant. The owners of the wheelchairs select their wheel types, according to their needs and preferences. The castor wheels can typically vary in diameter from 200 mm to 250 mm with a width of 25 mm to 100 mm. The castor wheel tires can be solid, pneumatic, or semi-pneumatic. Power-assisted wheelchairs have a range of up to 40 km, but typically 25 km, and speeds of up to 9.5 km/h. The wheelchairs are typically controlled and steered by use of a small joystick mounted on one of the wheelchair armrests. There are an estimated 133,000 wheelchairs operated in Canada, about 40,000 of which are power-assisted. Typical users of power-assisted wheelchairs are persons with spinal cord injuries, persons who suffer from multiple sclerosis or cerebral palsy, or senior citizens.

1.9.2 Safety at Railway Crossings

The condition of railway crossings accessed by the public is a safety matter and as such is the regulatory responsibility of TC. The federal legislation governing rail safety is the *Railway Safety Act* (RSA). It came into force on 01 January 1989 and is administered by TC. At the time of proclamation of the RSA, many regulations made under predecessor legislation were assumed under the RSA. Two of these regulations were CTC 1980-RAIL, the *Railway-Highway Crossing at Grade Regulations* and General Order E-6, the *Highway Crossings Protective Devices Regulations*. They covered the areas of design of crossing surfaces, approaches, signage and automated signal warning systems. The former was promulgated in 1980, the latter in 1976.

The type of warning system to be provided at a grade crossing depends primarily on road and rail traffic volumes and speeds, accident history, the type of vehicles and trains using it as well as its physical surroundings. The geometry of the road over the grade crossing and in the road approaches, including the effects of horizontal curvature on visibility and gradients on vehicles stopping and accelerating, are also factors in the overall system design. At any crossing with a passive (non-signalized) warning system, TC guidelines require that sight-lines in all quadrants be such to provide for at least 10 seconds' visual warning, to a stopped pedestrian or vehicle occupant, of the approach of a train. Because Penang Lane was equipped with stop signs, the stop location was the place where the 10 seconds' sighting distance was required.

Section 6 of the *Railway-Highway Crossing at Grade Regulations* states that: ". . . when a crossing other than a pedestrian crossing is constructed, the crossing surface shall be in accordance with the diagrams set out in Schedule I . . . ." Section 7 of the same regulations states that: "A flangeway with a width of between 65 mm and 120 mm to a depth of between 50 mm and 75 mm shall be provided between the gauge side of the running rail and the highway surface." When a new crossing is constructed or an existing crossing requires maintenance, the junior partner is responsible for the costs. Section 11 of the regulations also states that: "when the railway

company is the junior party, it is not responsible for construction or maintenance costs incurred beyond the width of the original highway right-of-way." The regulations are silent on any crossing surface requirements for pedestrian crossings, which can also be used by cyclists, in-line skaters and persons in wheelchairs. There is no mention of special flangeway considerations at crossings.

TC proposes to have new grade crossing regulations in place by early 2002. These regulations are intended to incorporate, by reference, a road-railway grade crossing manual which will outline comprehensive requirements for design, construction and maintenance standards of road crossings, including pedestrian and bicycle crossings. The regulations will incorporate information on wear tolerances between crossing surfaces and the top of rail for various types of use, including paths identified for regular use by persons with assistive devices.

1.9.3 Flangeway Treatments

Plastic materials have been used as flangeway fillers in low-speed (5 mph trains) industrial sidings. However, there is no equivalent system to provide a completely smooth surface to users of a level crossing which would permit a higher speed train to pass without the risk of a derailment.

1.9.4 Crossing Maintenance

Railway records indicated that track inspections were made twice weekly, in accordance with the requirements of TC's *Railway Track Safety Rules* (TP 11373E), which included the conditions of the crossing at Mile 101.19, Penang Lane. Inspections are also performed to comply with the railway Maintenance-of-Way Standard Practice Circular (SPC) 2700. SPC 2700 describes the general installation and maintenance requirements for all road crossings at grade, as required by type of use. Section 15(d) of the SPC states: ". . . planking . . . in crossings shall be checked periodically to make sure they do not present a hazard to the roadway or railway traffic. If a hazard exists, appropriate action must be taken to correct the condition." CN had noted no problems related to planking during these inspections nor did the railway receive any complaints from the City or the public concerning the condition of this crossing.

TC records indicate that an inspection of this crossing was performed on 29 April 1998, before the accident. The records made no note of the planking conditions at the crossing, although there was a train speed restriction of 10 mph imposed until sight-lines, which were inadequate because of vegetation growth, were improved. Shortly after this accident, CN imposed a temporary speed restriction through the crossing area until such time as sight-lines were cleared of vegetation.

The construction and maintenance of railway-highway crossings are a shared responsibility governed by the RSA and specifically the *Railway-Highway Crossing at Grade Regulations*. The crossing at Penang Lane was primarily used as a pedestrian walkway across the track into a public City-run park. A locked gate arm across the laneway, on the south side of the tracks, restricted vehicular traffic access. The crossing was primarily used by service vehicles, for the

City and/or the railway, when required for maintenance in and around the track and crossing area. Operators of service vehicles using the crossing had a key to unlock the swing-type gate arm.

TC is responsible for monitoring crossing conditions to assure that crossings are being maintained by the road authority and the railway in compliance with applicable rules and regulations. Because CN was junior in title at Penang Lane, when deteriorated conditions developed on the crossing, the necessary repairs were the responsibility of and undertaken by the railway on its right-of-way with the cooperation and consent of the City. When conditions required that maintenance extend beyond the railway right-of-way, both senior and junior parties would coordinate their efforts to accommodate appropriate repairs.

2.0 Analysis

The analysis of this railway occurrence will address the design features of power-assisted wheelchairs, how they interface with railway crossings and the federal standards for the construction and maintenance of railway crossings.

2.1 Initial Response

VIA 71 was being operated in accordance with government safety standards and railway operating instructions. The locomotive engineers had observed something ahead that did not appear to be clearing the crossing and took quick action by putting the train brakes into emergency. This action mitigated the severity of the accident.

The emergency response by the fire department, the police and ambulance service was quick, effective and well coordinated.

2.2 Wheelchair Immobilization and Standards

From the locations at which the wheelchairs were struck, and the positions at which the wheelchairs and their occupants were recovered, it appears that one or both of the wheelchairs' front wheels, which were equipped with tires with a width less than that of the flangeways, fell into the flangeways on the field sides of the rails. The width and depth of these flangeways were such that the wheelchairs became immobilized and the persons were unable to extricate themselves.

It is probable that the roughness of the poorly maintained approaches and planking affected the control of these wheelchairs to the extent that the front castors were oscillating, or bouncing, and they easily fell into the flangeways.

Health Canada's voluntary standards do not address performance standards for wheelchairs on terrain similar to that found at many railway crossings.

2.3 Crossing Maintenance

Despite considerable public use of the crossing, and inspections by railway personnel and periodic monitoring by TC inspectors (where TC did take action to resolve a sight-line issue in 1998), nobody appears to have identified the issue of deteriorated planking conditions at the Penang Lane crossing, nor did the City take exception to or receive public complaints about the situation or the condition of the approaches. These conditions contributed to the eventual immobilization of the wheelchairs in the flangeways, with the roughness of the surface reducing the ability of the occupants to control their wheelchairs' path of travel. Smooth crossing approaches and surfaces would not have had such an effect, since the wheelchairs would have been more stable, with the castors tracking in the intended direction and the operators having more control.

The existing *Railway-Highway Crossing at Grade Regulations* are broad in scope with minimal specific detail on crossing surface maintenance, but have no detail on surface maintenance for pedestrian crossings. The regulatory standards for flangeways were made to account for both the railways' engineering needs and for road users in highway vehicles. There has been little recognition that certain roadway users, such as cyclists, roller bladers, and power-assisted wheelchair operators, have special needs which are not met by the standard flangeway specification, which has existed in the regulations for decades.

There are no minimum criteria or standards to identify the need to repair or replace a crossing surface or immediately adjacent crossing approaches. Although CN's SPC referred to planking hazards, there was no quantification of what would be defined as a hazard.

2.4 Crossing Construction Requirements

While the minimal requirements in the regulations have taken into account general safety factors, such as volume of traffic, angle of approach, and gradient of approach, they are silent on issues relating to wheelchairs, such as plank condition or surface roughness. Performance requirements or standards for these areas could perhaps mitigate the problems of those wheelchairs and other non-highway vehicles which have small-diameter wheels or narrow cross sections in crossing the track. Since flangeway filler technology does not address anything but low-speed, industrial track situations, the issue of narrow wheels falling into flangeways on main track crossings may continue.

TC's proposed crossing regulations will address the issue of surface design of paths identified for regular use by persons with assistive devices over grade crossings. The regulations will incorporate, by reference, a manual which outlines guidelines for surface conditions for vehicles, such as wheelchairs and bicycles, which will have maximum tolerances of 5 mm between the top of the rail and the adjacent crossing surface.

Given the current designs of the majority of power-assisted wheelchairs, and despite the TC future requirement for a smooth crossing surface, a control problem will still be likely at any grade crossing when traversing the flangeways. The flangeways, which will be required to be between 65 mm and 80 mm in width, will continue to cause problems for power-assisted wheelchair operators attempting to negotiate a crossing, because of the small width and limited directional controllability of the castors typically on the front of the wheelchairs.

3.0 Conclusions

3.1 Findings as to Causes and Contributing Factors

1. The persons in the wheelchairs became immobilized at the crossing when their wheelchairs became stuck in the flangeways adjacent to the running rails. The flangeways were slightly wider than the width of the front wheels. The width and depth of the flangeways were such that it was not possible for the occupants to extricate themselves.

2. The deteriorated condition of the crossing planking and the asphalt approach to the crossing probably led to a loss of steering control of the wheelchairs.

3.2 Findings as to Risk

1. There was no regulatory or industry mechanism in place for quantitatively defining or identifying hazardous or deteriorated surfaces of pedestrian level crossings.

2. The existing regulations pertaining to railway-highway crossings do not include any design or construction standards for the safe movement of wheelchair traffic over level crossings.

3. There are no design standards for wheelchairs that address outside transportation environments, such as railway crossings.

4.0 Safety Action

4.1 Action Taken

Subsequent to the crossing accident, railway officers from Transport Canada's (TC) Ontario Region, along with supervisors from Canadian National (CN) and the City of Windsor, inspected the crossing. As a result, the crossing planks were immediately replaced.

Another CN inspection of the newly installed crossing surface determined that a further enhancement to safety could be achieved by paving the crossing surface. The planking which was installed immediately after the accident was removed and replaced by an asphalt surface, with flange and mud rails on either side of the rails. Underbrush and vegetation growth along the right-of-way in the four sighting quadrants were also cleared within two weeks of the accident.

The Association of American Railroads has requested the U.S. Transportation Research Board to test and develop a flangeway filler which will accommodate higher train speeds.

The City of Windsor recognized the deteriorated condition of the asphalt surface in the vicinity of the crossing and arranged for its repair. It also enhanced the sight-lines in the two quadrants on the north side of the crossing by removing trees and underbrush on City-controlled property.

Within four weeks of the accident, an automated warning system (flashing light signals and a bell) was installed at the crossing.

The City of Windsor, in collaboration with the railway companies operating within the City boundaries, with input from the local association for persons with disabilities and from TC, carried out a study to identify the crossings used by wheelchair occupants. Preferred wheelchair routes were identified and the crossing surfaces of these preferred crossings were improved to facilitate safe passage of persons in wheelchairs.

TC has drafted grade crossing regulations and accompanying standards. These are intended to be published in the Canada Gazette in the near future, and include requirements to facilitate passage of assistive devices across grade crossing:

- while doing a safety assessment of a grade crossing, a responsible authority will be required to evaluate the volumes of pedestrian traffic, including persons utilizing assistive devices which routinely engage on the grade crossing;

- reference to persons using assistive devices is also made in the calculation of the departure time to determine the required sight-lines and warning system circuits;

- specific requirements were added for locations regularly used by persons with assistive devices in the design of crossing surface flangeway dimensions and wear tolerances between the crossing surface and the top of the rail; and

- sidewalk or pathway approaches to a grade crossing used by persons with assistive devices will be required to be level within 8 m of the nearest rail, and lines will be painted to delineate the edge of the travelled surface.

This report concludes the Transportation Safety Board's investigation into this occurrence. Consequently, the Board authorized the release of this report on 17 April 2001.

Appendix A - Event Recorder Data

Locomotive # 6407
File: [redacted]070808.LGA
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ce	Time hh:mm:ss.t	Analogs Spd	BC	BP	Sp1	Sp2	Thr	Digitals A B C D	Bell Horn BBl MRst	Sand GF Fr Rv	Sp2 DBset Foot (HL)	EqRs ABV Sp1 MO	Sp3 Sp4 RSC SU
Aug 06	13:13:50.9	68	0	104	0	0	ID	....	11..	..1.	...1	1...	....
Aug 06	13:13:52.6	68	0	104	0	0	ID	....	11..	..1.	...1	1...	....
Aug 06	13:13:55.4	68	0	104	0	0	ID	....	11..	..1.	...1	1...	....
Aug 06	13:13:57.5	67	0	104	0	0	ID	....	11..	..1.	...1	1...	....
Aug 06	13:13:58.5	67	0	104	0	0	ID	....	11..	..1.	...1	1...	....
Aug 06	13:14:00.0	67	0	104	0	0	ID	....	11..	..1.	...1	1...	....
Aug 06	13:14:02.2	67	0	104	0	0	ID	....	11..	..1.	...1	1...	....
Aug 06	13:14:03.2	67	0	104	0	0	ID	....	1...	..1.	...1	1...	....
Aug 06	13:14:21.1	64	0	104	0	0	ID	....	....	..1.	...1	1...	....
Aug 06	13:14:22.6	64	1	98	0	0	ID	....	....	..1.	.1.1	1...	....
Aug 06	13:14:23.6	64	9	94	0	0	ID	....	....	..1.	.1.1	1...	....
Aug 06	13:14:24.6	64	24	92	0	0	ID	....	....	..1.	.1.1	1...	....
Aug 06	13:14:25.8	63	29	91	0	0	ID	....	....	..1.	.1.1	1...	....
Aug 06	13:14:28.1	60	30	91	0	0	ID	....	....	..1.	.1.1	1...	....
Aug 06	13:14:30.1	58	30	91	0	0	ID	....	....	..1.	.1.1	1...	....
Aug 06	13:14:31.6	57	25	91	0	0	ID	....	....	..1.	.1.1	1...	....
Aug 06	13:14:32.6	56	18	92	0	0	ID	....	....	..1.	.1.1	1...	....
Aug 06	13:14:33.6	55	12	91	0	0	ID	....	....	..1.	.1.1	1...	....
Aug 06	13:14:36.1	52	9	92	0	0	ID	....	....	..1.	.1.1	1...	....
Aug 06	13:14:39.1	49	9	93	0	0	ID	....	....	..1.	.1.1	1...	....
Aug 06	13:14:42.1	47	9	95	0	0	ID	....	....	..1.	.1.1	1...	....
Aug 06	13:14:43.1	46	9	98	0	0	ID	....	....	..1.	.1.1	1...	....
[illegible] 06	13:14:45.0	45	3	102	0	0	ID	....	....	..1.	...1	1...	....
A 06	13:15:01.2	44	0	104	0	0	ID	....	11..	..1.	...1	1...	....
Aug 06	13:15:05.2	43	0	104	0	0	ID	....	11..	..1.	...1	1...	....
Aug 06	13:15:08.6	43	0	98	0	0	ID	....	1...	..1.	.1.1	1...	....
Aug 06	13:15:09.6	43	10	42	0	0	ID	....	1...	1.1.	.1.1	11..	....
Aug 06	13:15:10.6	43	41	9	0	0	ID	....	1...	1.1.	.1.1	11..	....
Aug 06	13:15:11.6	41	66	3	0	0	ID	....	1...	1.1.	.1.1	11..	....
Aug 06	13:15:12.6	40	80	2	0	0	ID	....	1...	1.1.	.1.1	11..	....
Aug 06	13:15:13.6	37	101	2	0	0	ID	....	1...	1.1.	.1.1	11..	....
Aug 06	13:15:14.6	34	110	2	0	0	ID	....	1...	1.1.	.1.1	11..	....
Aug 06	13:15:15.6	31	111	2	0	0	ID	....	1...	1.1.	.1.1	11..	....
Aug 06	13:15:16.6	29	111	2	0	0	ID	....	1...	1.1.	.1.1	11..	....
Aug 06	13:15:17.6	26	111	2	0	0	ID	....	1...	1.1.	.1.1	11..	....
Aug 06	13:15:18.6	23	110	2	0	0	ID	....	1...	1.1.	.1.1	11..	....
Aug 06	13:15:19.6	20	110	2	0	0	ID	....	1...	1.1.	.1.1	11..	....
Aug 06	13:15:20.6	17	110	2	0	0	ID	....	1...	1.1.	.1.1	11..	....
Aug 06	13:15:21.6	13	110	2	0	0	ID	....	1...	1.1.	.1.1	11..	....
Aug 06	13:15:22.6	10	110	2	0	0	ID	....	1...	1.1.	.1.1	11..	....
Aug 06	13:15:23.6	7	111	2	0	0	ID	....	1...	1.1.	.1.1	11..	....
Aug 06	13:15:24.6	3	110	2	0	0	ID	....	1...	1.1.	.1.1	11..	....
Aug 06	13:15:25.6	0	111	2	0	0	ID	....	1...	1.1.	.1.1	.1..	....
Aug 06	13:15:30.0	0	110	2	0	0	ID	....	1...	1.1.	.1.1	.1..	....
Aug 06	13:44:54.4	0.5	0	102	0	0	5	.111	11..	111.	.1.1	11..	...1
Aug 06	13:44:55.7	1	0	103	0	0	6	1111	1...	.11.	...1	1...	....
Aug 06	13:44:58.4	3	0	103	0	0	6	1111	1...	.11.	...1	1...	....
Aug 06	13:45:01.4	6	0	104	0	0	6	1111	1...	.11.	...1	1...	....
[illegible] 06	13:45:04.4	9	0	104	0	0	6	1111	1...	.11.	...1	1...	....
Aug 06	13:45:07.4	10	0	104	0	0	6	1111	1...	.11.	...1	1...	....
Aug 06	13:45:11.4	13	0	104	0	0	6	1111	1...	.11.	...1	1...	....
Aug 06	13:45:15.3	15	0	104	0	0	6	1111	1...	.11.	...1	1...	....
Aug 06	13:45:19.3	18	0	104	0	0	6	1111	1...	.11.	...1	1...	....

Appendix B - Glossary

CN	Canadian National
CROR	Canadian Rail Operating Rules
CTC	Canadian Transport Commission
EDT	eastern daylight time
km	kilometre
km/h	kilometre per hour
LRC	Light, Rapid, Comfortable
m	metre
mm	millimetre
mph	mile per hour
OCS	Occupancy Control System
OTS	on-train service
psi	pound per square inch
RSA	*Railway Safety Act*
RTC	rail traffic controller
SM	service manager
SPC	Standard Practice Circular
SSA	senior service attendant
TC	Transport Canada
TSB	Transportation Safety Board of Canada
U.S.	United States
UTC	Coordinated Universal Time
VIA	VIA Rail Canada Inc.