RAILWAY INVESTIGATION REPORT
R02T0008

COLLISION WITH OBJECT

VIA RAIL TRAIN NO. 69
MILE 307.0, KINGSTON SUBDIVISION
WHITBY, ONTARIO
12 JANUARY 2002

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

Collision with Object

VIA Rail Train 69
Kingston Subdivision
Whitby, Ontario, Mile 307.0
12 January 2002

Report Number R02T0008

Summary

On 12 January 2002 at approximately 2335 eastern standard time, VIA Rail train 69 (VIA 69), travelling westward on the Kingston Subdivision on the south main track at 90 miles per hour, struck a large object lying between the rails at Mile 307.0 near Whitby, Ontario. The train was placed into an emergency brake application and stopped. An inspection of the train revealed that a freight car coupler was jammed into the undercarriage of the second locomotive. Both locomotives and the first coach were damaged. There were no injuries.

Ce rapport est également disponible en français.

Other Factual Information

VIA Rail train 69 (VIA 69) consisted of two locomotives, five coaches and one club car and was carrying 40 passengers, two locomotive engineers and three on-train service personnel.

The pilot of the lead locomotive hit a coupler which rolled under both locomotives, causing extensive damage to their undercarriages and six traction motors. One fuel tank on the second locomotive was severely dented but did not leak. A momentary erratic speed indication on data from the lead locomotive event recorder indicated that the first wheel set had momentarily lifted from the rail[1]. Some components had been torn from the coupler and made contact with the undercarriage of the first coach, causing minor damage to the brake rigging. In the night time conditions, with snow lying between the rails and heavy vehicle traffic moving along a nearby highway degrading the effectiveness of the locomotive headlights, the coupler was not seen by the locomotive engineers.

In the area of Mile 307.0 the subdivision is double main track. The authorized speed is 100 miles per hour (mph) for passenger trains and 60 mph for freight trains. The traffic in this area is controlled by the Centralized Traffic Control System authorized by the Canadian Rail Operating Rules and supervised by a rail traffic controller (RTC) in Toronto.

The weather was clear and the temperature was minus 1 degree Celsius.

The last train over the south main track at Mile 307.00 was eastward Canadian National Railway (CN) train M368-31-12 (train 368). Train 368 had departed Toronto, Ontario destined for Montreal, Quebec at 1445 eastern standard time[2]. At 1753, train 368 experienced an undesired emergency brake application at about Mile 307.0. After stopping and conducting the required emergency procedures, including notification of the supervising RTC who took this portion of the subdivision out of service, the train was inspected. The crew of train 368 (the crew) determined that the brake pipe hose connection between the trailing locomotive and the first car (box car CRLE 6227) had separated[3], causing the rapid depletion of brake pipe pressure that initiated the emergency brake application. As the hoses were re-connected and the crew began recharging the air brake system, they noticed what seemed to be a temporary repair to the brake pipe hose on CRLE 6227. After attempting to recharge the system, they observed that air was not reaching the rear of the train.

---

1 Event recorded speed and distance data are received from transponders located on locomotive lead axles.

2 All times are EST (Coordinated Universal Time [UTC] minus five hours) unless otherwise stated.

3 A train air brake line that both controls air brake applications and supplies compressed air to the individual cars, runs the length of the train, joining at each car with a pull apart connection.

A walking inspection of the train was initiated and, at 1900, it was determined that the coupler had pulled out of the east end of the 87th car, box car GTW 375675, causing train separation and loss of brake pipe continuity. The crew was unable to locate the missing coupler at this time. The RTC was notified of their determination and the controller, in turn, advised the Chief RTC, who had just come on duty, that train 368 was stopped due to a broken draw bar[4] and that the crew would be switching a car to a siding to enable them to rejoin their train.

The yoke fixing the coupler to the car had broken apart at the swivel pin. About 20 per cent of the fracture surface was rusted indicating that the component had been cracked prior to complete failure. The yoke attachment area of a box car is hidden from view, difficult to access and not subject to routine inspection or maintenance. Knuckles are designed to fail at lesser draft loads, offering a degree of protection for these components. It is not uncommon, however, for yokes or coupler shanks to fracture and cause train separation.

In order to rejoin their train, the crew needed to uncouple the locomotives, travel around the two portions on the north main track, move the rear portion to an adjacent siding where GTW 375675 could be set off, re-couple the two segments and then move the locomotives back to the head of the train. The RTC gave permission to perform the required switching procedures.

The Chief RTC dispatched two CN officers, a yardmaster and a transportation supervisor, to aid in the switching, but the train crew discouraged their assistance as the location was difficult to access by road vehicle. They felt they could handle the required movements on their own. Neither the yardmaster nor the transportation supervisor became involved in the switching or visited the site, although the transportation supervisor monitored developments on his CN radio and was aware that a coupler had been left lying between the rails. CN officers are strategically placed with distinct geographic areas of responsibility to deal with off-hours train operation issues such as that experienced by train 368.

At 2149, during the return move to re-couple the two segments of the train, the missing coupler was observed lying between the rails of the south main track at about Mile 307.0. The almost intact coupler could not be moved by hand [the coupler was 4½ feet (1.37 metres) long and weighed 563 pounds (255.9 kilograms)]. In order to ensure adequate clearance between the coupler and the cars, the conductor remained near the coupler and observed while the first 15 cars of the rear portion of the train were shoved eastward to re-couple with the front portion of the train. No contact between these cars and the coupler was noted.

While recharging the air brake system after re-coupling, the crew advised the RTC that they had located the coupler and that it was lying between the rails about 30 car lengths east of signal 3068. The RTC acknowledged the transmission but in conferring with the crew referred to the coupler as a knuckle. This misunderstanding of the nature of the obstacle lying between the rails was not noticed by the crew. The RTC then advised the Chief

---

[4] A coupler is composed of a head and a shank. The shank is also referred to as a draw bar. A knuckle is fixed to the coupler head and opens, closes and locks enabling rolling stock to be joined together. While a coupler has a length of more than 4 feet (1.3 metres), the maximum dimension of a knuckle is 11 inches (28 centimetres).

RTC that the component (again referring to it as a draw bar) had been located but did not mention that it was lying between the rails. The Chief RTC did not ask if it was foul of the tracks.

At 2223, 4 hours and 43 minutes after the emergency brake application, the crew sought and received RTC permission to depart. At this time, the crew again informed the RTC that the coupler was lying between the rails and indicated that, although it did not present a hazard to their train, it should be moved. The RTC took this conversation to mean that the entire train had safely passed over the component. The RTC did not appreciate that the locomotives, the first portion of the train and most of the rear, had not safely passed.

When resting on the ties, part of the coupler protruded 7.5 inches (19.0 centimetres) over the top of the rail. The Association of American Railroads (AAR) Interchange Rules allow freight cars to have a minimum clearance of 2¾ inches (6.98 centimetres) above the rail. Most of the lower components on freight equipment, e.g. brake rigging or brake pipe hose connections (hose bags), are 10 - 12 inches (25 - 30 centimetres) from the top of a rail. The pilot on the VIA locomotive had a clearance of about 5 inches (12.7 centimetres) although the AAR standard permits pilots and other locomotive components to be as low as 2½ inches (6.3 centimetres) above the rail.

Approaching Belleville, Mile 220.7, the brake pipe hose connection between the trailing locomotive and car CRLE 6227 separated again, stopping the train. The crew then realized that the irregular brake pipe arrangement presented a hazard to safe train operation and set the car off at Belleville for an inspection and repair. A car mechanic subsequently determined that the A-end brake pipe hose travel was restricted by a non-standard repair. The designed hose securement, which allows travel, was missing and had been substituted with restrictive plastic tie straps of the type used to harness electrical wiring or other similar items. CRLE 6227 could travel without triggering brake line separation if the A-end were coupled to another freight car and may have been in service with this non-standard arrangement for an extended period. When coupled to a locomotive which has relatively little brake pipe hose slack however, the restriction imposed by the plastic straps would probably have pulled the connection apart during the course of normal train operation. It was also possible that the restricted brake pipe hose could kink, resulting in loss of air brake control.

The car owner had no record of the air brake hose securement defect. Such a simple repair was likely carried out by non-railway personnel to enable car movement within a facility. Non-railway facilities that move rolling stock are supplied with instructions to call the railway when the need to repair a car arises. In such cases, a car mechanic is immediately dispatched to carry out the needed work. In North America, railway switching crews are to inspect cars taken from consignees and consignors to ensure that they are safe to move. Cars identified as not meeting this requirement are either repaired on location or given a temporary repair by a railway car mechanic.

Non-standard or temporary repairs are permitted in situations where a car has to travel either to be unloaded or conveyed to a repair facility. The need for repair is to be documented both electronically and by fixing routing cards to the cars. The electronic record prevents the car from leaving the repair facility until the proper repairs have been completed and the electronic record amended. The routing cards identify cars which should be

bad-ordered[5] on arrival at a repair facility such as MacMillan Yard. CLRE 6227, used to transport paper, arrived at MacMillan Yard on 12 January 2002, without documentation or an electronic defect record, after having been in Michigan and Ohio since 26 December 2001. The car had also been at MacMillan Yard on 23 December 2001 and 24 December 2001, after having been in Vermont and Maine from 24 April 2001 to 22 December 2001.

The non-standard arrangement had not been identified by the pre-departure certified car inspection (CCI)[6] of this train in the Toronto MacMillan Yard on the 12 January 2002. A pre-departure CCI is conducted to identify any car safety defects which may not have been observed during handling in the yard. The crew of train 368 had also coupled to their inspected train and had not noticed the jury-rigged brake pipe hose on CLRE 6227 while making the couple and subsequent brake pipe connection. The *Railway Freight Car Inspection and Safety Rules* require that coupler and draft components be inspected during safety inspections. The rules require a pre-departure inspection of equipment by train crews when picked up en route or at customer sites. The employee is required, as a minimum, to identify hazards where visible. In addition, Transport Canada regional safety inspectors perform equipment audits that include the audit of employees performing inspections of equipment.

After passing screening tests, the RTC was selected for the railway's RTC induction training course that included 12 weeks in a classroom setting, followed by extensive on-the-job training. At the time of the accident, the RTC had not completed the latter portion of the training and was performing RTC duties under the supervision of the Chief RTC.

The induction course given the RTC was the second one delivered after a revision. The course had previously included a "hands on"railway equipment module in the MacMillan Yard, designed to give RTC's a knowledge and appreciation of railway rolling stock and their components. This segment had been replaced in the revised syllabus with a slide-based classroom presentation on railway cars and their components. The RTC had not gained a knowledge of the various coupler components and did not have an appreciation of their respective sizes. The matter of railway equipment components, lying near or between the rails and posing a danger to safe train operation, was not a topic covered in the syllabus.

---

5 Railway terminology used to describe a car that has been determined to be in need of a repair and must be immediately moved to a repair facility.

6 Pre-departure certified car inspections, which to detect defects affecting safe train operation, are conducted by trained and certified railway employees.

Analysis

VIA Rail train 69 (VIA 69) contacted a freight car coupler which had been left lying between the rails of a main track by railway employees. The coupler had been pulled from a car with a defective yoke, from the force of an emergency brake application precipitated by a non-standard repair on another car's brake pipe. Neither the manner of operation of VIA 69 or Canadian National Railway (CN) M368-31-12 (train 368) played a role in the accident. The analysis will cover rail traffic controller (RTC) awareness and recognition of rolling stock components, railway safety programs and issues related to the non-standard brake pipe repair.

While the train crew identified the coupler and its location, the RTC, lacking familiarity with railway equipment components, did not recognize that the piece presented a safety hazard when left lying between the rails. The RTC had referred to the coupler as a knuckle when talking with the crew but as a draw bar (coupler) when informing the Chief RTC. The RTC had been recently trained for the position on an induction course that had just been altered to remove an in-yard session which had included the viewing of various railway car features. The danger that certain rail car components could pose to safe train movement if lying between or near the rails was not addressed in this training. It is concluded, therefore, that the RTC training course was not adequate with respect to the identification of rail car components and instruction on the potential safety hazard that such components could pose should they fall foul of the track.

Reinforcing the RTC's belief that the component posed no risk was the fact that the crew was able to pass over it without any contact and had indicated that it did not appear to pose any hazard to them. In fact, the only part of the train that the crew was certain could pass over the coupler was a block of 15 cars that had been behind car GTW 375675 at the time of train separation. The crew did not assess the potential for contact with the remaining cars or consider the hazard associated with the minimal clearance of a locomotive pilot or other components and the low clearance of specialized equipment, such as well cars used in double-stack container service.

CN supervisory personnel are strategically placed in order to keep informed of events transpiring on their territory and trained to be pro-active in ensuring the safe and timely movement of trains. While the initial focus had been on the movement of train 368, a timely determination of the location of the coupler to ensure that it would not present a safety hazard would have been appropriate. Discussions on the radio system indicating that it had been located lying between the rails should have provoked safety concerns and prompted immediate efforts to have it removed. Unlike the RTC, supervisory personnel in the field had the necessary experience and knowledge to understand the dimension of this piece of equipment and the risk it posed. The Chief RTC should have been monitoring radio communications on the training RTC's territory, especially if he/she was aware of a potential safety hazard.

Although the crew of train 368, the RTC, the Chief RTC and the supervisory personnel all performed the fundamentals of their job, the significance of the obstruction and the potential for adverse consequences was not discussed. Safety is a shared responsibility and should extend beyond basic job requirements.

The brake pipe bracket was both damaged and repaired while the car was in a railway customer facility. The customer's personnel may not have been sufficiently apprised of the importance of following established procedures or aware of the possible adverse consequences that such activity could present to safe train operation. It is also evident that the receiving crew either did not carefully inspect the car on pick-up or did not believe the non-standard manner of fixing the brake pipe hose created a safety hazard. The same could be said for the certified car inspection conducted on train 368 prior to its departure from MacMillan Yard.

Similarly, activities which would have brought, or did bring, railway employees into close proximity to this car, i.e., switching in the United States and MacMillan Yard, handling of the brake pipe hose connection by the operating crew of train 368, both on initially connecting to their train and after the first emergency brake application, did not raise concern.

Although this appears to be an isolated incident, the railway industry defences to prevent customers from altering rolling stock and inspection practices and employee vigilance to prevent defective equipment from entering and remaining in service may need to be reviewed.

Findings As to Causes and Contributing Factors

1. The accident occurred when VIA Rail train 69 struck a coupler, which had been left lying between the rails because of a misidentification by the rail traffic controller and a resultant misunderstanding of the hazard the object presented.

2. The RTC induction training course was not adequate with respect to the identification of railway car components instruction on the potential safety hazard that such components could pose should they fall to the roadbed.

3. Monitoring of radio communications should have alerted Canadian National Railway supervisory staff to the risk posed by the fallen coupler.

4. Railway industry defences to prevent customers from altering rolling stock, and inspection practices and employee vigilance thought to prevent defective equipment from entering and continuing in service, may not be sufficiently rigorous.

Safety Action Taken

The CN rail traffic controller induction training course has been amended to include a one-day comprehensive introduction to mechanical equipment and will provide prospective RTC personnel with a overview of the purpose and function of the components of a railway car. The revised course will include a "hands-on" segment. RTC's, who previously attended courses without "hands-on" training, have all received this additional module.

In order to mitigate similar incidents, Transport Canada has contacted CN to ascertain what follow up action is being taken by management and supervisors in regards to the roles and duties, as well as supervision and guidance provided to RTCs.

This report concludes the Transportation Safety Board's investigation into this occurrence. Consequently, the Board authorized the release of this report on 17 December 2002.

Visit the Transportation Safety Board's Web site (www.tsb.gc.ca) for information about the Transportation Safety Board and its products and services. There you will also find links to other safety organizations and related sites.