Transportation Safety Board of Canada

Bureau de la sécurité des transports du Canada

RAILWAY INVESTIGATION REPORT
R06V0111

TRAIN COLLISION AND DERAILMENT

BETWEEN ROCKY MOUNTAIN VACATIONS INC. PASSENGER TRAIN RMV P61051-21 AND CANADIAN NATIONAL SWITCHING MOVEMENT YKSS30 KAMLOOPS YARD KAMLOOPS, BRITISH COLUMBIA 21 MAY 2006

Canada

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

Train Collision and Derailment

Between Rocky Mountaineer Vacations Inc. Passenger Train RMV P61051-21 and Canadian National Switching Movement YKSS30 Kamloops Yard Kamloops, British Columbia 21 May 2006

Report Number R06V0111

Summary

At approximately 1910 Pacific daylight time on 21 May 2006, Canadian National Kamloops 1230 yard assignment (switching movement YKSS30) pulling southward toward the Okanagan connecting track collided with unoccupied Rocky Mountaineer Vacations Inc. passenger train RMV P61051-21 pushing northward from the Okanagan connecting track into track KF21 in Kamloops Yard. Four passenger cars derailed and Canadian National locomotive 1420 was heavily damaged. There were no injuries.

Ce rapport est également disponible en français.

Other Factual Information

Rocky Mountaineer Vacations Inc. Train Information

Armstrong Hospitality Group owns and operates Rocky Mountaineer Vacations Inc. (RMV). RMV operates the western Canada tourist trains Rocky Mountaineer and Whistler Mountaineer. The Rocky Mountaineer operates on the Yellowhead and Kicking Horse routes through the Rocky Mountains. Trains depart eastbound and westbound on Sundays, Tuesdays, and Thursdays, from mid-April to mid-October.

Train RMV P61051-21 was an eastbound train that originated in Vancouver, British Columbia, on 21 May 2006. Upon arriving in Kamloops, British Columbia, the train was routed southward on the Okanagan connecting track (OCT) to downtown Kamloops where the passengers were discharged and transported by motor coach to hotels. The train was approximately 2200 feet long, weighed 1812 tons and consisted of 2 locomotives and 25 unoccupied passenger cars.

Once passengers and onboard crew have detrained in downtown Kamloops, the train is backed along the OCT to RMV's maintenance facility in Kamloops Yard for servicing and stocking. The train is split into the Banff–Calgary and Jasper sections. The Jasper section is turned on the wye at the west end of Kamloops Yard. In the morning, the Banff–Calgary train leaves the RMV maintenance facility and travels on the OCT to the station in downtown Kamloops to pick up passengers. The Jasper train follows a short time later.

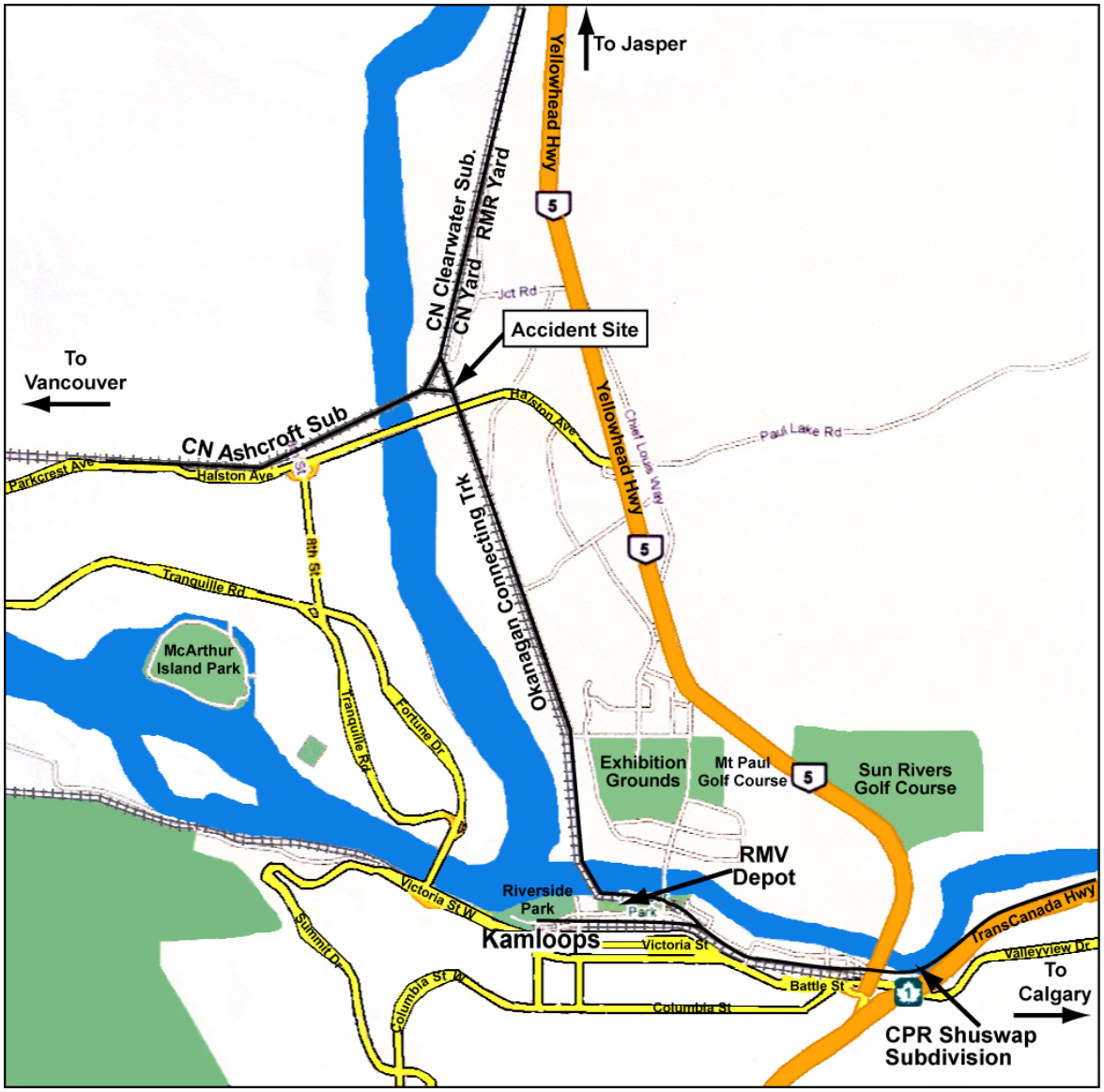

Figure 1. Railway trackage at Kamloops

RMV eastbound and westbound trains arrive in Kamloops on Sunday, Tuesday, and Thursday afternoons and return to the yard in the early evening after discharging passengers at the downtown station. RMV and Canadian National (CN) trains operate in Kamloops Yard on separate radio channels to avoid interference with each other's communications. The only shared channel is traffic coordinator channel 3.

The Accident

After discharging passengers in downtown Kamloops, the RMV locomotive engineer received permission from the traffic coordinator to return to the RMV maintenance facility in Kamloops Yard by way of a northward reverse movement over the OCT, a distance of approximately three miles. The crew consisted of a locomotive engineer at the controls and a conductor and assistant conductor riding the point in the vestibule. There were no lights on the leading passenger car.

Approaching the yard, the train stopped and the conductor lined the wye switch on the OCT and lead switch KR00. The train continued in reverse toward the maintenance facility in track KF21.

The two RMV crew members in the vestibule of the reversing train had observed a CN switching movement (the Kamloops 1230 yard assignment) after the conductor had lined the switches and the train had resumed its reverse movement. At this time, the switching movement was on the crossover in the yard, approximately 1500 feet away, approaching their location. When it appeared that the switching movement was approaching at an excessive rate of speed and did not look as though it would stop, the assistant conductor radioed his locomotive engineer to stop the reversing passenger train. The passenger train slowed and the two crew members detrained and ran from the impending collision.

The RMV crew members heard the brakes being applied on the locomotive of the switching movement.[1] The locomotive engineer on the CN switching movement exited the cab of locomotive 1420, gestured to the two RMV employees, then re-entered the cab. No emergency brake application was made on the RMV train. The RMV locomotive had stopped, but the passenger cars at the front of the movement were still moving slowly when the CN switching movement struck RMV 9272, the second car from the leading end. The collision caused the derailment of the four leading cars of the passenger train, with the third car, passenger car 3200, derailed on its side as shown in Photo 1.

Photo 1. Derailed passenger cars

[1] The generally accepted practice while switching in yards is to use only the locomotive brakes. This facilitates the shunting of cars within the confines of the yard. Train air brakes are not normally connected.

The CN switching movement was approximately 2600 feet long, weighed 3952 tons and consisted of 2 locomotives pulling 28 loads and 13 empties. The crew consisted of a locomotive engineer, yard foreman, and yard helper. The Kamloops 1230 yard assignment operates daily, performing switching and building trains. The crew was aware that their movement was a heavy lift based on the power required to move the cars.

As the switching movement was pulling southward from track KF06, the crew was advised that a westbound train was ready to depart from the yard to the Ashcroft Subdivision. This required the switching movement to clear down the OCT. The locomotive engineer initially saw no conflicting movement and turned to look backwards at the cars traversing the crossover. Shortly after, he turned around, looked forward and saw the RMV train on the lead at switch KR00. After applying full independent and emergency brake, the locomotive engineer went onto the running board of the locomotive and made a frantic gesture to the RMV personnel. He returned to the cab, advised his crew by radio, crossed over behind the control console, ducked down on the opposite side of the cab, and prepared himself for the imminent collision. No horn or bells were sounded.

Employees on both movements were familiar with the territory, were qualified for their positions and met fitness and rest standards.

Train and engine movements on other than main track are made in accordance with *Canadian Rail Operating Rules* (CROR) Rule 105. In addition, movements within the CN Kamloops Yard must adhere to CN System Special Instructions. Such movements are supervised by the Kamloops yardmaster.

CROR Rule 105 states, in part that ". . . a train or engine using other than a main track must operate at reduced speed. . . ." Reduced speed is defined in the CROR as a speed that will permit stopping within one-half the range of vision of equipment. CN Special Instructions to Rule 105(c) further specify that movements operating on other than main tracks must not exceed 15 mph. Maximum permissible speed on the OCT is 15 mph.

Yard operating employees are encouraged to perform switching operations at the safest maximum allowable speed to optimize yard productivity. This matter had been previously emphasized with the locomotive engineer operating the CN switching movement.

There was no requirement to add braking capacity while handling long/heavy cuts of cars by cutting in additional cars, though it was not prohibited.

The weather was cloudy, and the temperature was 16°C.

Equipment Damage

The post-derailment condition of the RMV train was as follows from tail end to head end (north to south):

RMV 3217 – Leading passenger car derailed; one wheel off the rail and in the air
RMV 9272 – Generator car derailed, leaking diesel fuel
RMV 3200 – Passenger car derailed on side
RMV 3203 – Passenger car derailed all wheels, upright

CN locomotive 1420 did not derail, but was extensively damaged. There were no known defects on the locomotive before the accident. The approximately 100 litres of diesel fuel that leaked from RMV 9272 was contained with minimal environmental damage.

Recorded Information

Locomotive event recorder (LER) information from locomotive CN 1420 indicates that the switching movement began pulling the cut of 41 cars out of track KF06 at 1900:11 and, with the throttle in position 8, achieved a speed of 15 mph at 1901:45. Approaching the crossover from the yard to the south main track, the speed was reduced to 10 mph at 1904:51.

At 1906:10, while travelling at 12 mph in throttle position 8, the train was placed into emergency. Speed dropped to 7 mph at 1906:19 and the movement stopped 16 seconds later at 1906:35. Brake cylinder pressure (locomotive brakes) increased from 9 pounds per square inch (psi) to 46 psi during this time.

LER information from RMV locomotive 8015 reveals that, while travelling in reverse between 1911:10 and 1911:26 when the movement stopped, brake pipe pressure decreased from 87 psi to 67 psi, indicating a full service train brake application. Between 1911:16 and 1911:24, brake cylinder pressure increased from 9 psi to 75 psi, indicating that the locomotive independent brake was fully applied. Between 1911:22 and 1911:26, train speed reduced from 5 mph to 0. The throttle was in idle.

Yard Track Details

There is a wye at the west (geographic south) end of Kamloops Yard formed by the beginning of the Ashcroft Subdivision, end of the Clearwater Subdivision and the OCT. The 3.5-mile-long OCT provides RMV access to downtown Kamloops, Kelowna Pacific Railway, and Canadian Pacific Railway trackage and is used as a switching lead by CN. Northbound traffic approaching the yard on the OCT can be observed by southward yard movements from the crossover area in the yard, but as they continue southward toward the OCT on the south leg of the wye, the track curves westward and the view becomes obstructed by the Halston connector road embankment and overpass. There is a clear view from the yard west of the crossover of northbound traffic on the OCT coming into the yard once it clears the highway overpass near the OCT wye switch.

At the time of the incident, the view from the yard was also partially obscured by trees near the highway overpass west approach span. The RMV crew members indicated that, as the train backed up past the wye switch into the yard, they could see the CN switching movement coming across the crossover (see Photo 2).

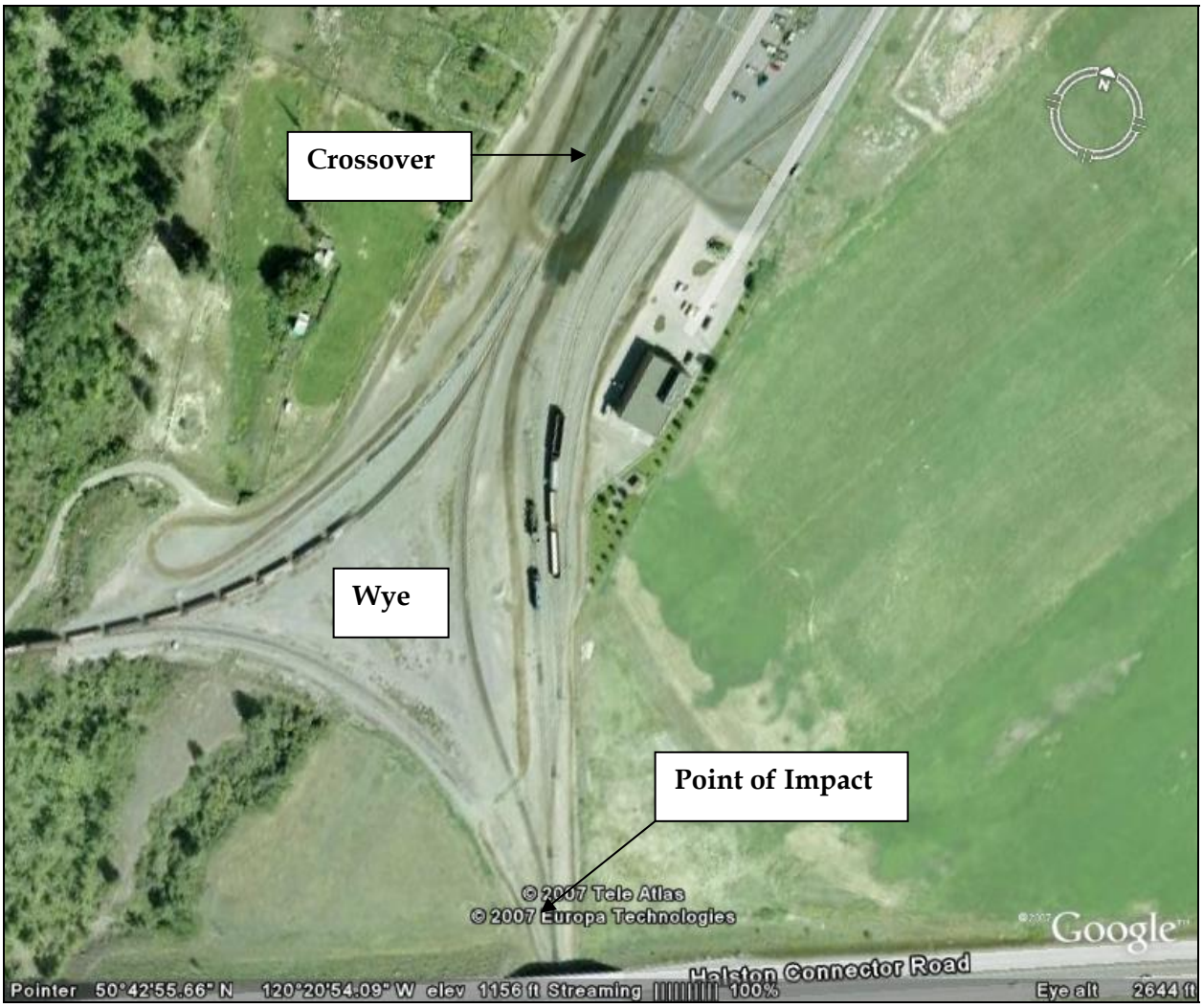

Photo 2. Aerial view of Kamloops wye

Analysis

Track maintenance, inspection, and condition of the equipment were not considered contributory to this accident. The analysis will therefore focus on the operation of the two occurrence trains.

The CN switching movement was pulling 13 empties and 28 loads as it travelled through the crossover toward the OCT. The crew members were aware that their movement, pulling out of track KF06, was a heavy lift based on the power required to move them. Not seeing any

conflicting movement ahead, the locomotive engineer turned to watch the cars traverse the crossover behind him. Satisfied with their progress, he turned back to face the direction of movement and at that moment saw the RMV train backing into the yard.

The LER indicated that the CN locomotive engineer applied both the independent and emergency brakes in an attempt to stop the movement. Nine seconds later, the collision occurred at an approximate speed of 7 mph. It is estimated that the movement travelled approximately 130 feet in that time. The locomotive stopped 16 seconds later after moving approximately 80 feet beyond the point of collision. The speed of the movement and distance to the RMV train, along with the weight and lack of braking power on the trailing cars, resulted in the switching movement being unable to stop before colliding with the RMV train.

Had the locomotive engineer on the switching movement been facing the direction of travel and observed the RMV movement, he might have applied the brakes earlier. Although the CN switching movement did not exceed 15 mph, the movement was unable to stop within one-half the range of vision of equipment as required by CROR Rule 105.

The switching movement was pulling 28 loads and 13 empties from track KF06 to clear down the OCT in advance of a westbound train ready to depart the yard to the Ashcroft Subdivision. Although the train did not exceed the maximum allowable speed of 15 mph at any time before the collision, there was a need to clear to avoid delays to the westbound train. This in combination with the expectation that cars be moved at a speed as close as possible to the maximum of 15 mph were probable factors that contributed to the speed at which the movement was travelling when braking was commenced and the train's inability to stop within half the range of vision.

The efficient flat switching of cars in yards generally requires that the air brake systems of the cars not be cut in. In such circumstances, a high degree of vigilance and specific attention is required at locations where the view of track ahead is obstructed, particularly when pulling long, heavy cuts of cars. While it may be expeditious to switch even long cuts of cars without air brakes in yard operations, this practice makes it more difficult for locomotive engineers to judge stopping distances, thereby increasing the risk of collisions.

When yard movements are handling longer/heavier cuts of cars or when the locomotive engineer has reason to believe that additional braking capacity may be necessary, it may be prudent to cut in some cars for the purpose of adding braking capacity. There were no additional cars cut in on the CN yard assignment to add braking capacity. Had one or more of the predominantly loaded cars at the head end of the switching movement been cut in, braking effort would have increased even though there was only nine seconds between the emergency brake application and the collision. The collision may not have been avoided, but damage would have been reduced.

It was common knowledge among yard operating employees at Kamloops that eastbound and westbound RMV trains arrive in Kamloops every Sunday, Tuesday, and Thursday afternoons and return to the yard in the early evening after discharging passengers at the downtown depot. The traffic coordinator was aware of the RMV train's impending return to the yard, but because yard movements are required by rule to stop within half the range of vision of other movements, he was not compelled to broadcast this information or advise the switching crew.

In addition, the CN switching and RMV crews operate on different radio channels so there was no radio contact between them before the collision. Communications between the traffic coordinator and train crews and between the two crews involved were inadequate to assist the crews in identifying each other's whereabouts.

Findings as to Causes and Contributing Factors

1. The speed of the movement and distance to the Rocky Mountain Vacations Inc. (RMV) train, along with the weight and lack of braking power on the trailing cars, resulted in the switching movement being unable to stop before colliding with the RMV train.

2. Although the Canadian National (CN) switching movement did not exceed 15 mph, the movement was unable to stop within one-half the range of vision of equipment as required by *Canadian Rail Operating Rules* (CROR) Rule 105.

3. The railway's expectation that cars be moved at a speed as close as possible to the maximum of 15 mph, and the need to clear to avoid delays to the westbound train were probable factors that contributed to the train's inability to stop within half the range of vision.

Findings as to Risk

1. While it may be expeditious to switch even long cuts of cars without air brakes in yard operations, this practice makes it more difficult for locomotive engineers to judge stopping distances, increasing the risk of collisions.

2. Communications between the traffic coordinator and train crews and between the two crews involved were inadequate to assist the crews in identifying each other's whereabouts.

Safety Action Taken

Canadian National (CN) cut down the trees under the highway overpass west approach span to improve sightlines down the Okanagan connecting track (OCT). In addition, Operating Bulletin BC068 issued on 26 May 2006 advised operating employees that a sign had been erected on the OCT approximately 500 feet south of the overpass, controlling northward movements, and signs had been installed at the west end clearance points of tracks KF21, 22, 23, 24, the RMV spur and east leg of the wye, controlling movement onto the OCT. All movements must not pass these signs unless authorized by the Kamloops yardmaster. The Kamloops yardmaster must ensure that other movements using the OCT beyond the signs are reported clear before issuing permission.

This report concludes the Transportation Safety Board's investigation into this occurrence. Consequently, the Board authorized the release of this report on 13 March 2008.

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