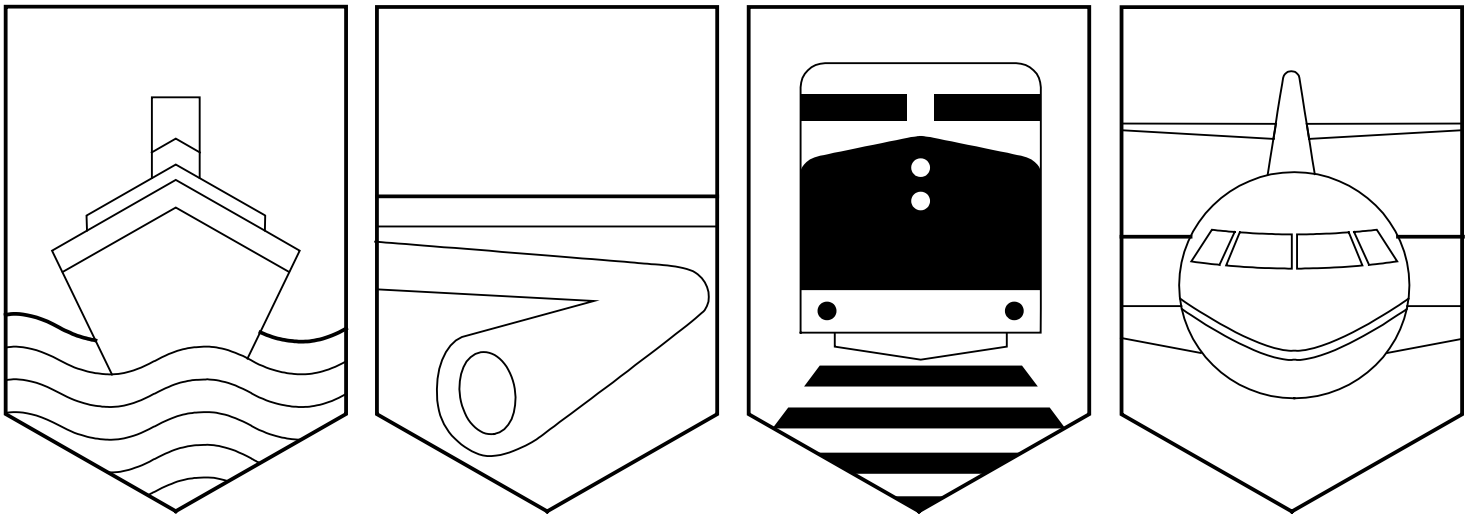
Transportation Safety Board of Canada

Bureau de la sécurité des transports du Canada



RAILWAY OCCURRENCE REPORT

RUNAWAY OF FIVE TANK CARS

CANADIAN NATIONAL
MILE 0.0, HAGERSVILLE SUBDIVISION
NANTICOKE, ONTARIO
24 APRIL 1996

REPORT NUMBER R96T0137

Canada

MANDATE OF THE TSB

The *Canadian Transportation Accident Investigation and Safety Board Act* provides the legal framework governing the TSB's activities.

The TSB has a mandate to advance safety in the marine, pipeline, rail, and aviation modes of transportation by:

- conducting independent investigations and, if necessary, public inquiries into transportation occurrences in order to make findings as to their causes and contributing factors;
- reporting publicly on its investigations and public inquiries and on the related findings;
- identifying safety deficiencies as evidenced by transportation occurrences;
- making recommendations designed to eliminate or reduce any such safety deficiencies; and
- conducting special studies and special investigations on transportation safety matters.

It is not the function of the Board to assign fault or determine civil or criminal liability.

INDEPENDENCE

To encourage public confidence in transportation accident investigation, the investigating agency must be, and be seen to be, objective, independent and free from any conflicts of interest. The key feature of the TSB is its independence. It reports to Parliament through the President of the Queen's Privy Council for Canada and is separate from other government agencies and departments. Its independence enables it to be fully objective in arriving at its conclusions and recommendations. Its continuing independence rests on its competence, openness, and integrity, together with the fairness of its processes.

Transportation Safety Board of Canada
Bureau de la sécurité des transports du Canada

Railway Occurrence Report

Runaway of Five Tank Cars

Canadian National
Mile 0.0, Hagersville Subdivision
Nanticoke, Ontario
24 April 1996

Report Number R96T0137

Summary

On 24 April 1996, at approximately 2100 eastern daylight time (EDT), a Canadian National (CN) train crew was switching at the Esso oil refinery near Nanticoke, Ontario, Mile 0.0 of the CN Hagersville Subdivision, when five tank cars went out of control. The cars rolled southward approximately two miles, crossed over two public road crossings and through the Ontario Hydro thermal generating plant building. The movement continued another 600 feet to the end of the track where the two leading cars derailed. One of the derailed cars contained spent sulphuric acid and the other car had last contained spent sulphuric acid. No product was released. There were no injuries.

The Board determined that the tank cars rolled southward and derailed because they were not securely coupled during a switching operation. The fact that a derail, positioned to prevent runaways in this area, was not left in the derail position contributed to the accident.

Ce rapport est également disponible en français.

Other Factual Information

The Accident

The Canadian National (CN) train crew completed switching at the south end of the Esso oil refinery at Nanticoke and was in the process of relocating the locomotives from the south end of a cut of 11 tank cars to the north end of these cars. As there were no nearby tracks available to run around the cars, it was necessary to perform a roll-by manoeuvre. The crew members pushed five tank cars up a one per cent ascending grade and coupled them to six other tank cars which had previously been placed in the track by another crew. A crew member stated that the coupling was tested by stretching the movement and he was satisfied that the coupling was secure. The 11 cars were then pushed northward past an adjacent track switch. The two locomotives were detached and placed into the adjacent track. A crew member then released the two hand brakes that had been applied on the six cars on the north end. This caused the 11 cars to roll southward on the descending grade past the locomotives standing in the adjacent track.

As the north end of the cars passed the switch, a crew member, riding on the north end of the cars, applied hand brakes and stopped the cars. The locomotives were then coupled to the north end of the cars. After the air hose from the locomotive was connected to the north-end car, the crew members noticed that the air pressure did not increase as expected. They then walked southward, checking for any unconnected air hoses and discovered that the five south cars were missing.

The crew then shoved the six cars that were attached to the locomotives southward, looking for the five cars. They expected to find them at a split-switch derail at Mile 1.5; however, the derail was discovered lined and locked in the non-derailing position. There was no sign of the missing cars.

The crew members continued their movement southward and found the entrance gate to the Ontario Hydro property destroyed. They continued southward and discovered that the north-end door of the Ontario Hydro fly-ash loading building had been ripped off. The south-end door of the building was in the opened position and was not damaged. Approximately 600 feet south of this building

and at the end of the track, the five missing cars were found at a stop block which had been pushed away from its position by the runaway cars. The leading car, ACFX 95236, an empty car that had last contained spent sulphuric acid, was lying on its side, down a 10-foot embankment. The leading wheels of the next car, UTLX 12895, a load of spent sulphuric acid, were derailed at the end of the track. The car was upright. There was no leakage from either car. The three other cars were not derailed.

Damage

One of the derailed tank cars sustained substantial damage and the other tank car sustained minor damage. There was substantial damage to private property, including a track mobile (car mover) which had been standing on the track in the Ontario Hydro fly-ash building. It was pushed ahead of the runaway cars to the end of the track and was destroyed. There was minor track damage.

Personnel Information

The crew consisted of a locomotive engineer, a conductor and a trainman. They were familiar with the territory, were qualified for their respective positions, and met fitness and rest standards established to ensure the safe operation of railway equipment.

They were to perform switching at the Esso refinery at Nanticoke and transfer any outward traffic to Brantford, Ontario, for connections with other trains.

A different crew had performed switching at the Esso refinery two days before the occurrence, and they had to go south past the derail at Mile 1.5 to the Ontario Hydro facility to lift four cars. They found the derail in the non-derailing position and, on their movement north, forgot to restore it to its derailing position. This crew consisted of a locomotive engineer, a conductor and a trainman. They were also familiar with the territory, were qualified for their respective positions, and met fitness and rest standards established to ensure the safe operation of trains.

Occurrence Site Information

The CN Hagersville Subdivision extends from Brantford to Nanticoke, a distance of 35 miles. Rail movements are governed by the Occupancy Control System (OCS) of the Canadian Rail Operating Rules (CROR) and supervised by a rail traffic controller (RTC) in Toronto. The maximum authorized speed is 40 mph.

The main track designation for the Hagersville Subdivision ends at Mile 0.0; however, the track extends southward (Hydro Spur) for another 3.5 miles to Lake Erie, so that the Esso refinery

immediately south of Mile 0.0 and the Ontario Hydro facility at the southern extremity of the track may be serviced. Rail movements south of Mile 0.0 are governed by CROR Rule 105. This rule requires movements to be able to stop within one-half the range of vision of equipment and be prepared to stop short of a red flag or red light. The maximum authorized speed was 20 mph at the time of this occurrence.

Public Crossings

The runaway cars crossed over public road crossings at Mile 0.97 and Mile 1.97 (Hydro Spur). Both crossings have automatic warning devices consisting of flashing light signals and bell. The automatic warning devices at both crossings have short activation circuits and published instructions require that rail movements be stopped and manually flagged over each crossing, unless it is known that the warning devices have been operating for at least 20 seconds.

Derail

The derail at Mile 1.5 was installed to protect against the possibility of runaway rail cars because of the one per cent descending grade from the Esso refinery south to Lake Erie. Unless authorized by the RTC, a derail must be left in the derailing position and locked when it is no longer in use.

Crew members had stated several times at safety meetings that the derail at Mile 1.5, located in its remote location, created walking problems[1] for employees returning to their locomotive after restoring it to its derailing position. The problem had been exacerbated because of increased rail traffic at Ontario Hydro. The problem was compounded during the winter months because of adverse weather conditions.

Employees had also expressed concern about the location of the derail because of the grade encountered when travelling northward. A northward movement, returning from Ontario Hydro when handling a number of cars and stopped while the derail is restored to the derailing position, could experience difficulty restarting its motion.

Several notices had been posted in the operating crew bulletin book at the Brantford crew office pertaining to the handling of derails in the Brantford area. Two notices had been issued during the previous 12 months by Transport Canada Safety Inspectors regarding the mishandling of derails in 13 observed instances

[1] "Walking problems" in this context relate to the necessity of employees having to walk the length of movements when activating the derail, which is a manual requirement of protecting equipment anywhere there is a derail.

in south-western Ontario. However, none of the 13 observed instances included the derail at Mile 1.5.

A suggestion to relocate the derail at the entrance to the Ontario Hydro property where movements must stop until the gate is opened had been discussed at monthly meetings of the local safety committee. CN officials rejected this suggestion and advised the employees that the derail must remain at its present location to protect Ontario Hydro property from possible runaway cars.

Coupling

Item 8, section 3.2 of CN's General Operating Instructions (GOI) states that, "when coupling to cars for any purpose, the coupling must be stretched to ensure that it is secure before hand brakes are released or movement commences." The employee at the coupling location said that, upon coupling, the movement was reversed and the cars stretched to verify that the coupling was complete. Event recorder data indicate that at a recorded time of 2056:16, the stationary locomotive, while at idle, was placed in reverse with the brake cylinder pressure measuring 67 pounds per square inch (psi). One second later the throttle was advanced to position No. 2 and the brake cylinder pressure was dropping. At 2056:25, the brake cylinder pressure had dropped to 5 psi and the throttle had been returned to idle. The distance log, measuring in 1/10 miles, did not change and no speed indication was registered.

A crew member rode between the last two cars on the north end, thereby making the hand brakes of two cars readily accessible to stop the movement. The employee thought that positioning himself at the north end of the trailing part of the movement was in accordance with item 17.6, section 8 of CN's GOI which requires crew members to use the hand brake on the last car in a movement when practicable.

The coupling mechanisms, where the coupling was attempted between car PROX 14698 and car PROX 70098, were inspected and found to be without mechanical defect. A number of additional tests were conducted in the Brantford Yard subsequent to the occurrence, and the unintentional disconnect between these two cars could not be duplicated.

The following were other procedures available for relocating the locomotives from the south end to the north end of the cars:

a) pull the cars to the Ontario Hydro yard tracks two miles to the south;

b) push northward for approximately one mile and then pull westward for two miles to the Stelco wye to turn the train; and

c) push northward four miles to the Cayuga wye.

These procedures entailed extra time and would have required an employee to be on the leading or trailing car and subject to prevailing weather conditions. The possibility of rail cars having been left at any or all of these locations might also negate the use of these tracks for marshalling purposes.

Weather

At the time of the occurrence, it was overcast with night visibility and a temperature of one degree Celsius.

Analysis

The first five cars ran away once the cut broke apart when braking was applied to the last car. It cannot be explained why the coupling of these cars did not take place. The couple worked without difficulty when tested after the occurrence, and no mechanical defects were found.

The event recorder data show that after the couple had been made, the locomotive engineer operated the locomotive in a manner consistent with “stretching” as indicated by the crew.

The employee did not consider it unsafe to ride on the last or 11th car of the movement on the descending grade. He was confident that the coupling was secure and that the public road crossing at Mile 0.97 was being protected by a fellow employee. However, in this instance, it would have been more appropriate to ride on the first car on the other end of the movement on the one per cent descending grade in spite of GOI 17.6 and the safety advantage gained by having access to two hand brakes at the rear of the

movement.

Although a member of the crew was at the crossing at Mile 0.97 to warn persons about to cross the track, it would have been virtually impossible to stop a cut of runaway cars by the use of hand brakes so as to prevent striking persons or vehicles. It is therefore considered to be inappropriate to switch cars in this manner in the vicinity of crossings at grade.

The roll-by manoeuvre on a descending grade with no employee on the leading car to ensure that it was intact and to apply hand brakes as required was the original activity leading to this runaway and derailment. Second, though not less important, was the apparent disuse of the derail designed to diminish the consequences of a runaway at this location. That disuse decreased safety at this location. Notices posted in the operating crew bulletin books adequately documented the improper handling of derails as a recurring problem. Although activity reports indicated that supervisors monitored train operations in the area, it did not result in employees consistently complying with the instructions for the proper handling of derails. Employees considered the derail at Mile 1.5 to be in an awkward location, and restoring it to its derailing position required them to walk additional distances. This may, in part, explain why this safety device was not respected.

The lack of a convenient run-around track enticed employees to perform the roll-by manoeuvre at an undesirable location. The alternative methods entailed significant extra time, work and discomfort during inclement weather conditions, negating the use of such options.

Conclusions

Findings

1. The required couple between the two cuts of cars inexplicably did not occur.

2. The application of hand brakes on the trailing cars of the movement resulted in the leading unsecured cars moving, uncontrolled, on the descending grade.

3. The practice of controlling free rolling cars from the trailing car may not be appropriate in all situations.

4. Supervisory efforts and company bulletins respecting the proper handling of derails did not result in employees consistently complying with the instructions.

5. The lack of convenient trackage for use by crew members to run around the cars contributed to unsafe work practices.

Cause

The tank cars rolled southward and derailed because they were not securely coupled during a switching operation. The fact that a derail, positioned to prevent runaways in this area, was not left in the derail position contributed to the accident.

Safety Action

Action Taken

Subsequent to this occurrence, and as a result of other occurrences in which similar shortcomings were identified, CN took the following action. The company:

- issued a special instruction for handling the derail installed at Mile 2.84, near the Hydro Compound gateway. Ontario Hydro is now responsible for returning the derail to derailing position when switching is completed. This measure eliminates an extra stop on the uphill grade to reapply the derail and reduces the walking for train crews.

- developed a training video, "Switching Safely", on car securement and derails.

- provided hands-on training for all transportation yard and engine service employees.

- conducted a system-wide review for locations where derails were required, installed approximately 600 derails and relocated approximately 200 others.

- created the position of Vice-President, Risk Management, to provide a focal point for presenting safety issues at the highest levels of company management.

- established an ombudsman to improve lines of communication and otherwise enhance the ability to communicate safety-related information.

- issued special instructions associated with CROR Rule 112. These instructions provide guidelines for applying hand brakes, checks of securement integrity and a chart of minimum hand brake application requirements.

This report concludes the Transportation Safety Board's investigation into this occurrence. Consequently, the Board, consisting of Chairperson Benoît Bouchard, and members Maurice Harquail, Charles Simpson and W.A. Tadros, authorized the release

of this report on 25 February 1998.