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Transportation Safety Board of Canada

Railway Investigation R15H0013

Derailment and fire of Canadian National crude oil train near Gogama, Ontario

The occurrence

On 14 February 2015, a Canadian National (CN) crude oil unit train was proceeding eastward on CN's Ruel Subdivision near Gogama, Ontario. The train crew was composed of a locomotive engineer and a conductor. The train was equipped with 2 head-end locomotives hauling 100 Class 111 tank cars, 68 loaded with Petroleum Crude Oil (UN 1267) and 32 loaded with Petroleum Distillates (UN 1268). The train was 6089 feet long and weighed 14 355 tons.

At about 23:50, while travelling at 38 mph, the train crew felt a heavy tug on the train and a train-initiated emergency brake application occurred near Mile 111.6. Subsequently, the crew observed a fire about 10 cars behind the locomotives, so they detached the locomotives from the train. The temperature at the time was -31°C and a slow order (speed restriction) of 40 mph was in place.

The train was designated as a "Key Train"[1] operating on a "Key Route".[2] The accident occurred in a remote area, and the CN Emergency Response Assistance Plan (ERAP) was implemented. There were no injuries reported, and no evacuation was required. The product in several cars was allowed to burn. All fires were extinguished by 20 February 2015.

What we know

Site examination determined that the 7th to the 35th cars behind the locomotives (29 cars in total) had derailed. During the derailment, a number of cars were breached, released product, and ignited a large fire that initially involved 7 of the derailed cars. Additional product was subsequently released, and a total of 21 cars sustained fire damage ranging from minor to severe. About 900 feet of track was destroyed.

While firefighters dealt with the fire, investigators were able to examine the site and recover a section of broken rail containing a rail joint and a broken wheel, that are of interest. All recovered rail components and the broken wheel were sent to the TSB Engineering Laboratory in Ottawa for further analysis.

Tank cars

The TSB conducted a preliminary damage assessment of all derailed tank cars. All of the Class 111 tank cars were constructed in the last 3 years, and were compliant with the industry's CPC-1232 standard. In comparison with the other general service "legacy" Class 111 tank cars, these cars have some enhancements which include half-head shields, improved top and bottom fitting protection, and normalized steel.

The preliminary assessment revealed that 2 tank cars at the head-end of the derailment sustained minor damage and 2 tank cars at the tail-end of the derailment had no damage. The remaining 25 derailed tank cars sustained more significant damage. At least 19 of the 25 tank cars were breached or partially breached and released various amounts of product. It is estimated that a total of over 1 million litres of product was released, either to the atmosphere or to the ground. The amount of product released will be determined more precisely as site mitigation and clean-up continue.

The accident occurred at 38 mph. Initial impressions are that the Class 111 tank cars, which were compliant with the CPC-1232 standard, performed similarly to those involved in the Lac-Mégantic accident which occurred at 65 mph.

Transportation of flammable liquids by rail

The transportation of flammable liquids by rail has been identified as one of the key risks to the transportation system and it is included on the TSB's 2014 Watchlist. The TSB has been pointing out the vulnerability of Class 111 tank cars for years, and the Board has called for tougher standards for all Class 111 tank cars, not just new ones, to reduce the likelihood of product release during accidents. In Lac-Mégantic, investigators found that even at lower speeds, the unprotected Class 111 tank cars ruptured, releasing crude oil which fuelled the fire. Consequently, until a more robust tank car standard with enhanced protection is implemented for North America, the risk will remain.

In response to the TSB's recommendation, Transport Canada (TC) formalized the CPC-1232 standard in January 2014 as a requirement for all new tank cars built for the transportation of flammable liquids. The TSB has warned TC that this standard was not sufficient and that more needed to be done to provide an adequate level of protection. Preliminary assessment of the CPC-1232-compliant tank cars involved in this occurrence demonstrates the inadequacy of this standard given the tank cars' similar performance to the legacy Class 111 tanks cars involved in the Lac-Mégantic accident.

Next steps

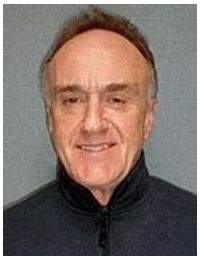
The investigation is ongoing and the next steps include the following:

- Examination of rail components and suspect wheel recovered from the derailment site
- Sampling and testing of product from select cars
- Review of Wheel Impact Load Detector records for subject train and 2 previous trains
- Review of all track infrastructure maintenance records for the area
- Review of CN Engineering Track Standards and cold weather policy
- Review of TC-approved *Track Safety Rules*
- Review and evaluation of ERAP and emergency response
- Conducting additional interviews as required.

Once all remaining product has been removed from the tank cars and they have been cleaned and purged, the TSB will complete a detailed damage assessment of the cars. The object of the assessment is to compare the performance of these tank cars against the known performance of the legacy Class 111 tank cars that were involved in the Lac-Mégantic accident. This may also include further failure analysis, testing and metallurgical examination at the TSB Engineering Laboratory.

Map of the area

Investigator-in-charge



Robert Bruder joined the Transportation Safety Board in September of 2013 as Regional Senior Investigator Rail/Pipeline at the TSB's Toronto office. Mr. Bruder has an extensive background in railway operations and risk management garnered over a 36-year career with CN Rail. He managed CN's Risk Management Department for Eastern Canada from 2004 to 2013, and was extensively involved in development and implementation of CN's safety management system, accident/injury investigation, analysis and cause-finding processes, as well as derailment emergency response and mitigation.

Photos

See more high resolution pictures on the TSB Flickr page.

Transportation Safety Board investigation process

There are 3 phases to a TSB investigation:

1. **Field phase**: a team of investigators examines the occurrence site and wreckage, interviews witnesses and collects pertinent information.
2. **Examination and analysis phase**: the TSB reviews pertinent records, tests components of the wreckage in the lab, determines the sequence of events and identifies safety deficiencies. When safety deficiencies are suspected or confirmed, the TSB advises the appropriate authority without waiting until publication of the final report.
3. **Report phase**: a confidential draft report is approved by the Board and sent to persons and corporations who are directly concerned by the report. They then have the opportunity to dispute or correct information they believe to be incorrect. The Board considers all representations before approving the final report, which is subsequently released to the public.

For more information, see our Investigation process page.

The TSB is an independent agency that investigates marine, pipeline, railway and aviation transportation occurrences. Its sole aim is the advancement of transportation safety. It is not the function of the Board to assign fault or determine civil or criminal liability.

Media

News releases

2015-02-23

Update on derailment and fire of Canadian National crude oil train near Gogama, Ontario
Read the news release

Deployment notices

2015-02-15

Transportation Safety Board of Canada deploys team to crude oil train derailment and fire 80 km south of Timmins, Ontario
Read the deployment notice

1 A "Key Train" is defined as any train containing 1 or more cars of PIH or TIH material, such as anhydrous ammonia, ammonia solutions, spent nuclear fuel or high-level radioactive waste, or containing 20 car loads, or intermodal portable tank loads, of any combination of other hazardous materials (e.g., crude oil).

2 A "Key Route" is defined as any track on which, over a period of one year, is carried 10 000 or more loaded tank cars or loaded intermodal portable tanks containing dangerous goods, as defined in the *Transportation of Dangerous Goods Act, 1992*, or any combination thereof that includes 10 000 or more loaded tank cars and loaded intermodal portable tanks.

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