



REASSESSMENT OF THE RESPONSE TO RAIL SAFETY RECOMMENDATION R02-02 - R99T0256

BACKGROUND

At 1311 eastern daylight time on 23 September 1999, Canadian National freight train M304-41-21, destined for Toronto, Ontario, derailed 26 cars near the north siding switch at Mowat, near Britt, Ontario. The derailed equipment included 14 residue tank cars last containing liquefied petroleum gas (LPG), 1 tank car loaded with LPG and 3 tank cars loaded with anhydrous ammonia. The loaded LPG car and one anhydrous ammonia car were breached, each releasing product and igniting, resulting in several fires. At 1348, the loaded car of LPG exploded, projecting pieces of its tank and jacket in all directions. Approximately 127 000 pounds of LPG and 158 000 pounds of anhydrous ammonia were released. All the LPG and a large amount of the anhydrous ammonia were consumed by fire. The train crew was not injured; however, an Ontario Provincial Police officer, a local woodcutter, and two firemen suffered minor injuries as a result of contact with ammonia vapours.

Tank cars are subject to a re-qualification inspection which includes the thermal protection; however, the standards do not contain requirements on methods of inspection, nor the relationship between thermal protection degradation, such as shifts or voids in the insulation, and the actual thermal resistance of the cars. As the presence of fire is frequent in a derailment, there is a risk to the public that hazardous products may be prematurely released to the atmosphere in the time-critical initial stages of an emergency response, before proper isolation and evacuation procedures can be implemented. Therefore, the Board recommended that:

The Department of Transport, in conjunction with the tank car owners, review the existing inspection and maintenance program for thermal protection of tank cars already in service, and ensure that their thermal protection systems confer acceptable thermal resistance to reduce the risk of the premature release of dangerous goods in a fire.

R02-02

Response From Transport Canada to Recommendation R02-02

TC agrees with the recommendation and has been pro-active in addressing this issue. Thermally protected tank cars in dangerous goods service must be re-qualified in accordance with sections 25.5.10 and 25.6.5 of the CAN/CGSB 43.147-2002 standard as part of the overall TC Safety Systems Inspection Program.

In June of 1996, TC sponsored a project named "Field Detection of Tank Car Insulation Deficiencies". The project has undertaken laboratory experimentation, field trials, and image analysis in order to establish the feasibility of using thermography to detect discontinuities in thermal protection under tank car steel jackets in the presence of a thermal gradient. The results

of the project and inspection techniques developed are being shared with the members of the AAR tank car committee.

TC is continuing its research to determine the effect of thermal protection defects on the re-qualification of tank cars and is currently developing a tool for scientifically determining the maximum acceptable deterioration of thermal protection. This tool will be used to develop an acceptance criteria for use by TC inspectors and once developed will also be shared with members of the AAR Tank Car Committee.

Board Assessment of the Response to R02-02 (January 2003)

The Board recommended a review of existing inspection and maintenance programs to ensure the performance of thermally protected cars. TC has taken many positive steps to fulfill the spirit of the recommendation. The response includes a number of ongoing initiatives, e.g. audits of shop facilities, participation with FRA in an AAR Task Force of the Tank Car Committee, and use of thermography to help identify thermal voids. Some of these initiatives predate the date of the occurrence.

The more recent research work, and the development of a tool to allow employees to scientifically determine the maximum acceptable deterioration of thermal protection shows promise. Such a tool will allow persons performing re-qualification inspections to quantify the relationship between thermal voids and degradation, a key to understanding whether a tank car that has been in service a number of years, can continue to provide adequate thermal resistance, to prevent the premature release of dangerous goods in a fire.

Improved testing procedures, stipulated methods of inspection and acceptable test results, when combined with improved technology and widespread industry participation, will address the identified safety deficiency. In consideration of the ongoing initiatives in that regard, the anticipation of this new technology's introduction, and the participation of the AAR Tank Car Committee, the response to Recommendation R02-02 is assessed as being "*Satisfactory intent*".

Additional Response to R02-02 (June 2004)

TC participated in the FRA - AAR Task Force in audits of tank car facilities. TC has been performing thermography inspections to help identify thermal voids, and as a result has recently removed non-conforming tank cars from service for repair or scrapping. TC has purchased thermographic equipment for its field forces in Canada and provided training to some of its inspectors for this purpose. TC has also provided training to US DOT FRA inspectors as well

Board Reassessment of Response to Recommendation R02-02 (May 2005)

In consideration that TC has implemented the use of the new technology and provided training for field forces in Canada and the USA the Board reassesses the response to Recommendation R02-02 as being "*Fully Satisfactory*".