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

**REASSESSMENT OF THE RESPONSE FROM CANADIAN NATIONAL TO RAIL SAFETY RECOMMENDATION R03-04**

**INSPECTION AND MAINTENANCE OF TIMBER BRIDGES**

## Background

On 14 May 2003, a Canadian National (CN) train derailed on a timber bridge at Mile 79 on the Fraser Subdivision near McBride, British Columbia The bridge, two locomotives, and five cars were destroyed by fire The two crew members in the lead locomotive were fatally injured The TSB uncovered deficiencies with the potential to degrade rail safety A number of bridge components were identified as defective and were not repaired by CN because of shortcomings in inspection and maintenance practices.

CN's inspection and maintenance programs are designed to provide the primary line of defence for the more than 2000 timber bridges on its network Standard Practice Circular (SPC) 4300 sets out the maintenance standards for timber bridges Regular inspections identify required bridge maintenance The inspection requirements for all CN bridges are in SPC 4000 Inspection frequencies are determined by the tonnage and importance of the line CN's inspection and maintenance requirements, detailed in SPC 4000 and 4300, respectively, were not followed for this bridge.

In addition to SPC requirements not being followed, there were deficiencies in some railway practices There was no clear direction as to the scope and nature of work to be undertaken for timber bridges, nor was the completed work inspected and recorded At the time of the occurrence, no recording system was in place to indicate the nature and extent of completed work As a result, confusion existed regarding the outstanding work to be performed on the bridge For example, work on the bridge was interrupted in 2001, and when work resumed in 2002, defective components were overlooked.

## Board Recommendation R03-04 (December 2003)

Effective inspection, assessment, and timely implementation of planned maintenance are of paramount importance to the continued safety of bridges The Board noted a concern that CN's inspection and maintenance practices are not providing a primary line of defence for timber bridges on the CN network Therefore, as a matter of urgency to address these risks, the Board recommended that:

> CN verify the condition of its timber bridges and ensure their continued safety with effective inspection and maintenance programs.
>
> R03-04

Canada

## Response to R03-04 (January 2004)

A response was received from CN as follows:

> This is with reference to your letter issued December 19, 2003 forwarding to my attention the Rail Safety Recommendations issued by the Transportation Safety Board (TSB) in the context of the on-going investigation into the May 14, 2003 derailment at Mile 7.9 Fraser Subdivision, near McBride, B.C. The Recommendations address inspection and maintenance of timber bridges in general, but read in the context of the McBride investigation, can raise some uncertainties.

We are concerned with the information that accompanies the Recommendations because it creates the false impression that when it comes to timber bridges, CN is not a safe railway.

You will appreciate that at this time, CN does not have access to the documentation supporting the recommendations and has yet to see the draft report that normally precedes the making of recommendations Nevertheless, some of the matters raised in the Rail Safety Recommendations need to be addressed immediately.

For instance, the reference in the letter to defective work on the bridge not being completed is incorrect All work required to ensure safe operations across the bridge was completed prior to the derailment CN understands that the TSB took exception to the fact that some stringer and cap repairs were not, in their opinion, completed in a timely fashion, but it should be noted that they were completed prior to the derailment Urgent cap replacements were completed immediately after the 1999-detailed inspection In spans 14/15, where 3 of 8 stringers were classified as reject, helper stringers were installed in 2002

The TSB statement that "not all of the required repairs were made" between the 1999 detailed inspection and the time of derailment is incorrect Thirteen (13) of 27 timber caps were changed out, two new stringers were installed in spans 25/26, and helper stringers were installed in spans 14/15. The cap at Bent 15 was not changed out, as it only had local deterioration towards the center, between stringers. This was being monitored to ensure the safety of operations As such, all of the necessary repairs were completed before the derailment occurred.

The TSB critiques the way CN ranks bridge components (ie specifically timber caps) with a generalized condition ranking (ie good, fair, poor) for each The TSB is incorrect to infer that the condition of individual components is not considered CN's inspectors give an overall ranking based on average condition (not worst), but also identify those in poor condition so repairs can be planned Individual components exhibiting signs of deterioration do not necessarily require immediate attention CN's strategy is to inspect them and monitor their condition with the aim of replacing them at the appropriate time, such that we do not compromise safety to operations and the public In this case, all caps requiring replacement were changed out, and the one that was not was being monitored.

TSB's statement that defects identified in the 1999 detailed inspection report were not considered in future visual inspections is also incorrect The purpose of visual inspections, as the TSB have correctly indicated previously, is to monitor changes between detailed inspections (every 5 years) If there has been no change, then the inspectors are not likely to note anything on the visual report, as it is already noted on the detailed report We feel our existing process is

adequate; however, your suggestion would be an enhancement worth considering
It is CN's practice to have every detailed and visual inspection report reviewed by an Engineer (Planning & Inspection Engineer), though it has not been our practice to have the Engineer sign those reports We have begun this practice pursuant to the TSB's suggestion It is however incorrect to assume that because there is no signature on these reports, unsafe conditions are not being addressed.

CN is in the process of developing a comprehensive, computerized Bridge & Culvert Condition System (BCS) It will provide a means for consistent component ranking utilizing a numeric ranking system better suited to tracking component deterioration and the appropriate scheduling of needed repairs The system will be rolled out in June 2004, and should provide the regulators with a higher level of confidence in our bridge condition tracking systems.

As concluded so far by the TSB, the cause of the accident has yet to be conclusively determined and we can assure you of CN's cooperation in completing your investigation.

We reiterate CN's commitment to assist the Board in its investigation and CN's commitment to safety, which is demonstrated by our safety record CN in the meantime will continue to address the valid issues raised in the interim Rail Safety Recommendations.

## Board Assessment of Response to R03-04 (April 2004)

The investigation determined that most cap replacements were completed in 2001, and not immediately in 1999 However, there is no record showing that cap No. 15 was changed out, and there are no records showing that any reject stringers were replaced CN records indicate that only two helper stringers were installed, between bents 14 and 16 It was determined that one short and one long stringer on the south chord had been installed, however, two reject stringers still remained on the north chord of span 26

Furthermore, the visual inspection in 2002 identified some defects which were repaired, but there is no mention of repairs to the remaining outstanding defects that were identified in 1999

The documentation process for the inspection and maintenance of wooden trestle bridges on CN is not adequate, as there is no documented means to ensure that the bridge inspections are completed Further, there is no indication that the defects remain identified until corrected There was no process to record instructions issued to correct defects, or details of any repairs.

CN has indicated that they are developing a comprehensive, computerized Bridge and Culvert Condition System (BCS), to be implemented in June of 2004. It would therefore appear that CN understands the nature of the safety deficiency and is planning on taking action to address some of the risks.

CN did not indicate that immediate appropriate action has been taken to verify the condition of its timber bridges However, CN has indicated that they are developing a Bridge and Culvert Condition System that, in the future, may contribute to more effective inspection and maintenance programs, therefore, the response to Recommendation R03-04 is assessed as **Satisfactory in Part**

The Board followed up with CN and TC to determine what action would be implemented.

This file is assigned an **Active** status.

## Response to R03-04 (July 2006)

TC was informed that as of 01 April 2004 CN had carried out inspections of all its timber bridges since the McBride accident On 20 April 2004 TC met with CN Bridges and Structures staff in Edmonton to review its findings from the inspections It was determined that routine maintenance work was required.

CN revised its Standard Practice Circular on inspection of bridges and installed a computerized system for tracking and reviewing inspection reports TC prosecuted CN and in April 2005 CN pleaded guilty to failing to ensure that engineering work was done in accordance with sound engineering principles TC now believes that CN has an effective inspection and maintenance program in effect TC continues to monitor CN as part of its regular program, and considers this recommendation closed.

## Board Assessment of Response to R03-04 (October 2006)

CN has established a new computerized system for tracking and reviewing inspection reports Transport Canada has audited CN and is satisfied that CN has effective inspection and maintenance programs to mitigate the risk, therefore the response to Recommendation R03-04 is reassessed as **Fully Satisfactory**.

This file is assigned **Closed** status.