

## **Better Culvert Inspections Can Prevent Track Bed Failures**

Though usually less visible than bridges, culverts underneath railroad tracks are important elements of railroad infrastructure and must be maintained to ensure the structural integrity of the tracks above them. The National Transportation Safety Board (NTSB) wants to inform railroads about the importance of thorough culvert inspections to identify problem areas before they lead to track bed failure.

### **Derailment and Earlier Track Bed Failure**

The NTSB investigated a July 5, 2024, accident in which Canadian Pacific Kansas City Railroad (CPKC) freight train 242-03 derailed 29 railcars, including 17 hazmat tank cars, near Bordulac, North Dakota. Flammable hazardous materials were released from some of the derailed tank cars and led to a fire, which then resulted in the release of anhydrous ammonia from other derailed cars.

The NTSB determined that a degraded concrete drainage culvert underneath the track had caused the loss of ballast and material from the track bed, leading to a subgrade void. As train 242-03 traversed this area, the track bed void suddenly collapsed, causing a severe dip in the rails and the derailment.

About a year before the accident, in the same section of track as the derailment, a maintenance crew saw the track bed suddenly give way while tamping. The crew repaired the track bed, but noted the culvert beneath the tracks was filled with ballast and subgrade material. This culvert was right next to the culvert over which train 242-03 derailed in July 2024. The culverts were installed in 1913.

### **What Can Railroads and Industry Do?**

Although CPKC's inspection frequency was sufficient, their inspection methods were not. Typically, inspectors looked into culverts from their ends, and this narrow and limited viewing angle did not allow them to fully assess or quantify the culverts' conditions. We recommended that CPKC revise its culvert inspection procedures to require culverts to be inspected internally, either on foot when safe or by using technology, such as cameras or remotely operated vehicles.

Inspectors also lacked established criteria to assess the condition of culverts and effectively describe what they found. The American Railway Engineering and Maintenance-of-Way Association's *Manual for Railway Engineering*, which includes recommended inspection practices, refers railroads to the American Association of State Highway and Transportation Officials' *Culvert & Storm Drain System Inspection Guide* for details about culvert inspection items and techniques and comprehensive condition rating systems. We also recommended that CPKC revise its culvert inspection procedures to provide detailed rating guidance, specific to each type of

culvert construction, similar to the *Culvert & Storm Drain System Inspection Guide*, and require remedial actions to be taken within set timeframes, when necessary.

Like the culverts at the accident location, many railroad culverts have been in service for decades (or longer). Therefore, railroads should

- Review and revise as necessary their culvert inspection procedures to require internal inspections either on foot when safe or by using technology, such as cameras or remotely operated vehicles, and
- Provide detailed rating guidance specific to each type of culvert construction and require remedial actions to be taken within set timeframes, when necessary. See the AASHTO guide here. [AASHTO Journal - AASHTO Releases Culvert/Storm Drain Inspection Guide](#).

### **Additional Information**

More information about the Bordulac accident, including the final report, *Canadian Pacific Kansas City Railroad Derailment with Subsequent Hazardous Materials Release and Fire, Bordulac, North Dakota, July 5, 2024*, can be found on the NTSB website at [www.nts.gov](http://www.nts.gov), railroad investigation [RRD24LR012](#).