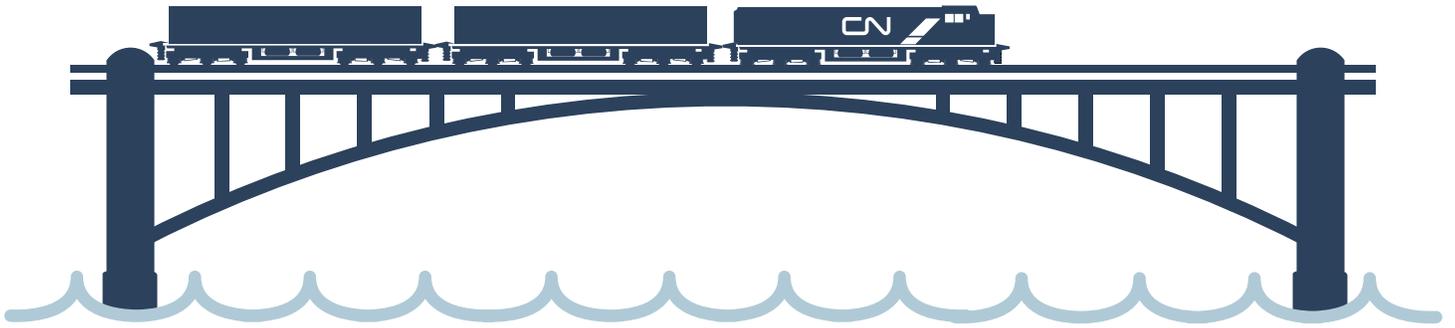




**Delivering Responsibly** is one of the most important dimensions of what CN stands for and we are intently focused on strengthening our leadership role in safety. This principle drives how we conduct our business every day – moving customer goods safely and efficiently, ensuring environmental stewardship, attracting and developing the best railroaders, adhering to the highest ethical standards, and building safer, stronger communities.



**7,250**

**bridges** stretching  
195 miles



**100M**

in capital invested in CN  
**bridge infrastructure**  
(2015)



Close to

**500**

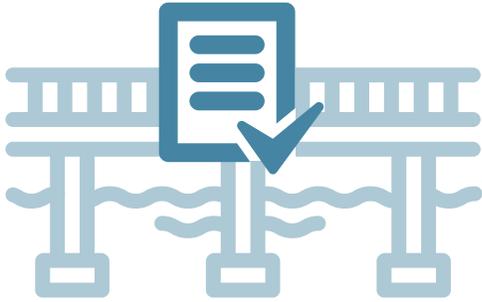
**CN employees** dedicated to  
bridge inspections, maintenance,  
and construction



## Keeping CN Bridges Safe

*Bridges represent a vital component of our network infrastructure. Like all railways, CN is highly motivated to keep these structures safe. We cannot serve our customers and move North America's freight without efficient, safe bridges.*

CN rail bridges vary from single timber 12-foot spans over streams in fields across the Midwest and Prairies, to structures spanning more than a mile over some of the continent's largest rivers. They are all inspected, maintained and, as necessary, repaired or rebuilt by a qualified workforce led by designated CN bridge engineers in accordance with Canadian and U.S. federal regulations and **CN's Bridge Management Program**.



- ✓ Meets or exceeds all federal standards
- ✓ Follows strict bridge inspection regimen
- ✓ Employs qualified railroad bridge inspectors
- ✓ All bridges inspected at least once annually
- ✓ Continuous investment in bridge maintenance and renewal

## Federal Regulations

- ✓ Federal regulations require railroads to have a Bridge Management Program to ensure the safety of railroad bridges
- ✓ Programs must include a provision for inspecting every bridge in service annually, with no more than **540 days** between inspections
- ✓ Regulators audit the Bridge Management Program and inspection records through document review and field verification

## Regular Comprehensive Inspections

- ✓ Comprehensive inspections are thorough, visual, documented inspections encompassing the entire bridge structure
- ✓ CN certified railroad bridge inspectors perform **more than 7,500 comprehensive inspections** per year
- ✓ Inspections are reviewed by experienced professional engineers. Apparent distress and deficiencies do not necessarily pose a threat to the bridge or to safe operations

## Commitment to Maintenance, Repair and Replacement

- ✓ In the rare instance a significant structural defect is identified, the bridge is removed from service until repaired or until a special inspection resolves the issue
- ✓ Since 2000, CN has installed nearly **2,500 new bridge spans**
- ✓ Since 2012, CN has invested **\$440 million** in capital spending to **repair, upgrade or replace bridges**
- ✓ CN has a separate strategic bridge initiative that plans the long-term replacement of major bridge structures

## Supplemental Inspection Technology

- ✓ CN owns/leases six-(6) bridge inspection vehicles specially equipped to allow safe access to large bridges. These snooper inspection vehicles access above and below the bridge deck
- ✓ The bridge inspection vehicle fleet averages **over 1,000 days** of service annually
- ✓ For portions of bridges that are underwater, CN uses specially trained and licensed engineer-divers to inspect those structures
- ✓ CN has been collaborating with universities and engineering firms in the development and testing of drone technology to supplement bridge inspections



*CN's Bridge Assessment group keeps a record of the safe load carrying capacity of all CN bridges in accordance with applicable regulations. Rating Engineers have a unique capability to complement their calculations with field measurements provided by our CN Bridge Testing group. The mobile bridge testing unit is equipped with state-of-the-art sensors and instrumentation that can measure strain, displacement and acceleration.*

## Key Facts about CN Bridges

- ✓ No train derailments have been caused by the structural failure of a CN bridge in modern times
- ✓ Each bridge inspection is carefully reviewed by an experienced professional engineer with authority to mandate an operating restriction and/or remediation and repair
- ✓ Bridges are assigned ratings which establish the loads and speeds to ensure safe passage
- ✓ Many railroad bridges in service today were constructed during the age of heavier steam engines and are built to handle loads far greater than today's freight trains
- ✓ CN's Bridge Management Program was instituted in 2010 and complies with Federal Railroad Administration and Transport Canada regulations
- ✓ Both regulatory agencies have the authority to perform spot inspections, audit CN inspection records and order bridges removed from service
- ✓ Bridges are constructed of steel, concrete or timber using designs such as beam, truss, swing span, and lift
- ✓ CN bridges come in all sizes and ages. A very few stone arches are even original to the railroad therefore dating back to the 1850's
- ✓ Bridge heights can approach 200 feet above ground level
- ✓ Bridges span roads, other railroads, rivers, canyons, estuaries and other geographic features
- ✓ Bridge inspection and maintenance teams are led by experienced professional engineers who supervise all bridge-related work and processes



# 440M

in capital spending to **repair, upgrade or replace bridges** since 2012



# 2,500

new **bridge spans** installed since 2000



# 36

trained, full-time **bridge inspectors**