



Committed to safety

At CN, running a safe railroad is a deeply held core value. It guides our actions at all times on our journey to become the safest railroad in North America, enabling us to build a strong future for our customers, employees, and the communities in which we operate.

CN continues to make significant investments to maintain a safe operation, through our topnotch training and technology and infrastructure improvements. In 2018, CN plans to invest a record C\$3.4 billion on capital programs, of which approximately C\$1.6 billion is targeted towards track and railway infrastructure maintenance and C\$400 million for the continued implementation of Positive Train Control in the United States.

We also continued to work closely with communities on safety through our Structured Community Engagement Program. Since this outreach effort began in 2013, we have met face to face with almost 2,000 municipal officials and their emergency responders all along our rail network to review our comprehensive safety programs, share information on dangerous goods traffic, and discuss emergency response planning and training. Last

year, we also brought critical training on dangerous goods handling to nearly 4,000 community emergency personnel through CN-supported TransCAER® (Transportation Community Awareness and Emergency Response) events.

However, just as critical as how we're investing in safety is how we're living it. We will redouble our efforts in 2018, continuing to invest in programs and tools to help each other stay safe, including the continued good work of over 100 joint union-management health and safety committees, safety summits, and other employee engagement initiatives.

We believe staying safe is about going beyond compliance, which is why we have been progressively changing our approach from strict performance monitoring to a more inclusive focus on learning, coaching and training, which will have long-term benefits. While we build a true safety culture, our focus is unwavering to stay engaged, accountable and to make safety a core value in everything we do.

We have the best team of railroaders in the business. Through continued commitment, teamwork and innovation, we are well positioned to also be the safest.

JJ Ruest Interim President and Chief Executive Officer

Michael Cory Executive Vice-President and Chief Operating Officer

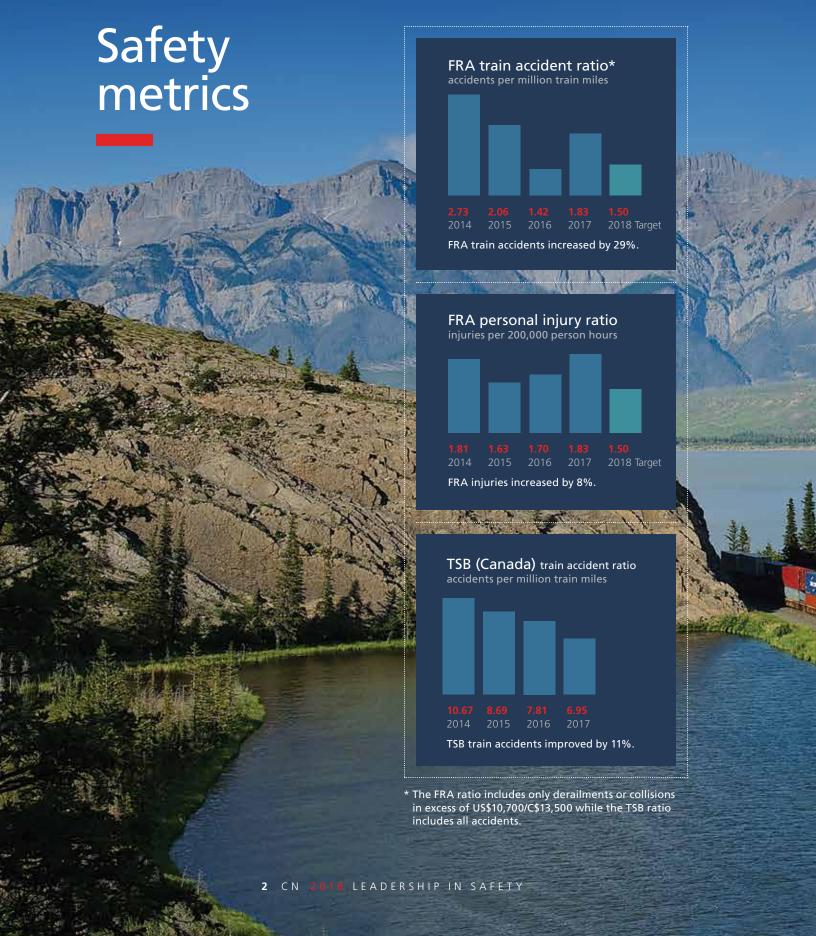
Mitch Beekman Vice-President, Safety and Environment

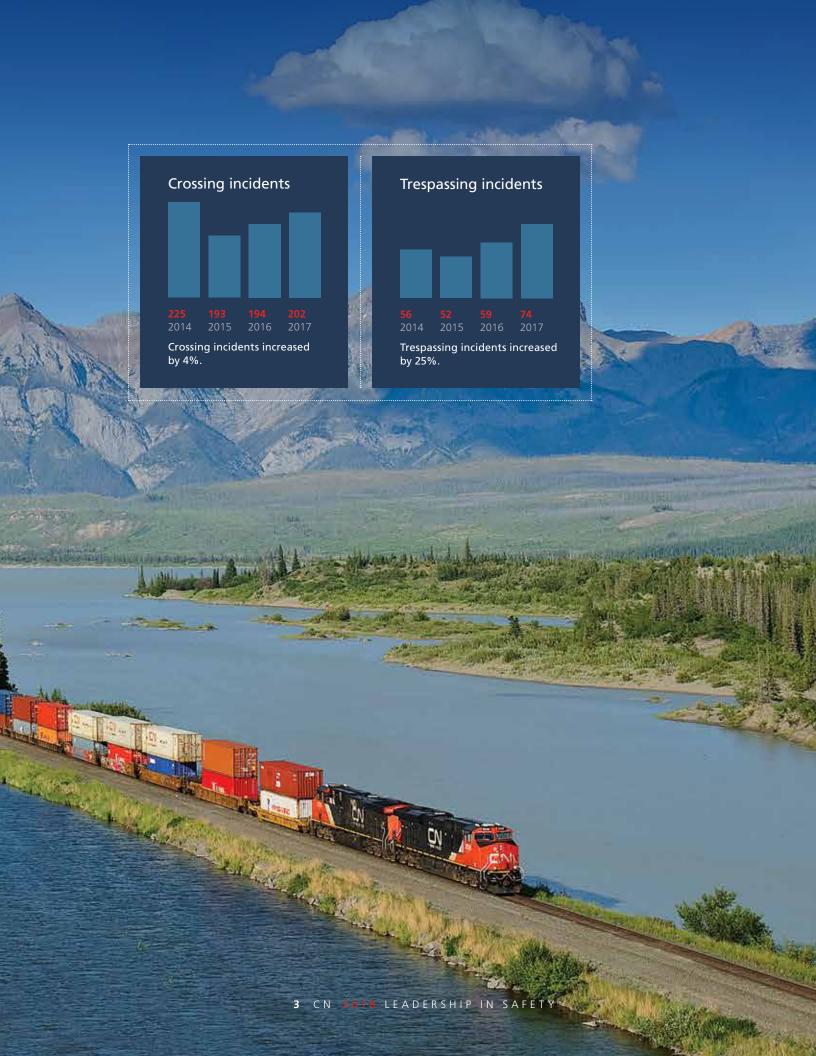






Our 2017 FRA accident and injury results were not as good as in 2016, which was an exceptional year characterized by unusually mild weather conditions. Nevertheless, our TSB accident ratio improved, and 2017 remained the second best year in terms of safety results in our history.









CN's Corporate Services team plays an integral role in keeping CN connected to the communities in which we operate. Working with our Dangerous Goods team and other colleagues, Corporate Services members, led by our community affairs staff and CN Police, have an ongoing community engagement program reaching municipal officials and local emergency responders along CN's North American rail network. Through this program, CN representatives regularly share information on crossing safety, corridor risk assessments, proximity guidelines, dangerous goods traffic, and emergency response training opportunities. CN Police officers work with communities to reduce grade crossing and trespassing incidents across our network through targeted enforcement and education initiatives. Our outreach program connects with hundreds of communities a year. CN is actively engaged and is cooperating fully in the Rail Safety Act Review that is currently evaluating the state of rail safety in Canada.

Dangerous Goods and Emergency Response

Every year, CN's Dangerous Goods group takes steps to enhance the Company's emergency preparedness and system protection, with a strong focus on safety, regulatory compliance and effective emergency response.

CN's DG team delivers Railroad Emergency
Response courses and other presentations, using
CN's 911 training car and training trailers. The team
also holds several training events at the Security
and Emergency Response Training Center (SERTC) in
Pueblo, Colorado. These include a one-week
CN-sponsored Tank Car Specialist training course
for firefighters from across North America, and

a one-week course for emergency response contractors. An important component of the group's work is supporting TransCAER® (Transportation Community Awareness and Emergency Response), an outreach effort to train community emergency personnel situated near rail lines where dangerous goods are transported.

First responders trained by CN Dangerous Goods Officers receive assistance on a wide variety of subjects, such as emergency planning, incident response techniques, tank car knowledge, and railroad safety, all of which can contribute to enhancing the safety of the community.







AskRail™ Mobile App tracks tank car contents

Developed by the Association of American Railroads, of which CN is a member, the AskRail™ mobile app lets emergency responders view the contents of railcars and get other information through a simple search, which helps them make more informed decisions about how to respond effectively to a rail emergency.

CN has registered more than 2,100 responders in Canada for the AskRail™ mobile app from nearly 550 locations. In the United States, almost 1,300 responders from 386 communities have registered for the app.



Corridor Risk Assessments

CN continues to examine the key corridors on its network to assess risk and to determine what technologies and processes could be used to mitigate the risk.

CN considers a number of risk factors, including the proximity of communities along its right-of-way, environmentally sensitive areas and the volume of dangerous goods transported along those corridors. The assessments are used to evaluate various technologies for their suitability to further reduce the frequency and severity of potential derailments.

In 2017, CN completed its three-year renewals of existing Corridor Risk Assessments covering all

key routes in Canada and the United States. All of CN's key routes, and many strategic routes for future business development, have now been assessed utilizing a detailed risk valuation methodology developed in collaboration with the University of Alberta's Canadian Rail Research Laboratory. This risk assessment process incorporates mathematical assessment techniques used by high-risk industries and infrastructure owners in North America. The mathematical tool is also extremely adaptable, allowing CN's safety team to evaluate the influence on reducing overall risk of various types of mitigating technologies or processes.

An innovative solution to transport bitumen

Working with InnoTech Alberta, CN has developed CanaPux[™], an innovative new way of transporting bitumen that puts safety and the environment at the forefront. CanaPux[™] are solid, dry pellets that meet rigorous strength requirements for bulk transport, float in water and don't leak or dissolve, resulting in minimal risk of environmental contamination. CN has selected Toyo Engineering Canada Ltd. of Calgary, AB, to design and build a pilot project demonstrating the commercial viability of transporting solid bitumen by rail.



Crossing and Trespassing

Rail safety is everyone's responsibility. By looking out for each other and working together, we can help keep our communities safe and prevent fatalities and injuries on or near railway property.

As part of our year-round effort to save lives, CN Police continued to be active in communities across our network to promote safe behaviour around railroads. These included conducting monthly enforcement initiatives, including joint operations with external agencies at high-incident locations and on CN's right-of-way, and delivering safety presentations to high-risk groups and law enforcement agencies. Our teams also continued to fully engage provincial, federal and state officials in identifying and eliminating crossing and trespassing hazards.

Reducing incidents across our network in 2018 will continue to be a top priority at CN.

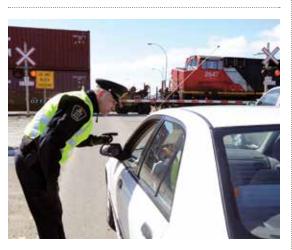
We will continue to identify high-risk areas and conduct regular public enforcement and education initiatives to change behaviours, engaging key stakeholders in our efforts. CN will also target high-risk groups, including young drivers and bus drivers, to change attitudes. Monitoring incidents across the network to identify trends and identifying the use of equipment and/or technology to reduce risks at high-incident grade crossings will continue to be pursued.

In 2018, the CN Signals & Communications team will be working with CN Police to install Crossing Emergency Notification signs at targeted grade crossings in Canada. All new CN crossing projects will include the new signs.











A Shared Responsibility

CN is working with communities and road authorities to meet Transport Canada's new Grade Crossing Regulations and Standards and advance our shared responsibility. CN provided communities across its network with information about its public grade crossings by the required deadline. The Grade Crossing Standards are mandatory engineering requirements for crossing surfaces, road geometry, sightlines, warning systems and other elements that improve safety at crossings.

Any new grade crossings and existing crossings undergoing upgrades or modifications must meet Transport Canada's new regulations immediately. All crossings must meet the new Regulations and Standards by 2021.

For more information from Transport Canada visit: www.tc.gc.ca/eng/railsafety/menu.htm

Children and adults at schools and community events in Canada and the United States receive the rail safety message every year, thanks to the commitment of CN employees who gave hundreds of All Aboard for Safety community education presentations and talks.

Rail Safety Week

Rail Safety Week 2017 was marked by national events in Canada in April, and in September in the United States, that took the rail safety message to hundreds of communities.

Throughout the Week, members of the CN Police Service conducted safety initiatives, enforcement blitzes and community events, raising awareness of the potentially deadly risks of trespassing on railway property and disregarding railway safety signs and devices at level crossings.

CN Police officers had custom virtual reality viewers to demonstrate 360° rail safety videos to the public. CN also encouraged the public to take the Rail Safety Pledge online which asks people to share rail safety tips in their community, talk about rail safety at their local schools, or report unsafe behaviour around trains or railway property.

In addition, CN asked strategically located communities along its rail network in the U.S. to participate in public proclamations of their support for National Rail Safety Week. 173 police agencies and village boards answered the call.

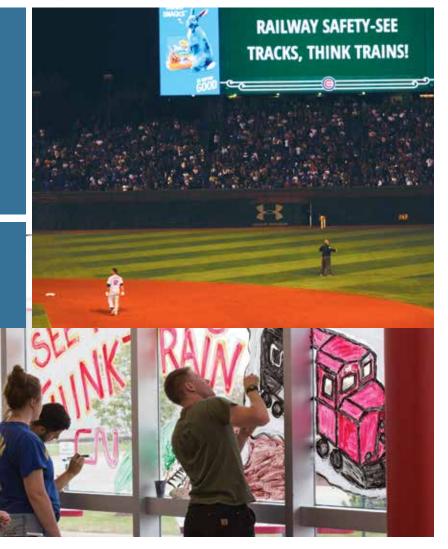
Rail Safety Week 2018 will be held in Canada and the United States from September 23-29.

A home run for safety.

The CN Police U.S. Central Division was successful in getting three Major League Baseball teams (the Chicago Cubs, the Chicago White Sox and the Minnesota Twins) to post Rail Safety Week messages on their scoreboards and play Operation Lifesaver public service announcements at a combined total of nine games. The "See Tracks, Think Trains" message was potentially seen by up to 360,000 spectators.

Getting creative for rail safety.

CN employees in Homewood, IL send the safety message through a mural painting contest at CN Campus during U.S. Rail Safety Week.







CN makes significant investments in infrastructure and technology and early detection and predictive detection analytics technologies to run a safe and fluid network.

In 2018, for the third straight year, CN plans to invest approximately C\$1.6 billion on track and railway infrastructure maintenance to support safe and efficient operations. The planned work includes the replacement of 2.1 million rail ties and more than 600 miles of rail, plus work on bridges and other general track maintenance.

Approximately C\$400 million is expected to be spent on equipment, including the acquisition of new high horsepower locomotives. A further C\$800 million is targeted towards initiatives to increase capacity and enable growth, such as track infrastructure expansion, investments in yards and in intermodal terminals; and on information technology to improve safety performance, operational efficiency and customer service.

Ultrasonic Rail Flaw Detections

Rail flaw detection systems are designed to catch internal rail defects that could potentially lead to broken rails. CN tested over 200,000 miles of track in 2017. It expects to test approximately 205,000 miles in 2018 using a risk-based approach. Testing frequencies remain in excess of regulatory requirements throughout the system.

CN tested over 11,000 miles of non-mainline track in 2017, and expects to test approximately 12,000 miles of non-mainline track in 2018.

TEST Car

A valuable tool for the inspection of track curvature, alignment and cross-level of track across the network. CN Engineering forces use the real-time reports to address any track irregularities and to assist in planning long-term rail replacement programs.

CN tested over 73,000 miles of track in 2017 and expects to test 77,000 miles of track in 2018.









Hi-Rail Geometry and Joint Bar Inspection Vehicles

CN has approximately 35 light geometry track inspection systems on engineering hi-rail vehicles. The inspection vehicles are used for additional geometry inspections between TEST car inspections, and for training less experienced employees.

CN operates three rail joint bar inspection vehicles capable of detecting missing bolts and cracks in joint bars. These trucks also have the ability to conduct light geometry inspections.

Vehicle Track Interaction Unit (V/TI)

This is an initiative to reduce the risk of main track accidents. An accelerometer is mounted on a locomotive and identifies unusual movements or accelerations resulting from track impact and alignment issues. The technology produces e-mail alerts that are sent to engineering forces when exceptions occur.

CN has 35 locomotives currently equipped with V/TI technology and is planning on adding 10 additional V/TI units in 2018.

Tie Rating Technology (TRT) System

The TRT system is a new technology at CN. Equipped with 3D measurement capability, the system more accurately assesses track tie conditions in an objective manner. The software analyzes the surface of ties and identifies the size, length, and location of cracks and splits.

The images and data collected by TRT can be used to pinpoint locations that need monitoring and for capital tie programs. CN believes this system enhances operational safety.

The TRT system was installed on the CN TEST car in July 2015, and will be used to collect and assess tie condition across the CN system in 2018.

Positive Train Control (PTC)

PTC, mandated by the U.S. government, is one of the most technologically complex initiatives the railway industry has ever undertaken. It requires the construction of infrastructure, training of employees, equipping of locomotives, and the testing of new technology. CN plans to invest approximately C\$400 million in 2018 on the implementation of PTC along 3,500 route miles of its U.S. network, for a total investment of US\$1.4 billion.







Rail Bridge Safety

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 of close to 500 employees led by designated CN bridge engineers in accordance with federal regulations and CN's Bridge Management Program.

CN has started using unmanned aerial vehicles and other advanced technologies to supplement bridge inspections.

Locomotives

Fleet renewal helps CN to improve the safety and reliability of its motive power and enhance customer service, as well as reduce fuel consumption and exhaust emissions.

In 2018, CN expects to purchase 60 new GE locomotives, the first deliveries from a 3-year order of 200 new units. In the years ahead, these GE Transportation locomotives and their digital technology, such as the Trip Optimizer™ System and Distributed Power LOCOTROL®, will support and enhance our operational efficiency.

Wayside Inspection System (WIS): Hot Bearing Detectors

CN has one of the densest wayside detection technology in North America, which comprises various detectors that monitor the network for unsafe operating conditions for trains. CN has significantly increased that capability year over year. Our strength is leveraging the information from our network of detectors to proactively respond to trends.

Hot bearing detectors sense and report unsafe wheel bearing temperature levels on moving cars or locomotives. The information from the detectors is used to prevent derailments. CN scanned almost four billion car and locomotive roller bearings on its WIS network in 2017.

CN continued to improve WIS spacing to the CN standard of 12- to 15-mile intervals on core routes. As of December 2017, CN had over 900 WIS detectors on its system.

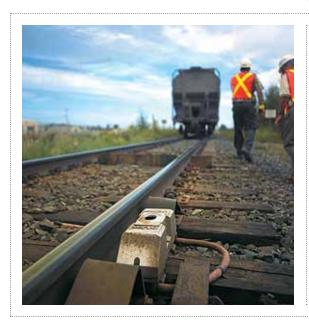
Wayside Inspection System (WIS): Hot Wheel Detectors

These detectors sense hot or warm wheels, which can create train delays and potential wheel tread damage, and reduce service life. CN uses its detector technology to be predictive of potential issues concerning wheels and bearings.

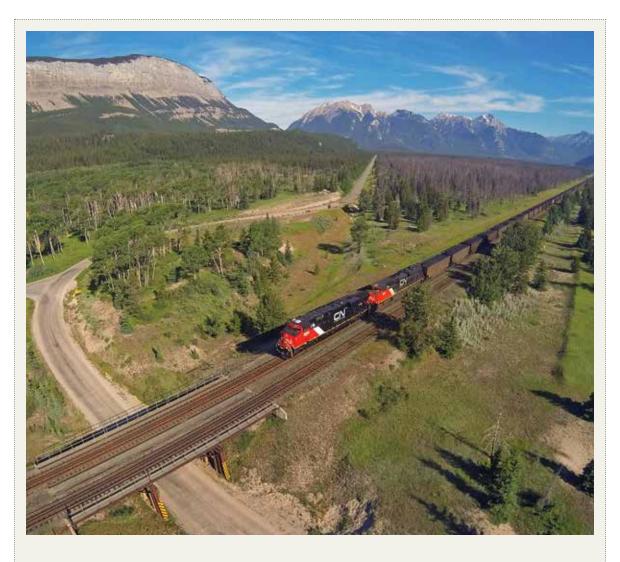
In 2017, CN added an additional eight new Hot Wheel Detectors to existing WIS locations that were not equipped with them. 13 more of these detectors will be added to WIS locations in 2018.

CN continued to be proactive in identifying and repairing cars that recorded multiple hot or warm wheel readings from its 674 hot wheel detectors.

In 2017, CN performed over 38,600 single car air brake tests. The tests enable CN to diagnose air brake problems more accurately, and to address service interruptions from stuck brakes. Employees on CN's centralized Mechanical service team carefully monitor all train activity over the detectors 24/7. They review trends of hot wheel occurrences and will initiate further train inspections based on the data.







Leveraging predictive data analytics

CN's investments in Predictive Data Analytics for our Engineering and Mechanical teams are another example of leveraging our strengths. The initiative involves using data from our industry-leading network of detectors and inspection technologies to take safety to the next level. Two programs are central to the effort:

Mechanical Analytics for Rail Safety (MARS)

This is a major initiative of our Mechanical and IT departments that integrates our existing carrelated data with Wayside Detector readings, Car Repair Billing, and service disruptions to find trends and determine pre-emptive action to prevent failures relating to railcars. The integrated database allows for more analytical research to identify areas of risk.

CN Engineering Reliability & Analytics (ERA)

An innovative initiative that helps field users visualize track conditions and better prioritize their work. The system consolidates historical repair and upgrade records, and combines that information with data from existing and new test equipment, to assist employees to understand the relative health of the track across the system.

Wheel Impact Load Detectors (WILDs)

WILDs detect wheels that have surface flat spots and other imperfections that can lead to broken components or broken rails. CN uses the information provided by WILD sites to help assess wheel replacement or maintenance needs. It may also use the data to instruct a train crew to take action, such as slowing down the train.

CN currently has 41 WILDs across the system, the densest WILD network in North America.

Truck Hunting Detectors

These detectors help CN prevent derailments, excessive rail wear and damage to truck components. In addition, they provide alerts of excessive dynamic lateral oscillation at high speed. Car owners are then required to correct any truck conditions that led to the detection.

As of December 2017, CN had a total of five Truck Hunting Detectors across its network, which work in conjunction with an existing WILD detector.



Acoustic Bearing Detector Network

To further enhance our detection of defective bearings, CN is preparing to install our first acoustic bearing detector in 2018. Acoustic bearing detectors use microphones to capture audible readings from bearings on train passes, and analyze the sound waves from these readings to identify any pending failure on wheel bearings.

These detectors are specifically focused on preventative maintenance, as the industry estimates acoustic bearing detectors can predict a bad bearing anywhere from 5,000 to 10,000 miles prior to failure. This type of identification will be beneficial in handling bearings at mechanical locations, prior to failing on the mainline. Additionally, these detectors are very accurate, with validated acoustic bearing detectors across the industry having an accuracy at or above 90% for finding condemnable defects.

Sharing Detector Data

CN currently receives WILD impact data from about 170 WILD detectors from other Class I railroads in North America through the Association of American Railroads. The information provides advance notice of when a car is interchanged on CN's system. CN also receives foreign railway data for hunting detectors and acoustic bearing detectors.

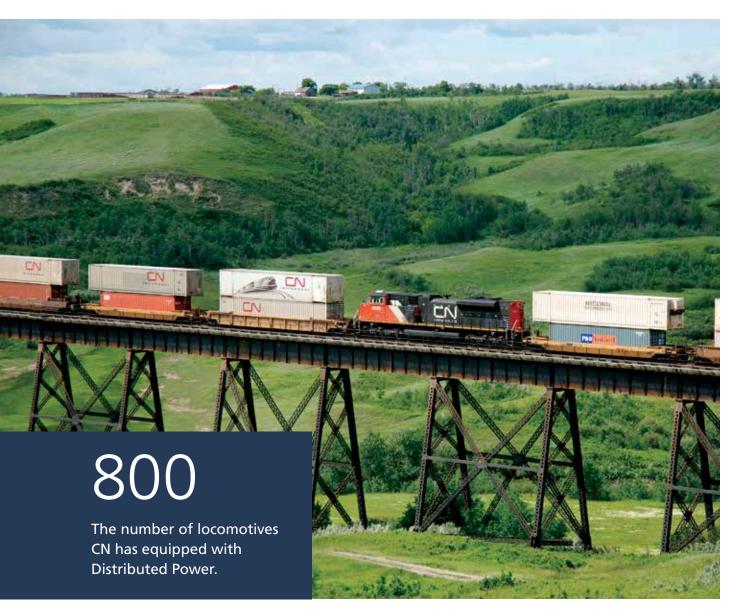
Plans are underway for the industry to share other wayside detector data in future, including information on bearings, brakes (cold and hot wheels), truck hunting, truck performance, wheel dimensions and automated vision inspection.

In 2018, CN plans to incorporate industry wayside detector data for bearings and brakes (cold and hot wheels, wheel dimensions).

Machine Vision Detection

CN has two state-of-the-art image-based video scanners that can identify inadequate coupler securement while a train passes over them at speeds of up to 65 mph (105 km/h). The deficiencies are found in real-time and an image is sent to Mechanical staff around the clock for any required action. CN Mechanical continues to work with the vendor to expand the capabilities of this new technology.

In 2018, CN will continue to fund development for Machine Vision Technology.



Distributed Power

With Distributed Power (DP), a locomotive can be placed along the length of a freight train and remotely controlled from the lead locomotive. DP technology improves braking performance, train handling and fuel efficiency. It also reduces the likelihood of sticking brakes and eventual damaged wheels.

CN continues to expand the use of the DP "Asynchronous" mode feature that allows for the

head-end and remote locomotives to be controlled independently with different throttle and/or dynamic brake settings. This form of independent train handling control provides enhanced management of in-train forces on challenging terrain.

In 2017, CN added 37 AC locomotives with DP to its fleet, bringing the total to approximately 800 locomotives equipped with DP.

Trip Optimizer

CN has made a substantial investment in Trip Optimizer technology, an energy management system that accurately regulates the speed of a train by automatically controlling locomotive throttle or dynamic brake. The system acts like an intelligent locomotive auto-pilot control system that processes real-time information on train position, terrain, train length and weight, speed limits, locomotive performance and braking ability, and continuously computes the most efficient manner to handle the train.

Beyond the environmental enhancement of reduced fuel consumption, Trip Optimizer provides consistent train handling by eliminating operator performance variability. As a result, in-train forces are managed in a predictable manner resulting in reduced likelihood of train separation or damage to customers' goods, all of which improve safety and increase CN's operational efficiency.

CN started using Trip Optimizer technology in 2010, and since then the system has evolved to incorporate several new features that have enhanced the safety of operations. As just one recent example, Trip Optimizer now also manages speed restrictions applicable to crude-by-rail "key" trains.

At the end of 2017, Trip Optimizer was operational on 510 GE locomotives.

In 2018, CN expects to purchase 60 new GE locomotives equipped with Trip Optimizer technology, the first deliveries from a 3-year order of 200 new units.





173M

The number of weather forecasts per day that are produced by the new forecasting model.



Weather watch: How detailed data is helping CN plan for extreme conditions

CN is not immune to extreme weather affecting the globe, so having precise weather forecasting information is an advantage to minimize risk to operations.

In 2017, CN hired IBM, which owns
The Weather Company, to generate extreme
temperature, fire and wind, and precipitation and
flooding information at a granular level as part of
a pilot project. Both companies worked together

to develop a visual dashboard tool allowing users to review instantaneous and short-term forecasts. The tool provides detailed territory, subdivision and mile-marker level views of local weather in real time, updated every hour. The dashboard allows CN to pinpoint areas that are likely to be affected by high and low temperatures, and plan inspections and operating restrictions, as required, to improve decision making and reduce risk.





CN invests significantly in training, coaching, recognition and employee engagement initiatives in order to strengthen our safety culture. We have taken a systematic approach to training and developing the new railroaders we hire every year. We place emphasis on continuously improving the quality of employee interactions in the field, with a focus on moving employees from a "compliance with the rules" mindset to demonstrating safe behaviour for themselves and their colleagues.

Looking Out For Each Other

Looking Out For Each Other is an integral part of CN's safety culture. It's a vital safety mindset employees are taught and encouraged to integrate into their daily practices to ensure everyone goes home safely at the end of the day.

CN initiated *Looking Out For Each Other* in 2014, with the support of its Joint Union-Management Policy Health and Safety Committee. The successful

peer-to-peer engagement strategy is designed to train employees to recognize potential at-risk work practices in the field, and teach them how to support their peers in working safely. *Looking Out For Each Other* is an integral part of the training curriculum for all new hires, and will continue to be an important aspect of CN's safety culture to help keep all our railroaders safe.











Training to instill a safety mindset

CN's two state-of-the-art training centres in Winnipeg, MB, (the CN Claude Mongeau National Training Centre) and Homewood, IL, continue to provide CN employees with hands-on and classroom training for all key railway jobs.

Employees receive training in ultra-modern indoor labs with equipment such as locomotive simulators. Outdoor labs are equipped with dedicated rolling stock, track and wayside equipment, as well as field training equipment. Experienced mentors deliver a robust curriculum.

Customer courses help develop a safety mindset

In an effort to align our customers' safety philosophy with ours, CN also welcomes customers to both the Winnipeg and Homewood campuses to participate in a set of free safety-focused classes. Targeting companies who have their own track facilities, the courses cover

track, rail safety and the requirements of safe switching operations. Participants in the Customer Partnership program gain hands-on experience with state-of-the-art training equipment, combined with theoretical classroom training.



Strengthening safety with Fatigue Management

Running a railroad 24/7 is necessary to keep the North American economy moving. Managing fatigue for employees working shifts in such an environment is critically important to safety.

Since 2017, CN and the Teamsters Canada Rail Conference (TCRC) have been working together on an innovative pilot program in Western Canada to address fatigue for train operations employees whose assignments make it challenging to follow a strict schedule. The joint union-management task force designed daily call windows in which Conductors could be expected

to be called to work, as well as a scheduling model providing a 3-month view of their shifts.

Employees were also invited to volunteer for a study to determine the effect scheduling has on improving fatigue by wearing a Readiband, a specialized motion tracking device worn on the wrist to track their sleep patterns. Thirty-nine employees in Vancouver, Prince George and Smithers B.C., as well as in Winnipeg, MB, wore Readibands continuously for 2-3 weeks both before and after scheduling, on duty and off. An independent Fatigue Management specialist will analyze the results before making recommendations to the task force.



Health and Safety Committees

CN has 103 joint union-management committees across the system that are empowered to improve local safety culture and engage the entire workforce in safety initiatives. The Committees review

safety issues or incidents at a local level to better understand trends, connect with employees in the field to find out what the issues are, and get ideas on where to improve.





Safety Summits

These sessions are an opportunity to engage employees in strengthening safety and culture. Summits promote effective two-way communications and the sharing of best safety practices. Of particular importance is the opportunity to listen to employees about their ideas and challenges that can be addressed jointly. Local management led 60 summits in 2017.

Safety Culture Summit a forum for best practices

CN was a major sponsor of the second international Safety Culture Summit held last fall in Halifax, Nova Scotia. More than 300 delegates from academia, government, regulators, unions, railroads and private and public companies came together to exchange ideas and best practices to advance safety culture.

The summit was designed by experts from CN, Saint-Mary's University and the American

Petroleum Institute to meet the needs of managers in safety-critical organizations. The summit featured presentations from senior leaders of organizations with world-class safety performance with opportunities for interactive discussions.

These gatherings are considered to help strengthen safety culture for North American industries.



- Mitch Beekman, CN Vice-President
 Safety and Environment, speaks
 about CN's safety culture experience.
- Keynote speaker Captain Richard Phillips retells his story of harrowing adventure fending off pirates on the high seas, which was the basis of a popular Hollywood movie.
- Denis Hoziel, CN Senior Manager, Training, demonstrates the CN locomotive simulator for conference participants.







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1-800-465-9239

For more information on CN's technology investments, consult The CN Safety Technology Overview, at: www.cn.ca/reports

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Printed in Canada.













