Overview of BNSF’s Approach to Grade Crossing Safety

Highway-railroad grade crossing safety is an integral part of BNSF’s operation and culture and involves the daily cooperative efforts of many employees. Because oncoming trains cannot stop for vehicles whose drivers violate motor vehicle laws when approaching railroad tracks, each grade crossing presents possible danger to motorists and train crews. Recognizing this potential hazard, BNSF is committed to grade crossing safety on many fronts, including the following:

- Community education, land use planning and awareness campaigns
- Train crew education and field operations testing to monitor rules compliance
- Grade crossing closures and consolidations
- Researching new crossing safety technology
- Vegetation control
- Implementing measures to reduce trespassing
- Signage compliance
- Coordination with long term capital expansion plans
- Working with state and local officials on installation of warning devices
- Track, surface and signal inspection and maintenance

BNSF has one of the lowest highway-railroad grade crossing collision rates in the rail industry and, as an industry leader, will continue to work with the states and the communities we serve to further improve grade crossing safety.
General Information

- The United States has about **212,000 highway-railroad grade crossings**, including just over 25,500 across BNSF’s approximately 32,500 route-mile network.

- BNSF’s highway-railroad grade crossings include approximately **17,000 public and 8,400 private at-grade crossings**. In addition, BNSF has more than **4,400 grade separations**.

- BNSF has one of the lowest highway-railroad grade crossing collision rates in the rail industry. Since BNSF’s merger in 1995, the rate of grade crossing collisions has **declined 70 percent** – from 5.3 per million train miles in 1995 to a rate of 1.56 in 2018.

- In 2017, 70 percent of the grade crossing collisions on BNSF occurred at crossings with active warning devices (flashing lights and/or automatic gates), prompting BNSF and public agencies to look deeper into crossing safety and develop innovative solutions to reduce incidents.

- For the past several years, **BNSF has spent an average of approximately $141 million annually** on programs related to grade-crossing safety. BNSF expenditures include 20 total full-time employees in charge of crossing safety efforts plus various staff for crossing/signal maintenance and vegetation control. The amount spent on grade-crossing safety includes an annual average of approximately $18 million to maintain grade-crossing road surfaces.

Federal/Railroad Grade Crossing Safety Program

**Federal and state processes for upgrading crossing signals:** Each state (and local road authority when applicable) determines the location and type(s) of rail-highway grade-crossing signals to be installed, with possible funding under a federal program. Crossing signals are to regulate drivers and are within the jurisdiction of road authorities. Therefore, they are defined by the Federal Highway Administration as traffic control devices, not railroad signals.

Each state receives an allocation of federal safety funds called Section 130 funding and develops a priority list of crossings each year for grade-crossing improvements. Each state creates its own formula to generate this list, which is believed to typically includes elements such as train speed, train volume, average daily traffic, and accident history.

Once a state determines which crossings are to be considered for modification, it contacts the railroad and, often, local officials as well, to begin the “diagnostic” process of evaluating the crossings. Then, the state decides the type and amount of signal protection for each crossing. The railroad designs the circuitry for each crossing and estimates the cost. Once the state reviews and approves the estimate, the state signs an agreement with the railroad to install the specified signals. BNSF participated in more than 200 diagnostic meetings in 2018.

Federal funds typically pay 90 percent of the cost of a signal installation and another party is required to cover the other 10 percent, which can fall to either the state, local government jurisdiction, or railroad. **The railroad maintains the signals once they have been installed.** These maintenance costs usually equal the cost of the initial installation in about 10 years. **The railroad cannot, on its own, decide to install crossing signals at public crossings.** Installation of traffic control devices must be done under the above procedures.

Traffic signals are often interconnected with the railroad crossing signal system. The road authority is responsible for the traffic signals and their portion of the interconnection system. There are 554 interconnected crossings on the BNSF system.
FRA Locomotive Horn Rule: Locomotive horns assist in alerting drivers to the presence of trains. In 2005, in response to a Congressional mandate, the Federal Railroad Administration (FRA) issued a Final Rule on the Use of Locomotive Horns at Highway-Rail Grade Crossings. See the rule here: https://www.fra.dot.gov/Page/P0889. Under this rule, local governments may establish quiet zones or continue existing quiet zones if they are willing to take remedial steps to address risk based on a calculation of potential risk at the crossing. In many cases, the rule makes these designations subject to FRA review, approval and ongoing oversight.

These remedial steps can include crossing closure, grade separation, full-width crossing gates with an approved median divider, full-width gates and lights at crossings on a one-way street, temporary closure (for nighttime quiet zones only) or four quadrant gates. The rule also allows for an automated horn system at the crossing as a substitute for the train horn called a Wayside Horn, if this provision is approved by the Federal Highway Administration. Certain Alternative Safety Measures (ASMs) are also described in the rule.

BNSF works with communities who wish to establish quiet zones and regularly reviews their quiet zone applications to the FRA. BNSF has 171 active quiet zones across the system. Community leaders who have questions about the proposed rule or about BNSF’s role in implementing that rule should contact Mr. French Thompson, Director, Public Projects, at French.Thompson@bnsf.com.

Community Education/Law Enforcement/Awareness

**Operation Lifesaver Program:** This program targets the highest risk populations: new drivers, senior drivers and professional drivers. More than 5,800 rail safety education courses were conducted with drivers as well as 409 professional driver presentations and 316 school bus driver presentations.

For additional information, refer to the Operation Lifesaver website at https://oli.org/

**Grade Crossing Collision Investigation:** These are courses ranging from four to 16 hours offered as standard training at law enforcement academies. This program has been endorsed and certified by the International Association of Police Chiefs through OL and is now the standard for training nationwide.

**Train crew education and operations testing:** BNSF train crew employees receive extensive hands-on, performance-based training that covers safety and operating rules, air brake and train handling rules, and practice on locomotive simulators. This training, provided to newly hired employees as well as more seasoned employees as part of BNSF’s recertification program, includes skills essential to grade crossing safety, such as a review of train whistle procedures and proper train speeds. This training is reinforced by frequent operations testing, as BNSF supervisors regularly monitor train operations to ensure all safety and operating rules are consistently followed.
Grade-crossing consolidation: One of the best ways to address grade crossing safety is to reduce the number of at-grade crossings. BNSF’s grade crossing safety program includes an aggressive initiative to close public and private at-grade crossings, working closely with communities and property owners. Good candidates for closure include those that are redundant (other crossings nearby allow access to the same roads or areas), are not designated emergency routes, have low traffic volumes, or are private crossings that are no longer needed or used. Since 2000, BNSF has closed more than 6,400 at-grade crossings.

Private crossing permits review: In 2017, about 14 percent of BNSF’s grade crossing collisions occurred at private crossings. In response, BNSF is working to reduce the number of private grade crossings, especially those that are rarely used or redundant, and closely scrutinizes all requests for new private crossings. During 2018, there were 218 requests for private crossing permits, and only 4 new crossings were installed.

Officer on the Train (OOT): This program gives local law enforcement the opportunity to observe motorist and pedestrian behavior from the cab of a locomotive or from the ground at a grade crossing in coordination with a BNSF train, to learn about grade crossing safety laws and get a sampling of compliance levels. Traffic citations or warnings are often issued as part of OOT exercises.

In addition, BNSF participated in 596 positive enforcement efforts at crossings in 2018. This program places law enforcement officers near crossings to watch driver behavior. Motorists who obey grade crossing laws are stopped and thanked for their safe driving and rewarded with a small token of appreciation. BNSF also participated in 1,033 trespass enforcement blitzes to inform trespassers about the dangers of trespassing on railroad right-of-way.
Track and Signal Inspection and Maintenance

Track inspection programs: Key corridors on BNSF are inspected four or more times per week by BNSF track inspectors, and many heavily-traveled routes are inspected daily. These inspections include a review of track conditions and right-of-way as well as surface, whistle posts, crossbuck signs and active warning devices. In addition, BNSF train crews are instructed to report any signal and crossing warning malfunctions immediately to BNSF’s Network Operations Center in Fort Worth. This program includes “power-on” lights at active warning devices that indicate a working power supply to the lights and gates.

Grade crossing warning inspection and maintenance: BNSF is responsible for maintenance of active warning devices and spends an average of $82 million annually on grade crossing signal maintenance and repair. Each of the active warning devices is thoroughly inspected monthly by BNSF signal employees. This inspection includes a review of functionality of gates and lights and of battery back-up power sources.

Vegetation Control

Vegetation treatment and brush control: As much as practical, BNSF’s goal is to follow all applicable laws in reducing vegetation on its right-of-way that would materially interfere with motorists’ ability to see approaching train traffic. In 2018, BNSF treated more than 42,800 acres along its right-of-way with herbicides to prevent growth of new vegetation at railroad crossings.

Crossing Safety Technology and Management Processes

Crossing surveillance systems: BNSF cooperated with various cities across the system to test surveillance systems that digitally record drivers who violate highway-rail grade crossing laws. Drivers receive correspondence advising them that they were observed behaving unsafely.

1-800 number signs: BNSF has posted an emergency contact number at all public grade crossings for the public’s use in contacting BNSF’s 24-hour Resource Operations Center with concerns regarding crossings or related questions (800-832-5452). These signs allow motorists or anyone who becomes stalled or in any way obstructs railroad tracks to call a number.
and simply provide the information on the sign. This information includes the Department of Transportation (DOT) identification number that pinpoints their location for BNSF’s dispatching center and allows us to warn or stop trains in the affected area.

**Other technologies:** BNSF continues to investigate emerging technologies that enter the marketplace related to highway-rail grade crossing safety. Examples are four quadrant gates, extended cantilever arms, median barriers, barrier gates, wireless crossings, stationary horns and instantaneous reporting of active warning device failures via cellular technology. BNSF works with its federal, state and local partners to investigate the appropriateness of new and emerging traffic control technologies.

![Image of grade crossing warning sign](image)

**Operations Monitoring Programs**

**Reports of unsafe motorists/trespassers:** As part of BNSF’s unsafe motorist and trespasser program, train crews and other field employees submitted more than 547 reports in 2017 of trespassers or drivers who violated grade crossing safety laws. The information is provided to state highway department personnel for consideration in preparing their grade crossing priority index to determine the possible need for traffic control devices, as part of the Federal Highway-Rail Grade Crossing and Trespasser Prevention Program. BNSF also uses this data to identify problem areas, respond with educational training and seek assistance from local law enforcement authorities.