# Oregon Highway-Railroad Crossing Safety Action Plan

## 2019

Oregon Department of Transportation

Copies of the Oregon State Highway-Railroad Crossing Safety Action Plan and supporting materials can be found at the project website: *https://www.oregon.gov/ODOT/RPTD/Pages/Safety.aspx*

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This document has been submitted to the Federal Railroad Administration for review and approval.

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# Acknowledgments

The Oregon Department of Transportation would like to thank the Stakeholder Committee for their commitment and input throughout the development of this Plan. Please see Appendix A for a listing of the stakeholder committee members.

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# Acronyms

| | |
|---|---|
| **AADT** | Average Annual Daily Traffic |
| **BNSF** | BNSF Railway Company |
| **CAR** | Crash Analysis and Reporting Unit |
| **CAV** | Connected and Autonomous Vehicles |
| **CDL** | Commercial Driver's License |
| **CDS** | Crash Data System |
| **CFR** | Code of Federal Regulations |
| **DMV** | Driver and Motor Vehicle Services |
| **FHWA** | Federal Highway Administration |
| **EMS** | Emergency Medical Services |
| **FARS** | Fatality Analysis Reporting System |
| **FAST** | Fixing America's Surface Transportation Act |
| **FRA** | Federal Railroad Administration |
| **GIS** | Geographic Information Systems |
| **GCPA** | Grade Crossing Protection Account |
| **HSIP** | Highway Safety Improvement Plan |
| **HSR** | High Speed Route |
| **KPM** | Key Performance Measure |
| **MHRR** | Mount Hood Railroad |
| **mph** | Miles Per Hour |
| **MUTCD** | Manual on Uniform Traffic Control Devices |
| **NEPA** | National Environmental Protection Act |
| **OAR** | Oregon Administrative Rule |
| **OFP** | Oregon Freight Plan |
| **OHP** | Oregon Highway Plan |
| **ODOT** | Oregon Department of Transportation |
| **ORS** | Oregon Revised Statute |
| **OSP** | Oregon State Police |
| **OSRP** | Oregon State Rail Plan |
| **OTC** | Oregon Transportation Commission |
| **OTOP** | Oregon Transportation Options Plan |
| **OTP** | Oregon Transportation Plan |
| **PNWR** | Portland & Western Railroad |
| **RAC** | Rail Advisory Committee |
| **RCSS** | Rail Crossing Safety System |
| **ROW** | Right-of-Way |
| **RPTD** | ODOT Rail and Public Transit Division |
| **STB** | Surface Transportation Board |
| **STIP** | State Transportation Improvement Program |
| **T2** | Technology Transfer Center |
| **TDD** | ODOT Transportation Development Division |
| **TPAU** | Transportation Planning and Analysis Unit |
| **TSAP** | Transportation Safety Action Plan |
| **TPOD** | Transportation Planning Online Database |
| **TSD** | ODOT Transportation Safety Division |
| **TSP** | Transportation System Plan |
| **UPRR** | Union Pacific Railroad |
| **USC** | United States Code |
| **USDOT** | United States Department of Transportation |
| **VMT** | Vehicle Miles Traveled |
| **WES** | Westside Express Service |
| **WPRR** | Willamette & Pacific Railroad |

# Executive Summary

Oregon's transportation system is a multimodal and seamless network of roads, trails, sidewalks, bicycle lanes, waterways and railroads. Millions of travelers and Oregon's economy depend on the system each day. Connections and intersections bring different modes together but also create exposure to potentially risky interactions.

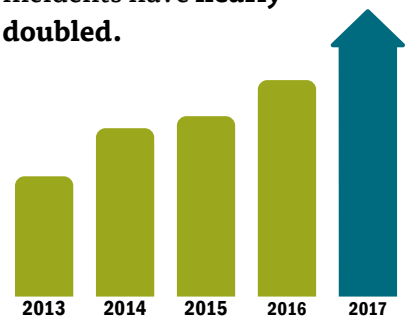
To improve safety and maintain an efficient system, the Oregon Department of Transportation (ODOT) relies on a series of policy and implementation plans to make the most strategic and informed decisions possible. The Highway-Railroad Crossing Safety Action Plan (Plan) supports ODOT's mission, refining the vision and goals of the Oregon Transportation Plan and the related modal and topic plans with a series of crossing safety action items. Equally, the Plan supports ODOT's safety goal of zero fatalities or life changing injuries on the transportation system.

The Plan is a cohesive set of strategies for a comprehensive approach to improving railroad crossing safety in Oregon. It provides a framework for all crossing safety efforts rather than prescribing specific solutions at individual crossings. The Plan recognizes Oregon's unique challenges, and through careful consideration of all travelers at crossings, highlights opportunities to improve crossing and overall transportation safety. Based on an investigation of best practices from within and outside of Oregon combined with extensive stakeholder input, the Plan urges innovative and unified approaches to crossing safety.

The Plan is foundationally a data based plan, and offers ODOT Rail and Public Transit Division (RPTD) the ability to respond to changing railroad crossing safety needs effectively. Outlined are a series of strategies for a multifaceted approach to improving crossing safety by means of engineering, education, enforcement, outreach, training, process improvements and identifying funding needs. No one strategy is more important than others, but together provide a comprehensive approach to improving crossing safety.

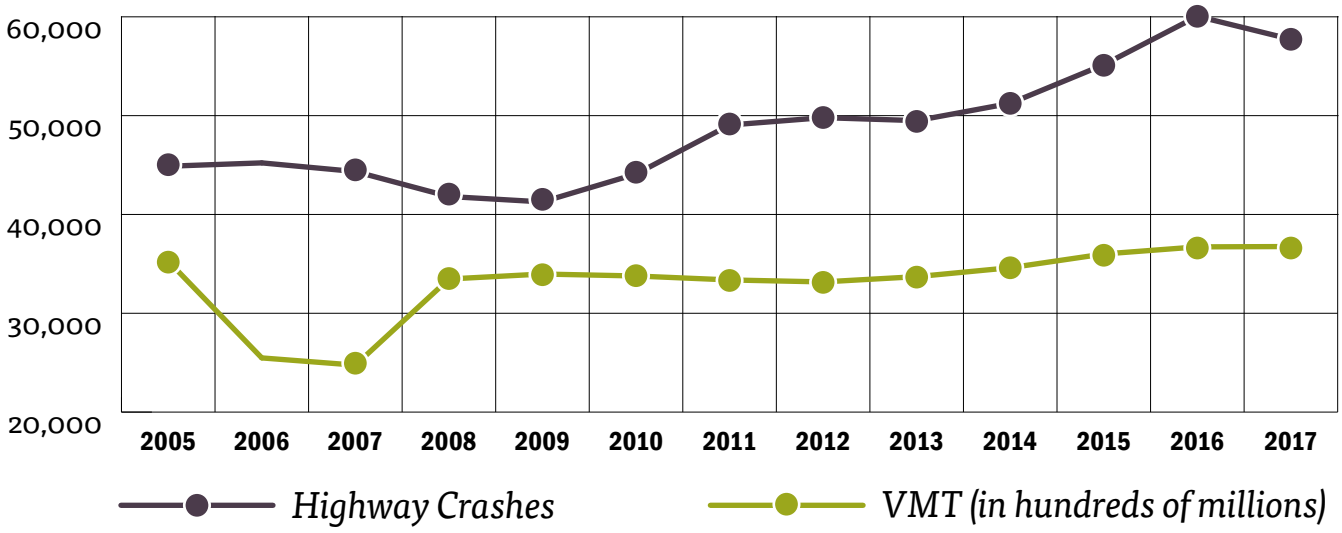
*Oregon Railroad Crossing Incidents*

Between 2013 and 2017, the number of Oregon railroad crossing incidents have **nearly doubled.**

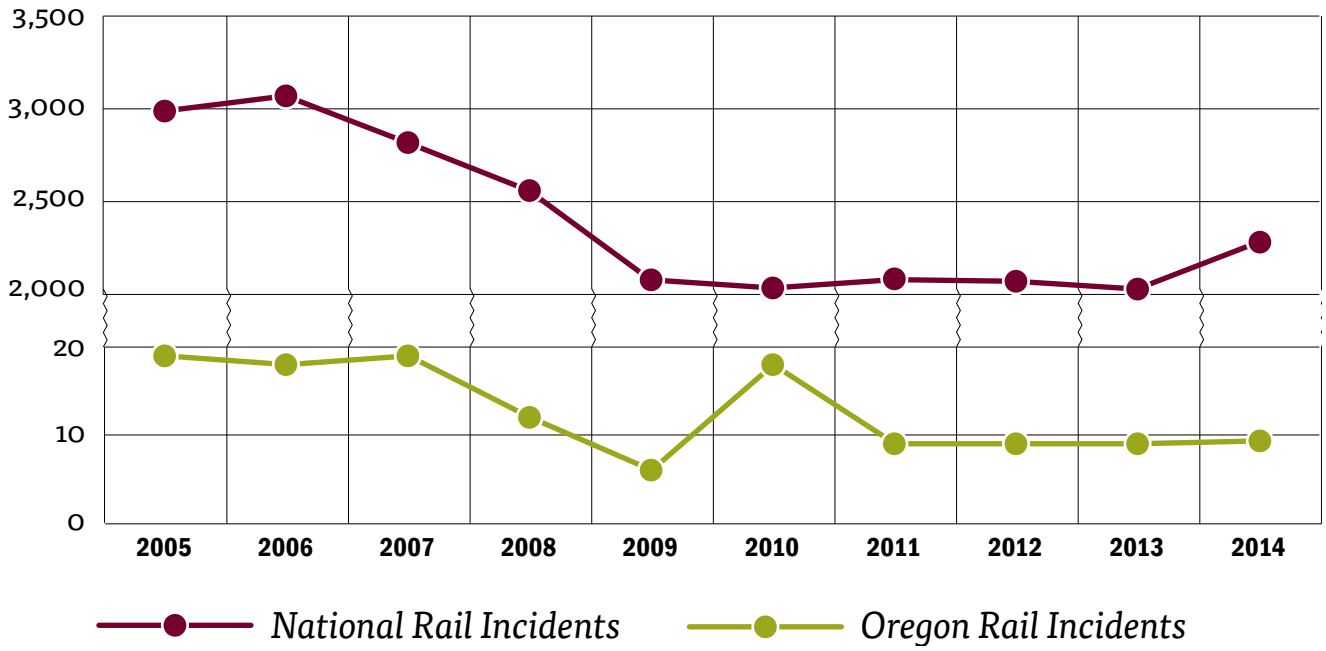


RPTD administers regulatory authority for railroad crossings; however, less than 10% of public railroad crossings are on the ODOT highway system. Consequently, RPTD relies on a network of strong partnerships with local road authorities, railroads and other agencies to address safety improvements. The Plan is fundamentally about collaboration between RPTD and its partners. It calls RPTD to lead the effort for improved railroad crossing safety in Oregon.

## Highway Crashes vs. Vehicle Miles Traveled: 2005-2017




## National Rail vs. Oregon Rail Incidents: 2005-2014



# Introduction

## The Need for a Highway-Railroad Crossing Safety Action Plan

In 2015, Oregon surpassed four million residents; anticipated growth is projected to push the population over 5 million residents by 2040. In line with a nationwide trend, Oregonians increased their usage of the road system and traveled nearly 37 billion miles in 2017, part of a rising five year trend. As Oregon's population and economy continue to grow, the number of passenger and commercial vehicles, bicycles and pedestrians crossing the railroad system at over 1,800 public at-grade railroad crossings grows as well, creating more potential opportunities for railroad crossing incidents.

The Oregon Department of Transportation (ODOT) is the state agency responsible for the development, maintenance and operation of the surface transportation system, including a vast network of roadways, sidewalks and multi-use pathways. ODOT is the regulatory body for transportation related rules and is also responsible for driver licensing and training. In close partnership with other state and local agencies, ODOT is committed to its mission to:

*Provide a safe and reliable multimodal transportation system that connects people and helps Oregon's communities and economy thrive.*

To meet this mission, ODOT has established a series of topic and modal plans to provide a policy and investment framework and provide guidance for investment decisions. The Highway-Railroad Crossing Safety Action Plan is a supporting component of these plans. It provides explicit guidance to improve railroad crossing safety to support ODOT's mission of a safe and efficient transportation network, but is not a policy plan. Rather, it is an action plan to help ODOT achieve greater railroad crossing safety.

The Highway-Railroad Crossing Safety Action Plan, hereinafter the Plan, provides a framework for ODOT, through its Rail and Public Transit Division (RPTD) and other divisions, to be a leader in

*About every three hours, a person is hit by a train in the United States. In 2016, 232 people died in railroad crossing incidents. These incidents are preventable.*[1]

1 https://www.nhtsa.gov/press-releases/dot-launches-new-railroad-crossing-safety-ad-campaign

*Railroad crossing safety impacts everyone: blocked crossings, incidents and congestion result in increased costs that are passed onto everyone.*

improving railroad crossing safety in Oregon in the face of these growing demands on the transportation system. The Plan is the culmination of extensive incident analysis, crossing safety research, project development assessment and stakeholder discussion. It outlines a strategic approach for reducing railroad crossing incidents throughout the state. While the Plan's focus is on public at-grade railroad crossings, transportation system safety is the overall focus and goes beyond railroad crossings. An at-grade crossing refers to a crossing where a railroad intersects at the same level with another mode of travel. Hereinafter, references to "crossing" or "crossings" refer to public highway-rail at-grade crossings. Highway-rail at-grade crossings include pedestrian and bicycle crossings, even when they are not part of a highway or roadway system. The Plan does not address light rail or private crossings.

The transportation system is an intermodal network supported by multimodal connections and interactions. The Plan recognizes the challenges of this complex system and provides a cohesive and consistent approach to crossing safety. Through careful consideration of all travelers at crossings, the Plan acknowledges these challenges and highlights opportunities to improve crossing and overall transportation safety.

# Call and Need for Plan

## Meeting Federal Requirements

The Fixing America's Surface Transportation Act (FAST Act) of 2015, Section 11401 established a requirement for all states to develop a state action plan for at-grade railroad highway crossings. Following the passage of the FAST Act, the Federal Railroad Administration (FRA) issued guidance and a series of requirements for the development of state action plans. Each state plan shall:

(A) Identify highway-rail at-grade crossings that have experienced recent highway-rail crossing accidents or incidents or multiple highway-rail at-grade crossing accidents or incidents, or are high-risk for accidents or incidents;

(B) Identify specific strategies for improving safety at highway-rail at-grade crossings, including highway-rail at-grade crossing closure or grade separations; and

(C) Cover a five-year time period.

The Plan is Oregon's federally required state action plan. It goes beyond minimum Plan requirements to establish a comprehensive framework to crossing safety. The Plan is short-term (five year) with long-term implications and initiatives. It stresses the importance of connections across units, agencies and stakeholder groups to improve crossing safety in Oregon.

## Highway-Railroad Crossing Safety Action Plan Purpose

Railroad crossing safety impacts all Oregonians. Oregon's cities and communities have developed alongside and around the extensive railroad network. This network is part of an international transportation framework that supports Oregon's strong and diverse economy. As Oregon continues to grow in population, Oregonians will travel on the system more. Economic growth can also impact railroad network usage, increasing the exposure at Oregon's at-grade railroad crossings as demand on the system intensifies.

Crossing safety improvement efforts occur across the state. ODOT's Rail Section oversees rail safety on Oregon's transportation system. The Rail Section is a unit of the larger RPTD. Within ODOT, RPTD is responsible for selecting crossing warning devices and obligating federal Section 130 crossing safety funds. ODOT's Driver and Motor Vehicle Services (DMV) is the primary unit for driver license testing and license administration. DMV is responsible for overseeing driver training schools and is supported in driver training by the Transportation Safety Division (TSD) which manages teen driver and motorcycle training programs with grant funds. TSD is also responsible for applying funding resources to programs that modify traveler behavior to eliminate fatalities and serious injuries on Oregon's roadways. Each of these efforts occur in separate programs within ODOT. The Plan seeks to bring all of these efforts together for ODOT to achieve its mission of improved safety at crossings in Oregon.

The Plan provides a framework of short and long-term strategies targeted to improving safety at and near Oregon's crossings and supports ODOT's safety goal as stated in the 2016 Transportation Safety Action Plan (TSAP) of zero fatalities or life-changing injuries on the transportation system by 2035. This Plan serves as a pivotal connection between ODOT's Transportation Safety Action Plan, Oregon Highway Plan (OHP) and Oregon State Rail Plan (OSRP). The Plan addresses all modes of travel at crossings and will be implemented by ODOT as well as local road authorities, railroads and other stakeholders.

*Plan purpose: provide a framework of short- and long-term strategies for improving safety at and near Oregon's public, at-grade railroad crossings and support ODOT's safety goal of zero fatalities or life-changing injuries on the transportation system by 2035.*

*Over the next 25 years, Oregon's population is expected to increase by nearly 30%*


Total population 2018 Total population 2050

*Source: State of Oregon Office of Economic Analysis*

## Plan Development Process

The Plan is Oregon's first Highway-Railroad Crossing Safety Action Plan and is a partnership between two ODOT divisions: RPTD and Transportation Development Division (TDD). The Plan development process began with extensive analysis of historical crossing incident data. Although "crash" is a widely used term in the transportation sector to refer to collisions or accidents, for the purposes of the Plan, the term "incident" refers to any impact between a highway user and a train or railroad maintenance of way equipment associated with a crossing.

The data analysis is supplemented by review of other state's efforts as well as research around crossing safety best practices. The Plan built on extensive engagement with ODOT units, outside partners and agencies.

A stakeholder committee of transportation experts and railroad crossing safety practitioners was established early in the Plan development process. This group convened for two extended work sessions to discuss and prioritize factors contributing to crossing incidents, advance Plan objectives, assess current crossing project development processes, develop Plan strategies and provide input on funding prioritization process improvements. Appendix A includes a full list of stakeholder committee members.

Additionally, various ODOT program areas were engaged through the Plan development process, contributing valuable insight to issue analysis, process improvements and other critical issues. Units engaged included:

- TSD
- Transportation Data Section
- DMV
- Research
- Traffic Safety
- Active Transportation
- Communications and Public Relations

The following stakeholders provided additional input and information:

- Oregon Operation Lifesaver
- Illinois Department of Transportation
- Iowa Department of Transportation
- Seattle Department of Transportation
- Washington State Department of Transportation

ODOT utilized its extensive network of leadership teams and stakeholder groups as part of the Plan process. The following groups provided specific and timely input to the Plan:

- Planning Business Leadership Team (PBLT)
- Scope and Selection Leadership Team (SSLT)
- Oregon Rail Advisory Committee (RAC)

The partnerships developed in the Plan process will serve as a critical foundation to strategic and systematic Plan implementation. The Plan is intended to be short-term; it will be continuously improved and updated every five years by RPTD.

## Plan Framework

An assessment of issues and opportunities impacting crossing safety served as the basis for Plan objectives. This assessment was supported by extensive data analysis of previous crossing incidents, consideration of national and state trends, connections to other state transportation plans and broad outreach to public and private stakeholders. Plan objectives provide direction toward specific results. Objectives are supported with strategies to provide more specific direction.

The Plan outlines a series of strategies and related actions which address various crossing safety issues at Oregon's at-grade railroad crossings. The implementation of these strategies impact

more than just railroad crossings; it affects the entire transportation system and the ability to provide safe connections within and between communities. The success of this Plan relies on a consistent and continuous commitment to implementation with ODOT leading this effort.

## Plan strategies fall into two categories:

1. Addressing traveler behavior.

2. Improving ODOT coordination and collaboration.

Within each category, ODOT and stakeholders identified specific focus areas to organize the Plan strategies, as shown below::

### Addressing Traveler Behavior

- Education
- Enforcement
- Engineering
- Multimodal Users
- Multiple-Incident Locations

### Improving ODOT Coordination and Collaboration

- Coordination
- Data Collection
- Funding
- Training & Outreach

Each strategy is accompanied by specific action items to implement the Plan.

The Plan encourages ODOT to consider transportation and coordination best practices and tailor them to Oregon's context and need. It recognizes the intermodal nature of crossings as well as the important role each stakeholder plays in crossing safety. To address the complexity of crossing safety, the Plan is comprehensive. Strategies and actions provide a multifaceted approach to addressing numerous key issues defined throughout the Plan development process.

# SPOTLIGHT ON:

## *Coordination and Collaboration*

**Oregon ODOT / City of Salem / UPRR**

### *Salem Walkway Promenade*

Between November of 1993 and May of 2002, 22 train/pedestrian incidents occurred within a short railroad corridor in Salem that parallels 12th St., resulting in 18 fatalities and 4 injuries. Six of the incidents involved pedestrians being struck by a train at the public crossings, while the other 16 incidents involved pedestrians navigating the tracks at locations other than at crossings, illegally trespassing across railroad property.

This high number of incidents prompted ODOT RPTD to put together a coalition of stakeholders to help determine ways to address the issues. The stakeholders included the UPRR, Federal, State, and City agencies, local school districts and Universities, Oregon Operation Lifesaver, and local businesses. The issue was initially misidentified as a "railroad problem", but through the research of the stakeholders, was eventually determined to be a multi-modal access issue. The selected solution was the development of a pedestrian promenade (10 foot wide pathway) along the east side of the UPRR rail line, with a 52 inch high fence between the promenade and the tracks. The promenade and fence reduce the potential for trespassing, essentially channelizing pedestrians to the legal crossings. The design of the promenade is aesthetically pleasing and provides amenities that enhance the appearance of the local community.

The coalition was able to gather funding from eight of the stakeholders (FHWA, Oregon Department of Administrative Services, ODOT Highway division, ODOT RPTD, City of Salem, Oregon National Guard, Salem-Keizer School District, and Safeway), providing $3.1 million to design and construct the project. The project was completed in 2006, and extends from the Amtrak station at the southern end, and crossing a new pedestrian bridge over Mill Creek at the north end, which provides improved access to the downtown area for the students of the nearby middle and high schools located north of the bridge.

The pedestrian promenade through this corridor channelizes pedestrians to cross the tracks at the designated public crossings, and has eliminated instances of pedestrian trespass across the tracks between these crossings. In 2013, the city of Salem completed additional enhancements through this corridor, in response to establishing this as FRA Quiet Zone.

# Connections to Other State Transportation Plans

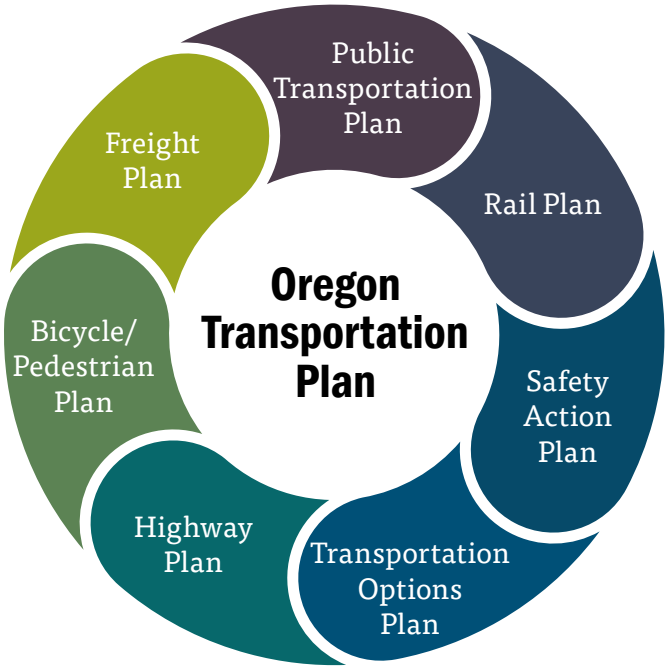
## Policy Framework

### Oregon Transportation Plan

Oregon's statewide transportation policies, programs and investments are guided by the Oregon Transportation Plan (OTP). The OTP has a 25 year planning horizon and provides a framework of multimodal goals, policies and investment decision-making. It is supported by a series of modal and topic plans. The overarching goal of the OTP is:

*A safe, efficient and sustainable transportation system that enhances Oregon's quality of life and economic vitality.*

Modal and topic plans support the OTP with refined policy, system information and specific implementation priorities to address the particular needs of a specific mode or topic. These plans refine and apply OTP policy, guiding state, regional and local investment decisions for parts of the transportation system they address.




### Oregon Highway Plan

The Oregon Highway Plan is an element of the OTP and the primary plan for the State Highway System. The OHP establishes long-range policies and investment strategies which serve as a decision-making framework for the highway network. It recognizes the multimodal nature of the transportation system and outlines a series of strategies for the efficient management of a safe highway system that is supported by transportation connections and links to land use. The OHP specifically recognizes competing interests for land and the need for efficiency with a series of strategies pertaining to railroad crossings. It emphasizes the importance of crossing closures in conflict reduction as well as the importance of partnerships between public and private entities for crossing safety.

## Oregon State Rail Plan

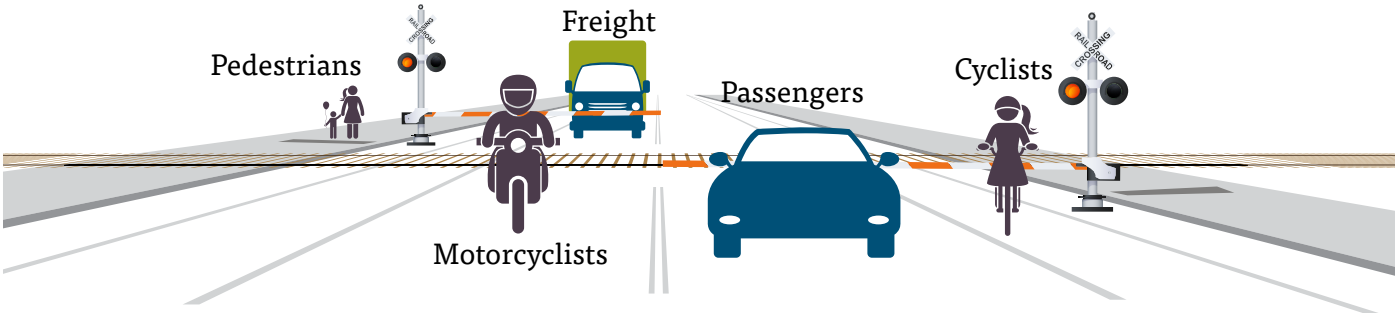
The Oregon State Rail Plan provides policy guidance for the Highway-Railroad Crossing Safety Action Plan. The OSRP addresses OTP guidance and provides expanded modal policy, goals and strategies to achieve the OSRP vision:

*Oregon will have a safe, efficient, and commercially viable rail system that serves its businesses, travelers and communities through private resources leveraged, as needed, by strategic public investments.*

The OSRP's seven goals are:

- **Goal 1 - Partnership, Collaboration and Communication.** Partner, collaborate and communicate with rail system operators and other stakeholders to maximize benefits, align interests, remove barriers and bring innovative solutions to the rail system; and foster public understanding of rail's importance.
- **Goal 2 - Connected System.** Promote, preserve and enhance an efficient rail system that is accessible and integrated with Oregon's overall multimodal transportation system.
- **Goal 3 - System Investments and Preservation.** Enhance transportation system reliability, capacity, frequency and travel times through investments that preserve and improve freight and passenger rail assets and infrastructure.
- **Goal 4 - Funding, Finance and Investment Principles.** Establish funding that meets the critical needs of the rail system in Oregon and achieve the objectives of this State Rail Plan.
- **Goal 5 - System Safety.** Plan, construct, operate, maintain and coordinate the rail system in Oregon with safety and security for all users and communities as a top priority.
- **Goal 6 - Preserving and Enhancing Quality of Life.** Increase use and investment in freight and passenger rail systems to conserve and improve Oregon's environment and community cohesion.
- **Goal 7 - Economic Development.** Increase opportunity and investment in freight and passenger rail assets to grow Oregon's economy.

The Plan is a supporting element of the OSRP and primarily works to achieve Goals 1 (Partnership, Collaboration and Communication), Goal 2 (Connected System), Goal 5 (System Safety) and Goal 6 (Preserving and Enhancing Quality of Life).




Oregon's transportation system serves the needs of multiple users.

## Transportation Safety Action Plan

Topic plans support the OTP with policies, needs and implementation priorities for a topic area that often entails more than one mode. Examples include the Oregon Freight Plan (OFP), Oregon Transportation Options Plan (OTOP) and Transportation Safety Action Plan , Oregon's strategic highway safety plan.

Crossing improvements are intended to improve the safety of the traveling public and are just one component of the Plan. The Plan outlines a series of strategies that go beyond crossing improvements with a multipronged approach that is foundationally safety oriented. Strategy areas include the 3 Es: engineering, education and enforcement. In addition, there is an expanded set of focus areas that provide broader emphasis including: multimodal users, improved outreach, improved training, stakeholder coordination and funding prioritization enhancement.

The Plan unites the OSRP railroad system goals with the safety goals outlined in the TSAP. The Plan's success is ultimately measured with reduced fatalities and life changing injuries on the transportation system, specifically as a result of incidents at crossings. The Plan supports ODOT's Transportation Safety Vision as outlined in the TSAP:

*Oregon envisions no death or life-changing injuries on Oregon's transportation system by 2035.*

The TSAP's six goals are:

- **Goal 1 - Improving Safety Culture.** Transform public attitudes to recognize that all transportation system users have responsibility for other people's safety in addition to their own safety while using the transportation system. Transform organizational transportation safety culture among employees and agency partners (e.g., state agencies, MPOs, local agencies (Tribes, counties, cities), Oregon Health Authority, stakeholders, and public and private employers) to integrate safety considerations into all responsibilities.
- **Goal 2 - Improving Infrastructure.** Develop and improve infrastructure to eliminate fatalities and serious injuries for users of all modes.
- **Goal 3 - Facilitating Healthy and Livable Communities.** Plan, design and implement safe systems; and support enforcement and emergency medical services to improve the safety and livability of communities, including health outcomes.
- **Goal 4 - Best Available Technologies.** Plan, prepare for, and implement technologies (existing and new) that improve transportation safety for all users, including pilot testing innovative technologies as appropriate.
- **Goal 5 - Communication and Collaborating.** Create and support a collaborative environment for transportation system providers and public and private stakeholders, to work together to eliminate fatalities and serious injury crashes.
- **Goal 6 - Strategic Investments.** Target safety funding for effective education, enforcement, engineering, and emergency medical services priorities.

The TSAP provides an implementation framework structure for the goal areas, including a series of "Emphasis Areas" or near-term action focus areas for implementation. The four Emphasis Areas TSAP are defined as (the key subareas in bold text signify those which the Plan addresses):

- Risky Behavior
  - **Impaired driving**
  - Unbelted occupants
  - Speeding
  - **Distracted Driving**

- Infrastructure
  - **Intersection**
  - Roadway departure
- Vulnerable Users
  - **Pedestrians**
  - **Bicyclists**
  - **Motorcyclists**
  - **Older Road Users**
- Improved System
  - **Improved data**
  - **Training and education**
  - **Enforcement**
  - **Emergency Medical Services**
  - **Commercial vehicles**

## Oregon Freight Plan

The purpose of the OFP is to improve freight connections to local, state, tribal, regional, national and international markets with the goal of increasing trade-related jobs and income for Oregon workers and businesses. The OFP is a resource designed to guide freight-related operation, maintenance and investment decisions.

While primarily focused on freight needs and investments for economic purposes, the OFP also highlights the role of transportation system safety in supporting a diverse and robust economy. The OFP specifically highlights the significance of railroad crossing safety in the following issue area and strategy:

***Freight Issue 6:*** *Freight needs to be able to move throughout the state in a manner that is as safe as possible. Its movement may impact safety in Oregon communities and risk to the environment.*

**Strategy 6.1:**

- Partner with local, statewide, tribal and federal partners to monitor and manage the safety performance of the statewide freight system.
- **Action 6.1.1:** Work with the ODOT Motor Carrier Transportation Division, Rail Division (SIC) and other programs within state agencies to advance freight issues for consideration in safety plans. This should include continued monitoring of locations on state highways for high incidence of truck-involved crashes to identify any emerging safety issues and continued ***evaluation of rail grade crossing safety*** through the Oregon Operation Lifesaver program.

## Multimodal in Nature

Railroad crossings are intersections between railroads and various other modes (e.g. auto, bicycle, pedestrian, etc.). They are intended to provide safe crossing for roadway users. The complex nature of these multimodal crossings presents many safety challenges. The Plan seeks to address this complex set of safety needs with a comprehensive approach to crossing safety.

The Plan is multifaceted; it brings together issues affecting crossing safety and provides strategies to address these issues, organized by focus areas. The Plan implements the goals and policies set forth in the OTP and refined in the OSRP, TSAP and OFP. Despite the rail-focus of the Highway-Railroad Crossing Safety Action Plan, the Plan is a ***multimodal action plan*** to address safety of all transportation system users at some of Oregon's most risky intersections - railroad crossings.

# Oregon Freight and Passenger Railroad System

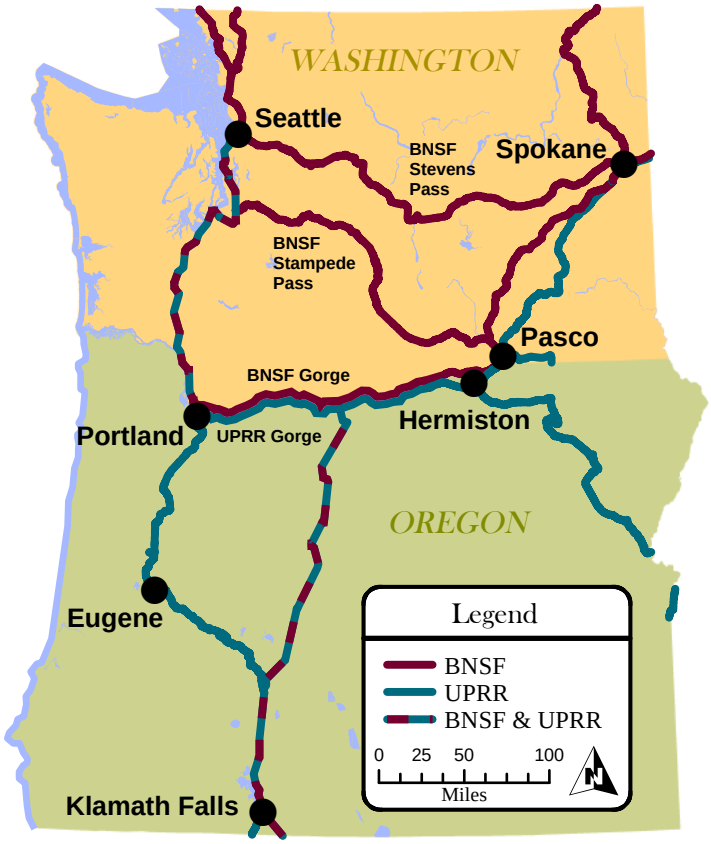
## Introduction

The railroad system provides the backbone of Oregon's economy; an extensive system that provides connection for the movement of goods and people. The railroad system connects Oregon to the larger nationwide railroad network and to international markets with connections at ports. The railroad system also provides critical mode choice for freight and passenger options, relieving congestion and reducing environmental impacts of the transportation system.

Oregon's railroad system encompasses 1,142 route miles of Class I and 1,245 of regional and short-line railroad route miles. The Union Pacific Railroad (UPRR) operates 877.8 miles and the BNSF Railway (BNSF) operates 264.4 routes miles.[1] Class I railroads are those with annual gross revenues exceeding $401.4 million. Class II, or Regional Railroads are the second largest railroads, classified as at least 350 miles and annual revenues exceeding $40 million. Oregon has no Class II railroads. In Oregon, Portland & Western Railroad (PNWR) and Willamette & Pacific Railroad (WPRR) operate as a single Class III regional carrier. Class III, or shortline railroads, are the smallest, generating less than $40 million annually. Oregon has 27 short-line railroads.[1]

BNSF and UPRR both access Oregon along the Columbia River corridor. BNSF utilizes the north side of the corridor in Washington and UPRR accesses along the south side of the river. Both railroads traverse the state from northern to southern border. UPRR extends further west through Portland and along the I-5 corridor through the Willamette Valley and east through

**BNSF and UPRR rail system in Oregon and Washington**




1 Oregon Department of Transportation, *the Oregon State Rail Plan* (September 2014) and Rail and Public Transit Division.

Hermiston. BNSF routes east of the Cascade Mountains along the U.S. 97 corridor and south through Klamath Falls, connecting to California.

## Freight Rail System

Oregon's railroad system is a critical component of the nationwide, interconnected freight transportation system, providing long-haul and regional connections between Oregon's industries and international markets. Oregon's two Class I railroads together operate 47% of the railroad mileage, carrying the majority of freight traffic. These lines serve as the primary interstate connections. Oregon's regional and short-line railroads provide important collector and distributor connections within the state and to Class I lines.

Oregon experienced a small decline in freight shipments for all modes following the 2008 recession but have regained volumes in recent years.

## Passenger Rail System

Oregon's railroad system serves a critical function for passenger transportation, offering important modal options through commuter, intercity and long distance services on the national passenger network. Through agreements with UPRR and BNSF, Amtrak provides service between cities along the west coast and connections to other national destinations. Amtrak offers three routes in Oregon:

- **Empire Builder:** daily services on long-distance route linking Portland to Chicago.
- **Coast Starlight:** daily service on long-distance route linking to Seattle, Tacoma, Portland, Sacramento, Oakland and Los Angeles.
- **Cascades:** frequent daily services between Eugene and Vancouver, British Colombia along a federally designed high speed route (HSR) corridor.

Crossings related to TriMet light rail, Willamette Shores Trolley, and Astoria Trolley lines are not included in this plan. Through a freight line system agreement, TriMet Westside Express Service (WES) provides commuter services in the Portland metropolitan area and important connections to urban public transportation services. Amtrak and WES crossings are included in the Plan.

A full list of railroads with public crossings in Oregon is included in Appendix B.

### Oregon Statewide Commodity Flows by Mode

| Mode | 2011 | 2016 | 2045 | Change (2016-2045) | 2016 Mode Share | 2045 Mode Share |
|---|---|---|---|---|---|---|
| *Tonnage in Thousands* | | | | | | |
| Truck | 221,046 | 287,399 | 388,468 | 35% | 88% | 76% |
| Rail | 34,840 | 21,127 | 36,184 | 71% | 6% | 7% |
| Water | 3,950 | 6,727 | 4,967 | -26% | 2% | 1% |
| Air (including Truck-air) | 68 | 100 | 308 | 207% | 0% | 0% |
| Multiple Modes & Mail | 16,782 | 11,174 | 16,552 | 48% | 3% | 3% |
| Pipeline & Other | | 34,295 | 62,355 | 82% | 11% | 12% |
| **TOTAL** | 276,686 | 326,527 | 508,833 | 56% | 100% | 100% |

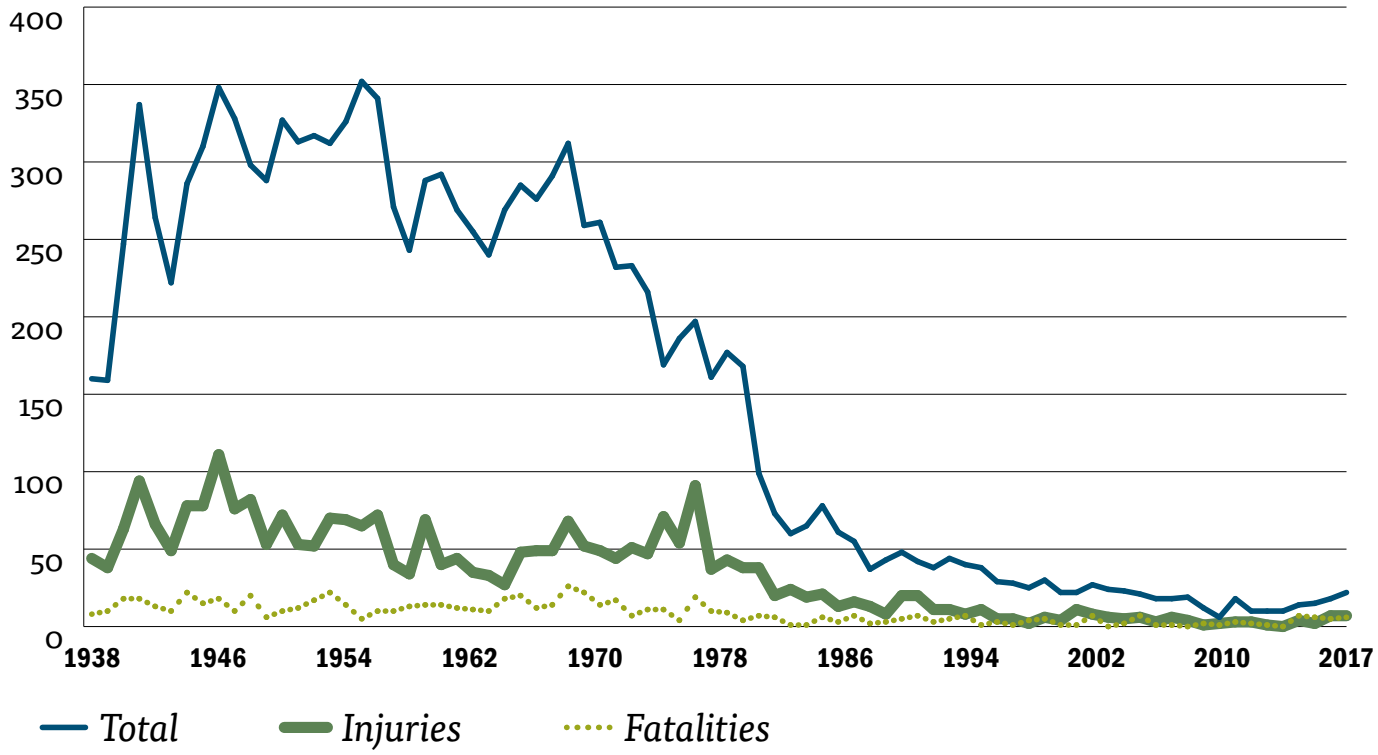
# ODOT RPTD and Regulation

## Introduction

ODOT is the state agency with exclusive regulatory authority for public crossings in the state of Oregon. ODOT exercises this authority through RPTD.

In 1995, responsibility of railroad regulation in Oregon was transferred from the Public Utilities Commission to ODOT; then the rail division merged with the public transit division in 2012 to form RPTD. Under the RPTD Administrator are five units: Transit Operations, Transit Programs, Rail Safety, Crossing Safety and Rail Operations. RPTD has state statutory authority over public crossings with the responsibility to improve

*Oregon Crossing Incidents (1938-2017)*




*Railroad crossing incidents in Oregon have been declining since 1938. Although significant progress has been made in railroad crossing safety, particularly through the efforts of the RPTD, incidents have begun to rise again in recent years. This Plan uses a comprehensive approach to improve railroad crossing safety in Oregon.*

# OREGON RAILROAD CROSSINGS

**2,373** Total crossings (at-grade and grade separated, including light rail)

**508** Grade separated crossings

**1,865** At-grade crossings (all)

**92** At-grade light-rail crossings

**1,773** At-grade crossings (no light-rail)

**49** At-grade pedestrian only crossings (no light-rail)

safety at public crossings for the traveling public. This authority includes all modes of railroad crossings (i.e. vehicle, pedestrian, bicycle) for nearly 2,400 public crossings. The Crossing Safety Unit regulates all at-grade and grade separated railroad-highway crossing activities involving railroads. RPTD staff manage crossing compliance, inspections and railroad employee safety.

Oregon has 508 public grade separated crossings and 1,865 public at-grade crossings. There are roughly 2,400 private at-grade crossings. RPTD has authority at public crossings to regulate the construction of new crossings, the alteration, relocation, or closure of existing crossings, and the placement of all traffic control devices at and in advance of the crossing.

ODOT authorizes signage at private crossings but currently neither federal nor state funds are available for improvements at private crossings. Although federal Section 130 and state Grade Crossing Protection Account (GCPA) funds may not be utilized at light rail crossings, RPTD does work in conjunction with TriMet for at-grade crossing construction and improvements.

There are currently no light-rail at-grade crossings of a state (ODOT system) roadway.

## Rail Specific Regulation

Railroad safety decisions are informed by a series of federal and state laws. FRA regulations and standards pertaining to the railroad lines connected to the United States general railroad system are contained in 49 CFR 200-299. FRA does not regulate segregated urban railroad transit systems such as TriMet. ODOT is the state agency with regulatory authority to implement FRA regulation. The state of Oregon has also enacted legislation which provides ODOT with exclusive authority over railroad-highway crossings in the state, and has adopted a series of related Oregon Revised Statutes (ORS) and Oregon Administrative Rules (OAR):

**ORS 824.200-824.256. Railroad Crossings.** Provides ODOT the authority to regulate, construct, alter and eliminate railroad crossings. ODOT permission is required to construct new highways across railroad tracks or construct new railroad tracks across highways. It requires ODOT to adopt regulations prescribing specifications to achieve uniform and coordinated regulation of railroad-highway crossings.

**ORS 824.204. Construction of New Grade Crossing and Protective Devices.** Describes ODOT authority over the construction of new crossings, determine need for grade crossing

separation and authorize type and location of protection (traffic control) devices.

**ORS 824.206. Elimination, Alteration or Closure of Existing Grade Crossing.** Describes ODOT authority to eliminate, alter or relocate at-grade crossings. This law also provides authority to require installation or alteration of protective devices.

**ORS 824.210. Construction or Alteration of Crossing.** Describes ODOT authority over the construction or alteration of grade separated railroad crossings.

**OAR 741-120-0020. Grade Crossing Construction and Maintenance.** Describes the requirements that new and altered grade crossings conform or exceed nationally recognized standards and provides ODOT compliance authority. This law also sets the requirement that construction of any new driveway within 100 feet of any railroad track at existing crossing requires a crossing application requesting authority to alter the crossing per ORS 824.206.

**OAR 741-200-0050. Information to Accompany Application.** Provides specific engineering plan and vehicle traffic signal plan requirements that must be included in crossing application.

## Funding Authority

RPTD receives a set amount of federal and state funds annually for crossing safety improvements. The largest source of dedicated crossing safety improvement funds in Oregon is the Federal Aid Crossing Safety Program of Title 23, United States Code, Chapter 1, Section 130 (23 USC § 130), hereinafter referred to as Section 130 Program. These funds are to be utilized for hazard elimination at crossings, typically in the form of warning (traffic control) devices. A non-federal 10% match is required for Section 130 funds.

ODOT is the regulatory and authorized agency for obligation of these funds. To assist with this process, RPTD has established a process to evaluate and prioritize crossing needs for funding allocation. The process initiates with crossing evaluation utilizing the risk analysis tool, JAQUA, to create a 200% funding project list. Next, projects are sent to the relevant ODOT region staff for input and coordination with local jurisdictions. Based on additional information obtained, a 150% list is created. Next, RPTD Crossing Safety staff completes an on-site diagnostics meeting with stakeholders

*Project Development and the Order Process*

1 **Scope Project**
Is there a Railroad within 500 feet in any direction?

2 **Call Rail Division**
Does the project alter, close, or create a railroad crossing?

3 **Design Crossing**
Cooperatively work with railroad, road authority, and Rail Division to design crossing portion of the project and submit a draft application.

4 **File Application**
Initiate legal process that culminates in a Crossing Order.

5 **Rail Division Serves Notice of Proposed Action**
Serve notice to railroad and road authority.

6 **Final Order**
Signed by the Rail Division Administrator.

**Construction authorized**
*(2-4 month process after design completion.)*


- Section 130 *($3 million)*
- Oregon Rail Grade Crossing Protection Account *($300,000)*

Oregon receives approximately $3.3 million annually for railroad crossing safety. This total has largely remained unchanged for years.

including local jurisdiction, railroad, FRA, Federal Highway Administration (FHWA) and ODOT representatives. Finally, the RPTD Crossing Safety Manager considers any other relevant factors to select projects. Once crossing projects are selected, a diagnostics team completes a needs assessment. Next, the project team develops a project scope including the anticipated budget. Funds are allocated through the State Transportation Improvement Program (STIP) and obligated. ODOT does not require a monetary match from local road authorities but does attempt to leverage Section 130 funds with participation in larger scale projects when appropriate. RPTD works with over 30 railroads and over 200 road authorities for statewide crossing safety projects.

Section 130 funds have specific eligibility requirements. Section 130 funds may not be used for construction of new grade crossings or alteration or closure of light rail crossings.

Activities eligible for Section 130 funds include:

- Crossing consolidations
- Installation of grade separations or repair to existing grade separations
- Signage
- Pavement marking
- Illumination
- New highway-railroad grade crossing signals
- Upgraded highway-railroad grade crossing signals or circuits
- Improved crossing surfaces
- Traffic signal interconnection/preemption
- Sight distance or geometric improvements
- Data improvements (up to 2% of fund apportionment)

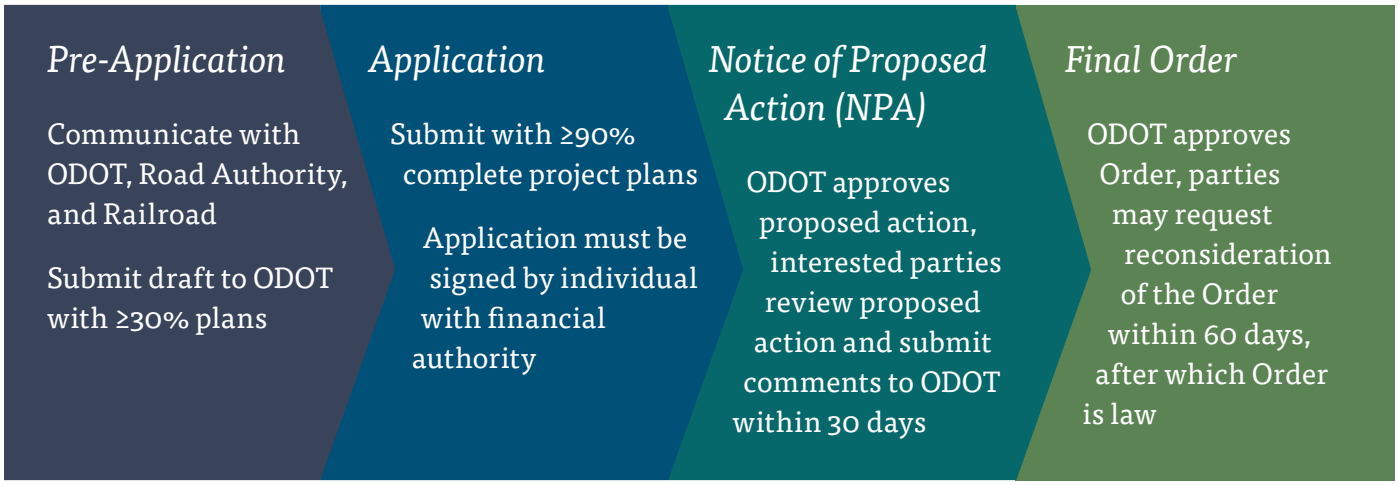
## Grade Crossing Protection Account

In 1974, Oregon initiated the rail Grade Crossing Protection Account to eliminate hazards at railroad-highway crossings and to enhance safety at these crossings.

GCPA funds are to be expended for railroad-highway crossing safety improvements and include:

- Acquisition and installation of warning devices
- Crossing consolidations
- Installation of grade separations or repair to existing grade separations

*Crossing Order Process Summary*




*Order process takes about 3 months (more with issue negotiation)*
*Administrative hearing process (can be initiated if issues cannot be resolved)*

- Signage
- Pavement marking
- Illumination
- New highway-railroad grade crossing signals
- Upgraded highway-railroad grade crossing signals or circuits
- Traffic signal interconnection/preemption
- Sight distance or geometric improvements

Neither funding source can be used for education, enforcement, outreach or training efforts.

## Crossing Orders

Crossing Orders are essentially laws issued by the RPTD Division Administrator, which specify how crossings are constructed, modified or closed. RPTD is responsible for authorizing crossing changes and completing related crossing Orders. Crossing Orders may be initiated by a local road authority or railroad with an application, or by RPTD upon its own determination. A draft review of the application can begin with 30% engineering design plans. The formal application process requires 90% design plans and all parties must agree to the modifications before the process can be completed. After review and final negotiations are complete, RPTD will issue the crossing Order. Parties may request a reconsideration within 60 days after which the Order is law.

# SPOTLIGHT ON:

## *Coordination*

**Oregon ODOT / Umatilla County / UPRR**

### *Ott Road and Canal Road Crossing Safety Project Umatilla County*

In 2012, RPTD initiated a Crossing Safety Project to improve safety at two at-grade crossings in Umatilla County with a high frequency of incidents. Ott Road and Canal Road were adjacent at-grade passive crossings approximately 1.25 miles apart, equipped with STOP and CROSSBUCK signs. The approaches to the crossings were surfaced with gravel. There were a total of five incidents at the Canal Road crossing and three at the Ott Road crossing between 2006 and the end of 2012. The need for improvement was significant. The Crossing Safety Project proposed to close Ott Road and add crossing signal lights and gates to Canal Road.

The Ott Road crossing was closed and required the removal of the road surface through the tracks, the removal of the road south of the tracks up to the intersection with Hermiston Loop Rd., and the construction of a cul-de-sac on the north side of the tracks. The work at Canal Road consisted of installing signal masts, lights, gates and control cabinet, replacing railroad ties and rail through the crossing, installing new concrete crossing surface panels, and paving the approaches to the crossing out to 250 feet.

The project was completed in 2014 significantly under budget, affording nearly $460,000 to be used for other crossing safety projects. The budget surplus was attributed to several factors, most significant was that with FHWA authorization, Umatilla County was able to perform their own professional engineering services and road construction, greatly reducing expenditures. ODOT Highway Division was able to perform all National Environmental Policy Act (NEPA) processes in an expedited fashion, allowing the construction schedule to remain on time. UPRR provided funding for the removal of the crossing surface at Ott Road and the installation of the concrete crossing surface panels at Canal Road.

All of the parties involved (FHWA, Umatilla County, UPRR, ODOT Highway, and ODOT RPTD) were able to work cooperatively together to efficiently construct a project that continues to benefit all users.

# Previous Incidents Analysis

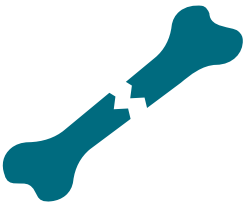
## Review of Incidents, 2008-2017

### Introduction

Data analysis of historical crossing incidents allows the pinpointing of contributing factors to incidents and highlights systematic issues with railroad-highway grade crossings. The incident data has been collected from the FRA database using form 6180.71 and supplemented with Oregon crash record information from the Crash Data System (CDS) and Fatality Analysis Reporting System (FARS). FRA

*Between 2008 and 2017...*

**120** incidents occured at Oregon railroad crossings, resulting in...



**29** injuries and...


**20** fatalities

defines three categories of at-grade railroad-highway crossings: private, public and pedestrian. Data analysis was performed on only public and pedestrian crossings for the purposes of this Plan. TriMet and Willamette Shore Trolley provide light rail and commuter rail service in the Portland metropolitan area. Astoria Trolley provides light rail (trolley) service to the Astoria area. RPTD does regulate light rail or trolley crossings, however RPTD cannot fund these projects with FHWA or FRA funds. Consequently, incidents at these crossings were not included in the Plan. TriMet Westside Express Service (WES) operates on freight rail lines. RPTD does have regulatory authority along this service line and incidents at these crossings are included in this analysis.

## Summary

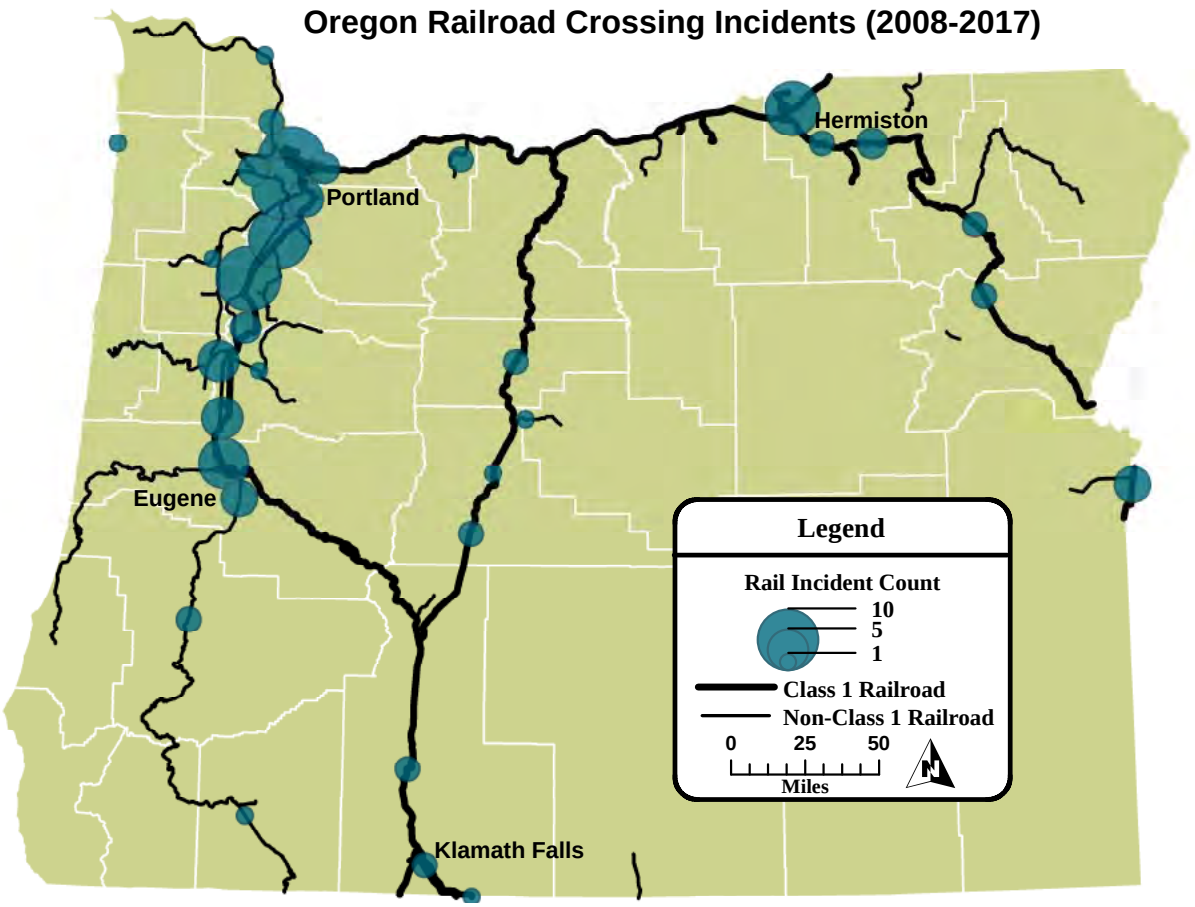
Crossing incidents were investigated and analyzed for the most recent years available. To better understand contributing factors, trends, and gaps, 10 years of data were assessed (2008-2017). The assessment followed the process:

1. Confirm data years
2. Collect data
3. Address anomalies and data gaps
4. Eliminate inconsistencies

In that period, 129 incidents occurred at public at-grade crossings in Oregon. Of the 129 incidents, nine incidents were confirmed to be suicides and were removed from the data analysis. The remaining 120 incidents occurred at 100 unique crossing locations, 17 incidents resulted in 20 fatalities and 24 incidents resulted in 29 injuries. Most incidents resulted in property damage only. One incident resulted in three fatalities while another incident resulted in two fatalities. Additionally, one incident resulted in four injuries. Nine fatalities occurred as a result of daytime incidents, two at the same location (Albany, Oregon). Seven fatalities occurred from incidents at crossings with passive devices (crossings with no train activated gates, lights or bells.). Nineteen locations experienced more than one incident during this time period.

Bicycle and pedestrian incidents more often resulted in fatality or injury. Seven pedestrian and three bicycle incidents resulted in fatality.

The following is a summary and analysis of the 120 incidents at Oregon's public at-grade railroad-highway crossings.



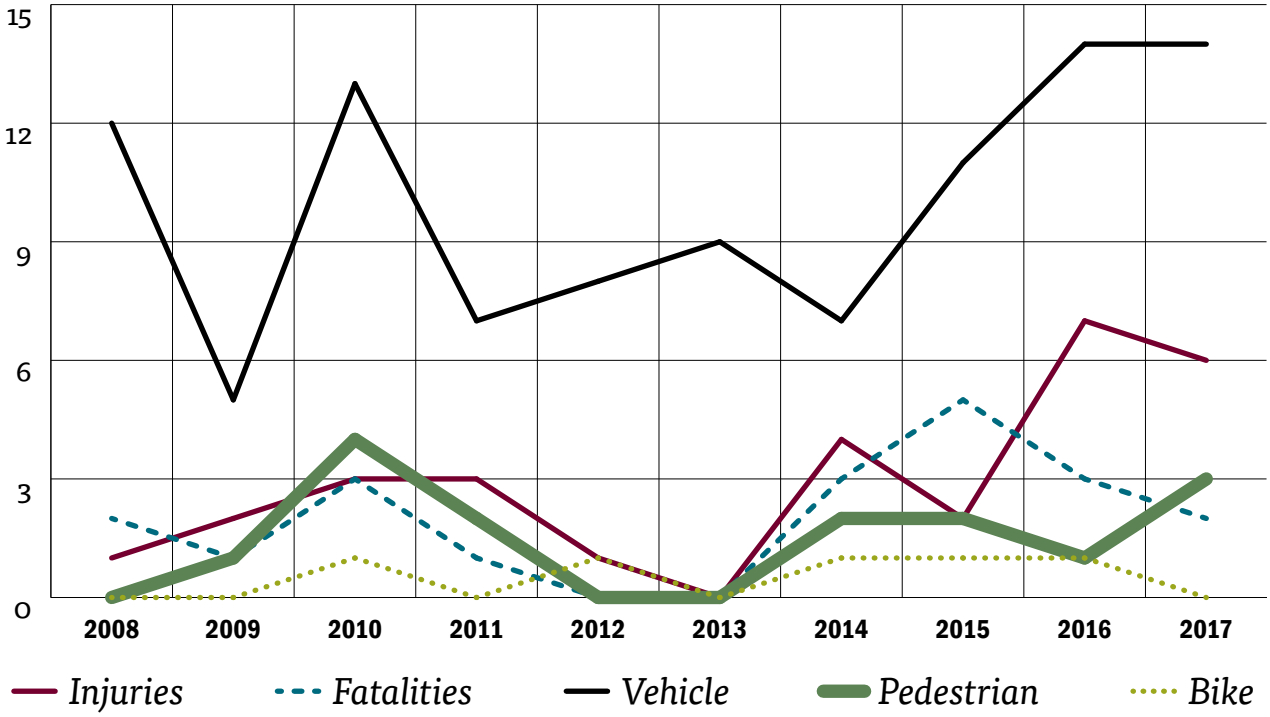

## Trend

From 2008 to 2017, the lowest number of annual incidents was six in 2009, likely reflecting an overall decline in transportation activity following economic downturn in prior years. The peak total was 19 in 2017 and is part of a trend in rising annual incidents in Oregon. While the overall number of annual crossing incidents is lower than previous decades, incidents are increasing. Oregon's rising crossing incidents follows the national trend and the overall Oregon highway crash trend.

*All crossing incidents between 2008 and 2017 involved adult travelers.*

The incident trend line shadows the investment programming timeline. In 1974, Oregon initiated the state GCPA, allocating $300,000 annually to crossing safety. Following the initial investments, incidents experienced a downward trend with fewer annual incidents recorded in 1977, 1978 and 1979 with a significant reduction in 1980 and forward. The program investments correlated quickly with a reduction in incidents, underscoring the significance of investing in crossing safety improvements.

*Oregon Incidents by Mode of Traveler (2008-2017)*




In 1986, the federal Section 130 Program began, resulting in reduced incidents at Oregon's crossings in the following years. While state and federal dollars have contributed greatly to a reduction in crossing incidents, recent funding has remained stagnant and annual incidents have risen in recent years.

Nationally, vehicle miles traveled (VMT) has risen steadily in the last 20 years and is forecast to continue increasing at an average rate of 1.2% annually.[2] Oregonians have logged more VMT in recent years. In 2017, Oregon statewide VMT was nearly 37 billion,[3] an increase from the previous year and part of a larger trend upward.[4] The percentage of overall trips by Oregonians on bicycle and walking have increased in recent years as well.

2 Federal Highway Administration, *FHWA Forecasts of Vehicle Miles Traveled (VMT): Spring 2018* (May 2018)
3 Oregon Transportation Safety Division
4 Oregon Office of Economic Analysis, *Oregon Vehicle Miles Traveled*. (March 2017)

The VMT trend line mirrors Oregon's population growth. Oregon reached four million residents in 2015 and population is projected to reach 5.2 million by 2040.[5] As population increased, VMT of all modes increased, following a short-term decline between 2005 and 2008. As VMT of all modes increase, the potential for increased railroad crossing incidents also increases.

VMT + Population Growth + RR Volume Increases = ***Higher Railroad Crossing Exposure***

## Traveler Mode

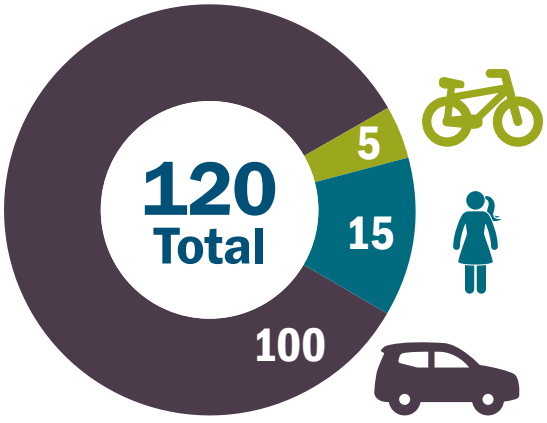
While most incidents involved a motor vehicle, 18 incidents involved a vehicle with a commercial driver license (CDL) required. One incident involved a dump truck with trailer and two incidents involved a "road grader."

Five incidents involved a bicycle traveler, three of which resulted in fatality and two resulted in injury. Of those, two incidents occurred at the same crossing that includes an approach via an on-street bicycle lane, four railroad tracks and four travel lanes. Fifteen incidents involved pedestrians with only one incident occurring at a passive crossing. Pedestrians account for 7 of the 20 fatalities resulting from crossing incidents and 15 of 120 incidents. Given the low volume of pedestrian travel versus automobile travel, it is notable that pedestrian incidents are overrepresented in the Oregon incidents from 2008 to 2017.

*Pedestrians are overrepresented (account for more than their share) of incidents at multiple-incident locations.*

*Incidents by Mode*

**18** incidents inovolved a vehicle which required a CDL




5 Oregon Office of Economic Analysis, *Oregon's long-term county forecast, 2000-2050.* (2013)

# SPOTLIGHT ON:

## *Training and Guidance*

**Utah Department of Transportation**

### *Pedestrian Grade Crossing Manual*

Following federal aid appropriations, Utah's light rail transit network has grown rapidly in recent years. Miles of new tracks have been added, primarily in the Salt Lake City and Wasatch Front areas.

The state of Utah Department of Transportation (UDOT) recognized the growing concern for pedestrian safety at railroad crossings. To address these pedestrian crossing safety issues, UDOT developed and issued pedestrian crossing guidance, the Utah Pedestrian Grade Crossing Manual (2013). Intended for engineers and planners, the guidance outlines some of the risk factors at pedestrian crossings and highlights best practices and approaches to address these risks. This guidance helps to ensure that application of warning devices is consistent and effective. It prescribes a standard evaluation and implementation procedure, supported with regulation and maintenance information. The manual is one of the earliest and few examples of mode specific crossing safety guidance and is an example of clear and consistent guidance and training.

## Traveler Information

Male travelers accounted for 74% of 130 incidents in Oregon between 2005 and 2014 (these years were assessed for even comparison to national level percentages). Oregon closely followed the national average of 75% male traveler involved in crossing incidents. Between 2008 and 2017, male travelers were involved in 68% of crossing incidents. This is a modest improvement but indicates that male travelers account for the majority of incidents. Nationally, males of all age groups travel more miles than females but even when adjusted for this difference, males represent a disproportionate share of crossing incidents. In Oregon, male drivers account for more miles and time traveled, but the gap between female counterparts is smaller. A recent Oregon survey found that male travelers completed 28 miles for 76 minutes of travel each day compared to females travelers who logged 24 miles and 73 minutes.[6]

Oregon also has a higher representation of travelers under the age of 40 involved in incidents than the national average. Two incidents involved 85 year old male travelers while the oldest traveler involved in an incident was 91 years old. The youngest traveler involved in an incident was 19. None of the crossing incidents between 2008 and 2017 involved children or adolescents.

In Oregon, travelers between 35 and 54 years travel the highest number of miles and minutes but travelers over 65 years travel more miles and time than the state average. Although older drivers travel nearly as many miles and minutes as younger drivers in Oregon, younger drivers account for a higher percentage of crossing incidents.

6 Oregon Department of Transportation, *Daily Travel in Oregon: A Snapshot of Daily Household Travel Patterns* (July 2018)

## Traveler Behavior

The majority of incidents occurred as a result of poor traveler judgment, risky behavior or distraction. A total of 106 incidents resulted from travelers not stopping, going around activated gates, stopping and proceeding, or stalling or getting stuck on tracks. One incident resulted from a traveler climbing over a train. Another incident occurred as a result of a traveler colliding with a second passing train. Two bicycle incidents occurred after the bicyclists went around activated gates and were struck by a second passing train.

*Risky behavior and poor judgment are largest factors in crossing incidents.*

Traveler distraction was noted in a handful of incidents, including one incident of a traveler wearing headphones and unable to hear the train. Based on recent traveler trends for all modes, it is anticipated that traveler distraction will be an increasingly common factor in future incidents.

Although queuing was not specifically cited as a contributing factor in the incidents during this period, near-miss reports from this period have indicated that queueing is a growing issue at crossings.[7] No incidents were a result of non-functioning or poor functioning warning devices.

*In Oregon and nationwide, younger male travelers are more likely to be involved in crossing incidents.*

7 Oregon Department of Transportation, Rail and Public Transit Division

# DID YOU KNOW:

## *Blocked Crossings*

Blocked crossings are a concern for communities in Oregon. When one or more at-grade crossing is blocked for a significant portion of time, whether a result of a crossing incident, a railroad malfunction or railroad operational activities, travelers including emergency services (EMS) are unable to cross the railroad tracks. Blocked crossings lead to congestion, unsafe traveler behavior (crossing and general road system), and delay to EMS and bus routes.

ODOT (RPTD) does not have authority to regulate crossing blockages but recognizes there is a safety issue associated with them, and is working with the federal government to establish regulation standards. The federal government is conducting research to gain a better understanding of ongoing issues, impacts, and potential remediation.

When a train is stopped, blocking a crossing, it is imperative that travelers do not climb on, over, or under the train as it may move at any time.

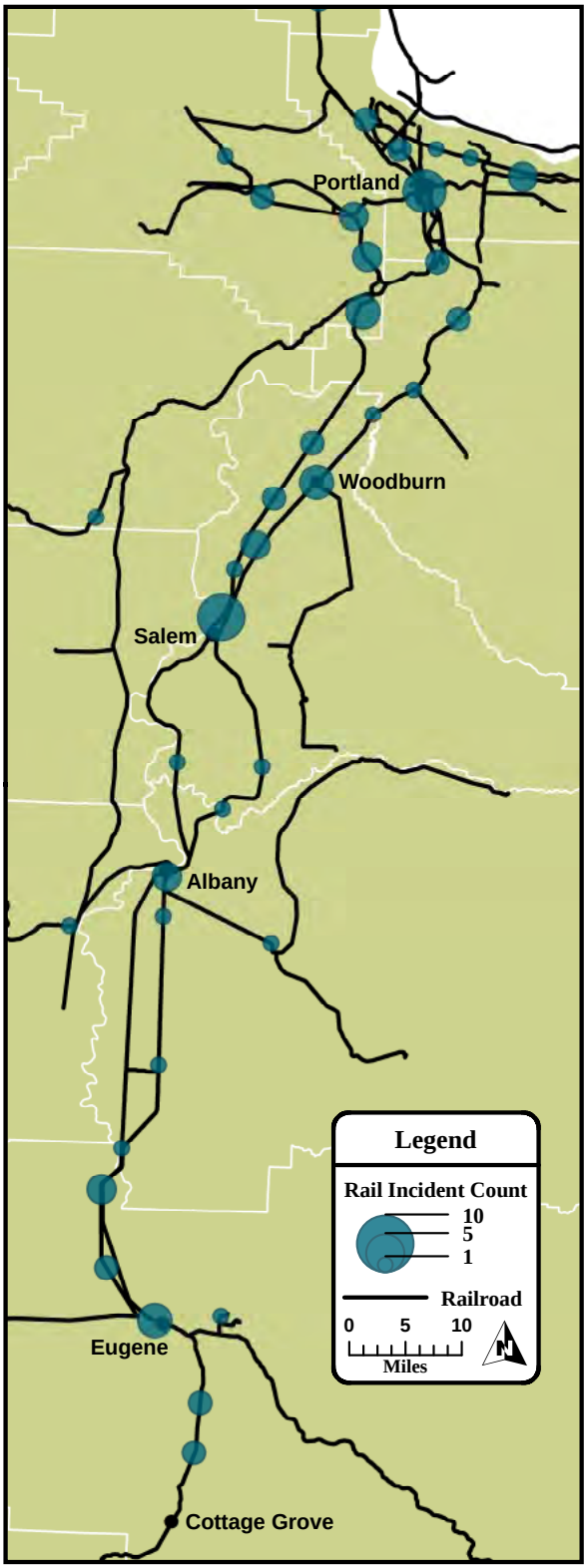
## Location

The majority, 72% of incidents, occurred at "urban" locations, although only 55% of Oregon's crossings are characterized as urban. A significant number of incidents were concentrated in the Willamette Valley, specifically the Salem and Eugene metropolitan areas. These are high population areas with a higher than average number of public at-grade crossings. For example, Marion County accounted for 19.2% of crossing incidents but only has 9% of public at-grade crossings in Oregon. Lane and Multnomah Counties each account for 12.5% of crossing incidents. Outside of the Willamette Valley, Umatilla County is over-represented with crossings incidents, accounting for 10.8% of incidents but only 5.5% of total public at-grade crossings. Four separate crossings in Umatilla County had two or more incidents occur at each, which accounts for the higher representation. One crossing has since been closed and safety improvements have been completed at two others.

## Railroad

While Oregon has 35 railroads with public at-grade crossings, only nine railroads experienced incidents at crossings from 2008-2017. UPRR has the most route miles and the second highest number of crossings in Oregon. Fifty-eight incidents occurred at UPRR crossings, including 13 Amtrak incidents. PNWR has the second highest amount of route miles and the highest number of crossings but experienced only 38 incidents. UPRR track routes carry the most and longest trains in Oregon. Amtrak operates primarily on UPRR mainline and Amtrak trains were involved in 15 incidents. Although Mount Hood Railroad (MHRR) has a low amount of route miles and a low number of crossings, this railroad experienced a relatively high number of incidents during the study period. Passenger and commuter trains were involved in 22 (18.33%) incidents

**Willamette Valley**
**Railroad Crossing Incidents (2008-2017)**



statewide. Freight trains were involved in 95 incidents and three incidents involved railroad maintenance of way equipment.

## Temporal and Environmental Effects

*Travelers are more likely to be in a crossing incident during lunchtime on weekdays.*

In Oregon, the majority of crossing incidents between 2008 and 2017 occurred during daytime hours (7:00am to 6:00pm). A significant clustering of incidents occurred during the lunchtime period (11:00am and 1:00pm). This is similar to national findings which show that the largest cluster of incidents occur slightly later, between 1:00pm and 4:00pm. A secondary cluster of Oregon incidents occurred during the early evening peak, between 5:00pm and 6:00pm. These numbers most likely correlate to traffic counts, which trend higher during daytime hours. Similar to traffic counts, train volumes tend to be higher during daytime hours.

Most incidents occurred during weekdays, with Friday being the most and Sunday being the least common day for incidents, reflecting national level findings.

Also following national trends, winter was the most common season for crossing incidents with 37 total incidents. This is closely followed by summer when 36 incidents occurred. Together, incidents during these two seasons make up over 60% of all incidents. Fall was the least common season for incidents with 21 total incidents. In Oregon between 2008 and 2017, December was the most common month for crossing incidents, again following the national trend.

The majority of incidents occurred during clear weather conditions. Nearly one quarter of incidents occurred during cloudy conditions and fewer incidents during foggy and rainy conditions (11% total). Snow or ice was noted in three incidents and does not appear to be a major contributing factor in incidents during this period.

## Physical Characteristics

Physical features and characteristics of crossings may contribute to crossing incidents. Therefore, the physical characteristics of the 100 crossings with incidents were analyzed. It was found that crossing intersection angle, number of travel lanes and train speed may be factors in incidents.

*The Willamette Valley area has the most incidents.*

*Counties and Cities with the Highest Number of Incidents*

| *County*/City | Incidents | Fatalities | Injuries |
|---|---|---|---|
| ***Lane County*** | | | |
| Eugene | 6 | 1 | 2 |
| Junction City | 4 | 1 | 0 |
| Creswell | 3 | 0 | 0 |
| Springfield | 1 | 0 | 1 |
| Halsey | 1 | 0 | 0 |
| ***Marion County*** | | | |
| Salem | 7 | 0 | 2 |
| Woodburn | 4 | 1 | 1 |
| Donald | 2 | 0 | 0 |
| St. Louis | 2 | 0 | 0 |
| Aurora | 1 | 0 | 0 |
| Brooks | 1 | 0 | 1 |
| Gervais | 1 | 0 | 0 |
| Jefferson | 1 | 1 | 0 |
| Keizer | 1 | 0 | 1 |
| Marion | 1 | 0 | 1 |
| Talbot | 1 | 0 | 0 |
| Waconda | 1 | 0 | 0 |
| ***Multnomah County*** | | | |
| Portland | 14 | 2 | 2 |
| Rockwood | 1 | 0 | 0 |
| ***Umatilla County*** | | | |
| No city identified | 6 | 2 | 2 |
| Hermiston | 5 | 0 | 0 |
| Pendleton | 2 | 0 | 0 |
| ***Washington County*** | | | |
| Beaverton | 4 | 0 | 2 |
| Tualatin | 3 | 1 | 1 |
| Tigard | 2 | 0 | 1 |

Between 2008 and 2017, 65 incidents occurred at crossings equipped with active warning devices while 55 occurred at crossings with passive devices in place. Twelve passive crossings have since been upgraded to active devices and three others have been closed since the incident. Nearly half, 58 of 120 of crossing incidents occurred on roadways under city jurisdiction. Incidents on county jurisdiction roadways accounted for 49 incidents. In total, local jurisdiction (city and county) of crossings represents 89% of incident locations. Incidents on state roadway jurisdictions totaled 10 during this study period and are slightly overrepresented compared to the total number of state jurisdiction crossings (6%).

Crossing intersection angle was assessed for incidents during the study period. Crossings with an acute angle less than 45 degrees were overrepresented when compared to statewide totals. Conversely, intersections at or near 90 degrees were underrepresented when incident locations were compared to the statewide totals, indicating these are safer crossings.

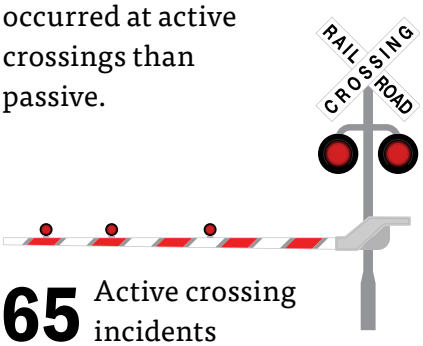
Average Annual Daily Traffic (AADT) is analyzed as a consideration factor in Oregon's risk assessment and exposure rating for crossings. Related AADT information was collected for the incident locations. Over one third of incidents occurred on roadways with AADT less than 500, typically rural in nature. However, in Oregon overall, crossings with AADT less than 500 make up 42.7% of all crossings. Thirty-one incidents occurred at crossings with an AADT range of 5,001 to 10,000 and are overrepresented when compared to the state crossings overall. Eight incidents occurred at crossings with AADT higher than 20,000. These incidents are also overrepresented when compared to the total number of these high volume crossings statewide.

Fifty-nine incidents, roughly half of all incidents, occurred on roadways with posted speeds of 21-30 mph. Roadways with posted speed of 40 mph or lower represent 99 out of the 120 incidents. Thirteen incidents occurred on roadways with a posted speed of 51-60 mph.

Further, 57 incidents (nearly half) occurred at crossings with a train speed of 30 mph or below. Only 10 incidents occurred at locations with a train speed higher than 61 mph. There may be a correlation with lower train speeds and traveler behavior at crossings.

### *Active & Passive Crossings*

More incidents occurred at active crossings than passive.




**65** Active crossing incidents


**55** Passive crossing incidents

*Higher train speed is not a major factor. In fact, slower train speed may be a bigger factor in incidents.*

# SPOTLIGHT ON:

## *Education*

**Oregon Operation Lifesaver**

### *City of Gervais Outreach*

The city of Gervais, a small Oregon city (population 2,500), located in Marion County experienced a significant number of crossing incidents in a short period of time. After the devastating loss of a high school student who was trespassing and struck by a train in an incident where another survived, the city decided to take action on crossing safety outreach and education. The city council engaged Oregon Operation Lifesaver at a series of education and outreach opportunities. The city urged reaching young adults through outreach at targeted events including National Night Out, summer events and in school programs. The city also pushed to engage local law enforcement for targeted enforcement efforts at crossings. Through a multifaceted approach, the city of Gervais has seen a major reduction in crossing incidents.

Roadway travel lanes were assessed as well. It was found that the vast majority of incidents, 71%, occurred at crossings with two travel lanes. Most often, two travel lanes are in bidirectional form. It is notable that two incidents occurred at crossings with nine travel lanes as large crossing intersections present difficult safety challenges.

Finally, the number of train tracks at incident crossing locations was assessed. It was found that most incidents occurred at crossings with one railroad track. Twenty-four, or 20% of incidents occurred at crossings with two railroad tracks and these incidents are overrepresented when compared to the statewide percentage of crossings with two railroad tracks.

## Multiple Incident Locations

During the study period, 39 incidents (33%) occurred at repeat locations. Nineteen crossings had two or more incidents. One location had three incidents during this period and 18 locations had two incidents. A broader study range allowed for better analysis of crossings where multiple incidents have occurred.

Eight fatalities and 13 injuries occurred at multiple incident crossing locations. Over half (10) of the crossings have an intersection angle less than 85 degrees and most (13) have two travel lanes. Further, 10 locations have one track and five have two tracks. Two locations have three tracks and one location has four tracks. One location has since been closed. Twenty-nine incidents at these crossings involved a traveler in a motor vehicle. Eight incidents involved a pedestrian, representing over half of the statewide pedestrian incidents. Two bicycle incidents occurred at the same location.

At the time of the incidents, the majority of multiple incident locations (12) were equipped

with passive warning devices. Four locations have been upgraded to active devices, 2 locations have been upgraded with additional devices and 3 locations are scheduled for upgrades. A high number of incidents (19) involved the traveler being stalled or stuck on tracks, compared to 14 who did not stop or stopped and proceeded and six who went around activated gates.

Appendix C provides a list of crossings with multiple incidents between 2008-2017 and includes upgrade or improvement status.

## Conclusions from Data Analysis

Oregon experienced an increase in crossing incidents for all travel modes in recent years. Rising incident rates parallel increases in highway crash and VMT rates. In Oregon, bicyclists and pedestrians together represent a significant number of incidents.

Risky behavior is the most common contributing factor. Equipment malfunction, weather and obstructions rarely contributed to incidents in Oregon during this time. Rather, deliberate crossing safety violations, possibly related to impatience, are a significant factor in crossing incidents. A major number of incidents occurred as a result of going around activated gates and failure to stop at crossings. Many incidents occurred during weekdays, near lunchtime, during the most popular travel times.

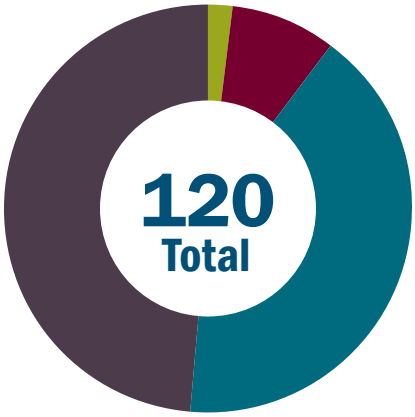
Male travelers, particularly below the age of 45 were involved in a majority of incidents. In fact, the younger the traveler, the higher the risk. Nearly half of all incidents involved a traveler younger than 40 years, slightly higher than the national average.

Most incidents occurred in Oregon's high population centers along the Willamette Valley while Umatilla County was an outlier with a high number of incidents. Umatilla County, located in eastern Oregon, is primarily rural in nature.

Given the high number of incidents resulting from stalls and stuck on tracks, queuing is a potential factor, as is severe roadway approach. Moreover, a significant number of incidents (18) involved a truck or similar vehicle that requires a CDL, further indicating driver training should be further investigated. Intersection angle is also a potential factor as most incidents occurred at locations with a severe angle.

*Jurisdiction of Incident*

Most incidents occur at **non-state roadways.**




| | |
|---|---|
| 58 | City |
| 49 | County |
| 10 | State |
| 0 | Federal |
| 3 | Other |

*Multiple Incident Location*

Out of 100 locations, 19 locations experienced **more than 1 incident.**

*Engineering alone is insufficient in improving crossing safety. A multipronged approach is needed.*

Road speed and train speed may be potential contributing factors. A significant number of crossing incidents occurred on roadways with low AADTs, moderate road speed and low train speed, indicating that travelers misjudge the proximity and danger of an approaching train.

Engineering solutions alone are insufficient in addressing contributing factors to incidents in Oregon. A multipronged approach including driver education, effective outreach and enforcement is needed to reduce crossing incidents statewide.

# DID YOU KNOW:

## *Near Misses*

A "near miss" or "near hit" is an incident on or near the railroad that involves the near collision of the train and a roadway traveler. Railroads are not required to report near miss incidents but this information is valuable in identifying areas of risky behavior, unsafe conditions or behavior trends and changes.

Near miss reports provide RPTD with valuable information identifying locations of risky behavior. RPTD uses this information to help target locations that need additional investigation. These investigations help RPTD to better understand key safety issues and risky traveler behavior and offer insight in issues near railroad crossings that may impact crossing safety. This information may lead to implementing a crossing safety upgrade before an incident occurs.

RPTD utilizes near miss reports to develop an understanding of critical system safety issues and to identify risky crossings or areas. To encourage near miss reporting, near miss information will be considered in project funding prioritization processes.

# Issues and Opportunities

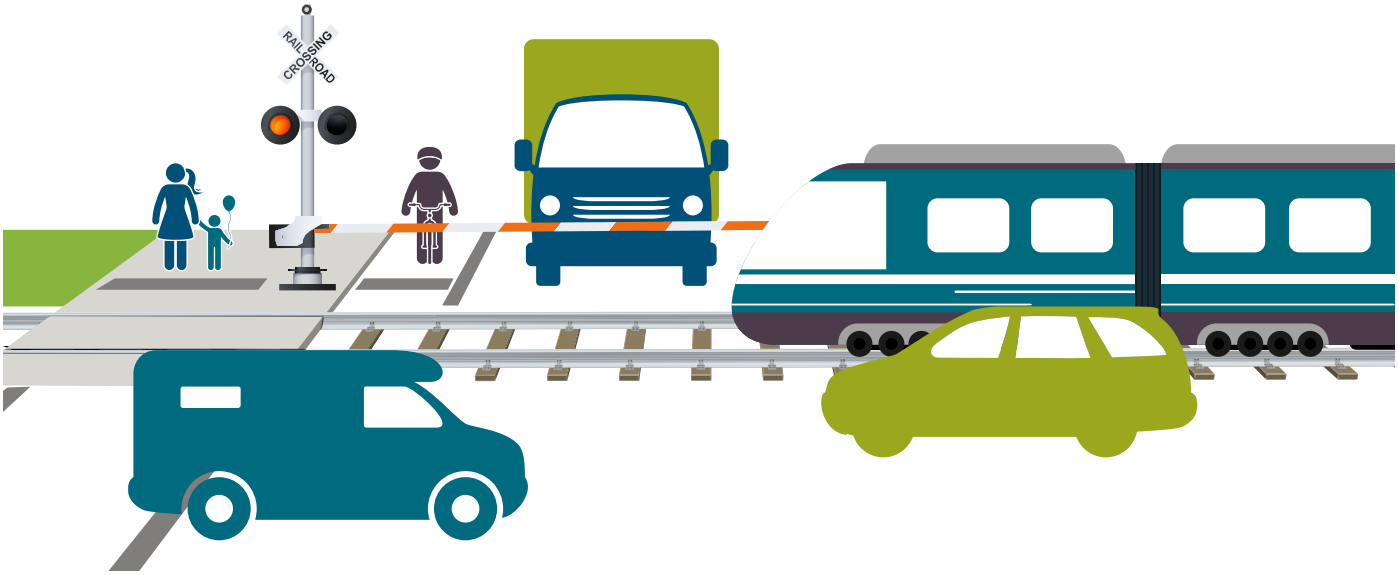
The following is a synthesis of crossing incident analysis, stakeholder input, trends assessment, research and literature review regarding transportation safety, grouped into 17 issues and opportunities. Issues and opportunities inform the Plan strategies and actions that follow.

**Issues**

- Risky Traveler Behavior and Poor Judgment at Crossings
- Incident Location
- Behavior and Demographic Trends
- Competing Priorities
- System Impacts
- Data Sharing
- Land Use Impacts
- Coordination
- Working with Railroads
- Route Importance
- Funding

**Opportunities**

- Rail Crossing Safety is part of ODOT
- Outside Partnerships
- Training
- Analysis Tools
- Emerging Technology
- Legislative Input



# Issues

## Risky Traveler Behavior and Poor Judgment at Crossings

*Driver judgment is the single biggest factor in rail crossing incidents.*

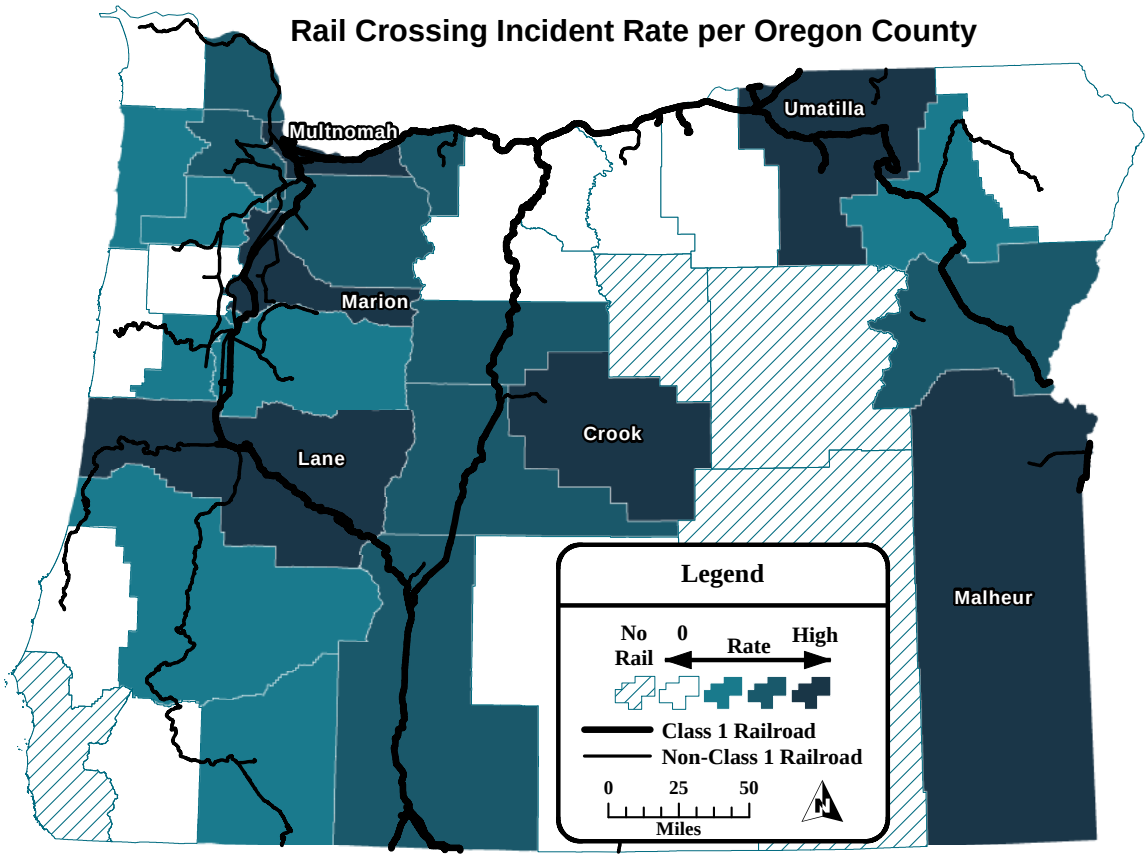
In-depth data analysis of crossing incidents provides insight into several critical issues impacting crossing safety. An assessment of contributing factors and behaviors to Oregon's crossing incidents revealed that risky behavior and poor traveler judgment were the primary factor in most incidents. Understanding when and where these behaviors occur most often and who is involved will inform future safety improvement efforts. Strategic investment in key projects and initiatives can work to improve traveler judgment and reduce risky behavior at crossings, resulting in fewer incidents.

Younger, male travelers were most frequently involved in crossing incidents, indicating this is a critical demographic to direct education and outreach efforts. Incidents occur most often during the lunchtime period, typically on weekdays, and most commonly on Friday. This suggests that travelers are possibly engaged in break time activities and less patient at crossings. Similarly, travelers often proceeded around activated gates or failed to stop at crossings with an approaching train, showing poor judgment and willingness to commit risky behavior. Oregon has seen a rise in bicycle and pedestrian related crossing incidents, illustrating that automobile drivers are not the only travelers engaging in these behaviors.

Stalling, getting stuck on tracks and stopping on tracks are a common factor in incidents.

Poor traveler judgment is also seen in the significant number of incidents involving stalls and stops on railroad tracks and at crossings. This implies that drivers may need more training to better understand how to make the crossing safely and how to prevent stalls on tracks. Queuing is likely related and is important to understand as well. Further, CDL drivers were involved in many crossing incidents, suggesting improvement may be needed in CDL training.

In the past 10 years, most incidents occurred at crossings with low AADTs, low travel speeds and low train speeds, signifying that traveler judgment in these conditions is poor. Weather does not appear to be a factor in Oregon incidents but time of year may play a role. Most incidents occurred in the winter months, suggesting that darkness may play a role in incidents. Summer was also a common time for incidents, potentially correlated to higher travel periods.




While engineering solutions can attempt to reduce risky behavior, education and outreach are important complementary approaches to improve traveler judgment and reduce risky behaviors at crossings.

*Engineering solutions can attempt to reduce impacts of risky behavior but is not enough. Education and outreach are also important.*

## Incident Location

Oregon's population is largely concentrated in the Portland metropolitan area and Willamette Valley metropolitan areas (e.g. Salem, Corvallis, Eugene). These areas also have concentrations of railroad tracks with the highest number of crossings and the majority of urban crossings. Given the concentration of crossings in these population centers with rising AADTs, it is not surprising that a significant portion of incidents occur in these areas. However, it is surprising that a high portion of Oregon crossing incidents occur in a few rural areas, namely Umatilla and Malheur counties. It is important to recognize the disparate nature of crossings statewide and strategically address these issues.

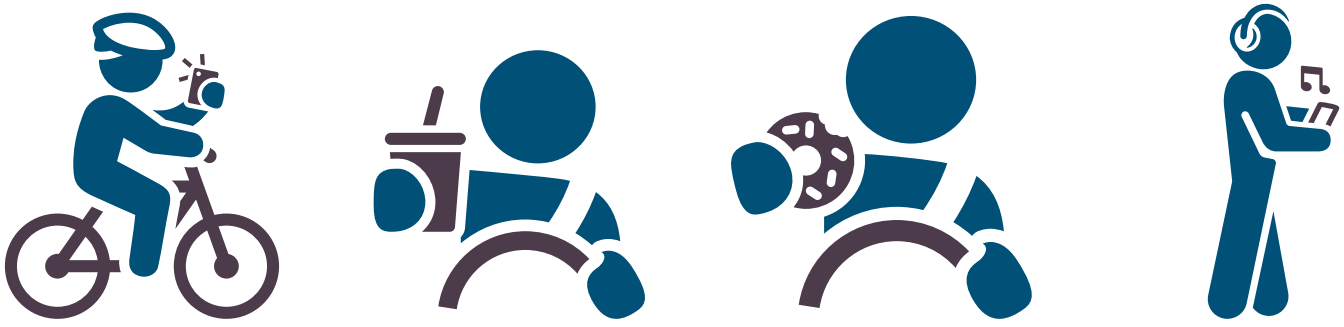
The physical nature and warning devices of crossings may factor into traveler behavior at crossings. While 54% of incidents occur at crossings with active devices, 46% occur at crossings equipped with passive devices. It is likely that acute angle, severe vertical crossing rise and limited sight distance contribute to incidents. It is not feasible to improve all crossings but crossings with the worst conditions can be prioritized for improvements, requiring coordination with local road authorities and railroads.

## Behavior and Demographic Trends

A number of trends impacted traveler behavior and transportation safety. Distracted traveling, including using phones and wearing headphones is on the rise. A recent study found that three quarters of drivers surveyed had previously engaged in distracted driving.[8] More in-depth studies and statistics are still being compiled at the state and national level but the consensus amongst transportation safety experts is that distracted traveling by all modes is a rising concern and threat to transportation safety. Implementing a coordinated education and outreach campaign between ODOT divisions and with external partners is an example strategy for addressing this trend.

Impaired driving, bicycling and walking is a major contributing factor to crashes on Oregon's transportation system including crossings. As noted in the TSAP, between 2009 and 2013, driver impairment was a factor in 22% percent of all fatal and injury crashes.[9] Alcohol impairment is the most commonly recognized form of impairment but impairment can also result from prescription drug-use, marijuana and other drug use. Driver fatigue is also a form of impairment. Traveler impairment reduces cognitive abilities at crossings and is more likely to lead to poor judgment and risky behavior.

*Examples of Traveler Distractions*



Cellphone use | Drinking | Eating | Wearing noise cancelling headphones

8 Angela Durant et al. *Distracted Driving: an Epidemic, A Study of Distracted Driving Attitudes, Behaviors, and Barriers Preventing Change*. Southern Oregon University, prepared for Oregon Department of Transportation. *https://www.oregon.gov/ODOT/Documents/Distracted%20Driving%20An%20Epidemic.pdf*.

9 Oregon Department of Transportation, *Oregon Transportation Safety Action Plan* (2016)

Demographic trends also influence crossing safety. Oregon is experiencing a rise in older drivers. Although younger drivers are more likely to be involved in a crossing incident, older drivers face visual acuity, hearing and depth assessment challenges. These faculties are critical at crossings and these challenges make it difficult for older drivers to detect critical signage, markings or approaching train. If involved in an incident, older travelers are more likely to experience more severe outcomes than younger travelers. The FHWA published the *Handbook for Designing Roadways for the Aging Population*. *Chapter 6: Highway-Rail Grade Crossing,* which provides guidance for improving crossings to accommodate the needs of older drivers.

## Competing Transportation Priorities

Oregon's population is growing and Oregonians are seeking more active modes of travel and recreation, resulting in new commercial, residential and education developments. Changes in land use adjacent to railroad right-of-way often increase crossing volumes. Land use changes also result in new crossing requests. Similarly, increased interest in active transportation has led to development of new multi-use pathways, also initiating new crossing requests. State statute provides that grade crossings are to be eliminated wherever possible, which stresses that new grade crossings must meet a rigorous review process to determine if they are required for "public safety", "public convenience", and "general welfare". RPTD, using current funding sources, is not permitted to fund the establishment of new grade crossings. Regardless, new crossing requests are increasing and system impacts may not be fully understood.

A robust and diversified economy also means increased traffic volumes on both the roadway system and the railroad system, creating more exposure and resulting in greater risk at crossings. This issue is not limited to urban areas as Oregon's rural areas are experiencing similar trends. Balancing transportation safety with system efficiency and mobility requires understanding of the needs and impacts, particularly at railroad crossings.

Oregon is also experiencing travel growth in alternate travel modes, recording increases in bicycle and pedestrian travel in recent years. While Oregon's transportation system infrastructure is continuously growing and improving to accommodate all users, there is still room for improvement around and particularly at crossings. Railroad crossings present unique challenges for multimodal users. For example, pedestrian sidewalks are often difficult to construct due to excessive costs associated with widening the crossing to accommodate the sidewalk, which includes acquiring additional right-of-way (ROW). An expanding on-street bicycle network with designated bike lanes presents channelization difficulties at many crossings. Also, existing crossings with severe intersection angles make multimodal crossings particularly difficult for safe crossing. Additionally, poor crossing conditions such as slippery crossing surfaces, rough surfaces and holes and major gaps are also examples of these challenges.

## System Impacts

Studies have assessed the economic cost of highway crashes, accounting for loss of life, lost wages, cost of travel delay, medical expenses, property damage and additional costs to employers. The cost of railroad crossing incidents goes beyond these measures, additionally accounting for system delay due to extended periods of blocked crossings, economic hardship to railroads, freight system delay, environmental impacts of congestion and other system delays such as shared line passenger transit delay.

# SPOTLIGHT ON:

## *Multimodal Crossings*

**Seattle Department of Transportation**

### *Multimodal Crossing Infrastructure*

The city of Seattle has embarked on implementation of a very ambitious transportation plan which advances transportation modal choices with a safe and connected system. Supported by a bicycle modal plan and accompanying implementation plan, the city has made significant strides in expanding and improving the multimodal network throughout the city and better connecting neighborhoods. Chapter 4 of the Seattle Bicycle Master Plan addresses the bicycle network and multimodal corridors. Improved safety and access at railroad crossings is specifically called out in the strategy section.

The Burke-Gilman Trail is an implementation project example. The trail is a largely separated multi-use trail system which connects north Seattle neighborhoods with the primary transportation framework, offering travelers a safe and efficient system for movement.

The westernmost portion of this trail in the Ballard neighborhood had specific challenges related to multimodal crossings at active freight railroad lines. One such crossing involved a dangerously sharp curve that put bicyclists at risk since crossing at a sharp angle has proven to be dangerous, especially in poor conditions. Numerous incidents were reported and prompted the city to investigate. SDOT selected the design option that changed the trail railroad crossing to a right angle by obtaining nearby ROW adding specific pavement markings and signage to reduce speeds for safer crossing navigation. Facilitating a series of 90 degree turns allows travelers to cross the railroad tracks at a right angle and has greatly reduced incidents at the crossing.

NCHRP Report 755 *Comprehensive Costs of Highway-Rail Grade Crossing Crashes* (2013) evaluated an array of cost factors and provided a spreadsheet tool for communities to evaluate the cost of railroad crossing incidents, accounting for components such as time of stopped train, freight system and environmental impacts, crash severity and emergency medical services (EMS) costs.[10]

## Data Sharing

ODOT is the steward for a significant collection of transportation system asset and crash information and is continuously improving the collection and utilization of data from a large set of sources. RPTD collects a wide range of crossing information including physical characteristic information (e.g. warning device information, pavement markings, intersection angle, surface type, bus route information, etc.). RPTD catalogs this information in the "Rail Crossing Safety System" (RCSS) database, which can be queried as needed. RPTD also collects incident information obtained from the FRA and collaborated with police reports. However, this incident information is not currently cataloged in conjunction with the crossing characteristic information.

Additionally, data collaboration between ODOT divisions has potential for improved knowledge sharing and can lead to more informed decision making processes. For example, crossing incident information combined with other sets of data from TSD and Transportation Data units could yield insights about behavior at intersections including railroad crossings.

As ODOT's data collection and warehousing efforts continue to evolve, incorporating railroad system and incident information will provide additional layers of information and support informed decision making.

## Land Use Impacts

RPTD works with hundreds of road authorities and 35 railroads on crossing safety projects. Many factors influence crossing projects and land use changes may greatly impact railroad crossings. Localities with land use decision authority should consider the short

### Information RPTD collects for crossing data include:

***Physical characteristics including:***

- Number of tracks
- Number of travel lanes (including bicycle lanes and sidewalks)
- Crossing angle
- Vertical elevation
- Train posted speed
- Roadway posted speed

***Route designation including:***

- Bus routes
- Hazmat routes
- Freight routes
- EMS routes

***Incident information:***

- Previous incidents
- Mode of traveler for incidents
- Weather
- Traveler behavior at time of incident

***Warning devices:***

- Gates
- Bells
- Lights
- Pavement markings
- Signage
- Guardrail

*Simple land use changes may affect crossing safety.*

10 Transportation Research Board, *NCHRP Report 755: Comprehensive Costs of Highway-Rail Grade Crossing Crashes* (2013)

# SPOTLIGHT ON:

## *Education*

**Iowa Department of Transportation**

### *Brief Bother Big Benefit*

Iowa Department of Transportation (Iowa DOT) recognized the significant role of risky behavior at railroad crossings, specifically, increased traveler impatience leading to a rising number of travelers going around activated gates. To increase awareness of the risks of this behavior, Iowa DOT created a short video and posted to Youtube. The video, titled "Brief Bother, Big Benefit" pointed out that trains carry the same weight as 7 miles of semi-truck trailers and reduce overall congestion of the transportation system. But these trains are unable to detour while travelers can detour around a blocked crossing. It reminds drivers that waiting at blocked crossings is a short price to pay for safety, congestion reduction and the goods that trains deliver to Iowa's economy.

and long-term impact of development on crossings. For example, the development of an after school program activity center on a former light warehouse site near a crossing has crossing safety implications in terms of potential bus routing, increased pedestrian and bicycle activity and increased auto traffic. It is more effective and efficient to address potential impacts to the crossing prior to development rather than later. Local governments are encouraged to report changes in land use and traffic impacts to RPTD but often fail to do so. These entities may be unaware of the need to engage RPTD or unwilling to contact ODOT or the appropriate railroad.

## Coordination

Transportation projects near crossings also often go unreported to RPTD, sometimes leading to crossing impacts. Local road authorities may be unaware or not understand the need to engage RPTD with regards to crossing regulation, including areas near crossings. Moreover, local road authorities may have misconceptions about the role of RPTD and railroads. There is a need for clear and consistent information for when and how to engage with RPTD and railroads including how RPTD can assist local road authorities in communicating with the railroad. This information can be distributed by a number of methods such as the ODOT website, training materials, and through other resources such as League of Oregon Cities (LOC) or Association of Oregon Counties (AOC).

## Working with Railroads

Engaging with railroads on local road projects near crossings is also challenging for local road authorities. Early coordination with railroads is important for crossing project success but is often hindered by slow response rates,

lack of engagement or unwillingness to participate in the project. Recognizing the significant role of railroads in crossing safety projects, RPTD seeks to improve coordination between road authorities and railroads. To help railroads and local jurisdictions better understand the benefits of railroad crossing safety projects and the importance of early coordination, RPTD will lead the effort for stronger coordination between these entities for improved project development and delivery processes.

## Route Importance

In addition to land use, consideration should be given to roadway route designations. EMS, bus routes and freight routes are a few examples. To recognize the importance of these and other route designations such as bicycle routes, route designations may receive stronger consideration in future improvement prioritization processes.

## Funding

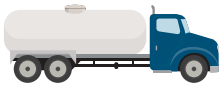
ODOT crossing safety funds come primarily from two sources: federal Section 130 dollars and state GCPA funds. These program funds have explicit eligibility requirements and are limited to engineering improvements. As such, ODOT funds for crossing safety education and outreach are limited, with no dedicated funding source available for these initiatives. RPTD will continue partnering with Oregon Operation Lifesaver and with other related agency initiatives for strategic education and outreach opportunities.

Although grade separation projects are eligible for Section 130 and state GCPA funds, the funds available are not enough to complete a grade separation project. Additionally, RPTD is not positioned to provide a match for immediate opportunity grant programs such as those initiated by FHWA, FRA or the Better Utilizing Investments to Leverage Development (BUILD) transportation grant program. Grant programs often provide additional weight for increased match and partners, further challenging RPTD's ability to compete for such funds.

Section 130 is a highway based fund for eligible crossing projects and as such, renders crossing projects ineligible for the Connect Oregon program, a program that provides grant funds for rail, marine and

*Route Priority Considerations in project prioritization.*

School Bus



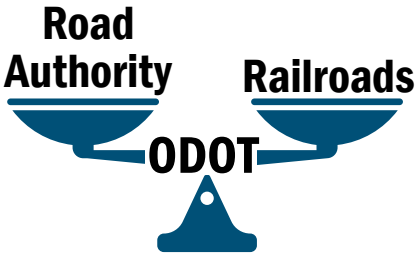
Hazmat

EMS

OHP Freight

*Balance and Coordination*

RPTD facilitates project coordination between railroads and road authorities.



# SPOTLIGHT ON:

## *Outreach*

### *FRA Social Media Campaign*

The Federal Railroad Administration has utilized various social media platforms such as Facebook, Instagram and Twitter in an attempt to counter a growing trend of using railroad tracks as a location for photographs. FRA tagged the messages with the hashtags #ThursdayThoughts and #NoPhotosOnTrainTracks in an effort to reach younger audiences and educate them about the dangers of taking photos on or near railroad tracks. Messages incorporated targeted graphics and video stories of the dangers; these were retweeted thousands of times, connecting them through the hashtags to topic summaries. The effort also emphasized the legal repercussions of trespassing on railroad property.


bicycle infrastructure. Connect Oregon funds are not eligible for projects that are eligible for highway funds.

Section 130 funds require a non-federal 10% match and may be used for a limited number of project elements with 50% of funds intended for warning devices. Funding has been relatively stagnant with dollar amounts remaining largely unchanged in recent years. As a result, funding dollars do not go as far as they did in the past, declining the value of these funds in the face of increased project costs.

# Opportunities

## Railroad Crossing Safety is Part of ODOT

In many states, crossing safety oversight is implemented through the public utilities commission or similar agency that is not part of the statewide transportation agency. These agencies have the same regulatory and oversight authority as those railroad crossing safety agencies that are part of the department of transportation but must coordinate efforts with the transportation agency.

In Oregon, the crossing safety oversight is coordinated by ODOT through the RPTD. This arrangement affords close coordination and collaboration within ODOT, facilitating streamlined funding and project delivery processes as well as strong partnership opportunities for data coordination, driver training, education and outreach.

Similarly, in coordination with other ODOT divisions such as TSD, Research, DMV, Communications and TDD, RPTD can employ a collaborative approach to improve crossing safety. This includes engagement in funding

processes, driver training improvements, guidance development, participation in safety initiatives and exploring research opportunities. Furthermore, RPTD and the Active Transportation Section can collaborate on initiatives such as multimodal crossing guidance, project application development processes and relevant rulemaking.

RPTD provides information and analysis to the Oregon Transportation Commission (OTC), a five person governor appointed body with the responsibility of establishing state transportation policy in Oregon. As part of ODOT, RPTD may also influence legislative efforts as part of a larger transportation discussion. Through ODOT's "leadership teams" structure, RPTD can engage and inform agency stakeholders on various processes, identify key areas for improvements and improve crossing project delivery.

## Outside Partnerships

ODOT relies on strong partnerships with local agencies, other state agencies, railroads and stakeholder groups to implement system improvement initiatives. Building on these partnerships to address crossing safety, RPTD plays a central role in coordination and collaboration. With local agency support, projects are more likely to progress efficiently. Local road authorities can promote local community support and relay safety benefits to stakeholders. Engaging railroads is often challenging for local road authorities. Whether identifying the appropriate railroad, engaging at the right time or working on project tasks, engaging with railroads can be complex and difficult. RPTD can serve a critical role to promote communication between local road authorities and railroads.

Private sector companies and non-profit groups such as Oregon Operation Lifesaver have and will continue to play a pivotal role in crossing safety. Railroads play a major role in education and outreach as well as project delivery and training. RPTD will be more engaged in existing safety awareness efforts and seek opportunities to expand on these efforts.

Local law enforcement agencies and Oregon State Police (OSP) also play an important role in crossing safety efforts. However, enforcement resources are very limited and especially so for crossing safety efforts. To better incorporate enforcement strategies in railroad crossing safety, local community support will be needed to dedicate resources to these efforts. Developing strong partnerships with

*RPTD is in ODOT*

ODOT's Rail Crossing Safety Unit is in RPTD.

- Oregon Transportation Commission
- *ODOT Director*
- Transportation Development Division
- *Rail/Transit Divison*
  - Transit Operations
  - Transit Programs
  - ***Rail Crossing Safety***
    - Rail Safety
    - Rail Operations

# SPOTLIGHT ON:

## *Enforcement*

### *Grand Prairie Rail Crossing Enforcement*

In 2007, the city of Grand Prairie, Texas was experiencing the highest crossing incident rate in the state. These incidents occurred along a six mile corridor of double main-line tracks through the city that includes 10 at-grade crossings, all with gates and lights. After a string of fatal incidents at railroad crossings, three crossings with the highest number of crossing violations were selected for photo enforcement. Grand Prairie partnered with the UPRR on a railroad grade crossing photo enforcement program. Rather than focus on the program as a revenue generator, city and railroad officials focused on the safety aspect of the program and applied the collected citations to safety programs including school zone signage, pedestrian safety upgrades and intersection improvements.

Since its inception, enforcement efforts has resulted in a reduction of incidents at and near crossings and there have been no fatalities in this corridor since inception. Additionally, violations have decreased as well. Program implementation required a local ordinance, engineering study and installation of advance signs and video equipment.

local communities and law enforcement will enable coordinated action efforts such as targeted enforcement and education campaigns.

ODOT is dedicated to working with private sector, non-profit groups and local entities on an integrated and strategic approach that combines targeted outreach, strategic education and coordinated enforcement to improve crossing safety. These efforts will also facilitate stronger project partnerships for future efforts.

## Training

Training is an essential component of transportation system safety efforts. Engineers and project managers depend on up to date training to incorporate engineering standards and requirements and to understand project procedures. Training also provides information on best practices, railroad regulations and recommended practices, going beyond the Manual on Uniform Traffic Control Devices (MUTCD) guidance to promote the best approaches to crossing safety in Oregon. Currently, little railroad crossing safety training and guidance is offered by ODOT and there is an opportunity to develop and distribute this information. Through development of a railroad crossing curriculum, RPTD can serve as the central source of crossing safety information and establish a foundation for providing pertinent and timely information on crossing project facts, funding process improvement strategies and best practices. Coordinated training may also expand avenues for information sharing, further improving project processes. By developing crossing guidance and training, RPTD will provide stronger direction to local road authorities and ODOT divisions.

## Analysis Tools

Grade Dec is a crossing evaluation tool offered by FRA for cost benefit analysis of crossing projects. Many states are employing more robust cost benefit tools and risk assessment tools to strategically target funding to crossing safety needs. As technology continues to evolve in data collection and data sharing and analysis, opportunities for improved information sharing and analysis will inform project selection decisions.

*Training is essential for rail crossing safety improvement.*

## Emerging Technology

Emerging technology will impact the transportation sector, including crossings. Connected and autonomous vehicle (CAV) technology promises to transform transportation systems. Automated vehicles are already being tested and may soon be deployed. These technologies bring a range of policy implications as well as strategies for safety improvement at crossings.

Radar detection, track intrusion detection technology and geo-fencing are also examples of emerging technologies with implications to crossing safety. Several pilot projects have been implemented to study the possibilities and crossing safety implications. Recognizing the role and potential implications of technology is imperative for improving crossing safety. Partnering with railroads and other partners will be essential to incorporate technology into the transportation system for improved safety.

*Emerging Technology*

Connected and Autonomus Vehicles

Video Enforcement

Cameras

Radar/Lidar

Phones

## Legislative Input

ODOT works closely with the Oregon legislature on policies related to transportation. Railroad safety, including crossing safety are important legislative topics. Backed with information, strategies and guidance from the Plan, ODOT can play a stronger role in crossing safety related legislation including potential funding mechanisms.

# DID YOU KNOW:

## *Trespassing*

Trespassing on railroad property is a growing concern. Incidents resulting from trespassing are on the rise nationally and in Oregon. Between 2012 and 2017, 5,397 trespassers were injured or killed, an 18% increase during the time period. In Oregon, 77 fatal or injury incidents resulted from trespassing and the numbers may be under-reported. While railroad crossing incidents have generally declined, trespassing numbers have risen sharply in recent years.

Trespassing often occurs as a result of limited crossing locations but is also often a result of travelers utilizing railroad tracks and right-of-way as a pathway parallel to the tracks, or one that crosses the tracks. Homelessness is also a growing concern related to trespassing.

This Plan does not specifically address trespassing but many of the strategies and actions may indirectly address trespassing. While federal and state crossing safety funds cannot be used specifically for trespassing prevention efforts, it is recognized as a major safety issue by railroads and communities across the U.S.

The FRA has declared trespassing to be a major area of concern and has dedicated resources to understanding the issue and development of prevention strategies through their *National Strategy to Prevent Trespassing on Railroad Property.* Education, outreach and enforcement are key strategy areas important to reducing trespass incidents but community and transportation planning may play a key role in preventing railroad trespassing and related incidents.

*Source: Federal Railroad Administration, 2019*

# Plan Objectives

## Introduction

The Plan objectives provide direction for strategies and actions, uniting the overarching statewide policy framework to implementation opportunities. Objectives reflect the need and purpose of the Plan as well as the system issues and challenges.

## 8 Objectives of the Plan

1. Reduce the number of railroad grade crossings.
2. Coordinate and collaborate with railroads, road authorities and other stakeholders to improve railroad crossing safety.
3. Strengthen education and outreach about railroad crossing safety.
4. Strengthen enforcement of illegal and dangerous behavior near railroad crossings.
5. Apply engineering solutions for improvements.
6. Balance safety with quality of life.
7. Reduce the number and rate of crossing incidents, injuries and fatalities.
8. Leverage opportunities for railroad crossing improvements.

## Achieving Plan Objectives

Achieving the Plan objectives will be met with numerous challenges. A course of sustained implementation efforts will be needed to overcome obstacles to achieving these objectives. The Plan's supporting strategies and actions outline a path to achieving the objectives through a coordinated and continuous path forward.

RPTD determines which best practices are suited for Oregon's transportation system needs. Additionally, RPTD must articulate and support the need for increased crossing safety funds. The objectives and strategies outlined serve this purpose. Calls for additional resources must be combined with efforts to improve current project processes to make the best use of limited resources.

Furthermore, stakeholder engagement plays a significant role in ODOT's effort to improve crossing safety. Continuously engaging with stakeholders to understand the barriers to Plan objectives and evolving needs will serve as a strong foundation for Plan success.

# DID YOU KNOW:

## *Key Performance Measures*

The Legislative Fiscal Office and the Budget and Management Division of the Department of Administrative Services adopted a set of criteria that state agencies including ODOT must meet when developing measures. These measures and progress toward them are reviewed during Oregon's biennial legislative session.

ODOT's Key Performance Measures exist to fulfill the following aims:

- Ensure transparency and accountability to the public and decision makers;
- Drive solutions and outcomes to meet ODOT's mission, goals, values, and statewide plans;
- Support and inform performance-based decision making;
- Support and inform effective resource allocation.

The visibility provided by the performance management system and Key Performance Measures support better and faster decisions and control of processes in the organization. KPMs drive solutions and outcomes to best manage systems and information. KPMs also support a process to provide valuable information for ODOT to identify gaps and issues that should be addressed. These measures are pivotal in identifying what is and is not working to meet the mission and inform resource allocation.

# Strategies and Actions

## Introduction

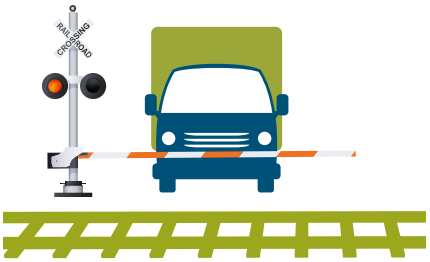
Strategies are the framework of the action plan and were developed through consideration of incident data analysis, stakeholder input, extensive research and agency discussions. The strategies include improved methods of targeted engineering, a focus on best practices and recognition of ODOT's role in coordination and collaboration. Furthermore, the strategies prescribe the leveraging of limited resources and emphasize the important role of education, training, outreach and enforcement in crossing safety.

*Grade Separation*

## Plan strategies fall into two categories:

1. Modifying traveler behavior.
2. Improving ODOT coordination and collaboration.

*At-Grade Crossing*




Together, strategies in these areas comprehensively address crossing safety. Each strategy includes specific actions for RPTD implementation. When taken together, the Plan strategies and actions provide a synthesis of Plan findings, best practices and recommended direction for improving crossing safety.

## Focus Areas

Within the two categories are a series of focus areas that collectively form the strategy framework of the Plan. Each focus area is connected to others but is distinguished by unique contributions to improving crossing safety in Oregon.

# Modifying Traveler Behavior

## Education

Education-focused strategies complement the other focus areas as each strategy is more impactful with a key education element. For example, when combined with targeted enforcement efforts, education strategies help travelers understand the true dangers of risky behavior at crossings. The Plan calls for research into best education practices to find the best approach for Oregon and a joint effort with partners such as Oregon Operation Lifesaver. Education strategies are relatively low cost approaches with very high impact as evidenced by experience in other states.

| Category | Plan Objective | | Strategy |
|---|---|---|---|
| Modifying Traveler Behavior | Strengthen education and outreach about railroad crossing safety | Edu 1 | Engage with ODOT divisions responsible for driver training programs to improve railroad safety coverage |

| | Actions | Description |
|---|---|---|
| **Edu 1.1** | Establish internal RPTD work group to systematically review driver training materials, review best practices, make corrections and recommend improvements | To participate in driver training materials development, RPTD will review current materials and current incident and behavior trends to evaluate materials and make revisions related to crossing safety. To do so, RPTD will establish an internal expert work group to determine key messages and issues related to driver activity at crossings. This group will assess current materials and recommend revisions, corrections and improvements. RPTD will deliver these messages during the driver training materials improvement cycle. |
| **Edu 1.2** | Regularly participate in driver licensing manual review and development (DMV) and driver training review process (TSD). | ODOT develops and distributes driver training materials through two units: DMV and TSD. TSD manages two specific group driver training materials: teen drivers and motorcycle drivers. DMV coordinates training material for regular licensing and works with vendors for CDL licensing. RPTD will participate in driver license training materials development including establishing key crossing safety messages, selecting related images and ensuring accuracy. Also, RPTD will engage in CDL training material development to better address crossing safety. |

| Category | Plan Objective | | Strategy |
|---|---|---|---|
| Modifying Traveler Behavior | Strengthen education and outreach about railroad crossing safety | Edu 2 | Lead development of education materials to accompany targeted enforcement efforts and other distribution |
| | | | |
| | | | |
| | Strengthen education and outreach about railroad crossing safety | Edu 3 | Seek opportunities to distribute education materials and messages |

| | Actions | Description |
|---|---|---|
| **Edu 2.1** | Develop key education messages based on best industry practices | It is critical to assess trends in risky behavior, high risk locations and key times when these activities are happening to develop timely education materials best suited to reduce these behaviors. |
| **Edu 2.2** | Identify distribution opportunities | The distribution of education materials is important in delivering the crossing safety message to as many groups as possible. Expanding distribution avenues can reach a wider audience. Additional distribution opportunities include DMV offices, city events, high school programs and city halls. |
| **Edu 2.3** | Revise message as needed | Trends and changes should be reflected in timely education materials. For high risk groups, messages will be tailored accordingly. |
| **Edu 3.1** | Work with ODOT units to identify key education outreach opportunities | Partner with TSD and Communications to target distribution for maximum impact to high risk groups or in high risk areas. |

# Enforcement

Enforcement plays a major role in reducing risky driver behavior at crossings. Targeted enforcement of railroad crossing violations is a critical component of crossing safety strategies. However, resources for enforcement are limited in Oregon, necessitating a strategic approach to enforcement at crossings. These strategies encourage the use of enforcement at those crossings where risky behavior occurs most often in combination with outreach and education strategies. The strategies recognize the significant shortfall of resources and encourage joint effort campaigns to best utilize limited enforcement resources, calling on a partnership with local enforcement agencies and RPTD.

| Category | Plan Objective | | Strategy |
|---|---|---|---|
| Modifying Traveler Behavior | Strengthen enforcement of illegal and dangerous behavior near railroad crossings | **Enf 1** | Promote enforcement of traffic laws related to railroad crossings |
| | | | |
| | | | |
| Modifying Traveler Behavior | Strengthen enforcement of illegal and dangerous behavior near railroad crossings | **Enf 2** | Investigate alternative methods of enforcement |
| | | | |

| | Actions | Description |
|---|---|---|
| **Enf 1.1** | Explore best practices of enforcement combined with education | Enforcement should be complemented by education outreach to convey railroad crossing safety messages in addition to legal ones. |
| **Enf 1.2** | Develop and distribute strategic message with education component | Developing a timely and impactful education message will be important to support enforcement efforts. RPTD will develop the education message and work with law enforcement to distribute the message when completing crossing enforcement efforts. |
| **Enf 1.3** | Target high risk crossings and/or high risk times for enforcement efforts | With limited resources, enforcement efforts should be targeted to areas and/or during times when risky behavior is more often occurring. RPTD can utilize video recordings to observe behavior to select priority crossings for these efforts. |
| **Enf 2.1** | Research innovative enforcement options | The use of enforcement technology is growing. Many Oregon cities have implemented camera/video enforcement at highway intersection signals and some in other states have expanded this technology to crossings. RPTD will research and pursue best practices in this area and work with partners to develop proper enabling statutes. |
| **Enf 2.2** | Identify opportunities to employ alternative enforcement methods | Work with agency partners to evaluate opportunities to employ alternative methods (e.g. camera, radar, etc.). |

| Category | Plan Objective | | Strategy |
|---|---|---|---|
| Modifying Traveler Behavior | Strengthen enforcement of illegal and dangerous behavior near railroad crossings | **Enf 3** | Utilize targeted enforcement campaigns to address observed risky behaviors at railroad crossings |
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| | Actions | Description |
|---|---|---|
| **Enf 3.1** | Identify high risk crossings or crossings with observed risky behavior for targeted campaigns | Enforcement should be targeted to crossings with the highest risk or highest amount of risky behavior. With background crossing data and observation, RPTD will develop a list of high risk crossings to target enforcement efforts. |
| **Enf 3.2** | Work with ODOT partners and units to leverage specialized grant opportunities (e.g. FRA enforcement, NHTSA distracted driving, etc.) | Enforcement initiative funds are currently limited. RPTD will coordinate with agency partners to pursue enforcement related grant opportunities to expand opportunities for crossing enforcement efforts. |
| **Enf 3.3** | Address trespassing through targeted enforcement in high trespass activity corridors | Trespassing is major safety concern for communities and railroads but little enforcement is done by communities or railroads. Through strategic enforcement and education campaigns in high activity areas, trespassing can be reduced. |

# Engineering

The elimination of a grade crossing is the preferred option for crossing safety improvement. However, crossing elimination is often unrealistic, underscoring the importance of engineering in crossing safety improvement. Engineering strategies utilize design options, typically in the form of warning devices, signage, pavement markings and channelization to reduce poor traveler judgment at crossings. Engineering strategies focus limited funds as efficiently as possible on best practices. Strategies in this focus area also highlight the potentially significant impact of emerging technologies such as advanced connected warning signals, improved signage options such as activated signage, incorporation of smart phone warning technology and the role of connected and autonomous vehicles in crossing safety.

Grade separations are a viable alternative to crossing closure, providing a safe crossing above or below a railroad and relieving economic impacts from crossing related system congestion. Unfortunately, grade crossings are often cost prohibitive, with a single crossing costing considerably more than Oregon receives in annual crossing safety funds. The Plan calls for the establishment of an immediate opportunity fund for eligible projects where there is a demonstrated need for grade separation.

RPTD utilizes a corridor approach to crossing improvements, often upgrading one crossing in a corridor in exchange for a closure nearby in the corridor. A broader corridor approach is recommended to address the needs of all users including bicycles and pedestrians throughout a corridor. Through careful planning and engineering, a corridor approach encourages safe crossings designed through consolidation, channelization and additional safety devices such as gates, relocation of devices for movement efficiency and fencing to prevent trespassing.

| Category | Plan Objective | | Strategy |
|---|---|---|---|
| Modifying Traveler Behavior | Reduce the number and rate of crossing incidents, injuries and fatalities | **Eng 1** | Research best practices for engineering solutions at railroad crossings |
| | | | |

| | Actions | Description |
|---|---|---|
| **Eng 1.1** | Partner with ODOT units (e.g. TSD, Highway), local jurisdictions and federal agencies to explore best practices | Engineering has long been the primary tool for crossing safety improvements but understanding which practices offer the best results is needed to strategically and systematically employ these improvements. The field is evolving and improving. Understanding current and future best practices will offer valuable insight for decision making. |
| **Eng 1.2** | Develop a toolkit of engineering best practices | A regularly updated best practices toolkit will be a go-to information source for RPTD and project partners. |

| Category | Plan Objective | | Strategy |
|---|---|---|---|
| Modifying Traveler Behavior | Apply engineering solutions for improvements | **Eng 2** | Utilize project history and engineering experience to inform future investment strategies |
| | | | |
| Modifying Traveler Behavior | Reduce the number of railroad grade crossings | **Eng 3** | Target engineering solutions to the most challenging crossing safety issues |
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| | | | |

| | Actions | Description |
|---|---|---|
| **Eng 2.1** | Establish an engineering deployment database to capture current and future engineering projects | RPTD regularly selects and funds engineering improvements but does not regularly assess and monitor performance. A regular review of past practices will provide lessons learned for future decisions. |
| **Eng 2.2** | Identify key performance related information for tracking | Documenting key crossing issues that have been addressed and assessing engineering solution performance will enable RPTD to evaluate success. This information will provide lessons learned for future deployment of strategic engineering solutions to the most challenging crossings. |
| **Eng 3.1** | Continuously evaluate and improve crossing closure approach | Crossing closure is the primary option for safety improvements but local road authorities are often very reluctant to consider closure, despite incentives to do so. RPTD will take the lead in establishing a more formal approach to crossing closures to engage road authorities in process and foster an understanding of closure benefits. |
| **Eng 3.2** | Encourage and facilitate grade separation projects to highest risk crossings by development of a grade separation needs list for prioritization | Grade separated crossings are the safest crossings but are very costly. Grant programs exist but ODOT does not maintain a timely list of crossing separation project candidates. RPTD will evaluate risk at crossings and develop a prioritized list of best separation crossing projects based on a defined set of criteria. This list will be regularly reviewed and updated as needed, assisting ODOT in seeking funding opportunities for these projects. |
| **Eng 3.3** | Develop and implement corridor approach when appropriate | A corridor approach to crossing safety is standard for RPTD but can be improved with more defined and articulated project safety, mobility and efficiency benefits as well as a refined implementation approach. A corridor approach to crossing safety is also a strategy to reduce trespass, encouraging safe crossings in areas with highest need. With a reduction in long stretches without crossings, travelers are then less likely to trespass as a shortcut. |

| Category | Plan Objective | | Strategy |
|---|---|---|---|
| Modifying Traveler Behavior | Apply engineering solutions for improvements | **Eng 4** | Investigate opportunities to apply innovative engineering solutions to crossing with extreme challenges |
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| | Actions | Description |
|---|---|---|
| **Eng 4.1** | Identify good candidate crossings for innovative engineering solutions | Some crossings present significant challenges to safety improvements. Issues such as limited right of way, multimodal users, nearby roadways, queueing, nearby signals and increasing AADTs are good examples. RPTD will identify the most challenging crossings for consideration of innovative solutions. RPTD will also consider technology advancements as innovative solutions. Radar and LIDAR detection systems have been implemented at risky crossings. These systems use detection technology to reduce risk of collision by preventing travelers from being trapped on railroad tracks between activated gates. |
| **Eng 4.2** | Explore and implement pilot project initiatives | RPTD does not regularly employ crossing safety pilot projects. Seeking opportunities for pilot projects will afford RPTD the opportunity to test and employ new and innovative approaches and then evaluate success and develop improvements. This trial run practice will help identify potential problems and solutions for improved future implementation. |
| **Eng 4.3** | Assess effectiveness of pilot programs | Once a pilot program is complete, it's important to assess the effectiveness of the program in addressing the specific issue it was targeted toward. RPTD will assess pilot program effectiveness and complete a report on this information to inform future programs. |

# Multimodal Crossing

Oregon has a growing multimodal network with a significant number of multimodal crossings in the form of on-street bicycle lanes, mixed use trails, pedestrian crossings and sidewalks. These crossings present unique challenges including channelization, right-of-way, angled crossings and disconnected segments. Many areas lack sufficient multimodal crossings while others have crossings with poor surfaces. Multimodal crossing needs are a significant issue which was discussed and reiterated by stakeholders; and as a result, a series of strategies were incorporated into the Plan to address these specific types of crossings in Oregon.

| Category | Plan Objective | | Strategy |
|---|---|---|---|
| Modifying Traveler Behavior | Reduce the number and rate of crossing incidents, injuries and fatalities | **MM 1** | Apply best design practices and solutions |
| Modifying Traveler Behavior | Balance safety with quality of life | **MM 2** | Work in conjunction with other ODOT divisions to develop and distribute multimodal railroad crossing guidance and toolkit |

| | Actions | Description |
|---|---|---|
| **MM 1.1** | Research best practices for multimodal crossings that address unique challenges while meeting needs of bicycle, pedestrian and automobile travelers at crossings | Building from research, pilot programs and current best practices in other cities and states, RPTD will work with ODOT Active Transportation staff to assemble a series of best practices for multimodal crossings in Oregon. This information will take into account potential impacts to other users. |
| **MM 1.2** | Engage with ODOT divisions (e.g. Active Transportation, Freight Planning, Traffic Safety, etc.) for feasibility applicability in Oregon | Crossing safety improvements sometimes impact users differently. RPTD recognizes the important and unique needs of bicycle, pedestrian and truck modes. Incorporating expert input from ODOT modal units will be important for identifying crossing safety improvements that account for system mobility and efficiency. |
| **MM 2.1** | Develop multimodal guidance that incorporates best practices for multimodal crossing safety | Consistent guidance for multimodal crossings in Oregon does not currently exist. To best address the unique crossing needs of multimodal users (e.g. crossing surface, crossing angle, signage, channelization, etc.), a cooperative effort between RPTD and other units is needed to evaluate best practices and develop guidance that is suited for Oregon's system user needs. Incorporating modal expertise will result in a comprehensive system approach to multimodal crossings. |
| **MM 2.2** | Address potential system user needs and conflicts | Meeting the needs of one mode of travel may lead to unintended conflicts or impacts to other users. To best improve multimodal crossings, RPTD will systematically evaluate potential impacts to other users and select improvements that recognize the impacts to all users at crossings. |

| Category | Plan Objective | | Strategy |
|---|---|---|---|
| Modifying Traveler Behavior | Strengthen education and outreach about railroad crossing safety | MM 3 | Engage in ODOT modal efforts with connections to crossing safety |
| Modifying Traveler Behavior | Strengthen education and outreach about railroad crossing safety | MM 4 | Identify multimodal crossing funding needs |

| | Actions | Description |
|---|---|---|
| **MM 3.1** | Participate in Oregon Bicycle Manual Development | This guidance document is periodically updated by ODOT Active Transportation through a formal process. RPTD has not regularly participated in this process. Recognizing the significant influence of this document and opportunity to educate bicyclists on crossing safety dangers and risks, RPTD will be engaged in future cycle updates to ensure that crossing safety is adequately and appropriately incorporated. |
| **MM 3.2** | Partner with ODOT Active Transportation to participate in bicycle and pedestrian oriented processes to ensure crossing safety is consistently and appropriately covered | RPTD will regularly coordinate and collaborate to ensure crossing safety is systematically incorporated. Early and consistent engagement in ODOT processes such as program development, application processes (e.g. Safe Routes to School), rulemaking, etc. that directly or indirectly affect crossings will ensure that crossing safety is accomplished. |
| **MM 4.1** | Identify specific safety needs and risks | RPTD will identify specific multimodal crossing needs that are not currently fundable through Section 130 and GCPA programs. |
| **MM 4.2** | Articulate system mobility and efficiency benefits of multimodal crossing safety improvements | Explaining and demonstrating the system benefits of multimodal crossings to road authorities and stakeholders will foster project support. This will encourage project collaboration and funding support. |

# Multiple-Incident Locations

Between 2008 and 2017, 19 crossings had more than one incident. Oregon experienced 39 incidents at multiple-incident location railroad crossings. The contributing factors and crossing characteristics were reviewed in detail and an assessment was provided. While no major correlations between factors or characteristics were identified, RPTD should establish a review process for crossings with multiple incidents. Strategies in this focus area will provide direction for addressing multiple-incident crossings as they are identified.

| Category | Plan Objective | | Strategy |
|---|---|---|---|
| Modifying Traveler Behavior | Apply engineering solutions for improvements | MI 1 | Establish a formal review process triggered when a location becomes a multiple-incident location |
| Modifying Traveler Behavior | Strengthen education and outreach about railroad crossing safety | MI 2 | Consider alternatives to engineering at multiple incident locations |
| Modifying Traveler Behavior | Strengthen education and outreach about railroad crossing safety | MI 3 | Increase publicity and awareness at multiple-incident locations |

| | Actions | Description |
|---|---|---|
| **MI 1.1** | Define review criteria | A formal process will be triggered and the development of review criteria will enable a thorough process that assesses contributing factors and will lead to quicker solution delivery, when appropriate. |
| **MI 1.2** | Assign weight/value to criteria (e.g. passive devices, traveler mode, behavior, profile, crash severity, etc.) | Evaluating relevant incident factors will reveal important safety needs. Assigning value or weight to these factors will aid RPTD in crossing improvement prioritization. |
| **MI 1.3** | Initiate cost-benefit analysis for engineering | A cost benefit analysis will assist in prioritizing improvements at these crossings. |
| **MI 2.1** | Research best practices for addressing issues at multiple-incident locations | Engineering is just one solution to challenging crossing safety issues. When appropriate, a multi-faceted approach that includes education, outreach and enforcement initiatives will combine for a targeted approach to safety at these crossings. |
| **MI 2.2** | Develop a toolkit of best practices and innovative approaches to multiple-incident locations | Multiple-incident crossing locations often have challenges and complexities that are difficult to address. With an understanding of how other states successfully addressed these challenges, a toolkit of best practices and strategies will be assembled. These options will be considered for multiple incident locations. |
| **MI 3.1** | Partner with ODOT Public Information Officer for outreach strategies and efforts | Multiple incident crossings often present persistent safety challenges. RPTD will research what other states have successfully done in this area and partner with ODOT PIO to tailor approaches for Oregon's most challenging multiple incident crossings. |
| **MI 3.2** | Partner with Oregon Operation Lifesaver and local law enforcement for specific outreach efforts at high risk crossings | Working in conjunction with city councils, local law enforcement, etc. on targeted enforcement and education campaigns at risky crossings will offer a multipronged effort to reduce risky behavior. Campaigns should incorporate timely information and social media platforms as needed. |

# ODOT Coordination and Collaboration

## Coordination

RPTD is the primary source of crossing safety information in Oregon. RPTD will enhance current project selection processes and provide consistent information, made readily available to stakeholders through a series of forums. RPTD will also serve as a conduit between local road authorities and railroads with clear articulation of priorities, related policies, funding applicability and project benefits information. Currently, RPTD responds to project requests and questions as they are received. By proactively providing necessary information to key stakeholders, RPTD will ensure that information is consistent and remove barriers to crossing safety project development. To facilitate and improve communication, RPTD will proactively reach out to communities with risky crossings to engage them in crossing safety improvement efforts.

Strategies for improved coordination will strengthen partnerships between RPTD and project partners including local road authorities and railroads. This will result in more efficient project development and delivery processes, improved local community project support and better use of limited funding resources.

| Category | Plan Objective | | Strategy |
|---|---|---|---|
| ODOT Processes, Coordination and Collaboration | Coordinate and collaborate with railroads, road authorities and other stakeholders to improve railroad crossing safety | C1 | Develop an efficient process for coordinating with stakeholders to gain project support from local jurisdictions as well as project development efficiency |
| | Coordinate and collaborate with railroads, road authorities and other stakeholders to improve crossing safety | C2 | Pursue opportunities to engage all stakeholders in crossing safety improvements |

| | Actions | Description |
|---|---|---|
| C 1.1 | Develop and distribute education resources to communicate crossing risks and benefits to ODOT units, local road authorities and stakeholders | Local communities, road authorities and other stakeholders are often not fully aware of crossing safety risks and potential system impacts of crossing incidents. RPTD will develop resource information that provides crossing safety project benefits and potential areas of project risk. |
| C 1.2 | Partner with ODOT Public Information Officer and Transportation Safety Division to reach out to broader range of stakeholders | ODOT's PIO can help address project challenges and gain critical local project support early in the project development process. Local project support is very influential in reducing project delay, enabling coordination and promoting collaboration for crossing safety projects. |
| C 2.1 | Reach out to short-line railroads to discuss project needs, funding opportunities and potential corridor benefits | Small railroads often have little capacity for crossing safety improvements or efforts. RPTD will reach out to small railroads with demonstrated crossing safety issues to assist in improvement project development. |
| C 2.2 | Establish a process to reach out to communities with limited means that ODOT has identified as having at-risk crossings to facilitate potential improvements | For communities with very limited public dollars or engineering services, crossing safety improvements can be intimidating, confusing or imposing. RPTD will work with these communities to break down the barriers and assist in the funding and project process for crossing safety improvements. |

| Category | Plan Objective | | Strategy |
|---|---|---|---|
| | Coordinate and collaborate with railroads, road authorities and other stakeholders to improve crossing safety | C2 | Pursue opportunities to engage all stakeholders in crossing safety improvements |
| | Coordinate and collaborate with railroads, road authorities and other stakeholders to improve railroad crossing safety | C 3 | Improve coordination with railroads, articulate ODOT priorities, funding applicability and project benefits |
| | | | |
| | Coordinate and collaborate with railroads, road authorities and other stakeholders to improve railroad crossing safety | C 4 | Better engage in ODOT project identification processes and better articulate benefits of crossing safety projects |
| | | | |
| | Coordinate and collaborate with railroads, road authorities and other stakeholders to improve railroad crossing safety | C 5 | Strengthen coordination with railroad partners regarding blocked crossings |

| | Actions | Description |
|---|---|---|
| C 2.3 | Partner with Oregon Operation Lifesaver to identify and reach out to stakeholders | Operation Lifesaver works closely with Oregon communities and key groups to deliver timely and valuable education materials. RPTD will partner to promote crossing safety awareness. When appropriate, RPTD will partner to strategically target high risk groups or high risk areas to reduce crossing incidents. |
| C 3.1 | Utilize website to enhance communication with eligible stakeholders | ODOT RPTD offers little information beyond legislation and policies. The RPTD website could be better utilized to provide consistent crossing safety information and project development guidance. The website will stress the central role of RPTD as a facilitator between local road authorities and railroads. RPTD recognizes that working with railroads is challenging for some communities and this difficulty may result in project delays or lack of railroad inclusion. |
| C 3.2 | Develop and distribute guidance for external partners to engage ODOT RPTD when appropriate | Little guidance currently exists that disseminates crossing project information to external stakeholders such as local road authorities, engineering consultants or railroads. RPTD will promote stronger communication with external partners by developing and issuing guidance on working with RPTD on crossing safety projects and efforts. |
| C 4.1 | Develop and distribute guidance for internal partners to engage ODOT RPTD when appropriate | Many ODOT units work with RPTD on crossing safety projects but have no official guidance on when and how to engage RPTD. Development of guidance will provide important information for working with RPTD on crossing safety projects. |
| C 4.2 | Proactively and continuously participate in ODOT funding and project identification processes | RPTD will continue to engage in the STIP funding cycle processes to ensure crossing safety impacts are properly identified and leverage opportunities are identified whenever possible. Additionally, RPTD will participate in TSD annual safety workshops to encourage partnership on safety strategies. |
| C 5.1 | Coordinate with railroads and partners for blocked crossing identification to notify communities of blocked crossings to discourage unsafe behavior at blocked crossings | Blocked crossings present certain safety challenges and system impacts. ODOT cannot regulate crossing blockages but can assist in providing related information to affected communities. This information can be relayed to system users and help prevent unsafe and risky behavior of crossing a blocked train. |

# Data Collection

ODOT collects and maintains an extensive warehouse of transportation system asset and performance data. As such, RPTD is the primary keeper of railroad system incident and asset information. Through greater coordination and sharing, ODOT can improve data collection and enhance system information analysis tools. This information can then be shared with local road authorities for a more informed decision making process and improved allocation of crossing safety resources.

| Category | Plan Objective | | Strategy |
|---|---|---|---|
| Improving ODOT Processes, Coordination and Collaboration | Coordinate and collaborate with railroads, road authorities and other stakeholders to improve railroad crossing safety | D 1 | Work with internal and external state agency and stakeholder partners for improved incident reporting and data collection. |
| Improving ODOT Processes, Coordination and Collaboration | Coordinate and collaborate with railroads, road authorities and other stakeholders to improve railroad crossing safety | D 2 | Serve as a broker for railroad crossing system asset and crossing incident data. |

| | Actions | Description |
|---|---|---|
| D 1.1 | Assess state and local roadway crash reporting for areas of improvement | To improve current processes, RPTD will regularly assess what should be collected and engage in the reporting improvement process to implement revisions. RPTD will also expand crossing incident review to better assess incidents near crossings to determine if any incidents were related to the crossing. |
| D 1.2 | Encourage railroad near-miss reporting | Near miss reports (completed by railroads) are encouraged but not required. Since it is challenging to engage railroads to complete these reports, consider incentives to encourage railroad participation. |
| D 2.1 | Develop a strategic railroad crossing data plan (e.g. update cycle, assess data availability/ accuracy/timeliness) | A data plan would evaluate current data, identify opportunities for sharing and assess future needs. |
| D 2.2 | Collaborate with ODOT units for expanded data coordination | RPTD will work with ODOT units including Transportation Data, Asset Management Inventory (AMI), TSD and GIS as well as Motor Carrier Division for improved data sharing. |
| D 2.3 | Participate in ODOT data warehouse efforts | ODOT is in the process of a Strategic Data Plan development. RPTD will engage as needed for crossing data sharing. |
| D 2.4 | Work with TransGIS tool to include/improve information for local partners, railroads and other stakeholders | TransGIS and TPOD are powerful asset tools for all project stakeholders, providing valuable system asset info, performance information as well as incident information. Additional crossing characteristic and incident information can enhance this tool. This system may be enhanced with local system information as it becomes available. |

# Funding

Strategic allocation of limited funds is essential for maximizing resources. Crossing safety projects are most often funded through a combination of local transportation and general funds. In some cases, state and federal crossing safety funds are used for improvements. In each case, leveraging funds is a tool to maximize these resources. For example, utilizing match funds for immediate funding opportunities amplifies the dollars available to achieve more project goals.

Leveraging opportunities are equally important as leveraging funds. Through improved coordination and communication with project stakeholders, opportunities for crossing safety projects can be coordinated with other transportation system improvements. For example, coordinating private investments at crossings with public funded projects in one project can minimize blocked crossings and system disruptions while simultaneously completing multiple crossing safety projects. RPTD will improve partnership with ODOT Region divisions and engage in project selection processes that maximize opportunities.

The crossing safety project process typically requires a partnership between the railroad, the local road authority and RPTD. The project delivery process is traditionally managed by ODOT Regions rather than RPTD. Through its central role, RPTD can provide greater statewide consistency for project delivery processes, challenges, and opportunities.

Like other states, Oregon relies on a project identification process to identify crossing safety needs and high-risk crossings. Through an enhanced prioritization process that better accounts for system changes, incident severity, multimodal users, route priority and cost/benefit and feasibility analysis, RPTD will also maintain a timely list of crossing project needs. This list can be utilized for improved coordination.

| Category | Plan Objective | | Strategy |
|---|---|---|---|
| Improving ODOT Processes, Coordination and Collaboration | Leverage opportunities for railroad crossing improvements | **F 1** | Seek additional railroad crossing safety funding sources |

| | Actions | Description |
|---|---|---|
| F 1.1 | Establish a list of project needs including grade separation projects, crossing surface needs and other needs | Identify projects for grant opportunities and develop a crossing safety project needs list. This needs list will inform future Oregon State Rail Plan efforts and support funding requests. |
| F 1.2 | Work with legislative partners for increased funding opportunities | Legislatures develop policy and funding mechanisms for crossing safety projects. ODOT will work with these bodies when appropriate to provide important information and timely needs lists. |

| Category | Plan Objective | | Strategy |
|---|---|---|---|
| Improving ODOT Processes, Coordination and Collaboration | Leverage opportunities for railroad crossing improvements | F 1 | Seek additional railroad crossing safety funding sources |
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| | Actions | Description |
|---|---|---|
| **F 1.3** | Better leverage funding for grade separation projects | Grade separation projects have extensive benefits but are currently too costly for RPTD to fund on a regular basis. Grant programs periodically become available but require a state match, which is also more than ODOT can obligate. RPTD will complete a list of recommended and prioritized grade separation project candidates and work with local communities to gain support. With a needs list and local support and funding partners, RPTD can strategically pursue grade separation projects. |
| **F 1.4** | Seek funding for crossing surface improvement projects | Although there are documented crossing surface safety issues, crossing surface improvements are not funded by current crossing funding programs. RPTD will establish a list of crossing surface project needs and pursue funding opportunities. |
| **F 1.5** | Seek funding and efficiencies for education and outreach efforts | Education and outreach are recognized as complementary safety approaches but current crossing safety funding programs do not fund these efforts. It is imperative for RPTD to seek opportunities with related safety initiatives to fund these initiatives. Examples include partnering with Transportation Safety Division (TSD) on targeted outreach, engage the ODOT Public Relations in strategic efforts and work closely with Oregon Operation Lifesaver for shared opportunities. |
| **F 1.6** | Seek funding and options for crossing closures (e.g. incentive funds) | RPTD will investigate best incentive practices in other states and seek incentives funds to encourage crossing closures. |
| **F 1.7** | Seek funding and opportunities for crossing safety related enforcement | Enforcement is a key crossing safety strategy for reducing risky behavior at crossings. However, resources are currently limited for this type of effort. RPTD will work to identify and pursue funding for these safety efforts including special grants, participation in other safety programs and local programs. |

| Category | Plan Objective | | Strategy |
|---|---|---|---|
| Improving ODOT Processes, Coordination and Collaboration | Leverage opportunities for railroad crossing improvements | F 1 | Seek additional railroad crossing safety funding sources |
| Improving ODOT Processes, Coordination and Collaboration | Leverage opportunities for railroad crossing improvements | F 2 | Enhance the crossing safety project prioritization process for funding |
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| | Actions | Description |
|---|---|---|
| **F 1.8** | Maximize leverage opportunities for engineering improvements and seek additional funds for low-cost treatments | Leveraging project opportunities, in particular funding opportunities is critical for maximizing limited transportation project dollars. In coordination with local road authorities, ODOT Region offices and railroads, RPTD can line up project opportunities with defined crossing needs. |
| **F 2.1** | Determine prioritization criteria (e.g. risk factor, routing, partnership opportunities, nearby land use, etc.) | ODOT crossing project selection process will begin with an evaluation of crossing criteria. To select this set of criteria, a number of factors should be evaluated. The merits of each criteria should be debated and a final collection of prioritization criteria should be selected. These criteria will be applied to all eligible potential crossing projects. |
| **F 2.2** | Develop prioritization algorithm | Work with technical team to establish variables and assign weight to a series of crossing related prioritization criteria. |
| **F 2.3** | Utilize a work group of technical experts for final selection | Engaging a technical expert group to select projects will encourage thorough consideration of factors and benefits and provide process transparency. |
| **F 2.4** | Establish project performance measures | To complete before and after crossing safety evaluation, performance measures will be identified. |

# Training and Outreach

Local road authority and ODOT engineers depend on timely information related to design standards, requirements, project process information and design solutions for project development. Currently, little centralized crossing safety design training exists in Oregon. RPTD plays a central role in the development and distribution of crossing safety related materials and will lead the effort to develop a training curriculum to provide foundational and consistent information for all engineers and planners involved in crossing projects. This information will detail the project process, explain funding, provide information on working with railroads and provide specifics about the project development process. The development of a comprehensive training curriculum will ensure consistency in the crossing safety project development process and offer a reliable source of information for future projects.

Utilizing technology such as social network platforms with highly targeted messaging and outreach can play a strong role in improving safety at crossings. Nearly all crossing incidents in Oregon between 2008 and 2017 resulted from poor or risky traveler behavior. Engineering and enforcement discourage this type of behavior, but it is proven these efforts must be supported with targeted outreach to prevent such behavior. These strategies encourage RPTD to work closely with internal and external partners to prevent risky behavior and improve traveler judgment through strategic outreach. As outreach approaches continue to evolve, this Plan encourages ongoing exploration of best practices that meet the needs for Oregon.

| Category | Plan Objective | | Strategy |
|---|---|---|---|
| Improving ODOT Processes, Coordination and Collaboration | Coordinate and collaborate with railroads, road authorities and other stakeholders to improve railroad crossing safety | TO 1 | Facilitate improved project development |

| | Actions | Description |
|---|---|---|
| **TO 1.1** | Develop crossing safety information training curriculum | Training should include items such as ROW, design, NEPA, legal information, RPTD contact info, process, design standards, multimodal issues and guidance, federal and state requirements, federal pre-emption, best practices, "Do's and Don'ts", engaging and partnering with railroads, funding, land use change notification recommendations, etc. |
| **TO 1.2** | Provide training curriculum on a regular basis | Partner with Association of Oregon Counties, League of Oregon Cities and other partners to reach engineers and planners statewide through cross training opportunities, providing consistent and timely training. Training format may vary depending on audience. Options may include in person training, webinars, online videos or paper materials. Providing engineers with consistent and easily available crossing safety guidance will offer process guidance and improve crossing safety project understanding. |

| Category | Plan Objective | | Strategy |
|---|---|---|---|
| Improving ODOT Processes, Coordination and Collaboration | Coordinate and collaborate with railroads, road authorities and other stakeholders to improve railroad crossing safety | TO 1 | Facilitate improved project development |
| | | | |
| | | | |
| Improving ODOT Processes, Coordination and Collaboration | Coordinate and collaborate with railroads, road authorities and other stakeholders to improve railroad crossing safety | TO 2 | Continuously improve project development process |
| | | | |

| | Actions | Description |
|---|---|---|
| **TO 1.3** | Develop and distribute clear Section 130 and Oregon GCPA funding information | Development of "Railroad Crossing Safety Funds - Facts and Myths" will ensure that audiences have a foundational understanding the "can" and "cannot" of the program, dispelling any misinformation. |
| **TO 1.4** | Identify, implement and analyze innovative solutions to unique crossing issues | Each crossing is unique but some crossings present bigger challenges than others. RPTD will consider innovative approaches to the toughest crossing safety challenges and reviewing effectiveness. Cataloguing this information will inform future efforts. |
| **TO 1.5** | Seek project efficiencies through enhanced communication and coordination with project partners | RPTD currently coordinates and communicates with crossing safety project stakeholders and ODOT local agency liaisons. Enhancing and improving this process will result in stronger coordination and collaboration with existing and new stakeholders, including railroads. RPTD will assess best practices, areas of concerns and ideas for improved communication and develop strategies for improvement. |
| **TO 1.6** | Develop recommended guidance for land use change notification process to RPTD to mitigate safety issues at crossings early in development process | Land use changes can greatly impact crossings and reduce crossing safety. Road and land use agencies are often unaware of the need for engaging RPTD early in the development process to ensure crossing safety is addressed. To encourage communication, RPTD will develop procedure guidance directed at local land use and road authorities on when and how to engage RPTD, identifying the benefits as well as risks of not considering crossing safety. This interaction should encourage local agencies to formally consider crossing safety in project processes. |
| **TO 2.1** | Assess project development and delivery process gaps | Crossing safety project processes have unique and often challenging complexities that result in process gaps. RPTD will assess gaps to identify areas for improvement to improve project development efficiency and reduce delays. |
| **TO 2.2** | Define areas for improvements in project development process | Once project development gaps and challenges are identified, RPTD will assess the gaps and identify areas for improvement and develop improvement strategies. |

| Category | Plan Objective | | Strategy |
|---|---|---|---|
| Improving ODOT Processes, Coordination and Collaboration | Coordinate and collaborate with railroads, road authorities and other stakeholders to improve railroad crossing safety | TO 2 | Continuously improve project development process |
| Improving ODOT Processes, Coordination and Collaboration | Reduce the number and rate of crossing incidents, injuries and fatalities | TO 3 | Increase awareness of high risk crossings |
| | | | |
| Improving ODOT Processes, Coordination and Collaboration | Strengthen education and outreach about railroad crossing safety | TO 4 | Work in conjunction with Oregon Operation Lifesaver and ODOT divisions to increase awareness of risks of railroad crossings |
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| | Actions | Description |
|---|---|---|
| **TO 2.3** | Develop work plan for process improvement | Project process improvements will require concerted effort. To address this important area of crossing safety project implementation, RPTD will develop a work plan for process improvement, outlining key gaps, strategies for improvement, key stakeholders and a timeline for improvement and evaluation. |
| **TO 3.1** | Proactively reach out to communities with high risk crossing locations | RPTD will maintain and regularly update a list of crossings with a record of high risk behavior and crossing hazards. Working with communities before an incident, or after the first incident at these locations can help prevent future incidents. Communities may be unaware of crossing safety risk and potential options for improvements. RPTD will proactively reach out to communities not previously engaged or those with a poor record of crossing safety engagement to encourage these communities to pursue safety improvements at these crossings. |
| **TO 3.2** | Assist communities through project development process | Communities often struggle with understanding and working through the complexities of crossing safety project processes. RPTD will enhance outreach and communication throughout the process to minimize complications and reduce project delay. |
| **TO 4.1** | Identify specific modal and traveler groups (e.g. bicycle advocacy groups, etc.) for joint outreach efforts | Reaching certain modal groups is challenging. Although bicyclists most often have a drivers license, it is challenging to convey bicycle crossing safety information to those with a license and especially those bicyclists with no driver license. Working in conjunction with advocacy groups at key events and opportunities can help educate about the crossing safety risks to these users. Additionally, participating in bicycle and pedestrian events such as Portland "Sunday Parkways" program can help reach these vulnerable user groups. |
| **TO 4.2** | Partner with Oregon Operation Lifesaver to develop timely crossing safety education materials | Operation Lifesaver continuously develops education materials. Backed with incident data information, RPTD will partner with Oregon Operation Lifesaver to develop specific and relevant materials to address the highest priority crossing safety issues in Oregon. |

| Category | Plan Objective | | Strategy |
|---|---|---|---|
| Improving ODOT Processes, Coordination and Collaboration | Strengthen education and outreach about railroad crossing safety | TO 4 | Work in conjunction with Oregon Operation Lifesaver and ODOT divisions to increase awareness of risks of railroad crossings |
| | | | |
| | | | |
| Improving ODOT Processes, Coordination and Collaboration | Coordinate and collaborate with railroads, road authorities and other stakeholders to improve railroad crossing safety | TO 5 | Better engage with railroad partners to maximize outreach efforts |
| | | | |

| | Actions | Description |
|---|---|---|
| **TO 4.3** | Develop and implement "Railroad Crossing Safety Communication Plan" in conjunction with ODOT Communications division | A well developed "communication plan" will assist RPTD is developing and managing crossing safety communication efforts, maximizing key opportunities with key messaging. |
| **TO 4.4** | Distribute education materials as needed (e.g. DMV, city council meeting, etc.) | Distributing education materials strategically to high volume areas will aid in conveying information on crossing safety risks. |
| **TO 4.5** | Utilize social media platforms for message campaigns | Social media is a valuable communication tool for easily reaching a wide variety of audiences. ODOT currently utilizes these platforms for communication and education efforts. RPTD will utilize these communication tools to target specific groups regarding crossing safety. |
| **TO 5.1** | Participate in "Safety day" and other railroad education and outreach activities | RPTD regularly participates in railroad safety day and other outreach activities. RPTD will enhance participation with targeted information and provide education resources as part of the effort. |
| **TO 5.2** | Develop "ODOT Railroad Crossing Safety Day" | RPTD partners with railroads on safety day initiatives but does not currently have an independent effort. RPTD will develop and promote an "Oregon Railroad Crossing Safety Day" with internal and external partners. |

# Measuring and Reporting

## Tracking Progress

The Plan provides a blueprint for improving crossing safety. The strategies and actions guide efforts to achieve the Plan objectives. Plan implementation will be iterative and on-going and progress should be assessed at various milestones. Effectiveness of the Plan will be impacted by implementation of Plan strategies and other actions of ODOT and its partners.

Monitoring and measuring progress is important to understand where improvements are occurring and which areas need more attention. It will also inform future Plan iterations as well as other modal planning efforts.

Tracking progress of the Plan occurs in two ways:

- Tracking progress of individual strategies and related actions
- Measuring effectiveness of the strategies, in terms of crossing incidents and safety

Tracking the completion of Plan actions will inform the status of Plan implementation and can serve as measures of progress. Example measures include:

- Development of education materials
- Number of outreach efforts completed
- Number of enforcement efforts completed
- Completion of training curriculum
- Distribution of training materials
- Engagement in ODOT funding process (e.g. STIP, etc.)
- Outreach materials distributed
- Funding sources identified including grants
- Review of multiple-incident locations

The second approach for measuring Plan progress is to assess the effectiveness of Plan strategy and action implementation. This approach builds on tracking progress of individual strategies by evaluating the effectiveness of the strategies with a series of progress indicators. Progress indicators should be accompanied with a desired effect. For example, reduction in number of incidents more meaningfully measures impact than a simple total number of incidents. Example progress indicators reviewed annually include:

- Reduced number of crossing incidents
- Reduced number of vehicle, bicycle and pedestrian crossing incidents
- Decreased severity of crossing incidents
- Reduction in cluster location of crossing incidents
- Reduced risky behavior activity at crossing incidents
- Improved funding obligation efficiency

As Plan implementation begins, measuring and tracking progress on strategy implementation and Plan effectiveness will follow. An iterative and continuous process will facilitate improved Plan progress allowing RPTD to pivot as needed for improvement.

## Assess Crossing Incidents

Crossing incidents provide insight into traveler behavior and crossing safety hazards. RPTD will continue to collect crossing incident data, analyze incidents and assess trends and progress at high-risk locations. RPTD will establish an incident baseline for future progress tracking and continuously improve data collection efforts.

## Near Miss Reports

ODOT receives "near-miss" reports from railroads intermittently. While not required, RPTD does recommend that railroads submit reports of near misses. This information provides RPTD and local road authorities the opportunity to better understand behaviors and other factors of high-risk crossings. With this information, RPTD can direct resources for further investigation and proactively address risky crossing factors before incidents occur.

## Key Performance Measures

ODOT regularly tracks and reports a series of "Key Performance Measures" (KPM), in relation to the statewide transportation goals. This assessment answers critical questions about how ODOT is meeting the goals of OTP and which areas need improvement. RPTD reports on two railroad safety related KPMs in the form of a quarterly update and discussion with the OTC. ODOT tracks the following railroad related KPMs:

- Rail crossing incidents – number of highway-railroad at-grade incidents
- Derailment incidents – number of derailments caused by human error, track or equipment

The Plan indirectly supports the reduction of KPM "rail crossing incidents" by addressing overall crossing safety through a series of specific actions. RPTD will support the KPM reporting process with specific measures and supporting actions directed for crossing safety improvement. RPTD will provide details regarding the Plan and related initiatives. RPTD will report on progress indicators, trends, successful initiatives, issues and opportunities related to crossing safety. Further, RPTD will report on Plan progress as requested by the OTC.

## Plan Reporting

Although Plan status reporting is not currently required by FRA, ODOT does anticipate future reporting requirements and will be prepared to provide such updates. RPTD does intend to report on Plan progress to Oregon's crossing safety stakeholders, primarily through the standing Rail Advisory Committee (RAC). Additionally, RPTD will continue regular reporting related to crossing incidents to the OTC as related to the KPM updates. Also, RPTD currently reports to Oregon legislature on crossing safety efforts as needed. Future reporting will include Plan information and updates.

## Continued Reporting

As required by federal legislation, RPTD reports regularly on Section 130 highway-rail crossing program progress and effectiveness of crossing improvements. The reports provide detailed information on crossing project delivery processes, cost assessments, crossing closures and safety improvements (e.g. warning devices, lighting upgrades, signs, etc.); and they are completed annually and included in the Highway Safety Improvement Plan (HSIP) report. Future reports will include Plan action implementation information for actions that utilize Section 130 funds.

## Rail Advisory Committee

Internal and external stakeholders play a key role in ODOT's planning processes and plan implementation. Regular reporting is essential for information sharing and continuous improvement. RPTD will regularly report to the RAC on Plan progress, key initiatives and improvements. Additionally, RPTD will seek RAC engagement at critical milestones or decision points as needed.

## Legislative Reporting

RPTD provides crossing safety information as needed to the Oregon legislature, primarily through the Joint Committee on Ways and Means. RPTD provides specific information on project funding, safety initiative and related measures. RPTD will continue to report as needed.

# DID YOU KNOW?

## *Rail Regulation in Oregon*

In 1853, six years before statehood, Oregon followed several states into railroad regulation when its territorial legislature granted four corporate charters for proposed rail lines. These charters allowed the entities to fix rates and tolls, to connect or consolidate with other railroads, to borrow money, and to exercise the power of eminent domain.

Over the next 30 years, railroads grew to become the country's dominant form of transportation, accompanied by abuses of power. Oregon's legislature responded by passing the Hoult Law in 1885, which limited railroad rates, rate progression and discrimination based on length of haul. In 1887, Congress passed the Interstate Commerce Act which established the Interstate Commerce Commission to enforce and administer new federal regulations. In the decades that followed, Oregon went back and forth with regulation, eventually preempted by the passage of the Interstate Commerce Commission Termination Act in 1995 which created the Surface Transportation Board. This Act overhauled laws governing railroads and interstate commerce and preempted state regulation. During these decades, Oregon established the Public Utilities Commission (PUC), which was responsible for regulation of Oregon's railroads. Railroad regulation was eventually moved to ODOT through its rail division. Today, through ODOT's RPTD, the state retains jurisdiction over all intersections of public roads with railroads, and clearance and walkway standards that have not been coopted by the federal rulemaking.

In the 21st century, regulation of the U.S. railroad industry primarily resides with the federal government through two agencies, the Federal Railroad Administration, an arm of the Department of Transportation, and the independent Surface Transportation Board. Although federal oversight has come to dominate the field, the trail was blazed by state regulation.

# Next Steps

The Plan sets a guidance framework for RPTD and crossing safety partners. It includes a series of strategies and actions, categorized into focus areas. To prioritize actions based on ease of implementation, resource availability and urgency, an action priority matrix provides additional guidance.

**High/Short –** urgent strategies and actions that are feasible in the near term with current resources and meet immediate needs.

**Medium/Mid –** short term strategies that require additional actions, information or resources to complete.

**Low/Long –** longer term efforts that have less urgency or require additional resources.

## RPTD Staff

RPTD staff are the primary implementers of this Plan. Their role in crossing safety is central to all actions outlined in this Plan. RPTD currently works to achieve the purpose of the Plan but future consideration for staff efforts will be essential for Plan success.

The development of staff level implementation matrix including who is responsible, other units involved and target completion dates will guide RPTD direction. Identifying action "champions" who are responsible for seeing actions to completion is a valuable process for successful action implementation. This will assist RPTD is understanding how each effort relates to the Plan strategies and related crossing safety improvements.

RPTD will strategically commission consultant services for specific tasks related to crossing safety. Consultants can provide technical expertise and assist RPTD in tasks such as data gathering, data analysis and other crossing safety related initiatives.

## Role of Stakeholders

Internal and external stakeholders play a key role in ODOT's planning processes and plan implementation. Regular reporting is essential for information sharing and continuous improvement. RPTD will regularly report to the RAC on Plan progress, key initiatives and improvements and seek input as needed. RPTD will also engage additional crossing safety stakeholders as needed.

## Future Updates

The Plan is a short-term action Plan, focusing on a five year horizon. It is anticipated that regular updates will incorporate timely data analysis, relevant changes, lessons learned and action refinements.

ODOT will work continuously with FRA on future Plan iterations and ensure that the Plan continues to meet FRA requirements.

## Inform Other Plans

Although action-oriented, the needs and details provided in the Plan will inform future modal plan processes, namely the OSRP update. Understanding pivotal factors and traveler behavior at crossings allows ODOT to better

understand the unique needs of the railroad system overall. These needs will be factored into the OSRP as it is updated.

# Partnering with ODOT Divisions and Units

This plan's foundation is connections. RPTD will need to collaborate with other agency divisions for the most successful Plan implementation. To initiate implementation of the Plan, RPTD will meet with impacted and associated units across ODOT.

The following are recommended coordination steps with ODOT units:

## TSD

- Partner on safety initiatives with overlap such as distracted driving, enforcement, outreach, DUII, driver training and multimodal focus
- Coordination for improved data sharing
- Coordination and collaboration with local law enforcement

## Transportation Development Division

- Planning and policy integration
- Integrate grade crossing needs into Oregon State Rail Plan
- Integrate grade crossing issues into Transportation System Plan (TSP) guidelines
- Better articulate railroad and crossing safety needs in OTP, including emerging technology discussions
- Participate in Connect Oregon application process to promote crossing safety project efficiencies

## Transportation Planning Analysis Unit (TPAU)

- Complete analysis to better understand system impacts of crossing incidents, blockages and project improvements

## Active Transportation

- Work with the State Bicycle and Pedestrian Program Manager and Active Transportation Section Policy Lead on guidance development, application process, funding opportunities and design considerations
- Continued project coordination to incorporate current and future bicycle and pedestrian needs
- Participate in Oregon Bicycle Manual development process
- Engage in relevant program application processes to ensure crossing safety is adequately addressed

## Transportation Data

- Improve data sharing and analysis opportunities
- Improve data collection on crash report forms and related analysis
- Better integrate railroad system, incident and project data in mapping systems (e.g. TransGIS)

## DMV

- Engage in driver licensing manual development process
- Work to reach drivers at all ages, not just new drivers for continuous education
- Information sharing at DMV offices (e.g. pamphlets, posters, etc.)

## Research

- Utilize research options in place including simulator to understand driver responses to crossing specific situations
- Coordinate with Technology Transfer (T2) Center for rail crossings safety training opportunities

## Communications and Public Affairs

- Maximize outreach opportunities targeting groups and geographic areas especially at risk for crossing incidents (e.g. young male travelers, Salem area, etc.)
- Utilize internal resources for information sharing such as broader ODOT railroad safety initiatives, project process training, etc.
- Develop an Outreach Plan to target high risk travelers or high risk crossings. A draft "Communications and Outreach Plan" is included in Appendix D

## Highway / Project Delivery Branch

- Incorporate crossing safety in highway investments
- Work closely with ODOT railroad liaison

# OPERATION LIFESAVER

Operation Lifesaver is a national non-profit safety education and awareness organization committed to reducing railroad crossing and right-of-way incidents. The organization relies on a strong network of trained volunteers to deliver education messages to audiences of all ages and background. Operation Lifesaver is supported by state chapters, including Oregon.

The Oregon Operation Lifesaver was established in 1977 and has since been instrumental in providing presentations to school groups, drivers, emergency responders and law enforcement. The organization has worked to improve driver training, coordinated with multimodal advocacy groups and assisted local communities in educating about safety near railroads. ODOT will rely on a strong partnership with Oregon Operation Lifesaver to implement strategies and actions outlined in this Plan.

OPERATION LIFESAVER®
OREGON

# Partnering with outside agencies and groups

## Oregon Operation Lifesaver

- Provide timely and strategic education materials for distribution
- Partner to develop strategic initiatives at high risk crossings
- Partner on shared opportunities for outreach

## Railroads

- Improve project process coordination
- Coordinate with railroad safety initiatives (e.g. Safety Week, etc.)
- Reach out to railroads not typically involved in safety projects to educate and encourage stronger crossing safety project involvement

## Oregon State Police and Local Law Enforcement

- Reach out to gain better understanding of needs, resources and options for targeted enforcement efforts at high risk locations
- Develop enforcement pilot projects for testing
- Coordinate outreach and education opportunities, emphasizing the risks and legal implications of crossing safety violations
- Partner to improve crossing and trespass incident reporting and prevention efforts for all travel modes
- Promote new enforcement technology implementation in high risk crossing areas

## League of Oregon Cities and Association of Oregon Counties

- Provide coordinated training opportunities for local road authority engineers and planners
- Utilize social media and internet resources to provide crossing safety information

## Conclusion

Oregon regularly commits significant investments toward crossing safety and has seen benefits of fewer crossing incidents. With the Plan as a guide, Oregon will continue its investments in crossing safety with the goal of no fatalities or life changing injuries resulting from crossing incidents.

The Plan sets forth a path to crossing safety improvements based on data analysis, research, stakeholder input and needs assessment. The framework of strategies cross over disciplines, combining best practice approaches for a comprehensive and innovative path forward. Implementing the strategies and related actions will require a continuous, coordinated and collaborative approach. Led by RPTD, implementation of this Plan will result in stronger internal and external stakeholder engagement, improved funding mechanisms and strategic investments resulting in increased crossing safety in Oregon. With the Plan as a guide, project partners working together at all levels can achieve the goal of zero fatalities or serious injuries at Oregon's crossings.

# Action Term Table

| Draft Final Strategy | | Term | Actions | TSAP EA |
|---|---|---|---|---|
| Pursue opportunities to engage all stakeholders in crossing safety improvements | C 2.3 | short | Partner with Oregon Operation Lifesaver to identify and reach out to stakeholders | Improved System |
| Improve coordination with railroads, articulate ODOT priorities, funding applicability and project benefits | C 3.1 | short | Utilize website to enhance communication with eligible stakeholders | Improved System |
| Better engage in ODOT project identification processes and better articulate benefits of crossing safety projects | C 4.2 | short | Proactively and continuously participate in ODOT funding and project identification processes | Improved System |
| Serve as a broker for railroad crossing system asset and crossing incident data for ODOT and local jurisdictions to better fulfill data stewardship responsibility | D 2.2 | short | Collaborate with ODOT units for expanded data coordination | Improved System |
| Serve as a broker for railroad crossing system asset and crossing incident data for ODOT and local jurisdictions to better fulfill data stewardship responsibility | D 2.3 | short | Participate in ODOT data warehouse efforts | Improved System |
| Engage with ODOT divisions responsible for driver training programs to improve railroad safety coverage | Edu 1.1 | short | Establish internal RPTD work group to systematically review driver training materials, review best practices, make corrections and recommend improvements | Improved System |
| Engage with ODOT divisions responsible for driver training programs to improve railroad safety coverage | Edu 1.2 | short | Regularly participate in driver licensing manual review and development (DMV) and driver training review process (TSD). | Improved System |

| Draft Final Strategy | | Term | Actions | TSAP EA |
|---|---|---|---|---|
| Research best practices for engineering solutions at railroad crossings | Eng 1.1 | short | Partner with ODOT units (e.g. TSD, Highway), local jurisdictions and federal agencies to explore best practices | Infrastructure |
| Research best practices for engineering solutions at railroad crossings | Eng 1.2 | short | Develop a toolkit of engineering best practices | Infrastructure |
| Seek additional railroad crossing safety funding sources | F 1.8 | short | Maximize leverage opportunities for engineering improvements and seek additional funds for low-cost treatments | Infrastructure |
| Establish a formal review process triggered when a location becomes a multiple-incident location | MI 1.1 | short | Define review criteria | Infrastructure |
| Establish a formal review process triggered when a location becomes a multiple-incident location | MI 1.2 | short | Assign weight/value to criteria (e.g. passive devices, traveler mode, behavior, profile, crash severity, etc.). | Infrastructure |
| Consider alternatives to engineering at multiple incident locations | MI 2.1 | short | Research best practices for addressing issues at multiple-incident locations | Infrastructure |
| Apply best design practices and solutions | MM 1.1 | short | Research best practices for multimodal crossings that address unique challenges while meeting needs of bicycle, pedestrian and automobile travelers at crossings | Vulnerable User |
| Apply best design practices and solutions | MM 1.2 | short | Engage with ODOT divisions (e.g. Active Transportation, Freight Planning, Traffic Safety, etc.) for feasibility applicability in Oregon | Vulnerable User |
| Engage in ODOT modal efforts with connections to crossing safety | MM 3.1 | short | Participate in Oregon Bicycle Manual Development | Vulnerable User |

| Draft Final Strategy | | Term | Actions | TSAP EA |
|---|---|---|---|---|
| Facilitate improved project development | TO 1.3 | short | Develop and distribute clear Section 130 and Oregon GCPA funding information | Improved System |
| Work in conjunction with Oregon Operation Lifesaver and ODOT divisions to increase awareness of risks of railroad crossings | TO 4.2 | short | Partner with Oregon Operation Lifesaver to develop timely crossing safety education materials | Improved System |
| Better engage with railroad partners to maximize outreach efforts | TO 5.1 | short | Participate in Safety day and other railroad education and outreach activities | Improved System |
| Develop an efficient process for coordinating with stakeholders to gain project support from local jurisdictions as well as project development efficiency | C 1.1 | medium | Develop and distribute education resource to communicate crossing risks and benefits to ODOT units, local road authorities and stakeholders | Improved System |
| Develop an efficient process for coordinating with stakeholders to gain project support from local jurisdictions as well as project development efficiency | C 1.2 | medium | Partner with ODOT Public Information Officer and Transportation Safety Division to reach out to broader range of stakeholders | Improved System |
| Pursue opportunities to engage all stakeholders in crossing safety improvements | C 2.1 | medium | Reach out to short-line railroads to discuss project needs, funding opportunities and potential corridor benefits | Infrastructure |
| Improve coordination with railroads, articulate ODOT priorities, funding applicability and project benefits | C 3.2 | medium | Develop and distribute guidance for external partners to engage ODOT RPTD when appropriate | Improved System |
| Better engage in ODOT project identification processes and better articulate benefits of crossing safety projects | C 4.1 | medium | Develop and distribute guidance for internal partners to engage ODOT RPTD when appropriate | Improved System |

| Draft Final Strategy | | Term | Actions | TSAP EA |
|---|---|---|---|---|
| Work with internal and external state agency and stakeholder partners for improved incident reporting and data collection | D 1.1 | medium | Assess state and local roadway crash reporting for areas of improvement | Improved System |
| Work with internal and external state agency and stakeholder partners for improved incident reporting and data collection | D 1.2 | medium | Encourage railroad near-miss reporting | Improved System |
| Serve as a broker for railroad crossing system asset and crossing incident data for ODOT and local jurisdictions to better fulfill data stewardship responsibility | D 2.4 | medium | Work with TransGIS tool to include/ improve information for local partners, railroads and other stakeholders | Improved System |
| Lead development of education materials to accompany targeted enforcement efforts and other distribution | Edu 2.1 | medium | Develop key education messages based on best industry practices | Improved System |
| Lead development of education materials to accompany targeted enforcement efforts and other distribution | Edu 2.2 | medium | Identify distribution opportunities | Improved System |
| Lead development of education materials to accompany targeted enforcement efforts and other distribution | Edu 2.3 | medium | Revise message as needed | Improved System |
| Seek opportunities to distribute education materials and messages | Edu 3.1 | medium | Work with ODOT units to identify key education outreach opportunities | Improved System |
| Promote enforcement of traffic laws related to railroad crossings | Enf 1.1 | medium | Explore best practices of enforcement combined with education | Improved System |
| Promote enforcement of traffic laws related to railroad crossings | Enf 1.2 | medium | Develop and distribute strategic message with education component | |

| Draft Final Strategy | | Term | Actions | TSAP EA |
|---|---|---|---|---|
| Promote enforcement of traffic laws related to railroad crossings | Enf 1.3 | medium | Target high risk crossings and/or high risk times for enforcement efforts | Improved System |
| Utilize targeted enforcement campaigns to address observed risky behaviors at railroad crossings | Enf 3.1 | medium | Identify high risk crossings or crossings with observed risky behavior for targeted campaigns | Improved System |
| Utilize targeted enforcement campaigns to address observed risky behaviors at railroad crossings | Enf 3.2 | medium | Work with ODOT partners and units to leverage specialized grant opportunities (e.g. FRA enforcement, NHTSA distracted driving, etc.) | Risky Behavior |
| Utilize targeted enforcement campaigns to address observed risky behaviors at railroad crossings | Enf 3.3 | medium | Address trespassing through targeted enforcement in high trespass activity corridors | Improved System |
| Utilize project history and engineering experience to inform future investment strategies | Eng 2.1 | medium | Establish an engineering deployment database to capture current and future engineering projects | Infrastructure |
| Utilize project history and engineering experience to inform future investment strategies | Eng 2.2 | medium | Identify key performance related information for tracking | Infrastructure |
| Target engineering solutions to the most challenging crossing safety issues | Eng 3.1 | medium | Continuously evaluate and improve crossing closure approach | Infrastructure |
| Target engineering solutions to the most challenging crossing safety issues | Eng 3.3 | medium | Develop and implement corridor approach when appropriate | Infrastructure |
| Investigate opportunities to apply innovative engineering solutions to crossing with extreme challenges | Eng 4.1 | medium | Identify good candidate crossings for innovative engineering solutions | Infrastructure |
| Seek additional railroad crossing safety funding sources | F 1.5 | medium | Seek funding and efficiencies for education and outreach efforts | Infrastructure |

| Draft Final Strategy | | Term | Actions | TSAP EA |
|---|---|---|---|---|
| Enhance the crossing safety project prioritization process for funding | F 2.1 | medium | Determine prioritization criteria (e.g. risk factor, routing, partnership opportunities, nearby land use, etc.) | Improved System |
| Enhance the crossing safety project prioritization process for funding | F 2.2 | medium | Develop prioritization algorithm | Improved System |
| Enhance the crossing safety project prioritization process for funding | F 2.3 | medium | Utilize a work group of technical experts for final selection | Improved System |
| Establish a formal review process triggered when a location becomes a multiple-incident location | MI 1.3 | medium | Initiate cost-benefit analysis for engineering | Infrastructure |
| Consider alternatives to engineering at multiple incident locations | MI 2.2 | medium | Develop a toolkit of best practices and innovative approaches to multiple-incident locations | Infrastructure |
| Engage in ODOT modal efforts with connections to crossing safety | MM 3.2 | medium | Partner with ODOT Active Transportation to participate in bicycle and pedestrian oriented processes to ensure crossing safety is consistently and appropriately covered | Vulnerable User |
| Facilitate improved project development | TO 1.5 | medium | Seek project efficiencies through enhanced communication and coordination with project partners | Improved System |
| Facilitate improved project development | TO 1.6 | medium | Develop recommended guidance for land use change notification process to RPTD to mitigate safety issues at crossings early in development process | Improved System |
| Continuously improve project development process | TO 2.1 | medium | Assess project development and delivery process gaps | Improved System |
| Increase awareness of high risk crossings | TO 3.1 | medium | Proactively reach out to communities with high risk crossing locations | Infrastructure |

| Draft Final Strategy | | Term | Actions | TSAP EA |
|---|---|---|---|---|
| Increase awareness of high risk crossings | TO 3.2 | medium | Assist communities through project development process | Infrastructure |
| Work in conjunction with Oregon Operation Lifesaver and ODOT divisions to increase awareness of risks of railroad crossings | TO 4.1 | medium | Identify specific modal and traveler groups (e.g. bicycle advocacy groups, etc.) for joint outreach efforts | Vulnerable User |
| Work in conjunction with Oregon Operation Lifesaver and ODOT divisions to increase awareness of risks of railroad crossings | TO 4.3 | medium | Develop and implement Railroad Crossing Safety Communication Plan in conjunction with ODOT Communications division | Risky Behavior |
| Work in conjunction with Oregon Operation Lifesaver and ODOT divisions to increase awareness of risks of railroad crossings | TO 4.4 | medium | Distribute education materials as needed (e.g. DMV, city council meeting, etc.) | Improved System |
| Work in conjunction with Oregon Operation Lifesaver and ODOT divisions to increase awareness of risks of railroad crossings | TO 4.5 | medium | Utilize social media platforms for message campaigns | Risky Behavior |
| Pursue opportunities to engage all stakeholders in crossing safety improvements | C 2.2 | long | Establish a process to reach out to communities with limited means that ODOT has identified as having at-risk crossings to facilitate potential improvements | Infrastructure |
| Strengthen coordination with railroad partners regarding blocked crossings | C 5.1 | long | Coordinate with railroads and partners for blocked crossing identification to notify communities of blocked crossings to discourage unsafe behavior at blocked crossings | Improved System |

| Draft Final Strategy | | Term | Actions | TSAP EA |
|---|---|---|---|---|
| Serve as a broker for railroad crossing system asset and crossing incident data for ODOT and local jurisdictions to better fulfill data stewardship responsibility | D 2.1 | long | Develop a strategic railroad crossing data plan (e.g. update cycle, assess data availability/accuracy/timeliness) | Improved System |
| Investigate alternative methods of enforcement | Enf 2.1 | long | Research innovative enforcement options | Improved System |
| Investigate alternative methods of enforcement | Enf 2.2 | long | Identify opportunities to employ alternative enforcement methods | Improved System |
| Target engineering solutions to the most challenging crossing safety issues | Eng 3.2 | long | Encourage and facilitate grade separation projects to highest risk crossings by development of a grade separation needs list for prioritization | Infrastructure |
| Investigate opportunities to apply innovative engineering solutions to crossing with extreme challenges | Eng 4.2 | long | Explore and implement pilot project initiatives | Infrastructure |
| Investigate opportunities to apply innovative engineering solutions to crossing with extreme challenges | Eng 4.3 | long | Assess effectiveness of pilot programs | Infrastructure |
| Seek additional railroad crossing safety funding sources | F 1.1 | long | Establish a list of project needs including grade separation projects, crossing surface needs and other needs | Improved System |
| Seek additional railroad crossing safety funding sources | F 1.2 | long | Work with legislative partners for increased funding opportunities | Improved System |
| Seek additional railroad crossing safety funding sources | F 1.3 | long | Better leverage funding for grade separation projects | Infrastructure |
| Seek additional railroad crossing safety funding sources | F 1.4 | long | Seek funding for crossing surface improvement projects | Infrastructure |
| Seek additional railroad crossing safety funding sources | F 1.6 | long | Seek funding and options for crossing closures (e.g. incentive funds) | Infrastructure |

| Draft Final Strategy | | Term | Actions | TSAP EA |
|---|---|---|---|---|
| Seek additional railroad crossing safety funding sources | F 1.7 | long | Seek funding and opportunities for crossing safety related enforcement | Improved System |
| Enhance the crossing safety project prioritization process for funding | F 2.4 | long | Establish project performance measures | Improved System |
| Increase publicity and awareness at multiple-incident locations | MI 3.1 | long | Partner with ODOT Public Information Officer for outreach strategies and efforts | Improved System |
| Increase publicity and awareness at multiple-incident locations | MI 3.2 | long | Partner with Oregon Operation Lifesaver and local law enforcement for specific outreach efforts at high risk crossings | Improved System |
| Work in conjunction with other ODOT divisions to develop and distribute multimodal railroad crossing guidance and toolkit | MM 2.1 | long | Develop multimodal guidance that incorporates best practices for multimodal crossing safety | Vulnerable User |
| Work in conjunction with other ODOT divisions to develop and distribute multimodal railroad crossing guidance and toolkit | MM 2.2 | long | Address potential system user needs and conflicts | Vulnerable User |
| Identify multimodal crossing funding needs | MM 4.1 | long | Identify specific safety needs and risks | Vulnerable User |
| Identify multimodal crossing funding needs | MM 4.2 | long | Articulate system mobility and efficiency benefits of multimodal crossing safety improvements | Vulnerable User |
| Facilitate improved project development | TO 1.1 | long | Develop crossing safety information training curriculum | Improved System |
| Facilitate improved project development | TO 1.2 | long | Provide training curriculum on a regular basis | Improved System |
| Facilitate improved project development | TO 1.4 | long | Identify, implement and analyze innovative solutions to unique crossing issues | Infrastructure |

| Draft Final Strategy | | Term | Actions | TSAP EA |
|---|---|---|---|---|
| Continuously improve project development process | TO 2.2 | long | Define areas for improvements in project development process | Improved System |
| Continuously improve project development process | TO 2.3 | long | Develop work plan for process improvement | Improved System |
| Better engage with railroad partners to maximize outreach efforts | TO 5.2 | long | Develop ODOT Railroad Crossing Safety Day | Improved System |

# Appendix A

## Stakeholder Committee

Stakeholder engagement is a critical component of Oregon's planning process. The Plan was developed upon meaningful input from a broad range of stakeholders. A stakeholder committee of crossing safety experts was convened to provide direction and input in the planning process. Comprised of 19 members, the committee was selected to represent public and private viewpoints and provide local, county and state agency representation.

| Individual | Group |
|---|---|
| Bryon Alger | ODOT - RPTD |
| Fahad Alhajri | ODOT- Region 2 |
| Terrel Anderson | UPRR |
| Mark Barrett | ODOT- Region 4 |
| John Boren | ODOT - Freight Planning Unit |
| Nick Cantonwine | Oregon Operation Lifesaver |
| Mike Eliason | Association of Oregon Counties |
| Peter Fernandez | City of Salem |
| Nick Fortey | FHWA |
| Johan Hellman | BNSF |
| Steve Kreins | Oregon Operation Lifesaver |
| Katie Johnson | ODOT- Technical Services |
| Donald Leap | Oregon Rail Advisory Committee |
| Robert Melbo | ODOT - RPTD |
| Don Newell | Marion County |
| Traci Pearl | ODOT - Transportation Safety Division |
| Matt Rodrigues | City of Eugene |
| Jon Rolufs | GWRR (PNWR & CORP) |
| Kim Roske | City of Portland |
| Jeff Stewart | FRA |

### Rail Advisory Committee

Oregon's standing statewide rail committee, Rail Advisory Committee provides input and guidance to ODOT on issues that impact freight and passenger railroad services in Oregon. Appointed by the director of Transportation, committee members represent railroads, ports, freight interests and passenger rail services and are supported by RPTD staff. The committee provided critical input to the Plan development.

| Individual | Group |
|---|---|
| Gary Cardwell | Northwest Container Services |
| Glenn Carey | SMART Union |
| Bruce Carswell | Oregon Eastern Division |
| Mark Davidson | Union County |
| Robert Eaton | Amtrak |
| John Ficker | Retired |
| Kevin Haugh | Portland & Western Railroad |
| Johan Hellman | BNSF Railway |
| Aaron Hunt | Union Pacific RR |
| Paul Langner | Teevin Brothers |
| Donald Leap | AORTA |
| Ivo Trummer | Port of Portland |

## Other Outreach

Additional stakeholder outreach helped inform the Plan on issues, opportunities and strategy development. Stakeholder input included in-depth discussions with ODOT representatives and other transportation representatives. Internal and external discussions included the following divisions and agencies:

- ODOT DMV
- ODOT Research
- ODOT TSD
- ODOT Transportation Data
- ODOT Active Transportation
- ODOT Planning
- ODOT TPAU
- ODOT Traffic Safety
- ODOT Region 2
- ODOT Communications and Public Relations
- ODOT Office of Innovation
- Iowa Department of Transportation
- Illinois Department of Transportation
- Washington State Department of Transportation
- Seattle Department of Transportation

# Appendix B

## Oregon Railroads with Public Crossings

| Railroad Name | Code |
|---|---|
| Albany & Eastern Railroad Company | AERC |
| Astoria Riverfront Trolley | ARFT |
| BNSF Railway | BNSF |
| Central Oregon & Pacific Railroad, Inc | CORP |
| City of Prineville Railway | COP |
| Clackamas Valley Railway | CVLY |
| Columbia Walla Walla Railroad | CWW |
| Coos Bay Rail Line | CBR |
| Goose Lake Railway, LLC | GOOS |
| Hampton Railway, Inc. | HLSC |
| Idaho Northern & Pacific Railway Company | INPR |
| Klamath Northern Railway | KNOR |
| Longview, Portland & Northern Railway Company | LPN |
| Mount Hood Railroad Company | MHRR |
| Oregon Coast Scenic Railroad | OCSR |
| Oregon Eastern Railroad | OERR |
| Oregon Pacific Railroad Company | OPR |
| Palouse River & Coulee City Railroad | PCC |
| Peninsula Terminal Company | PT |
| PGE Boardman | XPGE |
| Port of Morrow Railroad | XPOM |
| Port of Portland | POPZ |
| Port of Tillamook Bay Railroad | POTB |
| Portland Terminal Railroad Company | PTO |
| Portland & Western Railroad, Inc. | PNWR |
| Rogue Valley Terminal Railroad | RVT |
| SP Fiber Tech | SPFT |
| Sumpter Valley Railroad Restoration Company | SUVX |
| Superior Veneer Company | GFPI |

| Railroad Name | Code |
|---|---|
| Tri County Metropolitan Transit Agency | TriMet |
| Union Pacific Railroad Company | UPRR |
| Valley & Siletz Railroad, LLC | VASR |
| Venell Farms Railroad Company | VFRC |
| Wallowa Union Railroad Company | WURR |
| Willamette Shore Trolley Line | COPX |
| Willamette Valley Railway Company | WVR |

# Appendix C

## Status of Oregon Public At-Grade Rail Crossings with 2 or More Incidents (2008-2017)

| State Crossing ID | USDOT Crossing ID | Incident Total | Street | City | County | Railroad | Status |
|---|---|---|---|---|---|---|---|
| C 690.40 | 759683T | 2 | Queen Ave | Albany | Linn | UP | Upgrade project in development |
| FD 755.41 | 749212B | 2 | Farmington-Lombard | Beaverton | Washington | PNWR | Investigation completed; determination of no upgrade needed |
| CF 459.60 | 748995V | 2 | USFS Rd. 5811-260 | Chiloquin | Klamath | UP | Crossing has been upgraded |
| 3E 051.40 | 058344C | 2 | Butteville Rd. | Donald | Marion | PNWR | Crossing has been upgraded |
| C 647.92 | 756537C | 2 | Monroe St. | Eugene | Lane | UP | Investigation completed; determination of no upgrade needed |
| C 647.76 | 756539R | 2 | Jefferson St | Eugene | Lane | UP | Investigation completed; determination of no upgrade needed |
| 2A 331.40 | 809448K | 2 | 3rd St. | Haines | Baker | UP | Further analysis revealed this location is a not a multiple incident location |
| 2AH 188.80 | 809057R | 2 | S. Ott Rd. | Hermiston | Umatilla | UP | Crossing closed |
| FD-763.80 | 749342X | 2 | River Rd. | Hillsboro | Washington | PNWR | Upgrade project in development |
| 2AH 190.10 | 809058X | 3 | Canal Rd. | N/A | Umatilla | UP | Crossing upgraded |

| State Crossing ID | USDOT Crossing ID | Incident Total | Street | City | County | Railroad | Status |
|---|---|---|---|---|---|---|---|
| 2J 498.80 | 819436T | 2 | SE 5th Ave | Ontario | Malheur | UP | Investigation completed; determination of no upgrade needed |
| C 755.70 | 760017A | 2 | 10th St. | Oregon City | Clackamas | UP | Investigation completed; determination of no upgrade needed |
| 2A 215.39 | 809011C | 2 | SW Fraziers St. | Pendleton | Umatilla | UP | Crossing has been upgraded |
| 5D-000.80 | 101880L | 2 | NW 17th Ave & Upshur | Portland | Multnomah | BNSF | Investigation completed; determination upgrades are not feasible |
| 2AE 15.90 | 808350D | 2 | NE 148th Ave | Portland | Multnomah | UP | Investigation completed; determination of no upgrade needed |
| 3E 070.75 | 067029K | 2 | D St. (at Front) | Salem | Marion | PNWR | Investigation completed; determination upgrades are not feasible |
| 3E 057.40 | 058359S | 2 | St Louis Rd | St Louis | Marion | PNWR | Crossing has been upgraded |
| C 735.50 | 759605L | 2 | Hardcastle | Woodburn | Marion | UP | Crossing is currently being upgraded |
| 2A-202.00 | 809086B | 2 | Cunningham | N/A | Umatilla | UP | Further investigation needed |

# Appendix D

## Railroad Crossing Safety Communication and Outreach Plan

*DRAFT 12/5/18* Communications and Outreach Plan to supplement Highway-Railroad Crossing Safety Action Plan

**Goal:** *(IF this communications plan is successful…)* Oregon sees a reduction in the number of incidents, including people killed, at railroad crossings, annually.

**Strategy:** Using powerful messaging, communicate to audiences that play a major role in crossing incidents so that they understand their risky behaviors are causing incidents that impact more than just themselves when they are hurt or die; it hurts train employees, bystanders and everyone else involved – because in the battle between a train and a car, a walker or a bicyclist, the train always wins.

### Audiences:

- **Younger drivers.** Drivers under age 39: 53% of those killed at crossings involved drivers under age 39 (32% under age 29).
- **Rural drivers.** 32% of the incidents where someone was killed occurred at crossings where the average annual daily traffic count is under 500 (41% where AADT is under 1000).
- **Men (drivers, pedestrians).** Some 74% of the incidents involved male travelers.
- **Multnomah, Marion and Lane county drivers.** These locations had the highest incidents, and the incidents most often occur during the afternoon hours: plenty of light and notice, but drivers think they can beat the train (stalls/stuck) or they aren't paying attention (stop and go/didn't stop at all).

### Key Messages:

- **PAY ATTENTION.** Most incidents and fatalities are occurring during the afternoon and at crossings that have gates, lights and bells.
- Trains can't stop; incidents at crossings can be completely eliminated, but it's up to drivers, pedestrians and bicyclists to make smart decisions.
- When people are hurt or killed at crossings, it's not just the victim's family and friends that are hurt – train employees and innocent bystanders suffer, too.
- Incidents are on the rise: there are higher volumes of traffic, and more things to distract drivers. But the train always wins in a battle with cars, walkers or bicyclists, so it's time to "See tracks, think train" – and act accordingly.

### Tactics: TBD, but may include:

#### *Educational campaign about the dangers of crossings*

- We will call on our partners to help fund and promote an awareness campaign.
- Tools and channels include social media, radio ads, billboards, videos.

- Examples of successful campaigns from around the U.S. are available from Operation Lifesaver. Many of these include the group's national message, "See tracks? Think train." Others create their own messaging based on targeted groups. Because we can identify our targeted group in Oregon, we may use different messaging, which we can test for effectiveness with focus groups.
- Here are some examples of successful messaging campaigns:
  - » Pause your play; Stay alert, stay alive; Don't let death metal become death by metal. (TriMet, Portland)
  - » Eyes up, phone down. (Boston)
  - » Heads up, Look twice, Stand back, Stay off tracks. (NM)

Outreach to other safety programs

- There are several programs throughout the department in which opportunities may exist to dove-tail messaging or add new messaging (without watering down the other's message!), such as:
  - » Driver's Education materials
  - » DMV educational materials
  - » Districted driving program
  - » DUII program
  - » Bike/Ped Safety
  - » Active Transportation program

## Next steps:

1. Finalize goals, strategies, key audiences.
2. Create/finalize messaging and proposed tactics.
3. Secure funding and support from partners.
4. Roll out a campaign; roll out plan to work with other programs.
5. Measure success, adjust plan.
6. Continue implementing until goals are met.

# Appendix E

## Table Categories

# Summary of Oregon Railroad Crossing Incidents: 2008-2017

*All information excludes confirmed suicide incidents unless otherwise noted.*

## Incident Summary

Table 1: *Oregon Railroad Crossing Incidents Yearly Summary*

| Year | Oregon Total | % change from previous year | Bike | Ped | Vehicle | Fatalities | Injuries | Injuries |
|---|---|---|---|---|---|---|---|---|
| 2008 | 12 | | 0 | 0 | 12 | 2 | 1 | 1 |
| 2009 | 6 | -50.00% | 0 | 1 | 5 | 1 | 2 | 2 |
| 2010 | 18 | 200.00% | 1 | 4 | 13 | 3 | 3 | 3 |
| 2011 | 9 | -50.00% | 0 | 2 | 7 | 1 | 3 | 3 |
| 2012 | 9 | 0.00% | 1 | 0 | 8 | 0 | 1 | 3 |
| 2013 | 9 | 0.00% | 0 | 0 | 9 | 0 | 0 | 0 |
| 2014 | 10 | 11.11% | 1 | 2 | 7 | 3 | 4 | 4 |
| 2015 | 14 | 40.00% | 1 | 2 | 11 | 5 | 2 | 2 |
| 2016 | 16 | 14.29% | 1 | 1 | 14 | 3 | 7 | 7 |
| 2017 | 17 | 6.25% | 0 | 3 | 14 | 2 | 6 | 6 |
| **Total** | 120 | | 5 | 15 | 100 | 20 | 29 | 31 |

Table 2: *National Railroad Crossing Incident Yearly Summary (suicides included)*

| Year | National Annual Total | National % change from previous year | Oregon Total | Oregon % change from previous year |
|---|---|---|---|---|
| 2005 | 2986 | | 18 | |
| 2006 | 3070 | 2.81% | 19 | 5.56% |
| 2007 | 2812 | -8.40% | 12 | -36.84% |
| 2008 | 2547 | -9.42% | 6 | -50.00% |
| 2009 | 2054 | -19.36% | 18 | 200.00% |
| 2010 | 2009 | -2.19% | 9 | -50.00% |
| 2011 | 2055 | 2.29% | 9 | 0.00% |
| 2012 | 2046 | -0.44% | 9 | 0.00% |
| 2013 | 2003 | -2.10% | 10 | 11.11% |
| 2014 | 2262 | 12.93% | 110 | |
| **Total** | **23844** | | | |

Table 3: *Oregon Highway Crashes Yearly Summary*

| Year | Highway Crashes | Injuries | Fatalities |
|---|---|---|---|
| 2005 | 44881 | 29023 | 487 |
| 2006 | 45219 | 29710 | 478 |
| 2007 | 44342 | 28006 | 455 |
| 2008 | 41816 | 26806 | 416 |
| 2009 | 41271 | 28153 | 377 |
| 2010 | 44094 | 30493 | 317 |
| 2011 | 49050 | 35031 | 331 |
| 2012 | 49797 | 36083 | 337 |
| 2013 | 49495 | 33149 | 313 |
| 2014 | 51244 | 35054 | 356 |
| 2015 | 55156 | 41754 | 445 |
| 2016 | 60049 | 44628 | 498 |
| 2017 | 57726 | 41628 | 439 |

*Source: ODOT Transportation Safety Division*

# Traveler Info

Table 4: *Number of Fatalities and Injuries by Traveler Mode*

| Mode | Number of Fatalities (suicides included) | Number of Fatalities | Number of Injuries | No injury | Total |
|---|---|---|---|---|---|
| Vehicle | 11 | 10 | 20 | 80 | 100 |
| Bicycle | 3 | 3 | 2 | 0 | 5 |
| Pedestrian | 15 | 7 | 7 | 1 | 15 |
| **Total** | 29 | 20 | 29 | 81 | 120 |

Table 5: *Oregon Railroad Crossing Incidents by Gender*

| Gender | Incidents | # Incidents no data available | % of total |
|---|---|---|---|
| Male | 79 | | 68% |
| Female | 37 | | 32% |
| **Total** | 116 | 4 | |

Table 6: *National Railroad Crossing Incidents by Gender*

| Gender | "National Incidents by Gender (2005-2014)" | % of total |
|---|---|---|
| Male | 16908 | 75% |
| Female | 5526 | 25% |
| **Total** | 22434 | |

Table 7: *Oregon Total Incidents by Age of Traveler 2005-2014 and 2008-2017*

| Age | '05 | '06 | '07 | '08 | '09 | '10 | '11 | '12 | '13 | '14 | '15 | '16 | '17 | Oregon Total 2005-2014 | Oregon Total 2008-2017 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <29 | 6 | 6 | 7 | 0 | 3 | 4 | 1 | 1 | 3 | 3 | 2 | 2 | 4 | 34 | 23 |
| 30-39 | 2 | 1 | 3 | 4 | 0 | 4 | 2 | 4 | 1 | 2 | 2 | 2 | 5 | 23 | 26 |
| 40-49 | 2 | 3 | 0 | 3 | 1 | 2 | 1 | 1 | 2 | 0 | 4 | 5 | 3 | 15 | 22 |
| 50-59 | 1 | 4 | 1 | 1 | 0 | 1 | 1 | 2 | 2 | 0 | 2 | 4 | 1 | 13 | 14 |
| 60-69 | 0 | 0 | 3 | 1 | 1 | 0 | 2 | 1 | 0 | 1 | 2 | 2 | 2 | 9 | 12 |
| 70-79 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 1 |
| 80-89 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 5 | 3 |
| 90+ | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |

Table 8: *National Total Incidents by Age of Traveler 2005-2014 and 2008-2017*

| Age | '05 | '06 | '07 | '08 | '09 | '10 | '11 | '12 | '13 | '14 | Total | National Total 2005-2014 | National Total 2008-2017 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <29 | 774 | 709 | 680 | 600 | 423 | 462 | 472 | 467 | 464 | 512 | 5563 | 5563 | 3400 |
| 30-39 | 539 | 498 | 473 | 416 | 304 | 331 | 330 | 308 | 332 | 342 | 3873 | 3873 | 2363 |
| 40-49 | 463 | 509 | 446 | 380 | 335 | 319 | 336 | 317 | 347 | 348 | 3800 | 3800 | 2382 |
| 50-59 | 331 | 342 | 367 | 328 | 261 | 314 | 320 | 335 | 354 | 374 | 3326 | 3326 | 2286 |
| 60-69 | 183 | 180 | 179 | 143 | 145 | 158 | 144 | 173 | 189 | 228 | 1722 | 1722 | 1180 |
| 70-79 | 120 | 129 | 98 | 100 | 79 | 92 | 89 | 93 | 90 | 96 | 986 | 986 | 639 |
| 80-89 | 73 | 47 | 69 | 51 | 51 | 54 | 50 | 42 | 51 | 52 | 540 | 540 | 351 |
| 90+ | 5 | 6 | 6 | 8 | 5 | 14 | 11 | 7 | 7 | 15 | 84 | 84 | 67 |

*Note: Information is not available for all.*

Table 9: *Behavior of Traveler at Time of Incident*

| Behavior | Incidents |
|---|---|
| Stop and Go/Didn't Stop | 47 |
| Stall / Stuck on Tracks | 41 |
| Went Around Gates | 18 |
| **Total** | 106 |

*Note: Information is not available for all.*

# Locations

Table 10: *County Summary*

| County | Total Incident | Total Fatals | Total Injury or Property Damage Only | % |
|---|---|---|---|---|
| Baker | 2 | 0 | 4 | 1.7% |
| Benton | 1 | 0 | 0 | 0.8% |
| Clackamas | 5 | 3 | 1 | 4.2% |
| Columbia | 3 | 1 | 0 | 2.5% |
| Crook | 1 | 0 | 0 | 0.8% |
| Deschutes | 3 | 0 | 0 | 2.5% |
| Douglas | 2 | 1 | 0 | 1.7% |
| Hood River | 2 | 0 | 0 | 1.7% |
| Jackson | 1 | 0 | 0 | 0.8% |
| Jefferson | 2 | 1 | 3 | 1.7% |
| Klamath | 5 | 0 | 1 | 4.2% |
| Lane | 15 | 2 | 3 | 12.5% |
| Linn | 6 | 2 | 0 | 5.0% |
| Malheur | 4 | 0 | 1 | 3.3% |
| Marion | 23 | 2 | 6 | 19.2% |
| Multnomah | 15 | 2 | 2 | 12.5% |
| Tillamook | 1 | 0 | 0 | 0.8% |
| Umatilla | 13 | 2 | 2 | 10.8% |
| Union | 2 | 3 | 0 | 1.7% |
| Washington | 13 | 1 | 6 | 10.8% |
| Yamhill | 1 | 0 | 0 | 0.8% |
| **Total** | 120 | 20 | 29 | 100.0% |

Table 11: *City Summary (highest to lowest)*

| City | County | Total Incident | Fatalities | Injuries | Property damage only |
|---|---|---|---|---|---|
| Portland | Multnomah | 14 | 2 | 2 | 10 |
| Salem | Marion | 7 | 0 | 2 | 5 |
| Eugene | Lane | 6 | 1 | 2 | 3 |
| no city identified | Umatilla | 6 | 2 | 2 | 2 |
| Hermiston | Umatilla | 5 | 0 | 0 | 5 |
| Junction City | Lane | 4 | 1 | 0 | 2 |
| Woodburn | Marion | 4 | 1 | 1 | 2 |
| Beaverton | Washington | 4 | 0 | 2 | 2 |
| Tualatin | Washington | 4 | 0 | 2 | 2 |
| Creswell | Lane | 3 | 0 | 0 | 3 |
| Albany | Linn | 3 | 2 | 0 | 1 |
| Hillsboro | Washington | 3 | 1 | 1 | 2 |
| Haines | Baker | 2 | 0 | 4 | 1 |

| City | County | Total Incident | Fatalities | Injuries | Property damage only |
|---|---|---|---|---|---|
| Oregon City | Clackamas | 2 | 0 | 1 | 1 |
| Scappoose | Columbia | 2 | 1 | 0 | 1 |
| Chiloquin | Klamath | 2 | 0 | 0 | 2 |
| Nyssa | Malheur | 2 | 0 | 1 | 1 |
| Ontario | Malheur | 2 | 0 | 0 | 2 |
| Donald | Marion | 2 | 0 | 0 | 2 |
| St. Louis | Marion | 2 | 0 | 0 | 2 |
| Pendleton | Umatilla | 2 | 0 | 0 | 2 |
| Tigard | Washington | 2 | 0 | 1 | 1 |
| Corvallis | Benton | 1 | 0 | 0 | 1 |
| Canby | Clackamas | 1 | 2 | 0 | 0 |
| Lake Oswego | Clackamas | 1 | 0 | 0 | 1 |
| Milwaukie | Clackamas | 1 | 1 | 0 | 0 |
| Rainier | Columbia | 1 | 0 | 0 | 1 |
| no city identified | Crook | 1 | 0 | 0 | 1 |
| Bend | Deschutes | 1 | 0 | 0 | 1 |
| LaPine | Deschutes | 1 | 0 | 0 | 1 |
| Sunriver | Deschutes | 1 | 0 | 0 | 1 |
| Roseburg | Douglas | 1 | 0 | 0 | 1 |
| Sutherlin | Douglas | 1 | 1 | 0 | 0 |
| no city identified | Hood River | 1 | 0 | 0 | 1 |
| Parkdale | Hood River | 1 | 0 | 0 | 1 |
| Central Point | Jackson | 1 | 0 | 0 | 0 |
| no city identified | Jefferson | 1 | 0 | 0 | 1 |
| Culver | Jefferson | 1 | 1 | 3 | 0 |
| no city identified | Klamath | 1 | 0 | 0 | 1 |
| Klamath Falls | Klamath | 1 | 0 | 0 | 1 |
| Malin | Klamath | 1 | 0 | 1 | 0 |
| Goshen | Lane | 1 | 0 | 0 | 1 |
| Springfield | Lane | 1 | 0 | 1 | 0 |
| Halsey | Linn | 1 | 0 | 0 | 1 |
| Lebanon | Linn | 1 | 0 | 0 | 1 |
| Tangent | Linn | 1 | 0 | 0 | 1 |
| Aurora | Marion | 1 | 0 | 0 | 1 |
| Brooks | Marion | 1 | 0 | 1 | 0 |
| Gervais | Marion | 1 | 0 | 0 | 1 |
| Jefferson | Marion | 1 | 1 | 0 | 0 |
| Keizer | Marion | 1 | 0 | 1 | 0 |
| Marion | Marion | 1 | 0 | 1 | 0 |
| Talbot | Marion | 1 | 0 | 0 | 1 |
| Waconda | Marion | 1 | 0 | 0 | 1 |
| Rockwood | Multnomah | 1 | 0 | 0 | 1 |
| Rockaway | Tillamook | 1 | 0 | 0 | 1 |
| La Grande | Union | 1 | 0 | 0 | 1 |
| Union | Union | 1 | 3 | 0 | 0 |

| City | County | Total Incident | Fatalities | Injuries | Property damage only |
|---|---|---|---|---|---|
| Amity | Yamhill | 1 | 0 | 0 | 1 |
| **Total** | ALL | 120 | 20 | 29 | 79 |

Table 12: *Incident Location: Urban and Rural Designation*

| Type | "Incident Location Crossing Type (2008-2017)" | Oregon Crossing Type (No TriMet) |
|---|---|---|
| Urban | 87 | 976 |
| Rural | 33 | 806 |
| **Total** | 120 | 1782 |

Table 13: *Incidents by Railroad*

| Railroad | Incidents | Fatalities | Injuries | Miles of Track | Rate Incidents/ Track Mile | Public At-Grade Crossings | Rate per Crossing |
|---|---|---|---|---|---|---|---|
| AERC | 1 | 0 | 0 | 72 | 0.013888889 | 92 | 0.0109 |
| BNSF | 10 | 2 | 5 | 230 | 0.043478261 | 128 | 0.0781 |
| COP | 1 | 0 | 0 | 18 | 0.055555556 | 13 | 0.0769 |
| CORP | 7 | 1 | 0 | 247 | 0.028340081 | 169 | 0.0414 |
| MHRR | 2 | 0 | 0 | 21 | 0.095238095 | 18 | 0.1111 |
| PNWR | 38 | 2 | 8 | 447 | 0.085011186 | 571 | 0.0665 |
| POTB | 1 | 0 | 0 | 84 | 0.011904762 | 7 | 0.1429 |
| UPRR | 58 | 15 | 15 | 881 | 0.065834279 | 427 | 0.1358 |
| WVR | 2 | 0 | 1 | 33 | 0.060606061 | 45 | 0.0444 |
| **Total** | 120 | 20 | 29 | 2033 | | | |
| AMTRAK | 15 | 6 | 4 | 349.4 | 0.042930738 | | |

# Temporal

Table 14: *Incidents by Time of Day*

| 12a-6a | | 6a-12p | | 12p-6p | | 6p-12a | |
|---|---|---|---|---|---|---|---|
| 17 | | 33 | | 43 | | 27 | |
| | | | Hourly | | | | |
| 12:00am | 3 | 6:00am | 3 | 12:00pm | 12 | 6:00pm | 4 |
| 1:00am | 3 | 7:00am | 7 | 1:00pm | 6 | 7:00pm | 5 |
| 2:00am | 3 | 8:00am | 6 | 2:00pm | 7 | 8:00pm | 2 |
| 3:00am | 2 | 9:00am | 1 | 3:00pm | 5 | 9:00pm | 7 |
| 4:00am | 2 | 10.00am | 4 | 4:00pm | 2 | 10:00pm | 4 |
| 5:00am | 4 | 11:00am | 12 | 5:00pm | 11 | 11:00pm | 5 |

Table 15: *Total Incidents by Day of the Week*

| Day | Total Incidents |
|---|---|
| Sunday | 6 |
| Monday | 20 |
| Tuesday | 21 |
| Wednesday | 15 |
| Thursday | 20 |
| Friday | 23 |
| Saturday | 15 |

Table 16: *Oregon Incidents by Season and Month*

| Season | # of Incidents |
|---|---|
| Spring | 26 |
| Summer | 36 |
| Fall | 21 |
| Winter | 37 |

| Month | Incidents by Month |
|---|---|
| January | 16 |
| February | 5 |
| March | 6 |
| April | 9 |
| May | 11 |
| June | 11 |
| July | 12 |
| August | 13 |
| September | 7 |
| October | 9 |
| November | 5 |
| December | 16 |

Table 17: *National Incidents by Month*

| Month | Incidents by Month (per billion VMT) |
|---|---|
| January | 0.984 |
| February | 0.906 |
| March | 0.747 |
| April | 0.675 |
| May | 0.714 |
| June | 0.71 |
| July | 0.708 |
| August | 0.758 |
| September | 0.783 |
| October | 0.824 |
| November | 0.828 |
| December | 0.909 |

# Crossing Characteristics

Table 18: *Oregon Weather at Time of Incident*

| Weather | # of Incidents |
|---|---|
| Clear | 73 |
| Cloudy | 29 |
| Foggy | 2 |
| Raining | 11 |
| Snowing | 3 |
| Undefined | 2 |
| **Total** | 120 |

Table 19: *Incidents by Warning Device*

| Type | Incidents | Fatalities | Injuries |
|---|---|---|---|
| Gates | 62 | 13 | 17 |
| Flashing Lights | 64 | 13 | 17 |
| Only Passive Signs | 55 | 7 | 9 |

Table 20: *Incidents by Warning Device*

| | Gates | Flashing Lights |
|---|---|---|
| Incidents | 62 | 64 |
| Fatalities | 13 | 13 |
| Injuries | 13 | 13 |

Table 21. *Incidents by Warning Device Type*

| | Suicides Included | | Suicides Excluded | |
|---|---|---|---|---|
| | Active | Passive | Active | Passive |
| Incidents | 74 | 55 | 65 | 55 |
| Fatalities | 21 | 3 | 12 | 3 |
| Injuries | 13 | 9 | 13 | 9 |

Table 22: *Multi-Incident Locations Summary*

| Type | Number of Incidents |
|---|---|
| Repeat | 40 |
| One Time | 80 |
| **Total** | 120 |

*Note: Incident location characteristics are totaled for all incidents. Repeat locations are counted for each incident.*

Table 23: *Road Speed at Incident Locations*

| Road speed (mph) | Number of Crossings |
|---|---|
| 20 or less | 19 |
| 21-30 | 52 |
| 31-40 | 20 |
| 41-50 | 13 |
| 51-60 | 13 |
| 61-70 | 0 |

Table 24: *Number of Tracks*

| Number of Tracks | Incident Locations | Oregon |
|---|---|---|
| 1 | 85 | 1455 |
| 2 | 24 | 255 |
| 3 | 5 | 49 |
| 4 | 3 | 12 |
| 5 | 0 | 3 |
| 6 | 0 | 0 |
| 7+ | 0 | 0 |

Table 25: *Intersection Angle at Crossing with Incidents*

| Intersection Angle | Incident Locations | All |
|---|---|---|
| <=45 | 12 | 134 |
| 46-84 | 37 | 410 |
| 85-95 | 38 | 840 |
| 96-135 | 17 | 328 |
| 136-160 | 3 | 63 |
| Exactly 90 | 32 | 703 |

Table 26: *Number of Travel Lanes*

| Number of Travel Lanes | Incident Locations | Oregon |
|---|---|---|
| 1 | 9 | 183 |
| 2 | 85 | 1416 |
| 3 | 9 | 66 |
| 4 | 8 | 67 |
| 5 | 3 | 16 |
| 6 | 1 | 5 |
| 7 | 0 | 1 |
| 8 | 0 | 1 |
| 9 | 2 | 1 |

Table 27: *Incident Location Roadway Jurisdiction*

| Jurisdiction | |
|---|---|
| City | 58 |
| County | 49 |
| State | 10 |
| Federal | 0 |
| Other | 3 |

Table 28: *AADT at Railroad Crossing*

| AADT at Railroad Crossing | Incident Locations | Oregon |
|---|---|---|
| <=45 | 12 | 134 |
| 46-84 | 37 | 410 |
| 85-95 | 38 | 840 |
| 96-135 | 17 | 328 |
| 136-160 | 3 | 63 |
| Exactly 90 | 32 | 703 |

Table 29: *Safe Stopping Distance*

| Safe Stopping Distance (feet) | Incident Locations | Oregon |
|---|---|---|
| <100 | 4 | 215 |
| 101-200 | 62 | 804 |
| 201-300 | 23 | 457 |
| 301-400 | 8 | 234 |
| 401-500 | 5 | 39 |
| 501-600 | 13 | 115 |
| >600 | 0 | 2 |

# Multiple Incident Locations

Table 30: *Incident Severity*

| Severity | Total |
|---|---|
| Fatal | 8 |
| Injury | 13 |
| Property/None | 22 |

Table 31: *Intersection Angle*

| Intersection Angle | Total |
|---|---|
| <=45 | 2 |
| 46-84 | 10 |
| 85-95 | 4 |
| 96-135 | 1 |
| 136-160 | 1 |
| exactly 90 | 4 |

Table 32: *Number of Lanes*

| Number of Lanes | Total |
|---|---|
| 0 | 0 |
| 1 | 2 |
| 2 | 13 |
| 3 | 1 |
| 4 | 1 |
| 5 | 0 |
| 6 | 0 |
| 7+ | 1 |

Table 33: *Number of Tracks*

| Number of Tracks | Total |
|---|---|
| 0 | 0 |
| 1 | 10 |
| 2 | 5 |
| 3 | 2 |
| 4 | 1 |
| 5 | 0 |
| 6 | 0 |
| 7+ | 0 |

Table 34: *Traveler Mode*

| Traveler Mode | Total |
|---|---|
| Car | 19 |
| Road Grader | 2 |
| Pedestrian | 8 |
| Bicycle | 2 |
| Truck | 3 |
| Motor Home | 1 |
| Truck & Trailer | 3 |
| Truck & Trailer | 3 |

Table 35: *Warning Devices*

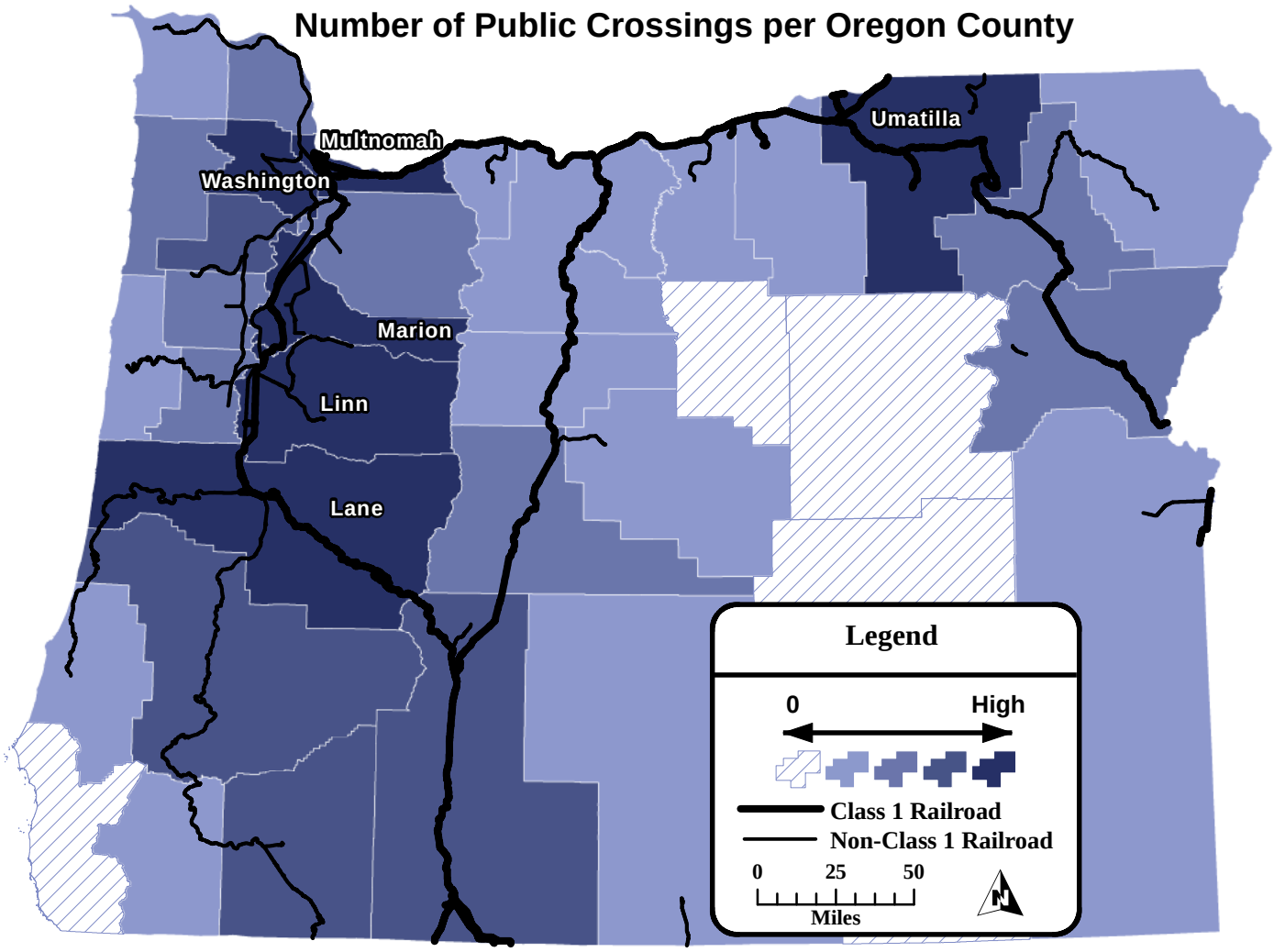
| | |
|---|---|
| Passive | 12 |
| Active | 7 |

Table 36: *Traveler Mode for Incidents*

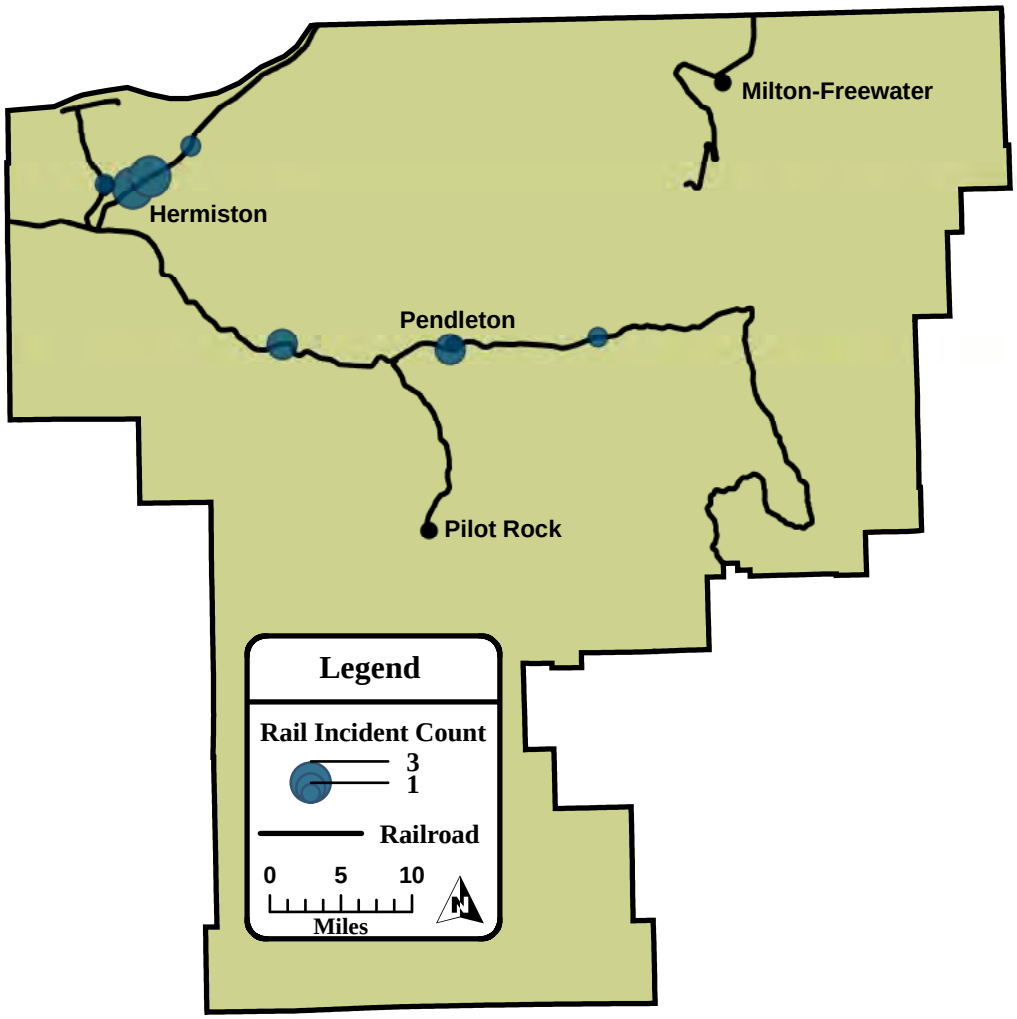
| | |
|---|---|
| Pedestrian | 8 |
| Bicycle | 2 |
| Automobile | 29 |
| **Total** | 39 |

Table 37: *Traveler Behavior*

| Traveler Mode | |
|---|---|
| Stop and Go/Didn't Stop | 14 |
| Stall / Stuck on Tracks | 19 |
| Went Around Gates | 6 |
| Unidentified | 1 |
| **Total** | **40** |


Number of Public Crossings per Oregon County
Multnomah
Washington
Umatilla
Marion
Linn
Lane
Legend
0
High
Class 1 Railroad
Non-Class 1 Railroad
0
25
50
Miles
N

## Umatilla County Railroad Crossing Incidents (2008-2017)



## Railroad Crossing Incident Severity (2008-2017)