



2011-2015 Virginia Work Zone Crash Facts

September 2016

Traffic Engineering Division

Foreword

The Virginia Department of Transportation (VDOT) is pleased to present *2011-2015 Virginia Work Zone Crash Facts*. This publication provides an overview of traffic crashes that occurred in work zones throughout Virginia from 2011 through 2015.

For the purpose of this publication, a *work zone crash* is defined as a crash for which a “Yes” is indicated for work zone status on the Virginia Police Crash Report, Form FR-300. Work zone crashes that occurred on roads maintained by VDOT including interstates, primary roads, and secondary roads and on local roads maintained by Arlington and Henrico counties, cities, and towns are included in this publication. Work zone crash data for 2011-2015 were extracted from the crash database in VDOT’s Roadway Network System (RNS) and used to produce the work zone crash statistics provided in this publication.

To calculate work zone exposure statistics such as the annual number of work zones statewide, 2011-2015 work zone activities were extracted from the Virginia Traffic Information Management System (VaTraffic) database, which contains information on traffic incidents, work zones, planned events, weather conditions, etc. In this publication, a *work zone* in the exposure statistics is defined as an event in the VaTraffic database indicating “work zone” in the event type and such an event with a unique event identification number is regarded as one work zone.

It should be noted that the work zone crash statistics reported in previous publications such as *1999-2003 Virginia Work Zone Crash Facts* defined a work zone crash as a crash with an indication of “road under repair” in the roadway defect information in the crash database since work zone information was not part of reporting items in a police crash report before 2004. It should be noted, however, that the police could still report work zone information in a space for a note or drawing. Meanwhile, work zone crashes reported in this publication were based on work zone information included as a reporting item in a later version of the form. In addition, the damage threshold for a reportable crash in Virginia changed from \$1,000 to \$1,500 in July 2008. For these reasons, readers should be advised that the work zone crash statistics shown in this publication are not necessarily comparable to those in the previous publications.

Readers should be advised that under Title 23, Section 409, of the United States Code, the statistics and information in this publication cannot be used in discovery or evidence in a federal or state court proceeding or be considered for any other purposes in any action for damages against VDOT or the State of Virginia arising from any occurrence at locations identified. The statistics and information in this publication are intended mainly for training purposes, for public relations purposes especially in conjunction with National Work Zone Awareness Week, and for Strategic Highway Safety Plan (SHSP) development or updating.

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Glossary

Crash severity: The most severe injury to any person involved in a crash, coded using the KABCO scale.

Fatal crash: Crash that results in one or more fatalities.

Fatality: Person who dies as a result of a traffic crash within 30 days of the crash.

Incapacitating injury: Disabling injury.

Injury crash: Crash that results in no fatalities but one or more persons injured.

KABCO scale: Scale classifying injury severity (K: fatal, A: incapacitating injury, B: non-incapacitating injury, C: possible injury, O: no injury).

Non-incapacitating injury: Evident yet not disabling injury.

Possible injury: Injury that is not a fatal, disabling, or evident injury.

Property damage only (PDO) crash: Crash that results in no fatalities or injuries but there is property damage of at least \$1,500 (The threshold for a PDO crash changed from \$1,000 to \$1,500 in July 2008.)

Road functional classification: Process by which streets and highways are grouped into classes according to the character of service they are intended to provide.

Roadway Network System (RNS): System tracking and managing Virginia's road inventory and associated assets and attributes.

VDOT district: VDOT divides the state into nine districts, each of which oversees maintenance and construction on the state-maintained highways, bridges, and tunnels in its area.

1. **Bristol:** Bland, Buchanan, Dickenson, Grayson, Lee, Russell, Scott, Smyth, Tazewell, Washington, Wise, and Wythe counties
2. **Salem:** Bedford, Botetourt, Carroll, Craig, Floyd, Franklin, Giles, Henry, Montgomery, Patrick, Pulaski, and Roanoke counties
3. **Lynchburg:** Amherst, Appomattox, Buckingham, Campbell, Charlotte, Cumberland, Halifax, Nelson, Pittsylvania, and Prince Edward counties
4. **Richmond:** Amelia, Brunswick, Charles City, Chesterfield, Dinwiddie, Goochland, Hanover, Henrico, Lunenburg, Mecklenburg, New Kent, Nottoway, Powhatan, and Prince George counties
5. **Hampton Roads:** Accomack, Greensville, Isle of Wight, James City, Northampton, Southampton, Surry, Sussex, and York counties; cities of Chesapeake, Emporia, Hampton, Newport News, Norfolk, Poquoson, Portsmouth, Suffolk, Virginia Beach, and Williamsburg
6. **Fredericksburg:** Caroline, Essex, Gloucester, King George, King and Queen, King William, Lancaster, Mathews, Middlesex, Northumberland, Richmond, Spotsylvania, Stafford, and Westmoreland counties
7. **Culpeper:** Albemarle, Culpeper, Fauquier, Fluvanna, Greene, Louisa, Madison, Orange, and Rappahannock counties
8. **Staunton:** Alleghany, Augusta, Bath, Clarke, Frederick, Highland, Page, Rockbridge, Rockingham, Shenandoah, and Warren counties
9. **Northern Virginia:** Arlington, Fairfax, Loudoun, and Prince William counties

Virginia Traffic Information Management System (VaTraffic): Integrated data management platform for managing a variety of activities that affect the quality of travel including planned events such as roadway maintenance and unplanned events such as traffic accidents.

Work zone: An area of a highway or roadway with construction, maintenance, or utility work activities.

Virginia's Work Zone Safety Measures

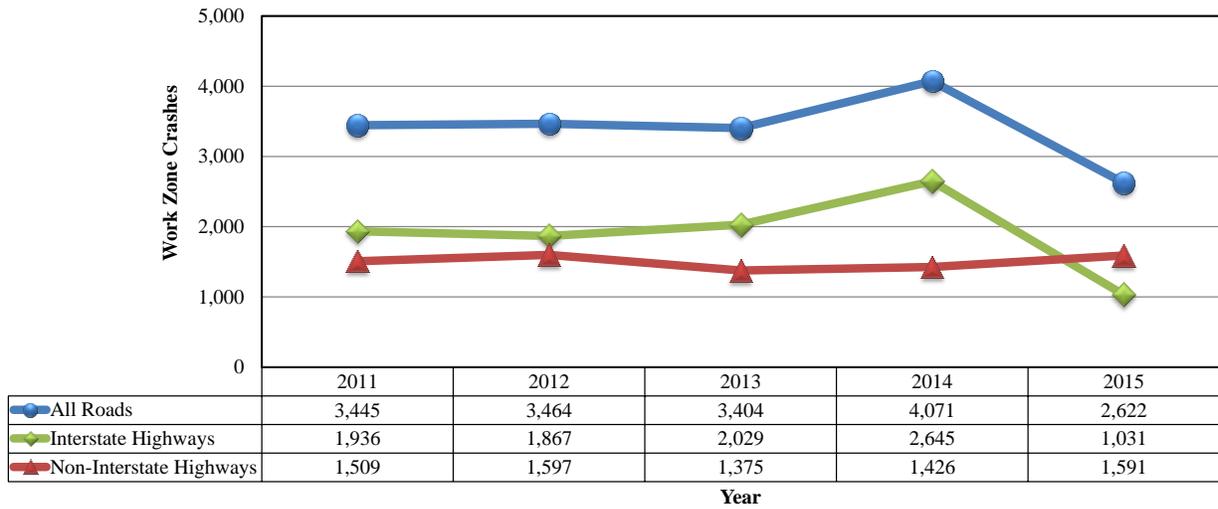
Statewide work zone safety measures are presented in this section. There are two types of safety measures: performance measures and summary measures. The safety performance measures are for monitoring and evaluating the statewide safety performance of work zones, and the safety summary measures are for providing additional insights and understanding on work zones and work zone safety in general. Please refer to VDOT's 2016 research report (VTRC 16-R10), "Work Zone Safety Performance Measures for Virginia," for details of these safety measures and their development.

Crash locations are classified into interstate and non-interstate highways based on `TMPD_FUNCTIONAL_CLASS_CD` in the RNS crash database. Specifically, a crash with `TMPD_FUNCTIONAL_CLASS_CD = 'INT'` is classified as a crash occurring on an interstate highway and a crash with `TMPD_FUNCTIONAL_CLASS_CD` not equaling 'INT' is classified as a crash occurring on a non-interstate highway. Work zone locations are classified into interstate and non-interstate highways based on a route number starting with an "I" corresponding to "interstate" in the VaTraffic database.

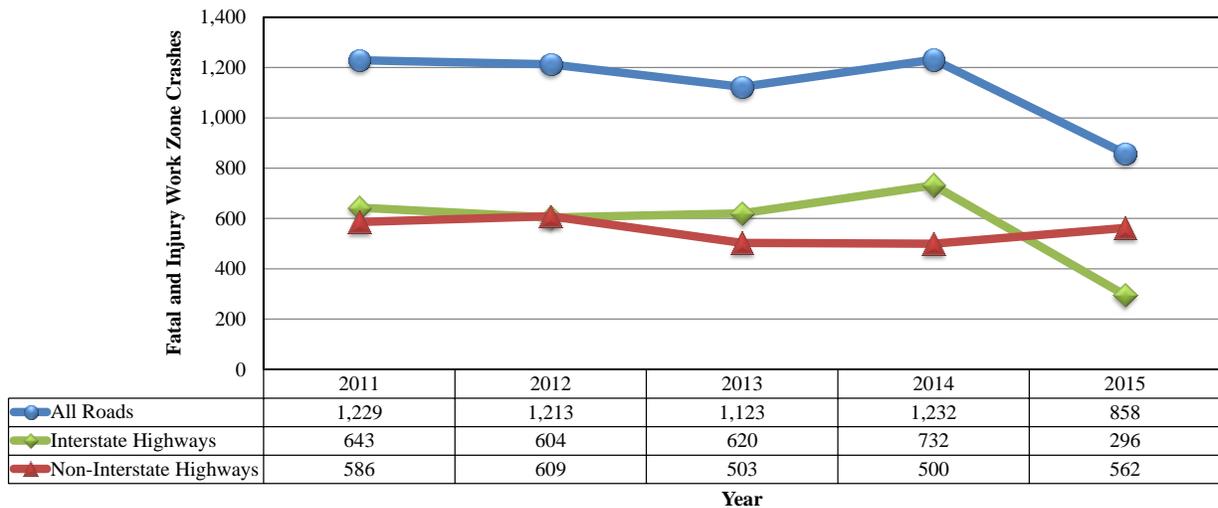
Safety Performance Measures

Four safety performance measures of work zones were calculated using 2011-2015 crash data extracted from the RNS crash database and 2011-2015 exposure data extracted from the VaTraffic database: (1) all work zone crashes, (2) fatal and injury work zone crashes, (3) all work zone crashes per million work zone-hour-miles, and (4) fatal and injury work zone crashes per million work zone-hour-miles.

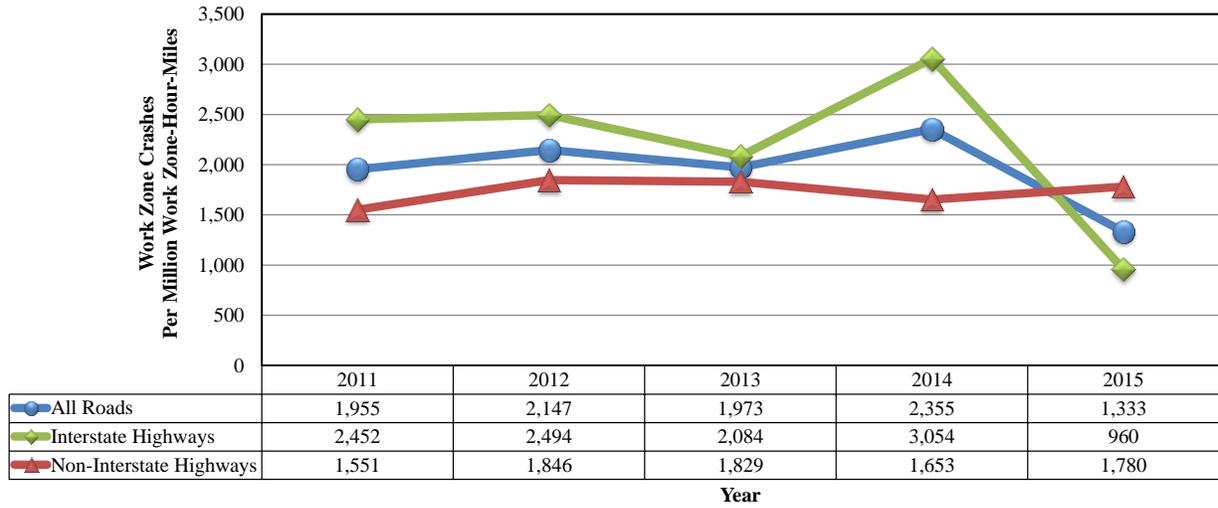
All Work Zone Crashes (2011-2015)



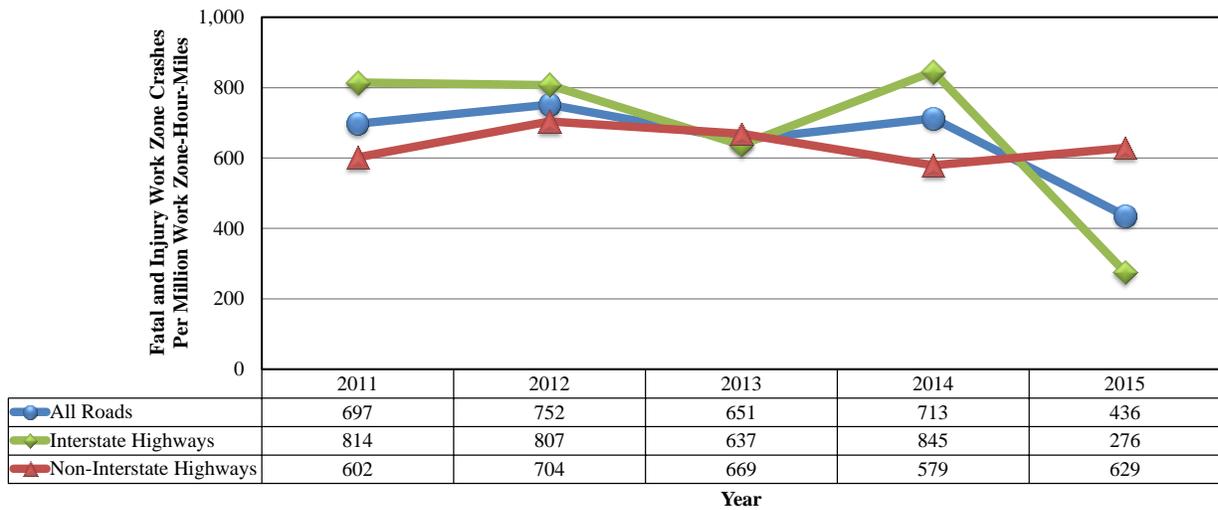
Fatal and Injury Work Zone Crashes (2011-2015)



All Work Zone Crashes per Million Work Zone-Hour-Miles (2011-2015)



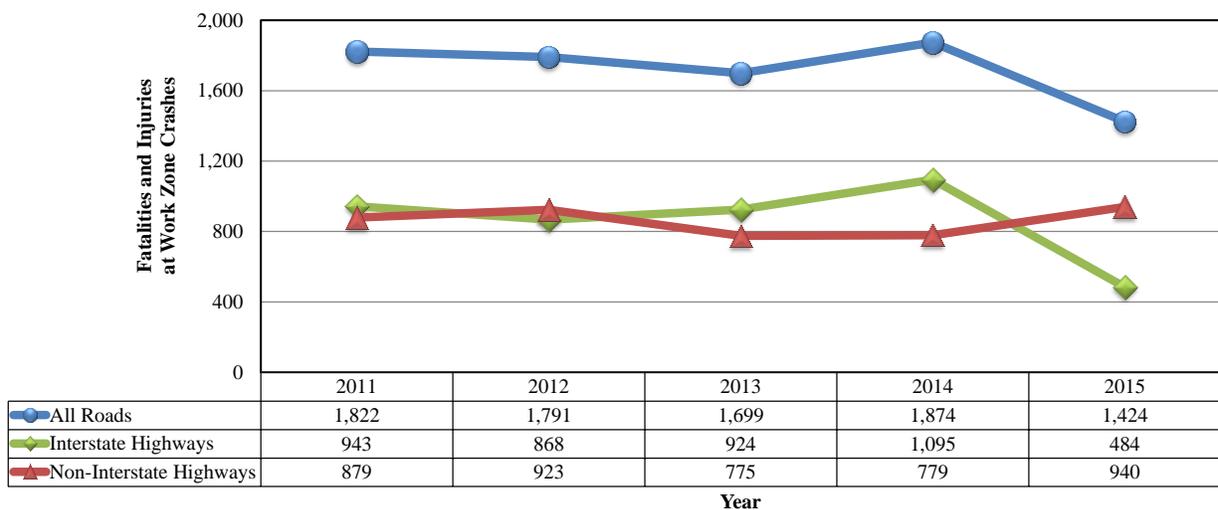
Fatal and Injury Work Zone Crashes per Million Work Zone-Hour-Miles (2011-2015)



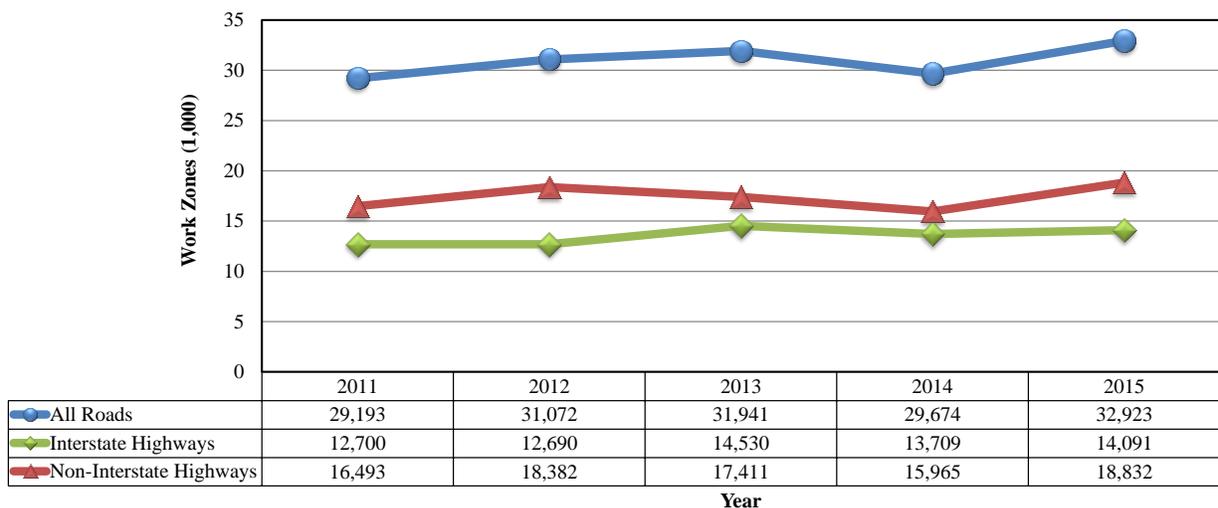
Safety Summary Measures

Eight safety summary measures of work zones were calculated using 2011-2015 crash data extracted from the RNS crash database and 2011-2015 exposure data extracted from the VaTraffic database: (1) fatalities and injuries at work zone crashes, (2) work zones, (3) work zone-hours, (4) work zone-miles, (5) work zone-hour-miles, (6) all work zone crashes per 1,000 work zones, (7) all work zone crashes per 1,000 work zone-hours, and (8) fatal and injury work zone crashes per 1,000 work zones.

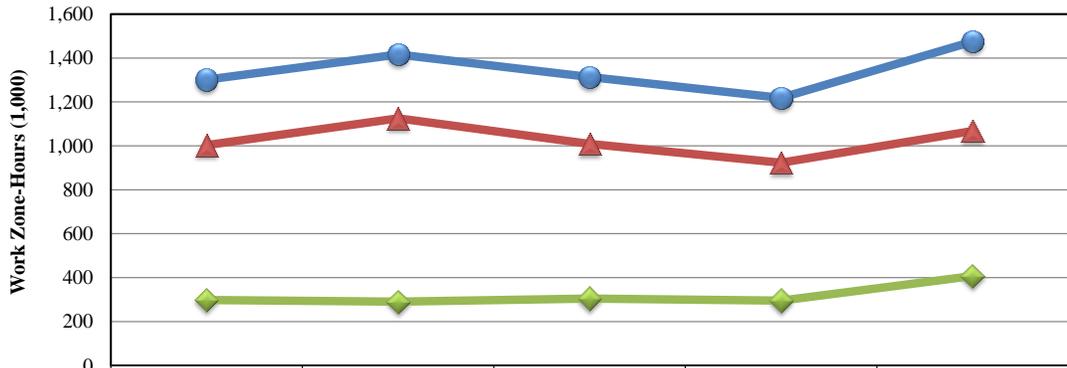
Fatalities and Injuries at Work Zone Crashes (2011-2015)



Work Zones (2011-2015)



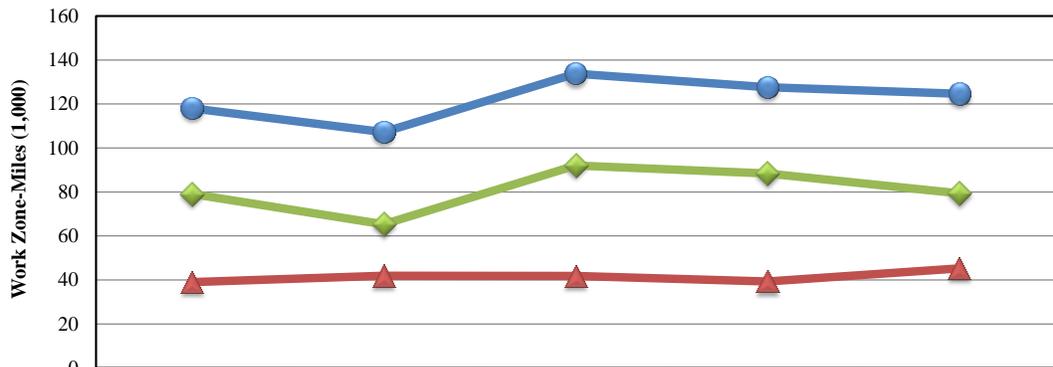
Work Zone-Hours (2011-2015)



	2011	2012	2013	2014	2015
All Roads	1,301,629	1,415,729	1,313,973	1,218,193	1,474,544
Interstate Highways	297,937	290,421	305,003	294,865	406,836
Non-Interstate Highways	1,003,692	1,125,308	1,008,970	923,328	1,067,708

Year

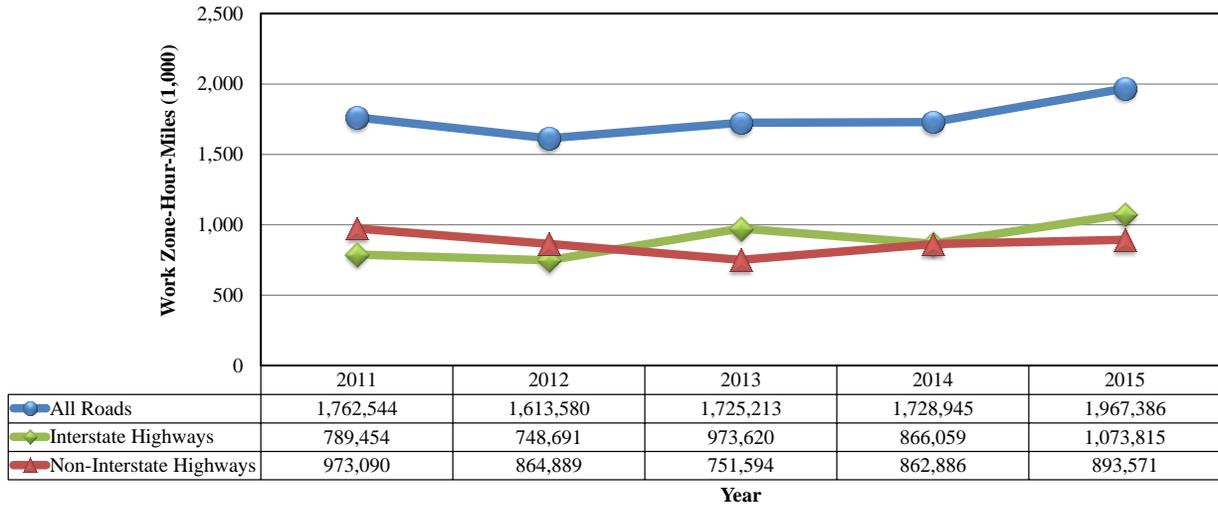
Work Zone-Miles (2011-2015)



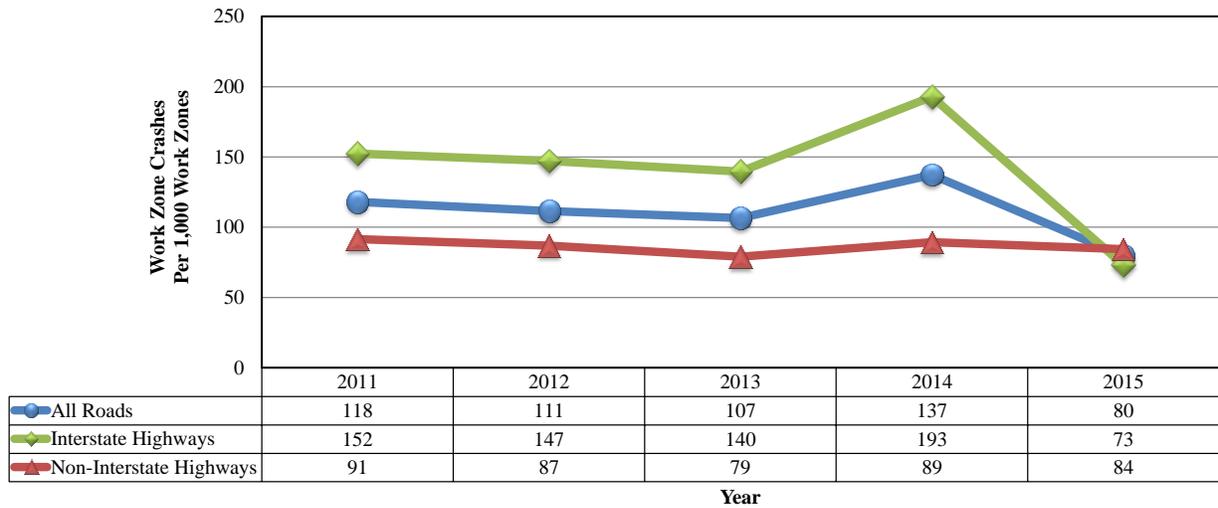
	2011	2012	2013	2014	2015
All Roads	118,067	107,247	133,810	127,649	124,645
Interstate Highways	79,057	65,289	92,023	88,381	79,383
Non-Interstate Highways	39,010	41,958	41,787	39,268	45,262

Year

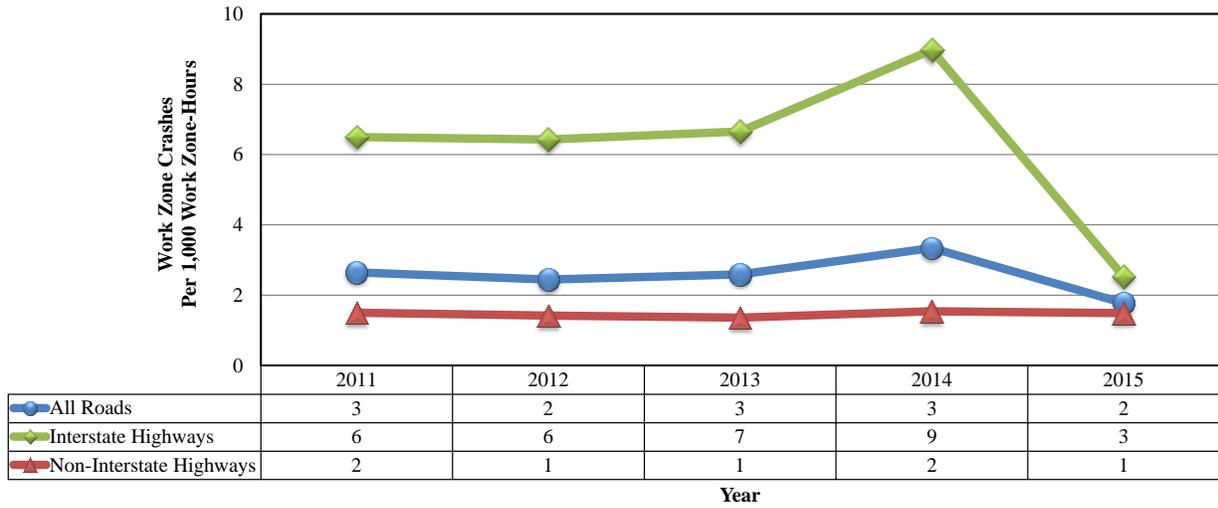
Work Zone-Hour-Miles (2011-2015)



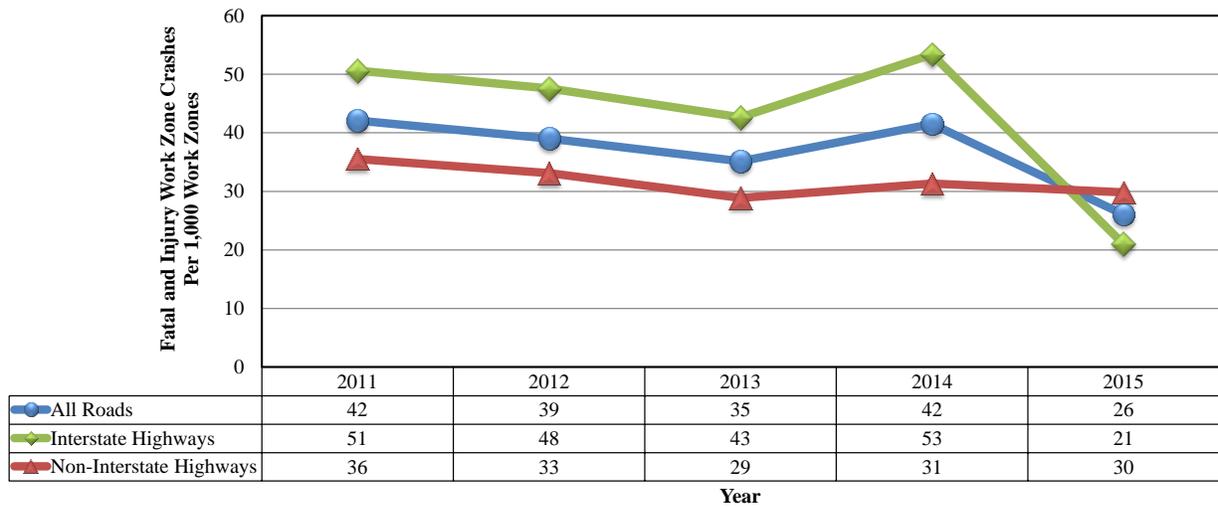
All Work Zone Crashes per 1,000 Work Zones (2011-2015)



All Work Zone Crashes per 1,000 Work Zone-Hours (2011-2015)



Fatal and Injury Work Zone Crashes per 1,000 Work Zones (2011-2015)

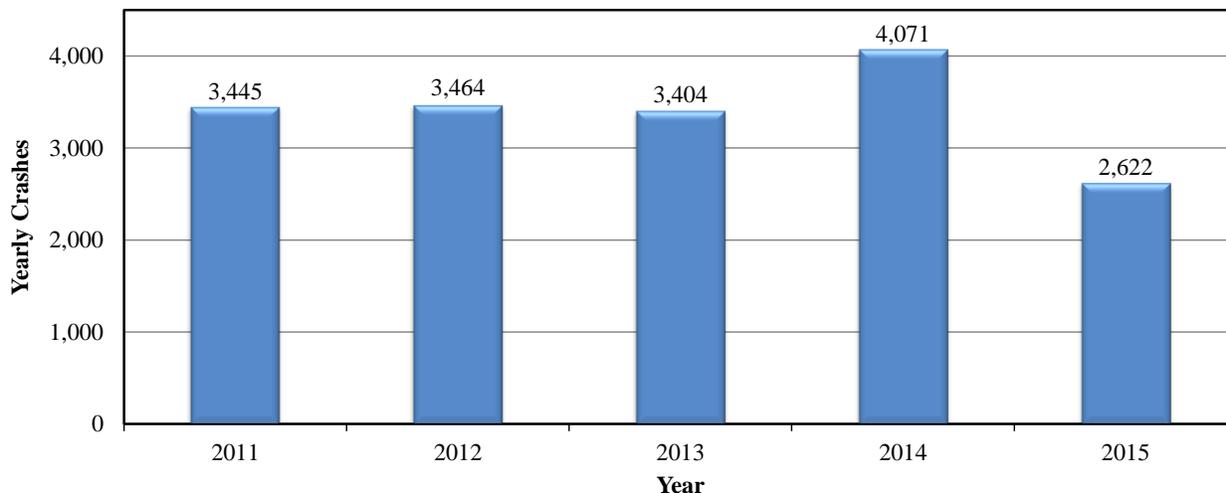


Virginia's Work Zone Crash Characteristics

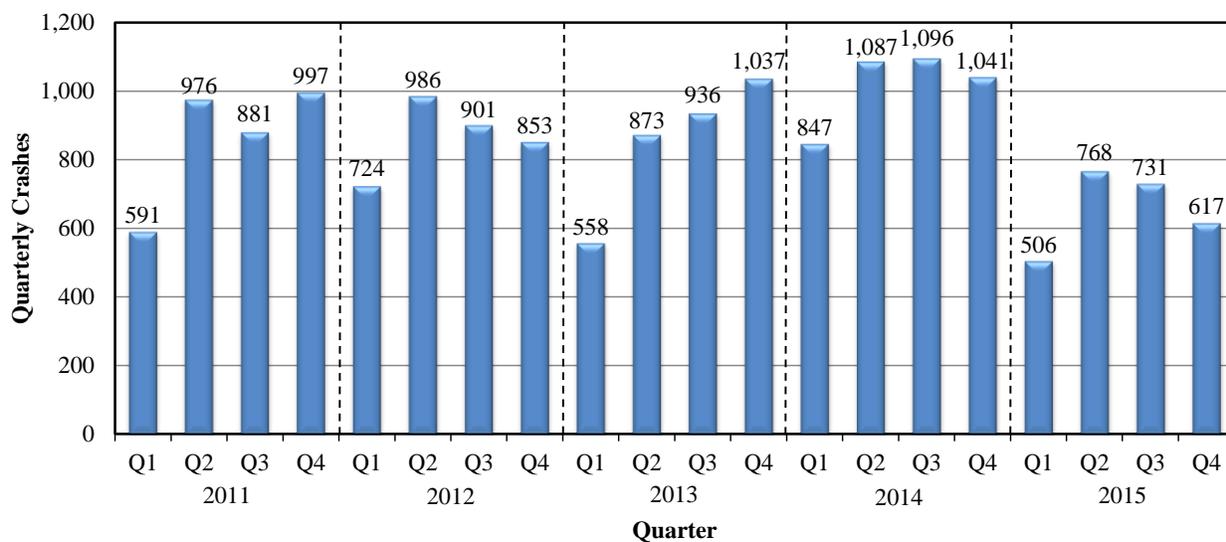
Work zone crash characteristics are presented in this section. Most characteristics are shown on a statewide 5-year aggregate basis, and some are shown on an annual or district basis. Road functional classification is based on `TMPD_FUNCTIONAL_CLASS_CD`, and facility type is based on `RIM_FACILITY_TYPE_CD` in the RNS crash database.

Statewide Crash Characteristics

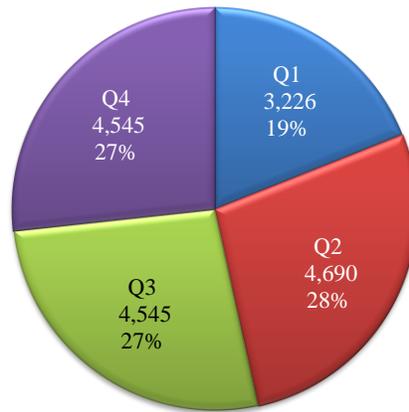
Yearly Work Zone Crashes (2011-2015)



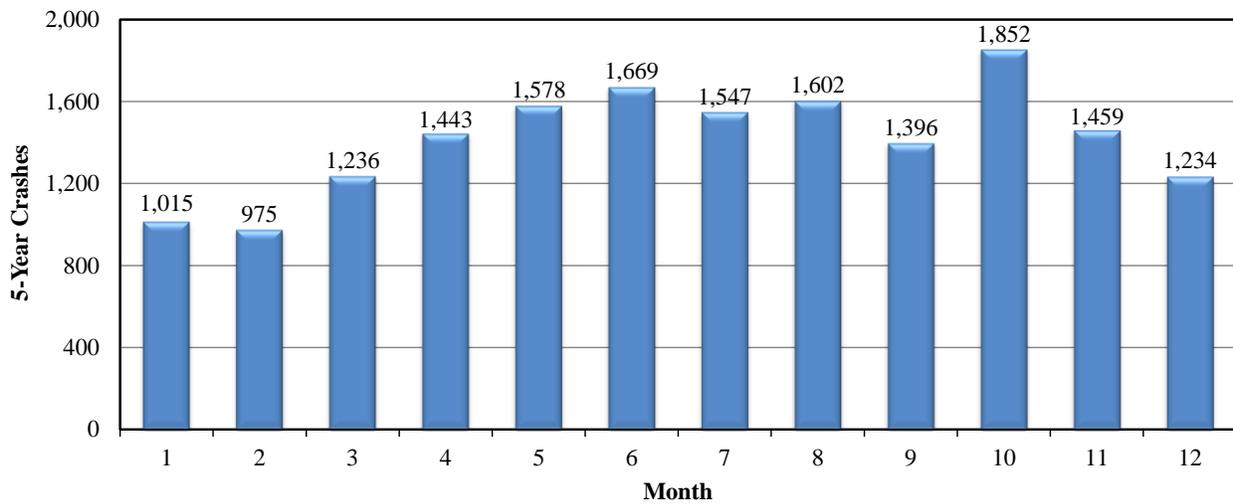
Quarterly Work Zone Crashes (2011-2015)



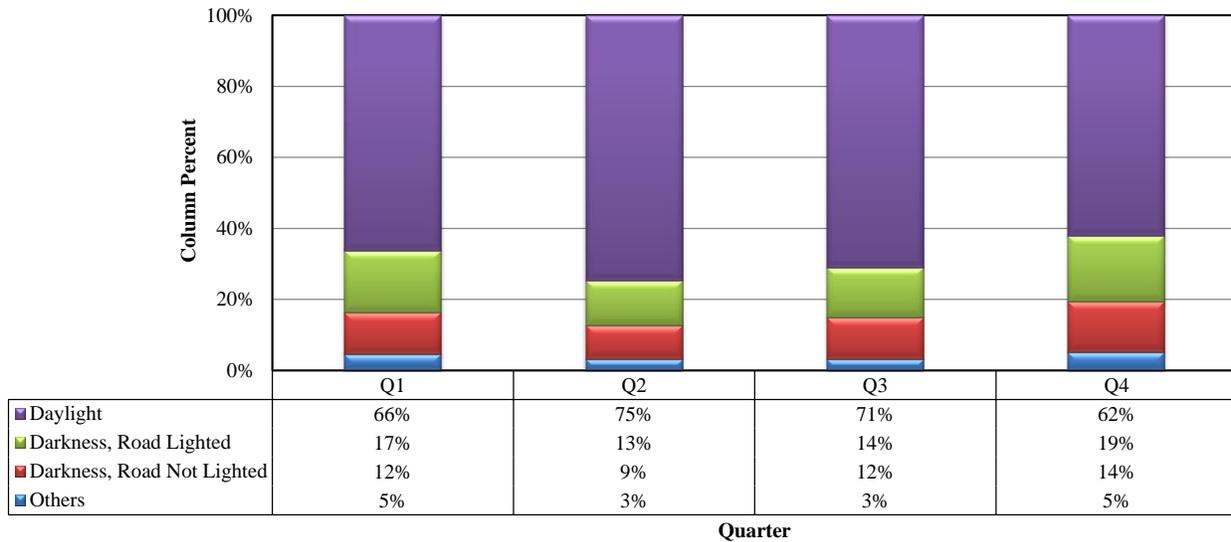
Five-Year Work Zone Crashes by Quarter (2011-2015)



Five-Year Work Zone Crashes by Month (2011-2015)

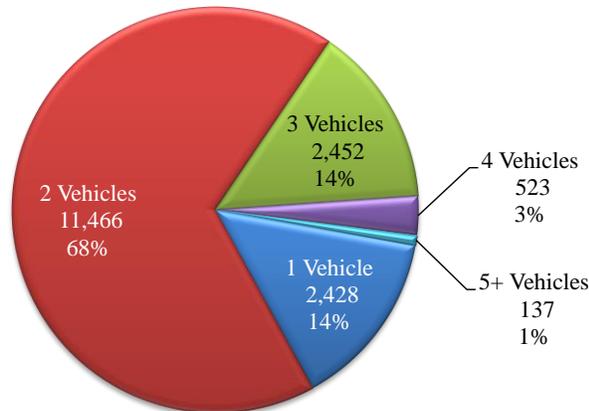


Percentages of Five-Year Work Zone Crashes by Light Condition by Quarter (2011-2015)

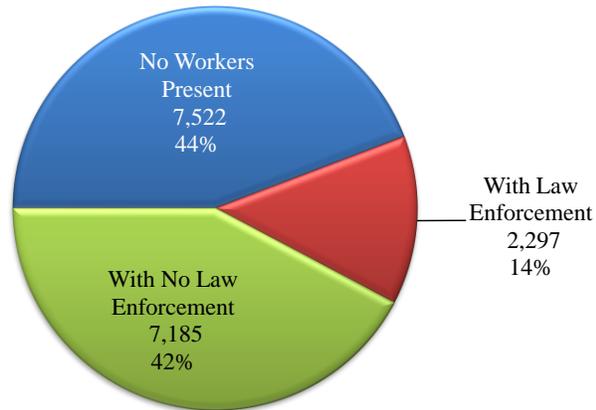


Note: "Others" include dawn, dusk, unknown, etc.

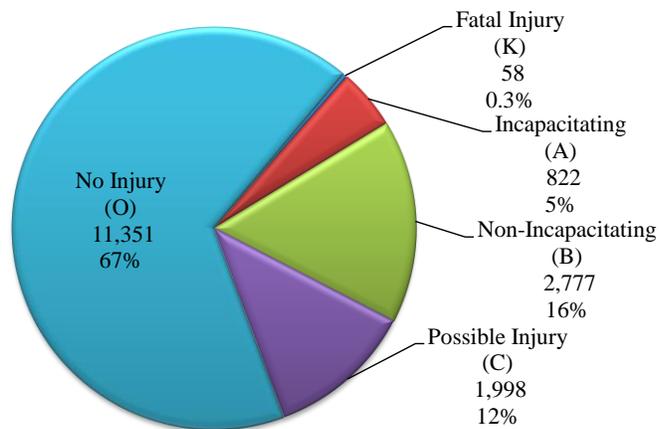
Five-Year Work Zone Crashes by Number of Vehicles (2011-2015)



Five-Year Work Zone Crashes by Presence of Workers (2011-2015)

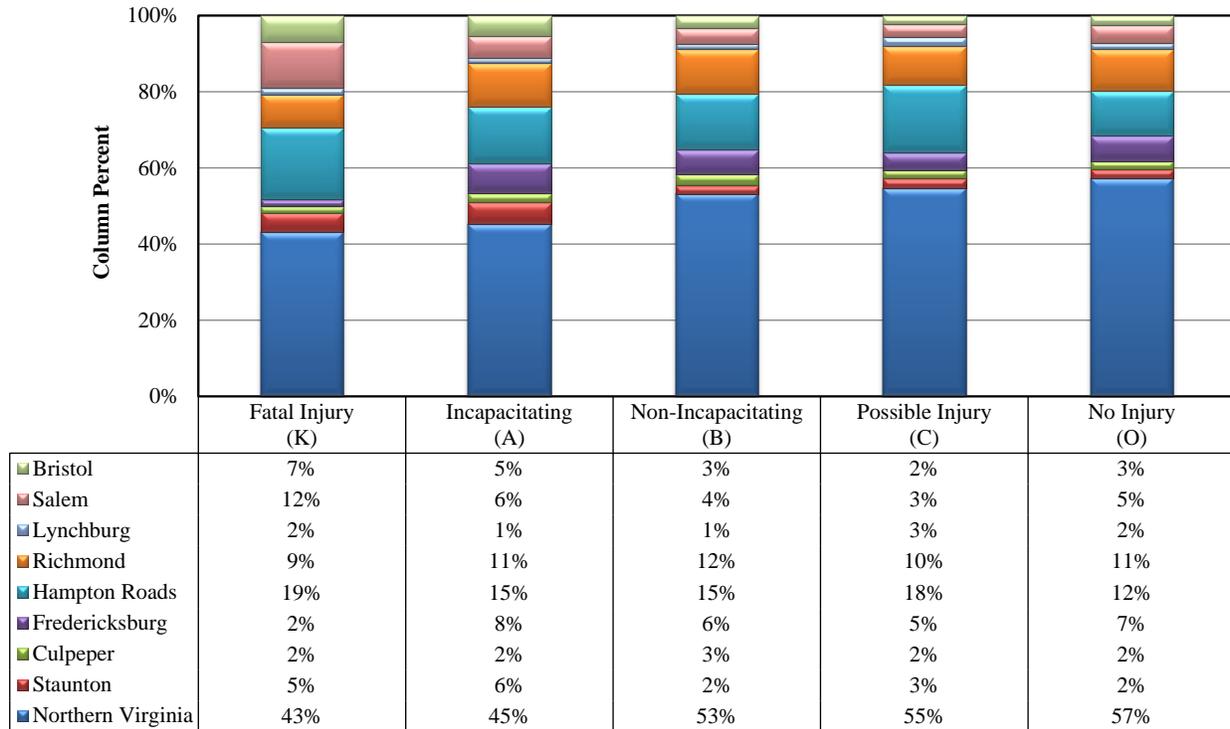


Five-Year Work Zone Crashes by Crash Severity (2011-2015)



Note: Crash severity is based on the KABCO severity scale. A “No Injury” crash is also called a property damage only (PDO) crash.

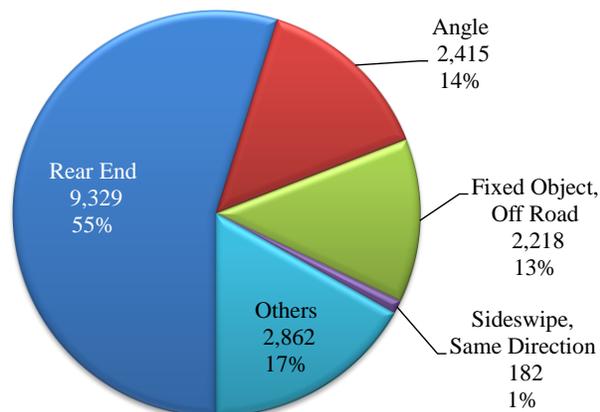
Percentages of Five-Year Work Zone Crashes by District by Crash Severity (2011-2015)



Crash Severity (KABCO Scale)

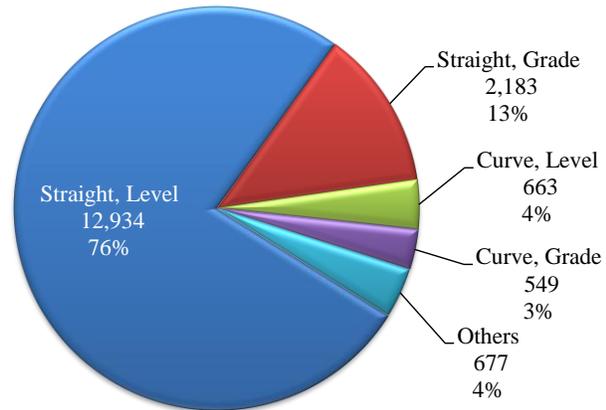
Note: Crash severity is based on the KABCO severity scale. A “No Injury” crash is also called a property damage only (PDO) crash.

Five-Year Work Zone Crashes by Collision Type (2011-2015)



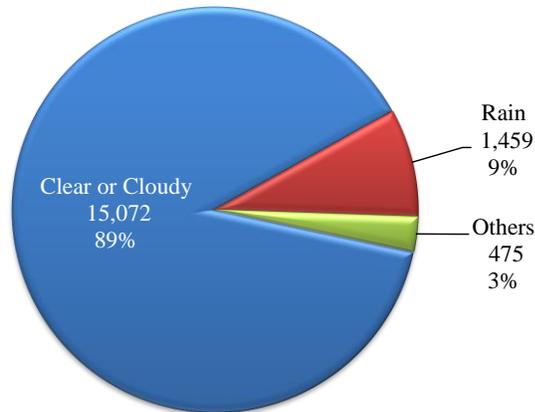
Note: “Others” include head on, fixed object in road, sideswipe in opposite direction, etc.

Five-Year Work Zone Crashes by Road Alignment (2011-2015)



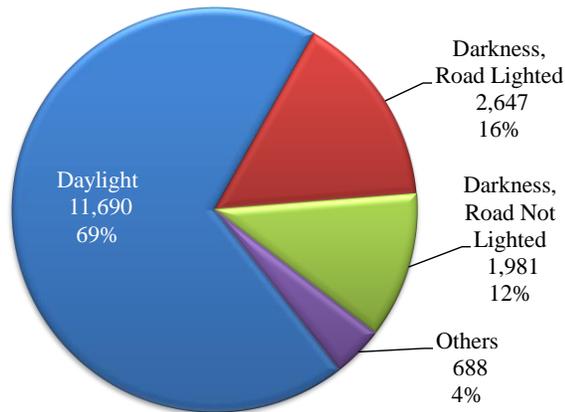
Note: “Others” include straight or curve hillcrest; straight or curve, dip; etc.

Five-Year Work Zone Crashes by Weather Condition (2011-2015)



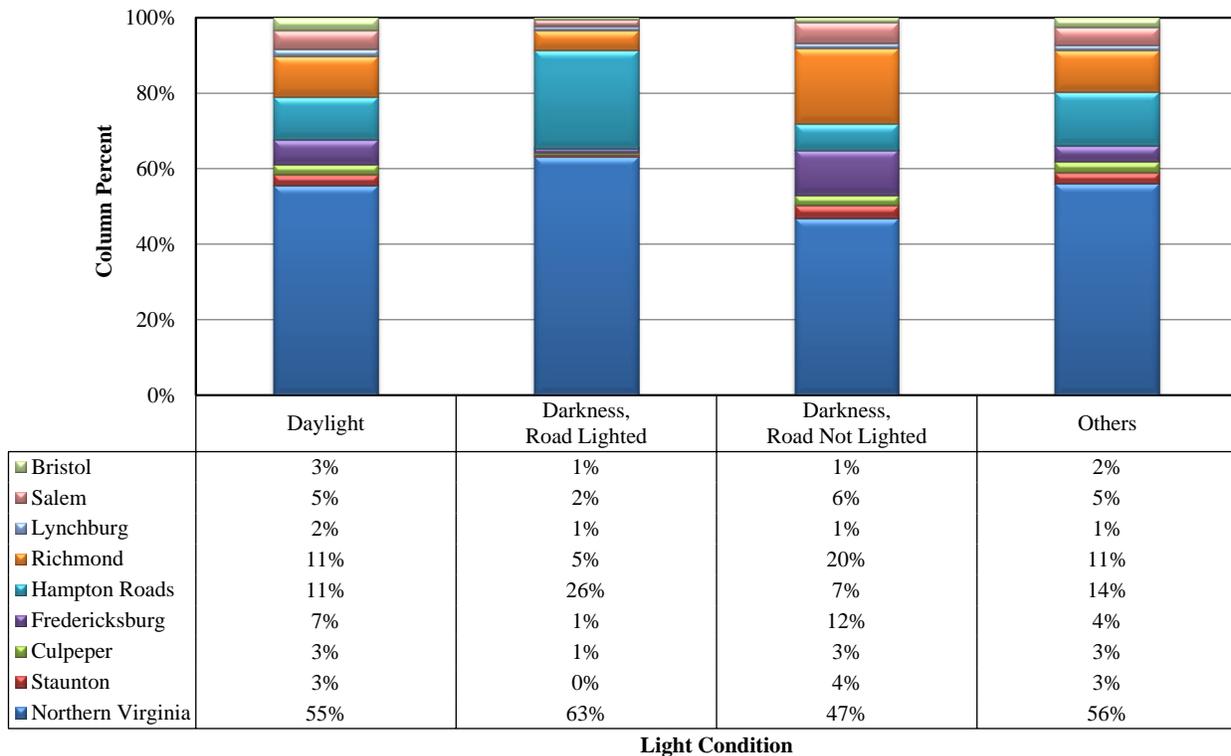
Note: “Others” include fog, mist, raining, snowing, etc.

Five-Year Work Zone Crashes by Light Condition (2011-2015)



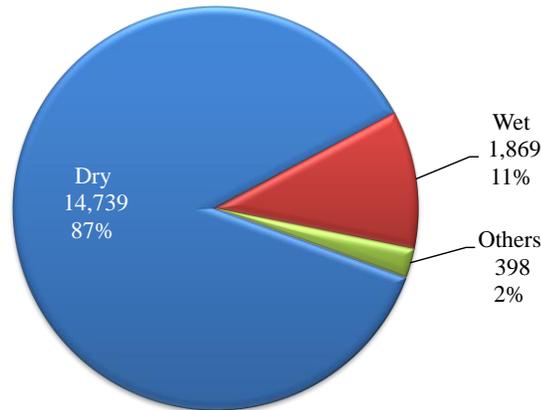
Note: "Others" include dawn, dusk, unknown, etc.

Percentages of Five-Year Work Zone Crashes by District by Light Condition (2011-2015)



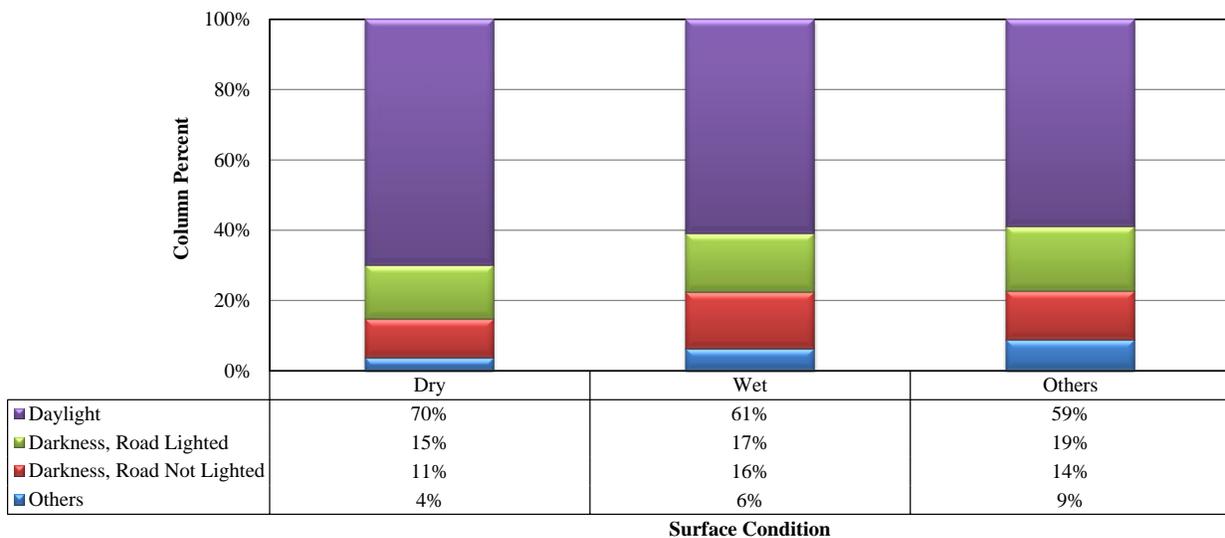
Note: "Others" include dawn, dusk, unknown, etc.

Five-Year Work Zone Crashes by Surface Condition (2011-2015)



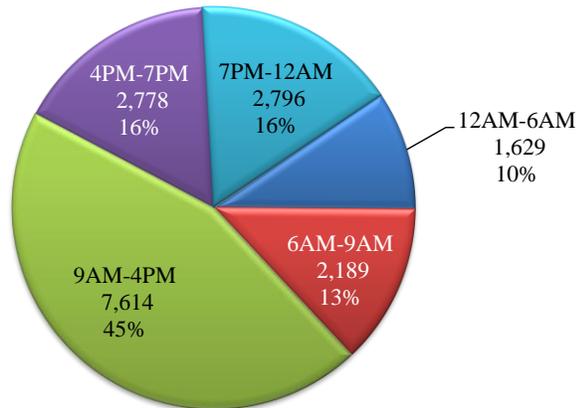
Note: "Others" include snowy, icy, muddy, oil or other fluids, etc.

Percentages of Five-Year Work Zone Crashes by Light Condition by Surface Condition (2011-2015)

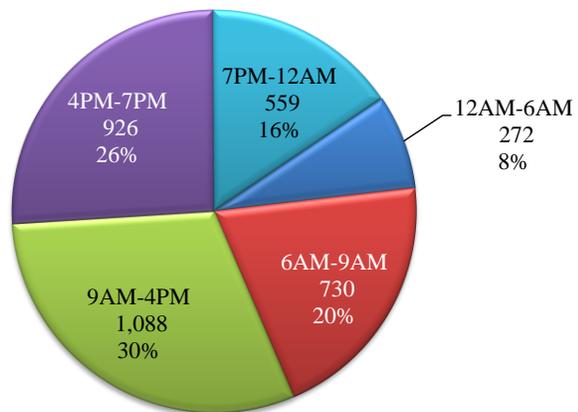


Note: "Others" include snowy, icy, muddy, oil or other fluids, etc.

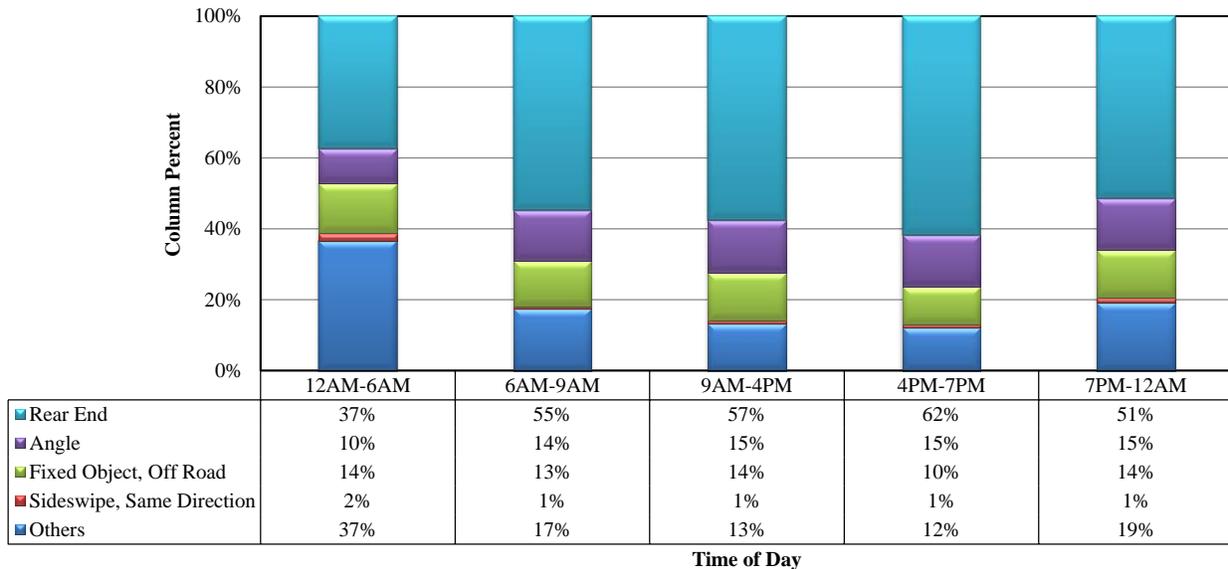
Five-Year Work Zone Crashes by Time of Day (2011-2015)



Five-Year Work Zone Crashes per Hour by Time of Day (2011-2015)

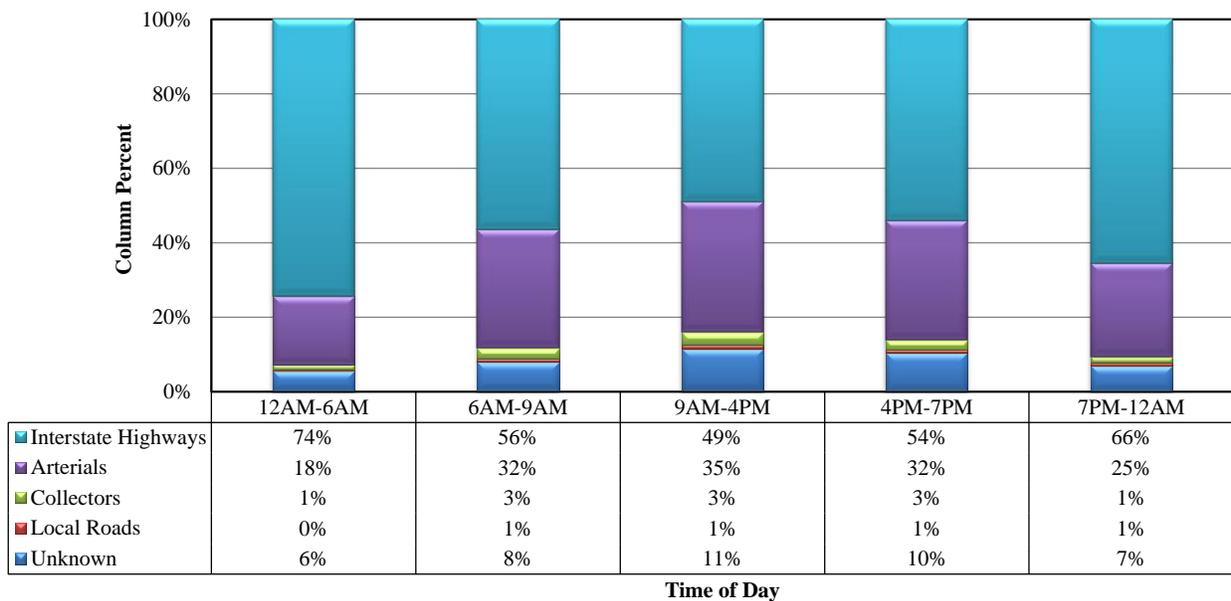


Percentages of Five-Year Work Zone Crashes by Collision Type by Time of Day (2011-2015)



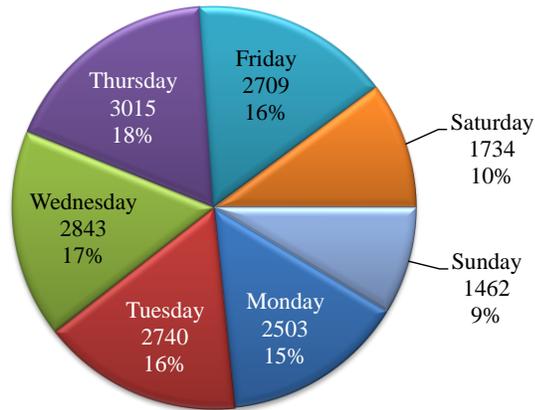
Note: "Others" include head on, fixed object in road, sideswipe in opposite direction, etc.

Percentages of Five-Year Work Zone Crashes by Functional Classification by Time of Day (2011-2015)

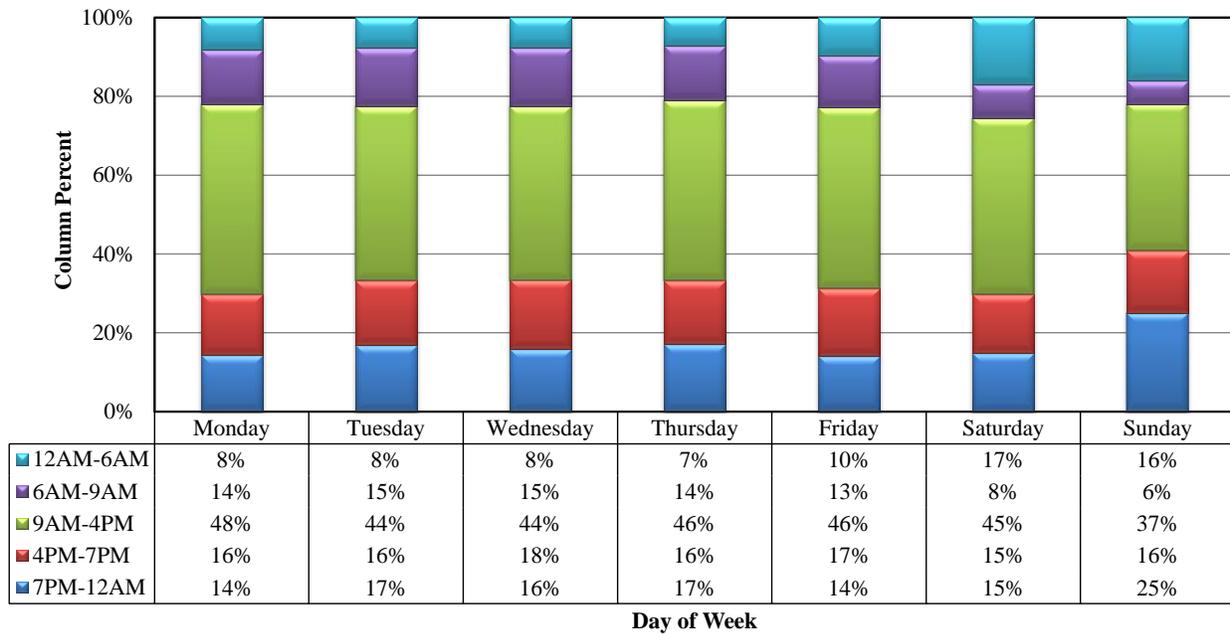


Note: "Unknown" includes non-VDOT maintained roads (e.g., roads in cities or towns) or roads that are not identified because of insufficient or unclear locational information in a police crash report.

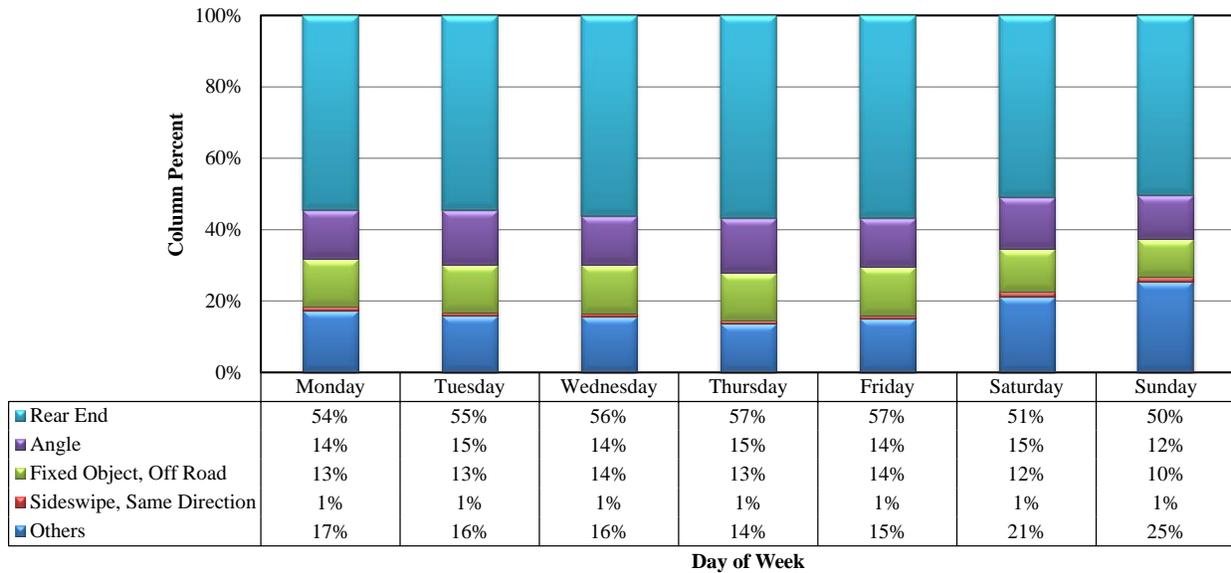
Five-Year Work Zone Crashes by Day of Week (2011-2015)



Percentages of Five-Year Work Zone Crashes by Time of Day by Day of Week (2011-2015)

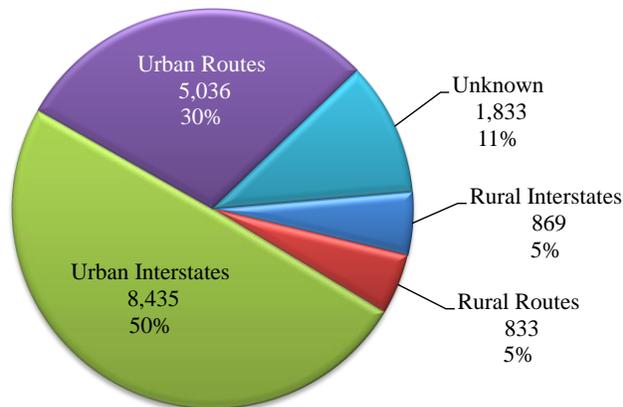


Percentages of Five-Year Work Zone Crashes by Collision Type by Day of Week (2011-2015)



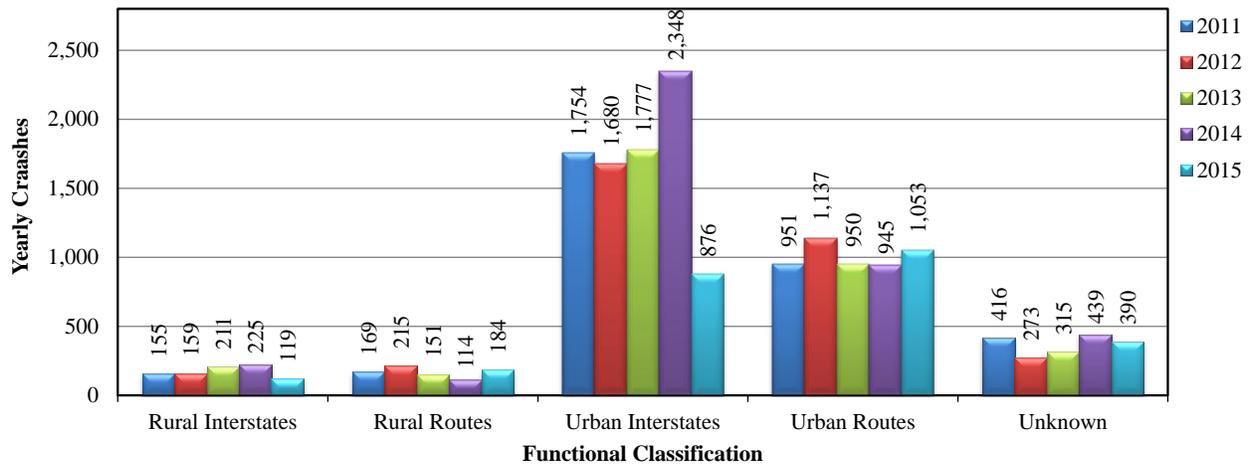
Note: "Others" include head on, fixed object in road, sideswipe in opposite direction, etc.

Five-Year Work Zone Crashes by Functional Classification (2011-2015)



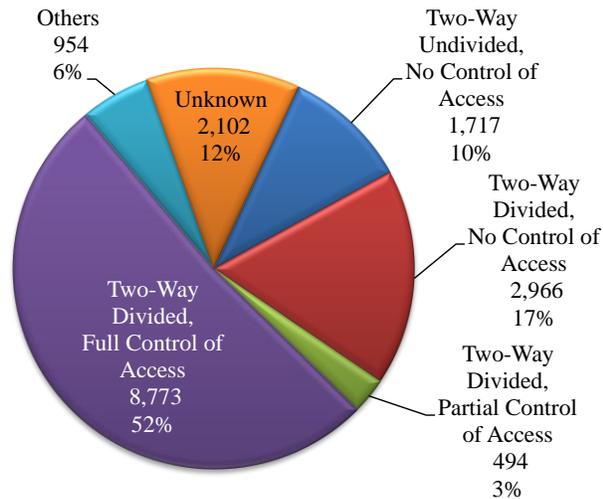
Note: "Unknown" includes non-VDOT maintained roads (e.g., roads in cities or towns) or roads that are not identified because of insufficient or unclear locational information in a police crash report.

Yearly Work Zone Crashes by Functional Classification (2011-2015)



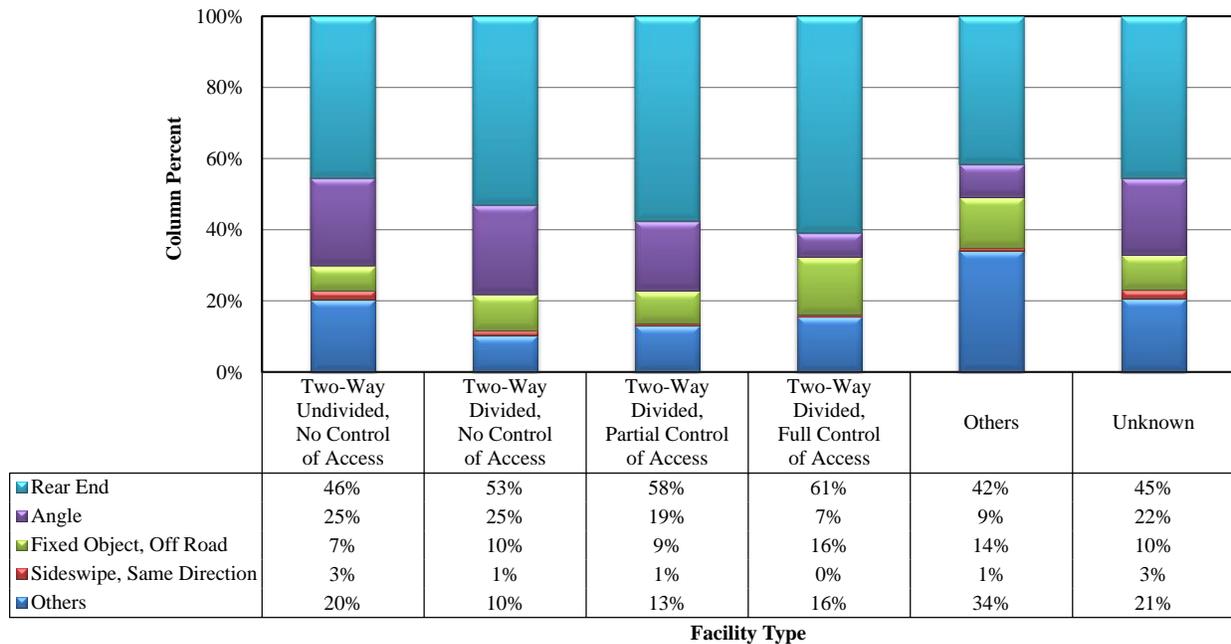
Note: “Unknown” includes non-VDOT maintained roads (e.g., roads in cities or towns) or roads that are not identified because of insufficient or unclear locational information in a police crash report.

Five-Year Work Zone Crashes by Facility Type (2011-2015)



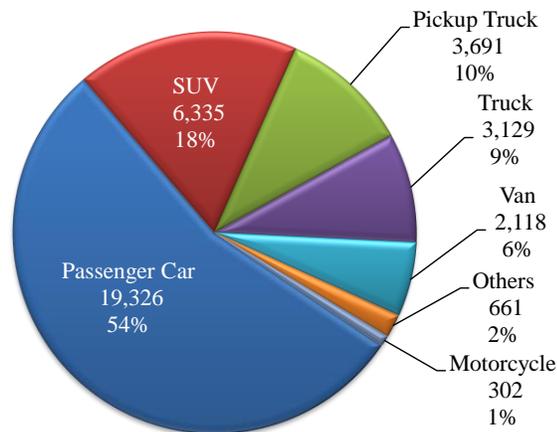
Note: “Others” include one-way system, transition, structures (e.g., bridge and tunnel), etc. “Unknown” includes non-VDOT maintained roads (e.g., roads in cities or towns) or roads that are not identified because of insufficient or unclear locational information in a police crash report.

Percentages of Five-Year Work Zone Crashes by Collision Type by Facility Type (2011-2015)



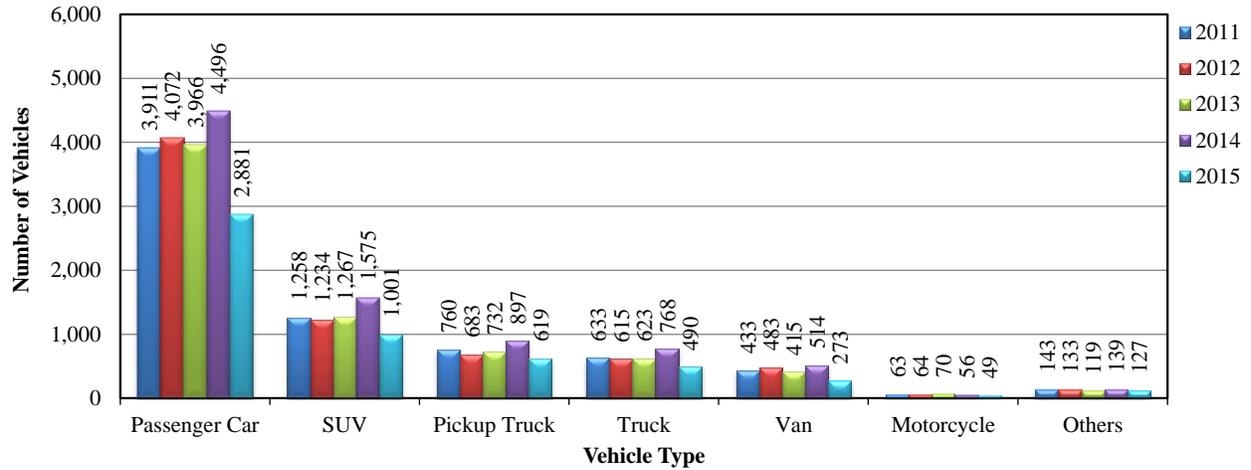
Note: “Others” in facility type include one-way system, transition, structures (e.g., bridge and tunnel), etc. “Unknown” in facility type includes non-VDOT maintained roads (e.g., roads in cities or towns) or roads that are not identified because of insufficient or unclear locational information in a police crash report. “Others” in collision type include head on, fixed object in road, sideswipe in opposite direction, etc.

Vehicles in Five-Year Work Zone Crashes by Vehicle Type (2011-2015)



Note: “Truck” includes a single-unit truck with 2 or more axles and a truck tractor (bobtail–no trailer). “Others” include recreational vehicle, bus, etc.

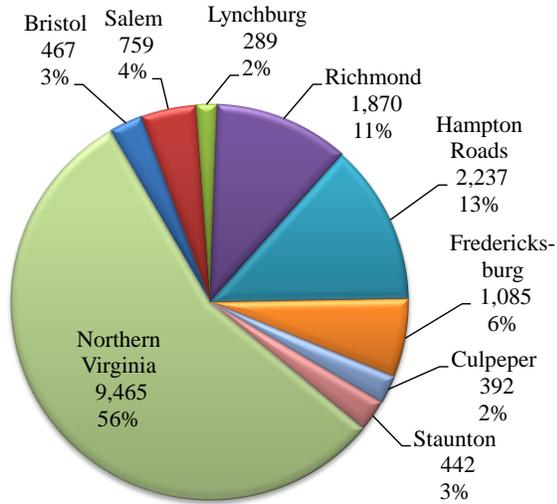
Vehicles in Yearly Work Zone Crashes by Vehicle Type (2011-2015)



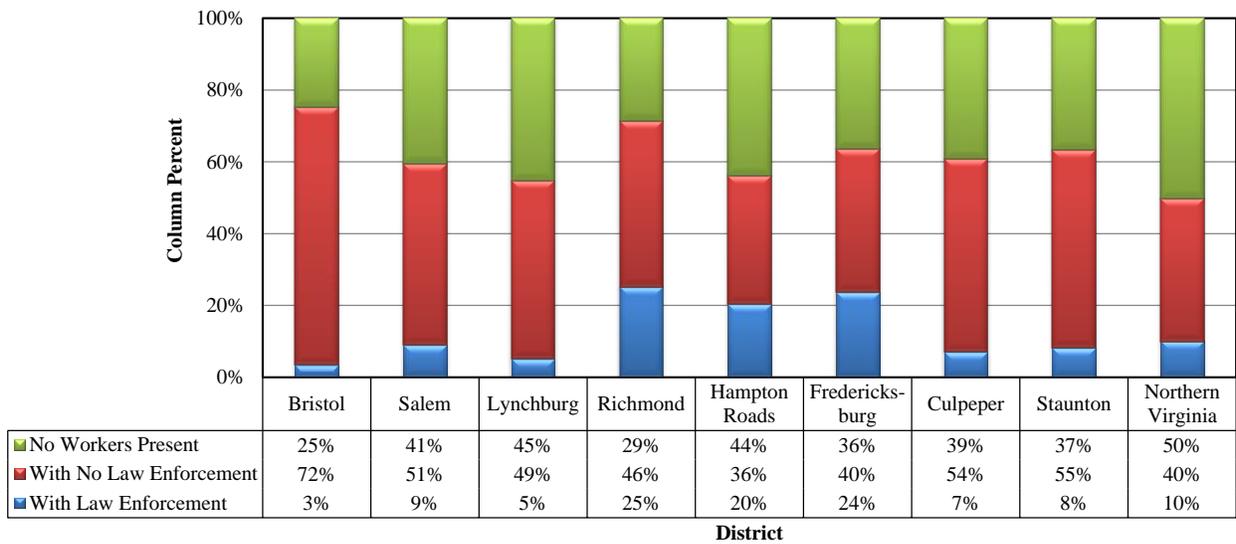
Note: “Truck” includes a single-unit truck with 2 or more axles and a truck tractor (bobtail–no trailer). “Others” include recreational vehicle, bus, etc.

Crash Characteristics by District

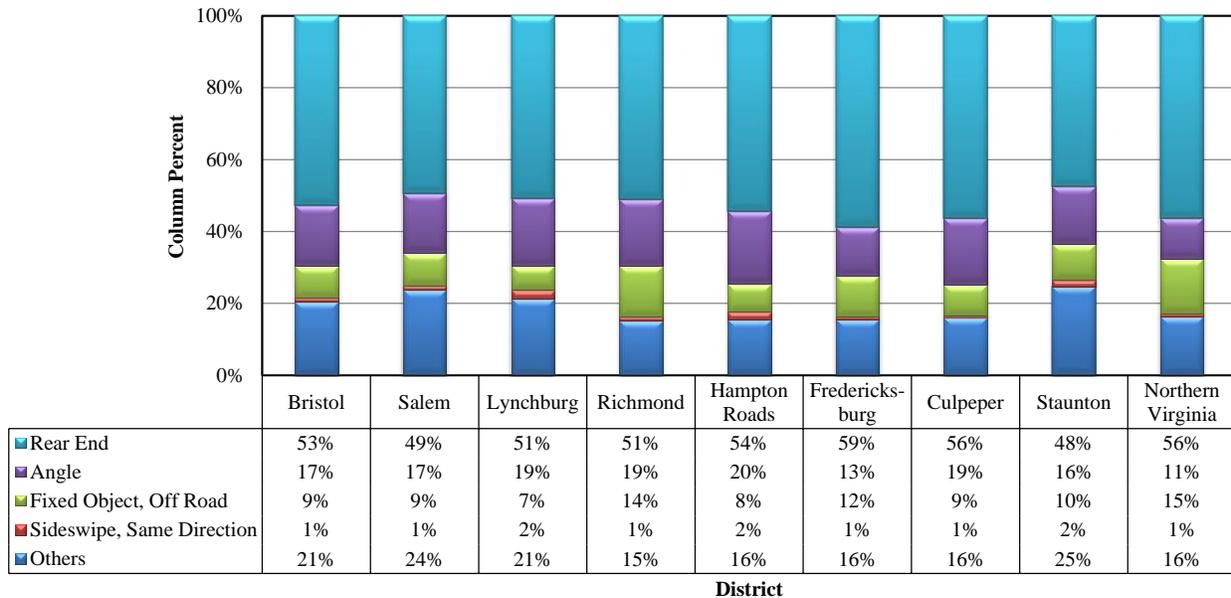
Five-Year Work Zone Crashes by District (2011-2015)



Percentages of Five-Year Work Zone Crashes by Presence of Workers by District (2011-2015)

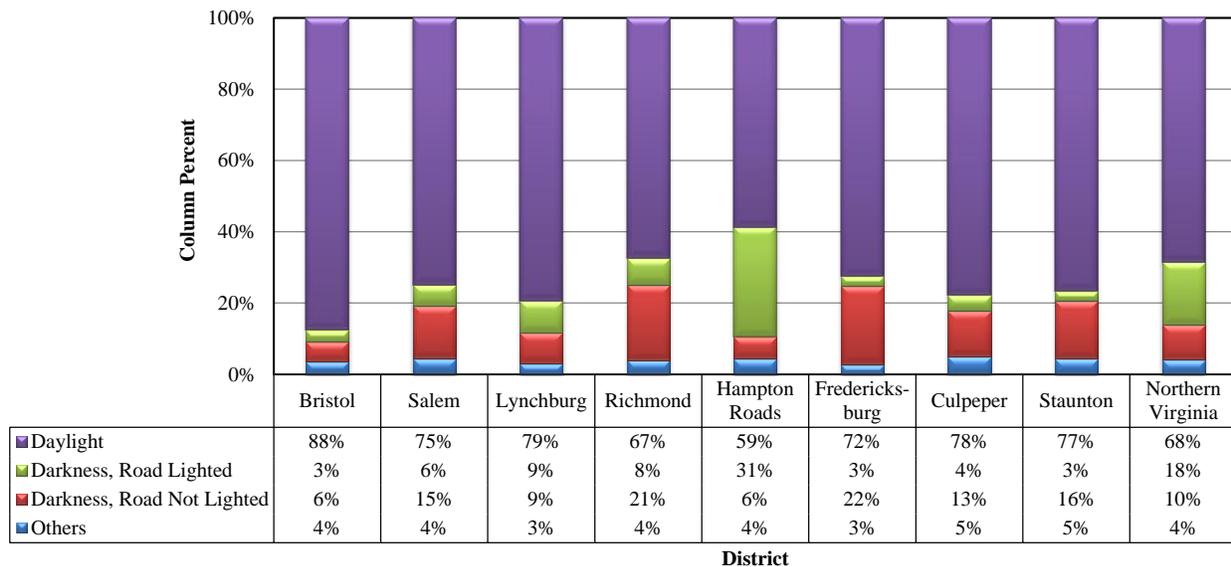


Percentages of Five-Year Work Zone Crashes by Collision Type by District (2011-2015)



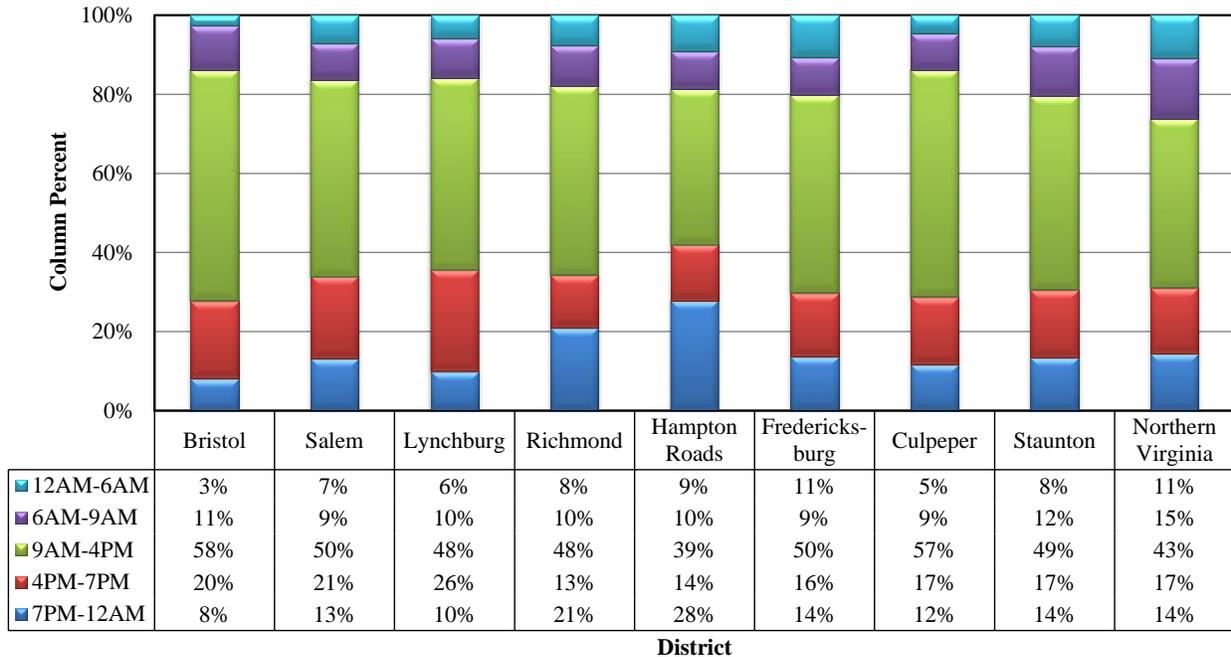
Note: "Others" include head on, fixed object in road, sideswipe in opposite direction, etc.

Percentages of Five-Year Work Zone Crashes by Light Condition by District (2011-2015)

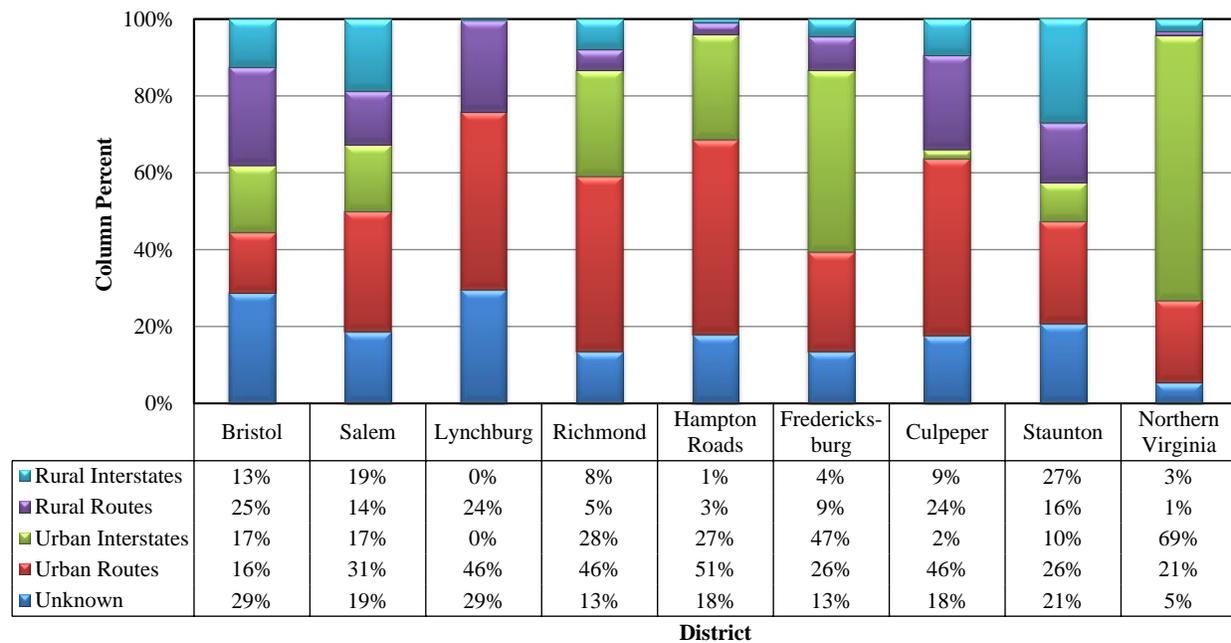


Note: "Others" include dawn, dusk, unknown, etc.

Percentages of Five-Year Work Zone Crashes by Time of Day by District (2011-2015)

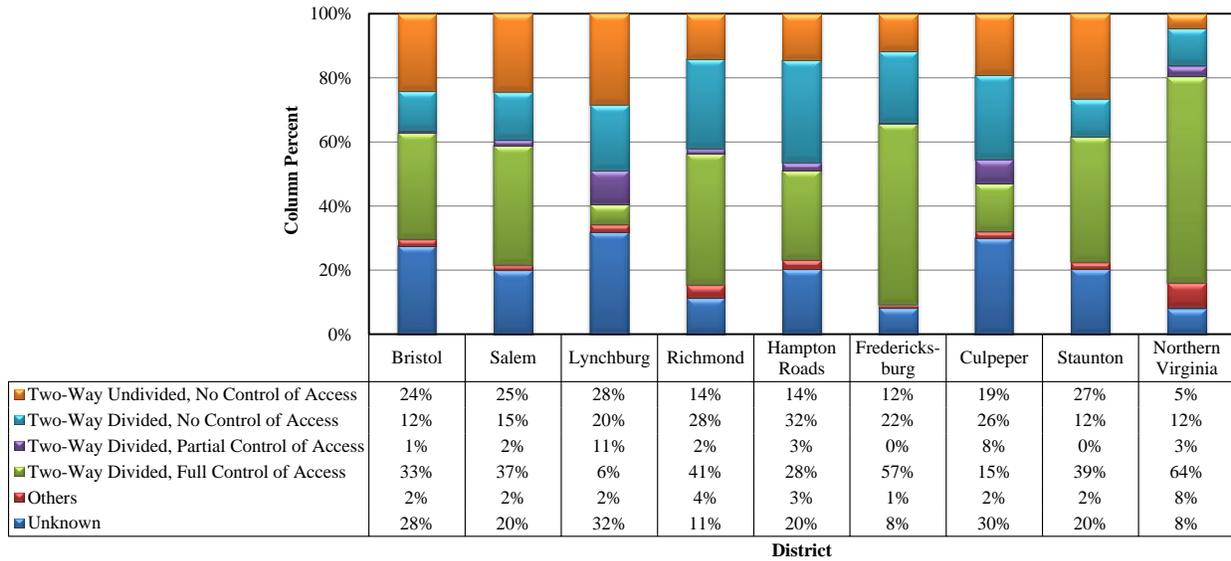


Percentages of Five-Year Work Zone Crashes by Functional Classification by District (2011-2015)



Note: “Unknown” includes non-VDOT maintained roads (e.g., roads in cities or towns) or roads that are not identified because of insufficient or unclear locational information in a police crash report.

Percentages of Five-Year Work Zone Crashes by Facility Type by District (2011-2015)



Note: “Others” include one-way system, transition, structures (e.g., bridge and tunnel), etc. “Unknown” includes non-VDOT maintained roads (e.g., roads in cities or towns) or roads that are not identified because of insufficient or unclear locational information in a police crash report.