

# Understanding Bicycle and Pedestrian Safety Using Crash Types



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**April 30, 2018**



# Housekeeping

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## ⇒ **Problems with audio?**

Dial into the phone line instead of using “mic & speakers”

## ⇒ **Webinar issues?**

Re-Load the webpage and log back into the webinar. Or send note of an issue through the Question box.

## ⇒ **Questions?**

Submit your questions at any time in the Questions box.



# Archive and Certificates

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Archive posted at [www.pedbikeinfo.org/webinars](http://www.pedbikeinfo.org/webinars)

- ⇒ Copy of presentations
- ⇒ Recording (within 1-2 days)
- ⇒ Links to resources

Follow-up email will include...

- ⇒ Link to certificate of attendance
- ⇒ Information about webinar archive



# Webinars and News

- ⇒ Find upcoming webinars and webinar archives at [pedbikeinfo.org/webinars](http://pedbikeinfo.org/webinars)
- ⇒ Follow us for the latest PBIC News  
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- ⇒ Join the conversation using **#PBICWebinar**
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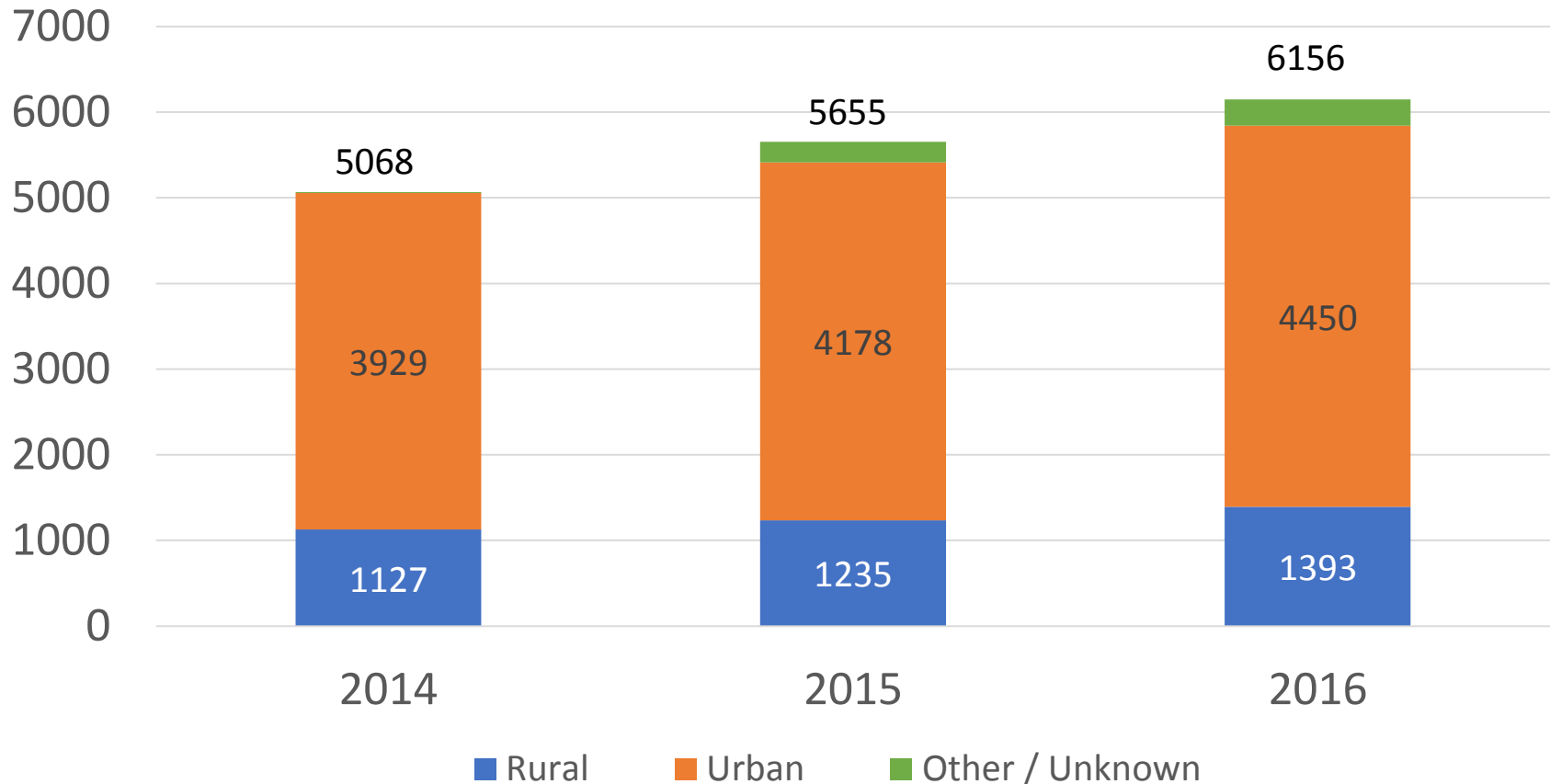
The screenshot shows the website for the Pedestrian and Bicycle Information Center (PBIC). The header includes the PBIC logo and navigation links: Data & Resources, Community Support, Planning & Design, Training & Events, and Behavior Change. The main content area is titled "Webinars" and contains the following information:

- Webinars:** The Pedestrian and Bicycle Information Center (PBIC) offers webinars on a variety of topics related to pedestrian and bicycle safety. Sign up for our [newsletter](#) to receive webinar announcements, and follow us on [Facebook](#) and [Twitter](#).
- Upcoming Webinars:**
  - 04/18/2017 – Getting from Vision Zero Plan to Vision Zero Progress**  
Presented by: Rob Viola, New York City Department of Transportation; Luis Montoya, San Francisco Municipal Transportation Agency; and Cathy Tuttle, Seattle Neighborhood Greenways.
  - Designing for Bicyclist Safety Webinar Series**  
Presented by: Brooke Struve, Federal Highway Administration; Peter Lagerwey, Toole Design Group; and Michael Cynecki, Lee Engineering
- Recently Delivered Webinars:**
  - 03/14/2017 – Preparing for Successful Education and Enforcement Efforts**  
Presented by: Laura Sandt, UNC Highway Safety Research Center; Kara Macek, Governors Highway Safety Association; Shannon Purdy, National Highway Traffic Safety Administration; LT Joe Raulerson, Gainesville Police Department; and LT Michael Montanye, Greenville (NC) Police Department.

The screenshot shows the Facebook page for the Pedestrian and Bicycle Information Center. The page features the PBIC logo, the name "Pedestrian and Bicycle Information Center", and the handle "@pedbikeinfo". The cover photo displays the text "Pedestrian and Bicycle Information Center" and the website "www.pedbikeinfo.org". The page includes a navigation menu on the left with options like Home, About, Photos, Likes, Videos, Posts, and Events. The main content area shows a post titled "VISION ZERO STRATEGIES SERIES" with a photo of a person in a high-visibility vest. The page also displays engagement metrics, such as "3,509 people like this and 3,446 people follow this", and contact information including the phone number "888-823-3977" and the website "www.pedbikeinfo.org".



# U.S. Pedestrian Fatalities



# Top 7 Ped Fatality Crash Type Groups

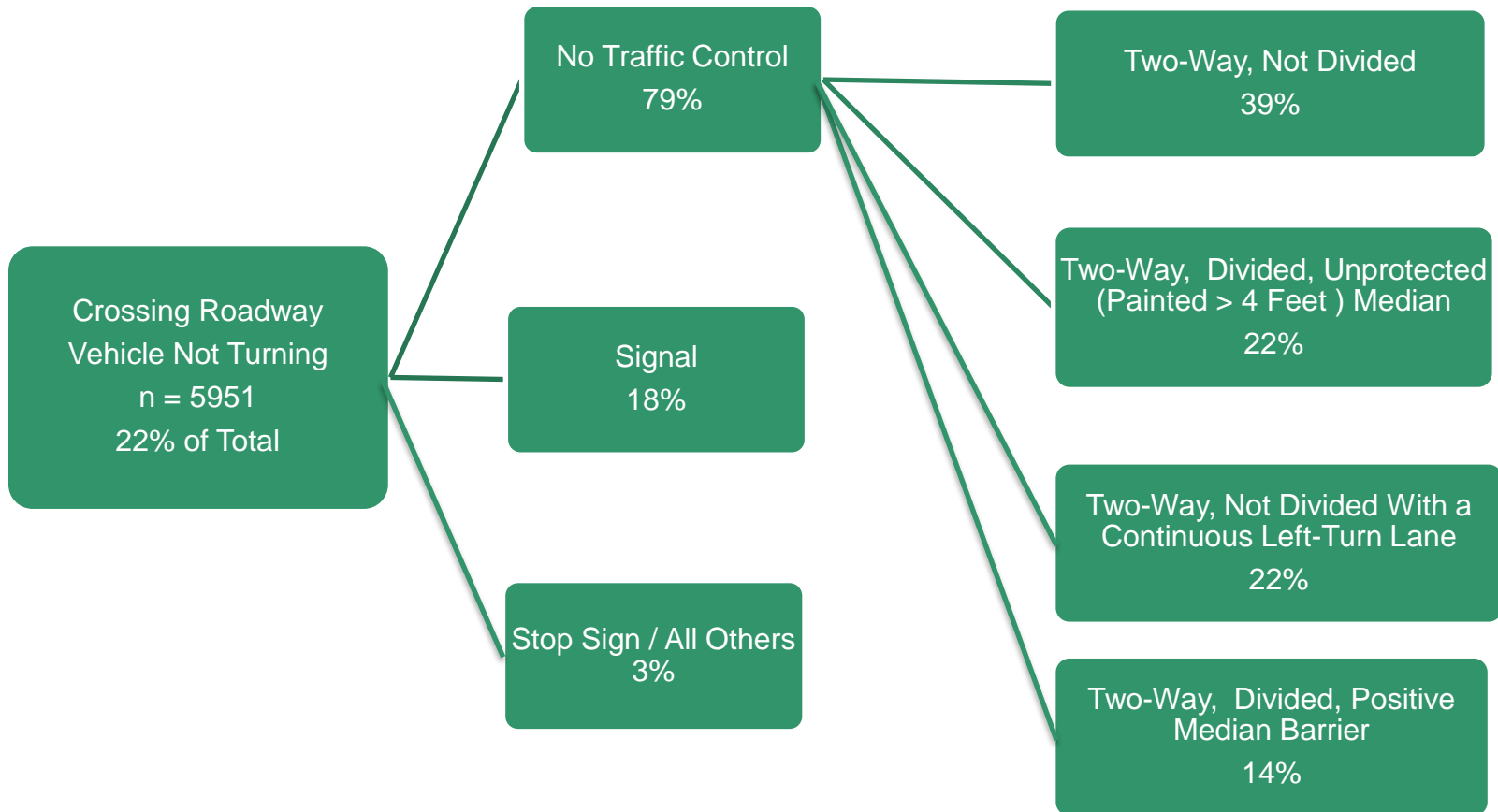
Pedestrian Crash Group	Crash Date (Year)			Total
	2014	2015	2016	
Crossing Roadway - Vehicle Not Turning	1,728 34.1%	1,978 35.0%	2,245 36.5%	5,951 35.3%
Walking/Running Along Roadway	669 13.2%	763 13.5%	787 12.8%	2,219 13.1%
Unusual Circumstances	510 10.1%	547 9.7%	576 9.4%	1,633 9.7%
Dash / Dart-Out	444 8.8%	448 7.9%	455 7.4%	1,347 8.0%
Pedestrian in Roadway - Circumstances Unknown	393 7.8%	389 6.9%	457 7.4%	1,239 7.3%
Crossing Roadway - Vehicle Turning	242 4.8%	266 4.7%	271 4.4%	779 4.6%
Crossing Expressway	233 4.6%	261 4.6%	276 4.5%	770 4.6%
Top 7 Crash Groups subtotal	4,220 83.3%	4,653 82.3%	5,068 82.3%	13,939 82.6%
All Others (Backing, Working/Playing in Road, Bus-related, Non-trafficway & )	849 16.8%	1,003 17.7%	1,089 17.7%	2,941 17.4%
Total	5,068	5,655	6,156	16,879



Data from Fatality Analysis Reporting System (FARS)

<https://www.nhtsa.gov/research-data/fatality-analysis-reporting-system-fars>

# U.S. Pedestrian Fatalities





# Florida's Bike/Ped Crash Typing and Applications

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April, 2018



# Outline

- Florida's web-based bike/ped crash typing system (Web-based PBCAT)
- Using the system for typing of statewide bike/ped crashes
- Application of crash typing in safety analysis - Metroplan Orlando case study

# The Need for Pedestrian and Bicycle Crash Typing

- Typically detailed crash types are not available in crash reports
- Need to relate crashes to ped/bike, driver behavior and location characteristics
- Pedestrian and Bicycle Crash Analytical Tool (PBCAT) - FHWA



# PBCAT Overview

- It's a standalone software – requires installation and setup
- Requires key in or import of data PBCAT local database
- Import involve matching of local crash data fields to PBCAT fields
- Lack of seamless GIS Integration
- Requires Windows XP
- No longer supported

Pedestrian & Bicycle Crash Analysis Tool (PBCAT) - Version 2.0

File Form Design Reports Database Countermeasures Help

Pedestrian Crash Type Form - NEW\_DATABASE.MDB

Report Number:  Number of Peds Involved:

Crash Type/Crash Group Information

Crash Type Number:  Crash Type Description:

Crash Group Number:  Crash Group Description:

Ped Location Information - Intersection/Intersection-Related Crashes

Crash Location Description:

Pedestrian Position Description:

Pedestrian Direction:

Motorist Direction:  Motorist Maneuver:

Leg Intersection:  Scenario:

CRASH LOCATION

Where did the crash occur?

The crash occurred within the intersection proper or within the crosswalk area.  
Note: Driveways controlled by signals or signs should be coded as Intersections. Uncontrolled driveways should be coded as Non-Intersection Locations.

Intersection

defined intersection area

Intersection-Related

Intersection-related area

15m (50ft)

Non-Intersection Location

Non-Roadway Location

Unknown/Insufficient Information

Close

# Considerations for Florida

- Large number of bike/ped crashes
- Many local/regional/state agencies and contractors needing the same data
- Need for easy data sharing
- Existence of a statewide web-based crash data system available to all agencies
- Limitations of standalone PBCAT

# Florida's Alternative Solution to PBCAT

- Based on existing PBCAT method but programmed from scratch
- Different paradigm: plug the method into the existing database system using a **web-based** approach
- Accessible to all relevant stakeholders
  - DOT, MPO, local governments, contractors etc

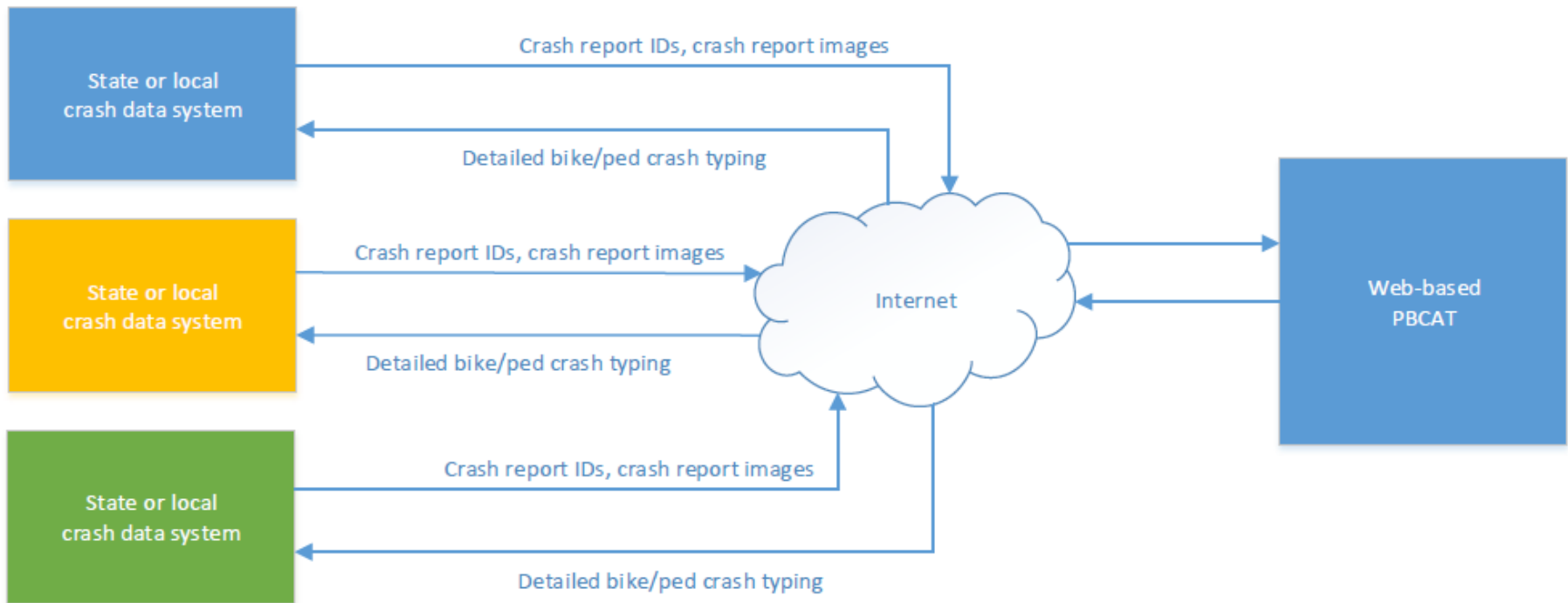
# Live Demonstration of the Web-based PBCAT

# Advantages of the Web-based PBCAT

- Centralized Engine
  - Over 350 crash types
  - Complex paths to get to the crash type
  - A single server-based engine to compute the crash type
  - Easier to update in one place, transparent to the user
- Web based client interface
  - Client crash typing interface linked to existing local crash database

# Broader Applicability – PBCAT as Service

- Developed as a service, which can be plugged into other crash data systems
- Requires access to a list of crash record IDs and the individual crash reports
- Returns detailed bike/ped crash typing data elements

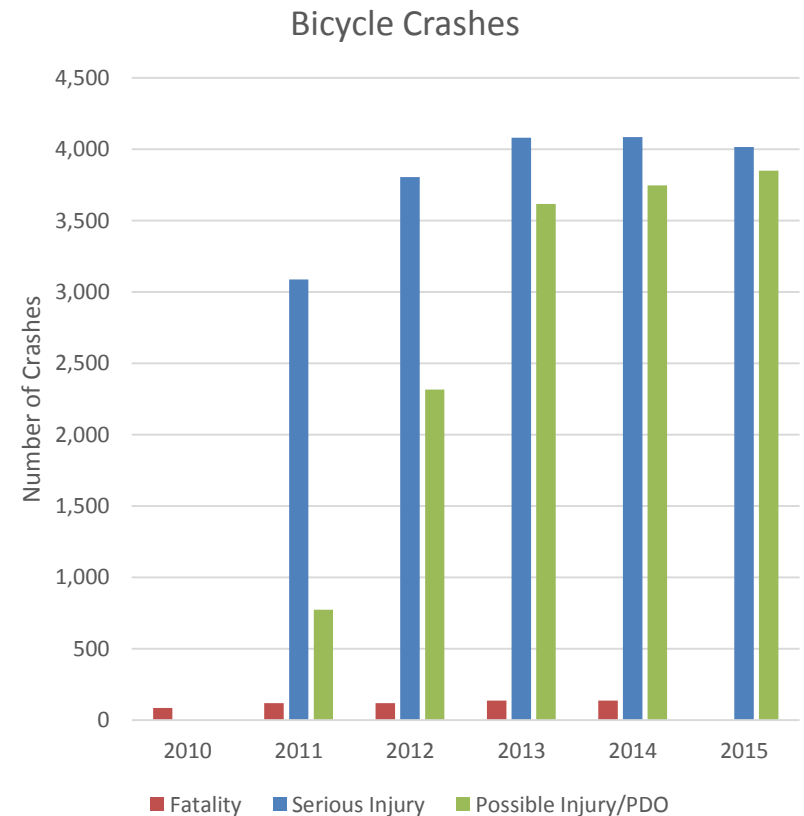
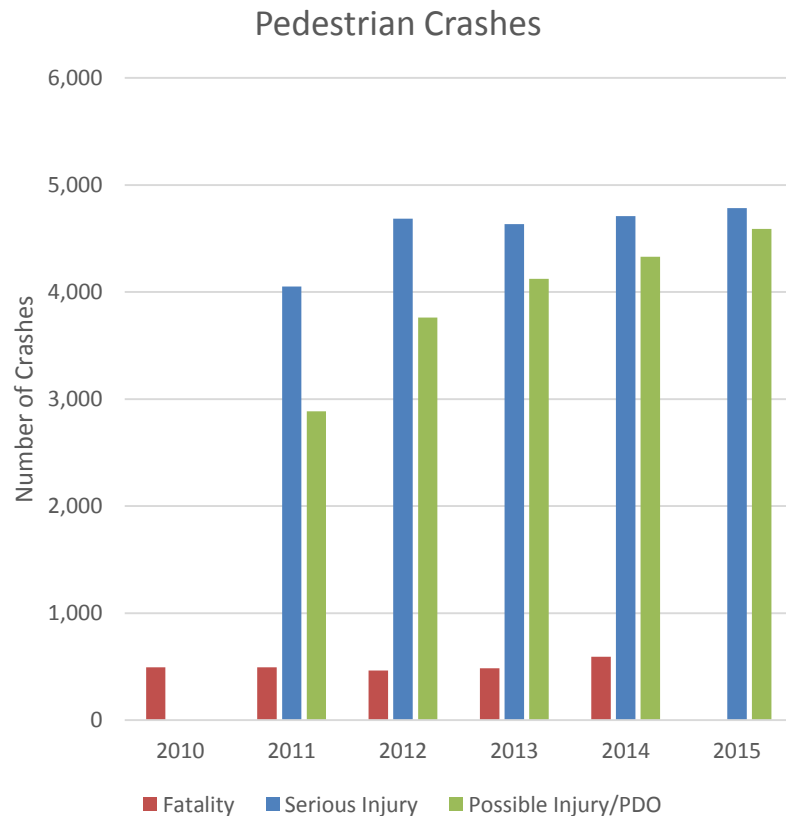




# Crash Typing using the Web-based PBCAT in Signal Four Analytics

Achilleas Kourtellis, CUTR, University of South Florida  
[kourtellis@cutr.usf.edu](mailto:kourtellis@cutr.usf.edu)

# Typed Bicycle and Pedestrian Crashes



# Pedestrian Serious Injury Crashes

CRASH GROUP	Count	%
Crossing Roadway - Vehicle Not Turning	6,803	30%
Dash/Dart-Out	3,057	13%
Unusual Circumstances	2,676	12%
Off Roadway	2,328	10%
Backing Vehicle	2,008	9%
Crossing Roadway - Vehicle Turning	1,507	7%
Walking Along Roadway	1,440	6%
Pedestrian in Roadway - Circumstances Unknown	1,334	6%
Crossing Driveway or Alley	386	2%
(blank)	339	1%
Multiple Threat/Trapped	251	1%
Other/Unknown - Insufficient Details	210	1%
Working or Playing in Roadway	206	1%
Bus-Related	145	1%
Unique Midblock	135	1%
Waiting to Cross	102	0%
Crossing Expressway	5	0%
Grand Total	22,932	100%

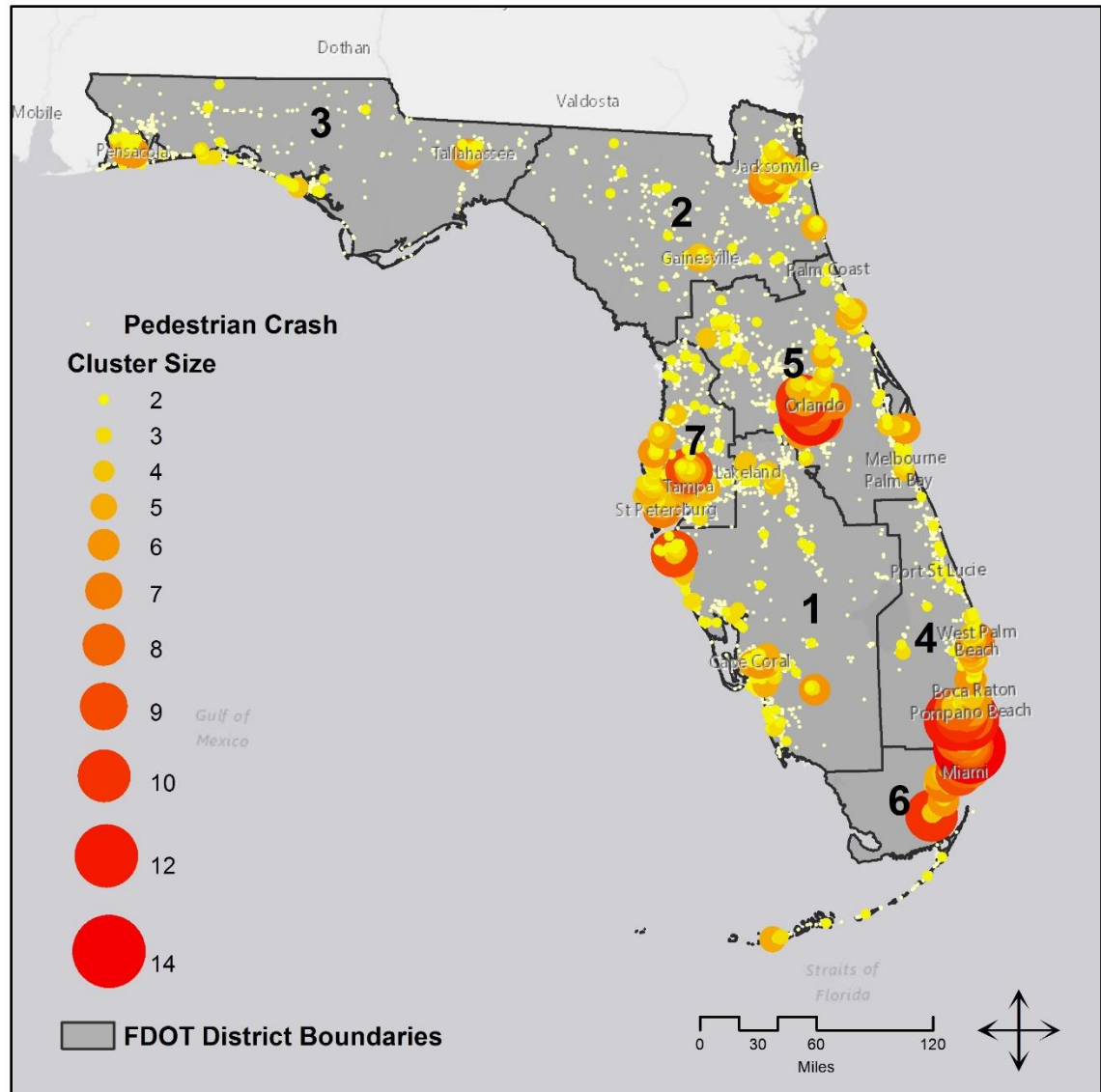
PEDESTRIAN POSITION	Count	%
On a roadway, in a travel lane	11,781	51%
Other non-roadway areas	4,136	18%
Within a crosswalk, marked or unmarked	4,015	18%
On a sidewalk, shared use path, or driveway crossing	727	3%
On a roadway, in a paved shoulder, bike lane, or parking lane	623	3%
On a driveway or alley	554	2%
Other road right-of-way	418	2%
(blank)	339	1%
Within intersection proper	182	1%
Other / unknown	157	1%
Grand Total	22,932	100%

CRASH LOCATION	Count	%
Non-Intersection Location	13,049	57%
Non-Roadway Location	4,723	21%
Intersection	3,718	16%
Intersection-Related	1,065	5%
(blank)	339	1%
Unknown/Insufficient Information	38	0%
Grand Total	22,932	100%

# Pedestrian Serious Injury Crashes

PEDESTRIAN MOVEMENT	Count	%
Pedestrian within crosswalk area, traveled from motorist's right	635	21%
Pedestrian within crosswalk area, approached from opposite direction as motorist	515	17%
Pedestrian within crosswalk area, traveled from motorist's left	441	14%
Pedestrian within crosswalk area, approached from same direction as motorist	401	13%
Pedestrian outside crosswalk area, traveled from motorist's right	311	10%
Pedestrian outside crosswalk area, approach direction unknown	258	8%
Pedestrian outside crosswalk area, traveled from motorist's left	221	7%
Pedestrian within crosswalk area, approach direction unknown	167	5%
Pedestrian outside crosswalk area, approached from opposite direction as motorist	88	3%
Pedestrian outside crosswalk area, approached from same direction as motorist	49	2%
Grand Total	3,086	100%

# Pedestrian Crash Cluster Map



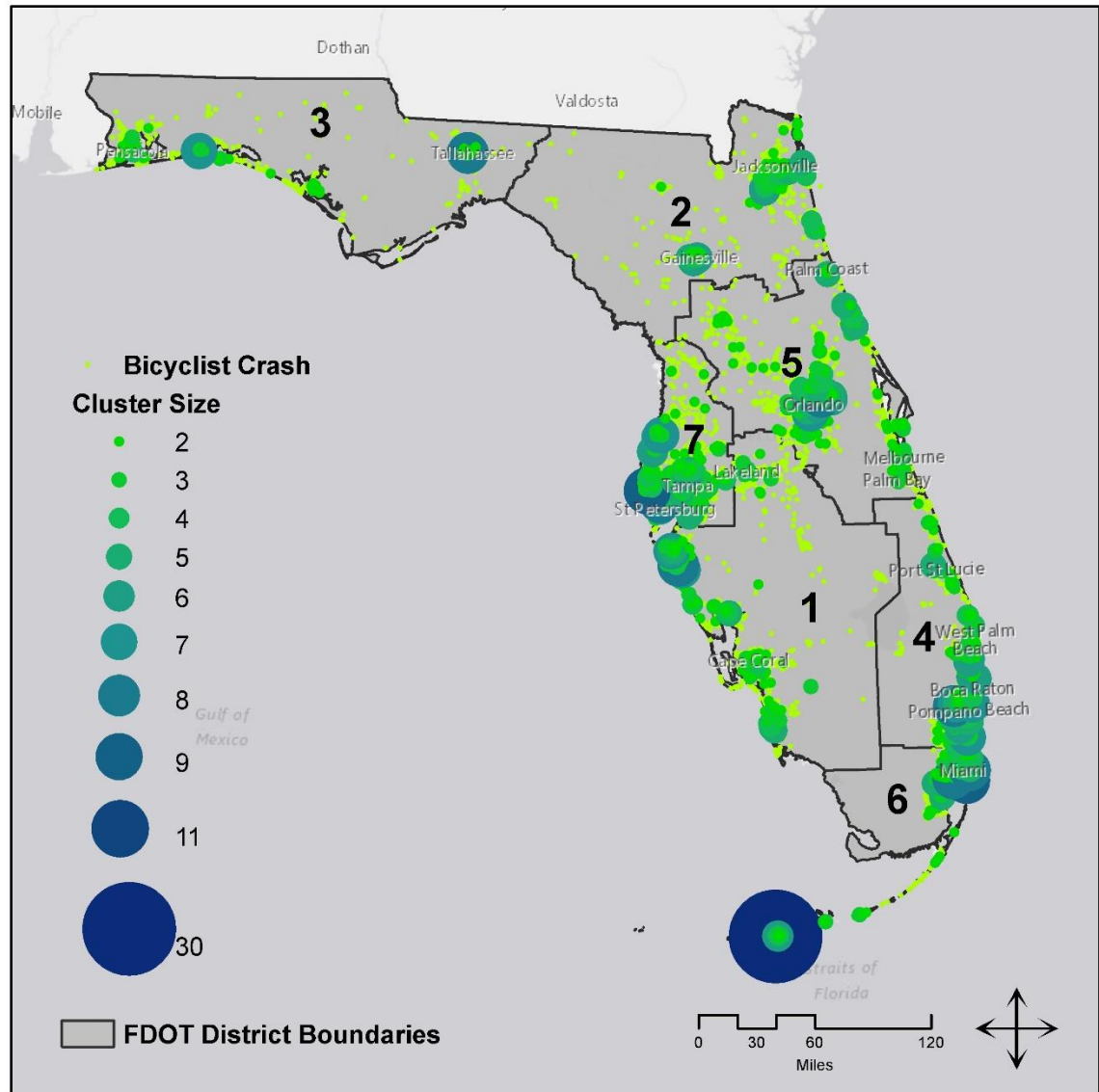
# Bicycle Serious Injury Crashes

CRASH GROUP	Count	%
Motorist Failed to Yield - Sign-Controlled Intersect.	2,740	14%
Motorist Failed to Yield - Midblock	2,299	12%
Motorist Overtaking Bicyclist	1,662	9%
Bicyclist Failed to Yield - Signalized Intersection	1,533	8%
Bicyclist Failed to Yield - Midblock	1,284	7%
Motorist Left Turn/Merge	1,279	7%
Crossing Paths - Other Circumstances	1,264	7%
Motorist Failed to Yield - Signalized Intersection	1,195	6%
Motorist Right Turn/Merge	1,174	6%
Bicyclist Failed to Yield - Sign-Controlled Intersect.	1,080	6%
Loss of Control/Turning Error	798	4%
Parallel Paths - Other Circumstances	584	3%
Bicyclist Left Turn/Merge	515	3%
Non-roadway	404	2%
Head-On	285	1%
Bicyclist Overtaking Motorist	248	1%
Other/Unusual Circumstances	235	1%
Other/Unknown - Insufficient Details	152	1%
Backing Vehicle	149	1%
Bicyclist Right Turn/Merge	92	0%
(blank)	85	0%
Parking/Bus-Related	17	0%
Grand Total	19,074	100%

CRASH LOCATION	Count	%
Intersection	10,109	53%
Non-Intersection Location	7,947	42%
Intersection-Related	491	3%
Non-Roadway Location	404	2%
Unknown/Insufficient Information	38	0%
(blank)	85	0%
Grand Total	19,074	100%

BICYCLIST POSITION	Count	%
On a sidewalk, crosswalk, or driveway crossing	9,638	51%
On a roadway, in a shared travel lane	5,676	30%
On a roadway, in a bicycle lane or on a paved shoulder	2,349	12%
Other non-roadway areas	486	3%
Other	302	2%
On a driveway or alley	256	1%
Unknown	166	1%
(blank)	123	1%
On a separate bicycle/multi-use path	78	0%
Grand Total	19,074	100%

# Bicycle Crash Cluster Map



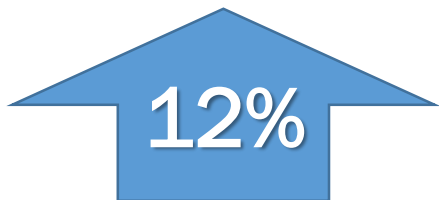
# MetroPlan Orlando Crash Typing Analysis and Application



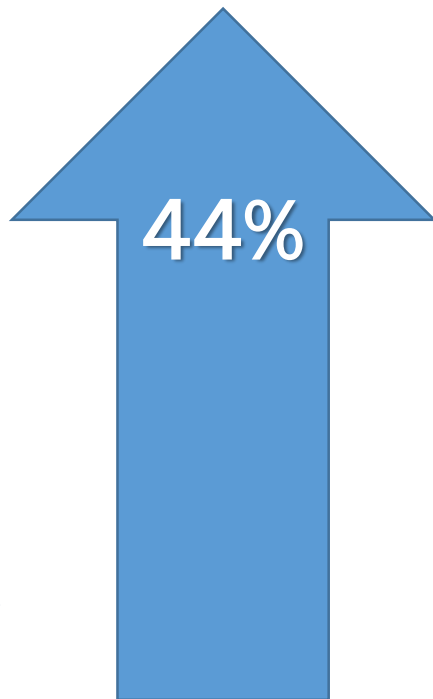
Mighk Wilson  
[MWilson@metroplanorlando.org](mailto:MWilson@metroplanorlando.org)



All  
Pedestrian  
Injury  
Crashes



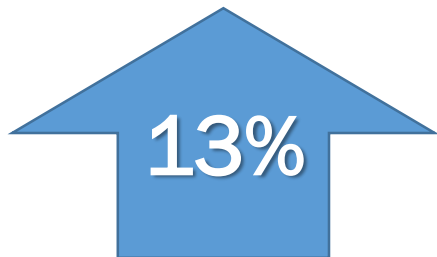
Pedestrian  
Fatalities



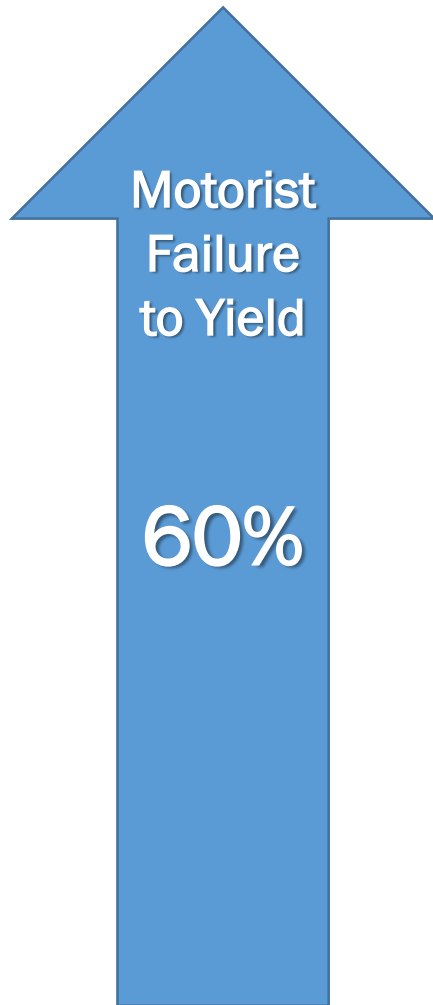
Increase:  
2011-13 to 2015-17



Pedestrian  
Mid-Block  
Failure  
to Yield



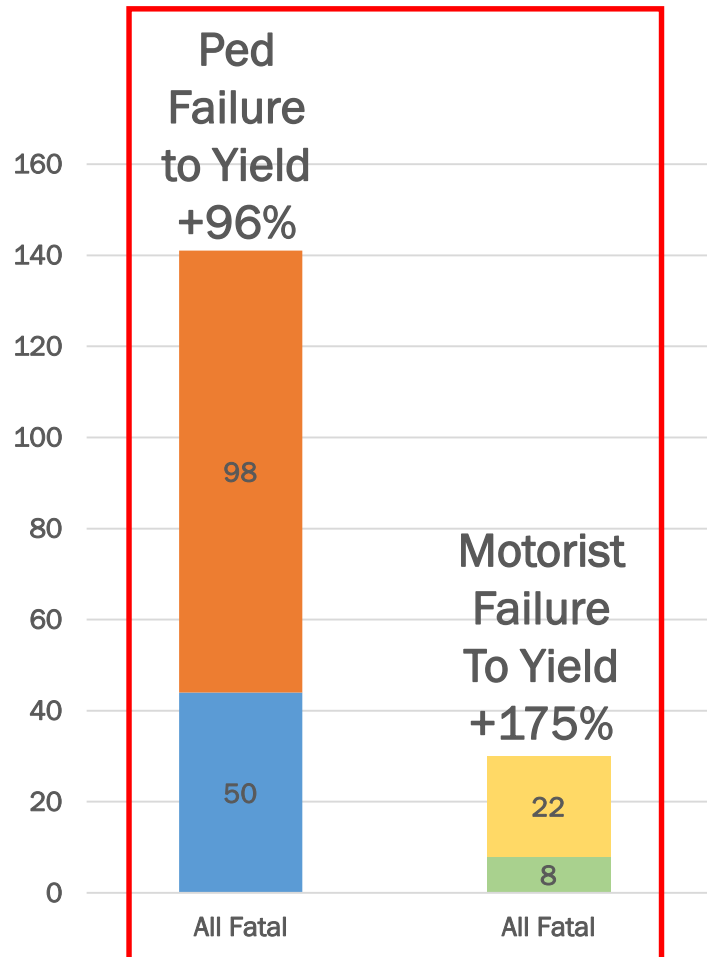
Motorist  
Failure  
to Yield



Increase:  
2011-13 to 2015-17

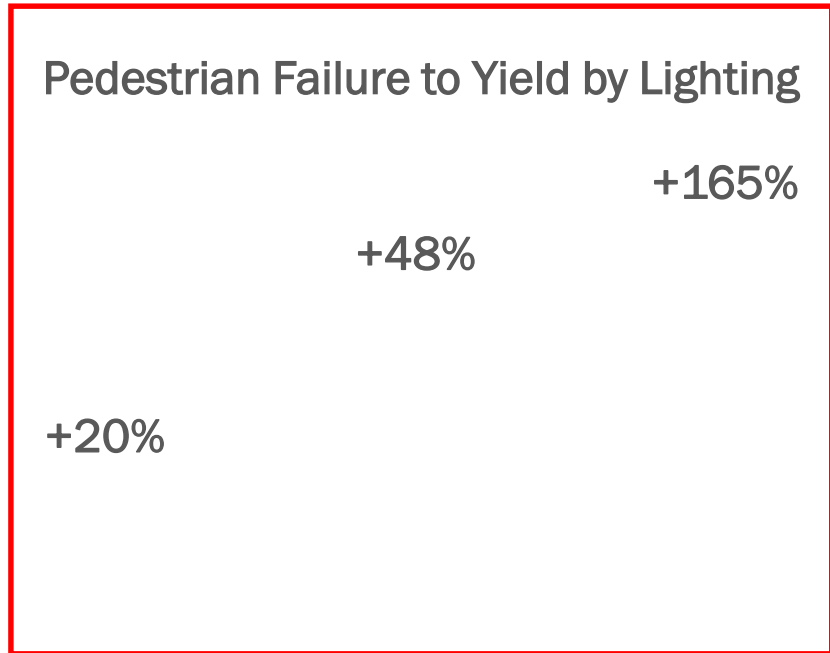


# Pedestrian Fatalities



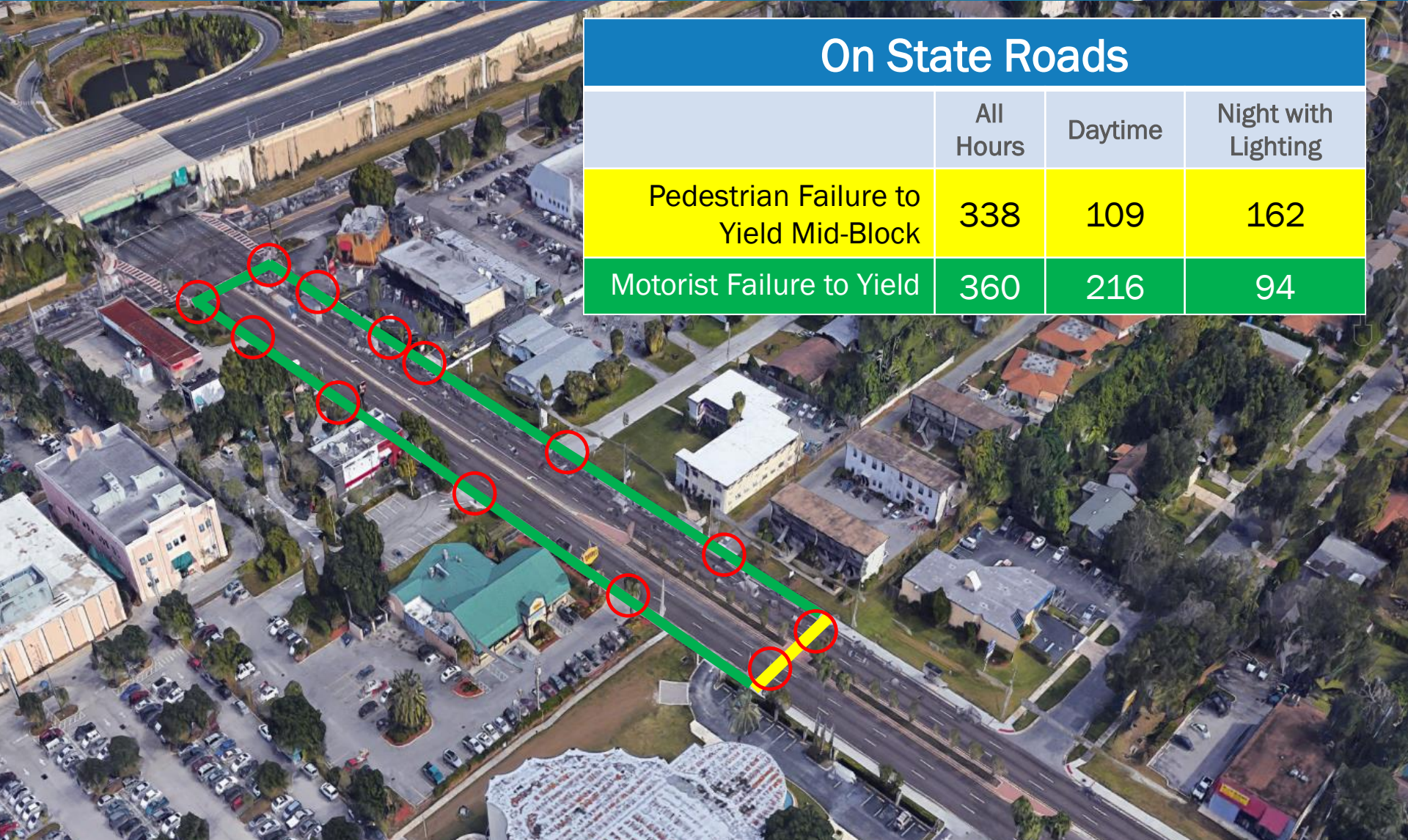
Fatal Crashes: Pedestrian Failure to Yield Mid-Block Versus Motorist Failure to Yield at Intersection or Driveway

Overall Fatality Increase: 44%



■ 2011-13 ■ 2015-17

# Which is Safer?



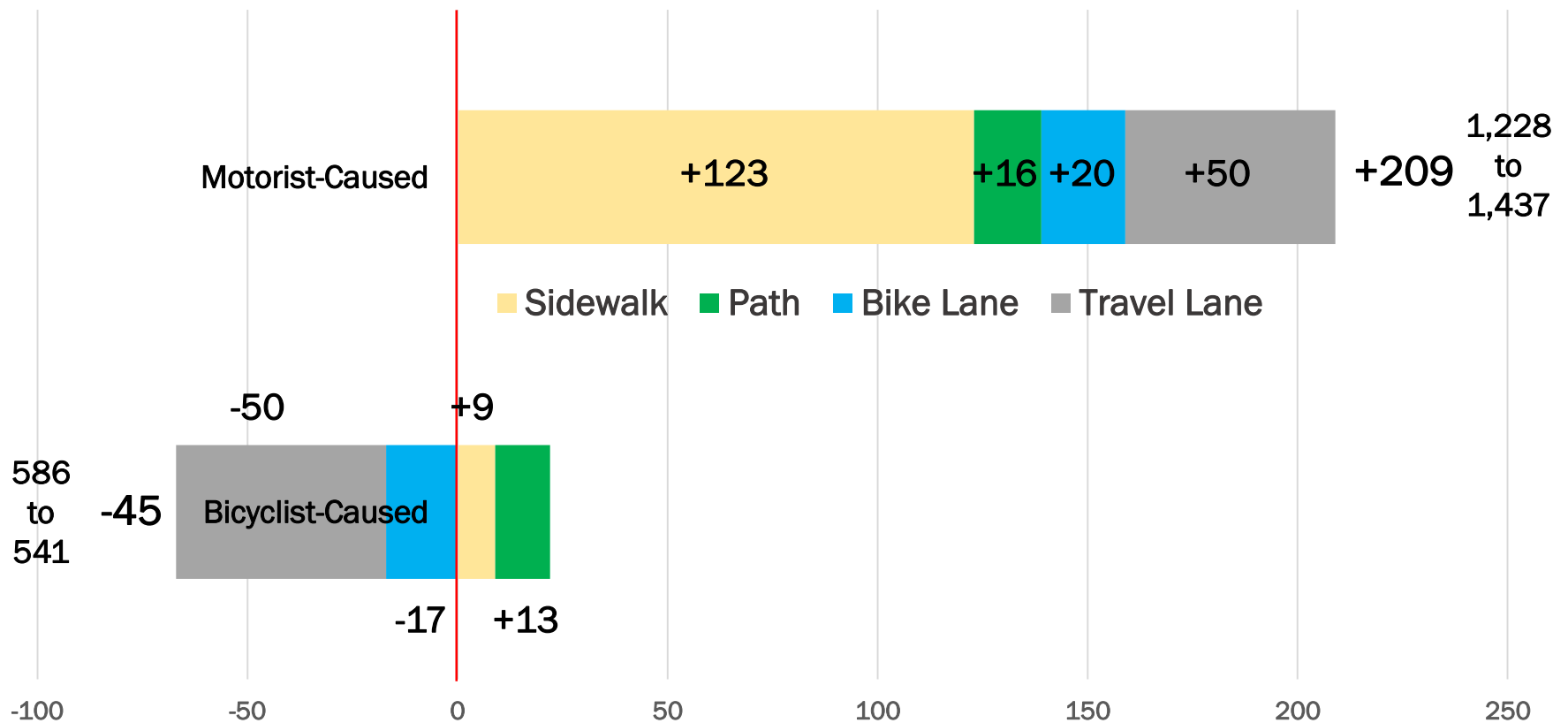
## On State Roads

	All Hours	Daytime	Night with Lighting
Pedestrian Failure to Yield Mid-Block	338	109	162
Motorist Failure to Yield	360	216	94

# Bicyclist Trends



## Change in Motorist-Caused & Bicyclist-Caused: 2011-13 to 2015-17



# Safety In Numbers?

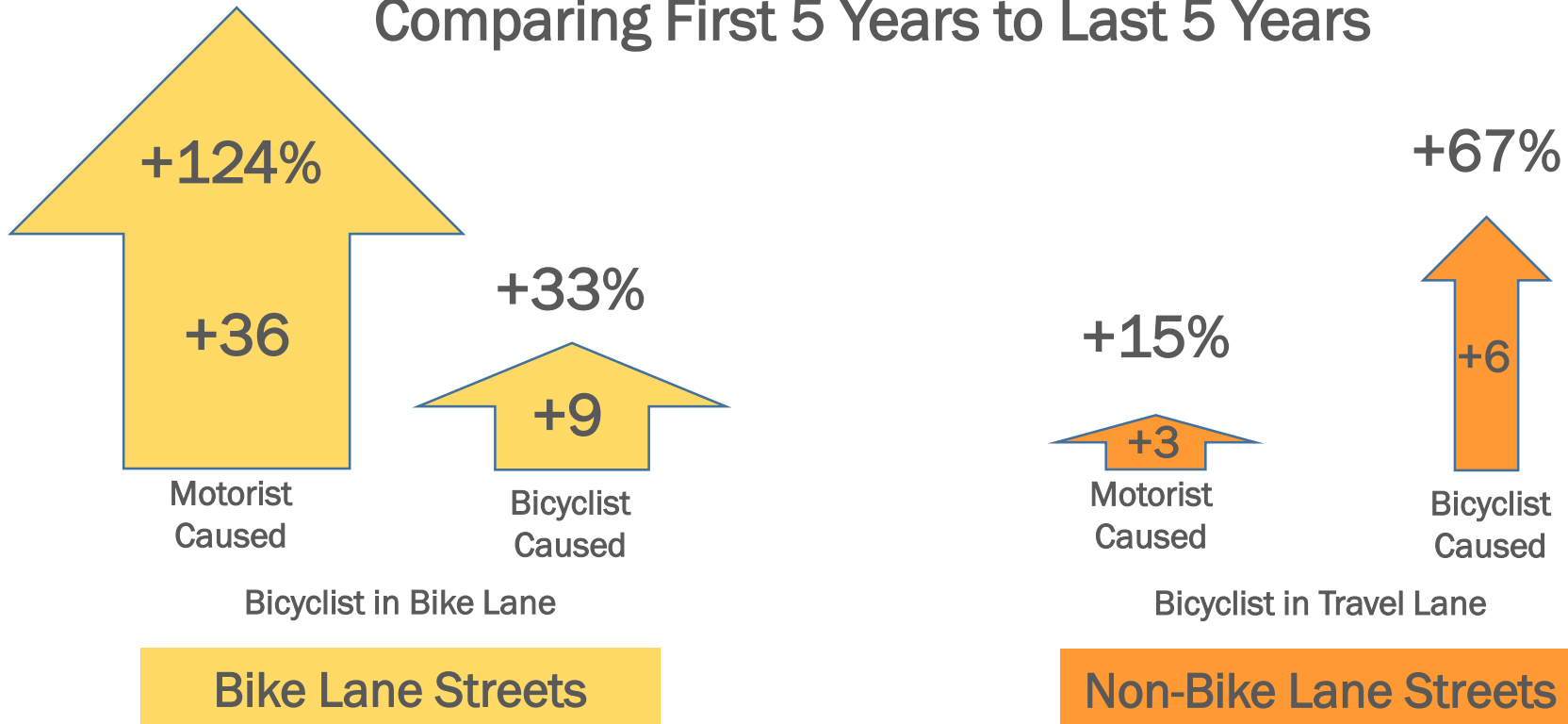


10 Years of Crash Data (2007 to 2016)

70 Miles of Roads With Bike Lanes

67 Miles of Comparable Roads Without Bike Lanes

Comparing First 5 Years to Last 5 Years



# Safety In Numbers?



Comparison: 10 Years of Crash Data (2007 to 2016)  
70 Miles of Roads With Bike Lanes  
67 Miles of Comparable Roads Without Bike Lanes

## % Change by Type (First 5 Years to Last 5 Years)

Key Crash Types	Cyclist in Bike Lane		Cyclist in Travel Lane	
	Number Change	% Change	Number Change	% Change
Overtaking Motorist	7 to 8	<b>+120%</b>	10 to 12	<b>-10%</b>
Drive-Out	18 to 47		11 to 7	
Right Hook				
Left Cross				
Wrong-Way Cyclist	20 to 28	40%	4 to 15	275%

# Safety Action Plans



**Crash  
Types**



**Crash  
Countermeasures**

~~**Engineering**~~  
~~**Education**~~  
~~**Enforcement**~~

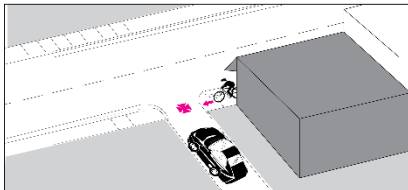
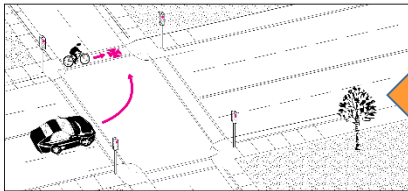
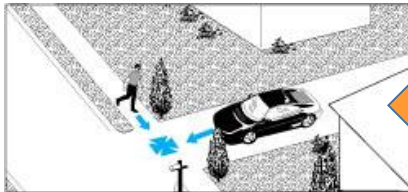
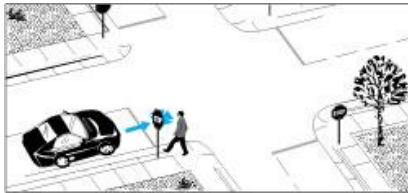
**Design**  
**Behavioral**  
**Control**



# Safety Action Plans



## Crash Types



## Critical Success Factor Types

Visibility

Predictability

Conflicts

Speed

## Countermeasure Types

Behavioral Changes

Changes

Design Changes

Changes

Control Changes

Changes



# Thank You

MetroPlanOrlando.com | (407) 481-5672  
250 S. Orange Ave., Suite 200, Orlando, FL 32801



A map of Florida with numerous blue circles of varying sizes scattered across the state, representing the locations of speakers. The circles are concentrated in the central and southern parts of the state, particularly around the Orlando and Tampa areas. The map includes major highways, cities, and airports.

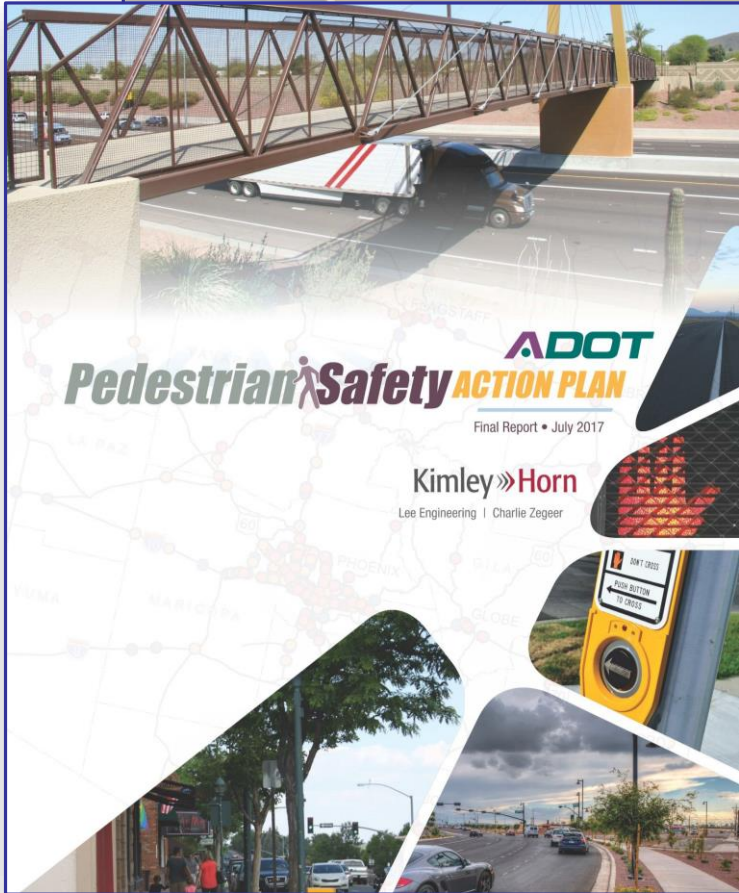
# Florida Speakers Contact Information:

**Ikir Bejleri (UF):** [ikir@ufl.edu](mailto:ikir@ufl.edu)

**Achilleas Kourtellis(USF):** [kourtellis@cutr.usf.edu](mailto:kourtellis@cutr.usf.edu)

**Mighk Wilson(Metroplan):** [MWilson@metroplanorlando.org](mailto:MWilson@metroplanorlando.org)

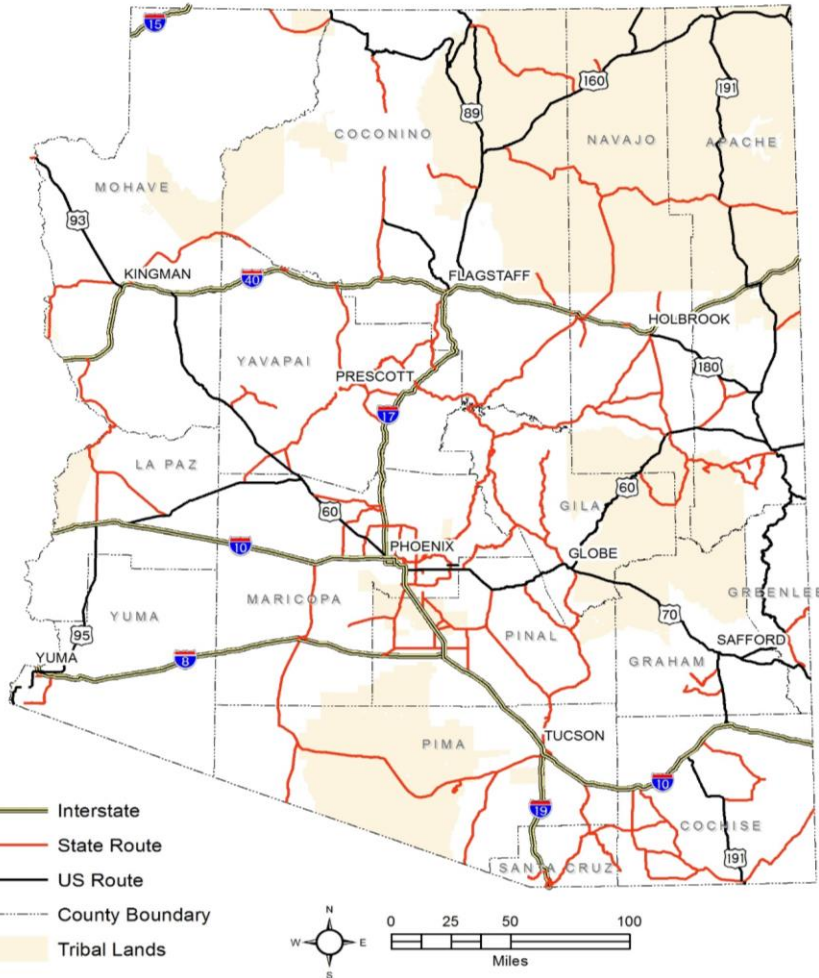
# ADOT PEDESTRIAN AND BICYCLE SAFETY ACTION PLANS



Multimodal Planning



# Pedestrian and Bicycle Safety Action Plans



## EVALUATE...

effectiveness of ADOT efforts to reduce the frequency of pedestrian and bicycle crashes with motor vehicles.

## ANALYZE...

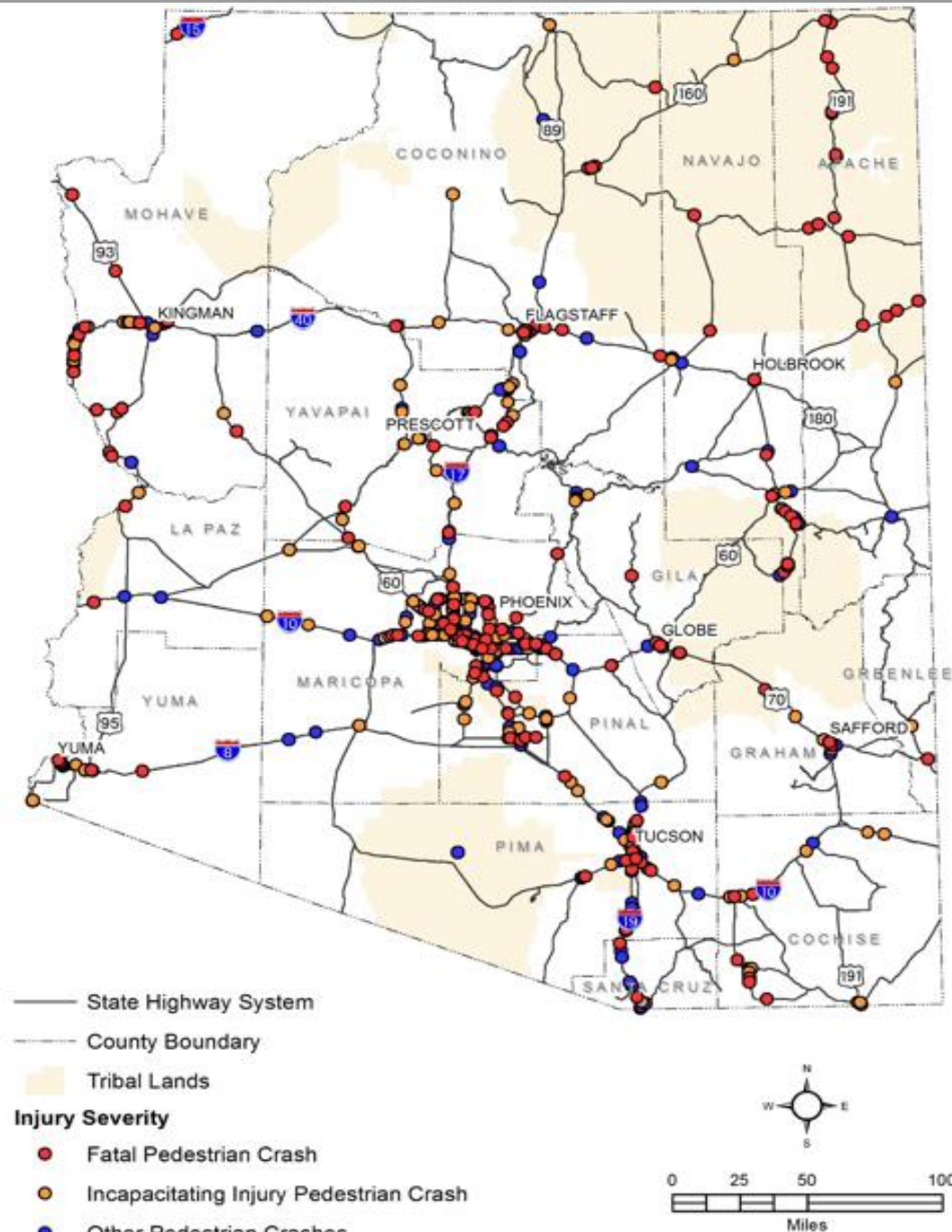
State Highway System (SHS) pedestrian and bicycle crash data (5-year periods).

## IDENTIFY...

steps, actions, and countermeasures to reduce pedestrian crashes, injuries, and fatalities on SHS.

# Crashes on State Highway System

- **824 pedestrian** and **778 bicycle** related crashes on SHS (5-year period)
- Represents **10.7 %** of state-wide pedestrian related crashes (7,633 crashes), **8.8%** of total state-wide bicycle related crashes



# Detailed Analysis of Pedestrian and Bicycle Crash Data




The screenshot shows the website for the Pedestrian and Bicycle Information Center (PBIC). The header features the PBIC logo and navigation links: Data & Resources, Community Support, Planning & Design, Training & Events, and Programs & Campaigns. The main content area is titled "Pedestrian and Bicycle Crash Analysis Tool (PBCAT)" and includes a description of the tool, a list of features, and a photograph of a pair of worn sneakers on a paved surface. The footer contains sections for "ABOUT PBIC", "RESOURCES", "SHARE WITH US", and logos for the U.S. Department of Transportation Federal Highway Administration and the Highway Safety Research Center.

- ▶ Pedestrian Safety Action Plan (PSAP), 2009
- ▶ *PSAP Update, 2017*
- ▶ *Bicycle Safety Action Plan (BSAP), 2012*
- ▶ *BSAP Update, 2018*

# Detailed Analysis of Pedestrian and Bicycle Crash Data

## THE PROCESS:

1. **Obtain** pedestrian crash reports
2. **Enter data** into PBCAT – used to crash type each SHS crash
3. **Identify:**
  - Hot spot locations
  - High risk locationsExamples: five-lane roadway, 45 mph + , urbanizing / suburban locations



The screenshot shows the website for the Pedestrian and Bicycle Information Center. The header features the center's logo and name. Below the header is a navigation menu with links for Data & Resources, Community Support, Planning & Design, Training & Events, and Programs & Campaigns. The main content area is titled "Pedestrian and Bicycle Crash Analysis Tool (PBCAT)" and includes a description of the tool, a list of links (About PBCAT, PBCAT Features, Download PBCAT, PBCAT Applications, PBCAT Manual & Tech Support, Pedestrian Crash Type Images, Bicyclist Crash Type Images), and a photograph of a pair of worn sneakers on a paved surface. The footer contains sections for "ABOUT PBIC", "RESOURCES", "SHARE WITH US", and "Please visit the sites of these PBIC projects:", along with logos for the Federal Highway Administration, the Highway Safety Research Center, and other related organizations.

[www.pedbikeinfo.org/pbcat\\_us/](http://www.pedbikeinfo.org/pbcat_us/)



# Arizona Crash Report Form

ADOT USE ONLY

ARIZONA CRASH REPORT		REPORT ID				Agency Report Number	
<p><b>1 POLICE ONLY - FORWARD COPY TO ADOT TRAFFIC RECORDS SECTION, 1008 S. 17<sup>th</sup> AVENUE, PHOENIX, ARIZONA 85004-3743</b></p>							
YEAR	MONTH	DAY	HOUR	ICIC NO.	OFFICER ID NO.		
<p><b>COMPLETE THE TRUCK/BUS SUPPLEMENT IF ANY (circle) AND ANY (diamond) ARE CHECKED</b></p>							
2 Total Hrs	Total Miles	Total Passes	Estimated Trip (to stop location) (to 100 miles)	Driver	Other	Truck	Bus
3	4	5	6	7	8	9	10
<p><b>LOCATION</b></p>							
<p>11 - WEATHER CONDITIONS</p>							
<p>12 - ROAD SURFACE CONDITION</p>							
<p>13 - ROAD GRADE</p>							
<p>14 - RELATION TO JUNCTION</p>							
<p>15 - TYPE OF INTERSECTION</p>							
<p>16 - TRAFFIC WAY DESCRIPTION</p>							
<p>17 - MANNER OF CRASH IMPACT</p>							
<p>18 - LIGHTING CONDITION</p>							
<p>19 - CONTRIBUTING CIRCUMSTANCES</p>							
<p>20 - TRAFFIC CONTROL DEVICE</p>							
<p>21 - CONDITION INFLUENCING Driver/Ped/Cyclist UP TO TWO CHOICES PER UNIT</p>							
<p>22 - VIOLATIONS/BEHAVIOR UP TO TWO CHOICES PER UNIT</p>							
<p>23 - TRAFFIC UNIT MANUEVER/ACTION</p>							
<p>24 - LOCATION OF PEDESTRIAN/CYCLIST</p>							
<p>25 - PASSENGERS</p>							
<p>26 - OWNER'S NAME</p>							
<p>27 - PHOTO TAKEN</p>							
<p>28 - OFFICER'S NAME/ID #</p>							

LOCATION

TRAFFIC UNIT #1

TRAFFIC UNIT #2

TRAFFIC UNIT #3

Name	Address	City	State	Zip Code	Telephone Number	D/O BIRTH
<p>9 WRITERS</p>						
<p>10 LIGHT CONDITION</p>						
<p>11 WEATHER CONDITIONS</p>						
<p>12 ROAD SURFACE CONDITION</p>						
<p>13 ROAD GRADE</p>						
<p>14 RELATION TO JUNCTION</p>						
<p>15 TYPE OF INTERSECTION</p>						
<p>16 TRAFFIC WAY DESCRIPTION</p>						
<p>17 MANNER OF CRASH IMPACT</p>						
<p>18 LIGHTING CONDITION</p>						
<p>19 CONTRIBUTING CIRCUMSTANCES</p>						
<p>20 TRAFFIC CONTROL DEVICE</p>						
<p>21 CONDITION INFLUENCING Driver/Ped/Cyclist UP TO TWO CHOICES PER UNIT</p>						
<p>22 VIOLATIONS/BEHAVIOR UP TO TWO CHOICES PER UNIT</p>						
<p>23 TRAFFIC UNIT MANUEVER/ACTION</p>						
<p>24 LOCATION OF PEDESTRIAN/CYCLIST</p>						
<p>25 PASSENGERS</p>						
<p>26 OWNER'S NAME</p>						
<p>27 PHOTO TAKEN</p>						
<p>28 OFFICER'S NAME/ID #</p>						

LIGHTING

MANNER OF COLLISION

WEATHER

TRAVEL DIRECTION

INFLUENCING CONDITION

VIOLATIONS

MANEUVER

POSITION OF PED/BIKE

ROADWAY DESCRIPTION

TRAFFIC CONTROL

# SUPPLEMENTAL GUIDANCE DOCUMENT

## CREATED INTERNALLY, FOR DATA ENTRY CONSISTENCY

- Excluding crash records
- Location of data on crash report form
- Roadway type and coding based on position of bicyclist



ARIZONA  
TEXAS  
NEW MEXICO  
OKLAHOMA

## ARIZONA BICYCLE SAFETY ACTION PLAN DATA ENTRY GUIDE

The purpose of this document is to serve as a guide for data entry associated with the ADOT Arizona Bicyclist Safety Action Plan Update. The Bicyclist Data Entry Form was created by Kimley-Horn for the purposes of this project. The Data Entry Form, <https://extsites.kimley-horn.com/BSAP2018/>, requires a unique username and password for each user. A significant amount of the data for each crash has been pre-filled from tabular data, but this data should be confirmed by the person responsible for the data entry, and changes to the pre-filled data should be made, where appropriate.

We anticipate a small percentage of crashes to be miscoded, that do not belong in this dataset. In these cases, enter all data and make a note in the 'Data Manifest' spreadsheet that it should be excluded for one of the following reasons:

- Officer coding error – indicates one of the units as a “pedacyclist”, while both units were motor vehicles
- Officer coding error – indicates one of the units as a “pedacyclist”, when the unit was a pedestrian (code as a pedestrian if the person was *walking* their bike)
- Crashes not related to the state highway system – the system pulls all crashes within 500 feet of the state highway system, regardless of context to the highway. Several examples that should be excluded include:
  - A. Neighborhood street behind highway
  - B. Overpass road (without connection to highway)



- Crashes located more than 500 feet from the state highway/ramp
- Crashes located less than 500 feet from the state highway/ramp, but otherwise unrelated



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# OVERVIEW OF WEB-BASED PBCAT TOOL



- DEVELOPED BY Kimley»Horn

**Principal Information**

Report Number: 2879167

Date of Crash: 09/06/2014

Time of Day: 13:18

No. of Bicyclists: 1

Hit and Run: No

**Location**

Jurisdiction 1: Williams

Jurisdiction 2: COCONINO

Route Name: US Highway 180

Mile Post: 252 0.28

Cross Street:

Direction From Cross Street:

Distance From Cross Street: 0

**GPS Data**

Latitude: 35.573396

Longitude: -111.929108

**Driver Information**

Driver Age: 46

Driver Gender: Female

Driver Alcohol/Drug Use: No

Driver Injury Severity: NO\_INJURY

Motorist Maneuver: OVERTAKING\_PASSING

Direction of Travel: EAST

Driver Violation/Behavior: SPEED\_TOO\_FAST\_FOR\_CONDITIONS

Driver Violation/Behavior: SPEED\_TOO\_FAST\_FOR\_CONDITIONS

**Vehicle Information**

Motor Vehicle Type: Van/Minivan

Motor Vehicle Defects: None

Estimated Original Vehicle Speed: 65

**Bicyclist Information**

Bicyclist Age: 33

Bicyclist Gender: Female

Bicyclist Alcohol/Drug Use: No

Bicyclist Injury Severity: FATAL

Bicyclist Helmet Use: No

Bicycle Maneuver: GOING\_STRAIGHT\_AHEAD

Direction of Travel: EAST

Bicyclist Violation/Behavior: NO\_IMPROPER\_ACTION

Bicyclist Violation/Behavior:

**Bicycle and Facility Information**

Bicycle Type: Adult 2-wheel

Bicycle Defects: None

Bicycle Facility Presence: None

Curb Lane Width: 12.00

Bike Lane/Paved Shoulder Width: 0.00

**Roadway Features**

No. of Through Lanes: 1

Roadway Type: US Route

Roadway Configuration: TWO\_WAY\_NOT\_DIVIDED

Roadway Terrain: LEVEL

Roadway Alignment: STRAIGHT

Roadway Surface: Asphalt

Roadway Defects: None

Traffic Control: NO\_CONTROLS

Speed Limit: 65

Marked Crosswalk: No

Sidewalk Presence: No

School Zone: No

**Environmental Conditions**

Weather Conditions: CLOUDY

Surface Conditions: WET

Light Conditions: DAYLIGHT

**Influencing Factors/Citations/Fault**

Driver Influencing Factors: None

Driver Citation 1:

Driver Citation 2:

Bicyclist Influencing Factors: None

Bicyclist Citation 1:

Bicyclist Citation 2:

Fault: Motorist at Fault

**Crash Typing**

Crash Location: 3 Non-Intersection

Crash Group: 230 Motorist Overtaking Bicyclist

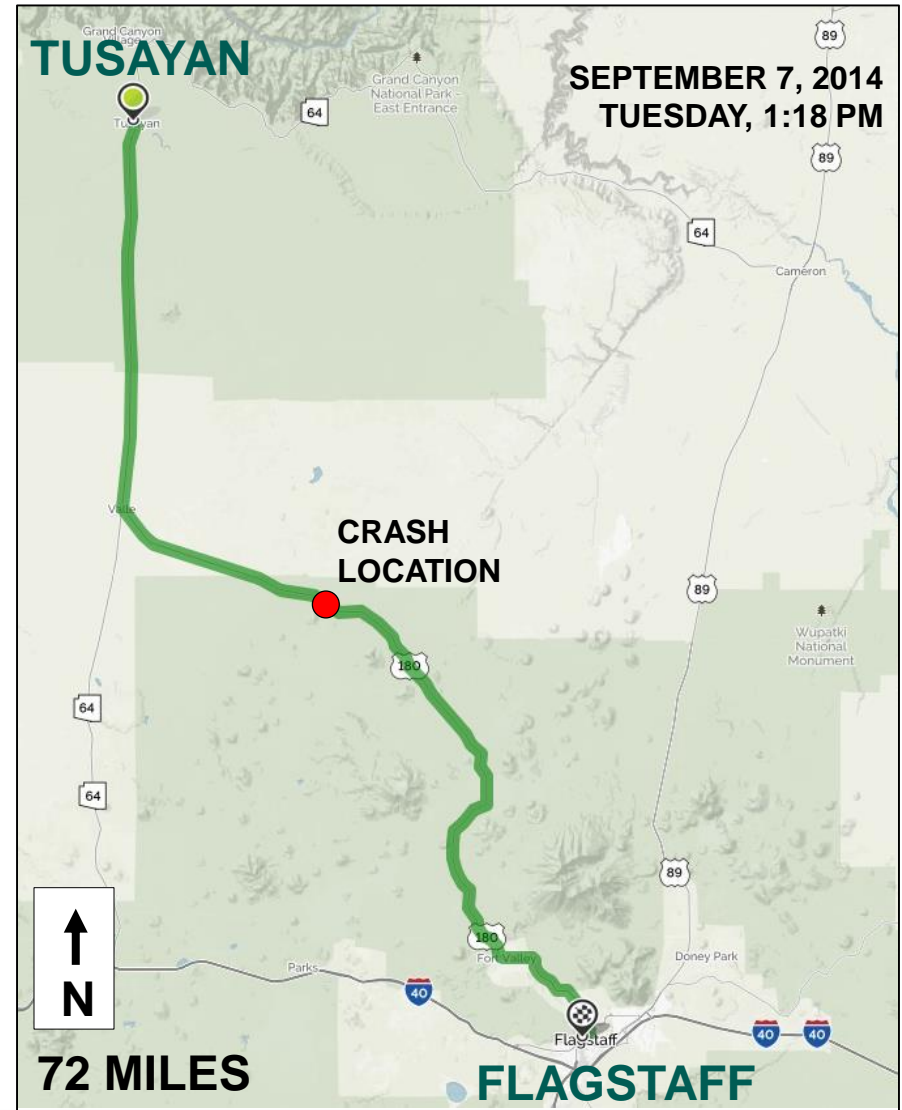
Crash Type: 232 Motorist Overtaking - Misjudged Space

Bicyclist Position: 1 Travel Lane

Bicyclist Direction: 1 With Traffic

# PBCAT TOOL CRASH TYPING

## CASE STUDY 1



# PBCAT TOOL CRASH TYPING

US-180



# PBCAT TOOL CRASH TYPING

**Crash Typing**

Crash Location	<input type="text"/>	<input type="text"/>
Crash Group	<input type="text"/>	<input type="text"/>
Crash Type	<input type="text"/>	<input type="text"/>
Bicyclist Position	<input type="text"/>	<input type="text"/>
Bicyclist Direction	<input type="text"/>	<input type="text"/>

Non-Intersection ▼

Unknown

Intersection

Intersection-Related

**Non-Intersection**

Non-Roadway

# PBCAT TOOL CRASH TYPING

**Crash Typing**

Crash Location	3	Non-Intersection ▼
Crash Group		
Crash Type		
Bicyclist Position		
Bicyclist Direction		

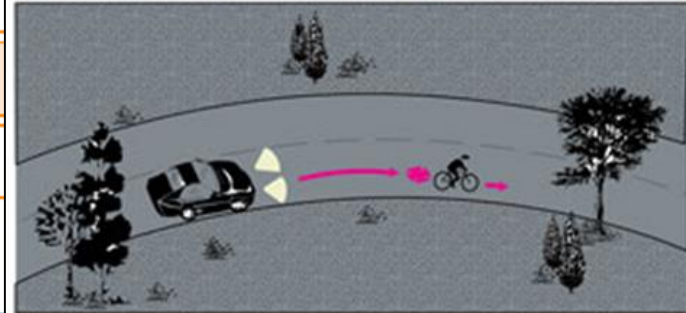
- Motorist Overtaking Bicyclist ▼
- Crossing Paths - Other Circumstances
- Motorist Left Turn / Merge
- Motorist Right Turn / Merge
- Parking / Bus-Related
- Bicyclist Left Turn / Merge
- Bicyclist Right Turn Turn / Merge
- Motorist Overtaking Bicyclist
- Bicyclist Overtaking Motorist

# PBCAT TOOL CRASH TYPING

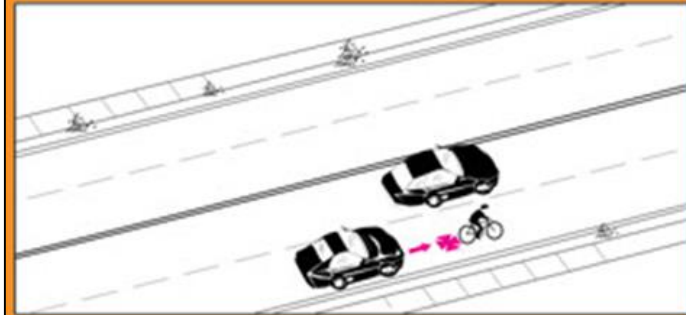
## Crash Typing

Crash Location	3	Non-Intersection ▼
Crash Group	230	Motorist Overtaking Bicyclist
Crash Type		
Bicyclist Position		
Bicyclist Direction		▼

Motorist Overtaking - Undetected Bicyclist



Motorist Overtaking - Misjudged Space



Motorist Overtaking - Bicyclist Swerved



Motorist Overtaking - Other/ Unknown



# PBCAT TOOL CRASH TYPING

**Crash Typing**

Crash Location	3	Non-Intersection ▼
Crash Group	230	Motorist Overtaking Bicyclist ▼
Crash Type	232	Motorist Overtaking - Misjudged Space ▼
Bicyclist Position		
Bicyclist Direction		▼

Travel Lane ▼

- Unknown
- Travel Lane**
- Bike Lane / Paved Shoulder
- Sidewalk / Crosswalk / Driveway Crossing
- Multi-Use Path
- Driveway / Alley
- Non-Roadway (parking lot, open areas, etc)
- Other (unpaved shoulder, worn path, etc) ▼

# PBCAT TOOL CRASH TYPING

**Crash Typing**

Crash Location	3	Non-Intersection ▼
Crash Group	230	Motorist Overtaking Bicyclist ▼
Crash Type	232	Motorist Overtaking - Misjudged Space ▼
Bicyclist Position	1	Travel Lane ▼
Bicyclist Direction		▼

With Traffic ▼

Unknown

**With Traffic**

Facing Traffic

Not Applicable

# PBCAT TOOL CRASH TYPING - LOCATION

Crash_Location_Desc (Crash Location)	Crash_Location (Crash Location)	Definition
		<b>Where did the crash occur?</b>
Intersection	1	<u>Intersection</u> —The crash occurred within the intersection proper or within the crosswalk area. <b>Note: Driveways are considered to be nonintersection locations. The exception is signalized commercial driveways which should be coded as intersections.</b>
Intersection-Related	2	<u>Intersection-Related</u> —The crash occurred outside the intersection proper or crosswalk area but was related to the presence of the intersection (e.g., the result of queueing traffic).
Nonintersection	3	<u>Nonintersection Location</u> —The crash occurred outside the intersection proper or crosswalk area and was <b>not</b> related to the presence of any intersection.
Nonroadway	4	<u>Nonroadway Location</u> —The crash occurred off the street network; this includes parking lots, driveways, alleys, and other open areas. <b>Note: crashes occurring on paved shoulders, sidewalks, or driveway crossings are considered to be "roadway" crashes and should not be placed in the nonroadway classification.</b>
Unknown Location	9	<u>Unknown/Insufficient Information</u> —There is insufficient information to determine where the crash occurred.
<b>Bicyclist Position Definitions</b>		
Bicyclist_Position_Desc (Bicyclist Position)	Bicyclist_Position (Bicyclist Position)	Definition
Travel Lane	1	On a roadway, in a shared travel lane
Bike Lane/Paved Shoulder	2	On a roadway, in a bicycle lane or on a paved shoulder
Sidewalk/Crosswalk/Driveway Crossing	3	On a sidewalk, crosswalk, or driveway crossing
Driveway/Alley	4	On a separate bicycle/multi-use path
Multi-use Path	5	On a driveway or alley
Nonroadway	6	Other nonroadway areas (parking lot, open areas, etc.)
Other	8	Other (e.g., unpaved shoulder, worn path, etc.)
Unknown	9	Unknown

# PBCAT TOOL CRASH TYPING - CRASH GROUP

Crash_Group_Basic (Crash Group Number)	Crash_Group_Desc (Crash Group Description)
110	Loss of Control/Turning Error
140	Motorist Failed to Yield— Sign-Controlled Intersection
145	Bicyclist Failed to Yield— Sign-Controlled Intersection
150	Motorist Failed to Yield— Signalized Intersection
158	Bicyclist Failed to Yield— Signalized Intersection
190	Crossing Paths—Other Circumstances
210	Motorist Left Turn/Merge
215	Motorist Right Turn/Merge
219	Parking/Bus-Related
220	Bicyclist Left Turn/Merge

Crash_Group_Basic (Crash Group Number)	Crash_Group_Desc (Crash Group Description)
225	Bicyclist Right Turn/Merge
230	Motorist Overtaking Bicyclist
240	Bicyclist Overtaking Motorist
258	Head-On
290	Parallel Paths—Other Circumstances
310	Bicyclist Failed to Yield— Midblock
320	Motorist Failed to Yield— Midblock
600	Backing Vehicle
850	Other/Unusual Circumstances
910	Nonroadway
990	Other/Unknown— Insufficient Details

# PBCAT TOOL CRASH TYPING - CRASH TYPE

Crash Type Basic (Crash Type Number)	Crash Type Desc (Crash Type Description)
216	Bus/Delivery Vehicle Pullover
217	Motorist Right Turn on Red—Same Direction
218	Motorist Right Turn on Red—Opposite Direction
219	Motorist Turn/Merge—Other/Unknown
221	Bicyclist Left Turn—Same Direction
222	Bicyclist Left Turn—Opposite Direction
223	Bicyclist Right Turn—Same Direction
224	Bicyclist Right Turn—Opposite Direction
225	Bicyclist Ride-out—Parallel Path
231	Motorist Overtaking—Undetected Bicyclist
232	Motorist Overtaking—Misjudged Space
235	Motorist Overtaking—Bicyclist Swerved
239	Motorist Overtaking—Other/Unknown

Crash Type Basic (Crash Type Number)	Crash Type Desc (Crash Type Description)
111	Motorist Turning Error—Left Turn
112	Motorist Turning Error—Right Turn
113	Motorist Turning Error—Other
114	Bicyclist Turning Error—Left Turn
115	Bicyclist Turning Error—Right Turn
116	Bicyclist Turning Error—Other
121	Bicyclist Lost Control—Mechanical Problems
122	Bicyclist Lost Control—Oversteering, Improper Braking, Speed
123	Bicyclist Lost Control—Alcohol/Drug Impairment
124	Bicyclist Lost Control—Surface Conditions
129	Bicyclist Lost Control—Other/Unknown
131	Motorist Lost Control—Mechanical Problems
132	Motorist Lost Control—Oversteering, Improper Braking, Speed

Crash Type Basic (Crash Type Number)	Crash Type Desc (Crash Type Description)
216	Bus/Delivery Vehicle Pullover
217	Motorist Right Turn on Red—Same Direction
218	Motorist Right Turn on Red—Opposite Direction
219	Motorist Turn/Merge—Other/Unknown
221	Bicyclist Left Turn—Same Direction
222	Bicyclist Left Turn—Opposite Direction
223	Bicyclist Right Turn—Same Direction
224	Bicyclist Right Turn—Opposite Direction
225	Bicyclist Ride-out—Parallel Path
231	Motorist Overtaking—Undetected Bicyclist
232	Motorist Overtaking—Misjudged Space
235	Motorist Overtaking—Bicyclist Swerved
239	Motorist Overtaking—Other/Unknown

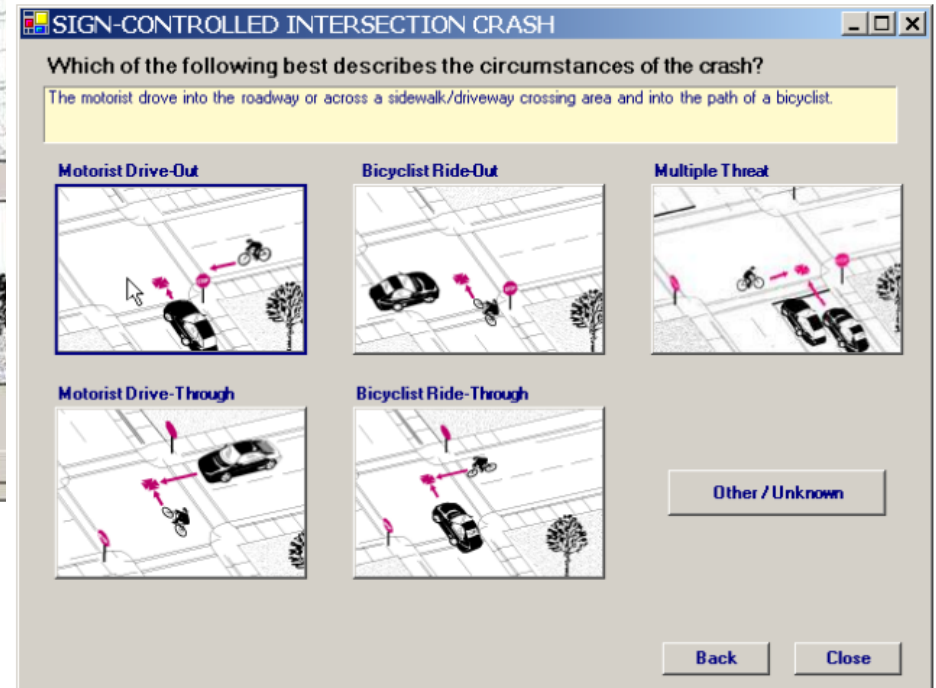
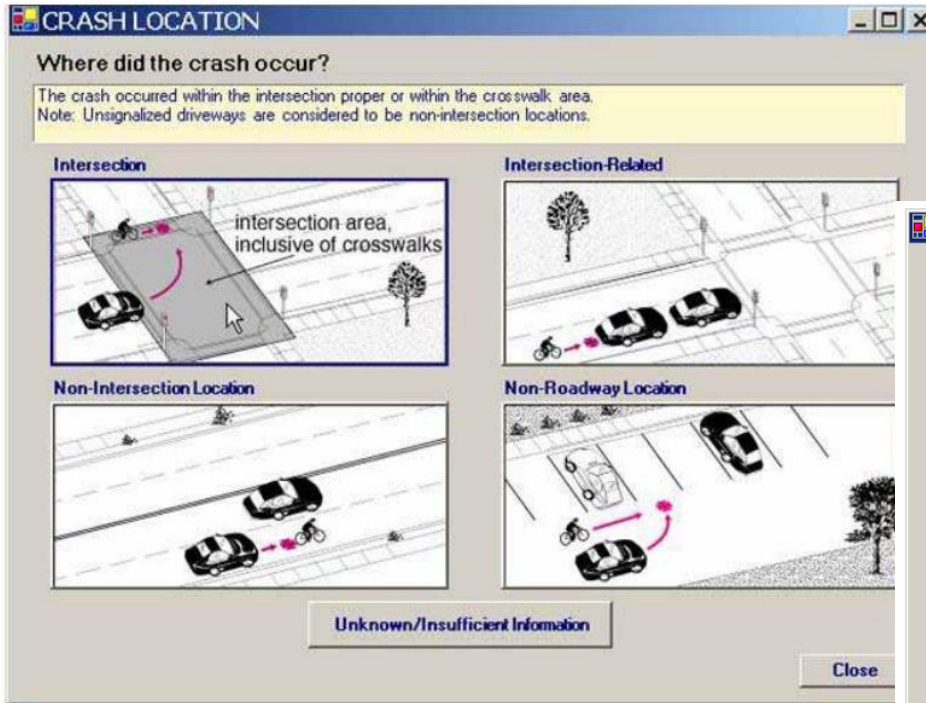
Crash Type Basic (Crash Type Number)	Crash Type Desc (Crash Type Description)
133	Motorist Lost Control—Alcohol/Drug Impairment
134	Motorist Lost Control—Surface Conditions
139	Motorist Lost Control—Other/Unknown
141	Motorist Drive-out Sign-Controlled Intersection
142	Bicyclist Ride-out—Sign-Controlled Intersection
143	Motorist Drive-through—Sign-Controlled Intersection
144	Bicyclist Ride Through Sign-Controlled Intersection
147	Multiple Threat—Sign-Controlled Intersection
148	Sign-Controlled Intersection—Other/Unknown
151	Motorist Drive-out—Right Turn on Red
152	Motorist Drive-out—Signalized Intersection
153	Bicyclist Ride-out—Signalized Intersection
154	Motorist Drive-through—Signalized Intersection

Crash Type Basic (Crash Type Number)	Crash Type Desc (Crash Type Description)
241	Bicyclist Overtaking—Passing on Right
242	Bicyclist Overtaking—Passing on Left
243	Bicyclist Overtaking—Parked Vehicle
244	Bicyclist Overtaking—Extended Door
249	Bicyclist Overtaking—Other/Unknown
250	Head-On—Bicyclist
255	Head-On—Motorist
259	Head-On—Unknown
280	Parallel Paths—Other/Unknown
311	Bicyclist Ride-out—Residential Driveway
312	Bicyclist Ride-out—Commercial Driveway/Alley
318	Bicyclist Ride-out—Other Midblock
319	Bicyclist Ride-out—Midblock—Unknown
321	Motorist Drive-out—Residential Driveway

Crash Type Basic (Crash Type Number)	Crash Type Desc (Crash Type Description)
155	Bicyclist Ride Through—Signalized Intersection
156	Bicyclist Failed to Clear—Trapped
157	Bicyclist Failed to Clear—Multiple Threat
158	Signalized Intersection—Other/Unknown
159	Bicyclist Failed to Clear—Unknown
160	Crossing Paths—Uncontrolled Intersection
180	Crossing Paths—Intersection—Other/Unknown
211	Motorist Left Turn—Same Direction
212	Motorist Left Turn—Opposite Direction
213	Motorist Right Turn—Same Direction
214	Motorist Right Turn—Opposite Direction
215	Motorist Drive-in/Out—Parking

Crash Type Basic (Crash Type Number)	Crash Type Desc (Crash Type Description)
322	Motorist Drive-out—Commercial Driveway/Alley
328	Motorist Drive-out—Other Midblock
329	Motorist Drive-out—Midblock—Unknown
357	Multiple Threat—Midblock
380	Crossing Paths—Midblock—Other/Unknown
400	Bicycle Only
510	Motorist Intentionally Caused
520	Bicyclist Intentionally Caused
600	Backing Vehicle
700	Play Vehicle-Related
800	Unusual Circumstances
910	Nonroadway
970	Unknown Approach Paths
980	Unknown Location

# PBCAT TOOL CRASH TYPING – EXAMPLES OF CRASH TYPING FIGURES

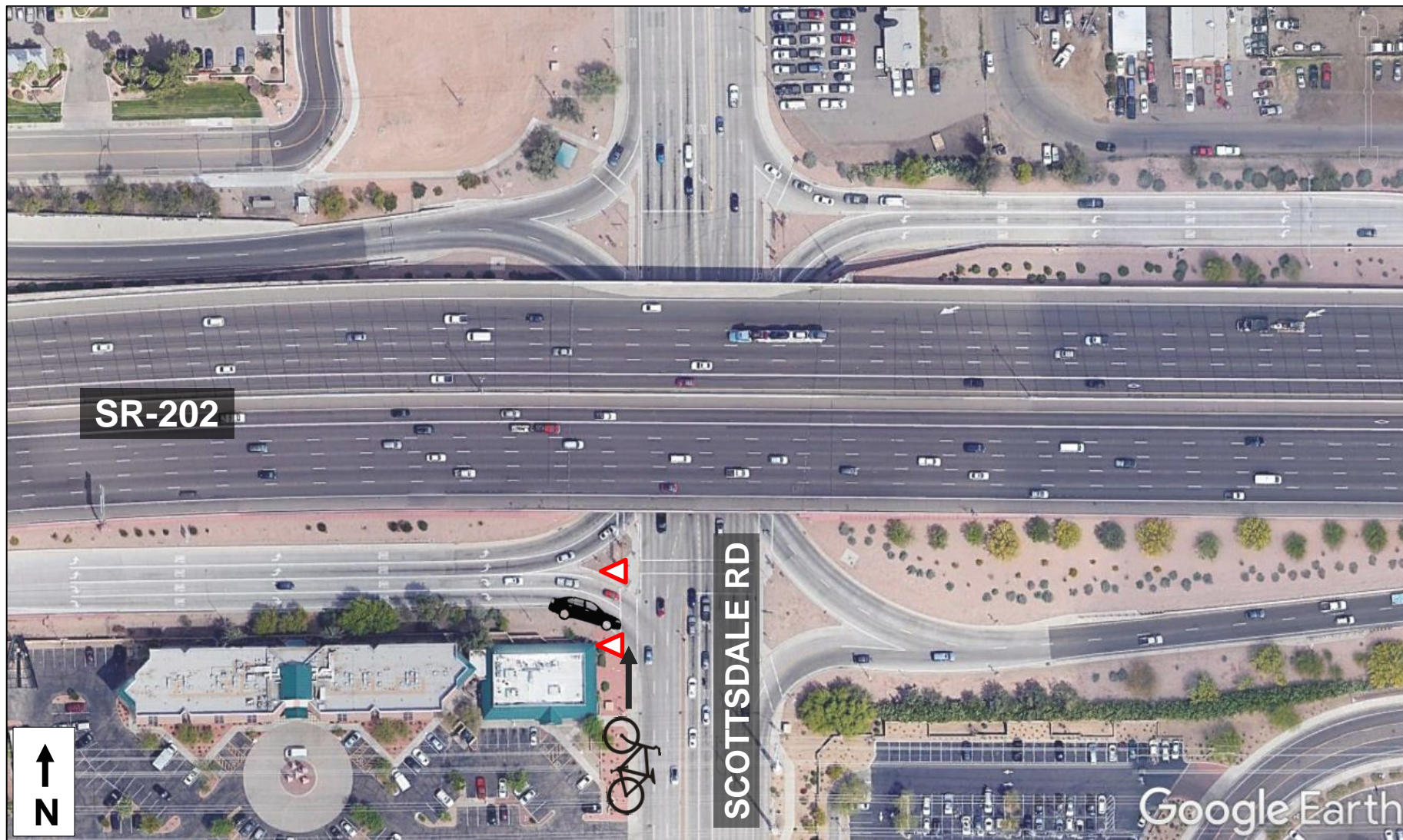


# PBCAT TOOL CRASH TYPING

## CASE STUDY 2



# PBCAT TOOL CRASH TYPING





# PBCAT TOOL CRASH TYPING

**Crash Typing**

Crash Location	<input type="checkbox"/>	<input type="text"/>
Crash Group	<input type="checkbox"/>	<input type="text"/>
Crash Type	<input type="checkbox"/>	<input type="text"/>
Bicyclist Position	<input type="checkbox"/>	<input type="text"/>
Bicyclist Direction	<input type="checkbox"/>	<input type="text"/>

Intersection ▼

Unknown

**Intersection**

Intersection-Related

Non-Intersection

Non-Roadway

# PBCAT TOOL CRASH TYPING

**Crash Typing**

Crash Location	1	Intersection ▼
Crash Group		▼
Crash Type		▼
Bicyclist Position		▼
Bicyclist Direction		▼

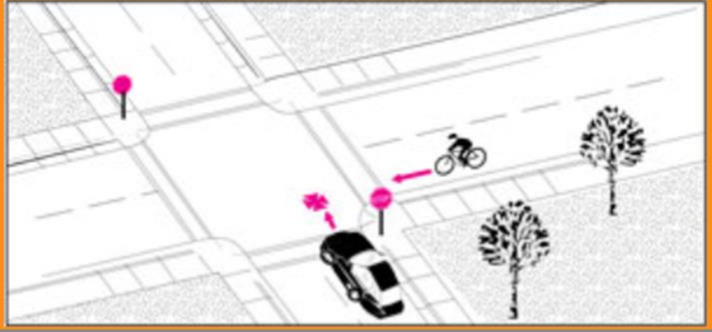
- Loss of Control / Turning Error
- Motorist Failed to Yield - Sign-Controlled Intersection**
- Bicyclist Failed to Yield - Sign-Controlled Intersection
- Motorist Failed to Yield - Signalized Intersection
- Bicyclist Failed to Yield - Signalized Intersection
- Crossing Paths - Other Circumstances
- Motorist Left Turn / Merge
- Motorist Right Turn / Merge

# PBCAT TOOL CRASH TYPING

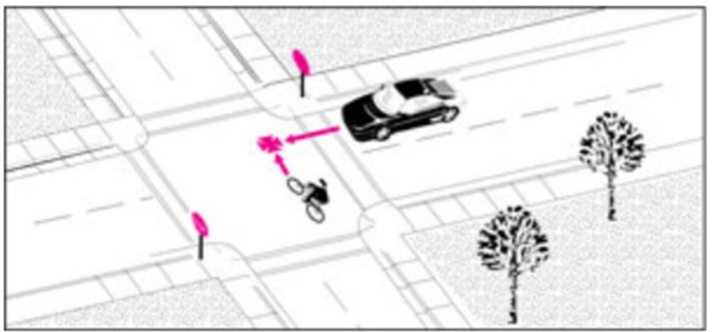
**Crash Typing**

Crash Location	1	Intersection ▼
Crash Group	140	Motorist Failed to Yield - Sign-Controlled Intersection ▼
Crash Type		
Bicyclist Position		
Bicyclist Direction		▼

**Motorist Drive Out - Sign-Controlled Intersection**



**Motorist Drive Through - Sign-Controlled Intersection**



**Motorist Drive Out - Sign-Controlled Intersection** ▼

The diagram shows a top-down view of a four-way intersection. A car is positioned in the middle of the intersection, having just crossed the path of a bicyclist who is also in the intersection. Pink arrows indicate the car's path and the bicyclist's path, showing they intersected. The car is moving from the bottom-left towards the top-right, and the bicyclist is moving from the top-left towards the bottom-right.

# PBCAT TOOL CRASH TYPING

**Crash Typing**

<b>Crash Location</b>	1	Intersection ▼
<b>Crash Group</b>	140	Motorist Failed to Yield - Sign-Controlled Intersection ▼
<b>Crash Type</b>	141	Motorist Drive Out - Sign-Controlled Intersection ▼
<b>Bicyclist Position</b>		▼
<b>Bicyclist Direction</b>		▼

Sidewalk / Crosswalk / Driveway Crossing ▼

- Unknown
- Travel Lane
- Bike Lane / Paved Shoulder
- Sidewalk / Crosswalk / Driveway Crossing**
- Multi-Use Path
- Driveway / Alley
- Non-Roadway (parking lot, open areas, etc)
- Other (unpaved shoulder, worn path, etc)

# PBCAT TOOL CRASH TYPING

**Crash Typing**

Crash Location	1	Intersection ▼
Crash Group	140	Motorist Failed to Yield - Sign-Controlled Intersection ▼
Crash Type	141	Motorist Drive Out - Sign-Controlled Intersection ▼
Bicyclist Position	3	Sidewalk / Crosswalk / Driveway Crossing ▼
Bicyclist Direction		▼

Facing Traffic ▼

- Unknown
- With Traffic
- Facing Traffic**
- Not Applicable

# PBCAT TOOL CRASH TYPING - LOCATION

Crash_Location_Desc (Crash Location)	Crash_Location (Crash Location)	Definition
		<b>Where did the crash occur?</b>
Intersection	1	<u>Intersection</u> —The crash occurred within the intersection proper or within the crosswalk area. <b>Note: Driveways are considered to be nonintersection locations. The exception is signalized commercial driveways which should be coded as intersections.</b>
Intersection-Related	2	<u>Intersection-Related</u> —The crash occurred outside the intersection proper or crosswalk area but was related to the presence of the intersection (e.g., the result of queueing traffic).
Nonintersection	3	<u>Nonintersection Location</u> —The crash occurred outside the intersection proper or crosswalk area and was <b>not</b> related to the presence of any intersection.
Nonroadway	4	<u>Nonroadway Location</u> —The crash occurred off the street network; this includes parking lots, driveways, alleys, and other open areas. <b>Note: crashes occurring on paved shoulders, sidewalks, or driveway crossings are considered to be "roadway" crashes and should not be placed in the nonroadway classification.</b>
Unknown Location	9	<u>Unknown/Insufficient Information</u> —There is insufficient information to determine where the crash occurred.
<b>Bicyclist Position Definitions</b>		
Bicyclist_Position_Desc (Bicyclist Position)	Bicyclist_Position (Bicyclist Position)	Definition
Travel Lane	1	On a roadway, in a shared travel lane
Bike Lane/Paved Shoulder	2	On a roadway, in a bicycle lane or on a paved shoulder
Sidewalk/Crosswalk/Driveway Crossing	3	On a sidewalk, crosswalk, or driveway crossing
Driveway/Alley	4	On a separate bicycle/multi-use path
Multi-use Path	5	On a driveway or alley
Nonroadway	6	Other nonroadway areas (parking lot, open areas, etc.)
Other	8	Other (e.g., unpaved shoulder, worn path, etc.)
Unknown	9	Unknown

# PBCAT TOOL CRASH TYPING - CRASH GROUP

Crash_Group_Basic (Crash Group Number)	Crash_Group_Desc (Crash Group Description)
110	Loss of Control/Turning Error
140	Motorist Failed to Yield— Sign-Controlled Intersection
145	Bicyclist Failed to Yield— Sign-Controlled Intersection
150	Motorist Failed to Yield— Signalized Intersection
158	Bicyclist Failed to Yield— Signalized Intersection
190	Crossing Paths—Other Circumstances
210	Motorist Left Turn/Merge
215	Motorist Right Turn/Merge
219	Parking/Bus-Related
220	Bicyclist Left Turn/Merge

Crash_Group_Basic (Crash Group Number)	Crash_Group_Desc (Crash Group Description)
225	Bicyclist Right Turn/Merge
230	Motorist Overtaking Bicyclist
240	Bicyclist Overtaking Motorist
258	Head-On
290	Parallel Paths—Other Circumstances
310	Bicyclist Failed to Yield— Midblock
320	Motorist Failed to Yield— Midblock
600	Backing Vehicle
850	Other/Unusual Circumstances
910	Nonroadway
990	Other/Unknown— Insufficient Details

# PBCAT TOOL CRASH TYPING - CRASH TYPE

Crash Type Basic (Crash Type Number)	Crash Type Desc (Crash Type Description)
133	Motorist Lost Control—Alcohol/Drug Impairment
134	Motorist Lost Control—Surface Conditions
139	Motorist Lost Control—Other/Unknown
141	Motorist Drive-out Sign-Controlled Intersection
142	Bicyclist Ride-out—Sign-Controlled Intersection
143	Motorist Drive-through—Sign-Controlled Intersection
144	Bicyclist Ride Through Sign-Controlled Intersection
147	Multiple Threat—Sign-Controlled Intersection
148	Sign-Controlled Intersection—Other/Unknown
151	Motorist Drive-out—Right Turn on Red
152	Motorist Drive-out—Signalized Intersection
153	Bicyclist Ride-out—Signalized Intersection
154	Motorist Drive-through—Signalized Intersection

Crash Type Basic (Crash Type Number)	Crash Type Desc (Crash Type Description)
111	Motorist Turning Error—Left Turn
112	Motorist Turning Error—Right Turn
113	Motorist Turning Error—Other
114	Bicyclist Turning Error—Left Turn
115	Bicyclist Turning Error—Right Turn
116	Bicyclist Turning Error—Other
121	Motorist Lost Control—Oversteering, Improper Braking, Speed
123	Bicyclist Lost Control—Alcohol/Drug Impairment
124	Bicyclist Lost Control—Surface Conditions
129	Bicyclist Lost Control—Other/Unknown
131	Motorist Lost Control—Mechanical Problems
132	Motorist Lost Control—Oversteering, Improper Braking, Speed

Crash Type Basic (Crash Type Number)	Crash Type Desc (Crash Type Description)
133	Motorist Lost Control—Alcohol/Drug Impairment
134	Motorist Lost Control—Surface Conditions
139	Motorist Lost Control—Other/Unknown
141	Motorist Drive-out Sign-Controlled Intersection
142	Bicyclist Ride-out—Sign-Controlled Intersection
143	Motorist Drive-through—Sign-Controlled Intersection
144	Bicyclist Ride Through Sign-Controlled Intersection
147	Multiple Threat—Sign-Controlled Intersection
148	Sign-Controlled Intersection—Other/Unknown
151	Motorist Drive-out—Right Turn on Red
152	Motorist Drive-out—Signalized Intersection
153	Bicyclist Ride-out—Signalized Intersection
154	Motorist Drive-through—Signalized Intersection

Crash Type Basic (Crash Type Number)	Crash Type Desc (Crash Type Description)
155	Bicyclist Ride Through—Signalized Intersection
156	Bicyclist Failed to Clear—Trapped
157	Bicyclist Failed to Clear—Multiple Threat
158	Signalized Intersection—Other/Unknown
159	Bicyclist Failed to Clear—Unknown
160	Crossing Paths—Uncontrolled Intersection
180	Crossing Paths—Intersection—Other/Unknown
211	Motorist Left Turn—Same Direction
212	Motorist Left Turn—Opposite Direction
213	Motorist Right Turn—Same Direction
214	Motorist Right Turn—Opposite Direction
215	Motorist Drive-in/Out—Parking

Crash Type Basic (Crash Type Number)	Crash Type Desc (Crash Type Description)
216	Bus/Delivery Vehicle Pullover
217	Motorist Right Turn on Red—Same Direction
218	Motorist Right Turn on Red—Opposite Direction
219	Motorist Turn/Merge—Other/Unknown
221	Bicyclist Left Turn—Same Direction
222	Bicyclist Left Turn—Opposite Direction
223	Bicyclist Right Turn—Same Direction
224	Bicyclist Right Turn—Opposite Direction
225	Bicyclist Ride-out—Parallel Path
231	Motorist Overtaking—Undetected Bicyclist
232	Motorist Overtaking—Misjudged Space
235	Motorist Overtaking—Bicyclist Swerved
239	Motorist Overtaking—Other/Unknown

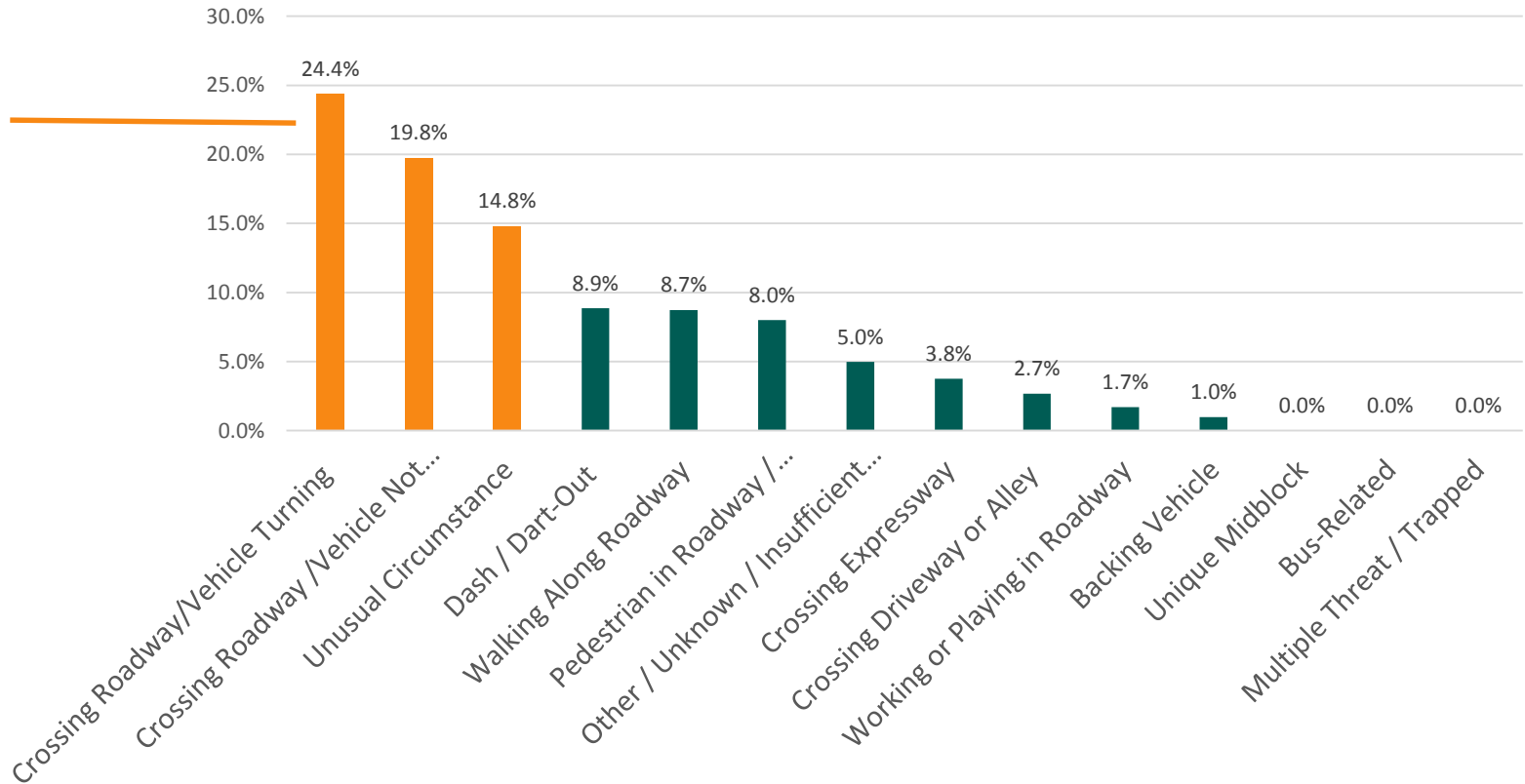
Crash Type Basic (Crash Type Number)	Crash Type Desc (Crash Type Description)
241	Bicyclist Overtaking—Passing on Right
242	Bicyclist Overtaking—Passing on Left
243	Bicyclist Overtaking—Parked Vehicle
244	Bicyclist Overtaking—Extended Door
249	Bicyclist Overtaking—Other/Unknown
250	Head-On—Bicyclist
255	Head-On—Motorist
259	Head-On—Unknown
280	Parallel Paths—Other/Unknown
311	Bicyclist Ride-out—Residential Driveway
312	Bicyclist Ride-out—Commercial Driveway/Alley
318	Bicyclist Ride-out—Other Midblock
319	Bicyclist Ride-out—Midblock—Unknown
321	Motorist Drive-out—Residential Driveway

Crash Type Basic (Crash Type Number)	Crash Type Desc (Crash Type Description)
322	Motorist Drive-out—Commercial Driveway/Alley
328	Motorist Drive-out—Other Midblock
329	Motorist Drive-out—Midblock—Unknown
357	Multiple Threat—Midblock
380	Crossing Paths—Midblock—Other/Unknown
400	Bicycle Only
510	Motorist Intentionally Caused
520	Bicyclist Intentionally Caused
600	Backing Vehicle
700	Play Vehicle-Related
800	Unusual Circumstances
910	Nonroadway
970	Unknown Approach Paths
980	Unknown Location



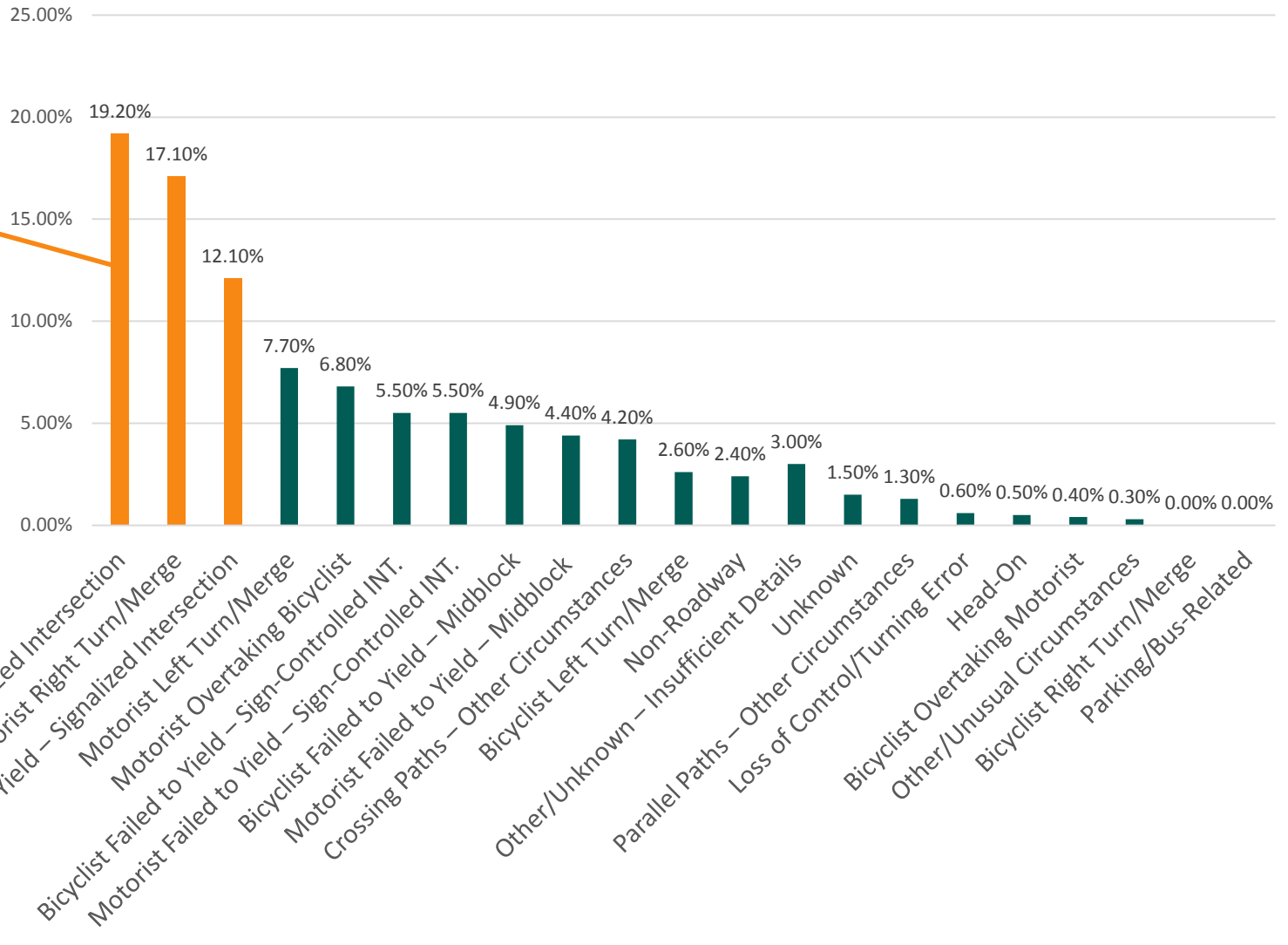
# Crash Groups Distribution – Pedestrian Crashes

59 % of crashes in 3 crash groups



# Crash Groups Distribution – Bicycle Crashes

48 % of crashes in 3 crash groups



# Countermeasure Selection Process

- 1. Review** location context and site characteristics:
  - *ADOT GIS data,*
  - *ADOT Photo Log, and Google Street View*
  - *Cross-section, posted speed limit, existing and bicycle pedestrian facilities*
- 2. Identify** potential countermeasures – PEDSAFE, BIKESAFE, others

## Examples of Countermeasures:

Interchange modifications

Crossing treatments

Lane reduction, speed limit reduction

Sidewalks, striped shoulders, bicycle lanes

Pedestrian and Bicycle safety education campaign

Install pedestrian refuge islands

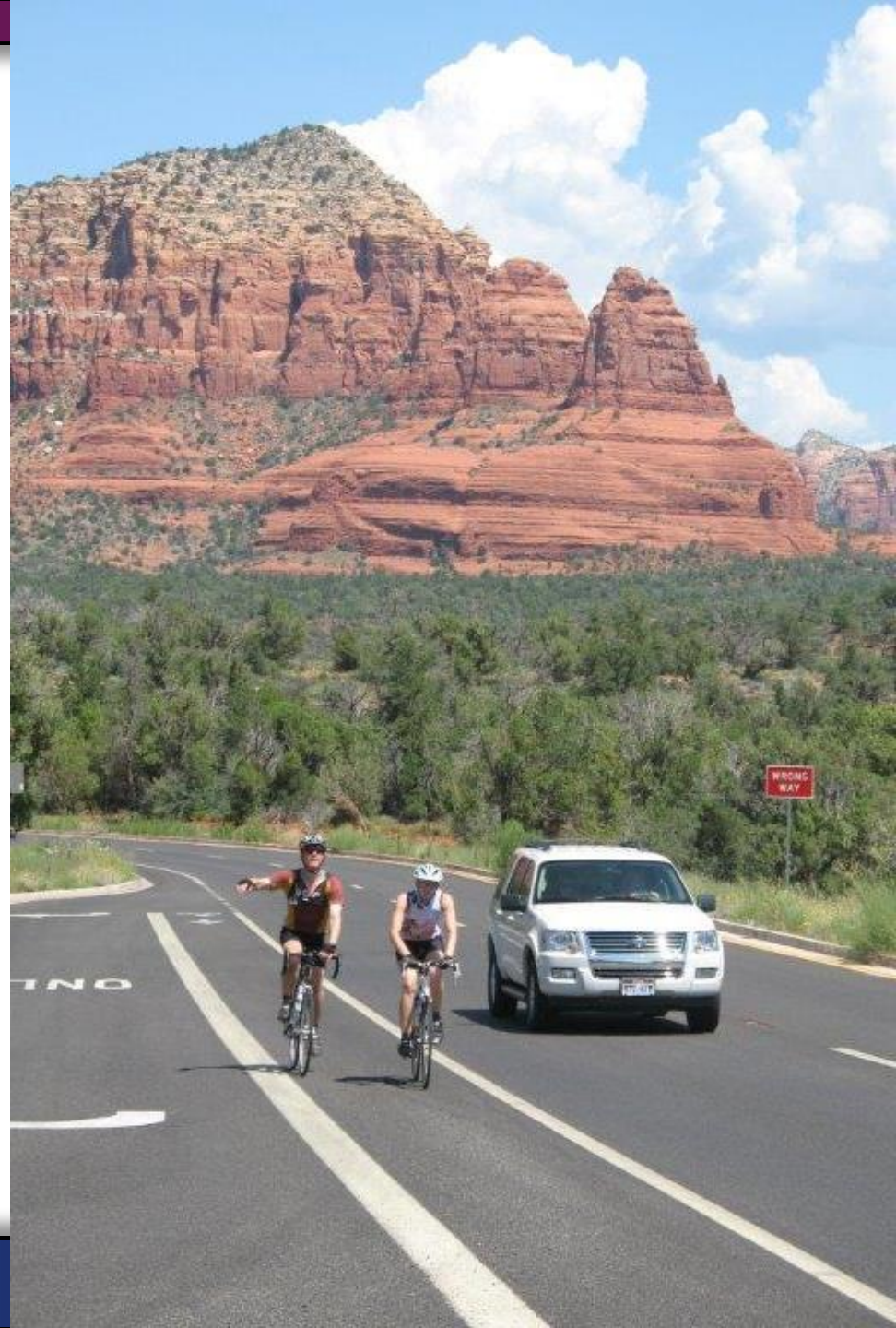
Access management improvements

Roadway Safety Assessments

## Conclusions

- ▶ Crash typing provided insight to identification of most common factors and behaviors leading to bicycle and pedestrian crashes
- ▶ Connects those factors to countermeasures that most effectively address the crashes

Questions?



# Discussion

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⇒ Send us your questions



⇒ Follow up with us:

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