

Root Cause Analysis: Bike & Pedestrian Crashes – Fact Sheet & Countermeasures

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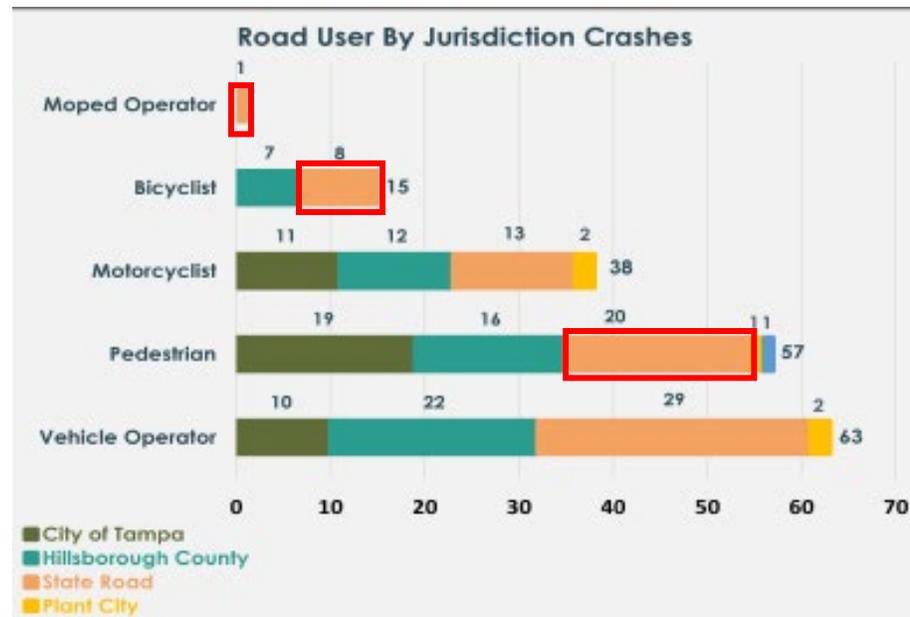
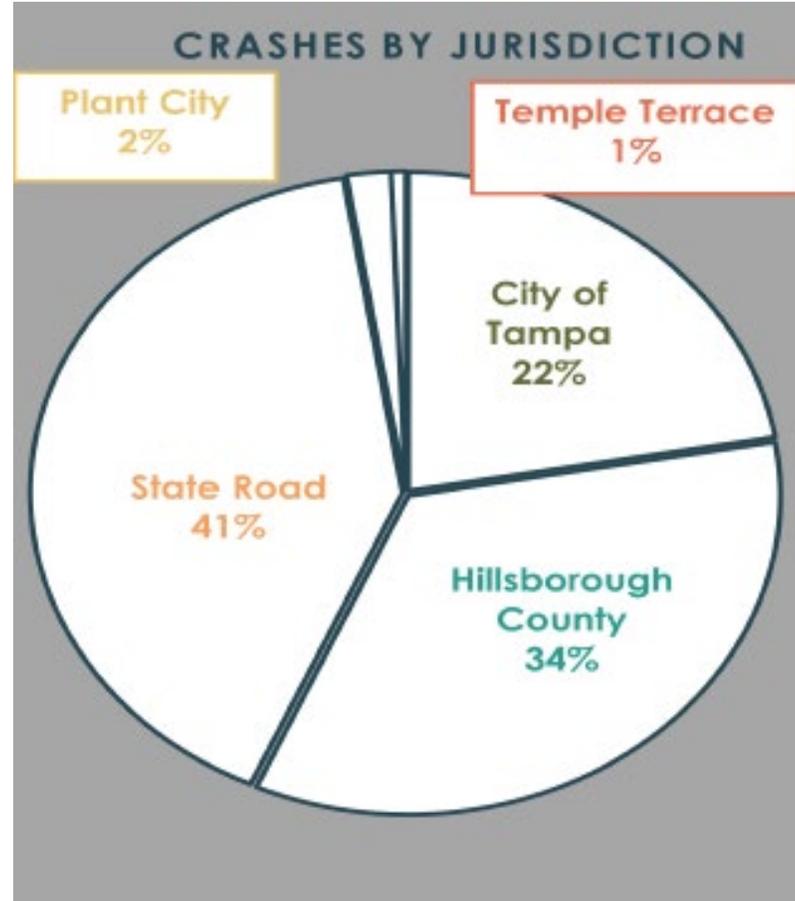
Design Engineer, JMT

January 28, 2026



Hillsborough CTST Fatal Crash Map

Jurisdiction	Percentage of Roadway Network
Hillsborough County	63.0%
Cities	25.9%
FDOT	11.1%
Totals:	100%



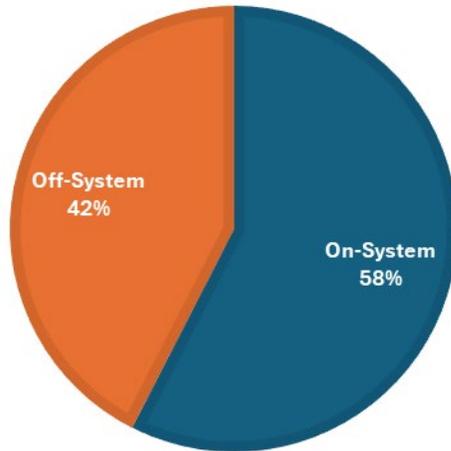
Data source: Signal Four Analytics (January 1st, 2024, to December 31st, 2024)



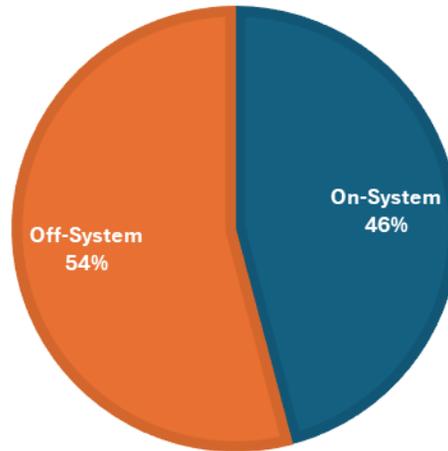
District 7 SHS Statistics

D7 Ped/Bike Fatal Crash Trends

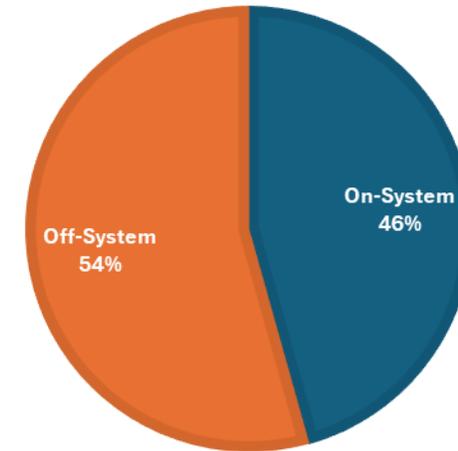
2019



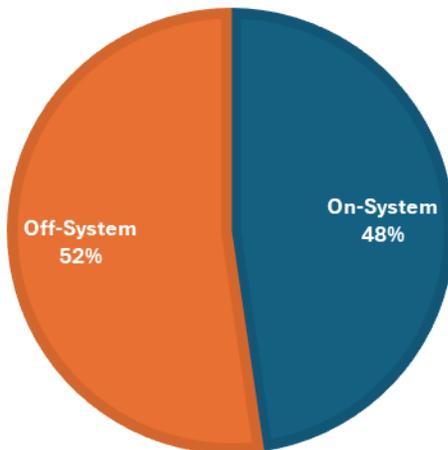
2020



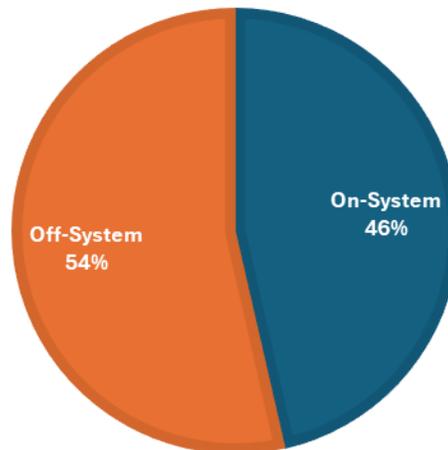
2021



2022

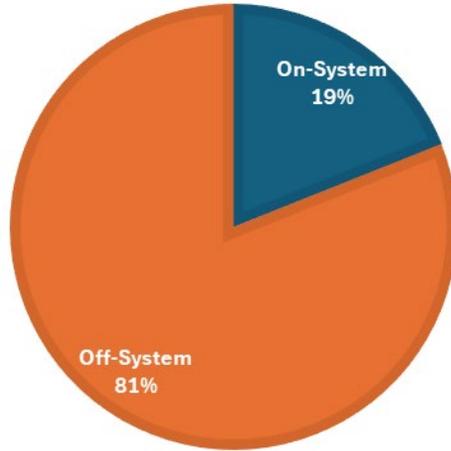


2023

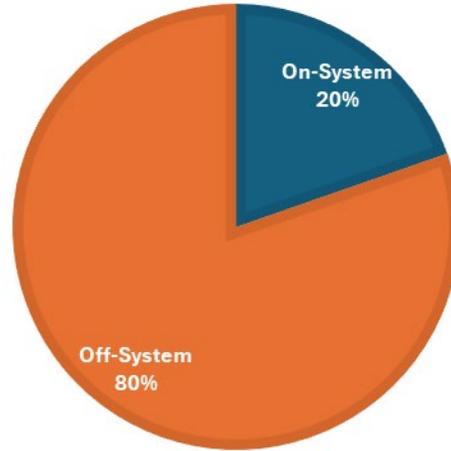


D7 Ped/Bike All Crash Trends

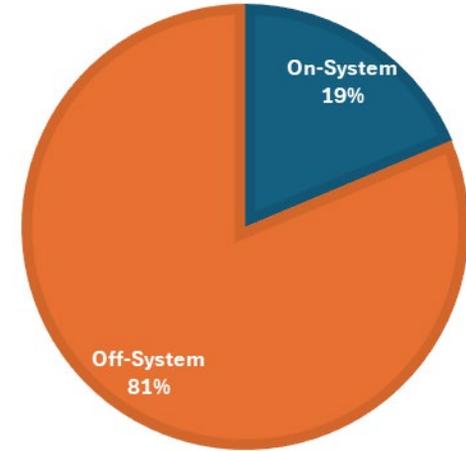
2019



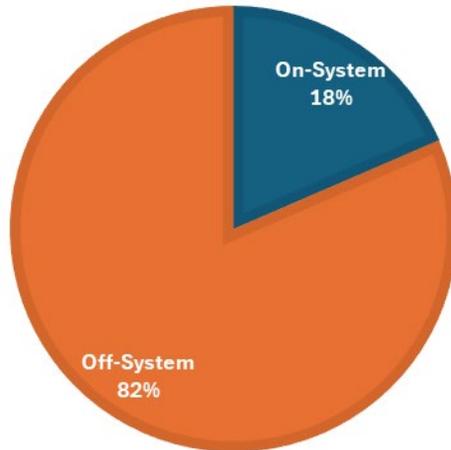
2020



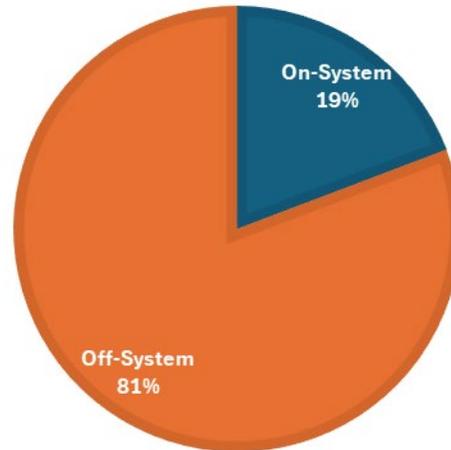
2021



2022



2023



D7 SHS Lane Mile Characteristics

County	Centerline Miles	Lane Miles	Daily Vehicle Miles Traveled, Thousands
Citrus	100.9	345.2	1,789.9
Hernando	126.3	492.5	2,823.5
Hillsborough	466.9 40%	2,096.1 42%	25,360.2 51%
Pasco	204.7	895.7	7,979.6
Pinellas	257.7	1,156.4	11,710.7
District 7	1,156.6	4,985.8	49,663.9

Lane miles divided by centerline miles

Citrus: 3.42 lanes

Hernando: 3.90 lanes

Hillsborough: 4.49 lanes

Pasco: 4.38 lanes

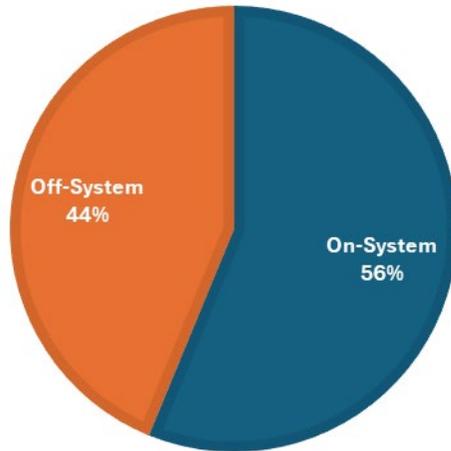
Pinellas: 4.48 lanes



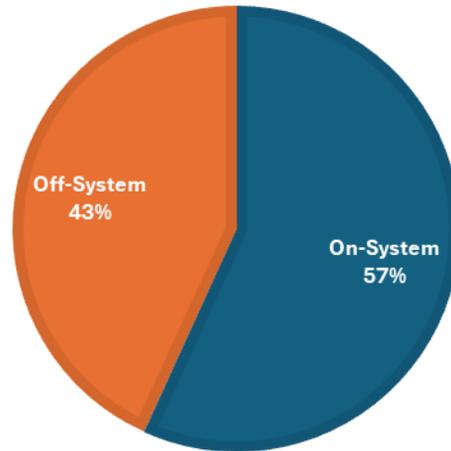
Statewide SHS Ped/Bike Crashes

Statewide Ped/Bike Fatal Crash Trends

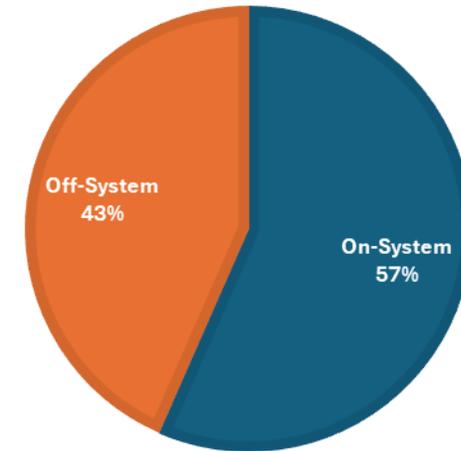
2019



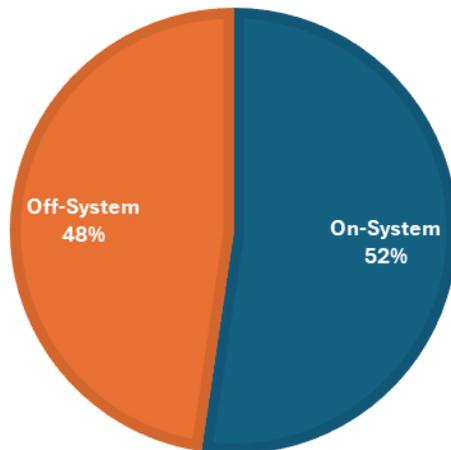
2020



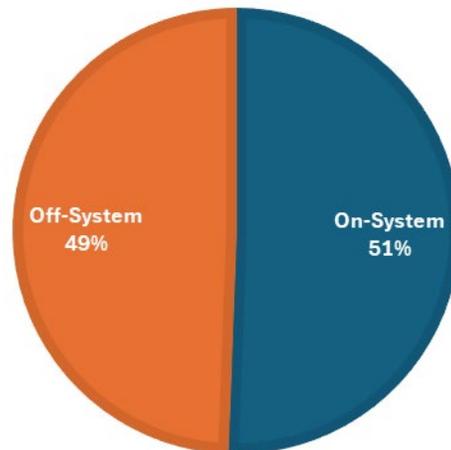
2021



2022

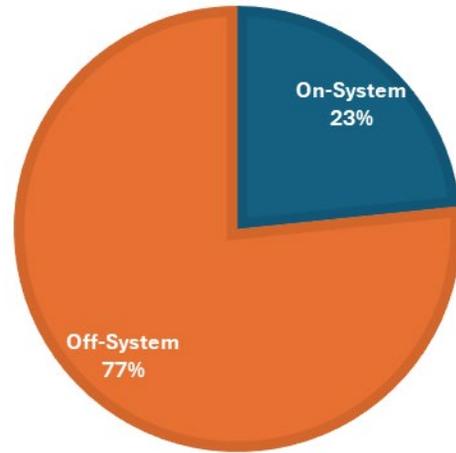


2023

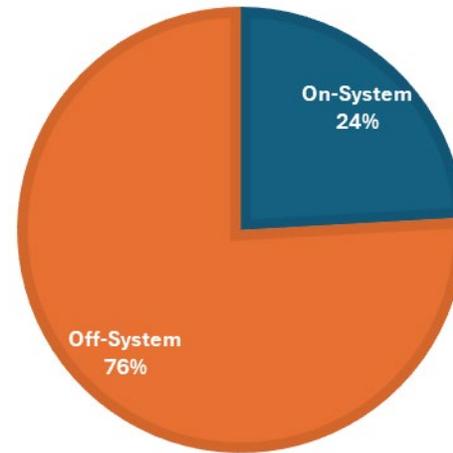


Statewide Ped/Bike All Crash Trends

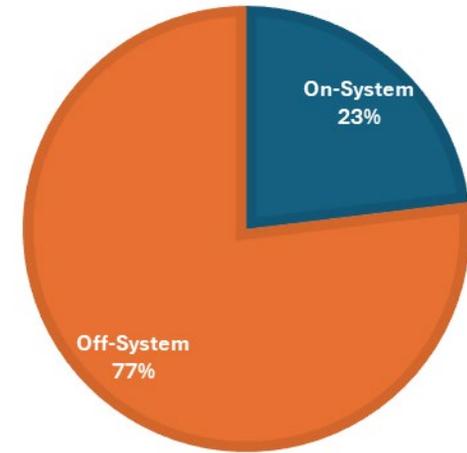
2019



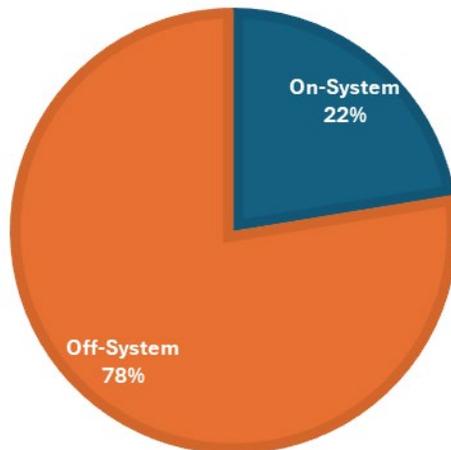
2020



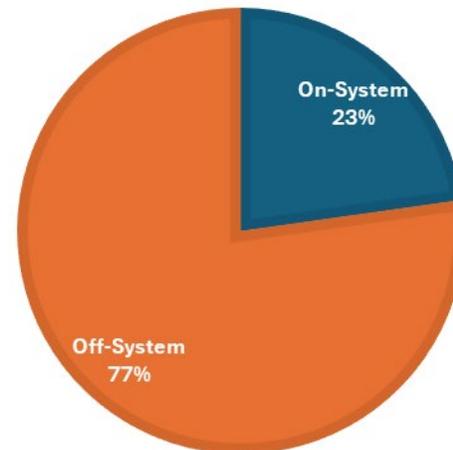
2021



2022

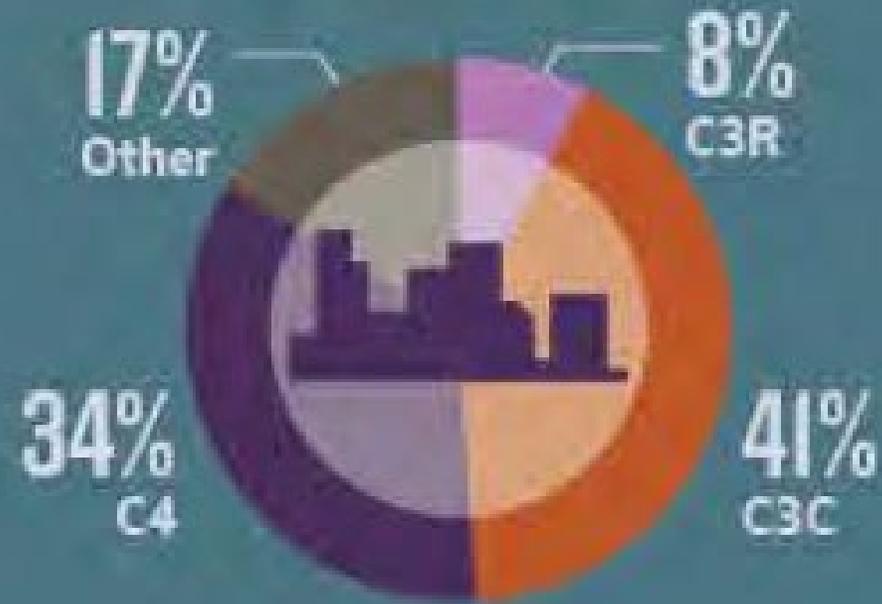


2023

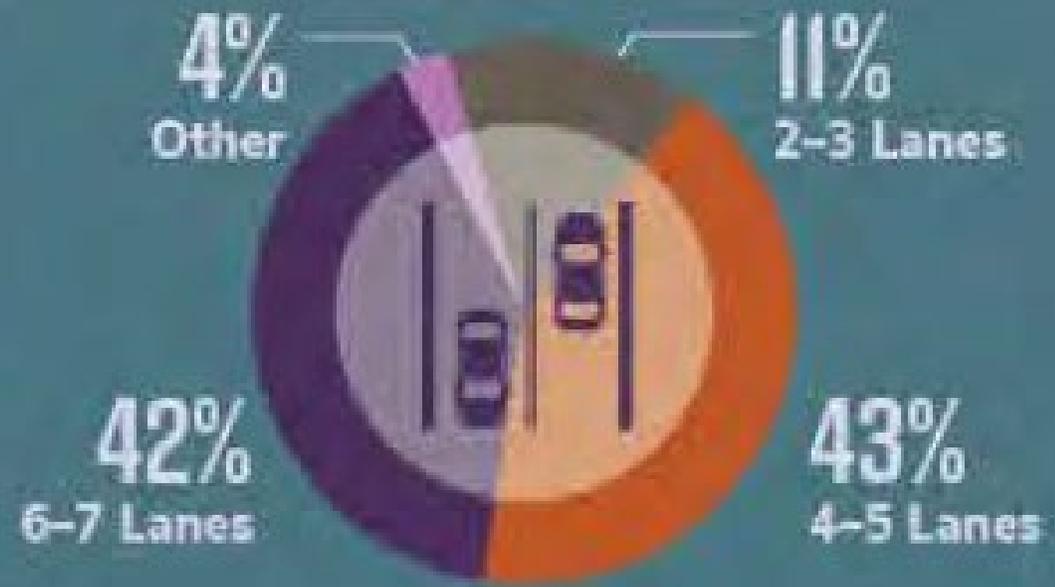


Metrics for State Highway System Only

Context Classification



Number of Lanes



Posted Speed*



57%
40-45 MPH

22%
50+ MPH

CONTEXT CLASS

SUBURBAN COMMERCIAL (C3C) CONTEXT CLASS

41% of severe and fatal crashes occur on C3C roadways



which are 19% of the network

URBAN GENERAL (C4) CONTEXT CLASS

34% of severe and fatal crashes occur on C4 roadways



which are 9% of the network

POSTED SPEED

POSTED SPEEDS OF 45-50 MPH

47% of severe and fatal crashes occur on roadways with a posted speed of



which are 24% of the network

POSTED SPEEDS OF 35-40 MPH

32% of severe and fatal crashes occur on roadways with a posted speed of



which are 12% of the network

NUMBER OF LANES

ROADWAYS WITH 5-6 TRAVEL LANES

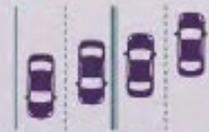
43% of severe and fatal crashes occur on 5-6 lane roadways



which are 19% of the network

ROADWAYS WITH 3-4 TRAVEL LANES

43% of severe and fatal crashes occur on 3-4 lane roadways



which are 37% of the network

TRANSIT FREQUENCY



72% of severe and fatal crashes occur on roadways with transit routes.



which are 51% of the network



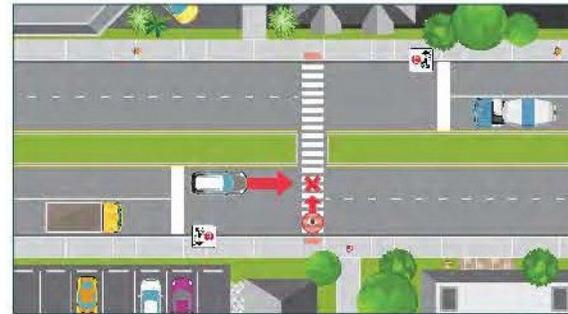
Ped/Bike Crash Problems and Countermeasures

Crash Problem 1

1. Struck by through motorist at midblock (41% pedestrian fatalities and serious injuries)



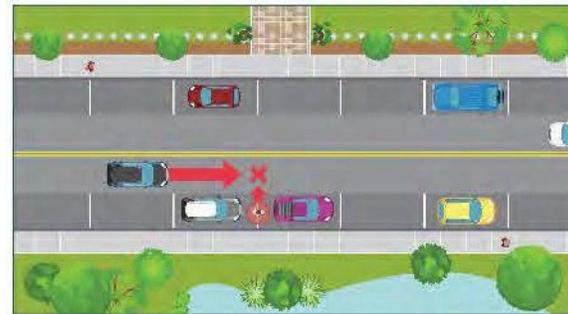
PEDESTRIAN FAILED TO YIELD AT MIDBLOCK



MOTORIST FAILED TO YIELD AT MIDBLOCK



DASH AT MIDBLOCK



DART OUT AT MIDBLOCK

47% IN C3C

36% IN C4

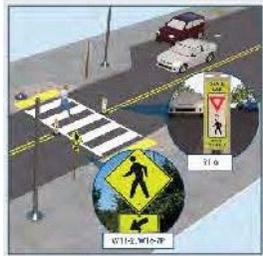
62% ON 40
AND 45 MPH ROADS

87% ON 4
AND 6-LANE ROADS

80% IN DARK
CONDITIONS



Countermeasures 1



High-visibility crosswalks



Pedestrian refuge islands



In-pavement flashing lights



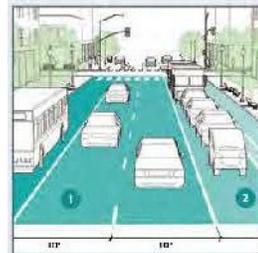
Wide sidewalks or shared use path



Advance stop or yield markings



Pedestrian Hybrid Beacons



Narrower travel lanes



Raised median with refuge island



Pedestrian scale lighting



Rectangular Rapid Flashing Beacons



Speed control



Targeted education

Crash Problem 2

2. Struck by through motorist at intersections (20% pedestrian fatalities and serious injuries)



DASH AT INTERSECTION



PEDESTRIAN FAILED TO YIELD



MOTORIST FAILED TO YIELD

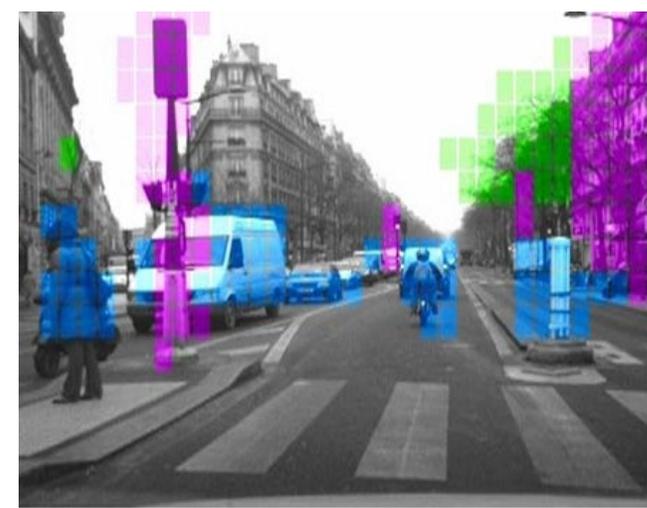


Countermeasures 2

- Compact Intersections
- Roundabouts
- Raised Intersections
- Curb Extensions
- Raised Pedestrian Crossings
- Pedestrian Refuge Islands
- Far Side Bus Stops

- Leading Pedestrian Intervals
- Automated Pedestrian Detection or Passive Detection
- Shorter Signal Cycles

- Safety Education
- Progressive Ticketing



Crash Problem 3

3. Struck by turning motorist (8% pedestrian fatalities and serious injuries)



MOTORIST LEFT TURN - PARALLEL PATHS



MOTORIST LEFT TURN - PERPENDICULAR PATHS



MOTORIST RIGHT TURN - PARALLEL PATHS



MOTORIST RIGHT TURN - PERPENDICULAR PATHS

42% IN C4

32% IN C3C

54% ON 40
AND 45 MPH ROADS

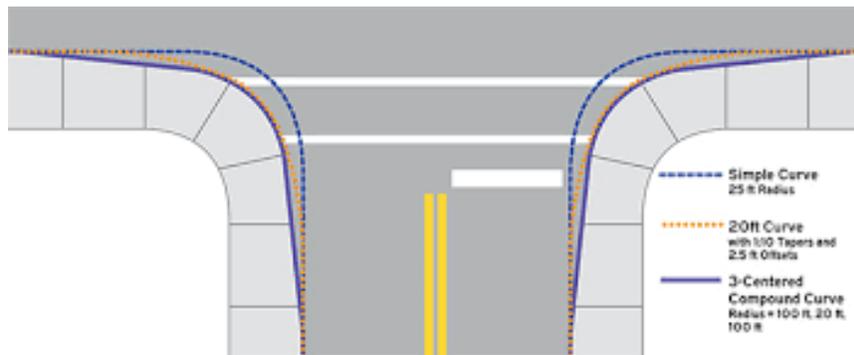
81% ON 4
AND 6-LANE ROADS

34% IN DARK
CONDITIONS



Countermeasures 3

- Tighter corner radii
- Tighten and calm left turns by implementing a permanent plastic curb delineator on receiving centerline
- Provide fully protected left turn phase separate from the pedestrian walk phase signal
- Install LPI in conjunction with Right Turn on Red restrictions
- Remove right turn slip lanes
- Safety education



Top Bicycle Crash Problems

Bicyclist Yielding Issues

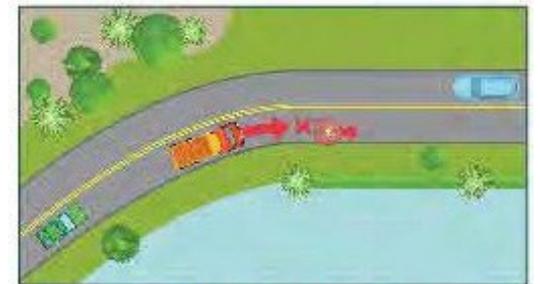
Bicyclists failing to yield at midblock (15%) and signalized intersections (11%) cause a significant portion of crashes.

Motorist Yielding Failures

Motorists often fail to yield at midblock (11%) and intersections, contributing to many bicycle crashes.

Motorist Overtaking Bicyclists

Unsafe overtaking maneuvers by motorists cause about 10% of bicycle crashes.



Bicycle Countermeasures



Engineering Solutions

Engineering improvements include enhanced crossings, median refuge islands, exclusive bike facilities, buffered bike lanes, protected intersections, roundabouts, and improved lighting and signage



Education Initiatives

Education promotes bicyclist rights, helmet use, and visibility to encourage safe riding behaviors and awareness.



Enforcement Strategies

Enforcement targets safe passing laws and yielding violations to ensure motorist compliance and bicyclist protection.

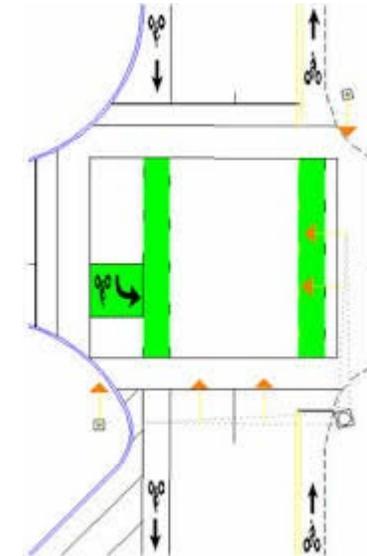
Bicycle Design Enhancements

Traffic Signal Solutions

Protected-only left-turn phasing and restricted left turns at key locations improve bicyclist safety at intersections.

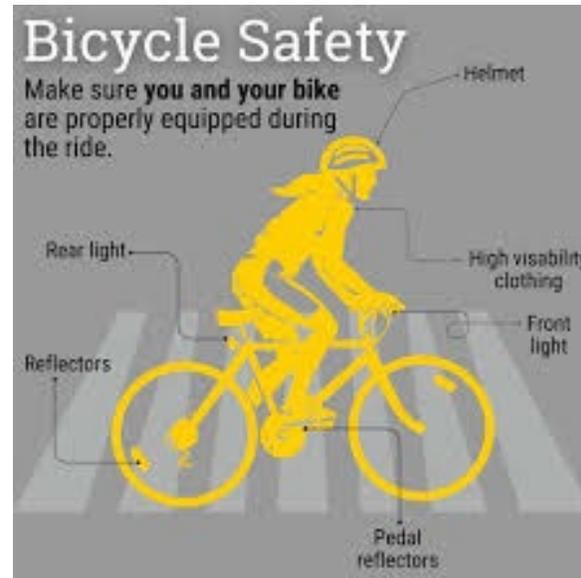
Intersection Design Enhancements

Bike boxes, two-stage turn queue boxes, and leading bicycle intervals enhance visibility and safety for cyclists.



Summary

- Most severe crashes are preventable with targeted engineering, education, and enforcement
- Focus on high-risk locations and vulnerable populations
- Implement and monitor countermeasures for effectiveness





Average risk of death for a pedestrian at impact raises as speed increases

90%

50%

10%

23 mph

42 mph

58 mph



DNT TXT + DRV



Thank You!
Questions?