Improving Roadway Infrastructure for Bicyclists

Ivan Cheung, PhD
Select Crash Locations Involving Bicycles and Motor Vehicles
Bicyclist Fatalities by 10 Most Frequent Bicycle Crash Groups and Location Types (2014 through 2016)

Motorist Overtaking Bicyclist: 614
Parallel Paths - Other Circumstances: 165
Bicyclist Failed to Yield - Midblock: 127
Bicyclist Left Turn / Merge: 125
Crossing Paths - Other Circumstances: 35
Bicyclist Failed to Yield - Signalized Intersection: 25
Bicyclist Failed to Yield - Sign-Controlled Intersection: 20
Other / Unknown - Insufficient Details: 10
Wrong-Way / Wrong-Side: 46
Loss of Control / Turning Error: 0

25% of All bicyclist fatalities
7% of All bicycle crashes involving motor vehicles
Likelihood of Sustaining Fatal or Serious Injury for a Bicyclist Involved in a Crash with a Motor Vehicle

• Analysis of 5,266 individual bicyclists involved in crashes with motor vehicles in 2017 in four states

• Twice as likely in midblock crashes compared to others (while controlling for land use and posted speed limit)

• 65% more likely in areas with 30-35 mph posted speed limit compared to 25 mph or less (while controlling for location and land use)
Separated Bike Lanes

- Separated bike lanes are expected to eliminate midblock crashes with motor vehicles that have the highest injury severity outcomes.
- Desired by many transportation officials interviewed.
- 35 states reported recommending them but only 4 states had them installed along their state roadways.
One-Way Separated Bike Lanes, Positioned on Right Side of Roadway
Two-Way Separated Bike Lanes
At Street Level, Parking Protected
Raised

Pedestrian
Bicycle
Vehicular
Bicyclist Fatalities by 10 Most Frequent Bicycle Crash Groups and Location Types (2014 through 2016)

- **Motorist Overtaking Bicyclist**: 53 fatalities
- **Parallel Paths - Other Circumstances**: 35 fatalities
- **Bicyclist Failed to Yield - Midblock**: 5 fatalities
- **Bicyclist Left Turn / Merge**: 43 fatalities
- **Crossing Paths - Other Circumstances**: 131 fatalities
- **Bicyclist Failed to Yield - Signalized Intersection**: 170 fatalities
- **Bicyclist Failed to Yield - Sign-Controlled Intersection**: 165 fatalities
- **Other / Unknown - Insufficient Details**: 39 fatalities
- **Wrong-Way / Wrong-Side**: 13 fatalities
- **Loss of Control / Turning Error**: 51 fatalities

In total, there were 466 bicyclist fatalities, which is 19% of all bicyclist fatalities and 24% of all bicycle crashes involving motor vehicles.

Intersection Locations: 53
Midblock Locations: 383

Graphical representation of the data.
Safety Treatments at Intersections: Bicycle Signal Face
Safety Treatments at Intersections: Two-Stage Bicycle Turn Box

Location of two-stage bicycle turn box
Updating the 2012 *Guide for the Development of Bicycle Facilities*

- Published in 2012
- Provides geometric design guidance for bicycle facilities
- Lacks information on separated bike lanes and safety treatments at intersections
Road Diet

- Repositions pavement markings
- Reduces number of through lanes and provides dedicated space for bicycle facilities, such as bike lanes
- Improves safety by reducing total crashes by 19% to 47%
- Placed on the FHWA’s List of Proven Safety Countermeasures in 2008
FHWA Programs to Accelerate State and Local Adoption of Proven Safety Countermeasures

- Proven Safety Countermeasures Initiative
- Every Day Counts Program