



Caltrans Division of Research,  
Innovation and System Information

# Research



# Results

Transportation  
Safety and  
Mobility

## Bicycle Crash Risk: How Does It Vary and Why

Develop a database that enables analysis and statistical modeling of crash incidence and crash risk as a function of explanatory variables.

### WHAT WAS THE NEED?

Since 2006, there has been an upward trend in bicyclist fatalities, counter to the trend of decreasing automobile crashes. In California in 2011, bicycle fatalities were 4.1 percent of total crashes - about twice the national average. During the years 2008-2010 there were 503,552 injury collisions in California, of which 35,934 involved bicycles (7.1 percent of the total). During that same three-year period, there were 9,216 roadway fatalities in California, of which 348 involved bicycles (3.8 percent of the total). Los Angeles County, with its relatively high number of cyclists, also had the highest percentage of collisions at nearly 31 percent of the total. Bicycle collisions are also known to be underreported; therefore, the injury level is likely higher than appears here.

### WHAT WAS OUR GOAL?

With bicycle infrastructure and bicycling activity on the rise, it is more crucial than ever to understand bicycle crash risk as a function of roadway design and operational characteristics, as well as driver and bicyclist behavior. This report significantly advances that goal by compiling data from just under 500 sites in Los Angeles County. By associating count volumes, we are able to differentiate between high incidence / high risk sites and high incidence / low risk sites. We also analyze a suite of roadway design and operational characteristics, adjacent land uses, and socioeconomic variables, to examine correlations with crash risk.

### WHAT DID WE DO?

Find the association between crash incidence (count of crashes over a period of time at a location) and bicycle exposure (number of bicyclists passing through a location over a period

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of time). To calculate crash incidence, the researchers employed California SWITRS data and precise spatial definitions of segments and intersections of streets. To calculate bicycle exposure, they employed a convenience sample of bicycle count data aggregated at bikecounts.luskin.ucla.edu, and employed a number of methods to standardize this data, which was collected via different technologies and methodologies, and over inconsistent time periods.

## WHAT WAS THE OUTCOME?

We analyzed bicycle crash incidence and bicycle crash risk at 247 intersections and 816 roadway segments in Los Angeles County. Many locations with high crash incidence also have high bicycle ridership. The locations with the highest crash risk tend to have below-average bicycle ridership.

## WHAT IS THE BENEFIT?

Policy Considerations:

The benefit of this data was to validate and reinforce policy for Bike/Ped safety.

- Data reinforces that Bike lanes are an effective Safety intervention, this lends to support continued programs for Bicycle Infrastructure Construction.
- Prioritization of crashes as a metric should be reconsidered. In the absence of systematic counting programs, cities can begin by conducting counts at locations with high crash incidence, allowing planners to distinguish between high risk / moderate volume sites and low risk / high volume sites.
- Reinforced findings that Bicycle Boulevards had a low crash risk.
- Found that Crash Risk cannot be understood without Bicycle Count Data. This validates the need for collection of volume data.

## LEARN MORE

[http://www.dot.ca.gov/research/researchreports/reports/2016/CA16-2801\\_FinalReport.pdf](http://www.dot.ca.gov/research/researchreports/reports/2016/CA16-2801_FinalReport.pdf)

## IMAGES

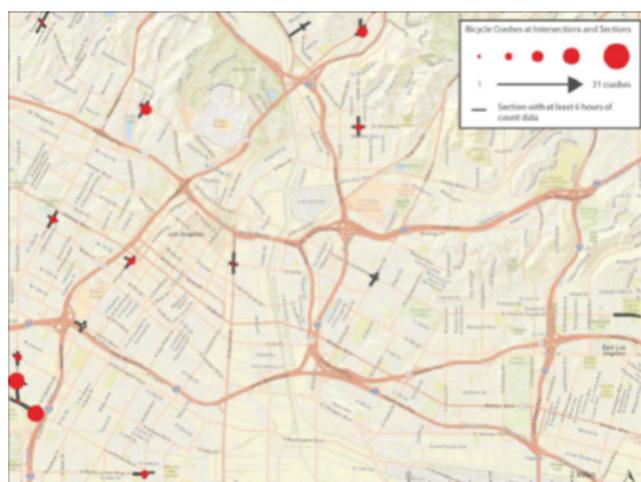


Image 1: Number of Crashes at select sections in Downtown Los Angeles, East Los Angeles

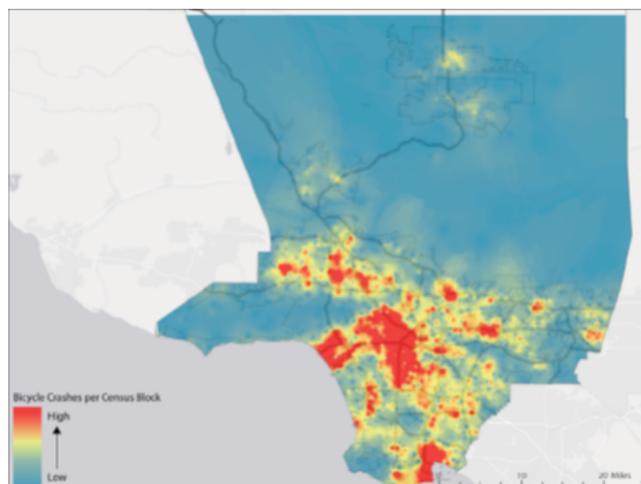


Image 2: Heat map of bicyclist-involved crashes resulting in injury in Los Angeles County, 2003-2014 (Source: California Highway Patrol, SWITRS).

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