8 . Collisions

Introduction

While traffic collisions can affect anyone, they have a disproportionate impact on bicyclists, who along with pedestrians are the most vulnerable users of the transportation system. Data on collisions involving bicyclists can help planners and other decision-makers identify specific locations and support programs—safety, education or enforcement—on which to focus efforts. The data presented in this section comes from the California Highway Patrol's Statewide Integrated Traffic Records System (SWITRS), a database of traffic collisions as reported to and collected by local police departments and other law enforcement agencies across the state.

We examined data for the five-year period from 2004 to 2008, 2008 being the latest full year for which data is available. Because SWITRS consists only of reports taken by officers in the field, the incidents in the database represent only a portion of all collisions; it also means that the incidents in SWITRS are more likely to be serious ones, since minor collisions are less likely to be reported to a police officer and lead to police response. Despite these limitations, SWITRS remains the most comprehensive source of information about traffic collisions involving bicyclists not only in Richmond but throughout most of the state.

When reading this section, it is worth keeping in mind that most bicycle collisions do not involve motor vehicles. Hospitalization data have shown that a majority of bicycle injuries involve collisions with stationary objects, other cyclists or pedestrians. Such collisions are unlikely to be included in SWITRS (for a number of reasons that are beyond the scope of this section) and are therefore not reflected in our analysis.

- **CHP's Statewide Integrated Traffic Records System (SWITRS):** http://www.chp.ca.gov/switrs/index_menu.html

Fatalities and injuries

For the 2004–2008 period, SWITRS reports precisely 100 traffic collisions in Richmond involving bicyclists. These collisions resulted in six bicyclists killed and 100 injured (see next table). Annual fatalities ranged from 1 to 3, with an annual average of 1.2; injuries ranged from 11 to 27, with an annual average of 20.0. The numbers show no discernible trend between 2004 and 20008 in the number of bicyclists killed or injured. For context, the numbers for all of Contra Costa County bicycle collisions are also given. The county, which has a population roughly ten times greater than Richmond's, had 23 bicycle fatalities and 1,193 injured during the same time period. In Richmond, bicycling accounts for less than 2 percent of primary work trips and commuting (see Chapter 4, "Background Conditions"). However, in 2004–2008 bicyclists made up over 15 percent of all traffic fatalities in the city (6 out of 39).

Table 8-1 | **Bicyclists killed and injured** (2004-2008)

	Richmond		*Contra Costa County*	
	Killed	*Injured*	*Killed*	*Injured*
2004	1	23	4	228
2005	0	27	1	247
2006	3	11	9	213
2007	0	16	2	243
2008	2	23	7	262
Total	**6**	**100**	**23**	**1,193**
Annual average	1.2	20.0	4.6	238.6

The following is comparative collision data from the California Office of Traffic Safety. It shows that in 2008 Richmond ranked 36th out of 52 California cities with a similar population size in the number of bicycle collisions.

Table 8-2 | **Traffic collisions and rankings (and percentile), 2008**

Type of collision	*Victims killed and injured*	*Ranking by daily vehicle miles traveled (of 52 cities)*	*Ranking by average population (of 52 cities)*
Bicyclists	**24**	**37 (67)**	**36 (65)**
Bicyclists < 15	**2**	**50 (91)**	**52 (95)**

Source: California Office of Traffic Safety, www.ots.ca.gov/Media_and_Research/Rankings/default.asp

Collisions hot spots

As the map of collision locations on the next page shows, the vast majority of bicycling fatalities and injuries occurred in an the area bound roughly by Cutting Boulevard to the south, Garrard Boulevard/Richmond Parkway to the west, Costa Avenue/Maricopa Avenue to the north and the city limits to the east. While this area makes up only a third or so of Richmond's total land mass, it should not be surprising that most bicycling fatalities and injuries occur here: this is the area of the city where most bicycling occurs; it is flat and compact; encompasses most of the population, contains many of the city's key destinations (including the BART station, Civic Center and Kaiser Permanente Medical Center) and has a higher percentage of zero-car households.

Even within the concentrated area mentioned above, there appear to be four main "hot spot" corridors. Roughly, these are:

- 13th Street/Harbour Way between Hellings and Barrett avenues, and west on Barrett Avenue to 2nd Street
- Macdonald Avenue between 24th and 2nd streets and again between 39th Street and San Pablo Avenue
- 22nd and 23rd streets and adjacent streets between Costa and Potrero avenues
- Cutting Boulevard between 41st Street and Marina Bay Parkway

While the hotspots listed above, and central Richmond in general, experience most of the bicycle collisions, it should not be assumed that these places are the riskiest or most hazardous for bicyclists. When evaluating the safety of an area, the number of collisions tells only part of the story. For a more meaningful evaluation, the data need to be adjusted for the number of bicycle commuters or of bicycling trips in the area, to account for bicyclists' "exposure." It is possible—indeed, likely—that the places mentioned above have the most collisions simply because they also have the highest bicycle volumes. If that is the case, the risk of any given bicyclist being hit by a motor vehicle might even be lower in an area that experiences more collisions. Unfortunately, at this time there is no reliable systematic method for estimating bicycle exposure and, therefore, the relative safety of an area.

Map 8-1 | **Bicycle-vehicle collisions, 2004-2008**

Other factors

Besides raw numbers and location, there are other ways in which it is useful to analyze collision data involving bicyclists. For example, of the 100 collisions involving bicyclists in Richmond between 2004 and 2008, 60 took place at intersections; the rest took place on straightaways. Other relevant factors are considered in the tables below. They include party at fault (Table 8-3), primary collision factor (Table 8-4), violation (Table 8-5), time of day (Table 8-6) and bicyclist's age (Table 8-7).

The table below, shows that the bicyclist was found to be at fault almost 60 percent of the time in the Richmond collisions and almost twice as often as the driver. This strongly suggests the need for more training and education of bicyclists on safe riding techniques and, more generally, on their responsibilities on the road. Of course, since drivers were at fault more than 30 percent of the time, more education of drivers on the rights of bicyclists should also be part of the city's efforts to promote traffic safety.

Table 8-3 | **Collisions by party at fault**

Bicyclist	59
Driver	31
Other / not stated	10
Total	**100**

Table 8-4 breaks down the Richmond collisions by "primary collision factor" (in the reports, "R-O-W ped" is used to refer not only to pedestrians' right-of-way but also to bicyclists'). By far the most common primary collision factor was the bicyclist riding on the wrong side of the street. This is followed by "R-O-W auto" (the reports' citation of this factor is confusing: depending on which party was at fault, it could mean either the bicyclist not yielding to the driver's right-of-way or the driver observing his or her right-of-way improperly). The third most common primary collision factor was failure to stop at a sign or signal. These three factors accounted for almost 70 percent of collisions.

The numbers suggest that targeted efforts to reduce the incidence of wrong-way bicycle riding promise the greatest reduction in bicycle-related collisions. Such efforts could consist of training and education on riding in the direction of traffic or of engineering fixes that address bicyclists' real or perceived need to ride on the wrong side of the street. An example of an engineering solution would be to convert a one-way street used as a bike route into a two-way street.

Table 8-4 | **Collisions by primary collision factor**

	Bicyclist at fault	*Driver at fault*	*Other at fault / not stated*	***Total***
Wrong side	29	1	1	**31**
R-O-W auto	11	9	1	**21**
Stop sign / signal	11	4	--	**15**
R-O-W ped	--	6	--	**6**
Improper turn	3	4	--	**7**
Improper pass	--	3	--	**3**
Other	3	2	2	**7**
Not stated	2	2	6	**10**
Total	**59**	**31**	**10**	**100**

The table below lists the violations of the California Vehicle Code related to the primary collision factors.

Table 8-5 | **Collisions by California Vehicle Code violation**

21650.1 (bicycle riding on wrong side of the street)	16
21202 (bicyclist not riding as close as practicable to the right-hand curb)	12
22450 (not stopping at stop sign)	11
22107 (unsafe or improper turning)	7
21802 (not yielding to other stopped vehicle at stop sign)	8
21950 (not yielding to pedestrian at crosswalk)	6
21453 (not stopping at traffic light)	5
21804 (not yielding when entering or crossing a street)	5
21800 (not yielding to vehicle in an intersection)	4
21801 (not yielding to oncoming vehicle when turning)	3
Other	12
Not stated	11
Total	**100**

Table 8-6 categorizes the collisions by the time of day in which they occurred. Almost three quarters of collisions occurred in the afternoon and evening. The fact that almost 40 percent of collisions occurred in the afternoon suggests that many bicyclists in Richmond ride outside of the regular morning and evening commute hours.

Table 8-6 | **Collisions by time of day**

Morning (6:00–11:59 am)	22
Afternoon (12:00–4:59 pm)	37
Evening (5:00–9:59 pm)	37
Night (10:00 pm–5:59 am)	3
Unknown	1
Total	**100**

Table 8-7 lists the bicyclists involved in collisions by age group. (Tables 8-6 refer to collisions involving bicyclists, whereas Table 8-7 refers to the bicyclists involved. It totals more than 100 because some collisions involved more than one bicyclist.) The age range of the bicyclists was 5–77. A majority were in the 35–64 age group and almost three quarters were between 18 and 64 years old. This strongly suggests the need for more bicycle training and education oriented toward adults.

Table 8-7 | **Bicyclists involved in collisions by age group**

0–12	15
13–17	9
18–34	23
35–64	51
65 and older	2
Unknown	3
Total	**103**

Conclusions

Below are key findings and conclusions related to our analysis of bicycle collision data:

Trend:

The numbers of bicyclists killed or injured in Richmond between 2004 and 20008 show no discernible trend. Fatalities spiked from zero in 2005 to three in 2006 but dropped back to zero in 2007. The number injured dropped significantly from 27 to 11 between 2005 and 2006 but has since crept up to 23, the level at which it was in 2004.

Hot spots

The vast majority of bicycling fatalities and injuries occurred in central Richmond, and four collision hot spots have been identified. These are not necessarily the most hazardous places for cyclists in relative terms, once exposure is taken into account; they are, however, the most dangerous in terms of absolute numbers of collisions, fatalities and injuries. For this reason, collision hot spots should be prioritized for physical improvements to increase bicycling safety. The plan chapter on the bicycle network determines the types of improvements that are best for various streets while the chapter on implementation establishes priorities among these improvements. The location of collision hotspots, and bicycling safety in general, were crucial considerations in the process to select and prioritize improvements.

Party at fault and primary collision factor

Bicyclists were found to be at fault in almost 60 percent of the collisions. By far the most common primary collision factor was wrong-way bicycle riding. Consistent with this, the most common violation was bicycle riding on the wrong side of the street; this was followed by not riding as close as practicable to the right-hand curb and not stopping at the stop sign (this one is applicable to both bicyclists and drivers). The data strongly suggests the need for more training and education of bicyclists on safe riding techniques, especially on riding in the direction of traffic. It also suggests the need for more motorist education on dealing with bicycles in traffic. The plan chapter on support programs will recommend education and law-enforcement programs—or efforts within existing programs—to promote safer bicycling.

Time of day and bicyclists' age

Almost three quarters of collisions occurred in the afternoon and evening, evenly split between the two periods. The fact that almost 40 percent of collisions occurred in the afternoon suggests that many bicyclists in Richmond ride outside of the regular morning and evening commute hours. A majority of bicyclists involved in collisions were in the 35–64 age group and almost three quarters were between 18 and 64 years old. This strongly suggests the need for more bicycle training and education oriented toward adults. The plan chapter on support programs will incorporate suggestions for safety, education and law-enforcement efforts that target different age groups and types of bicyclists.

Recommendations

Collision trends evolve over years rather than months, so we do not suggest conducting an analysis of the data as thorough as this one on an annual basis. However, this analysis should be thoroughly updated at least every five years. In the meantime, we recommend several monitoring and reporting actions related to bicycle collisions that should be conducted annually. (As mentioned in the previous section,

other plan chapters will include recommendations on physical improvements and support programs.)

These recommendations are consistent with Chapter 14.08 of the Richmond Municipal Code, which requires the Police Department to maintain traffic collision reports; share such reports with the Public Works Department; and submit annual traffic safety reports to the City Council containing not only raw collision information but also "[t]he plans and recommendations of the [uniform division of the Police Department] for future traffic safety activities." Unless indicated otherwise, our recommendations are directed at the Richmond Police Department. Again, the recommended actions should be conducted annually.

SWITRS reports

- ❑ Obtain standardized SWITRS reports for collisions in Richmond involving bicyclists for the latest available calendar year (SWITRS data is typically seven months behind the current date).
- ❑ Share the reports with the Public Works Department and the Community & Economic Development Department.
- ❑ Make the reports publicly available on the City's website, both as PDFs and as database-importable data, ideally in a new section dedicated to bicycle collisions.
- ❑ Maintain publicly available reports online covering at least the previous five years (start out by making available reports for 2004–2008).

Trends

- ❑ Compare the numbers of bicycle collisions, fatalities and injuries for the previous five years; look for significant or consistent increases or decreases in the numbers.
- ❑ If any trends or significant changes are observed, hold a meeting with engineering and planning staff from the Public Works and Community & Economic Development departments to discuss possible causes and brainstorm potential solutions.
- ❑ Include information about trends, causes and solutions in the annual traffic safety report to the City Council.
- ❑ Make the annual traffic safety reports publicly available on the City's website.

Hot spots

- ❑ Using SWITRS data, create a map of the locations of collisions involving bicyclists for the previous five years; on the map, differentiate collisions involving fatalities, injuries and neither fatalities nor injuries.
- ❑ Share the maps with the Public Works Department and the Community & Economic Development Department.
- ❑ Make the maps publicly available as PDFs on the City's website, ideally in the same section as the SWITRS reports.
- ❑ Examine the maps for hot spots, or concentrations of collisions; look for a string of collisions on the same street, for a cluster at or near the same intersection or for a cluster on several nearby street blocks.
- ❑ If a hot spot is found that is not mentioned or is not visible on the map in this chapter, hold a meeting with engineering and planning staff from the Public Works and Community & Economic Development departments to discuss possible causes and brainstorm potential solutions.
- ❑ Include information about bicycle collision locations and hot spots in the annual traffic safety report to the City Council.