

Facts About Red Light Running Crashes: 1999-2001

Data Caveats

An analysis was conducted of red light running crashes in the eight-county region for 1999-2001. There are some caveats about the data:

1. The data are obtained from the Accident Records Bureau of the Department of Public Safety. This is the state agency vested with documenting crashes for the State. Currently, their reporting requirements are that all fatal crashes, all injury crashes, and all property damage only (PDO) crashes in which one or more vehicles were towed be reported. Thus, they do not include the typical 'fender bender' in which no one is injured and all vehicles are driven away from the crash scene. In other words, the data we have represent the more serious crashes.
2. H-GAC has geocoded the crashes. However, because the data are kept in a very old information system by DPS in which road names are represented either by five-digit codes, the first five letters of the road name, or control-section numbers (for rural state roads), there is inevitably some geocoding error. We were able to geocode about 82% of all crashes in the DPS data set with about 90% accuracy on average. Spatial accuracy is within 50-100 yards. One would need actual crash diagrams to have more accuracy.\
3. To date, we have geocoded crashes for 1999-2001. Thus, any conclusions about location are only applicable for those years.
4. For some of the intersections, particularly along frontage roads, there are multiple intersections that could have been involved in the crash (e.g., at Greens Rd and IH 45 N, there is a southbound intersection of the west side of IH 45 N and a northbound intersection on the east side of IH 45 N). The data we have cannot easily distinguish between these multiple-intersection locations. A more detailed analysis of these intersections will be necessary to know where exactly the crashes occurred. In addition, there are locations with many red light running crashes where there does not appear to be an intersection (e.g., at Beltway 8 W and US 59 W). Again, a more detailed analysis of the actual crash records will be necessary to determine the exact crash locations.

Cite the Accident Records Bureau of the Texas Department of Public Safety as the source for the crash data and the Houston-Galveston Area Council as the source for the crash analysis.

General Facts

The following information is for crashes involving running red lights in our eight country region between 1999 and 2001.

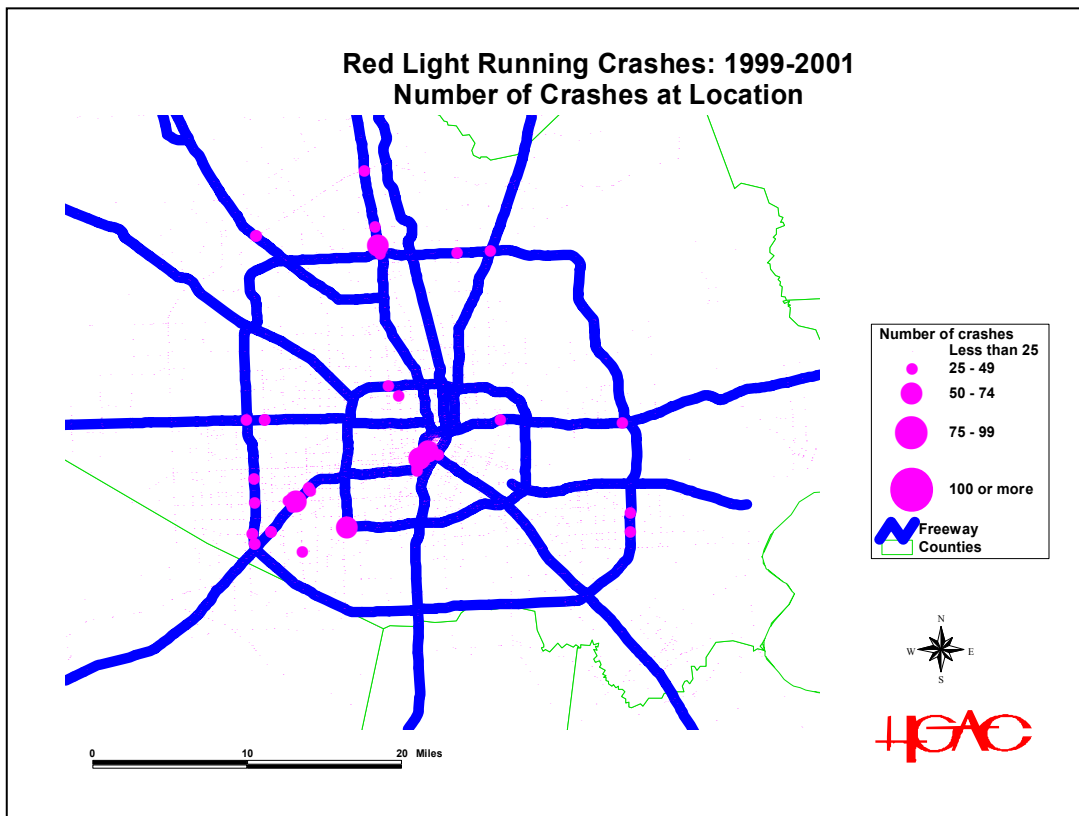
1. Between 1999 and 2001, there were 19,012 red light running crashes, an average of 6,004 a year.
2. Because of the nature of the crash (essentially at a right angle), injury levels are high. Of the 19,012 crashes, 113 involved fatalities and 13,448 involved injuries.

Red light running crashes are more likely to cause fatalities or injuries than other types of serious crashes (71.3% v. 63.4%)

3. In terms of persons, there were 128 persons killed and 26,847 persons injured from red light running crashes in the three year period.
4. Using the National Safety Council methodology for costing crashes, red light running crashes cost our region about \$165.3 million a year in direct economic costs and about \$319.6 million year in comprehensive costs. The economic costs include medical costs, costs to the employer, lost productivity, and legal costs. The comprehensive costs include both the economic costs plus the cumulative lifetime loss in productivity of victims.

Top 15 Intersections for Red light Running Crashes

Figure 1 shows the major locations for red light running crashes. The table below lists the top 15 intersections for red light running crashes in 1999-2001. The number of crashes occurring at these intersections totaled 1,104 for the three year period. All of these locations are within the City of Houston. They account for 7.8% of all red light running crashes that occurred within the City of Houston over the period and 5.8% of all red light running crashes that occurred in the eight county region. However, even though it's a small percentage, they do represent the top ones where many crashes occur. Eleven of the fifteen intersections are along frontage roads. As mentioned above, we cannot easily tell from these data which side of the freeway the crashes occurred. Nevertheless, the fifteen locations is a start for identifying the likely places for improved enforcement.



Top 15 Intersections for Motor Vehicle Crashes Due To Red Light Running			
Rank	Location	# of Crashes	Severity Distribution
1	Elgin @ Milam	113	No Fatalities 73 Personal Injuries
2	FM 1960 @ SH 249	112	No Fatalities 83 Personal Injuries
3	IH 610 W @ Braeswood	110	No Fatalities 84 Personal Injuries
4	Greens Rd. @ IH 45 N	92	No Fatalities 73 Personal Injuries
5 (tie)	Bissonnet @ BW 8 W	72	No Fatalities 62 Personal Injuries
5 (tie)	Hillcroft @ US 59 W	72	No Fatalities 32 Personal Injuries
7	Pierce @ Fannin	68	No Fatalities 48 Personal Injuries
8 (tie)	Bellaire @ US 59 W	65	No Fatalities 54 Personal Injuries
8 (tie)	Fondren @ US 59 W	65	No Fatalities 56 Personal Injuries
10	BW 8 W @ Bellaire	61	No Fatalities 42 Personal Injuries
11	Rankin Rd. @ IH 45 N	59	No Fatalities 44 Personal Injuries
12	BW 8 W @ US 59 W (Unknown at-grade intersection)	55	No Fatalities 45 Personal Injuries
13 (tie)	Richmond @ BW 8 W	54	No Fatalities 44 Personal Injuries
13 (tie)	Elgin @ Main	54	No Fatalities 42 Personal Injuries
15	Webster @ Fannin	52	No Fatalities 40 Personal Injuries

Effects of Photo Enforcement on Red light Running Crashes

Photo enforcement of red light running crashes appears to be a viable mitigation strategy. The following information was obtained from a web search:

1. The first reported use of red light cameras was on the German Autobahn between Cologne and Frankfurt in 1973. Sagberg, F. (2000). *Automatic enforcement technologies and systems*. (Working paper 7, RO-98-RS.3047 of the Escape Project). Technical Research Center of Finland. <http://www.vtt.fi>.
2. About 75 countries use photo enforcement of some kind. <http://www.drivers.com/article/562/>
3. The constitutional issues involved in using cameras for enforcement of red light running is discussed at http://www.hwysafety.org/safety%5Ffacts/state_laws/auto_enforce_paper.pdf
4. A joint 2003 Federal Highway Administration-National Highway Traffic Safety Administration report reviews driver, roadway and operations contributing to red light running and proposes guidelines for the installation and maintenance of the cameras. They point out that many features of intersections can be modified to reduce red light running in addition to cameras. See <http://www.nhtsa.dot.gov/people/injury/enforce/guidance03/Guidancereport.pdf>

A summary of this report is appended to this write-up.
5. FHWA also has established a web page for information about red light cameras. http://safety.fhwa.dot.gov/intersections/redl_cameras.htm
6. Estimates of their effectiveness vary.
 - A. The Insurance Institute for Highway Safety has conducted and compiled studies testing the effects of photo enforcement on red light running crashes (<http://www.hwysafety.org/fed/testimony%5Ffrar%5F050603.pdf>). In general, they find that there is substantial reduction in the number of crashes that occur at intersections that are monitored by cameras as well as reductions in the number of crashes at nearby intersections that are not monitored ('spill over' effect).
 - B. A FHWA review estimated that they reduce violations by 20-60%. Federal Highway Administration. (1999). *Synthesis and evaluation of red light running electronic enforcement programs in the United States* (Report number FHWA-IF-00-004). Washington, DC: FHWA. Available on the FHWA web site by typing in the report number. <http://www.fhwa.dot.gov>
 - C. Another review estimated that they reduce violations by 35-60%. Passetti, K. (1997). *Use of automated enforcement for red light violations* (Report for the graduate summer course CVEN 677 *Advanced Surface Transportation Systems* at

the Texas A&M University). Also available at the FHWA web site by typing in the author's last name. <http://www.fhwa.dot.gov>

- D. A recent review of international red light camera studies concluded that cameras reduce red light violations by 40-50% and reduce injury crashes by 20-30%.
 - a. R.A. Retting, S. A. Ferguson, and A. S. Hakkert (2003). "Effects of red light cameras on violations and crashes: a review of the international literature", *Traffic Injury Prevention*, 4: 17-23.
 - b. R. A. Retting and A. F. Williams (2000). "Red light cameras and the perceived risk of being ticketed". *Traffic Engineering and Control*, 41: 224-225, 227.
- E. A study in Oxnard, CA reported a 29% reduction in injury crashes following the introduction of red light cameras. Broadside collisions, the crash type most associated with red light running, were reduced 32% overall and broadside crashes involving injuries were reduced by 68%. In addition, red light crashes declined throughout Oxnard even though only 11 of the city's 125 intersections were equipped with cameras.
 - a. R. A. Retting and S. Y. Kyrychenko (2002). "Reductions in injury crashes associated with red light camera enforcement in Oxnard, California". *American Journal of Public Health*, 92: 1822-25.
- F. One study in Fairfax County, VA documented red light violations over a one year period at five intersections where red light cameras were installed and at two intersections where cameras were not installed. One year after installation, red light violations were lower at all camera (a 44% reduction) and non-camera sites (a 34% reduction).

<http://www.hwysafety.org/fed/testimony%5F030304.pdf>

- 7. Not all studies show a reduction in red light running crashes after the installation of cameras. An Australian study examined crashes over a five year period at 41 signalized intersections in Melbourne in which red light cameras had been installed and did not find any reduction in red light running crashes as a result, but did find an increase in rear end crashes. However, the author questioned the choice of the 41 intersections as three-quarters had initial crash frequencies of two or fewer prior to the installation of the cameras. This fact points out the need to place cameras at locations where there are many red light running crashes. See

<http://www.motorists.com/issues/enforce/95aussie.pdf>

- 8. A key issue is whether the red lights were run intentionally or not. Camera enforcement would be effective for those who ran the signals intentionally and much less effective for those who did not. Further, there is a possibility of increased numbers of rear-end crashes from camera enforcement. See a discussion at:

<http://www-nrd.nhtsa.dot.gov/departments/nrd-12/809-716/pages/InsightsRed.html>

9. Overall, the general conclusion from these studies is that photo enforcement of intersections with many red light running crashes can substantially reduce the number of drivers who run the red lights as well as the number actually involved in crashes. However, the proper selection of the sites as well as other measures to improve intersections may be as important in reducing crashes as the cameras themselves. For example, of the top 15 intersections with red light running crashes, 11 occur where a frontage road crosses an arterial road. Because many drivers go fast along frontage roads, it will be necessary to first slow drivers before applying red light camera enforcement.

FHWA-NHTSA Guidelines on Red Light Camera Enforcement

The Federal Highway Administration (FHWA) and the National Highway Traffic Safety Administration (NHTSA) have issued a joint publication providing guidelines for red light camera enforcement.¹ The use of cameras to enforce the running of red light running has been increasing at a rapid rate in the U.S. However, there has been inconsistent and, occasionally, incorrect implementation of this technology. The FHWA-NHTSA document attempts to standardize procedures and create a ‘checklist’ of issues that need to be addressed. Note, FHWA-NHTSA do not advocate the use of cameras for photo enforcement. The guidelines are meant to provide critical information for State and local agencies on relevant aspects of red light camera system.

The FHWA-NHTSA guidelines indicate that several steps are essential for successfully implementing a program. These include:

1. Early planning and setup including the establishing of an oversight committee, the establishing of program objectives (including operational needs), and the identification of legal requirements.
2. Establish system procurement alternatives over who will manage the program, equipment ownership, design and installation, equipment inspection, operation and maintenance, citation data processing, the decision process to issue a citation, and the handling of violator inquires.
3. Establish a public awareness and information campaign to inform the public about the program. This may include an initial educational program that issues warning citations for an extended period as well as clear public communication of the data on which warning citations will be halted and actual enforcement citations will begin. The document states that “A red light camera program should not be started without a comprehensive public awareness and information campaign”.
4. There should be a clear violations processing procedure.
5. Site selection should be based the number of crashes with the highest crash locations being selected. The FHWA-NHTSA guidelines point out that the

¹ Federal Highway Administration-National Highway Traffic Safety Administration, *Guidance for using Red Light Cameras*. Washington, DC. March 20, 2003. Available for download at <http://www.nhtsa.dot.gov/people/injury/enforce/guidance03/Guidancereport.pdf>

intersections with the most red light running violations are not necessarily those with the most crashes. Since the purpose of the policy should be to reduce crashes, it is important that the cameras be placed where there are the most crashes.

6. Warning signs should be placed before the intersections to allow drivers to moderate their behavior.
7. Traffic signal yellow times should be in accordance with the Institute of Transportation Engineers (ITE) and the FHWA Manual of Uniform Traffic Control Devices standards. If yellow times are reduced, then a reasonable time after the signal turns red should be given to allow drivers to clear the intersection.
8. The red light camera system installation plans should be prepared and signed by an appropriated licensed engineer.
9. Operation and maintenance should be guaranteed. The system needs to be kept in working order and needs to be inspected on a regular basis.
10. The photographs should be reviewed by traffic officers. The citation review procedures should be well established and clear including provisions for the procedure to be used when the number of citations is larger than usual or when there are not traffic officers available to conduct the reviews. Internal quality control is essential.
11. Citation data processing procedures should be designed to ensure the preservation of information along each step in the processing and should be backed up on to storage devices.
12. On-going problem identification and analysis should be done with community input. There should be continual monitoring of the red light running camera enforcement efforts. This should include considerations for traffic system efficiency as well as for safety.
13. An independent oversight committee should be appointed and should meet on a regular basis. Regular agenda items should be to review the data and violations with a discussion of any changes noted.
14. Finally, there should be on-going public information and education about the system and how it is working. The aim of the education program should be to reduce red light running. Consequently, the conditions and sub-populations associated with red light running violations should be targeted for education efforts.