

Using Automated Enforcement to Reduce Red-Light Running

Introduction

Automated enforcement technology can make intersections safer. The solution to the red-light running (RLR) problem involves a combination of engineering, education, and enforcement measures. Research suggests that “intentional” red-light runners, who account for a significant percentage of red-light runners, are most affected by enforcement countermeasures. *Whether the red-light running is intentional or unintentional, consistent and certain enforcement can help focus drivers on their driving behavior and increase compliance with traffic laws and signals.*

What Are Red-Light Cameras?

Red-light cameras encompass a system that allows for automated enforcement of red-light running. Some cameras use embedded vehicle detectors wired to signal controllers that can detect if a vehicle has entered the intersection when the signal is red, while other cameras use above-ground sensors. Roadside-mounted cameras record images (either film or digital) of the violation. Depending upon the camera placement and the agency’s policy, front and or rear images of the vehicle would be processed. A central location reviews the images and, if law enforcement confirms a violation, then they issue a citation.



Figure 1: Red-light camera mounted on a signal pole

When developing a red light camera program, jurisdictions generally choose between two types of citation distribution and penalties based on their particular enabling law: “driver responsibility” or “registered owner responsibility.”

- **Registered owner responsibility.** The registered owner of the cited vehicle is held responsible in most jurisdictions and the citations are treated similar to a parking ticket: that is, no points are issued against the driver’s license and no insurance penalty is assessed. The registered owner can contest the citation or identify another driver of the cited vehicle.
- **Driver responsibility.** In jurisdictions where the driver is held responsible for the violation, photographs must clearly identify both the driver and the vehicle, and the violations are considered to be moving violations. The citations carry the same penalties as citations issued by on-site law enforcement officers.



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Automated enforcement programs focused on RLR are expanding in the United States with more than 300 jurisdictions deploying camera systems.¹

Currently the following major cities have a red-light camera program in place: Albuquerque, Atlanta, Baltimore, Chicago, Denver, Houston, Los Angeles, New York City, Philadelphia, Phoenix, San Diego, San Francisco, Seattle, and Washington, DC.

What Effect Do Red-Light Cameras Have on Intersection Crashes or Red-Light Violations?

Red-light cameras have been found to be effective at reducing both RLR and RLR-related crashes. A recent study sponsored by the Federal Highway Administration (FHWA) evaluated red-light camera programs in seven cities in the United States. The study found that, overall, angle crashes decreased by 25 percent, while rear-end collisions increased by 15 percent. In general, rear-end collisions tend to be less severe, so in terms of economic costs (of collisions), the authors concluded that the costs from the increase in rear-end crashes were more than offset by the economic benefits from the decrease in right-angle crashes targeted by red-light cameras.²

The estimates of comprehensive and human capital costs per crash were developed by FHWA. The combined results indicated a positive aggregate economic benefit of approximately \$39,000 per site per year when property-damage-only (PDO) crashes are included and \$50,000 per site per year when PDO crashes are excluded.



Figure 2: Stand-alone red-light camera

The modest benefit per site is an average over all sites. This benefit can be increased through careful selection of the sites to be treated (e.g., sites with a high ratio of right-angle to rear-end crashes as compared to other potential treatment sites) and program design (e.g., high publicity, signing at both intersections, and jurisdiction limits).³

The aggregate economic benefit increases with total entering AADT, an increasing ratio of right-angle crashes to rear-end crashes, an increasing proportion of total traffic being on the major road, shorter cycle lengths, and shorter inter-green periods and is greater for locations with one or more protected left-turn phases as opposed to intersections without such protection. The most important determinant of site choice would be a high ratio of right-angle crashes.

3.0 to 4.1 seconds on the two side street approach legs where speed limits were 30 mph and from 4.0 to 4.9 seconds on the arterial approaches where speed limits were 45 mph. The modified yellow intervals met or exceeded the values associated with the ITE (1985) guidelines. Yellow intervals at the comparison sites remained constant. The results of the study showed that increasing the yellow indication reduced red-light violations by 36 percent. The addition of red-light camera enforcement further reduced red-light violations by 96 percent beyond levels achieved by the longer yellow timing.⁴

The National Cooperative Highway Research Program Project 03-93: Automated Enforcement for Speeding and Red Light Running is underway to prepare a comprehensive assessment of automated speeding and red-light

1. Insurance Institute for Highway Safety. January 2009. "Communities with Red Light Cameras." Arlington, VA. http://www.iihs.org/research/topics/auto_enforce_cities.html
2. *Safety Evaluation of Red-Light Cameras*, FHWA-HRT-05-048, 2005. <http://www.tfhr.gov/safety/pubs/05048/index.htm>

Retting, Ferguson, and Farmer (March 2007) evaluated the incremental effects on red-light running by first lengthening yellow signal timing, followed by the introduction of red-light cameras. Yellow intervals were increased by about 1 second—from

3. Ibid.

4. *Reducing Red Light Running Through Longer Yellow Signal Timing and Red Light Camera Enforcement: Results of a Field Investigation*. Richard A. Retting, Susan A. Ferguson, Charles M. Farmer. Insurance Institute for Highway Safety. Arlington, VA. March 2007.

10-Key Steps to Implementing a Successful Red-Light Camera Program⁵

Step 1: Identify the safety problem and determine whether red-light cameras are an appropriate solution. The crash history at problem intersections should be reviewed to determine if RLR crashes are occurring. An engineering review should be conducted on the problem intersection to determine the extent of the problem and the causes of red-light running. The study helps ensure that the red-light running problem is not due to engineering or other setting shortcomings. Can the problem be addressed with other countermeasures, such as road improvements, improved visibility of signals, or better traffic signal timing?(see Issue Brief 6: Engineering Countermeasures to Reduce Red-Light Running for further information).

Step 2: Identify and enlist the support of key players. The decision to use red-light cameras to enforce traffic laws is a public policy issue. Consequently, key players (police, legislators, local officials, traffic engineers, judiciary, media, and vendors/contractors) should be consulted early in the process.

Step 3: Review legislative and regulatory needs. In most jurisdictions within the United States and Canada, a red-light camera program requires enabling legislation. Local authorities will need to determine whether their state or province allows the use of automated enforcement and, if so, under what circumstances and conditions.

Step 4: Establish program goals. The organizing committee will need to decide whether the goal of the program is to reduce violations, crashes, injuries, fatalities, or all/some combination of the above. Another decision is to target a few key locations based on some safety criteria or disperse sites across an entire jurisdiction to ensure widespread coverage.

Step 5: Choose a camera system and vendor(s) based on the jurisdiction's objectives, priorities, and resources. The local authority take on full responsibility for system operations and ticket processing or may elect to outsource these functions to a private contractor. Typically, a police officer or an authorized public official reviews the photos prior to a citation being mailed to the violator. The vendor should not be responsible for selecting the sites or should not be paid on a per-ticket basis due to potential conflict of interest issues that may arise from this arrangement.

Step 6: Initiate a multifaceted public awareness campaign prior to program start and continue throughout life of program. The public needs to be made aware of the extent of the RLR problem and the benefits of using red-light cameras through a variety of media (television, print, radio, and Internet). The goal of the program should be to raise public awareness such that the red-light cameras act as a general communitywide deterrent.

Step 7: Evaluate and select sites. The sites should be reviewed to determine the feasibility of installing a red-light camera at the location in terms of line of sight, placement outside the clear zone, absence of manhole covers, and so forth.

Step 8: Implement the program using best management practices. Effective management of a red-light camera program requires a clear delineation of responsibilities and consistent communication between all parties involved. Issues of oversight and quality control need to be addressed.

Step 9: Predict, acknowledge, and address public concerns. Some members of the public will likely raise objections to the program. Such objections typically relate to privacy issues, presumption of innocence, ticket revenue, and safety (due to a potential increase in rear-end crashes). These issues should be anticipated and addressed in a proactive manner.

Step 10: Evaluate and monitor the program's results. The individual sites and the program as a whole should be monitored to determine whether there is a decrease in RLR violations and a corresponding decrease in RLR crashes. A proper statistical evaluation of the effectiveness of the program should be undertaken two to three years into the program. Sites located in a community with no RLR cameras should be used as a control to determine the true effectiveness of the program.

5. *Focus on Safety: A Practical Guide to Automated Traffic Enforcement*, National Campaign to Stop Red Light Running, 2007. Washington, DC. http://www.stopredlightrunning.com/pdfs/WEBONLY_Red%20Light%20Book.pdf.

enforcement activity in the United States and to develop guidelines to ensure successful operation of current and future programs. The project will consolidate studies of best practices in automated traffic enforcement and research on its effectiveness that can provide valuable information for state and local jurisdictions contemplating implementation.

Resources

Analysis of Red Light Violation Data Collected from Intersections Equipped with Red Light Photo Enforcement Cameras, report produced for the John A. Volpe National Transportation Systems Center, DOT-VNTSC-NHTSA-05-01, and March 2006.

Guidance for Using Red Light Cameras, FHWA-SA-03-018, 2003.
<http://www.nhtsa.dot.gov/people/injury/enforce/guidance03/Guidancereport.pdf>.

Impact of Red Light Camera Enforcement on Crash Experience. NCHRP Synthesis 310, Washington, DC, TRB, 2002.
http://www.trb.org/publications/nchrp/nchrp_syn_310.pdf.

Insurance Institute for Highway Safety. 2009. "Q&A Red Light Cameras as of February 2009."
<http://www.iihs.org/research/qanda/rlr.html>.

Red Light Running – A Policy Review., C.A. Quiroga, E. Kraus, I. van Schalkwyk, J.A. Bonneson. Texas Transportation Institute. 2003.
http://tti.tamu.edu/publications/catalog/record_detail.htm?id=26571.

National Campaign to Stop Red Light Running (NCSRLR). NCSRLR is a non-profit advocacy group in Washington, DC that has received funds from the photo enforcement industry in the past and is currently a public service initiative of Blakey & Agnew LLC.
<http://www.stopedlightrunning.com>.