

Red-light Cameras: Automated Traffic Cops in Orange County

1. Summary

Photo-enforced traffic control systems, commonly called red light cameras (RLCs), can contribute to safety at traffic intersections. They are, however, just one tool being used by five cities in Orange County to deal with drivers who run red lights. Extended times of yellow caution lights, short duration four-way red lights and other traffic engineering solutions also can improve intersection safety for the motoring public.

Existing accounting systems that track traffic citation revenue for the county as a whole fail to inform the five cities, simply and accurately, how much revenue their red light cameras are generating. The result is the cities do not know if their RLC systems are making money, paying for themselves, or operating at a loss. Additionally, citations are not easily tracked to ensure collection or resolution.

Some Acronyms and Abbreviations in this Report

RLCs	red light cameras
OC	Orange County
Caltrans	California Department of Transportation

2. Introduction and Purpose of Study



Photo of red light camera

The U.S. Department of Transportation says more than 92,000 crashes resulting in 900 deaths are caused each year in this nation by motorists who run red lights. These figures do not take into account such things as injuries, property damage, medical and insurance costs, and time off work. After reviewing figures and interviewing local law enforcement officials, it appeared to grand jurors that red light running is a significant problem in Orange County.

More than 100 cities in 18 states and the District of Columbia have installed red light camera systems to help combat red light running. About three dozen of the cities are in California, according to the Insurance Institute for Highway Safety. The results appear mixed. Federal studies indicate right-angle crashes decreased 25 to 30 percent at intersections where RLCs are used, but rear-end crashes increased about 15 percent.

Therefore the use of red light cameras to increase public safety is unclear. Generally speaking, though, right angle crashes are considered more devastating than rear-end collisions by most traffic experts.

Grand jurors focused on RLCs, the so-called “robo cops” of traffic enforcement. They are used by Costa Mesa, Fullerton, Garden Grove, San Juan Capistrano, and Santa Ana, primarily in the interests of making selected intersections safer for motorists and pedestrians. The purposes of the study were to determine how the camera systems work, whether they actually improve traffic safety, if they make sense legally and financially, and to inform the public about them. The jury also wanted to know:

- What interaction between police, RLC vendors, and the courts is necessary to make this enforcement system function?
- What other methods might reduce red light running?

3. Method of Study

Interviews with traffic engineers and police responsible for traffic enforcement were at the core of this study. The interviews were conducted in the five Orange County cities using RLCs and in five cities that aren't using them.

Grand jurors also:

- Observed court proceedings involving alleged red-light traffic violations captured by photo enforcement.
- Viewed examples of photos produced by RLCs.
- Interviewed representatives of the two vendors who contract with Orange County cities for RLC services.
- Learned from advocacy groups about controversies surrounding RLCs.
- Discussed with court administrators how RLC citations are handled.
- Reviewed current laws and regulations governing RLCs.
- Explored how other states regulate RLCs.
- Sought statistics on red-light running and how RLCs affected such violations.
- Looked at products marketed as ways of defeating RLCs.

4. Background

This section contains RLC history, definitions, and answers to frequently asked questions.

4.1 History

RLCs first appeared at traffic intersections in Europe and Australia in the 1970s. Currently, 12 other countries use them. RLCs came to the U.S. in 1993 when New York City started installing them.

The Stop Red-Light Running Program was created by the Federal Highway Administration in 1995 as a community-based safety program. The impetus was a study showing that red light running was the leading cause of auto crashes in the nation's urban areas.

That same year, the California Legislature authorized automated enforcement systems at traffic intersections. Previously, these systems were limited to rail crossings in California. In 1997 Oxnard became the first California city to install RLCs. The new law, which

became effective January 1, 1996, established a three-year trial period for the systems. That sunset provision was removed by the legislature in 1998.

In July 1999, the first RLC was installed in Orange County by the City of Garden Grove. It remains at the intersection of Brookhurst and Westminster avenues. The cities of Costa Mesa, Fullerton, San Juan Capistrano, and Santa Ana followed Garden Grove's lead. All five cities currently use RLCs at selected intersections.

In 2001, San Diego's RLC system was challenged in court. The case eventually led to the dismissal of about 300 RLC citations. RLC opponents hailed the decision as a major victory, but the judge deciding the case specifically upheld the constitutionality of the RLC program. He ruled the city was not operating the system as required by law because 1) the vendor exercised too much control, and 2) the vendor was paid per citation collected. Thus, the San Diego program was deemed subject to potential manipulation for profit.

In *People vs. John Allen, et al.*, San Diego Superior Court, Judge Ronald L. Styn held that:

Vehicle Code Section 21455.6 enables a city to enter a contract with a private entity for the 'use of the system,' but not for the operations of the system. The automated enforcement system must be operated by a governmental agency... In this case, the actions of the City do not satisfy the plain meaning of the word 'operate.' The City has no involvement with, or supervision over, the ongoing operation of the system.

The San Diego experience led to changes in the law. The changes came via Assembly Bill 1022 by Assemblywoman Jenny Oropeza, D-Carson. It became law January 1, 2004.

The law:

- Prohibits camera corporations from being paid on a per-conviction basis.
- Prohibits camera corporations from selecting the locations for cameras.
- Prohibits camera corporations from changing the timing of signal phases.
- Prohibits camera corporations from reviewing and approving tickets.
- Continues confidential treatment of photos, so that only the police, registered owner, and an identified driver of the vehicle can look at them.
- Requires shredding of the photos after six months.
- Makes mandatory minimum Caltrans requirements for the timing of yellow caution lights.

Currently, RLCs are governed by California Vehicle Code Sections 21453, 21455.5, 21455.6, 21455.7, 40518, and 40520, as well as Section 4D and Table 4D.102 of the California Supplement to the Federal Manual on Uniform Traffic Control Devices.

4.2 Definitions

Key RLC terms are:

- **Red light camera** – a computer-controlled camera that acts as an automated photo enforcement system, in effect functioning as a police officer
- **Approach** – an entrance to an intersection
- **Event** – when a photo is taken after a traffic signal has turned red
- **Loops** – magnetic loops under the pavement that trigger an RLC

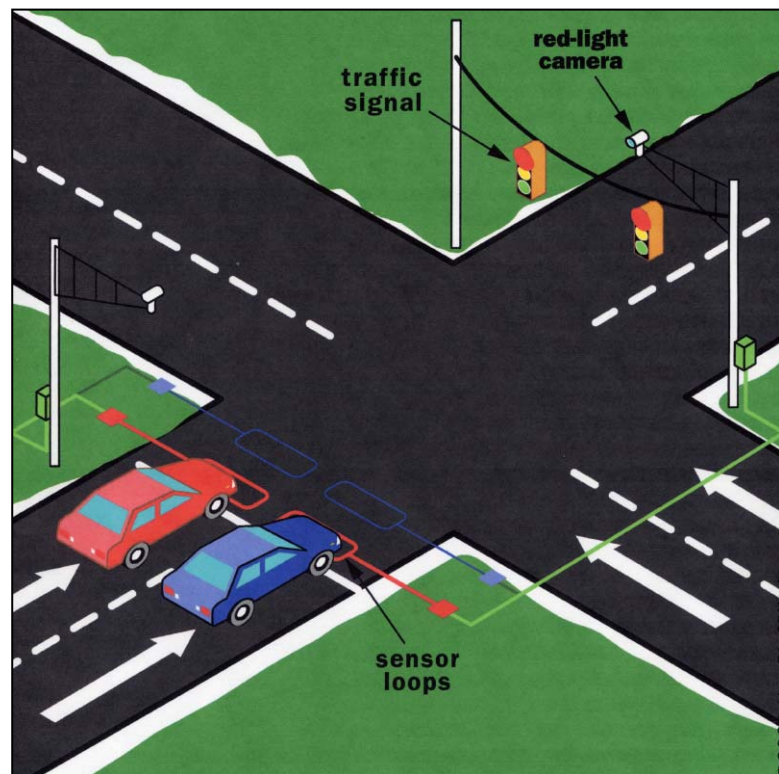
4.3 How do RLCs work?

RLCs are computer-controlled camera systems (digital or video) that record violations of red traffic signals at given traffic intersections 24 hours per day. (See diagram to the right.) They do this through sequential photographs that, in California, must provide visual evidence of the vehicle involved, its license plate, and the person driving the vehicle at the time of the violation.

A typical RLC system is made up of multiple cameras, a computer and triggering mechanisms known as magnetic loops.

The technology is intended to photograph events involving vehicles that have entered an intersection after the signal has turned red. Vehicles entering an intersection on a yellow light and still in the intersection when the light changes to red are not photographed.

When a vehicle approaches an RLC intersection, magnetic loops embedded in the roadway sense the presence of the vehicle and send a signal to the computer. There are two loops separated by several feet. The last loop is at the entrance to the intersection known as the “stop line.” If the traffic signal is green or yellow, the computer ignores signals from the loops. When the light turns red and both loops sense a vehicle, the computer factors the time between signals and calculates the speed of the vehicle. The computer then activates the camera or cameras which, depending upon the type of camera, might also include a flash device for augmenting the light needed for a photo.



Four photos are taken: 1) the vehicle at the stop line, 2) the vehicle inside the intersection, 3) the license plate, and 4) the driver. RLC systems also record information in the frames of the photos. Included are date, time, location of intersection, speed of vehicle, and elapsed time between the light turning red and the car entering the intersection.

Currently, two firms supply RLCs in Orange County—Nestor and Redflex. Their technology differs slightly, but overall their operations are similar. Nestor uses only video cameras and does not use magnetic loops embedded in the roadway. Instead, the firm uses a virtual loop. In this proprietary system, a computer analyzes a video feed from the intersection. The computer is programmed to recognize changes indicating a vehicle is moving through the intersection. If the light is red at the time, the computer recognizes this and stores the video.

4.4 What happens after an event?

After a suspected red light runner is photographed, the information is sent over a secure line to the vendor, whose staff analyzes it for clarity and completeness of information as specified by local police. The vendor makes an initial judgment about the information based on its completeness and the quality of the photos. Conditions that might diminish photo quality often have to do with weather; i.e., sun glare, fog, rain, etc. A vehicle without a license plate, or one driven by someone who obviously, because of gender differences, is not the registered owner might mean the information is not good enough.

The photos of the offending vehicle and driver, including the time, date, and speed involved in the event are forwarded to the appropriate police department, along with the identity of the vehicle's registered owner. Police then attempt to match the photo of the driver with the registered owner's license photo on file with the California Department of Motor Vehicles. Sworn police officers then examine all the materials and approve those they believe should result in citations.

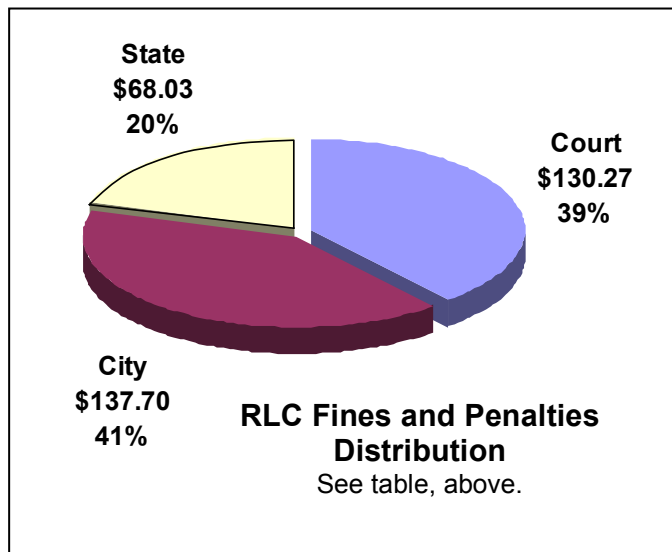
Several local jurisdictions in California are using trained civilian law enforcement personnel to examine and approve RLC citations under the direct supervision of sworn officers. All local jurisdictions in Orange County that were interviewed favored the use of this optional tactic. This approach appears to be efficient and cost effective and may result in an overall cost savings to local jurisdictions.

The red light events police approve for citation are returned to the vendor, who prepares the citations and sends them, within a specified time, to the registered owners and to the court. The registered owner also receives a courtesy notice from the court, followed by a warning notice if the owner doesn't respond. In many cases, the registered owner is the offending driver, but if not, the registered owner has the option of naming the driver on the back side of the citation.

Currently, the total fine, plus fees, for running a red light can be as much as \$336. (Below, see the table and pie chart for a breakdown of where the money goes.)

Red Light Camera Fines and Penalties Distribution Breakdown					
Superior Court Portion		Cities' Portion		State Portion	
Night Court Fee	1.00	Red Light Fund	29.40	State PA	48.03
Automation Fund	2.00	Motor Vehicle Fund	58.31	Surcharge	20.00
County Share of City Fines	10.29	Red Light Fund	49.99		
Court Construction Fund	14.70				
Court Automation Fund	3.90				
County DNA Identification	9.78				
County	20.58				
County PA	48.02				
Court Security	20.00				
Total	130.27		137.70		68.03

Before going to court, those receiving RLC citations are offered the opportunity to view the evidence recorded by the cameras, usually at police headquarters of the city involved. Many do not, choosing instead to wait until their court date. This can slow court proceedings, which are interrupted so the pictures can be shown to the alleged offender on a laptop computer carried to court by a police officer representing the city. Interestingly, after seeing the still photos or videos, a high percentage of the accused immediately plead guilty.



4.5 How many RLCs are operating in Orange County?

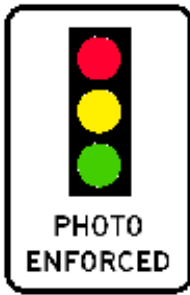
As of May 1, 2005:

- Costa Mesa has RLCs covering 15 approaches at four intersections.
- Fullerton has RLCs covering six approaches at three intersections.
- Garden Grove has RLCs covering 11 approaches at five intersections and is adding another intersection.
- San Juan Capistrano has RLCs covering four approaches at two intersections.
- Santa Ana has RLCs covering 14 approaches at 10 intersections.

4.6 How much do RLCs cost?

The cost of installing one RLC system ranges from \$50,000 to \$100,000 per approach, depending upon the configuration of a specific intersection. The two RLC vendors operating in Orange County absorb the installation cost; then rent the individual systems to the cities for about \$5,000 to \$6,000 per month for each approach.

4.7 RLCs aren't cheap. Why use them?



The primary motive for using the devices is to improve safety. RLCs are placed at intersections with high traffic volumes and histories of numerous vehicular crashes caused by drivers running red lights. RLCs also are seen as enhancements to local police departments that cannot possibly monitor intersections 24 hours per day. They are seen, too, as deterrents because signs that warn of their existence are required by the California Vehicle Code. In addition, RLCs are seen as a potential source of municipal revenue.

4.8 Are RLCs “cash cows” for cities?

The cities say they do not know how much revenue RLCs generate because of a reporting system at the county level that fails to distinguish between monies collected as a result of red light citations written by police officers in the field and citations issued through RLC systems. The grand jury’s investigation confirmed this.

In addition, the grand jury learned that approximately 33 percent of the total number of RLC citations issued by the five cities in 2004 was not paid. If they had been paid at the full fine level of \$336 per citation, the total revenue shared by the cities, the county, and the state would have been approximately \$5 million. There are a variety of reasons why these citations were not paid. Some were dismissed by the courts, but no reporting system alerts local police about which citations need follow-up.

4.9 Controversies and Legal Issues

4.9.1 *To whom is a citation issued?*

Four states—Arizona, California, Colorado, and Oregon—require that RLC citations be issued to the driver of the vehicle at the time of the alleged infraction. In all other states using RLCs, the citations are issued to the registered owner of the vehicle no matter who is driving when the camera records the event. It is then up to the registered owner to identify the driver, or pay the fine.

4.9.2 *Privacy Issues*

Some recipients of RLC citations argue that the camera systems constitute an invasion of privacy and a “big brother” approach to law enforcement. The California Department of Motor Vehicles, in contrast, takes the position that privacy cannot be invoked by a driver using a public roadway.

4.9.3 Yellow Light Timing

A key to RLC use is the minimum length of yellow caution lights at signalized intersections. This is governed under the California Supplement to the Federal Manual on Uniform Traffic Control Devices. The timing of yellow caution lights is specified in Table 4D.102 of the supplement. The times are tied to the posted speed limit near the intersection. The speed at approach to a signal is calculated on that basis, and the time of yellow lights is set accordingly. Minimum times for displaying yellow lights are based on these factors. The jurisdiction in charge of the specific signals may increase the yellow light time somewhat but cannot reduce it. Cities using RLCs often increase the time by 0.3 to 0.5 of a second.

4.9.4 Can you beat the cameras?

Someone who runs a red light at an RLC intersection might escape a citation because of a technical problem. Weather can have an effect of the quality of RLC photos. Police in several California cities that use RLCs advise motorists not to try covering their license plates (it's against the law), or spraying their plates with something they hope will block RLC photos. Police have tested any number of sprays, in some cases applying double coatings. They do not work, police say.

4.9.5 Legal Rulings

In February 2005, a driver in Costa Mesa won his appeal of a red light running conviction when a judge ruled the city was at fault for not publishing a notice and not issuing RLC warning notices 30 days in advance as required by the state Vehicle Code. The judge also ruled that the same government agency must control both the cameras and the traffic signals. In this case, the city controlled the camera, but Caltrans controlled the traffic signal. The city appealed; however, the Orange County Superior Court's ruling was upheld in May 2005.

5. Observations and Discussion

5.1 What do traffic engineers say?

Grand jurors interviewed traffic engineers, as well as police, in Anaheim, Irvine, Newport Beach, Westminster, and Orange—all cities that do not use RLCs. They were asked why they do not. In general, representatives of these cities said they do not need RLCs because they do not have a red light violation problem that warrants use of the devices, or because they are using other ways to deal with the problem. Some of those methods are:

- Coordinating traffic signals, thereby reducing driver frustration
- Using four-way red signals so that everyone has to stop for a few seconds
- Creating better signage for complicated intersections
- Using greater police presence at problem intersections

- Replacing incandescent bulbs in traffic signals with larger, brighter light emitting diodes (LEDs) that cost less, operate more efficiently, and can be powered by battery for up to four hours in the event of a power failure.
- Creating double left-turn lanes where practical
- Installing LED systems, commonly known as “rat boxes,” that can signal a traffic officer when someone has run a red light. This enables an officer to be positioned so he will not have to chase the offending motorist through a busy intersection, creating a potential danger for him and other motorists than the red-light-runner has already created.

A traffic engineer in one city noted that his city had tested RLCs but was not satisfied with the technology as it pertained to left turn lanes. He and other traffic engineers described RLCs as only one potential tool in combating red-light-runners.

5.2 Do RLCs actually reduce red light running?

The tables, below, show a two-year accident history at intersections with and without RLCs. In most cases, the advent of the cameras appears to have reduced the number of accidents at these intersections. Police records do not specifically attribute the cause of these accidents to the running of red lights. Therefore the statistics can be misleading. It is well to remember that auto accidents often result from more than one cause, and singling out the major cause can be a subjective decision.

RLC Accident Table			
Cities <u>with</u> RLCs (3 intersections from each city)	One Year <u>Before</u> RLCs	One Year <u>After</u> RLCs	% CHANGE
Costa Mesa	39	28	-28.2
Fullerton	88	83	-5.7
Garden Grove	45	24	-46.7
Santa Ana	68	57	-16.2
San Juan Capistrano	33	29	-12.1

Cities <u>without</u> Red Light Cameras (3 intersections from each city)	2003	2004	% CHANGE
Anaheim	95	147	+54.7
Westminster	29	22	-24.1

Notes:

1. Accident data was obtained from each respective police department. The percent increase/decrease is calculated from those data.
2. Westminster’s decrease in accidents was credited to added raised medians.

3. While each city that uses RLCs shows an overall decrease in accidents, it should be noted that two intersections (Harbor/Orangethorpe in Fullerton and Harbor/McFadden in Santa Ana) had a slight increase (10% and 4.2%, respectively).
4. The three intersections in the city of Anaheim were chosen randomly among a list of consistently high accident intersections. Each intersection showed an increase from 2003 to 2004.

That said, it appears RLCs can help reduce red light running in much the same way as the sight of a police officer causes motorists to slow down. Drivers learn the camera is there and become more cautious. Driver awareness of RLCs could produce safety benefits at intersections without RLCs. In addition, state law requires cities to post the fact that red light cameras are in use. This can be done at each entrance to the city or at approaches to intersections where RLCs are stationed. Some cities do both.

6. Findings

Under California Penal Code Sections 933 and 933.05, responses are required to all findings. The 2004-2005 Orange County Grand Jury has arrived at the following findings:

- 6.1** *Camera revenues:* The five cities in Orange County using RLCs are unable to determine through existing accounting systems how much revenue the cameras are producing. Cities should have this information to make informed decisions about RLCs.
- 6.2** *Unpaid citations:* Approximately 33 percent of all RLC citations issued by the five cities in 2004 were not paid, leading to potentially significant, but unknown, losses in revenue to the cities, the county, and the state.
- 6.3** *Police officers:* Currently, only sworn police officers in each city determine which RLC citations to issue. This may take officers away from more critical assignments.

Responses to Findings 6.1 and 6.2 are required from the city councils of Costa Mesa, Fullerton, Garden Grove, San Juan Capistrano, and Santa Ana.

Responses to Finding 6.3 are requested from the police chiefs of Costa Mesa, Fullerton, Garden Grove, and Santa Ana.

Responses to Finding 6.3, as regards San Juan Capistrano, are required from the Orange County Sheriff/Coroner.

7. Recommendations

In accordance with California Penal Code sections 933 and 933.05, each recommendation will be responded to by the government entity to which it is addressed. The responses are to be submitted to the Presiding Judge of the Superior Court. Based on the findings, the 2004-2005 Orange County Grand Jury makes the following recommendations:

- 7.1** *Camera revenues and unpaid citations*: The five cities in Orange County using RLCs should seek, independently or jointly, to resolve accounting/reporting issues so they can accurately determine the net operating effects of their RLCs and recover any lost revenues. (See Findings 6.1 and 6.2.)
- 7.2** *Police officers*: The five cities in Orange County using RLCs should explore the possibility of training and using non-sworn law enforcement personnel for the task of determining which RLC citations to issue to reduce costs and return sworn officers to more critical assignments. (See Finding 6.3.)

Responses to Recommendations 7.1 and 7.2 are required from the city councils of Costa Mesa, Fullerton, Garden Grove, San Juan Capistrano and Santa Ana.

Responses to Recommendation 7.2 are requested from the police chiefs of Costa Mesa, Fullerton, Garden Grove, and Santa Ana.

Responses to Recommendation 7.2, as regards San Juan Capistrano, are required from the Orange County Sheriff/Coroner.

8. Sources

8.1 Documents

1. California Vehicle Code
2. California Supplement to the Federal Manual on Uniform Traffic Control Devices

8.2 Internet

1. U.S. Department of Transportation, Division of Highway Safety
2. Insurance Institute for Highway Safety
3. "People vs. John Allen, et al.," Superior Court, San Diego County, 2001, No. 57927SC
4. "Photo Enforcement: A City's Guide to Profiting from Poor and Unsafe Engineering Practices," California Senate hearing testimony by Chad Dornsife, National Motorists Association, Aug. 28, 2001

5. "Red Light Cameras: Photo Enforced Intersections in the U.S.," PHOTOENFORCED. com, January 2005
6. "Red Light Cameras in Action," Insurance Institute for Highway Safety, July 2004
7. "Red-light Runners Cause About 106,000 Crashes A Year," Intersection Safety Brief, Red Light Cameras, U.S. Department of Transportation – Federal Highway Administration
8. "Red Light Camera Reform to Become Law," American Automobile Association of Northern California, December 2003
9. "How Red-light Cameras Work," Tom Harris, Howstuffworks, September 2004
10. "Motorists race to challenge red-light cameras," Valerie Alvord, USA Today, July 6, 2001
11. "Not up to Speed – Fresno traffic cameras do not lead to expected citations," Pablo Lopez, The Fresno Bee, October 9, 2004
12. "Focus on Fines for Red-Light Running – Bill would let police cite owners of cars caught on camera even if driver's identity isn't known," Nancy Vogel, Los Angeles Times, April 24, 2003
13. "Loophole threatens Virginia red-light program," Jim McElhatton, The Washington Times, February 2, 2005
14. "Driver caught by camera at light beats ticket –Judge says motorists must be given a 30-day notice of new monitors, and one agency must operate them," Brian Martinez, The Orange County Register, February 12, 2005
15. "Red-Light Video Pauses, for Now," Rong-Gong Lin II, Los Angeles Times, February 12, 2005
16. "Red-light cameras spark negative reactions – Use of the devices is suspended at three intersections after driver goes to court," Marisa O'Neil, Daily Pilot, February 12, 2005
17. "Stop Red Light Running Facts," U.S. Department of Transportation – Federal Highway Administration, April 21, 2003
18. "Q&A: Red Light Running," Insurance Institute for Highway Safety, March 2004
19. "Green Light for Reform of Red Light Camera Laws, American Automobile Association of Northern California, December 2003