

**The Bill Blackwood
Law Enforcement Management Institute of Texas**

**Red Light Cameras:
A Useful Tool for Intersection Safety**

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**By
Bennett Hall**

**Round Rock Police Department
Round Rock, Texas
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ABSTRACT

In recent years, a hotly debated topic within municipal politics has been the adoption of red light camera enforcement programs. In Texas, both large and small cities have seen the adoption of these programs as both a means to improve intersection safety as well as another source of revenue to help improve the economic health of cities' general funds. The Texas legislature has authorized the adoption of these programs with the expectation that the programs will represent a victory on multiple levels. Citing studies conducted for government organizations including the US Department of Transportation and National Highway Traffic Safety Administration, proponents of the systems contend that photographic enforcement of red light violations improves driver awareness at intersections. Increased driver awareness improves safety by making drivers become more attentive to traffic-control devices thereby reducing collisions. Specifically, red light running has been identified as a significant causal factor in many right angle or 'T-bone' collisions. These collisions, particularly on higher-speed roadways, cause significant injuries and substantial property damage.

Essentially, the model supporting these initiatives is that red light cameras put a virtual 'cop' at every intersection. The benefit to the adopting municipalities in addition to the improved safety, is that the volume of civil 'tickets' and subsequent collected revenue will pay for the cost of the system maintenance and further add additional dollars to city traffic safety programs.

There are many naysayers regarding this approach to improving traffic safety. Opponents cite first that the programs represent the worst of 'big brother' philosophies. Red light camera programs are the cause celeb for many groups arguing that this

technology is a violation of civil liberties. Cameras in public places holding persons accountable for what are framed as 'civil' offenses caused concern for those who believe government has over reached its boundaries. In addition, the argument has been made that red light cameras contribute to accidents at intersections as drivers over-react to their presence by breaking unexpectedly. One study conducted for the Virginia Transportation Research Council (Garber, 2005) showed some evidence that this has occurred. Opponents asserted that the only real motivation behind red light camera enforcement programs is it provides a means to leverage technology to further 'tax' citizens unfairly. So strong are some of these groups that numerous large metropolitan areas have given up entirely on red light camera enforcement programs. Houston, Texas is one such city.

While evidence exists to support both sides of the issue, this project seeks to identify meaningful information that will ultimately support that red light camera programs are one of many tools that ultimately improve safety and thereby save lives. In reviewing facts surrounding red light camera enforcement programs this paper will seek to balance philosophical positions and focus on facts that can be observed and documented.

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INTRODUCTION

Red light camera enforcement systems have been in use in the United States since the early 1990s. Over time, 35 states have allowed for the use of such systems with the goal to improve intersection safety by reducing collisions secondary to the reduction of red-light-running violations. The United States is a latecomer in the use of these systems, following the lead of European countries, such as the Netherlands. In Europe, camera systems of these types have been in use since the 1970's (Retting, Ferguson, & Hakkert, 2003). Since the 70s and with the rapid improvements in technology, more and more municipalities are looking to red light camera enforcement systems to supplement police efforts to improve intersection safety.

The National Highway Transportation Safety Administration (NHTSA) has identified red light running as a significant concern based on reported collisions and injuries. Red-light running is estimated to cause 1000 deaths annually and as many as 165,000 injuries (U.S Department of Transportation, 2008). The Insurance Institute for Highway Safety (IIHS) (2007) estimated that over one half the persons injured in red light running collisions are not the violators, but rather pedestrians or motorists who otherwise had the right-of-way. Injuries and deaths associated with these kinds of crashes are significant. The financial impacts of collisions involving red-light running are estimated to be as much as \$14 billion dollars annually (IIHS, 2007).

As the costs of red-light collisions have become evident, lawmakers have attempted to legislate changes in support of improving intersection safety. The methods used for improving safety in signalized intersections include improvements in engineering intersections and light timing, as well as enforcement options such as red

light camera enforcement systems. According to IIHS (2007), red light camera systems are in use in 500 U.S. cities. This indicates that there is a great deal of support in the use of these systems.

The use of red light camera enforcement systems is designed to assist enforcement efforts of law enforcement by lowering the number of violations that lead to serious collisions. These systems increase awareness on the part of drivers, provide another means to municipalities to improve safety and do so in a manner that allows for the financial costs of these collisions to be directed to those causing them, the red-light-running violators. The use of the red light camera technology has allowed municipalities the ability to essentially post a virtual 'cop' at these intersections who does not sleep, doesn't have to answer other calls and can focus exclusively on red light running violations that have proven to lead to injuries and death caused by red-light-running violations.

Much has been said in the media about the relative fairness of these systems and the invasive nature of electronic enforcement. Opponents to red light camera enforcement systems have offered arguments based assertions that since companies involved in the safety improvement process profit from the systems' use the systems themselves cannot be reasonably used as justification for these programs. This economic argument suggests that because there are profits associated at some level with enforcement effort it lacks objectivity and is unbiased. Further complaints allege that the use of technology without a human component to enforce law creates an unfair advantage against violators and deprives due process. Essentially, the argument is that

since there is no witness to cross examine it is unfair to use photographic enforcement as a sole determiner that a violation exists.

This project seeks to confirm that the use of red light camera systems changes driver behavior and reduces crashes and the severity of injuries associated with red-light running. This paper, further, will confirm that this technology is neither overly invasive nor abused based on the laws designed to allow their use. Finally, this document will offer recommendations that red light camera systems should be used by municipalities based on this review of the salient positions and research evidence available in the literature.

POSITION

Red light camera enforcement systems are primarily implemented to lower the events of serious right- angle crashes, which occur when one vehicle enters an intersection against a red light, striking another vehicle in the side. These collisions frequently result in serious injury, as the collisions often involve at least a portion of the passenger compartment being struck by another vehicle at a near perpendicular angle. Signalized intersections tend to be on higher-travelled roadways, and with higher speeds, the likelihood of injuries in these kinds of collisions increases. These kinds of collisions account for a large percentage of fatality collisions. Additional benefits of red light camera enforcement at these intersections include preventing accidents in left-turn lanes, where motorists turn left in front of oncoming traffic. This project focuses on the overall trends observed in intersections employing red light cameras. Studies supporting the use of red light camera enforcement technology are numerous. One such study includes a 2005 evaluation of 132 sites in seven jurisdictions which

concluded that right-angle crashes overall were reduced by about 25% across all sites (U.S. Department of Transportation, 2005b). Total red light related collisions in six of seven jurisdictions reductions ranged between 14% and 40%, while the remaining intersection saw an increase of 1%. Overall, rear-end collisions increased, averaging between 7% and 38% increases per jurisdiction. The same study concluded that the total number of crashes fell by about 1% over-all, but a 5% reduction in injury collisions was also recorded. This outcome is due to the fact that side-impact or right-angle collisions are significantly more likely to cause injuries (U.S. Department of Transportation, 2005c). Right angle crashes account for 59% of all crash fatalities and these types of crashes comprise the majority of red light running crashes. Rear end collisions account for only about 4% of the fatal intersection crashes in the United States (NCHRP, 2004).

An additional study containing data regarding red light camera enforcement systems is a Howard County, Md. Traffic engineering report (Maccubbin, Staples, & Salwin, 2001). This study detailed early findings and was followed up with by a ten-year study (Frangos, 2010). Early findings indicated that total crashes at camera enforced intersections resulted in a decline of all crashes ranging from 21% to 44% per intersection. Specifically, this report detailed that rear-end crashes decreased an average of 29%, right-angle crashes decreased an average of 42%.

Frangos (2010), in a follow up study conducted 10 years later for Howard County, indicated that a 12% to 18% reduction in crashes over-all occurred with the use of red light cameras, along with a more significant 4% reduction in right angle

crashes. Frangos (2010) further reported that a range of rear-end collision impacts changing from 5% reduction to increases per intersection of up to 10%.

The City of Garland, Texas compiled data relevant to their own red light camera enforcement efforts (Bochner & Walden, 2010). The City of Garland collected data for four intersections (one camera on one approach of each intersection.) Data was collected for 31 months prior to installation, as well as slightly more than 51 months with red light cameras in place for arterial intersections and 29 months for frontage road intersections. Garland's study found that overall crashes decreased by approximately 29% with the use of red light camera enforcement. Crashes that occurred directly as a result of red lights being run fell by 60%. Rear-end crashes increased by 45%.

This study also included data compilation of frontage road crashes after red light camera removal. After 29 months of red light camera's being in place on two frontage roads the cameras were removed. The resulting changes occurred in numbers and types of crashes after removal included overall intersection crashes increasing approximately 64%. The occurrence of crashes directly related to red light running occurred three times more frequently after camera removal. Rear-end collisions decreased by 57%. Additional information pertinent gained after removal of the systems included total injuries collisions increasing by 29% (Bochner & Walden, 2010).

An examination of studies like Garland's in general terms does tend to confirm that red light camera enforcement reduces right angle collisions and thereby reduces the occurrence of injuries in those intersections. Concurrently, rear end collisions tend to increase but not to the degree that right angle intersections are reduced. Studies of red light cameras worldwide showed an overall reduction in injury accidents of 25-30%

taking into account an increase in rear-end crashes in intersections utilizing red light cameras (Oesch, 2003).

COUNTER POSITION

When examining the arguments against red light camera enforcement the primary arguments seem to be related to the assertion that red light camera enforcement presents an unfair advantage to motorists and represents a significant invasion of privacy. In a letter written to members of the Connecticut Transportation Committee, ACLU Executive Director Andrew Schneider related that he believes traffic cameras in general (red light and speed cameras) present “major threats to due process and privacy rights” (Schneider, n.d, para. 1).

This letter cited that the time between violation and notification creates an unfair advantage as motorists may not remember the violation in order to defend themselves. The other issue argued by the ACLU is that the owner of the vehicle is held accountable for actions of the vehicle operator without any proof that the owner is culpable for the violation beyond owning the vehicle. Finally, Schneider (n.d.) believes that data collected by the red light cameras can ultimately be used to somehow defraud consumers. Essentially the argument by ACLU is that any use of automated enforcement tools or technology represents a slow declination of individual privacy rights (Schneider, n.d.).

Defending these allegations are fairly simple, in terms of privacy rights 35 states have determined that no such violation exists. The Virginia Transportation Research Council (Garber, 2005) indicated that red light camera enforcement passed “legal muster in the three key areas: privacy, equal protection and due process” (p. xi). States

that have allowed for the use of red light cameras have concluded that properly managed systems are both effective and do not curtail individual privacy rights. Surveillance cameras are literally everywhere, including retailers and other public places and no right of privacy violation has been specifically supported on public roadways by any court. The objection that the time between violation and notification is problematic is difficult to quantify.

There is no expectation established regarding what a 'reasonable' notification period would be regarding violations of these types. Current technology allows for citations to be mailed and included on those citations are photographs establishing that the vehicle entered the intersection after the light turned red by showing the vehicle prior to entering and after, with the red light illuminated throughout. Some enforcement systems send an internet link where motorists may watch the violation on video. Time between violation and notification may be as little as five to seven days. If the vehicle owner was not the operator at the time of violation, the owner may nominate the driver to be ticketed. Appeals processes are in place that allow for accurate follow up with hearing officers to account for any unusual circumstances such as changes of ownership of vehicles or any time where technology may fail to accurately record license plate numbers. The state of Texas has not assigned any criminal sanction to a red light camera violation. The process is a 'civil' process and no impact on insurance rates or drivers' license points' accumulation exists. Final appeals may be made before a municipal judge in Texas municipalities in the event that a motorist feels that they have not been fairly dealt with by the process.

Reviewing objections of other organizations to red light camera enforcement included the review of The National Motorists Association (NMA) (n.d.) website, which offers ten assertions against the use of red light cameras. The first point made by NMA is that ticket photo enforcement cameras do not improve safety and further offers that “there is no independent verification that photo enforcement devices improve highway safety, reduce overall accidents, or improve traffic flow” (NMA, n.d., para. 2). Answering this position includes noting that companies marketing red light cameras have long listed their goals as greater intersection safety and primarily market that red light cameras lessen instances of right angle collisions and reduce injuries. Studies noted previously in this paper do tend to confirm red light camera controlled intersections experience a reduction in right angle crashes and substantial reductions in the numbers of injuries associated with those crashes (Bochner & Walden, 2010; Frangos, 2010). The only part of the statement made by NMA in this point that is accurate is that in some cases the overall number of crashes does not go down (Garber, 2005). In Virginia, it was noted that the total number of crashes in intersections did increase over the course of the study, particularly in rear end collisions. This analysis did recommend the use of red light enforcement cameras but only under very specific conditions and with very robust engineering specifications being met prior to installation.

The assertion made by NMA that no independent verification exists to support that highway safety is improved is accurate to the text listed as intersection safety, not *highway safety*, is the goal of red light camera enforcement programs. Traffic flow is generally considered an engineering effort when discussing signalized intersections and

red light camera enforcement has not been lauded as a means to improved traffic flow for that reason.

The second point against the use of camera enforcement systems by NMA is that there is no certifiable witness to the allegation as it is captured by video/technology without an officer to testify against the motorist. Because there is no 'accuser' to be addressed in person the system is inherently unconstitutional (NMA, n.d.). The right to confront an accuser is listed by the NMA as the reason this technology must be invalid.

The basis of this argument is that because a person does not witness the event and one cannot address his accuser (a video camera), a video citation is a violation of a constitutional right. By this argument, the video of the murder of a store clerk captured on the store's video camera would be inadmissible as evidence against a criminal. Prior to ticket issuance in Texas, a Texas Peace Officer reviews the video and determines if the event captured meets the criteria for a violation. This officer will be required to testify to his qualifications should the ticket be appealed to a court. The systems use time/date stamps, GPS and road sensors to establish intersection entry speed by violators and violations are reviewed, in many cases, by several people prior to issuance based criteria set by the department of jurisdiction.

The third position of the NMA opposing red light cameras as listed on their website is the recipients of the tickets are not adequately notified of the violation (NMA, n.d.). It is the NMA's opinion because there is not notification made at time of violation the violator may either not receive the ticket at all or not know how to respond to it if received. The NMA objects to the fact that there is no fail safe that guarantees the violator was notified positively. The NMA contends if for whatever reason the violator

does not receive notification the assumption is that the violator failed to respond on purpose. In some states, warrants are issued for arrest based on failures to respond.

In answer to the NMA's claims, the law in most states requires that vehicles be registered to a current address within a certain period of time of establishing residency (30-60 days). Notification by mail of has been deemed reliable by municipalities for the purposes of other civil remedies and this process is no different. This argument also indicates that a 'failure to pay' will result in a warrant of arrest being issued. In Texas, there are no warrants issued for arrest for red light camera violations as these are 'civil' violations. Parking violations are another example of violations where a vehicle owner may be held accountable for actions when those actions cannot be attributed to a specific person.

This fourth point of contention listed by the NMA is an extension of the last concern, namely that a vehicle driver is not identified as the violator but the vehicle owner is held accountable. The NMA contends that this is unfair as the violator could be unknown to the owner. This, according to the NMA dictates that the owner is held accountable for charges relating from the violation. The NMA's position is that requiring the owner to name the driver, whether an employee, family member or friend not reasonable (NMA, n.d.).

The law allows that owners of vehicles captured by red light cameras making violations be held accountable for the violations as part of the understanding that the violation is a 'civil' violation. Arguing concerns about privacy rights, some state legislatures including Texas have elected to hold owners accountable rather than photographing drivers. In order to hold owners accountable for the actions of persons

they allow to drive their vehicles, similar processes were put in place. In Texas, upon receipt of a violation notice' the owner is provided the opportunity to nominate the person who is responsible for the violation. Ultimately, the vehicle owner is held accountable for actions of the driver in the same way they would be held if persons used their car to go through toll stations without paying tolls or received parking violations.

The fifth objection of the NMA to red light camera enforcement details that ticket recipients are not notified quickly enough. The concern listed is that because the citation may be mailed days after the incident the violator may not have a recollection of the violation. The NMA further argues that this lack of recollection or lack of knowledge would not allow the violator to defend themselves adequately due to difficulty recalling the violation (NMA, n.d.).

This fifth argument presumes that people will not remember violations and, therefore, it is unfair to hold them accountable for their violation. This same stance would also give license to violators of other infractions to use the excuse that they did not or do not remember doing anything wrong and therefore the violation is invalid based on that lack of recollection. The well-known adage the ignorance of the law is no excuse seems to answer this argument. Many companies that manage these systems collect significant amount of data, take pictures with varying light sources to ensure accuracy of the images captured. In Texas, additional information including vehicle speeds, dates and times are collected to help violators recollect the incident and appeals processes are in place to allow a person to person review of the incident with the appeal authority.

The 6th point made by the NMA on their website detailing their opposition to red light cameras espouses that these systems discourage the synchronization of traffic lights (NMA, n.d.). The primary argument made is that because this is a potential revenue source, the municipality may intentionally not work to synchronize lights in favor of collecting more fines from red light camera violations.

In the literature presented by the NMA, who claims to monitor these issues, there has not been one published instance found of a municipality tampering with synchronization in order somehow increase fines. In Texas, engineering studies are required prior to implementation of a red light camera enforcement program. Those studies include maximizing synchronization and ensuring proper yellow light timing at each intersection where red light camera enforcement is being considered. Section 707.003 of the Texas Transportation Code allows for the contracting of a red light camera program only if stringent requirements are met, including that the municipality conduct a traffic engineering study of the approach to determine if a design change in approach or change in synchronization of signalization would reduce the violations at the intersection.

The seventh argument made by the NMA is that the red light cameras do not prevent most intersection accidents. It further cites that because accidents are by nature unintentional, adding additional signage and putting cameras on poles will not change that (NMA, n.d.). Red light camera enforcement programs are designed to impact behavior, increase intersection safety awareness of drivers and do impact significantly the number of right angle crashes that occur. Crash data was analyzed in Texas and found that across 56 intersections where red light cameras were utilized,

total crashes fell by 30%, right angle crashes fell 44% (Walden, 2008). While there are certain percentages of crashes that will still occur at these intersections, those crashes caused by poor choices made by drivers to run red lights will be lessened, in many cases dramatically. The programs do not profess to eliminate all crashes or even most crashes, but rather to reduce the frequency of the higher injury producing right angle crashes. Awareness is the key to success in these programs. The Garland Study, in particular, demonstrates that driver decision making is impacted by the presence of or lack of red light camera enforcement. This was made obvious when frontage road cameras were removed and intersection crashes increased 64% in a measured period immediately following the removal (Bochner & Walden, 2010).

It is the NMA's position that there are better alternatives to cameras. They support proper engineering, noting that if intersections are properly installed and operated there will be 'very few red light violations.' While making this argument, the NMA asserted that government funds should be used to improve intersections, not install cameras. The NMA noted in this particular argument that governmental agencies chose the revenue source of red light cameras over making engineering improvements.

Red light camera programs are designed to augment and support well engineered intersections. In general, costs associated with installing red light cameras are recouped by agencies and while the systems may add dollars to city budgets the emphasis on improving intersection safety is what drives these programs. The economic impact of injury collisions is significant. A 2005 study by the Federal Highway and Safety Administration estimated a \$39,000 to \$50,000 savings of revenues saved by improved crash numbers at each intersection at which a red light camera was

installed reviewed in the study (U.S. Department of Transportation, 2005a). Unlike other traffic calming measures red light cameras systems are designed to be revenue neutral and in general do pay for themselves in violation fees collected. This is different than other measures and negates the need to delve as deeply into cost to benefit studies.

The argument that red light camera systems are designed to inconvenience motorists is the position taken by the NMA in this same listed website (NMA, n.d.) According to the NMA, the private contractors in some states refuse to send pictures or documentation of the violation to the vehicle owners involved in the violation. This assertion is this is done deliberately to discourage challenges of violations. The NMA listed this is because the photos do not depict the driver or the driver depicted is obviously not the owner.

This ninth point asserted by the NMA represents an inaccurate understanding of the impact of technology on these programs. Redflex, as an example, is a company that is in the business of administering red light camera enforcement programs for municipalities (www.redflex.com). This company sends a photograph of the violation to the owner of the violator vehicle. The photographs detail the vehicle's position prior to entering the intersection (with the red light clearly activated) then adds another photograph showing the vehicle in the intersection against the same red light. A link is also included in the notice of violation that allows for the recipient of the violation to view a video of the violation as it happened. Vehicle speed is measured and collected so that administrative hearings can add that to the data when having to make an appeal decision. Hearings are scheduled after business hours to better accommodate violators wishing an audience before a hearing officer. The final point of all of the arguments

made by NMA in this website listing is that merely photographing dangerous drivers does not stop them. This final point states that red light camera systems do not impact impaired, reckless, or flagrant violators (NMA, n.d.) This point continues by listing an example that if a fugitive drives through an intersection against a green light at clearly excessive speed the camera would not even document the incident.

Red light camera enforcement systems were designed for the expressed purpose of reducing dangerous right angle collisions by increasing awareness at controlled intersections. They have not been lauded as or recommended to be used for any other purpose, including reckless driver apprehension. The key is the modification of driver behavior. The presumption is based on the fact that if the likelihood of a consequence for a particular violation is nearly guaranteed then violators will more than likely change their behavior to avoid the consequence. This is demonstrated in the Garland Study (Bochner & Walden, 2010) as well as another. A team of psychologist from Old Dominion University led a study on intersections where red light cameras were removed from service in Virginia (Porter, Johnson, & Bland, 2006). They had been studying the impact of red light cameras on driver behavior. In 2005, laws authorizing their use expired and cameras were removed. With knowledge that the laws were due to expire, the researchers began researching violations committed for a specific time period prior to the expiration and removal of the red light camera systems as well as after. The studies concluded that when monitoring the actual running of red lights that red light camera monitored intersections saw an occurrence of red light running occur about 3% of the time. With the cameras removed, the rate of violation increased to 12% of the time. Studies of area traffic lights that had never had cameras remained constant

through both periods at about 14% of the time. Porter, Johnson, & Bland's (2006) comment on removal of red light camera systems was fairly telling: "Our findings suggest red light running reductions are likely to recidivate quickly, and certainly within a year, once cameras go dark" (para.1).

In general terms, the National Motorist Association is opposed to many long proven safety initiatives including mandatory seat belt laws, aggressive DWI enforcement, and mandatory insurance laws, according to their website. All of these laws are designed to protect people and encourage personal responsibility. The National Motorist Association advertises for ticket dismissal services, advocates repealing the .08% blood alcohol content laws, and further offers a blog that allows members to document the location of traffic enforcement efforts of law enforcement as a service to their members by way of listing 'speed traps' in communities. This organization's focus appears to focus on the political aspects of traffic law enforcement.

RECOMMENDATION

As the evidence abounding in literature shows, red light camera enforcement systems in most municipalities have proven to be a tool, that when coupled with solid intersection engineering, realistic awareness campaigns and effective law enforcement efforts have reduced the numbers of serious injury collisions as a result of right angle crashes in signalized intersections. The reduction in these types of collisions has been done by making drivers more aware of their behavior in intersections by assigning a known and nearly certain consequence for poor driver choices. The systems are not a solution for reckless driving or all issues surrounding intersection safety but when managed in accordance with the law have a positive impact on the community. This

positivity can be expressed in dollar figures due to a reduction in costs associated with injury collisions and property damage or in human terms. The prevention of death and injuries, even in modest numbers cannot be argued against realistically. The other benefit to municipalities is that after the up-front investment in these systems is funded, red light camera enforcement produces signalized intersection safety improvement in a way that is revenue-neutral or revenue producing.

Those who are opposed to this use of technology tend to focus their argument around privacy issues and see the cameras as a further tool in the erosion of individual freedoms. Those concerns have often been housed in theories which presume that municipalities' sole goal in the use of red light camera systems is the collection of revenue. Numerous private and public institutions have determined that while not a panacea, red light cameras do have the desired effect on intersection safety. Laws in place to measure the results of using the cameras and mandatory reporting requirements will yield further results and offer long term answers to the effectiveness of these programs, at least in Texas. This was by design. The Texas State legislature requires the capture of crash and violation data to determine the effectiveness of the programs at each intersection that employs their use. Even after walking through engineering studies and physical improvements that states may require before installing red light cameras at an intersection, red light camera systems continuing revenue stream makes photographic enforcement a no-cost or low-cost way for jurisdictions to reduce fatalities and injuries at intersections. Once the issues of civil-liberty concerns are addressed and set-aside, the economic reality may remain the strongest philosophical foundation for continuing and expanding these programs.

While not right for every municipality or every intersection, the use of red light cameras is largely supported in communities that use them. In a recent opinion survey conducted by the Insurance Institute for Highway Safety listed the following details: “More than 9 of 10 drivers surveyed in the 14 cities believe running a red light is unacceptable... two-thirds favor red light cameras, and 42% strongly favor them” (2011, para. 6). According to IIHS, figure 1 in Appendix A shows the general rate of approval for red light camera use according to their research (IIHS, 2011).

Overall, research is conclusive that red light camera enforcement programs reduce fatalities and injuries at low public cost. The cost of enforcement is shifted to the offender. Further, community support of these programs warrants municipalities consider them in their intersection safety planning. The Texas Legislature has made the adoption of these systems fairly simple, requiring solid studies and engineering templates. With the use of solid engineering, public awareness initiatives and proactive law enforcement, red light camera enforcement can be a successfully incorporated into jurisdictions’ intersection safety programs. Once the use of these systems is normalized, civil liberty concerns may diminish as they did with compulsory insurance and seat belt laws.

REFERENCES

- Bochner, B. & Walden, T. (2010, July). *Effectiveness of red light cameras*. College Station, TX: Center for Transportation Institute, The Texas A&M University System.
- Frangos, G. (2010). *Automated enforcement: 10-year evaluation of red light running detection*. Columbus, MD: Howard County (Maryland) Traffic Engineering Division.
- Garber, N. J., Miller, J.S., Eslambolchi, S., Khandelwal, R., Mattingly, K.M., Sprinkle, K.M., & Wachendorf, P. L. (2005). *An evaluation of red light camera (photo-red) enforcement programs in Virginia: A report in response to a request by Virginia's Secretary of Transportation*. Charlottesville, VA: Virginia Transportation Research Council.
- Insurance Institute for Highway Safety. (2007, January). *Status Report*. Retrieved from <http://www.iihs.org/externaldata/srdata/docs/sr4201.pdf>
- Insurance Institute for Highway Safety. (2009, January). *Q&A's: Red light cameras*. Retrieved from <http://iihs.org/research/qanda/rlr.html>
- Insurance Institute for Highway Safety. (2011, June 30). Most drivers favor red light cameras, a new survey of 14 big U.S. city finds [Press release]. Retrieved from <http://www.iihs.org/news/rss/pr063011.html>
- Maccubbin, R., Staples, B., & Salwin, A. (2001, August 13). *Automated enforcement of traffic signals*. Retrieved from http://ntl.bts.gov/lib/jpodocs/repts_te/13603.html

- National Cooperative Highway Research Program. (2004). *NCHRP report 500: Volume 12: A guide for reducing collisions at signalized Intersections*. Retrieved from http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_500v12.pdf
- National Motorists Association. (n.d.). *NMA objections to red light cameras*. Retrieved from <http://www.motorists.org/red-light-cameras/objections>
- Oesch, S. (2003, January). *Statement before the Virginia House of Delegates-Militia, Police, and Public Safety Committee - red light violations and red light cameras*. Retrieved from http://www.iihs.org/laws/testimony/pdf/testimony_slo_020102.pdf
- Porter, B., Johnson, K.L., & Bland, J.F. (2013, January). Turning off the cameras: Red light running characteristics and rates after photo enforcement legislation expired. *Accident Analysis & Prevention*, 50, 1104-1111.
- Schneider, A. (n.d.). *ACLU opposes traffic-light cameras*. Retrieved from <http://www.acluct.org/issues/privacyandtechnology/acluopposestrafficlightcam.htm>
- Retting, R. A., Ferguson, S. A., & Hakkert, A. (2003, March). Effects of red light cameras on violations and crashes: A review of the international literature. *Traffic Injury Prevention*, 4(1), 17–23.
- U.S. Department of Transportation, Federal Highway Administration. (2005a, April). *Red Light Camera Systems Operational Guidelines*. Retrieved from <http://safety.fhwa.dot.gov/intersection/redlight/cameras/fhwasa05002/fhwasa05002.pdf>

U.S. Department of Transportation, Federal Highway Administration. (2005b, April).

Safety evaluation of red-light cameras (FHWA HRT-05-048). Retrieved from

<http://www.fhwa.dot.gov/publications/research/safety/05048/05048.pdf>

U.S. Department of Transportation, Federal Highway Administration. (2005c, April).

Safety evaluation of red-light-cameras-executive summary (FHW HRT-05-049).

Retrieved from <http://fhwa.dot.gov/publications/research/safety/05049/05049.pdf>

U.S. Department of Transportation, National Highway Traffic Safety Administration.

(2008). *Traffic Safety Facts 2008*. Retrieved from [http://www-](http://www-nrd.nhtsa.dot.gov/Pubs/811170.pdf)

[nrd.nhtsa.dot.gov/Pubs/811170.pdf](http://www-nrd.nhtsa.dot.gov/Pubs/811170.pdf)

Walden, T. (2008). *Analysis on the effectiveness of photographic traffic signal*

enforcement systems in Texas. College Station, TX: Center for Transportation

Institute, The Texas A&M University System.

Appendix A

Bakersfield, Ca.	68%
Baltimore, MD	67%
Chandler, AZ	75%
Chicago, Il	65%
Garland, TX	66%
Long Beach, CA	48%
Phoenix, AZ	74%
Portland, Or	68%
Raleigh, N.C.	62%
Sacramento, CA	71%
San Diego, CA	64%
Santa Ana, CA	54%
Toledo, OH	58%
Washington, D.C.	78%

Figure 1. Percentage of drivers who support red light cameras in each of 14 study cities (IIHS, 2011).