Comments on the Red Light Camera Program in Ventura, CA

By Jay Beeber, Executive Director, Safer Streets L.A., Member ITE

The following report is a detailed discussion of the Red Light Camera (RLC) Program in Ventura, California. This report provides independently collected data as well as offering commentary on the Staff Report dated March 20, 2015. In addition, some comments on the proposed contract are provided.

Background

Safer Streets L.A. is a grassroots organization dedicated to furthering the interests of the motoring public through the adoption of scientifically sound and sensible transportation and traffic laws. We believe that accurate information and critical thinking are crucial to implementing sound public policy. Towards that end, we strive to provide the public and elected representatives with well researched and verifiable data. Our goal is to counter misconceptions and misinformation with solid facts in order to promote scientifically based solutions to motorist and pedestrian safety issues. Safer Streets L.A. provides this information on a voluntary basis and is not paid to interact with elected officials.

Our goal in forwarding you the following information is to provide you with additional data on the use of photo enforcement in Ventura, California. We hope that this information proves useful in your deliberations as to whether or not to continue the red light camera program.

About the Author

Jay Beeber is the Executive Director of Safer Streets L.A. and a research fellow with the Reason Foundation concentrating on traffic safety and enforcement. He also serves on the City of Los Angeles' Pedestrian Advisory Committee and has written numerous scientific studies on traffic related safety issues. Most recently, he served on the subcommittee of the California Traffic Control Devices Committee (CTCDC) which recommended changes to State standards and guidance for yellow light timing. These recommendations have since been incorporated into the latest version of the California MUTCD released in November 2014.

Introduction

Included in this report is an analysis of Red Light Related (RLR) collisions in the City of Ventura, as well as other cities throughout California. Accident statistics were compiled from the California Highway Patrol's Statewide Integrated Traffic Records System (SWITRS) database. The SWITRS database serves as a means to collect and process data gathered from collision scenes by multiple police agencies throughout the state.

The Proposed Redflex Contract

We would be remiss if we did not caution city officials that the proposed contract is an extremely bad deal for the taxpayers of Ventura and could put the city in legal jeopardy due to the cost neutral provisions.

Numerous other cities have been able to negotiate more favorable terms. For example, the City of

Hawthorne (as well as other cities) have negotiated a provision to cancel their contract with 30 days notice to Redflex without penalty. Further, the proposed contract for Ventura will automatically extend the term if there is an unpaid balance due Redflex at the end of each year. Considering the fact that the city is continually in arrears to Redflex, this provision will undoubtedly be invoked. The city could find itself locked into a contract long beyond the three years currently being offered. This could prove quite problematic for the city. Consider the experience of Santa Ana. City officials wished to sever their relationship with Redflex but had no way out of the contract. As a result, the city has had to endure an additional full year of the Redflex contract which won't end until July 2015. City officials publicly stated that they were sorry they had locked themselves into their contract. We urge Ventura officials not to make the same mistake. There is no urgency to sign a new contract. Council members should insist that any contract provide them with the ability to cancel for convenience with 30 days notice.

The contract also includes a provision that:

6.2.4. The City shall continue to pay to Redflex a pro rata share of all monies or revenue generated, collected and/or received by City after the expiration or termination of the Agreement that are, in any way, a result of, associated with and/or attributable to, in whole or in part, the products or services that Redflex provided to the City pursuant to this Agreement, notwithstanding the Cost Neutrality provisions outlined in Exhibit D.

This means that even if the city's debt is forgiven at the end of the contract under the Cost Neutrality provisions, and Redflex is providing no services, the city is still obligated to pay Redflex a share of any money received from tickets generated by the system. Theoretically, this could go on for years as some payments may come in months or years after the ticket has been issued. The city should not agree to such a provision.

Cost Neutral Contracts Have Been Ruled Illegal in California

City officials should be greatly concerned about the structure of this contract. In a published decision out of Napa (P v. Daugherty), the Appellate Court ruled that a cost neutral contract similar to the current and proposed new contract in Ventura, was in violation of Vehicle Code section 21455.5, subsection (g)(1).

This court agrees with defendant that the Redflex contract's cost neutrality provision improperly bases the City's payment to Redflex on the number of citations generated, at least to the extent there are not enough citations generated to cover the fee in a given month. ...In other words, Redflex's receipt of full payment is dependent on the issuance of a sufficient number of citations. The more citations issued, the more Redflex will receive, up to the cap. That type of arrangement has been specifically prohibited by the legislature and cannot be upheld by the court.

While the City of Ventura has not yet been sued for violating this provision of the vehicle code, by entering into a cost neutral contract, especially one where Redflex guarantees a certain amount of revenue to the city, City officials could be opening their jurisdiction to extreme legal liability. Indeed, if a group of plaintiffs where to prevail in a class action lawsuit, the city could find itself obligated to pay back all fines collected from defendants. This has occurred in other jurisdictions. Before entering into any such agreement, city officials should seriously weigh the potential legal ramifications.

Staff Has Failed to Address the Potential Effects of New Yellow Timing Protocols

Although staff is likely aware that new yellow timing protocols have been incorporated into the latest version of the California MUTCD they have failed to address the potential impact of these changes in the Administrative Report or when briefing council. These changes, which must be fully implemented by August 1, 2015, could significantly reduce the number of citations generated by the system. While fewer red light violations is a highly desirable outcome, the lower number of tickets will make it even more difficult for the city to meet its obligations under the cost neutral provisions of the contract. The contract requires an automatic extension, the length of which is directly tied to how much the city fails to pay Redflex each month. We have seen situations where the increase in yellow timing reduces the number of citations by 70% or more (see below). This, coupled with the city's current inability to pay Redflex the full fee each month could conceivably result in the City being obligated to continue the contract for many years beyond the three years currently contemplated. The city officials should not enter into this contract until they are able to measure the effect of any yellow timing changes that will be necessary due to the new protocols.

Yellow Interval Considerations

At the September 15th Council Meeting, staff was asked about the length of the yellow interval and potential reductions in violations if the time is increased. Staff responded that the reductions in red light running were only due to the fact that the yellow time was increased from an amount that did not meet engineering protocols (were deficient). This is not factually correct. We have conducted numerous studies where the yellow interval was increased beyond the minimum times required in the CA MUTCD and which resulted in huge reductions in red light running violations. The table below list some representative examples. A more full compendium of the studies we conducted appears at the end of this report.

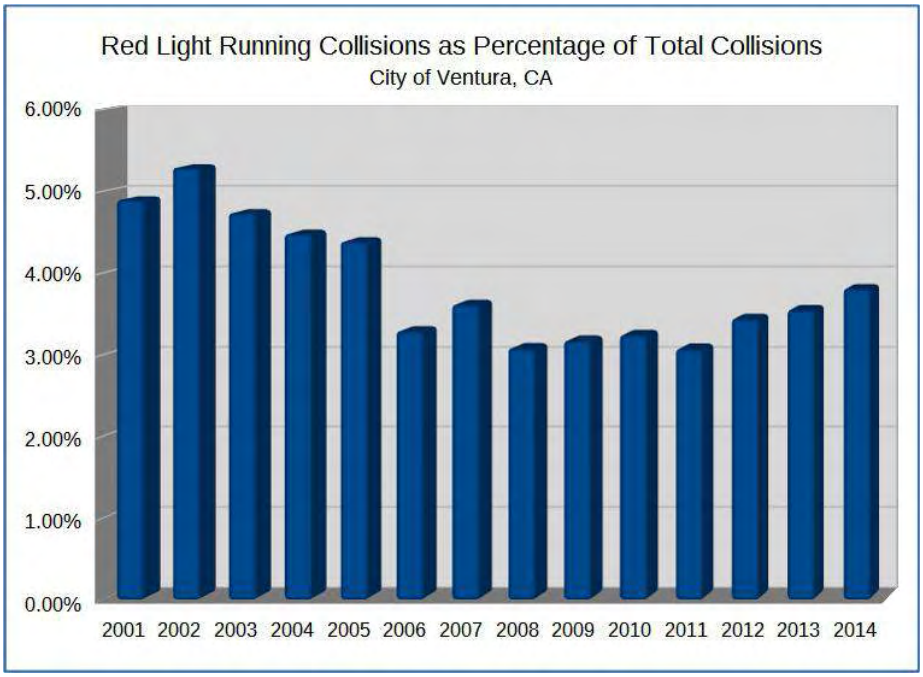
Location	Yellow Time Increase	Reduction in Red Light Running
Fremont, CA	0.7 Second	77.00%
Loma Linda, CA	1.0 Second	93.00%
Redlands, CA	0.9 Second	88.00%
West Hollywood, CA	0.3 Second	61.00%
Fairfax Cty, VA	0.5 Second	85.00%
Santa Clarita, CA	1.0 Second	71.00%

As stated above, this author served on the subcommittee of the CTCDC which recommended changes to yellow light timing protocols which have been incorporated into the latest version of the California MUTCD. Mr. Beeber was also invited by Santa Clarita city staff to consult on two projects initiated by city traffic engineers to 1) evaluate the effect of providing a longer protected left-turn yellow-light time and 2) determine the proper protocol for setting the yellow time in left turn lanes throughout the city. Those studies also determined that yellow intervals longer that 3.5 seconds were necessary in turning lanes. Although a full evaluation of the signal timing in Ventura has not been conducted, we are confident that the yellow interval will need to be increased at most, if not all, red light camera intersections in Ventura. As explained above, this will significantly impact the revenue generated by the red light camera system and could cause the three year contract to be automatically extended many years into the future. We again urge the City Council not to agree to the proposed contract terms and send the issue back for further consideration.

The balance of this report addresses other outstanding issues that need clarification with regard to the city's red light camera program.

Is the Red Light Camera System Responsible for a 75% Reduction in Red Light Running Collisions?

Many factors are responsible for increases or decreases in collisions such as additional engineering countermeasures, traffic volume, weather, and natural variations in collision rates over time. Staff analysis of collisions in Ventura does not take any of these factors into account. In order to account for some of these factors, we calculated the rate of red light running collisions in Ventura as a percentage of all traffic collisions in the city. This helps account for some, but not all, factors that might skew the results. The graph below shows the results obtained.



Note that while there initially was a reduction in red light running collisions through 2006, since that time the rate has begun to trend upwards. Comparing the rate in 2014 to the highest historical rate (2002) shows a 28% reduction in the percentage of red light running collisions, not 75%. However, this does not prove that the cameras were responsible for the decline. City engineering staff has previously explained that over time they have implemented a number of engineering improvements at intersections throughout the city, including increasing the yellow and all-red intervals. It is likely that these engineering improvements would account for most, if not all, of the reduction seen in red light running collisions.

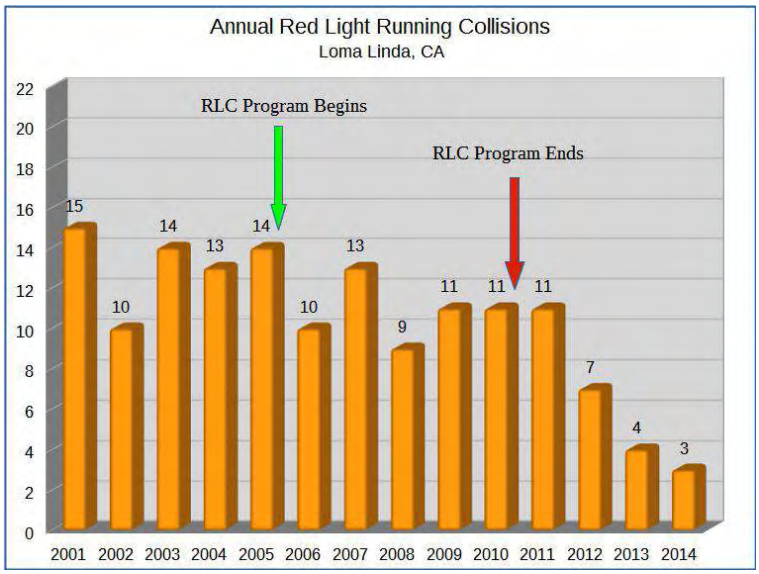
Furthermore, during the September 15th City Council meeting, Police Department staff explained that red light cameras cannot prevent collisions that occur late into the red interval. These are the most serious types of red light running events which cause the deadly T-bone collisions and are often the result of impairment, distraction, fatigue, inclement weather, etc. No red light camera system can prevent these collisions because if the driver does not recognize that the light is red, they certainly will not recognize that there is a red light camera present to ticket them. Yet these T-Bone accidents are exactly the types of collisions that City officials likely hoped to prevent when approving red light

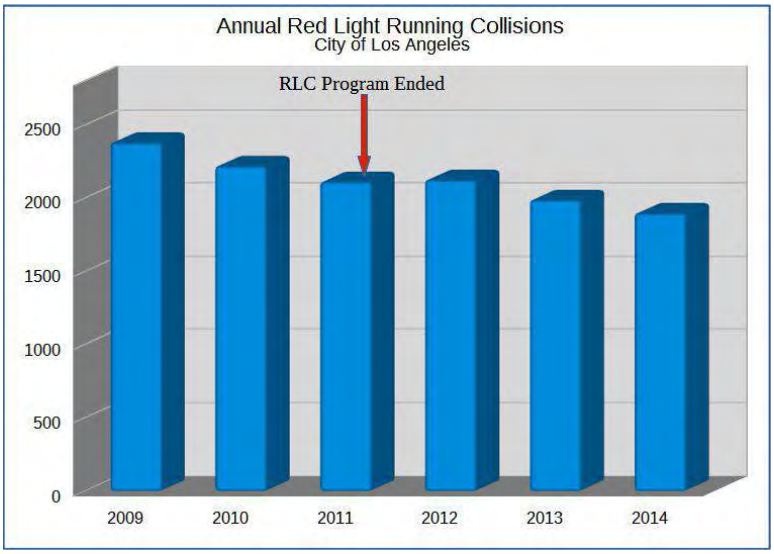
cameras. The Council was presented with dramatic video evidence of how red light cameras **did not** prevent the tragic collision that took the life of Katie Lively along with other videos showing the failure of red light cameras to prevent accidents. While dramatic, these videos are proof that red light cameras are ineffective in preventing serious red light running collisions.

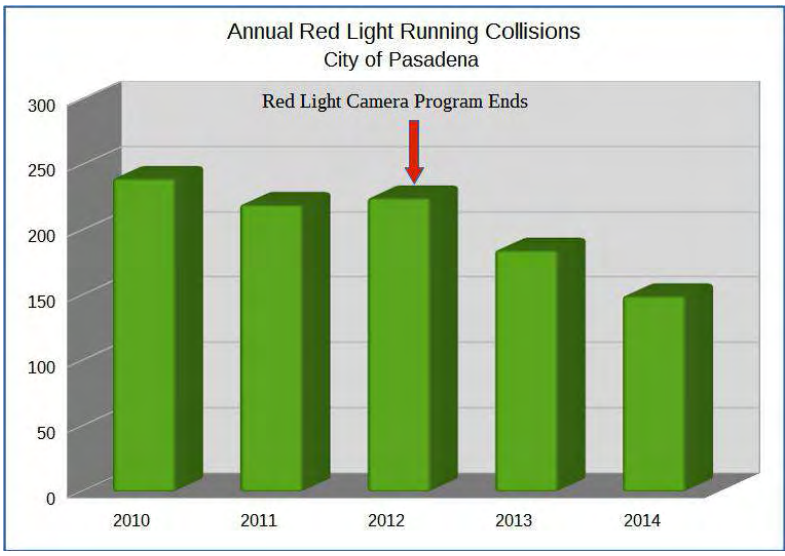
<u>Staff:</u> Further, we believe that past data supports a presumption that traffic collisions and related injuries could increase without ATES in operation.

There is no evidence to support this belief whatsoever. In fact, we offer evidence to the contrary.

The cities of Los Angeles, Pasadena, and Loma Linda (amongst many others) have all ended their red light camera programs in the last few years. Using the SWITRS database, we compiled the number of red light running collisions that have occurred in these jurisdictions after the cameras were turned off. Not only did traffic collisions due to red light running not increase, in all cases those types of collisions were reduced further. In some cases, the reduction was greater than when the cameras were operational. The charts below graphically represent the results of this study.







Red light camera supporters often claim that the only thing preventing carnage on our roadways is the presence of red light cameras. These results show that nothing could be further from the truth. As explained above and admitted to by PD staff, red light cameras cannot stop stop serious red light running collisions. Proper engineering is the best solution to improving intersection safety along with live police officer patrols.

Staff: In March 2013, the City of Poway, California suspended their ATES program for six months to allow time to collect and analyze data regarding the efficacy of the program. Six months after the suspension red light violations increased 115 percent at the monitored intersections. Data collected from the California Highway Patrol showed traffic collisions increased 25% at the same intersections.

This claim is patently untrue. The claim of a 115% increase in red light running was made by a Redflex representative attempting to get the city council not to cancel the contract. No evidence has ever been presented of the truth of this claim. We previously caught the red light camera companies making similar claims in other cities and proved how they intentionally mislead officials by comparing dissimilar data. You can read about their deceptive practices here:
http://saferstreetsla.org/646/american-traffic-solutions-ats-lies-deception/

Further, collisions actually went down at the Poway intersections after the cameras were turned off:

The council suspended the camera enforcement program seven months ago, at the suggestion of Mayor Don Higginson. All the cameras were deactivated and covered with gray plastic. Since then, accidents at the three intersections have actually decreased, according to city engineers who are now recommending the cameras be pulled altogether. During the six month period before the cameras were turned off, there were a total of eight accidents at the intersections, according to a memo prepared for Tuesday's council meeting by Robert Manis, the city's director of development services. In the six months since the turnoff date, there have been five accidents. "While a six-month period is a brief period of time to evaluate the accident data, ***it is clear the removal of the red light cameras has not had a negative effect on accidents at these three intersections,****" Manis wrote.*
http://www.utsandiego.com/news/2013/oct/08/poway-red-light-cameras/

The City Council of Poway voted to end the program, something they would not have done if they were convinced that they would be putting their constituents at risk by removing the cameras.

Staff: Some municipalities have chosen not to renew their contract with Redflex and other ATES companies. Common reasons cited were uncertainty of potential law changes for ATES (this was prior to the Supreme Court cases in 2014 mentioned above), budget reductions (some cities did not have guaranteed income provisions), and a lack of support from the community.

Staff has failed to mention the most important and widely cited reasons that cities have ended their red light camera programs. They are:

1. The cameras have failed to provide the expected improvement in safety.

2. The cities implemented proven engineering countermeasures such as increasing the yellow interval, which dramatically decreased the number of red light running incidents much more than had been achieved through the use of red light cameras.

3. A recognition that automated red light camera enforcement is widely reviled by their constituents and the need to cover the cost of the system or generate revenue provides a perverse incentive not to implement the engineering solutions that would reduce violations significantly.

We know of no city that ended their program due to a lack of uncertainty about how the courts would rule on the admissibility of evidence. In fact, since the rulings cited in the staff report have been published, more cities have chosen to end their programs. Further, many other cities that had cost neutral provisions or were generating income have chosen to abandon red light camera enforcement. Council should take the time to fully review what has occurred in other jurisdictions before locking the city into an inescapable 3 year contract with mandatory extension provisions.

Recommendations

There is no urgency in signing a new contract with Redflex at this time and we urge the City Council to defer this decision to a later date.

1. The proposed contract has provisions very unfavorable to the city. Council should demand the removal of provisions requiring automatic extensions and payments to Redflex after the contract ends. Further, Council should insist on the ability to cancel for convenience without penalty as other cities have done.

2. Council should not enter into any agreement until the full effect of required longer yellow intervals has been measured.

3. Council should fully explore the reasons other cities have chosen to end their relationship with Redflex to learn from their example.

Compendium of Yellow Interval Increase Studies

A Before and After Study of Violations in Fremont, CA Subsequent to an Increase in the Yellow Duration

By Jay Beeber, Safer Streets L.A., Member ITE

Introduction

Fremont, CA has been using photo enforcement since the early 2000's. In November of 2010, CalTrans officials examined the intersection of Mission Blvd. and Mohave Drive and increased the yellow signal time for the straight through movement by 0.7 second above the minimum time required by state law to a full 5.0 seconds. (See attached email exchanges documenting the change)

On January 31, 2013 we requested violation statistics from Sgt. Mark Dang of the Fremont Police Department. Specifically, we requested the Monthly Redflex Redlight Offender Statistics (RROS) Report (aka Late Time Bar Charts) for the intersection of Mission Blvd. and Mohave Drive for the period April 2010 through December 2012. The reports were received in hard copy format on February 15, 2013. Digital scans of the original reports are available at http://wp.me/a1mxAG-bz

The report shows, in chart format, the number of violations recorded in each of the four photo enforced lanes of approach to the intersection. Three charts are provided (by time into red, by hour of the day, and by day of the week) for each lane as well as for all 4 lanes combined.

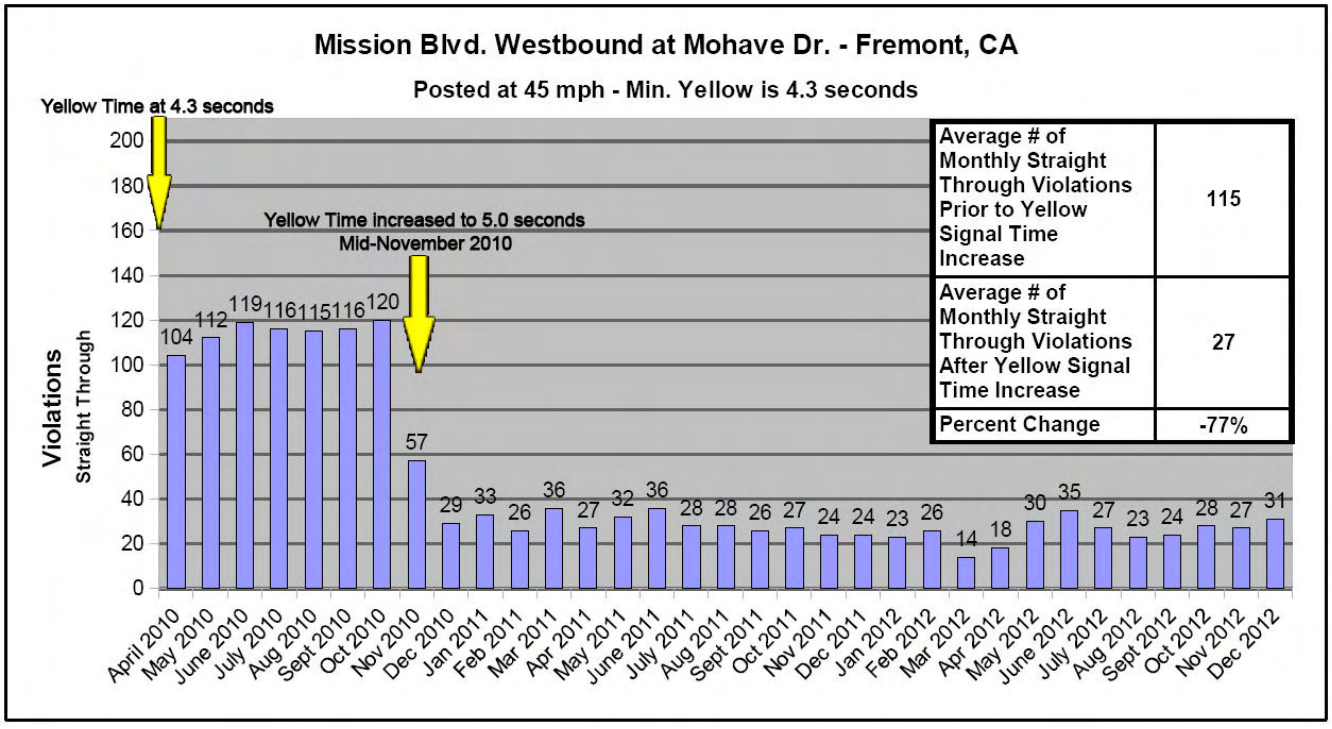
At the west bound approach to the Mission Blvd. and Mohave Drive intersection there are four lanes, all enforced with red light cameras. On the RROS Report, the lanes are numbered starting from the left hand side of the roadway closest to the center median. Lane 1 is the left turn lane, lanes 2 and 3 serve straight through traffic, and traffic in lane 4 may either proceed straight or turn right.

In order to perform the data analysis, we transcribed the data from the hard copy reports into an excel spreadsheet, listing the number of violations in each lane by month. (Spreadsheet available for download at http://wp.me/a1mxAG-ct) Since the goal of the analysis was to study the effect of the increase in signal timing for the straight through movement, we did not consider the violations in lane 1 as only left turns are permitted from that lane, nor lane 4 as that lane serves both straight through and right turn movements. We then added together the number of violations in lanes 2 and 3 to arrive at the approximate number of straight through violations occurring each month.

As stated previously, the signal timing was adjusted upwards by 0.7 second in November 2010. We therefore averaged the number of violations occurring in the previous 7 months to obtain the average number of violations in the "before" period. Since the timing change was made in mid-November, we eliminated that month's data from consideration and averaged the subsequent months' violations to obtain the average number of violations in the "after" period.

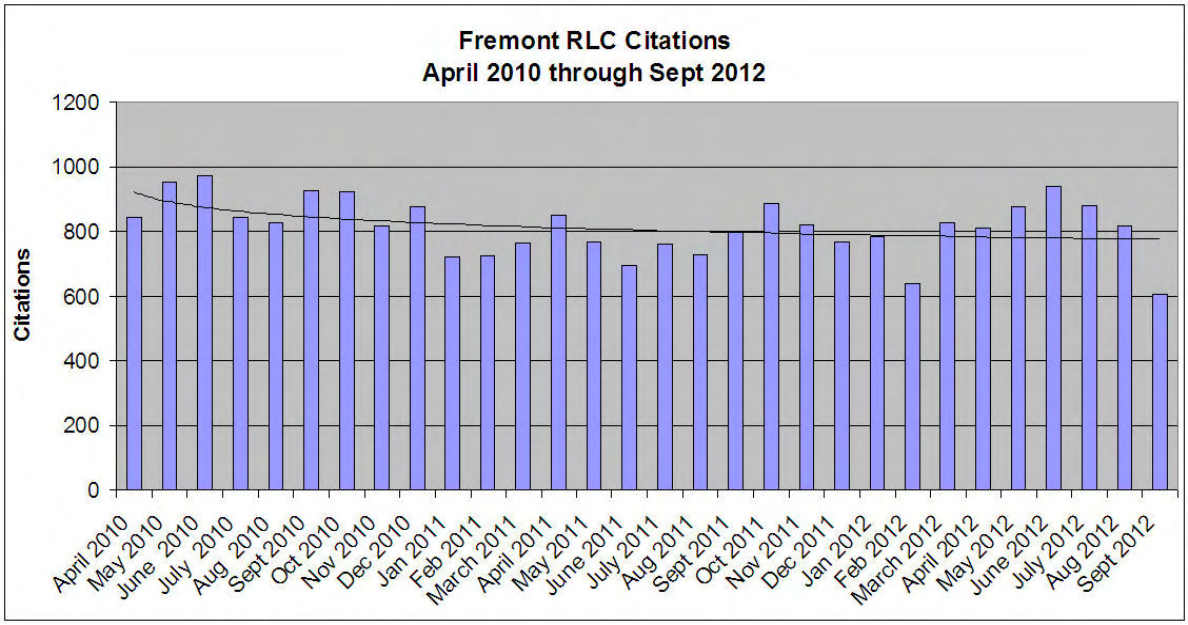
Results

The results appear in the table and chart below.



Immediately after the signal timing increase, the intersection experienced a significant reduction in straight through violations and the lower violation rate has not returned to earlier levels. As can be seen in the above chart, the positive safety results achieved by lengthening the yellow signal time have now remained in place for more than 24 months. Overall, there has been an average 77% decrease in violations during the study period and we have yet to observe any rebound to previous violation levels. In contrast, the violation rate for the left turn movement, where the yellow time remains unchanged at the state minimum of 3.0 seconds, increased approximately 25% during the same period (see spreadsheet). The reason for the increase is undetermined at this time, but regardless, it is almost a certainty that if the left turn yellow time had also been increased, the violation rate for that movement would have been significantly reduced as well.

In addition, since the yellow light time was not increased at any of the other red light camera intersections in Fremont, we analyzed the violation rates at those locations over the same time period to determine if there had been any change in violations over the study period. Using the data available at http://highwayrobbery.net/redlightcamsdocsFremontMain.html we charted the total number of monthly violations at all Fremont photo enforced intersections. As the chart below indicates, although the number of violations fluctuates from month to month, there was no overall change in violations at intersections that did not have the signal time increased.



Conclusions

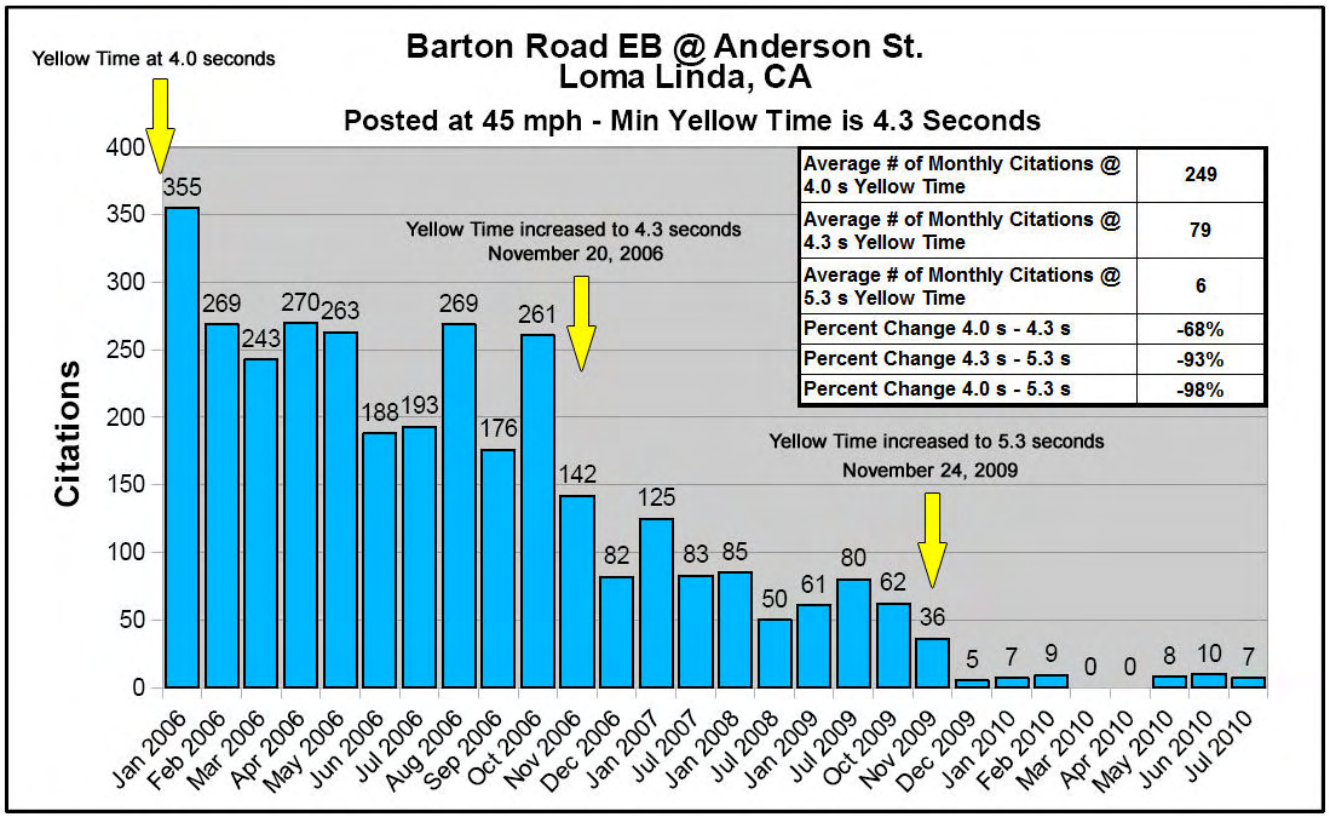
The absence of an increase in red light running violations both at intersections with longer yellow times and at intersections without increases clearly indicates that motorists do not adjust their driving behavior to any large extent to account for longer yellow times, as critics of this safety countermeasure have often claimed. Furthermore, the immediate and lasting reduction in violations which occurred upon lengthening of the yellow signal time strongly suggests that a large majority of the red light running incidents that had been occurring previous to the timing adjustment were inadvertent, not willful. This was likely primarily due to the use of the posted speed limit to calculate the minimum yellow duration rather than the true approach speed of the vehicles on the roadway.

A Before and After Study of Violations in Loma Linda, CA Subsequent to an Increase in the Yellow Duration

By Jay Beeber, Safer Streets L.A., Member ITE

In Loma Linda, CA, at the intersection of Barton Road eastbound at Anderson Street, photo enforcement began in January of 2006. The roadway was posted with a 45 mph speed limit with at 4.0 second yellow duration. Per California MUTCD standards, the signal time was deficient by 0.3 seconds. On November 20th 2006, city officials increased the yellow signal time by 0.3 seconds to the statutory minimum of 4.3 seconds. As the chart below indicates, there was an immediate 68% decrease in the number of citations issued from a monthly average of 249 per month to an average of 79 per month. According to city officials, no other engineering or signal timing changes were made.

In the fall of 2009, city officials decided to arbitrarily increase the yellow signal timing an additional 1.0 second. This decision was not based on any engineering study or criteria, simply the will of elected officials to further reduce violations. The timing change was made on November 24, 2009. As before, no other engineering or signal timing changes were made. As the chart below indicates, when the yellow time was increased this additional 1.0 second, citations decreased a further 93% from the previous monthly average of 79 per month to an average of 6 per month. The total decrease in issued citations in Loma Linda was 98% when the yellow time was increased from the originally deficient 4.0 seconds to the arbitrary 5.3 seconds. The data supplied indicates that the reduction in violations was maintained through July 2010 and according to elected officials, through the end of the red light camera program in November of 2010 as well.



Raw data in spreadsheet format compiled from official red light camera monthly reports provided by the City of Loma Linda under the California Public Records Act is attached. Original documents available at http://highwayrobbery.net/redlightcamsdocsLomaLindaMain.html.

From: Rigsby, Rhodes
Sent: Tuesday, June 11, 2013 4:35 PM
To: 'Erin.Riches@sen.ca.gov'
Cc: Rigsby, Rhodes
Subject: Yellow Timing Study for Loma Linda

Dear Senate Transportation and Housing Committee:

I have reviewed the attached documents prepared by Jay Bieber of Safer Streets LA. His analysis is correct.

During our 5-year experience with red light cameras from 2005 to 2010, we modified our yellow light durations twice. The first time was after we discovered that our yellow lights did not meet the minimum California standard. At that point, we immediately made the change, which is recorded in Mr. Bieber's analysis as a change from 4.0 to 4.3 seconds. The second time was on my initiative in the fall of 2009, based on my reading of the Texas Highway Institute studies showing that increased yellow durations caused significant decreases in straight-through and left-turn violations. On this arbitrary basis, we added another 1.0 second to each yellow light at each camera-controlled intersection. We made no other engineering changes and made no change in our enforcement. As the chart shows, the violations decreased by another 90% overnight, which more than confirms the Texas experience.

I hope this attestation helps you in your deliberations on this topic.

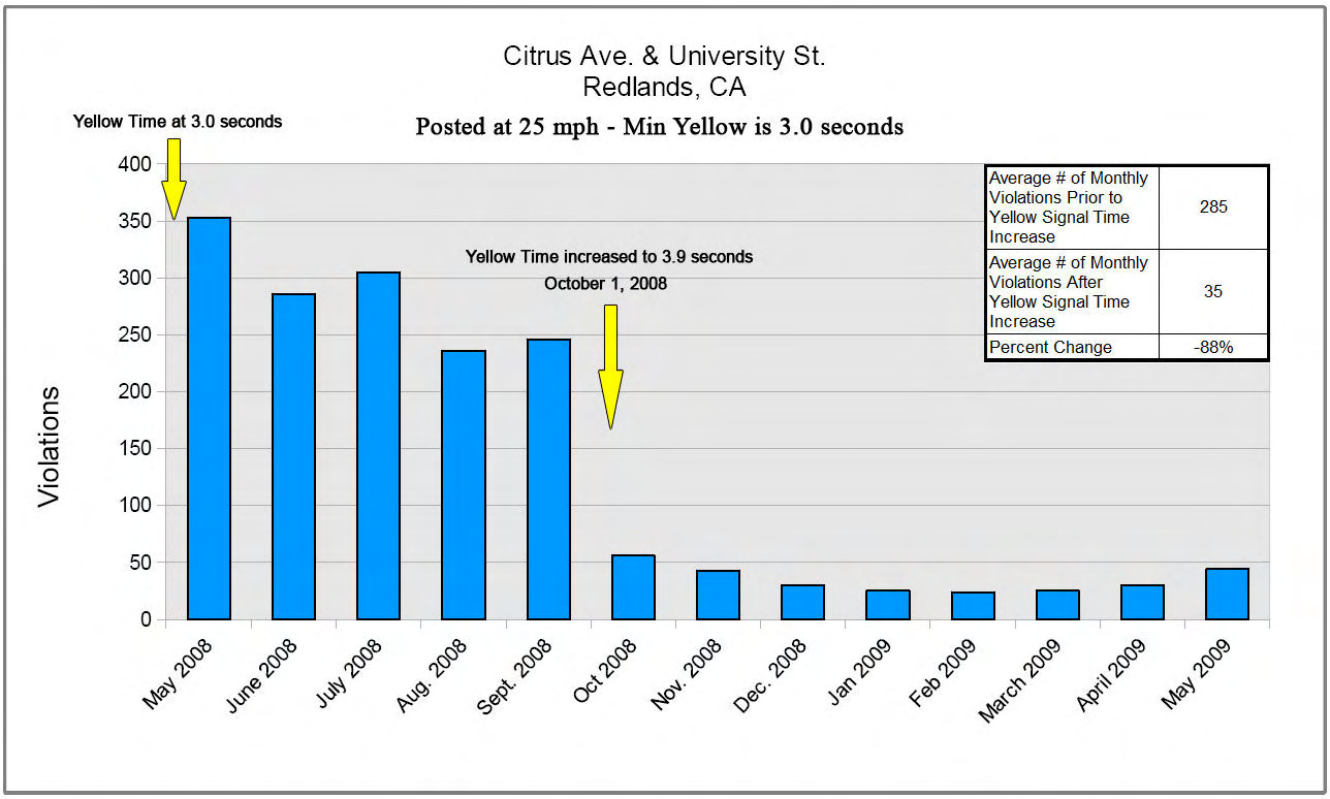
Sincerely,

Rhodes L. Rigsby, M.D., MBA
Assistant Professor, Loma Linda University School of Medicine
Mayor, City of Loma Linda

A Before and After Study of Violations in Redlands, CA Subsequent to an Increase in the Yellow Duration

By Jay Beeber, Safer Streets L.A., Member ITE

The City of Redlands installed one red light camera at the intersection of Citrus Ave. and University St. in May of 2008. The yellow time was set at 3.0 seconds, the minimum duration for a roadway posted at 25 mph. After numerous complaints and a court challenge, the city increased the yellow time by almost a full second to 3.9 seconds on October 1, 2008. Immediately, violations dropped an average of 88% and remained at the lower rate. The program was terminated at the end of May 2009.



Raw data in spreadsheet format compiled from official red light camera monthly reports provided by the City of Redlands under the California Public Records Act is attached. Original documents available at http://highwayrobbery.net/redlightcamsdocsRedlandsMain.html.

Case Study:
West Hollywood, CA

The City of West Hollywood, CA implemented a red light photo enforcement program in 1999. Currently, 24 approaches at a total of 8 intersections are monitored by red light cameras. Of those, 16 approaches are monitored on a continuous basis. The enforcement systems at the remaining 8 approaches are activated intermittently. Uninterrupted monthly citation figures, therefore, only exist for the 16 approaches where the enforcement cameras are continuously functional.

Until recently, traffic signal yellow intervals in West Hollywood had been set at the absolute minimum time based on the posted speed limit of the roadway. In 2012, the city began implementing a new policy of setting the yellow interval based on the posted speed limit plus an additional 5 mph. This resulted in 0.3 s to 0.4 s of additional time being added to the yellow interval at intersections where the new timing protocol has been employed. The process of re-timing the signals throughout the city has yet to be completed.

The purpose of this analysis is to determine the effect this increase in the yellow interval has had on the citation rate at photo enforced intersection approaches.

The West Hollywood red light camera program provides an ideal test case for this analysis as the city only cites for straight through violations. As a result, all citation data consists only of vehicles proceeding straight through the intersection. At our request, Los Angeles County Sheriff's Deputy Zenon Porche, who administers the city's red light camera program, generated a report detailing the number of monthly citations issued for each intersection approach in the city from the inception of the program through September 2013. In addition, the city's traffic engineering department provided a listing of the months in which the yellow interval was increased at each intersection monitored by red light camera systems. The change dates, along with the before and after yellow interval times, for each red light camera intersection are listed in the table below.

West Hollywood RLC Intersections Yellow Interval Change Dates		NB/SB			EB/WB		
		Previous	Current	Difference	Previous	Current	Difference
Intersection	Date Changed	Yellow Phase	Yellow Phase	YP	Yellow Phase	Yellow Phase	YP
Fountain Av/Crescent Hts Blvd	Oct-12	**3.6**	**3.9**	**0.3**	3.6	3.9	0.3
Fountain Av/Fairfax Av	Nov-12	**3.6**	**3.9**	**0.3**	3.6	3.9	0.3
Fountain Av/La Brea Av	Oct-12	**3.6**	**3.9**	**0.3**	3.5	3.9	0.4
Santa Monica Blvd/ Fairfax Av	Jun-12	**3.6**	**3.9**	**0.3**	3.5	3.6	0.1
Sunset Bl/La Cienega Bl	Jun-13	3.0	3.6	0.6	**3.6**	**3.9**	**0.3**
Santa Monica Blvd/La Brea	N/A	**3.6**	TBD	TBD	**3.5**	TBD	TBD
Melrose Av/La Cienega Bl	N/A	**3.7**	TBD	TBD	3.7	TBD	TBD
Beverly Bl/Robertson Bl	N/A	3.6	TBD	TBD	**3.7**	TBD	TBD

Of the five intersections where the yellow interval had been increased at the time of this study, one was increased in June 2012, two were increased in October 2012, one was increased in November 2012, and one was increased in June 2013.

Data Analysis and Results

For this study, we compiled the number of citations issued at each photo enforced intersection approach before and after the yellow interval was increased. We eliminated any intersection approach where the enforcement system was not active for all months of the study. Additionally, we eliminated the eastbound and westbound intersection approaches at Sunset Blvd and La Cienega Blvd as the limited after period of three months did not provide sufficient data for a valid analysis. After this data reduction, figures for a total of seven intersection approaches were available for analysis.

For each intersection approach, the average number of monthly citations before and after the signal timing increase was calculated, as was the percent change in the number of citations. The before period for the analysis ran from January 2012 to the month prior to the month in which the signal timing was changed. The after period for the analysis ran from the month after the month in which the signal timing was changed to September 2013, the most recent month for which data was available. The month in which the signal timing was changed was eliminated from the analysis as it contained a mix of before and after data. The results appear in the table below. Months highlighted in yellow represent the months in which the signal timing changes were made.

N/B LaBrea At Fountain Yellow Interval Increase of 0.3 sec in Oct. 2012		**S/B LaBrea At Fountain - Yellow Interval Increase of 0.3 sec in Oct. 2012**		**N/B Fairfax At Fountain - Yellow Interval Increase of 0.3 sec in Nov. 2012**		**S/B Fairfax At Fountain - Yellow Interval Increase of 0.3 sec in Nov. 2012**		**N/B Crescent Hts At Fountain - Yellow Interval Increase of 0.3 sec in Oct. 2012**		**S/B Crescent Hts At Fountain - Yellow Interval Increase of 0.3 sec in Oct. 2012**		**N/B Fairfax At Santa Monica - Yellow Interval Increase of 0.3 sec in June 2012**	
Month	Citations	Month	Citations	Month	Citations	Month	Citations	Month	Citations	Month	Citations	Month	Citations
Jan 2012	217	Jan 2012	109	Jan 2012	108	Jan 2012	33	Jan 2012	46	Jan 2012	51	Jan 2012	43
Feb 2012	148	Feb 2012	135	Feb 2012	89	Feb 2012	27	Feb 2012	35	Feb 2012	50	Feb 2012	45
Mar 2012	160	Mar 2012	134	Mar 2012	93	Mar 2012	35	Mar 2012	49	Mar 2012	59	Mar 2012	48
Apr 2012	165	Apr 2012	129	Apr 2012	101	Apr 2012	34	Apr 2012	47	Apr 2012	53	Apr 2012	40
May 2012	186	May 2012	142	May 2012	120	May 2012	37	May 2012	49	May 2012	42	May 2012	44
Jun 2012	199	Jun 2012	156	Jun 2012	126	Jun 2012	36	Jun 2012	47	Jun 2012	58	Jun 2012	20
Jul 2012	156	Jul 2012	149	Jul 2012	129	Jul 2012	39	Jul 2012	53	Jul 2012	59	Jul 2012	28
Aug 2012	193	Aug 2012	168	Aug 2012	155	Aug 2012	38	Aug 2012	52	Aug 2012	60	Aug 2012	16
Sept 2012	194	Sept 2012	159	Sept 2012	110	Sept 2012	44	Sept 2012	48	Sept 2012	57	Sept 2012	21
Oct 2012	129	Oct 2012	128	Oct 2012	100	Oct 2012	42	Oct 2012	49	Oct 2012	20	Oct 2012	27
Nov 2012	89	Nov 2012	64	Nov 2012	95	Nov 2012	33	Nov 2012	25	Nov 2012	20	Nov 2012	16
Dec 2012	45	Dec 2012	24	Dec 2012	82	Dec 2012	18	Dec 2012	15	Dec 2012	19	Dec 2012	15
Jan 2013	42	Jan 2013	55	Jan 2013	54	Jan 2013	17	Jan 2013	19	Jan 2013	19	Jan 2013	22
Feb 2013	55	Feb 2013	54	Feb 2013	56	Feb 2013	25	Feb 2013	13	Feb 2013	18	Feb 2013	22
Mar 2013	63	Mar 2013	66	Mar 2013	64	Mar 2013	19	Mar 2013	23	Mar 2013	16	Mar 2013	23
Apr 2013	56	Apr 2013	48	Apr 2013	18	Apr 2013	21	Apr 2013	27	Apr 2013	15	Apr 2013	23
May 2013	56	May 2013	41	May 2013	76	May 2013	10	May 2013	19	May 2013	22	May 2013	27
Jun 2013	41	Jun 2013	58	Jun 2013	57	Jun 2013	16	Jun 2013	19	Jun 2013	15	Jun 2013	23
Jul 2013	46	Jul 2013	46	Jul 2013	49	Jul 2013	17	Jul 2013	33	Jul 2013	28	Jul 2013	32
Aug 2013	61	Aug 2013	39	Aug 2013	43	Aug 2013	18	Aug 2013	22	Aug 2013	17	Aug 2013	28
Sept 2013	49	Sept 2013*	38	Sept 2013	13	Sept 2013	17	Sept 2013	29	Sept 2013	24	Sept 2013	23
Average Before Change	180	Average Before Change	142	Average Before Change	113	Average Before Change	37	Average Before Change	47	Average Before Change	54	Average Before Change	44
Average After Change	55	Average After Change	48	Average After Change	51	Average After Change	19	Average After Change	22	Average After Change	19	Average After Change	23
% Change	**-69.5%**	**% Change**	**-66.0%**	**% Change**	**-54.7%**	**% Change**	**-47.4%**	**% Change**	**-53.1%**	**% Change**	**-64.4%**	**% Change**	**-47.6%**

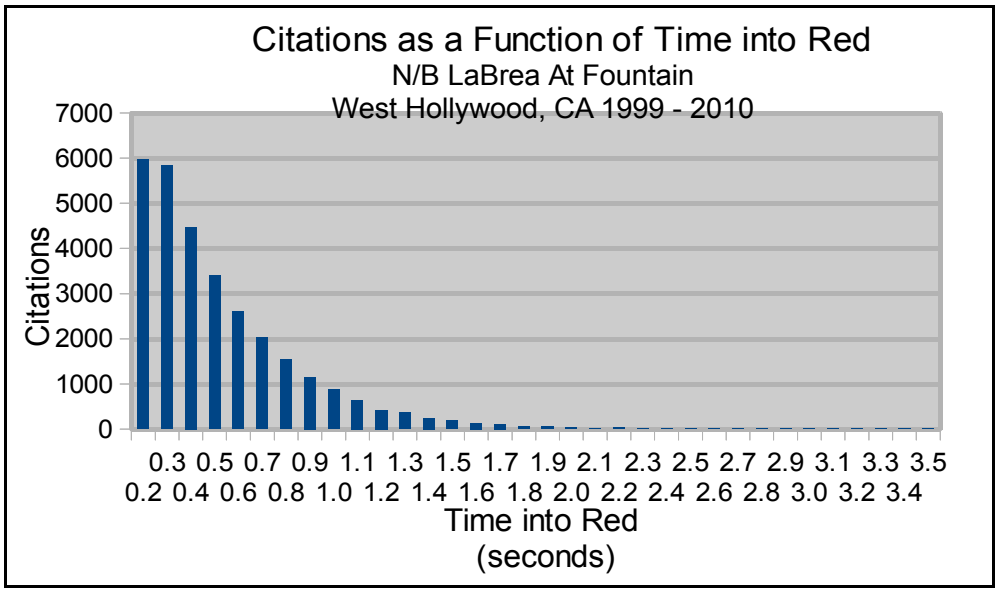
A summary table of the above results including a calculation of the overall rate of change in citations at the seven study locations appears below:

Change in Citations Issued After 0.3 Sec Increase in Yellow Interval West Hollywood, CA			
Location	Average Citations Before Change	Average Citations After Change	**% Change**
N/B LaBrea At Fountain	180	55	**-69.5%**
S/B LaBrea At Fountain	142	48	**-66.0%**
N/B Fairfax At Fountain	113	51	**-54.7%**
S/B Fairfax At Fountain	37	19	**-47.4%**
N/B Crescent Hts At Fountain	47	23	**-51.3%**
S/B Crescent Hts At Fountain	48	19	**-59.3%**
N/B Fairfax At Santa Monica	44	23	**-47.6%**
Totals	610	239	**-60.9%**

Discussion

By increasing the yellow interval by 0.3 s at intersections within the city of West Hollywood, traffic engineers were able to achieve an overall 61% reduction in red light running at the locations analyzed in this study. Individual intersection approaches saw reductions in the range of 48% to 70%, with the greatest percentage reductions occurring at locations with the greatest number of red light violations prior to the yellow time change. This result is to be expected as the number of red light violations at intersections where the yellow interval is set at or near the minimum time based on the posted speed limit is consistently found to be relatively high in the first few fractions of a second after the light turns red and decreases exponentially as the time into red increases.

The chart below illustrates the distribution of citations issued at the photo enforced intersection of LaBrea and Fountain Avenues in West Hollywood from the inception of the program through 2010 as a function of the time into red.



This is the typical distribution of red light running events seen for the straight through movement when the yellow interval is set at or near the minimum time based on the posted speed limit. When the yellow interval is increased, violations occurring during the corresponding time period are eliminated.

Conclusions

The decreased incidents of red light running brought about by the increase of 0.3 seconds in the yellow interval has likely increased safety at intersections where the change has been made. However, additional reductions in red light running incidents along with additional improvements in safety are achievable through additional increases in the yellow interval and possibly other engineering countermeasures. For example, a very modest 0.3 s increase in the yellow interval at the north and southbound approaches to the intersection of La Brea and Fountain Avenues resulted in an average 68% decrease in red light running from an average of 161 issued citations per month to an average of 52 issued citations per month. By increasing the yellow interval an additional 0.4 s to 0.7 s, red light running incidents would be further reduced. Based on experience at intersections in other jurisdictions where the yellow interval has been increased by 0.7 s to 1.0 s beyond the minimum time and which resulted in an overall 80% to 90% reduction in red light running, West Hollywood could expect to reduce the number of red light running events at this intersection, as well as others throughout the city, to no more than 10 and 20 per month by increasing the yellow interval to a similar extent.

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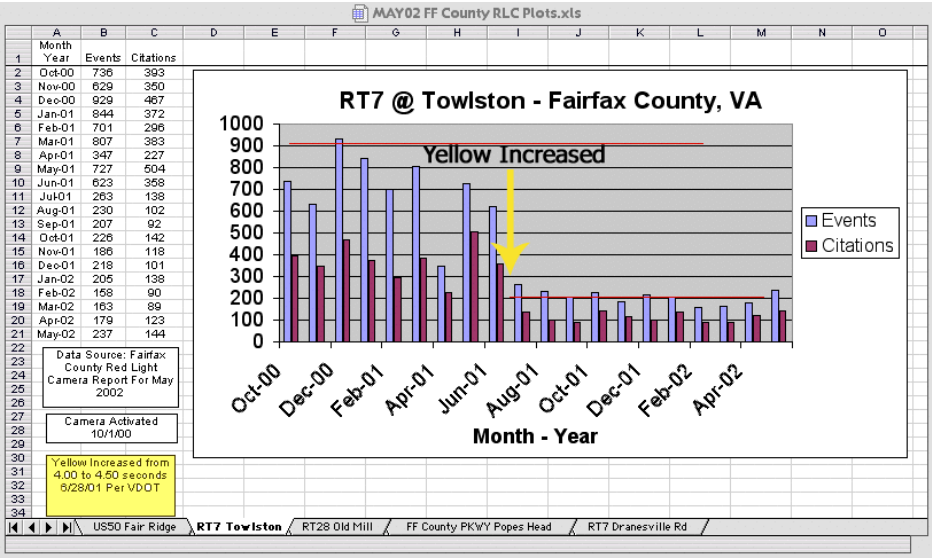
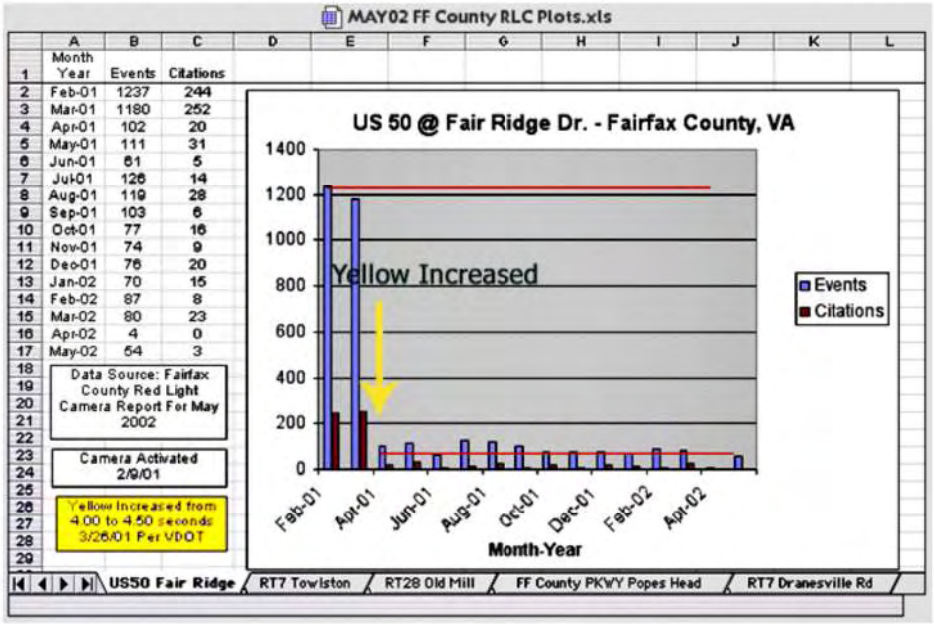
Fairfax County, VA

The following two figures show how Fairfax County, VA achieved a significant, sustained reduction in violations when the yellow timing was increased by ½ second. Note also that although red-light cameras were present at these intersections during the entire review period, a dramatic reduction in violations was seen only after the yellow timing was increased.



Month Year	Events	Citations
Oct-00	736	393
Nov-00	629	350
Dec-00	929	467
Jan-01	844	372
Feb-01	701	296
Mar-01	807	383
Apr-01	347	227
May-01	727	504
Jun-01	623	358
Jul-01	263	138
Aug-01	230	102
Sep-01	207	92
Oct-01	226	142
Nov-01	186	118
Dec-01	218	101
Jan-02	205	138
Feb-02	158	90
Mar-02	163	89
Apr-02	179	123
May-02	237	144



Month Year	Events	Citations
Feb-01	1237	244
Mar-01	1180	252
Apr-01	102	20
May-01	111	31
Jun-01	61	5
Jul-01	126	14
Aug-01	119	28
Sep-01	103	6
Oct-01	77	16
Nov-01	74	9
Dec-01	76	20
Jan-02	70	15
Feb-02	87	8
Mar-02	80	23
Apr-02	4	0
May-02	54	3

San Diego

The chart below shows the 30% to 55% reduction in violations achieved at San Diego red-light camera sites when the yellow interval times were increased, even by as little as 0.2 second.

RESULTS FROM INCREASING YELLOW TIMES AT 6 of 19 SAN DIEGO RED LIGHT CAMERA SITES:

INT #	LOCATION	BEFORE YELLOW (seconds)	BEFORE VIOLATIONS (per 100 hrs)	AFTER YELLOW (seconds)	AFTER VIOLATIONS (per 100 hrs)	YELLOW INCREASE (seconds)	VIOLATION REDUCTION (percent)
1454	WB GARNET AVE @ INGRAHAM ST	3.00	98.8	3.20	55.9	0.20	-43.4%
1504	WB "F" ST @ 16TH ST	4.00	49.4	4.90	22.5	0.90	-54.5%
1534	WB MIRAMAR RD @ CAMINO RUIZ	4.40	42.5	4.80	29.8	0.40	-29.9%
1541	NB MISSION BAY DR TO WB GRAND AVE	3.10	363.4	4.70	42.2	1.60	-88.4%
1542	SB MISSION BLVD @ GARNET AVE	3.00	49.9	3.70	30.3	0.70	-39.3%
1553	EB MIRA MESA BLVD @ SCRANTON RD	3.90	98.7	4.30	52.7	0.40	-46.6%

SOURCE: San Diego Photo Enforcement System Review January 14, 2002

FHWA Recommended Practices

In addition to the ITE, the USDOT and FHWA also provide recommended standards for the setting of yellow signal times. In their presentation regarding countermeasures for red light running, available at http://safety.fhwa.dot.gov/intersection/redlight/outreach/marketing/rlr_pps022509/long/, under the heading "Improve Signal Timing" (slides 27 - 28) are the following guidelines:

- Traffic engineers should make sure that yellow change interval is set properly. This step is covered in the field review checklist that was presented in an earlier slide.
- Research shows that yellow interval duration is a significant factor affecting the frequency of red-light running and that increasing yellow time to meet the needs of traffic can dramatically reduce red-light running.
- When yellow intervals are set too short for the prevailing speed, there is likely to be a higher incidence of red-light running due to drivers being caught in the dilemma zone.
- **If the approach speed is not known, then the speed limit plus 10 mi/h is recommended. Studies show that most speed limits in general are 8-12 mi/h below the prevailing speed.**
- **An additional 0.5 sec of yellow time should be considered for locations with significant truck traffic, significant population of older drivers**
- Yellow times less than recommended by this equation result in more red-light violations and higher crash rates.
- Increasing yellow times that are shorter than recommended by this equation has been show to reduce severe red-light related crashes. A 1.0 sec increase in yellow time results in 40 percent decrease in severe red-light related crashes.

Using an approach speed of 10 mph over the posted speed limit results in an additional 0.7 second yellow time. Adding the recommended 0.5 second for truck traffic and older drivers yields a total of 1.2 seconds of additional yellow.

Drivers Do Not Adapt to Longer Yellow Durations of About 1 Second.

In addition to the evidence presented above from locations where yellow signal times have been increased with no adaptation by drivers, other independent studies have found similar results.

"*The data show that the percentage of last-to-cross vehicles clearing the intersection (T + 0.2) seconds or more past the yellow onset was not appreciably changed by the extension of the yellow phase."*

The Influence of the Time Duration of Yellow Traffic Signals on Driver Response, Stimpson/Zador/Tarnoff, ITE Journal (November 1980)

"*Research has consistently shown that drivers do not, in fact, adapt to the length of the yellow."*

Determining Vehicle Change Intervals – A Proposed Recommended Practice,Institute of Transportation Engineers (1985)

"*Drivers do adapt to the increase in yellow duration*; however, this adaptation does not undo the benefit of an increase in yellow duration."*

Effect of Yellow-Interval Timing on Red-Light-Violation Frequency at Urban Intersections, Bonneson/Zimmerman, Texas Transportation Institute (January 2004)

*****Note, however, that the adaptation found was minor, shifting the statistical curve about 0.2 of a second. Most other studies at photo enforced intersections over long periods of time show no increase in red light running after the initial reduction in violations. This suggests that drivers do *not* adapt to the increase in yellow duration in any meaningful way. Yet even in this one study that suggested that drivers may adapt to a longer yellow time, the evidence showed that the safety benefit of a 53% decrease in violations and 40% decrease in crashes far outweighed any driver adaptation.

Conclusions

If the yellow signal time was increased at red light camera locations, violations would be greatly reduced resulting in a significant increase in safety as well as eliminating the needless ticketing of tens of thousands of otherwise law-abiding motorists every year. The lack of a rebound in violations or collisions, even after a number of years of motorists experiencing longer signal times, belies the notion that motorists can perceive this change and will adjust their driving behavior. All the evidence to date indicates that this does not happen. In fact, the evidence shows just the opposite, that once the yellow light time is increased, violations and collisions are significantly reduced, never to return.