

Analysis of Capitola Red Light Camera Enforcement Program

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

Background

Safer Streets L.A. is a public policy and research organization dedicated to the adoption of scientifically sound and sensible traffic and transportation practices. Safer Streets L.A. promotes science based solutions to motorist and pedestrian safety issues through the presentation of well researched and verifiable data to elected officials, Commissions and Boards. Safer Streets L.A. provides this information on a voluntary basis and is not paid to interact with elected officials.

Our goal in forwarding the following information is to provide additional information on the use of photo enforcement in Capitola, California. We hope that this information proves useful in deliberations as to whether or not to continue the city's photo enforcement 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 has served on a number of transportation related working groups including the Subcommittee on Statewide Traffic Signal Timing and the Subcommittee on School Zone Safety for the California Traffic Control Devices Committee, which sets the rules for statewide traffic practices. Mr. Beeber has been deemed an expert witness in court cases involving the proper usage of red light cameras in the State of California. He has authored numerous studies on traffic and pedestrian safety measures.

Introduction

The City of Capitola has maintained an Automated Red Light Enforcement (ARLE) System at the intersection of 41st Ave. and Mall Entrance since October 2005 and at the intersection of 41st Ave. and Clares Street since November 2007. At the City Council meeting on August 24, 2007, a staff report will be presented recommending an extension of the red light camera program for an additional two years.

Safer Streets L.A. reviewed the Staff Report and conducted a before and after analysis of collisions both citywide and at the two photo enforced intersections. All data was compiled from the CHP 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 database contains complete records from January 2001 through December 2016.

Findings

Our analysis determined the following:

1. While it is commendable that the Capitola Police Department employs a “spirit of the law” approach when considering the issuance of a citation, since the program's inception, the city has issued over 18,000 tickets. Approximately 38% of the tickets are for “rolling right turns”. Our

analysis of 11 years of statewide collision data shows that rolling-right-turns, while technically impermissible, rarely ever result in collisions involving motor vehicles, bicyclists, or pedestrians. We determined that rolling-right-turns represented just 0.075% (75/1000th of 1%) of all collisions each year in California. Rolling-right-turns involving pedestrians are just 63/10,000th of 1% of all collisions in the state each year and rolling-right-turns involving bicyclists are just 111/10,000th of 1% of all collisions in the state each year. 76% of rolling-right-turn collisions do not involve a pedestrian or bicyclist.

2. At the intersection of 41st Ave. and Mall Entrance, the rate of red light related collisions, rear end collisions, and total collisions **all increased** after the cameras were installed.
3. Further, at the intersection of 41st Ave. and Mall Entrance, there were no red light running collisions prior to camera installation from 2001 through 2005. It is unclear why this location was chosen for red light cameras enforcement.
4. At the intersection of 41st Ave. and Clares St., the rate of red light related collisions **increased** after the cameras were installed.
5. Citywide, the rate of red light related collisions has **remained unchanged** before and after the cameras were installed.
6. Although the city has issued over 18,000 citations since automated ticketing began in 2005 (now over \$500 each), it appears that the Capitola red light camera program **has not led to an increase in safety** in the city.

Detailed Analysis

The Staff Report incorrectly provides an analysis of the red light camera program by comparing the *total* accident rates before and after the cameras were installed rather than the accident rates for red light related collisions only. No study has ever shown that red light cameras have an effect on the rates of other categories of collisions not related to red light running, such as unsafe lane changes, failure to yield, unsafe turning, and speed unsafe for conditions. Therefore, the change in red light running collisions is the proper criterion for the evaluation of the effectiveness of red light camera systems, as collisions caused by red light running are the only type of collision that can reasonably be expected to be reduced through the use of red light cameras. Red light related collisions are those where the primary collision factor is listed in the SWITRS database as a red light violation (CVC 21453).

41st Ave. and Mall Entrance

Cameras were installed in October 2005. In our before and after analysis, we therefore used 2001 through 2005 as the before period and 2006 through 2016 as the after period.

Red light running collisions

41st Ave @ Mall Red Light Related Collisions	
Year	Collisions
2001	0
2002	0
2003	0
2004	0
2005	0
2006	1
2007	0
2008	1
2009	0
2010	0
2011	0
2012	0
2013	0
2014	0
2015	0
2016	1
Average 2001 -2005	0
Average 2006 -2016	0.3

As can be seen from the table at left, there were no red light running collisions prior to camera installation. Subsequent to the installation of cameras at the end of 2005, there have been three red light running collisions, one each in 2006, 2008, and 2016. All collisions were property damage only with no injuries.

Rear end collisions

41st Ave @ Mall Rear End Collisions	
Year	Collisions
2001	0
2002	0
2003	1
2004	0
2005	0
2006	1
2007	0
2008	0
2009	0
2010	0
2011	0
2012	1
2013	1
2014	1
2015	1
2016	1
Average 2001 -2005	0.2
Average 2006 -2016	0.5

The average number of annual rear end collisions within 75 ft of the intersection increased slightly from 0.2 per year before the cameras were installed to 0.5 collisions per year after the cameras were installed. Rear end collisions have been known to increase in the presence of red light cameras as some drivers tend to over-react and slam on their brakes in order to avoid a potential ticket. This may have occurred at this location, though a statistical analysis using a paired T-test determined that the change was not statistically significant.

Total collisions

41st Ave @ Mall Total Collisions	
Year	Collisions
2001	1
2002	2
2003	2
2004	0
2005	1
2006	3
2007	0
2008	2
2009	2
2010	2
2011	2
2012	2
2013	1
2014	2
2015	1
2016	2
Average 2001 - 2005	1.2
Average 2006 - 2016	1.7

Although the change in total collisions is not the proper criterion for evaluating the effectiveness of red light cameras, we include this analysis since the Staff Report claims a 94 percent reduction in “traffic collisions” at this intersection. Our analysis of the collisions listed in the database shows that there was a slight **increase** in the total number of collisions at this intersection. Again, the change was not statistically significant.

We were unable to duplicate the results claimed in the Staff Report nor were we able to find anywhere near the number of collisions at this intersection in 2005 (or any other year) as shown in the Staff Report. The Staff Report lists a total of 19 collisions at this intersection in 2005. However, as the table above shows, the SWITRS database only includes 1 collision at this intersection in 2005. The highest number of total collisions at this intersection in any of the years studied was 3 in 2006, after cameras began monitoring the intersection.

Since the city provides to the CHP the data that appears in the SWITRS database, we cannot explain such a huge discrepancy. Although we have found that collision data within a city's database may vary marginally from the number of collisions in the SWITRS database, in our experience, this great of an inconsistency is unusual. It is unlikely that the mismatch is due simply to the city not reporting all collisions to the state as there is less of a deviation between city

reported collisions and the state database at the Clares location. Further, the lower collision numbers found in the database is more consistent with the type of intersection at this location, a T intersection with the minor leg being an entrance into a mall. Although, Council Members may wish to have Staff report back with an explanation, we reiterate that the change in the total number of collision is irrelevant when evaluating the effectiveness of the red light camera program.

Results

In both categories relevant to the use of red light automated enforcement, red light running collisions and rear end collisions, there was an **increase in collisions** at this intersection after photo enforcement was implemented. Further, since there were no red light related collisions in the five years prior to the start of automated ticketing, this intersection was likely not a good candidate for the use of red light cameras. At best, red light cameras have had no effect on traffic safety at this location and may have caused a marginal decrease in safety due to an increase in rear end collisions.

41st Ave. and Clares St.

Cameras were installed in November 2007. In our before and after analysis, we therefore used 2001 through 2007 as the before period and 2008 through 2016 as the after period.

Red light running collisions

41st Ave @ Clares Red Light Related Collisions	
Year	Collisions
2001	0
2002	1
2003	1
2004	0
2005	0
2006	2
2007	1
2008	1
2009	2
2010	1
2011	0
2012	0
2013	1
2014	3
2015	0
2016	0
Average 2001 -2007	0.7
Average 2008 -2016	0.9

At the Clares intersection, the annual number of red light running collisions **increased** slightly, from 0.7 collisions per year to 0.9 collisions per year after the cameras were installed, though the change is not statistically significant.

Total collisions

41st Ave @ Clares Total Collisions	
Year	Collisions
2001	19
2002	35
2003	31
2004	33
2005	18
2006	18
2007	16
2008	14
2009	16
2010	13
2011	10
2012	11
2013	9
2014	11
2015	11
2016	11
Average 2001 -2007	24.3
Average 2008 -2016	11.8
% Change	-52%
Average 2002 -2004	33.0
2007	16.0
% Change	-52%

As we explained previously, the change in total collisions is not the proper criterion for evaluating the effectiveness of red light cameras as collisions caused by red light running are the single type of collision that can reasonably be expected to be reduced through the use of red light cameras. However, since the Staff Report claims a 74 percent reduction in “traffic collisions” at this intersection we include this analysis.

As can be seen in the table to the left, in a pure before and after analysis, the average number total collisions did go down about 52% at this location. However this reduction was likely not a result of the use of red light camera enforcement. First, note that prior to the implementation of automated enforcement in late 2007, the total accident rate had already dropped by 52% when comparing 2007 with the average rate in the three highest outlying years, 2002 – 2004. Since the cameras had not yet been employed, their use could not be responsible for the reduction. Further, the table below shows that the reduction in the rate of collisions was primarily due to a reduction in the types of collisions not associated with red light running. For example, collisions caused by unsafe lane changes (VC 21658) dropped 70%, collisions caused by failure to yield when entering the roadway (VC 21804) dropped 85%, collisions caused by speed too great for conditions (VC 22350) dropped 44%, and collisions where the cause was unknown or where there was no violation dropped 70%. None of these types of collisions would be expected to be affected by the presence of red light cameras. Therefore automated enforcement

cannot be credited with causing the reduction in overall collisions at this intersection.

Results

In the category relevant to the use of red light automated enforcement, red light running collisions, there was an **increase in collisions** at this intersection after photo enforcement was implemented. Further, the reduction in total collisions cannot be due to camera enforcement since the majority of the reduction occurred prior to the implementation of red light cameras and the reduction was in collisions categories not associated with red light running.

There is no evidence that red light cameras have had any positive effect on traffic safety at this intersection.

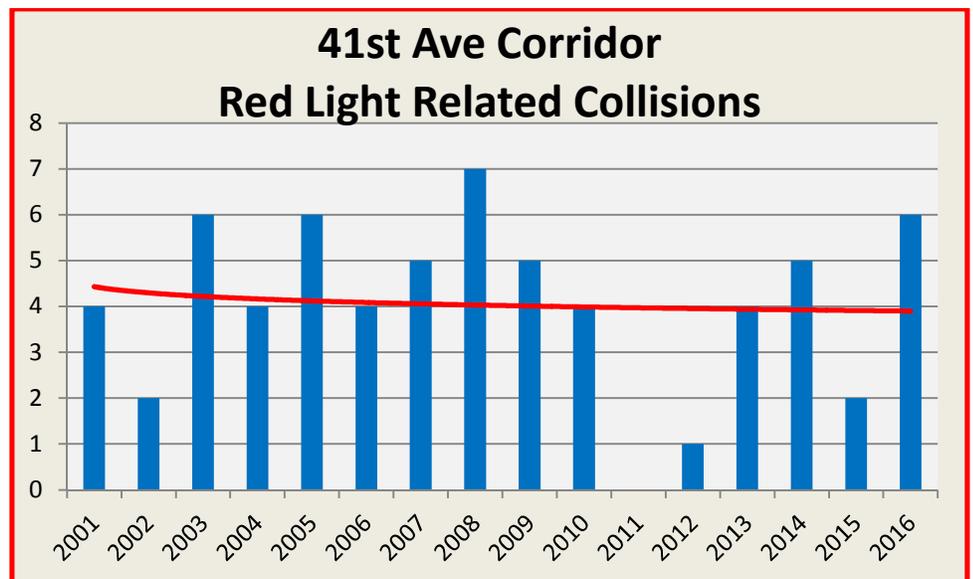
41st Ave. Corridor

The Staff Report notes that “the accident rate on 41st Avenue in the City has decreased by 43 percent since the program was initiated in 2005”. Again, we repeat our caution that the potential benefits of red light camera enforcement cannot be evaluated using the criterion of “total collisions” as is done in the Staff Report. We also note that evaluating an entire traffic corridor for the change in collisions, red light related or otherwise, is likely to yield less accurate results than evaluating red light related collisions at individual intersections where cameras are employed. Regardless, for completeness, we include an evaluation of red light running collisions along the 41st Ave corridor.

Red light running collisions

Since red light camera enforcement was first implemented at one intersection along this corridor at the end of 2005, we used 2001 through 2005 as the before period and 2006 through 2016 as the after period in our analysis.

41st Ave Corridor Red Light Related Collisions	
Year	Collisions
2001	4
2002	2
2003	6
2004	4
2005	6
2006	4
2007	5
2008	7
2009	5
2010	4
2011	0
2012	1
2013	4
2014	5
2015	2
2016	6
Average 2001 -2005	4.4
Average 2006 -2016	3.9



Note from the above table and chart, that red light running collisions along this corridor marginally decreased in the period after the cameras were installed. However, a paired T-test statistical analysis shows that the change is not statistically significant and is likely due to random fluctuations from year to year. The p-value was determined to be 0.656336. Statistical significance is likely only when the resulting p-value is less than 0.05.

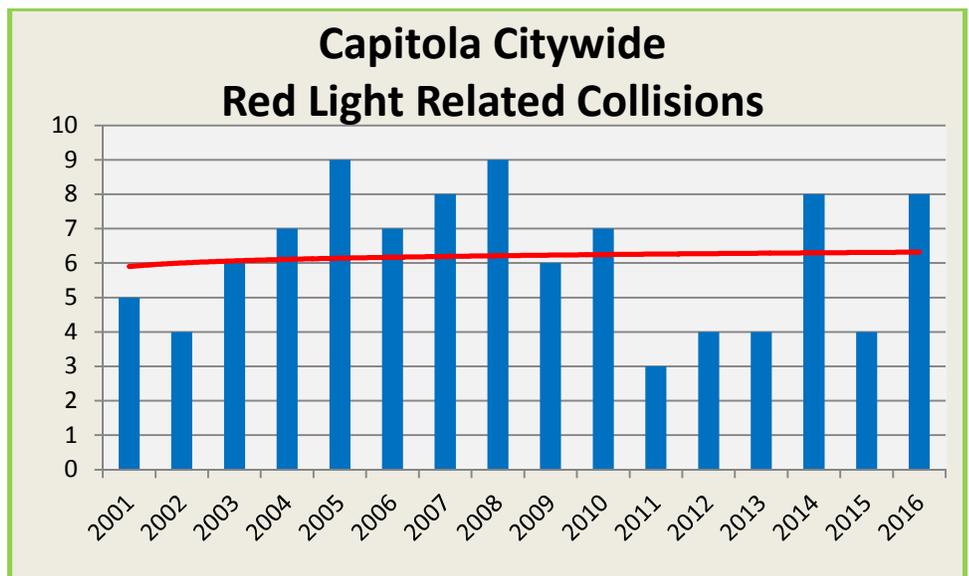
Results

Red light camera enforcement is unlikely to have had any effect on traffic safety in this corridor as the change in the collision rate is not statistically significant and red light running collisions actually increased at the individual intersections in this corridor where red light cameras were in use.

Citywide Collisions

For completeness, we also include an evaluation of red light running collisions, citywide, before and after the cameras were employed. Since red light camera enforcement was first implemented in the city at the end of 2005, we used 2001 through 2005 as the before period and 2006 through 2016 as the after period in our analysis.

Capitola Citywide Red Light Related Collisions	
Year	Collisions
2001	5
2002	4
2003	6
2004	7
2005	9
2006	7
2007	8
2008	9
2009	6
2010	7
2011	3
2012	4
2013	4
2014	8
2015	4
2016	8
Average 2001 - 2005	6.2
Average 2006 - 2016	6.2



As can be seen from the above table and chart, the rate of red light running collisions within the City of Capitola remains unchanged more than a decade after red light cameras were first implemented in the city.

Conclusions

Based on our analysis, the City of Capitola's red light camera program appears to have had no positive effect on traffic safety in the city, even after more than a decade of enforcement and the issuance of over 18,000 tickets, each of which costs defendants over \$500 per citation. Further, it appears that the cameras were installed in locations that did not have a prior red light running collision problem.

While the implementation of this program was likely well intended by those who initiated it, the program has not achieved the intended results. Additionally, there is concern that the presence of the cameras may be contributing to an increase in rear end collisions.

Due to the failure of the program to increase traffic safety, the excessive fines imposed by the state, and the economic damage done to both defendants and the city from loss of revenue and damage to the city's reputation, Council Members may wish to consider ending the red light camera program and re-deploy police and other staff resources to other efforts that may result in an improvement in traffic safety in Capitola. At the least, staff should re-negotiate the contract to provide for the ability of the city to cancel the program without penalty upon 30 days notice, a provision which commonly appears in contracts of other cities with long term red light camera programs.

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