INTRADEPARTMENTAL CORRESPONDENCE

April 19, 2011
16.2

BPC No. 11-0158

TO: The Honorable Board of Police Commissioners

FROM: Chief of Police

SUBJECT: ANALYSIS OF JAY BEEBER'S REPORT ENTITLED "SAFER STREETS IN LOS ANGELES: WHY ENGINEERING COUNTERMEASURES ARE MORE EFFECTIVE THAN PHOTO ENFORCEMENT IN REDUCING RED LIGHT RELATED CRASHES" (CITY COUNCIL MOTION 11-0125)

RECOMMENDED ACTIONS

1. That the Board of Police Commissioners (Board) REVIEW and APPROVE this report relative to the analysis of Jay Beeber's Report entitled "Safer Streets in Los Angeles: Why Engineering Countermeasures are More Effective Than Photo Enforcement in Reducing Red Light Related Crashes."

2. That the Board TRANSMIT this report to the City Council.

BACKGROUND

On January 26, 2011, Councilmembers Jan Perry and Dennis Zine introduced a motion (Council File {CF} No. 11-0125) requesting the Los Angeles Department of Transportation (LADOT), with the assistance of the Los Angeles Police Department (LAPD) and the Chief Legislative Analyst, to conduct an analysis of Jay Beeber's Report entitled "Safer Streets in Los Angeles: Why Engineering Countermeasures are More Effective Than Photo Enforcement in Reducing Red Light Related Crashes" (see attached).

The motion raised one area of concern:

1. Are the City's Photo Red Light intersections the most efficient and cost effective in reducing overall serious injury and fatal traffic collisions from red light violations?

DISCUSSION

In November 2010 and March 2011, Jay Beeber of the California Motorists Association and the Freedom Minute website released a report that indicates that the City has not appropriately incorporated effective countermeasures at its Photo Red Light (PRL) intersections. The report made the following claims:

1. Significant, sustained reductions in violations and crashes can be achieved when the yellow signal timing is increased by up to one second beyond the "minimum recommended time" based on the 85th percentile speed of free flow traffic approaching the intersection. Any driver adaptation to the longer yellow phase does not undo the benefit of an increase in yellow duration.
2. An all-red phase of two to three seconds may provide an added level of safety.
3. A protected left turn signal should eliminate most, if not all, left turn opposed crashes.
4. Most right angle crashes are a result of unintentional violations due to impairment, distraction, fatigue, etc. Red-light cameras have no effect on reducing these types of accidents.
5. Other engineering solutions which improve signal visibility and conspicuity may also be appropriate and contribute to safety improvements.
6. Once all appropriate engineering countermeasures are implemented, the need for costly photo enforcement systems will likely be eliminated. For intersections where engineering solutions have resulted in improved safety, adding red-light cameras may decrease safety due to an increase in rear-end collisions.

The report suggested that the City should immediately take the necessary steps to stop the Request for Proposal process and instead begin the process of evaluating intersections suspected of having an increased risk of red light related crashes to determine which engineering countermeasures would be most appropriate.

The report claimed that 95 percent of red light violations occur within the first two seconds and that 80 percent of violations occur during the first second after the light has changed to red. The report further claimed that late into red violations only account for five percent of red light running.

On July 1, 2010, the LAPD met with Mr. Beeber to discuss PRL operations in response to his inquiry about fatal traffic collisions at PRL intersections. Since that time, Mr. Beeber has been in periodic contact with City staff. On March 31, 2011, LAPD and LADOT staff met with Mr. Beeber as directed by the Board of Police Commissioners to discuss issues and recommendations contained in his report.

This report is a joint effort of LAPD and LADOT staff. All engineering issues addressed in this report were provided by LADOT.

ANALYSIS

Mr. Beeber claims that yellow signal timing should be increased by up to one second beyond the minimum recommended time, and that the minimum should be based on the 85th percentile, rather than the posted speed limit.

- **Significant, sustained reductions in violations and crashes can be achieved when the yellow signal timing is increased by up to one second beyond the "minimum recommended time" based on the 85th percentile speed of free flow traffic approaching the intersection. Any driver adaptation to the longer yellow phase does not undo the benefit of an increase in yellow duration.**

In California, jurisdictions are legally required to operate traffic control devices according to the standards established by the California Manual of Uniform Traffic Control Devices (MUTCD). With respect to setting the yellow change interval, the California MUTCD Section 4D.10 states:

> *"The purpose of the yellow signal indication is to warn traffic approaching a traffic signal that the related green movement is ending or that a steady red indication will be exhibited immediately thereafter and traffic will be required to stop when the red signal is exhibited.... The posted speed limit, or the prima facie speed limit established by the California Vehicle Code shall be used for determination of the minimum yellow change interval for the through traffic movement."*

Section 4D.10 also states that the minimum yellow change interval timing shall be calculated using the equation:

T = Minimum yellow change interval (sec)
V = Posted speed limit or prima facie speed (ft/sec)
d = Deceleration rate (10 ft/sec^2)
t_R = Reaction time (1 sec)

$$T = \frac{V}{2d} + t_R$$

Hence, the minimum yellow change interval shall be set in accordance with the posted speed limit—the higher the speed limit, the longer the yellow change interval shall be used. At PRL intersections, LADOT implemented the yellow time interval using a speed value that is five miles per hour higher than the posted speed limit. Hence, the yellow time interval used in the City exceeds the California MUTCD's standard for minimum yellow change interval. Generally, the actual approach speeds are reflected by the measured 85th percentile speeds may be slightly higher or lower than the posted speed limit. The upward adjustment of the speed value by five miles per hour accommodates the condition wherein the 85th percentile speed is slightly above the posted speed limit.

Further increasing the yellow change interval to accommodate the drivers driving beyond the 85th percentile speed would encourage disrespect for traffic signal control not just at one site but possibly at other traffic signals as well.

In the Federal Highway Administration report (also cited by Mr. Beeber), *Making Intersections Safer: A Toolbox of Engineering Countermeasures to Reduce Red-Light Running*, it was noted that a yellow "interval that is too long could decrease the capacity of the intersection and increase the delay to motorists and pedestrians. Present thought is that longer intervals will cause drivers to enter the intersection later and it will breed disrespect for the traffic signal. The tendency for motorists to adjust to the longer interval and enter the intersection later is referred to as *habituation*."

Furthermore, the cited studies which show significant benefit to lengthening the yellow change interval typically examined locations where the yellow change intervals were shorter than engineering guidelines, and thus were lengthened to meet those guidelines.

- **An all-red phase of two to three seconds may provide an added level of safety.**

The all-red clearance interval is an interval when all the signals are red, in all directions, and is intended to clear motorists who are proceeding through the intersection at the end of the yellow change interval. The California MUTCD does not require jurisdictions to implement an all-red clearance interval. Section 4D.10 states that "When used, red clearance intervals normally range from 0.1 to 2.0 seconds."

At all PRL intersections, an all-red clearance interval is already implemented. As with other intersections, an all-red clearance time is implemented based on the width of the cross street and the posted speed limit plus five miles per hour.

Generally, LADOT typically uses an all-red clearance interval under certain circumstances, for a very wide intersection, an offset intersection, and when it is desirable to delay the next green interval. At all PRL intersections, an all-red clearance interval is already implemented. As with other intersections, an all-red clearance time is implemented based on the width of the cross street and the posted speed limit plus five miles per hour.

Further extending the all-red clearance interval would reduce the capacity of the intersection and exacerbate delays, especially in congested corridors.

- **A protected left turn signal should eliminate most, if not all, left turn opposed crashes.**

Protected left turn signals can reduce left turn opposing traffic collisions. However, they can also significantly reduce traffic flow and volume. The City installs protected left turn arrows at intersections if there is a documented collision history in accordance with the goals of balancing intersection safety with sufficient traffic flow.

- **Most right angle crashes are a result of unintentional violations due to impairment, distraction, fatigue, etc. Red-light cameras have no effect on reducing these types of accidents.**

Red light running results from a combination of factors. It would be inaccurate to classify red light running as either wholly "intentional" or "unintentional." Consider drivers who intentionally speed up in order to beat the red light but are "unintentionally" behind the limit line when the light turns red.

Unintentional violations should also be considered for enforcement solutions. A major advantage of enforcement solutions is that they modify driver behavior and attitude. An inattentive driver may be complacent, distracted, or otherwise have an attitude that would be effectively modified through enforcement. This includes impaired or distracted drivers. Engineering solutions may be appropriate as well, but engineering and enforcement are not mutually exclusive.

Expert opinions indicate that a significant amount of red light running is intentional and that enforcement countermeasures can sometimes have a more dramatic impact than engineering countermeasures. However, the two should always be considered together as a multi-pronged traffic safety strategy.

There is scholarly disagreement regarding the intentionality of red light running, as well as the subjective and complex nature of driver motivations, it is inadvisable to categorize certain collisions as strictly unintentional. Traffic violators often run red lights because they believe they can get away with it. Consider the below reference:

> *"Applying consistent consequences in the form of fines for every violation will reduce red light running. Drivers will learn the behavior is no long tolerated. Failing to acknowledge and alter consequences of red light running behavior reduces the effectiveness of any countermeasure."*[1]

Speed limit signs shall be used to give notice of a prima facie or maximum speed limit except as provided under Section 22352, CVC. Chapter 2B of the California MUTCD states that speed limit signs shall be placed at the beginning of all restricted speed zones with intermediate placement placed at approximately one mile intervals. Speed limit signs at PRL intersections are placed in accordance with Section 627, CVC, Engineering and Traffic Surveys.

In addition, PRL warning signs are posted far enough back from the intersection to give motorists ample opportunity to stop for the red light. The placement of warning signs is an effective countermeasure to alert drivers that they are approaching an automated enforced intersection which decreases the chance of sudden braking, resulting in rear end traffic collisions.

- **Other engineering solutions which improve signal visibility and conspicuity may also be appropriate and contribute to safety improvements.**

Nationwide, studies have been conducted which demonstrate that traffic engineering countermeasures which improve traffic signal visibility and conspicuity can be effective in reducing incidences of red light running violations and/or related crashes. However, these studies were mostly conducted in some cities and states where traffic signals had not yet met the national standards or effective best practices. In contrast, the City's traffic signals go through a comprehensive design process and are implemented to meet or exceed the California (CA) and National MUTCD standards for effective visibility, conspicuity, and redundancy.

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[1] Martinez, K, and Porter, B. 2006. "Characterizing Red Light Runners Following Implementation of a Photo Enforcement Program." Accident Analysis and Prevention, vol. 38, issue 5, Sept.

Engineering Countermeasure	Practice in L.A.	Explanation
Install signal head overhead	Yes	• All photo-enforced approaches have overhead signal heads on mast arms. • As a longstanding practice, L.A. installs mast arm signal heads on approaches with 2 or more lanes.
Install additional signals on the near side of the intersection	Yes	• L.A. installs a near side signal head to improve visibility, e.g., where the stop line is far from the nearest signal head, at curves, etc. • L.A. has a longstanding practice of providing 3 signal heads per approach, exceeding CA MUTCD standard of 2 signal heads.
Install SIGNAL AHEAD sign	Yes	L.A. installs SIGNAL AHEAD sign for locations where visibility is not favorable, like around curves, or where a signal is not expected at a an isolated location.
Install advance warning flashers	Yes	L.A. installs advance warning flashers for locations where visibility is not favorable, like around curves, and where lesser remedies are not sufficient.
Remove/relocate sight obstruction; improve line of motorist's sight	Yes	• None of the 32 PRL intersections have lateral or horizontal curve visibility limitations. • Generally, at an unfavorable line of sight, like at curves, an extra signal head is installed on the left side of roadway, nearside, and/or high-mounted.
Install programmable lenses, shields and visors	Yes	Used where visibility should be limited so nearby, non-applicable signal heads are not seen by motorists.
Add signals to achieve one per lane	No	CA MUTCD does not have any provision for installing one signal head per lane. This measure would be grossly unnecessary on most streets in the L.A.'s urban environment.
Replace with LED lens type	Yes	• All 32 PRL intersections have LED indications, ever since photo enforcement began. • L.A.'s 5-year LED conversion program will be completed by June of 2011.
Replace 8" with 12" signal head	Yes	L.A. always embraced the use of 12-inch heads, and currently uses 12-inch faces for all three standard signal heads, exceeding CA MUTCD standards.
Install double red signal	No	CA MUTCD does not have any provision for installing double red signal heads.
Install backplates	Yes	L.A. has been using backplates for decades.
Install rumble strips on approach	No	• Helpful for isolated signals on very high speed roadways, not typical in L.A. • Noise impact on adjacent land use.
Install near side signal	Yes	Generally, at an unfavorable line of sight around curves, an extra signal head is installed on the left side of roadway, nearside, and/or high-mounted.
Install protected left-turn signal phase	Yes	• Protected left-turn signal phase • L.A. regularly installs protected left-turn signal phases where there is a related collision history and/or where visibility is limited between left-turn vehicles and opposing through traffic.

- **Once all appropriate engineering countermeasures are implemented, the need for costly photo enforcement systems will likely be eliminated. For intersections where engineering solutions have resulted in improved safety, adding red-light cameras may decrease safety due to an increase in rear-end collisions.**

Mr. Beeber and the City are in agreement that there were five fatal traffic collisions that occurred at PRL intersections, prior to the installation of the cameras. The disagreement comes as whether or not they were related to the PRL Program.

Fatal traffic collisions at PRL intersections where checked to determined if they met a pre-defined criteria; those collisions that occurred at or in the intersection. Traffic collisions that occurred beyond 75 feet from the intersection were excluded. All reports that listed "red light" violation as the primary cause of the collision were considered, as well as violations that could reasonably have been caused by a red light violation, but were attributed to another violation. For example, consider the collision between a pedestrian and a garbage truck making a right turn. A review of the report shows that there are conflicting statements regarding the color of the light, and independent witnesses all admit that they did not see the actual collision. Although the investigating officer identified the cause of the collision as "failure to yield to a pedestrian in a crosswalk" it also could have reasonably been caused by a "failure to stop at a red light." It was not coded as such on the report due to the lack of credible witnesses.

Collisions where drivers claimed that they were "tired" or "distracted" were still included because a driver's own report as to their reason for running a red light is not considered reliable testimony. Furthermore, inattention and other irresponsible driving habits are the kind of behavior that is best remedied through consistent enforcement.

In 2004, a traffic collision occurred at Victory Boulevard and Laurel Canyon Boulevard involved a drunk driver in which a fetus was killed. After the collision, the drunk driver fled the scene. This collision was included because the goal of the analysis was to evaluate the current PRL Program by examining collisions at all 32 intersections using a period of three years prior to and after activation of the current system. Furthermore, this collision is an example of the tremendous benefit of the PRL Program, since the apprehension and prosecution of the suspect in this case was aided by the use of the photographic evidence.

The goal of the City's PRL Program is to reduce serious injury and fatal traffic collisions caused by drivers who fail to stop for red lights through high profile enforcement and education as well as to maximize the effective use of police resources.

In March 2011, the National Safety Council released a report that tracked fatal and non fatal traffic collisions over a five year period. It tracked crash trends at PRL intersections investigated using data from the National Highway Traffic Safety Administration's Fatality Analysis Reporting System and the National Automotive Sampling System General Estimate System. The study concluded that over this five year period, there were **256** less red light running **fatal** crashes which represented a 58 percent decrease.[2]

[2] The National Safety Council Report *Analysis of Intersection Fatal and Nonfatal Crashes from 2005 to 2009,* dated March 3, 2011.

There are approximately two million cars that travel through the City's PRL intersections on a 24 hour basis. That equates to 64 million cars per month or 760 million cars per year. Since the cameras were installed in 2006, red light related traffic collisions have decreased by 63 percent and there have been no red light related fatalities at PRL intersections. The engineering countermeasures and rigorous signal design standards implemented by LADOT at PRL intersections undoubtedly have an impact on public safety.

However, using engineering tools or using enforcement alone would not be as effective as a comprehensive safety strategy that embraces the three E's of safety--engineering, enforcement, and education.

CONCLUSION

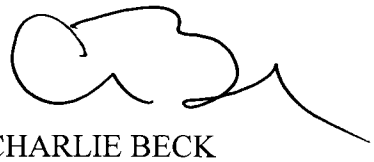
The LAPD and LADOT agree that engineering countermeasures are an integral part of an overall traffic safety strategy. The City already utilizes many of these countermeasures identified in Mr. Beeber's report, and PRL intersections received a rigorous engineering analysis before the cameras were installed. We also believe that engineering countermeasures depends in large part on their ability to be consistently enforced. Respect for traffic laws and reducing dangerous driver habits are essential to traffic safety, and therefore, a strong law enforcement component must always accompany even the most rigorous engineering program.

RECOMMENDATIONS

It is requested that the Board approve the aforementioned "Recommended Actions."

If you have any questions regarding this matter, please contact Captain Thomas J. McDonald, Commanding Officer, Emergency Operations Division, at (213) 486-0680.

Respectfully,



CHARLIE BECK
Chief of Police

Attachment

11-0125

PUBLIC SAFETY

JAN 26 2011

TRANSPORTATION

MOTION

In November 2010, Jay Beeber of the California Motorists Association released a report entitled "Safer Streets in Los Angeles: Why Engineering Countermeasures Are More Effective Than Photo Enforcement in Reducing Red-Light Related Crashes." This report documents the findings and conclusions reached by various experts in the field of traffic engineering and numerous research projects studying the problem of red-light running and effective countermeasures. According to the report, research studies that have examined the issue of red-light running and related crashes universally conclude that maximum intersection safety can only be achieved by first doing a comprehensive engineering study, implementing the appropriate engineering countermeasures and then evaluating the effectiveness of the countermeasures applied. Relatively inexpensive engineering countermeasures include, increasing the yellow signal phase, implementing a second "all red" phase and installing left-turn arrows. The report notes that in virtually every instance where studies have shown a reduction in accidents and when photo enforcement has been implemented, peer reviews have raised serious questions as to the validity of the results.

The August 2010 Controller's audit indicates that the existing photo red-light camera program has resulted in a net loss of $2.6 million dollars over the past two years, and that it has not conclusively shown to have improved safety on our roadways. It is important that the Los Angeles Police Department and the Department of Transportation review this new report and determine if the City's 32 red-light camera intersections are the most efficient and cost-effective ways to reduce overall serious injury and fatal traffic collisions resulting from red-light violations.

I THEREFORE MOVE that the City Council instruct the Los Angeles Department of Transportation, with the assistance of the Police Department and the Chief Legislative Analyst, to review Jay Beeber's November 2010 report entitled "Safer Streets in Los Angeles: Why Engineering Countermeasures Are More Effective Than Photo Enforcement in Reducing Red-Light Related Crashes" and report with recommendations on any changes to the City's photo red-light camera program.

ORIGINAL

PRESENTED BY _____
JAN PERRY
Councilmember, 9th District

SECONDED BY _____

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