HOUSE OF REPRESENTATIVES STAFF ANALYSIS

BILL #: CS/HB 33 Traffic Control Signals
SPONSOR(S): Ahern and others
TIED BILLS: **IDEN./SIM. BILLS:** SB 590

REFERENCE	ACTION	ANALYST	STAFF DIRECTOR or BUDGET/POLICY CHIEF
1) Transportation & Highway Safety Subcommittee	13 Y, 1 N	Kiner	Kruse
2) Transportation & Economic Development Appropriations Subcommittee			
3) Economic Affairs Committee			

SUMMARY ANALYSIS

The bill requires minimum yellow signal display durations and all-red clearance intervals on traffic control signals.

Current law requires drivers to follow set traffic control signal commands and yield the right-of-way to pedestrians lawfully in intersections and crosswalks. The bill requires the Florida Department of Transportation ("FDOT") and local authorities to ensure traffic control signals meet guidelines based on a pre-determined schedule. Provisions of the bill require that whenever an engineering analysis is undertaken to evaluate or reevaluate signal display durations, FDOT and local authorities will be responsible for ensuring traffic control signals meet guidelines related to the following:

- A minimum yellow signal display duration; and
- An all-red clearance interval following the yellow signal display.

The bill also:

- Provides for the dismissal of citations issued for running a red light if the traffic control signal does not meet requirements;
- Requires FDOT and local authorities to place signs alerting drivers approaching intersections with a speed limit of greater than 55 miles per hour; and
- Details a schedule for compliance as well as the result(s) of non-compliance.

Both state and local governments may see a decline in revenue from the issuance, and payment, of red light citations and an increase in the expenditure of funds related to ensuring traffic control signals meet requirements. FDOT estimates state government expenditures related to implementation of the bill to be approximately $812,830. Local government expenditures are estimated to be at least $300,000.

The bill is effective July 1, 2012, and requires FDOT and local authorities to ensure all intersections with traffic infraction detectors meet requirements by December 31, 2012. All traffic control signals must meet requirements by December 31, 2014.

FULL ANALYSIS

I. SUBSTANTIVE ANALYSIS

A. EFFECT OF PROPOSED CHANGES:

Present Situation

Federal Rules on Traffic Control Devices

The Federal Highway Administration ("FHWA") publishes a Manual on Uniform Traffic Control Devices ("MUTCD") that defines standards related to the installation and maintenance of traffic control signals. The MUTCD is updated periodically to "accommodate the nation's changing transportation needs and address new safety technologies, traffic control tools and traffic management techniques."[1] A federal rule adopting the 2009 edition of the MUTCD was published in the Federal Register on December 16, 2009.[2] All states must adopt the 2009 edition of the MUTCD by January 15, 2012. According to information published on FHWA's website, Florida has adopted this national standard.[3]

Florida Laws and Rules on Traffic Control Devices

Section 316.0745(1), F.S., requires FDOT to adopt a uniform system of traffic control devices for use on the streets and highways of the state.[4] FDOT is required to revise this system from time to time to conform to a national system or to meet local and state needs.[5] When revising the system, FDOT may receive assistance from local authorities.[6] FDOT is also authorized to permit the use of traffic control signals that do not conform to the uniform system upon a showing of good cause.[7]

Section 316.0745(2), F.S., requires FDOT to compile and publish a manual defining its uniform system.[8] The statute also requires FDOT to compile and publish minimum specifications for traffic control signal devices "certified . . . as conforming with the uniform system."[9]

Following statutory requirements, FDOT publishes a Traffic Engineering Manual ("TEM") to provide traffic engineering standards and guidelines.[10] In addition to Florida Statutes, Rule 14-15.010, F.A.C., gives FDOT authority to adopt the TEM. The TEM covers the processes whereby standards and guidelines are adopted, as well as chapters devoted to "highway signs and markings, traffic signals, traffic optimization through the use of computer models . . ., and links to information on FDOT's mature driver/pedestrian program."[11]

In addition to FDOT's TEM, many sections of Florida law require drivers to obey traffic control signal demands. Section 316.075, F.S., requires drivers to follow set traffic control signal commands and yield the right-of-way to pedestrians lawfully in intersections and crosswalks. Violators of s. 316.075, F.S., including those that run red lights, commit non-criminal traffic violations punishable pursuant to ch. 318, F.S.

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[1] *See* the Federal Highway Administration's (FHWA) information on the MUTCD at http://mutcd.fhwa.dot.gov/ (Last viewed 9/29/2011).
[2] Id.
[3] *See* FHWA's chart indicating Florida has adopted the 2009 edition of the MUTCD. This information can be accessed at http://mutcd.fhwa.dot.gov/knowledge/natl_adopt_2009.htm. (Last viewed 9/29/2011).
[4] s. 316.0745(1), F.S.
[5] Id.
[6] Id.
[7] s. 316.0745(8), F.S.
[8] s. 316.0745(2), F.S.
[9] Id.
[10] Florida Department of Transportation *Traffic Engineering Manual*, "Adoption Procedure." This information can be viewed at http://www.dot.state.fl.us/trafficoperations/Operations/Studies/TEM/TEM.shtm (Last viewed 9/15/2011).
[11] Id.

Institute of Transportation Engineers

According to its website, the Institute of Transportation Engineers ("ITE") is an international, educational and scientific association of transportation professionals.[12] Among other things, ITE offers recommendations to the MUTCD and is recognized as one of the leading organizations in transportation research. It publishes a Traffic Engineering Handbook containing information used by transportation officials nationwide. FDOT's TEM calculates the minimum yellow signal change and all-red clearance intervals using formulas contained within the ITE's Traffic Engineering Handbook. However, there is no express requirement in Florida law that FDOT's TEM contain formulas contained within ITE's Traffic Engineering Handbook.

Yellow Light Display Duration

The purpose of the yellow light display is "to provide a safe transition between two conflicting traffic signal phases."[13] More specifically, the function of the yellow light display is "to warn traffic of an impending change in the right-of-way assignment."[14]

The Federal MUTCD states that a yellow change interval should have a minimum duration of 3 seconds and a maximum duration of 6 seconds.[15] With regard to specific guidance for the length of a yellow signal, the MUTCD specifies that the length shall be determined using engineering practices.[16] These engineering practices are contained within FDOT's TEM.

The TEM calculates the minimum yellow change and all-red clearance intervals using a formula contained within the ITE's Traffic Engineering Handbook. The specific formula is explained in the image below, along with a chart calculating the formula's results for a hypothetical intersection on level ground.[17]

[12] *See* the Institute of Transportation Engineers website at http://www.ite.org/aboutite (Last viewed 9/15/2011).
[13] Florida Department of Transportation *Traffic Engineering Manual*, s. 3.6.1, "Purpose." This information can be viewed at http://www.dot.state.fl.us/trafficoperations/Operations/Studies/TEM/TEM.shtm (Last viewed 9/15/2011).
[14] Id.
[15] Id.
[16] FHWA *Manual on Uniform Traffic Control Devices* S.4D.26(2)-(3) (Last viewed 9/15/2011).
[17] "Table 3.6-1." is reproduced directly from s. 3.6.2.1 of the TEM and can be seen in context at the following address: http://www.dot.state.fl.us/trafficoperations/Operations/Studies/TEM/TEM.shtm (Last viewed 9/15/ 2011).

Table 3.6-1. Florida Yellow Change Interval (0.0 % Grade)*

APPROACH SPEED (MPH)	YELLOW INTERVAL (SECONDS)
25	3.0
30	3.2
35	3.6
40	4.0
45	4.3
50	4.7
55	5.0
60	5.4
65	5.8

* For approach grades other than 0%, Use ITE Formula.

Formula 3.6-1

$$Y = t + \frac{1.47v}{2(a + Gg)}$$

Where:

Y = length of yellow interval, sec.
t = perception-reaction time, (Use 1 sec.).
v = speed of approaching vehicles, in mph.
a = deceleration rate in response to the onset of a yellow indication. (Use 10 ft/sec^2)
g = acceleration due to gravity. (Use 32.2 ft/sec^2)
G = grade, with uphill positive and downhill negative. (percent grade /100)

All variables in the formula have assumed or fixed values except the approach speed, *v.* As a result, the speed of vehicles as they approach an intersection is the critical input an engineer must consider when solving the formula for *Y* – an appropriate length in seconds for the yellow light.

With respect to determining the correct approach speed, the TEM states, "[a]pproach speed… is the posted speed or the 85th percentile approach speed, whichever is greater.[18] The phrase "posted speed" refers to the speed limit applied to the road pursuant to ss. 316.187 and 316.189, F.S.[19] The phrase "85th percentile approach speed" is a commonly-used statistical measurement describing the speed at or below which 85 percent of free-flowing traffic is moving.[20]

The TEM also contains a provision allowing traffic engineers to modify yellow light intervals as appropriate. Section 3.6.2(5) states that "yellow change… intervals specified herein are minimums, and should be increased as necessary, based on professional engineering judgment, to fit site conditions at any particular intersection." FDOT's TEM does not contain language regarding the shortening of a yellow light interval to an amount of time less than those provided in the manual.

[18] Florida Department of Transportation *Traffic Engineering Manual* "Section 3.6.2," "Standard." This information can be viewed at http://www.dot.state.fl.us/trafficoperations/Operations/Studies/TEM/TEM.shtm (Last viewed 9/15/2011).
[19] Id.
[20] Id.

All-red Clearance Interval

The all-red clearance interval is a brief period when traffic is stopped at red lights in all directions. The purpose of the all-red clearance interval is to provide additional time following the yellow change interval to clear the intersection before conflicting traffic is released.[21] The idea is that the interval needs to be long enough to prevent accidents, but no longer than necessary to ensure traffic continues to flow. According to the Federal MUTCD, the duration of an all-red clearance interval should not exceed 6 seconds.

Effect of Proposed Changes

The bill amends s. 316.075, F.S., to require minimum yellow signal display durations and an all-red clearance interval on traffic control signals.

Yellow Light Display Duration

The bill provides that whenever an engineering analysis is undertaken to evaluate or reevaluate signal display durations, FDOT and local authorities will be responsible for ensuring traffic control signals meet guidelines related to the following:

- The minimum yellow signal display duration on traffic control signals is to be based on the posted speed limit plus 10 percent. The minimum yellow signal display duration is 3 seconds for traffic control signals on streets with a posted speed limit of 25 miles per hour or less, and the minimum yellow display duration shall increase by .5 second for each increase of 5 miles per hour in the posted speed limit, plus 10 percent. However, the yellow light display duration is not to exceed 6 seconds; and
- Intersections with a posted speed limit greater than 55 miles per hour are required to have, on approach, a sign posted to alert drivers of the upcoming traffic control signal. The sign is to be posted in accordance with FDOT's Manual on Uniform Traffic Control Devices.

All-red Clearance Interval

The bill also amends s. 316.075, F.S., to require an all-red clearance interval following the yellow signal display in order to provide additional time between conflicting traffic movements. FDOT is required to use its adopted engineering practices to determine the duration of the all-red clearance interval. The bill provides that the duration may be extended from its predetermined value for a given cycle based upon the detection of a vehicle that is predicted to violate the red signal indication.

Dismissal of Citations

The bill's proposed changes require FDOT and local authorities to submit proof that traffic control signals meet requirements – particularly when challenged in court by a person cited for an alleged red light violation. This may require traffic engineers at the hearing. The bill provides that a citation for a red light violation committed at an intersection where the traffic control signal does not meet all of the minimum yellow signal display duration, all-red clearance interval and other requirements is unenforceable and must be dismissed without penalty or assessment of points against the driver's license. However, the dismissal of the citation does not affect the validity of any other citation or charge for a violation of law and the dismissal may not be used as evidence in any other civil or criminal proceeding.

Possible Effect on Traffic Flow

Currently, the yellow signal display duration and all-red clearance interval on traffic control signals is not addressed by statute, but is stated in FDOT's TEM. The effect of the proposed changes is that functional aspects of traffic control signals will be more closely tied to FDOT's TEM, federal standards and current

[21] Florida Department of Transportation *Traffic Engineering Manual* "Section 3.6.1," "Purpose." This information can be viewed at http://www.dot.state.fl.us/trafficoperations/Operations/Studies/TEM/TEM.shtm (Last viewed 9/15/2011).

engineering practices. Additionally, statewide guidelines for minimum yellow light display durations and all-red clearance intervals may result in greater consistency and may reduce traffic crashes by clearing out intersections before allowing conflicting traffic to proceed.

While various studies may be used as diagnostic tools, they are not necessarily accurate predictors of actual driver behavior. However, multiple studies have shown that increases in yellow light display duration may reduce traffic crashes and may reduce the number of red light violations. This has been the case in several states – California,[22] Missouri[23] and Virginia[24] are examples. One study conducted by the Texas Transportation Institute found an increase of just one second in yellow light display duration in three Texas cities resulted in a 40 percent collision reduction.[25]

Conversely, one study suggests extending the yellow light display duration, or "indecision zone," results in a greater probability of rear-end collisions.[26] This same study, however, concedes the notion that rear-end collisions are the most frequent type of accident at any signalized intersection. Further, the study pointed to findings that while rear-end collisions were more frequent, extending yellow light display durations resulted in a reduction in the more-severe, right-angle accidents.[27]

While increased yellow light display durations may reduce red light violations and traffic crashes, drivers may experience longer commute times as a result of traffic being stopped in all directions whenever the traffic control signals enter the all-red clearance interval.

Effective Date

The bill is effective July 1, 2012, and requires FDOT and local authorities to ensure all intersections with traffic infraction detectors meet requirements by December 31, 2012. All traffic control signals must meet requirements by December 31, 2014.

B. SECTION DIRECTORY:

Section 1 Amends s. 316.075, F.S., relating to traffic control signals requiring traffic control signals to maintain certain signal intervals and display durations based on approach speeds; providing that a citation for specified violations shall be dismissed if the traffic control signal does not meet specified requirements; providing dates for intersections to meet the requirements of this act.

Section 2 Provides an effective date.

II. FISCAL ANALYSIS & ECONOMIC IMPACT STATEMENT

A. FISCAL IMPACT ON STATE GOVERNMENT:

1. Revenues:

Indeterminate. The number of citations that may be dismissed pursuant to provisions of this bill is unknown. Additionally, the number of citations that would not be written due to the additional yellow signal display duration is unknown. During the 2011 Legislative Session, the Revenue Estimating

[22] *California: Longer Yellows Nearly Eliminate Violations*. *See* http://www.thenewspaper.com/news/30/3055.asp (Last viewed 9/29/11); *California City Dumps Red Light Cameras After Increasing Yellow*. *See* http://www.thenewspaper.com/news/31/3110.asp (Last viewed 9/29/11).
[23] *Missouri: State Moves for Longer Yellow, Reduced Violations*. *See* http://www.thenewspaper.com/news/34/3477.asp (Last viewed 9/29/11).
[24] *Red Light Citations Drop Below One Per Day*. *See http://www.motorists.org/red-light-cameras/fairfax* (Last viewed 9/29/11).
[25] *Study: Longer Yellows Reduce Crashes*. *See* http://www.thenewspaper.com/news/02/243.asp (Last viewed 9/29/11).
[26] Mahalel, D. and Prashker, J.N. 1987. "A Behavioral Approach to Risk Estimation of Rear-End Collisions at Signalized Intersections." Transportation Research Record. Washington, D.C. (Record 1114, 96-102).
[27] Id.

Conference found a $49.7 million recurring negative fiscal impact for state general revenue and state trust funds for this same issue. An impact conference has not been held on the current bill draft.

2. Expenditures:

FDOT will incur costs associated with setting all of its traffic control signals to the required yellow signal display duration and all-red clearance interval. FDOT has approximately 7,714 intersections statewide and estimates that the total cost of implementation is $462,830.[28]

FDOT estimates it will incur costs related to the placement of signs at intersections with posted speed limits of greater than 55 mph. FDOT estimates that it has 350 intersections with posted speed limits of 60 or more mph. FDOT estimates that it will cost approximately $1,000 per intersection (two signs at $500 each) for a total cost of $350,000.

B. FISCAL IMPACT ON LOCAL GOVERNMENTS:

1. Revenues:

Indeterminate. The number of citations that may be dismissed pursuant to provisions of this bill is unknown. Additionally, the number of citations that would not be written due to the additional yellow signal display duration is unknown. During the 2011 Legislative Session, the Revenue Estimating Conference found a $37.3 million recurring negative fiscal impact for local governments for this same issue. An impact conference has not been held on the current bill draft.

2. Expenditures:

Local governments will incur costs associated with setting all traffic control signals to the required yellow light display durations and minimum all-red clearance intervals. FDOT estimates that the local governments have approximately 5,000 total intersections. Using the same information FDOT used in estimating its costs, the fiscal impact on local governments will be approximately $300,000.

Local governments will incur costs related to the placement of signs at intersections with posted speed limits of greater than 55 mph. FDOT estimates that cost at $1,000 per intersection, but the number of intersections are unknown.

C. DIRECT ECONOMIC IMPACT ON PRIVATE SECTOR:

Motorists may see fewer citations for red light running due to additional yellow signal display durations and all red clearance intervals.

D. FISCAL COMMENTS:

None.

[28] In estimating the potential cost, FDOT assumes that half of the intersections will be adjusted by department employees and half of the intersections will be adjusted by outside consultants. FDOT also estimates that half of the intersections will be adjusted from a central office and that half of the intersections will require someone to go to the traffic control signal to adjust the display duration.

III. COMMENTS

A. CONSTITUTIONAL ISSUES:

1. Applicability of Municipality/County Mandates Provision:

The county/municipality mandates provision of Article VII, s.18 of the Florida constitution may apply because this bill requires municipalities and counties to evaluate traffic signals to meet certain yellow display durations and all red clearance intervals and makes certain traffic violations unenforceable, where municipalities and counties receive a portion of the revenue; however, an exception for similarly situated entities may apply if – in conjunction – the Legislature formally determines the subject matter of this bill advances an important state interest and FDOT, a similarly situated entity, is also required to comply.

2. Other:

None.

B. RULE-MAKING AUTHORITY:

None.

C. DRAFTING ISSUES OR OTHER COMMENTS:

1. Other Comments:

None.

IV. AMENDMENTS/ COMMITTEE SUBSTITUTE CHANGES

On October 19, 2011, the Transportation & Highway Safety Subcommittee adopted one amendment which moved the implementation date for all intersections to comply with the bill's requirements from December 31, 2013, to December 31, 2014.