

## HOUSE OF REPRESENTATIVES STAFF ANALYSIS

**BILL #:** CS/CS/HB 149 Traffic Control Signals

**SPONSOR(S):** Economic Affairs Committee; Transportation & Highway Safety Subcommittee; Ahern and others

**TIED BILLS:**                   **IDEN./SIM. BILLS:**

REFERENCE	ACTION	ANALYST	STAFF DIRECTOR or BUDGET/POLICY CHIEF
1) Transportation & Highway Safety Subcommittee	15 Y, 0 N, As CS	Johnson	Brown
2) Transportation & Economic Development Appropriations Subcommittee	12 Y, 2 N	Davis	Davis
3) Economic Affairs Committee	15 Y, 1 N, As CS	Johnson	Tinker

### SUMMARY ANALYSIS

The bill amends s. 316.075, F.S., to specify an engineering standard for minimum yellow signal durations. When an engineering analysis of a signal display duration is conducted, the minimum yellow signal duration on traffic control signals must be based on the posted speed limit plus 10 percent. The minimum yellow signal display duration is to be three seconds for traffic control signals where the posted speed is 25 miles per hour or less. The minimum yellow signal duration is to increase by one-half second for each increase of five miles per hour, not to exceed six seconds.

The bill requires intersections with a speed limit of greater than 55 miles per hour to have signs alerting drivers to the approaching intersection.

The bill requires intersections to have a minimum red light clearance interval.

The bill provides that traffic infractions related to red light running are unenforceable if the intersection does not meet the minimum yellow-light interval requirements. Based on these provisions, and to the extent that fewer violations may be issued due to longer yellow durations, these provisions of bill have an indeterminate, negative impact on General Revenue and state trust funds, as well as local governments that would otherwise receive a share of the citation revenue.

The bill requires all intersections to meet these requirements by December 31, 2011.

The Florida Department of Transportation (FDOT) and local governments are required to set the minimum yellow signal duration at each intersection. As a result, there will be costs associated with setting the signal display durations and installing warning signs at certain high speed intersections. FDOT estimates its total cost to be \$812,840. The cost to local government for adjusting signal display durations is estimated at approximately \$300,000, plus any costs associated with required signs warning of traffic signals on certain roads.

The bill has an effective date of July 1, 2011.

# FULL ANALYSIS

## I. SUBSTANTIVE ANALYSIS

### A. EFFECT OF PROPOSED CHANGES:

#### Federal Rules on Traffic Control Devices

Since 1971, the Federal Highway Administration (FHWA) has published and administered a Manual on Uniform Traffic Control Devices (MUTCD). The MUTCD defines standards “used by road managers nationwide to install and maintain traffic control devices on all public streets, highways, bikeways, and private roads open to public traffic.”<sup>1</sup> It is updated periodically to “accommodate the nation’s changing transportation needs and address new safety technologies, traffic control tools and traffic management techniques.”<sup>2</sup> A federal rule adopting the 2009 Edition of the MUTCD was published in the Federal Register on December 16, 2009, and states must adopt the 2009 National MUTCD as their legal standard for traffic control devices within two years.<sup>3</sup>

#### Traffic Control Devices in Florida

Traffic control devices are installed and operated by the state and local governments pursuant to section 316.0745, F.S. This statute requires FDOT to adopt a “uniform system of traffic control devices for use on the streets and highways of the state.”<sup>4</sup> The system can be revised to include changes necessary to conform to a uniform national system (see discussion of MUTCD, above) and also to meet local and state needs. FDOT is required to publish this uniform system<sup>5</sup> and does so by referencing the MUTCD. Additionally, FDOT publishes a Traffic Engineering Manual, which makes the MUTCD specific to Florida, clarifies the MUTCD, or imposes standards stricter than the MUTCD.<sup>6</sup>

According to the FDOT,

[t]he purpose of the FDOT Traffic Engineering Manual (TEM) is to provide traffic engineering standards and guidelines to be used on the State Highway System. The manual covers the process 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 our mature driver/pedestrian program.<sup>7</sup>

All public bodies or officials that purchase and install traffic control devices in Florida must ensure that such devices conform to the manual and specifications published by FDOT.<sup>8</sup>

#### Yellow Lights

The federal MUTCD and the Florida TEM each provide basic functional information<sup>9</sup> about yellow lights, referred to in engineering terms as “steady circular yellow” signals. The MUTCD discusses the underlying concept behind the yellow signal, explaining that “the exclusive function of the yellow change interval shall be to warn traffic of an impending change in the right-of-way assignment.”<sup>10</sup> As

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<sup>1</sup> See <http://mutcd.fhwa.dot.gov/> (January 26, 2011).

<sup>2</sup> *Id.*

<sup>3</sup> *Id.* The relevant text of the Federal Register can be accessed online at <http://edocket.access.gpo.gov/2009/pdf/E9-28322.pdf> (January 26, 2011).

<sup>4</sup> S. 316.0745(1), F.S.

<sup>5</sup> S. 316.0745(2)(a), F.S.

<sup>6</sup> DOT’s Traffic Engineering Manual is only available electronically. It is available at <http://www.dot.state.fl.us/trafficoperations/Operations/Studies/TEM/TEM.shtm> (April 1, 2011).

<sup>7</sup> *Id.*

<sup>8</sup> S. 316.0745(3), F.S.

<sup>9</sup> For example, MUTCD section 4D.05 requires a steady circular yellow signal to be displayed following a steady green signal and that the yellow signal to be followed by a red signal. TEM Section 3.6.1 provides that “[t]he purpose of the yellow change and all-red clearance intervals is to provide a safe transition between two conflicting signal phases.”

<sup>10</sup> S. 4D.26(2)-(3), FHWA *Manual on Uniform Traffic Control Devices* (December 2009).

specific guidance for the length of a yellow signal, the MUTCD says only that “the duration of the yellow change interval shall be determined using engineering practices.”<sup>11</sup>

Such engineering practices are provided in the TEM. FDOT’s manual provides overall minimum and maximum yellow-light durations as well as an algebraic formula to be applied by the traffic engineer for each specific intersection. Section 3.6.1 of the TEM states that a “yellow change interval should have a minimum duration of 3 seconds and a maximum duration of 6 seconds.” 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.<sup>12</sup>

**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<sup>2</sup>)  
g = acceleration due to gravity. (Use 32.2 ft/sec<sup>2</sup>)  
G = grade, with uphill positive and downhill negative. (percent grade /100)

All of the variables in the equation 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 provides additional guidance, stating that “Approach speed... is the posted speed or the 85<sup>th</sup> percentile approach speed, whichever is greater.” The phrase “posted speed” refers to the speed limit applied to the road pursuant to ss. 316.187 or 316.189, F.S. The phrase “85<sup>th</sup> percentile approach speed” is a commonly-used statistical measurement describing the speed at or below which 85 percent of free-flowing traffic is moving.<sup>13</sup>

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

<sup>11</sup> *Id.*  
<sup>12</sup> “Table 3.6-1.” is reproduced directly from s. 3.6.2.1 of the TEM and can be seen in context at the hyperlink identified in footnote 6.  
<sup>13</sup> “According to a Federal Highway Administration study, all states and most local agencies use the 85th percentile speed of free flowing traffic as the basic factor in establishing speed limits.” *Speed Zoning Information*, Institute of Transportation Engineers, available at [http://www.ite.org/standards/speed\\_zoning.pdf](http://www.ite.org/standards/speed_zoning.pdf), last accessed January 26, 2011. Though not specifically related to yellow-light intervals, this document notes another important aspect of the 85<sup>th</sup> percentile speed: “Studies have shown [that] crash rates are lowest at around the 85th percentile speed. Drivers traveling significantly faster OR slower than this speed are at a greater risk for being in a crash. It is not high speeds alone that relate to crash risk; it is the variation of speed within the traffic stream,” that creates greater risk for being in a crash.

should be increased as necessary, based on professional engineering judgment, to fit site conditions at any particular intersection.” The 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.

### Proposed Changes

The bill amends s. 316.075, F.S., to require minimum yellow signal display durations at intersections. The bill provides that when an engineering analysis is done for the purpose of evaluating or reevaluating yellow and red signal display durations for a new or existing traffic signal, FDOT and local authorities are required to adhere 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 durations shall increase by one-half second for each increase of 5 miles per hour in the posted speed limit plus 10 percent. However, the yellow light interval is not to exceed 6 seconds.
- 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.

In order to provide additional time between conflicting traffic movements, the bill requires that the yellow signal display must be followed by an all-red clearance interval delaying the change of opposite red light signals. The duration of the clearance interval is to be determined by engineering practices provided for in FDOT’s Manual on Uniform Traffic Control Devices. The duration of the red clearance interval 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.<sup>14</sup>

The bill provides that a citation for a violation of the red light statute<sup>15</sup> committed at an intersection where the traffic signal device does not meet all of the yellow signal display duration requirements above is unenforceable. The court, clerk of the court, designated official, or authorized operator of a traffic violations bureau is required to dismiss the citation without penalty or assessment of points against the driver’s license of the person cited. However, the dismissal of this 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.

Intersections with traffic infraction detectors must meet these requirements and be certified by the appropriate authority for the jurisdiction by December 31, 2011. All other intersections must meet these requirements by December 31, 2011.

The bill has an effective date of July 1, 2011.

#### B. SECTION DIRECTORY:

Section 1 Amends s. 316.075, F.S., relating to traffic control signal devices 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.

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<sup>14</sup> This requirement is currently provided in the Manual on Uniform Traffic Control Devices, as well.

<sup>15</sup> This document is required pursuant to s. 316.075 F.S.

## II. FISCAL ANALYSIS & ECONOMIC IMPACT STATEMENT

### A. FISCAL IMPACT ON STATE GOVERNMENT:

#### 1. Revenues:

Indeterminate. Because the number of citations that may be dismissed pursuant to provisions of this bill is unknown, there will be an indeterminate, negative fiscal impact on general revenue and various state trust funds.

Additionally, the number of citations that would not be written due to the additional yellow signal display duration is unknown; therefore revenue that may be lost due to these citations not being written is unknown. Any impact would be a negative fiscal impact on general revenue and various state trust funds.

#### 2. Expenditures:

FDOT will incur costs associated with setting all of its traffic signals to the required yellow signal display durations and minimum red light clearance intervals. FDOT has approximately 7,714 intersections statewide and estimates that the total cost of the implementing the minimum yellow signal display durations and minimum red light clearance intervals is \$462,830.<sup>16</sup>

FDOT estimates that the FDOT will incur costs in placing signs at intersections with posted speed limits of greater than 55 miles per hour. FDOT estimates that it has 350 intersections with approaches of 60 or more miles per hour. It 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. Because the number of citations that may be dismissed pursuant to provisions of this bill is unknown, there will be an indeterminate, negative fiscal impact on municipalities and counties that would otherwise receive revenue from these traffic citations.

Additionally, the number of citations that would not be written due to the additional yellow signal display duration is unknown; therefore revenue that may be lost due to these citations not being written is unknown. Therefore there is an indeterminate negative fiscal impact

#### 2. Expenditures:

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

Local governments will incur costs in placing signs at intersections with posted speed limits of greater than 55 miles per hour. 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.

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<sup>16</sup> In estimating the potential cost, FDOT assumes that half of these intersections will be adjusted by FDOT 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 signal to adjust the display durations.

There may be user delay costs associated with longer yellow signal display duration and all red intervals resulting from fewer full traffic cycles over a given period of time.

#### D. FISCAL COMMENTS:

Some traffic violations may be invalid if committed at an intersection whose yellow signal display duration does not meet the requirements of the bill; however, the number of invalid violations and the fiscal impact of those violations cannot be determined at this time. While indeterminate, this will have a negative impact on general revenue and various state trust funds and local governments.

Currently, for every citation for running a red light written by a law enforcement officer which becomes invalid, \$60 is distributed pursuant to s. 318.21, F.S., which provides for small percentages of all traffic fines to be distributed to a myriad of various sources, \$65 goes to the Department of Health's Administrative Trust Fund, \$30 to General Revenue and \$3 to the Brain and Spinal Cord Injury Trust Fund.<sup>17</sup>

For every citation issued by a local government from a red light camera, \$10 is distributed to the Department of Health's Administrative Trust Fund, \$70 goes to General Revenue, \$3 goes to the Brain and Spinal Cord Injury Trust Fund and \$75 goes to the local government running the red light camera program.

### III. COMMENTS

#### A. CONSTITUTIONAL ISSUES:

##### 1. Applicability of Municipality/County Mandates Provision:

The county/municipality mandates provision of Art. VII, section 18, of the Florida Constitution may apply because this bill requires municipalities and counties to reprogram 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. FDOT is also required to comply with the yellow signal display duration requirement of the bill.

##### 2. Other:

None

#### B. RULE-MAKING AUTHORITY:

None

#### C. DRAFTING ISSUES OR OTHER COMMENTS:

The bill requires all intersections to meet the requirements of the bill by December, 31, 2011. In the ordinary course of business, an engineering analysis would not be done on all intersections in the state by December 31, 2011.

The bill contains a requirement that the minimum yellow signal display duration "shall be based on the posted speed limit plus 10 percent." This provision may be interpreted in multiple ways. It could be interpreted as requiring a 10 percent addition to the posted speed limit (for example, at an intersection with a 30 mph speed limit, the duration would be engineered for a 33 mph approach). Alternatively, the provision could be interpreted as requiring the engineer to calculate the minimum display duration and add 10 percent (for example, an intersection otherwise requiring a 3.5 second yellow light duration would be increased 10 percent to 3.85 seconds).

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<sup>17</sup> The distribution to the Brain and Spinal Cord Injury Trust Fund is further distributed to the Miami Project to Cure Paralysis.

#### **IV. AMENDMENTS/ COMMITTEE SUBSTITUTE CHANGES**

On April 4, 2011, the Transportation & Highway Safety Subcommittee adopted a strike-all amendment to the bill, creating a Committee Substitute. The strike-all amendment:

- Requires traffic control signals to meet minimum yellow signal display durations.
- Requires warning signs before traffic control signals at certain intersections.
- Requires an all red clearance interval at intersections.
- Provides that certain traffic citations are unenforceable if the intersection does not meet the yellow light interval requirements required by the bill.

On April 21, 2011, the Economic Affairs adopted one amendment as amended. This amendment:

- Changes the basis for the minimum yellow signal display duration from the greater of the speed limit or the 85<sup>th</sup> percentile approach speed to the posted speed limit plus 10 percent.
- Changes the intersections required to have a sign alerting drivers for traffic control signals from intersections with a speed limit or actual approach speed of 55 miles per hour or greater to those with a posted speed limit of greater than 55 miles per hour.
- Requires intersections to meet the requirements of this section by December 31, 2011.

The analysis is drafted to the Committee Substitute to the Committee Substitute.