

## HOUSE OF REPRESENTATIVES STAFF ANALYSIS

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

**SPONSOR(S):** 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			

### 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 85<sup>th</sup> percentile approach speed. The minimum yellow signal display duration is to be three seconds for traffic control signals where the 85<sup>th</sup> percentile approach 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 or 85<sup>th</sup> percentile approach of 55 miles per hour or greater 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. This provision has an indeterminate, negative impact on general revenue and state trust funds.

The Department of Transportation (DOT) and local governments are required to set the minimum yellow signal duration at each intersection when performing an engineering analysis of the intersection. As a result, there does not appear to be an additional cost associated with the bill's requirements. The costs associated with signs warning drivers of approaching traffic control signals on high-speed roads is expected to be minimal.

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, DOT 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 or the actual 85<sup>th</sup> percentile approach speed, whichever is greater. The bill defines the 85<sup>th</sup> percentile approach speed as the speed at or below which 85 percent of the free-flowing traffic is traveling. The bill further provides that for streets with “actual 85<sup>th</sup> percentile approach speeds of 25 miles per hour or less,” the minimum yellow-light interval shall be 3 seconds, and that for each increase of 5 miles per hour in the 85<sup>th</sup> percentile approach speed above 25 miles per hour, the minimum yellow-light interval shall be increased one-half second. However, the yellow light interval is not to exceed 6 seconds.
- For intersections with a speed limit or an actual 85<sup>th</sup> percentile approach speed of 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 DOT’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 DOT’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.

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.

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> S. 316.075(1)(c)1., F.S.

## II. FISCAL ANALYSIS & ECONOMIC IMPACT STATEMENT

### A. FISCAL IMPACT ON STATE GOVERNMENT:

#### 1. Revenues:

Indeterminate. To the extent citations are dismissed pursuant to the provisions of this bill, there will be an indeterminate, negative fiscal impact on general revenue and various state trust funds.

#### 2. Expenditures:

While there are costs associated with setting the minimum yellow display durations, the bill provides that this may be done when an engineering analysis is done on the traffic control signal; therefore, there will be no additional costs to DOT.

DOT will incur costs in placing signs at intersections with 85<sup>th</sup> percentile speeds of 55 miles per hour or greater, but DOT expects to do so within its existing budget.

### B. FISCAL IMPACT ON LOCAL GOVERNMENTS:

#### 1. Revenues:

None

#### 2. Expenditures:

While there are costs associated with setting the minimum yellow display durations, the bill provides that this may be done when an engineering analysis is done on the traffic control signal; therefore, there will be no additional costs to local governments.

DOT will incur costs in placing signs at intersections with 85<sup>th</sup> percentile speeds of 55 miles per hour or greater, but the cost is expected to be minimal.

### C. DIRECT ECONOMIC IMPACT ON PRIVATE SECTOR:

None

### D. FISCAL COMMENTS:

Some traffic violations may be invalid if committed at an intersection whose yellow light interval 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.

## III. COMMENTS

### A. CONSTITUTIONAL ISSUES:

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

Not Applicable. This bill does not appear to require counties or municipalities to spend funds or take action requiring the expenditures of funds; reduce the authority that counties or municipalities have to raise revenues in the aggregate; or reduce the percentage of state tax shared with counties or municipalities.

#### 2. Other:

None

B. RULE-MAKING AUTHORITY:

None

C. DRAFTING ISSUES OR OTHER COMMENTS:

None

**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.

The analysis is drafted to the Committee Substitute.