Topic No. 750-000-005   June 2002
Traffic Engineering Manual
Signals   Revised: June 2010

Section 3.6

STANDARDIZATION OF YELLOW AND ALL- RED INTERVALS FOR SIGNALIZED INTERSECTIONS

3.6.1   PURPOSE

The purpose of the yellow change and all-red clearance intervals is to provide a safe transition between two conflicting traffic signal phases. The function of yellow change interval is to warn traffic of an impending change in the right-of-way assignment and the function 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. The *MUTCD* states that a yellow change interval should have a minimum duration of 3 seconds and a maximum duration of 6 seconds and a red clearance interval should have a duration not exceeding 6 seconds. The intent of this section is to provide a State standard for uniform application of the minimum yellow and all-red intervals.

3.6.2   STANDARD

(1)   *Section 316.075(3)(a), F.S.* states that no traffic control signal device shall be used which does not exhibit a yellow or "caution" light between the green or "go" signal and the red or "stop" signal. The Statute is silent on the yellow clearance interval duration and does not mention nor mandates the use of an all red clearance interval.

(2)   *Section 316.075(1)(c)(1), F.S.* requires "Vehicular traffic facing a steady red signal shall stop before entering the crosswalk on the near side of the intersection or, if none, then before entering the intersection and shall remain standing until a green indication is shown."

(3)   *Section 316.075(1)(a),F.S.* requires "Vehicular traffic facing a circular green signal may proceed cautiously straight through or turn right or left unless a sign at such place prohibits either such turn. But vehicular traffic, including vehicles turning right or left, shall yield the right-of-way to other vehicles and to pedestrians lawfully within the intersection or an adjacent crosswalk at the time such signal is exhibited."

(4)   Approach speed used in this section is the posted speed or the 85th percentile approach speed, whichever is greater.

(5)   Yellow change and all-red clearance intervals specified herein are minimums, and should be increased as necessary, based on professional engineering judgment, to fit site conditions at any particular intersection.

3.6.2.1   Yellow Change Interval

The Florida yellow change intervals shown in *Table 3.6-1*, are computed using the ITE formula (*Formula 3.6-1*, found in *ITE's Traffic Engineering Handbook*). These intervals are the required minimums. If necessary and due to equipment limitations, round computed values up to the next 0.5 second.

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)

3.6.2.2   All-Red Clearance Interval

The all-red clearance interval values shown in *Table 3.6-2* were computed using Formula 3.6-2, found in *ITE's Traffic Engineering Handbook*. For intersections with sight distance problems, single point interchanges, complex intersections, and intersections with widths other than shown in *Table 3.6-2*, compute the all-red clearance

interval using *Formula 3.6-2* with actual measured width and use site-specific observations and engineering judgment as necessary to adjust the interval duration. The all-red clearance interval duration should not exceed 6 seconds.

Formula 3.6-2

$$R = \frac{W + L}{1.47v}$$

Where:

R = length of all-red interval, sec.
W = total traversed width, from the approach stop bar to the far side of no-conflict point.
L = Length of vehicle (Use 20 ft.)
v = speed of approaching vehicles, in mph.

Table 3.6-2. Florida All-Red Clearance Interval

INTERSECTION GEOMETRY									
Intersection Type	UD	UD	UD	UD	D	D	D	D	D
# Through Lanes	2	2	4	4	4	4	6	6	6
# Turn Lanes		1		1		2	2	3	4
Median Width (ft.)					15	3	3	3	3
X-Walk Width (ft.)		6	6	6	6	6	6	6	6
Stop Bar Setback (ft.)	6	4	4	4	4	4	4	4	4
Total Traversed Width W (ft.)	**30**	**46**	**58**	**70**	**73**	**85**	**109**	**121**	**133**
APPROACH SPEED (MPH)	ALL-RED CLEARANCE INTERVAL (Seconds)								
25	1.4	1.8	2.1						
30	1.1	1.5	1.8	2.0					
35	1.0	1.3	1.5	1.7	1.8				
40	0.9	1.1	1.3	1.5	1.6	1.8	2.2	2.4	2.6
45	0.8	1.0	1.2	1.4	1.4	1.6	2.0	2.1	2.3
50	0.7	0.9	1.1	1.2	1.3	1.4	1.8	1.9	2.1
55	0.6	0.8	1.0	1.1	1.2	1.3	1.6	1.7	1.9
60	0.6	0.7	0.9	1.0					
65	0.5	0.7	0.8						
░░ Uncommon Parameters									

3.6.2.3 Turn Phases

(1) **Protected Turns.** For protected left or right turns terminating concurrently with the adjacent through phase, the yellow and all-red intervals shall be selected from *Table 3.6-1* and *Table 3.6-2* based on speed. Where a protected left or

right turn does not terminate concurrently with the adjacent through phase, determine actual turn lane approach speed and compute clearance intervals using *Formulas 3.6-1 and 3.6-2*.

(2)   **Protected/Permissive Turns.** For protected left or right turns, the yellow and all-red intervals shall be selected from *Table 3.6-1* and *Table 3.6-2* based on the speed. For permissive left or right turns, the yellow and all-red intervals are determined by the concurrent through phase.