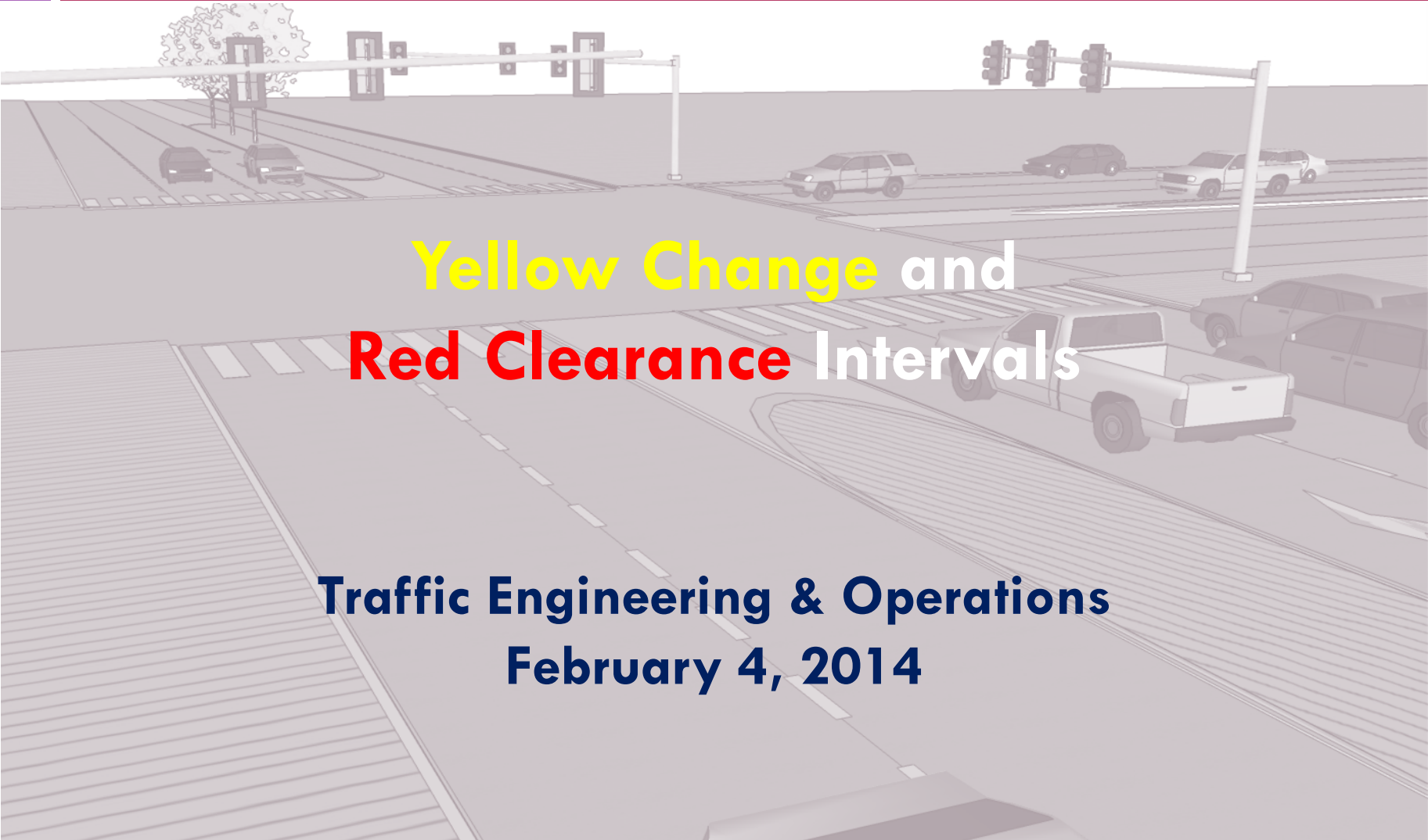




Florida Department of Transportation
offers:

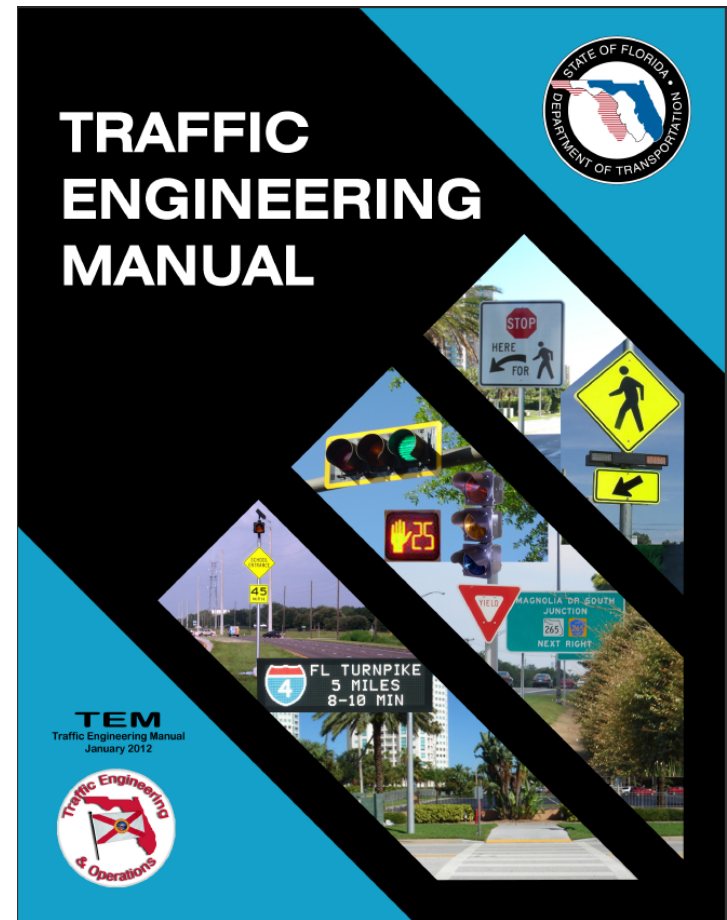
A 3D perspective rendering of a multi-lane traffic intersection. The scene is rendered in a light gray, wireframe-like style. Several vehicles, including cars and a pickup truck, are shown at various points in the intersection. Traffic lights are visible on poles above the road. The overall scene is used as a background for the text.

Yellow Change and
Red Clearance Intervals

Traffic Engineering & Operations
February 4, 2014

FDOT's Traffic Engineering Manual

- Chapter 1 – Adoption Procedure
- Chapter 2 – Signs
- Chapter 3 – Signals
- Chapter 4 – Markings
- Chapter 5 – Specialized Operational Topics
- Chapter 6 – Safe Mobility for Life
- Chapter 7 – Technology
- [FDOT link to TEM](#)
- Section 3.6 – Standardization of Yellow Change and Red Clearance Intervals for Signalized Intersections



TEM Section 3.6 – Standardization of Yellow Change and Red Clearance Intervals for Signalized Intersections

- Purpose: to provide a safe transition between two conflicting traffic signal phases.
- Yellow change interval: to warn traffic of an impending change in the right-of-way assignment.
- Red clearance interval: to provide additional time following the yellow change interval to clear the intersection before conflicting traffic is released.
- Section 4D.26 of Manual on Uniform Traffic Control Devices (MUTCD):
 - min yellow = 3 sec; max yellow = 6 sec; max red = 6 sec.
- This section of the TEM provides a standard for uniform application of yellow and red intervals.

3.6.2. Standards

- [Florida Statute 316.075\(3a\)](#) refers to use of yellow, green and red indications but is silent on clearance duration.
- Institute of Transportation Engineers (ITE) formula shall be used to calculate yellow change interval (YCI).
- For a given posted speed limit (PSL), YCI shall not be less than values shown in Table 3.6-1; max YCI = 6.0 sec.
- Computed values < 3.4 sec shall be set at 3.4 sec.
- Values > those in Table 3.6-1 shall be based on MUTCD 4D.26, engineering practice and ITE formula.
- Perception Reaction Time (PRT) of 1.4 sec shall be used.
- Interval durations shall be rounded up to the nearest 0.1 sec.
- 'Approach speed' in this section is the PSL for the approach being analyzed.

Table 3.6-1

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

APPROACH SPEED (MPH)	YELLOW INTERVAL (SECONDS)
25	3.4
30	3.7
35	4.0
40	4.4
45	4.8
50	5.1
55	5.5
60	5.9
65	6.0

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

Formula for computing YCI

- The YCIs shown in Table 3.6-1 are computed using Formula 3.6-1 (ITE's Traffic Engineering Handbook) with a PRT of 1.4 seconds and 0% grade. These are the required standard min. values.

Formula 3.6-1

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

Where:

Y = length of yellow interval, sec.

t = perception-reaction time (use 1.4 sec.)

v = speed of approaching vehicles, in mph.

a = deceleration rate in response to the onset of a yellow indication (use 10 ft/sec²)

g = acceleration due to gravity (use 32.2 ft/sec²)

G = grade, with uphill positive and downhill negative (percent grade /100)

Red Clearance Interval (RCI)

- 3.6.2.2. Providing RCI can significantly impact intersection safety by reducing the probability of occurrence of right-angle crashes.
- Compute RCI Using Formula 3.2-2 (from ITE)

Formula 3.6-2

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

Where:

- R = length of red interval, sec.
- W = width of the intersection, in feet, measured from the near-side stop line to the far edge of the conflicting traffic lane along the actual vehicle path.
- L = Length of vehicle (Use 20 ft.)
- v = speed of approaching vehicles, in mph.

- Min. RCI = 2.0 sec; max RCI = 6.0 sec.
- The determination to use longer RCI than 2.0 sec shall be based on engineer's discretion where intersection width, sight distance, complex intersections, crash history and unique conditions may warrant longer RCI.
- NCHRP 731 recommends using modified ITE formula to allow for 1.0 sec reduction due to reaction time delay from conflicting movement; however, min. RCI is 2.0 sec.

A 3D architectural rendering of a multi-lane intersection. The scene is shown from an elevated perspective. There are several traffic light poles with multiple signal heads. Several cars, including a white pickup truck, a white SUV, and a dark sedan, are positioned at the intersection. The road has multiple lanes with white lane markings and crosswalks. The background is a plain, light-colored surface.

Thank you.

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