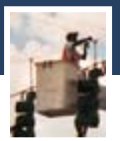




Traffic Engineering and Operations Office

Fundamentals of Traffic Control Devices

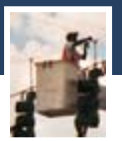
Traffic Engineering & Operations

October 8, 2014

Raj Ponnaluri, Angela Wilhelm, and Christopher Lewis

Agenda





Traffic Engineering and Operations Office

- Agenda
  - Signs
  - Pavement Markings
  - Signals

Traffic Operations Website



Traffic Engineering and Operations Office

- www.dot.state.fl.us/trafficoperations/

Traffic Operations Documents



Traffic Engineering and Operations Office

- From the Operations Website
  - www.dot.state.fl.us/trafficoperations/Doc_Library/Doc_Library.shtm

Publications and Laws



Traffic Engineering and Operations Office

- 316.0745 Uniform signals and devices

THE FLORIDA SENATE

Home | Senators | Committees | Session | Laws | Media | About | Offices

Home > Laws > 2013 Florida Statutes > Title XXIII > Chapter 316 > Section 0745

2013 Florida Statutes

Title XXIII	Chapter 316	SECTION 0745
MOTOR VEHICLES	STATE UNIFORM TRAFFIC CONTROL Entire Chapter	Uniform signals and devices.

316.0745 Uniform signals and devices.—

(1) The Department of Transportation shall adopt a uniform system of traffic control devices for use on the streets and highways of the state. The uniform system shall, insofar as is practicable, conform to the system adopted by the American Association of State Highway Officials and shall be revised from time to time to include changes necessary to conform to a uniform national system or to meet local and state needs. The Department of Transportation may call upon representatives of local authorities to assist in the preparation or revision of the uniform system of traffic control devices.

(2) The Department of Transportation shall compile and publish a manual of uniform traffic control devices which defines the uniform system adopted pursuant to subsection (1), and shall compile and publish minimum specifications for traffic control signals and devices certified by it as conforming with the uniform system.

(a) The department shall make copies of such manual and specifications available to all counties, municipalities, and other public bodies having jurisdiction of streets or highways open to the public in this state.

(b) The manual shall provide for the use of regulatory speed signs in work zone areas. The installation of such signs is exempt from the provisions of s. 335.10.

(3) All official traffic control signals or official traffic control devices purchased and installed in this state by any public body or official shall conform with the manual and specifications published by the Department of Transportation pursuant to subsection (2).

(4) It shall be unlawful for any public body or official to purchase, or for anyone to sell, any traffic control signal or device unless it conforms with the manual and specifications published by the Department of Transportation and is certified to be of such conformance prior to sale. Any manufacturer or vendor who sells any traffic control signal, guide, or directional sign or device without such certification shall be ineligible to bid or furnish traffic control devices to any public body or official for such period of time as may be established by the Department of Transportation; however, such period of time shall be for not less than 1 year from the date of notification of such ineligibility.

(5) It is unlawful for any public body to manufacture for installation or placement any traffic control signal, guide, or directional sign or device unless it conforms to the uniform system of traffic control devices published by the Department of Transportation. It is unlawful for any public body to sell any traffic control signal, guide, or directional sign or device it manufactures to any nongovernmental entity or person.

(6) Any system of traffic control devices controlled and operated from a remote location by electronic computers or similar devices must meet all requirements established for the uniform system, and, if such a system affects the movement of traffic on state roads, the design of the system shall be reviewed and approved by the Department of Transportation.

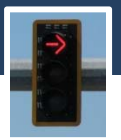
(7) The Department of Transportation is authorized, after hearing pursuant to 14 days' notice, to direct the removal of any purported traffic control device wherever located which fails to meet the requirements of this section. The public agency erecting or installing the same shall immediately remove said device or signal upon the direction of the Department of Transportation and may not, for a period of 5 years, install any replacement or new traffic control devices paid for in part or in full with revenues raised by the state unless written prior approval is received from the Department of Transportation. Any additional violation by a public body or official shall be cause for the withholding of state funds for traffic control purposes until such public body or official demonstrates to the Department of Transportation that it is complying with this section.

(8) The Department of Transportation is authorized to permit traffic control devices not in conformity with the uniform system upon showing of good cause.

History.—s. 1, ch. 71-135; s. 1, ch. 72-189; s. 1, ch. 73-310; s. 1, ch. 76-31; s. 1, ch. 77-146; s. 1, ch. 80-178; s. 4, ch. 88-91; s. 3, ch. 88-93; s. 95, ch. 99-248; s. 6, ch. 2010-80.

Note.—Former s. 316.131.

Publications and Laws

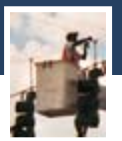


Traffic Engineering and Operations Office

- Title 23 CFR requires all states to do one of three things within two years after a new national MUTCD edition is issued or any national MUTCD amendments are made:
  - adopt the new or revised national MUTCD as the standard for traffic control devices in the state;
  - adopt the national MUTCD with a state supplement that is in substantial conformance with the new or revised national MUTCD; or
  - adopt a state MUTCD that is in substantial conformance with the new or revised national MUTCD.

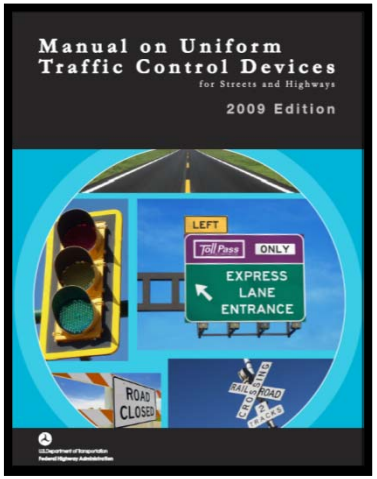
Publications and Laws





Traffic Engineering and Operations Office

- Manual on Uniform Traffic Control Devices (MUTCD)
  - Published by the Federal Highway Administration
  - Contains national design, application, and placement standards, guidance, options, and support provisions for traffic control devices
  - http://mutcd.fhwa.dot.gov/index.htm



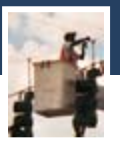
Publications and Laws



- The MUTCD defines a traffic control device as:
  - “A sign, signal, marking, or other device used to regulate, warn, or guide traffic, placed on, over, or adjacent to a street, highway, private road open to public travel, pedestrian facility, or shared-use path.”

Basics of Traffic Control Devices





Traffic Engineering and Operations Office

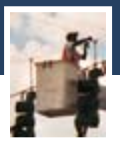
According to MUTCD, traffic control devices must meet five basic requirements to be effective:

1. Fulfill a need
2. Command attention
3. Convey a clear, simple meaning
4. Command respect from road users
5. Give adequate time for proper response.

MUTCD Section 1A.02

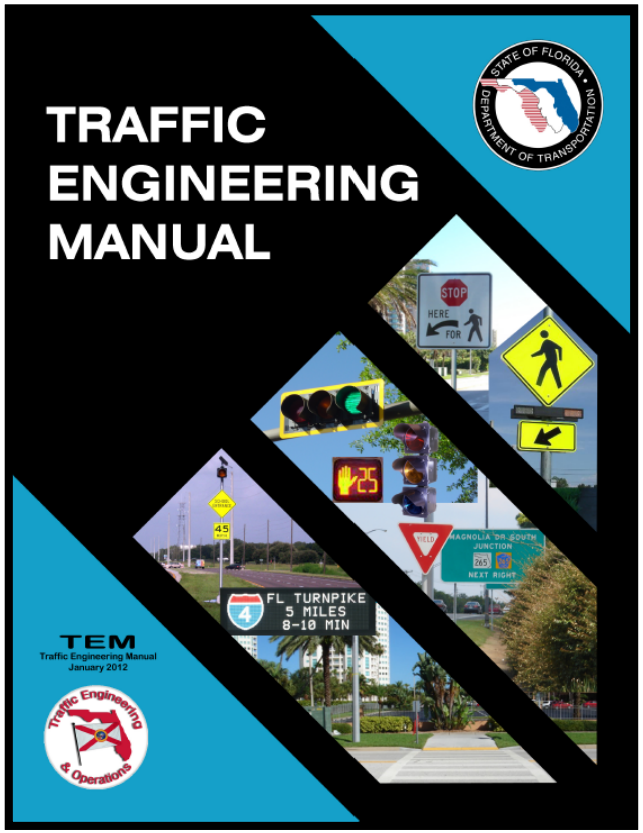
Publications and Laws



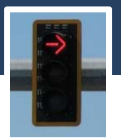


Traffic Engineering and Operations Office

- Traffic Engineering Manual (TEM)
  - The purpose of the FDOT Traffic Engineering Manual (TEM) is to provide traffic engineering standards and guidelines to be used on the State Highway System



Publications and Laws



Traffic Engineering and Operations Office

- Product Specifications
  - All traffic control devices sold or installed in the state of Florida must conform to the specifications and be listed on the FDOT Approved Product List

Minimum Specifications For Traffic Control Signals and Devices		
Section	**Description**	**Compliance Matrix** *[click to download]*
PCH	Test Lab Requirements	Rev 2.0
	Product Marking (ID) Requirements	Rev 2.0
A610	Truck Mounted Incident Management Dynamic Message Signs	Rev 1.0
A615	Environmental Requirements	Rev 0.0
A650	Traffic Signal Heads	Rev 2.0
	Traffic Signal Back Plates	Rev 3.0
	Traffic Signal LED Optical Unit	Rev 3.0
A653	Pedestrian Signal Assembly	Rev 1.0
A659	Signal Head Auxiliaries	Rev 0.0
A670	Traffic Controller Assembly	Rev 2.0
A671	NEMA Traffic Controller	Rev 1.0
	Type 170 Traffic Controller	Rev 2.0
A676	NEMA Controller Cabinet	Rev 1.0
	Type 170 Controller Cabinet	Rev 1.0
	552A Controller Cabinet	Rev 1.0
	PDA Surge Protective Device	Rev 2.0
	UPS Cabinet	Rev 1.0
A678	NEMA Traffic Controller Accessories	Rev 1.0
	Type 170 Traffic Controller Accessories	Rev 1.0
A680	System Control Equipment	Rev 3.0

MUTCD Part 2 - Signs



Traffic Engineering and Operations Office

PART 2
SIGNS

CHAPTER 2A. GENERAL

Section 2A.01 Function and Purpose of Signs

Support:

01 This Manual contains Standards, Guidance, and Options for the signing of all types of highways, and private roads open to public travel. The functions of signs are to provide regulations, warnings, and guidance information for road users. Words, symbols, and arrows are used to convey the messages. Signs are not typically used to confirm rules of the road.

02 Detailed sign requirements are located in the following Chapters of Part 2:

Chapter 2B — Regulatory Signs, Barricades, and Gates
Chapter 2C — Warning Signs and Object Markers
Chapter 2D — Guide Signs for Conventional Roads
Chapter 2E — Guide Signs for Freeways and Expressways
Chapter 2F — Toll Road Signs
Chapter 2G — Preferential and Managed Lane Signs
Chapter 2H — General Information Signs
Chapter 2I — General Service Signs
Chapter 2J — Specific Service (Logo) Signs
Chapter 2K — Tourist-Oriented Directional Signs
Chapter 2L — Changeable Message Signs
Chapter 2M — Recreational and Cultural Interest Area Signs
Chapter 2N — Emergency Management Signs

Standard:

03 **Because the requirements and standards for signs depend on the particular type of highway upon which they are to be used, the definitions for freeway, expressway, conventional road, and special purpose road given in Section 1A.13 shall apply in Part 2.**

Section 2A.02 Definitions

Support:

01 Definitions and acronyms that are applicable to signs are given in Sections 1A.13 and 1A.14.

Section 2A.03 Standardization of Application

Support:

01 It is recognized that urban traffic conditions differ from those in rural environments, and in many instances signs are applied and located differently. Where pertinent and practical, this Manual sets forth separate recommendations for urban and rural conditions.

Guidance:

02 *Signs should be used only where justified by engineering judgment or studies, as provided in Section 1A.09.*

03 *Results from traffic engineering studies of physical and traffic factors should indicate the locations where signs are deemed necessary or desirable.*

04 *Roadway geometric design and sign application should be coordinated so that signing can be effectively placed to give the road user any necessary regulatory, warning, guidance, and other information.*

Standard:

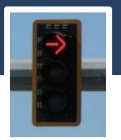
05 **Each standard sign shall be displayed only for the specific purpose as prescribed in this Manual. Determination of the particular signs to be applied to a specific condition shall be made in accordance with the provisions set forth in Part 2. Before any new highway, private road open to public travel (see definition in Section 1A.13), detour, or temporary route is opened to public travel, all necessary signs shall be in place. Signs required by road conditions or restrictions shall be removed when those conditions cease to exist or the restrictions are withdrawn.**

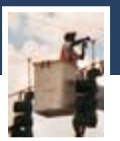
Section 2A.04 Excessive Use of Signs

Guidance:

01 *Regulatory and warning signs should be used conservatively because these signs, if used to excess, tend to lose their effectiveness. If used, route signs and directional guide signs should be used frequently because their use promotes efficient operations by keeping road users informed of their location.*

MUTCD Part 2 - Signs





- The MUTCD defines a sign as:
  - “Any traffic control device that is intended to communicate specific information to road users through a word, symbol, and/or arrow legend. Signs do not include highway traffic signals, pavement markings, delineators, or channelization devices.”

MUTCD Part 2 - Signs

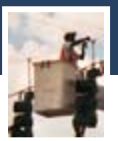


Traffic Engineering and Operations Office

- The MUTCD breaks down signs into 13 different sub-chapters
  - Regulatory, Barricades and Gates
  - Warning and Object Markers
  - Guide Signs for Conventional Roads
  - Guide Signs for Freeways and Expressways
  - Toll Road Signs
  - Preferential and Managed Lanes
  - General Information
  - General Service
  - Logo
  - TODS
  - Changeable Message
  - Recreational and Cultural Interest Area
  - Emergency Management

TEM Chapter 2 – SIGNS





Traffic Engineering and Operations Office

FDOT

Chapter 2
SIGNS

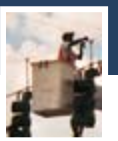
TEM Chapter 2 continued



Traffic Engineering and Operations Office

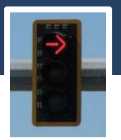
TEM Chapter 2 continued





Traffic Engineering and Operations Office

Florida's Highway Guide Sign Program



Traffic Engineering and Operations Office

- Florida Administrative Code 14-51
  - Part I – General
  - Part II – Guide Signs on Limited Access Facilities
  - Part III – Guide Signs on Non-Limited Access Facilities
  - Part IV – Place Name Signs on Non-Limited Access Facilities
  - Part V – Tourist Oriented Directional Signs

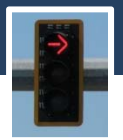
Florida's Highway Guide Sign Program

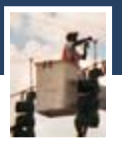


Traffic Engineering and Operations Office

- Who can request a sign?
  - Local Municipality
  - Politician
  - Public
  - State Agencies

Pavement Marking Resources





- MUTCD Chapter 3
- TEM Chapter 4
- FDOT Design Standards, Index 17344, 17345, 17346, 17347
  http://www.dot.state.fl.us/rddesign/DesignStandards/Standards.shtm
- FDOT Specifications, 700 Series
  http://www.dot.state.fl.us/specificationsoffice/Implemented/SpecBooks/default.shtm

Traffic Engineering and Operations Office

FDOT

MUTCD Guidance

Traffic Engineering and Operations Office

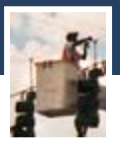
- **Markings shall be**
  - Yellow
  - White
  - Red
  - Blue
  - or purple

Black can be used in conjunction with one of these colors.

- **Markings can be used alone or with other Traffic Control Devices**

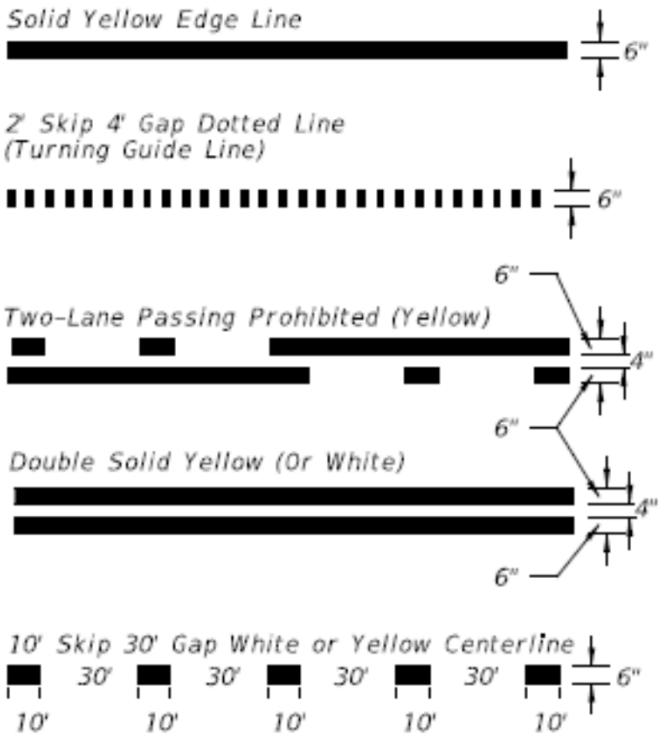
Striping Details

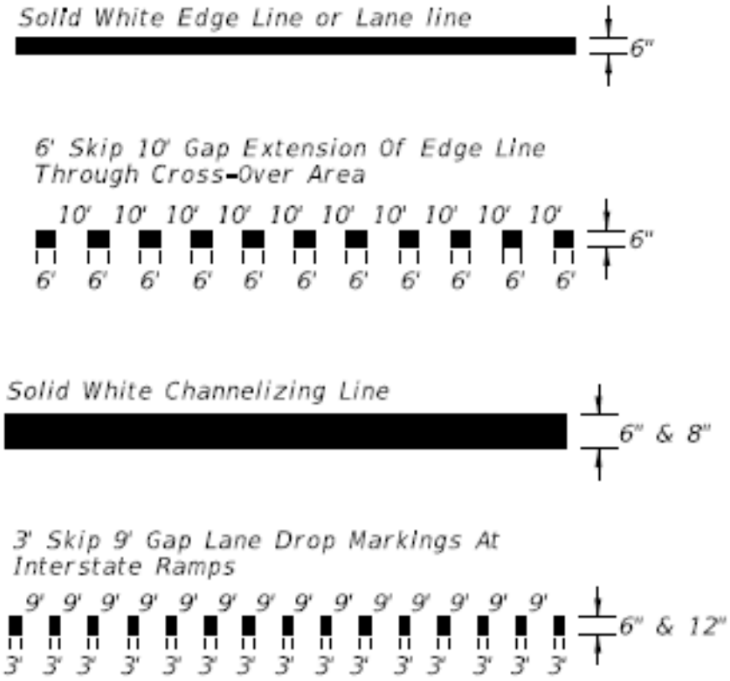




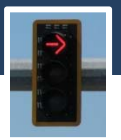
Traffic Engineering and Operations Office

- Standard Index 17346





TEM Guidance



- To apply non-standard pavement messages, an engineering study indicating how the application can be expected to optimize operations efficiency and/or safety will be forwarded through the District Traffic Operations Engineer to the State Traffic Operations Engineer in support of a FHWA Request for Experiment.

Traffic Engineering and Operations Office

FDOT

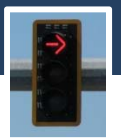
Pavement Marking Material Selection

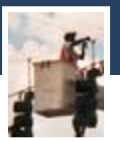


Traffic Engineering and Operations Office

Adapted from earlier material prepared by FDOT Design Office

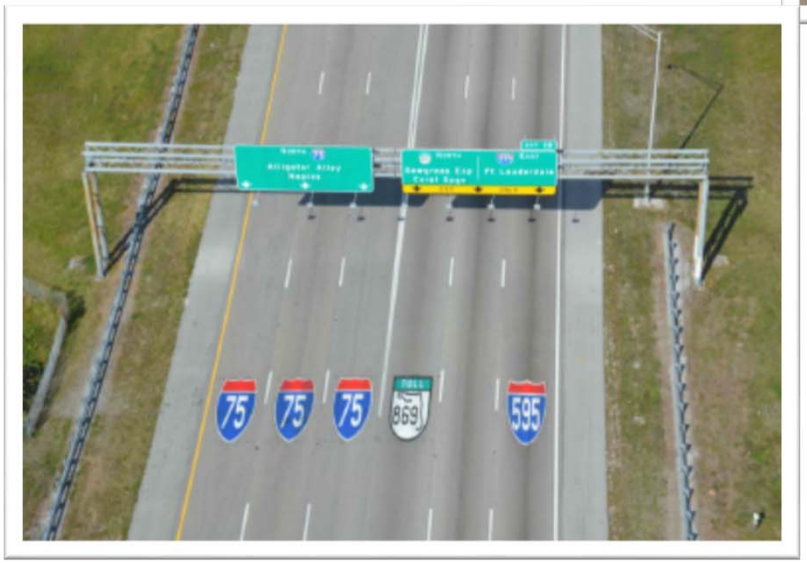
Considerations for All Markings





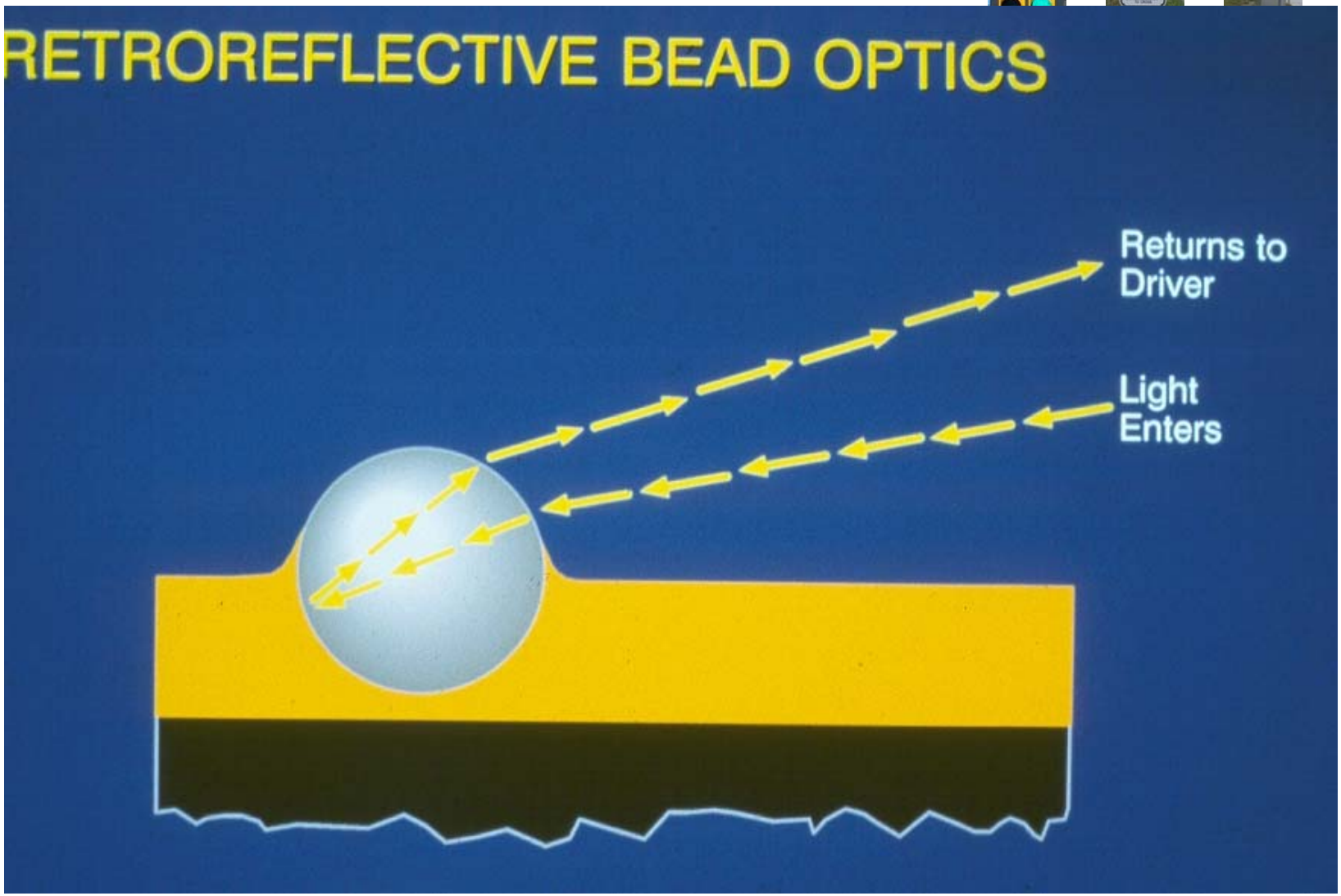
Traffic Engineering and Operations Office

- Retroreflectivity
- Color



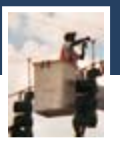
Retroreflectivity

Traffic Engineering and Operations Office



Types of Marking Materials



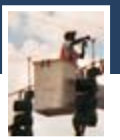


Traffic Engineering and Operations Office

- Paint
- Thermoplastic
- Preformed Thermoplastic
- High Performance Tapes
- Audible & Vibratory Markings

Types of Marking Materials



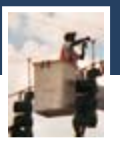


Traffic Engineering and Operations Office

- Paint

Painted Pavement Markings





Traffic Engineering and Operations Office

Primary Uses:

- Maintenance of Traffic Markings
- Short Term Refurbishment
- Contrast Marking

Limitations:

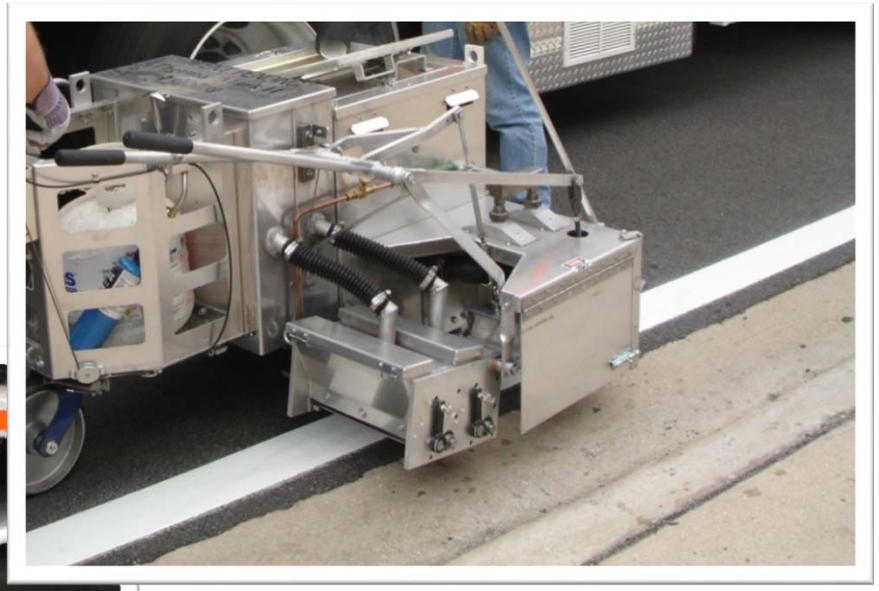
- Expected Service Life - 6 to 12 Months
- No Wet Retroreflectivity Characteristics

Types of Marking Materials

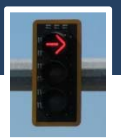


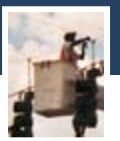
Traffic Engineering and Operations Office

- Paint
- Thermoplastic



Thermoplastic Pavement Markings



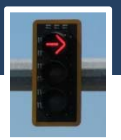


Traffic Engineering and Operations Office

Primary Uses:

- Longitudinal and Transverse Lines
- Messages and Symbols
- Arrows

Thermoplastic Pavement Markings



Traffic Engineering and Operations Office

Advantages:

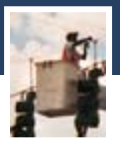
- Expected Service Life - 7 to 8 Years
- Higher Retroreflectivity than Paint
- Wet Retroreflectivity Characteristics

Limitations:

- Will Not Bond to Concrete if Moisture is Present

Types of Marking Materials



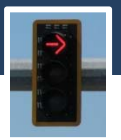


- Paint
- Thermoplastic
- Preformed Thermoplastic

Traffic Engineering and Operations Office

FDOT

Preformed Thermoplastic Pavement Markings

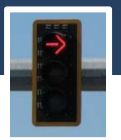


Traffic Engineering and Operations Office

Primary Uses:

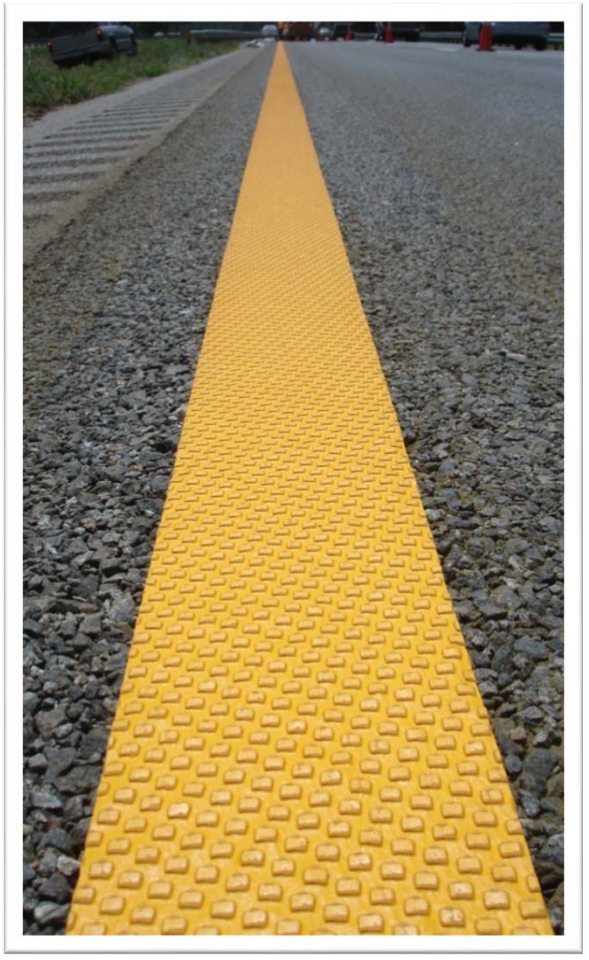
- Exit Ramp Numbers
- Bicycle Symbols
- Crosswalk Markings
- Pavement Messages

Types of Marking Materials



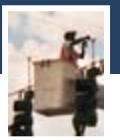
Traffic Engineering and Operations Office

- Paint
- Thermoplastic
- Preformed
  Thermoplastic
- Permanent Tapes



Tape Pavement Markings





Traffic Engineering and Operations Office

FDOT

Primary Uses:

- Longitudinal Centerlines on Concrete

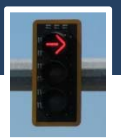
Advantages:

- Expected Service Life - 7 to 8 Years
- Wet Retroreflectivity Characteristics

Limitations:

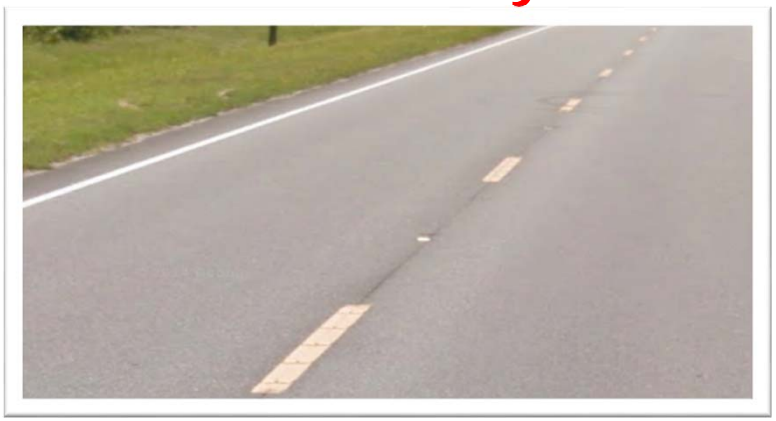
- High Cost
- Performs Best on Concrete
- Requires Lane Closures to Install
- Extensive Preparation for Refurbishment

Types of Marking Materials

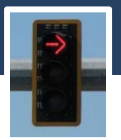


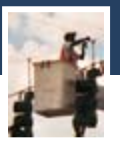
Traffic Engineering and Operations Office

- Paint
- Thermoplastic
- Preformed Thermoplastic
- High Performance Tapes
- Audible & Vibratory Markings



Audible & Vibratory Pavement Markings





Traffic Engineering and Operations Office

Primary Use:

- Longitudinal Edge Lines
- Centerline Markings (if justifiable)

Limitations:

- Do Not Specify for Tapers, Turn Lanes or Radius Markings

Audible & Vibratory Markings



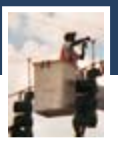
Traffic Engineering and Operations Office




Audible & Vibratory Markings

Field Installation - Ground-in Rumble Stripe





Traffic Engineering and Operations Office

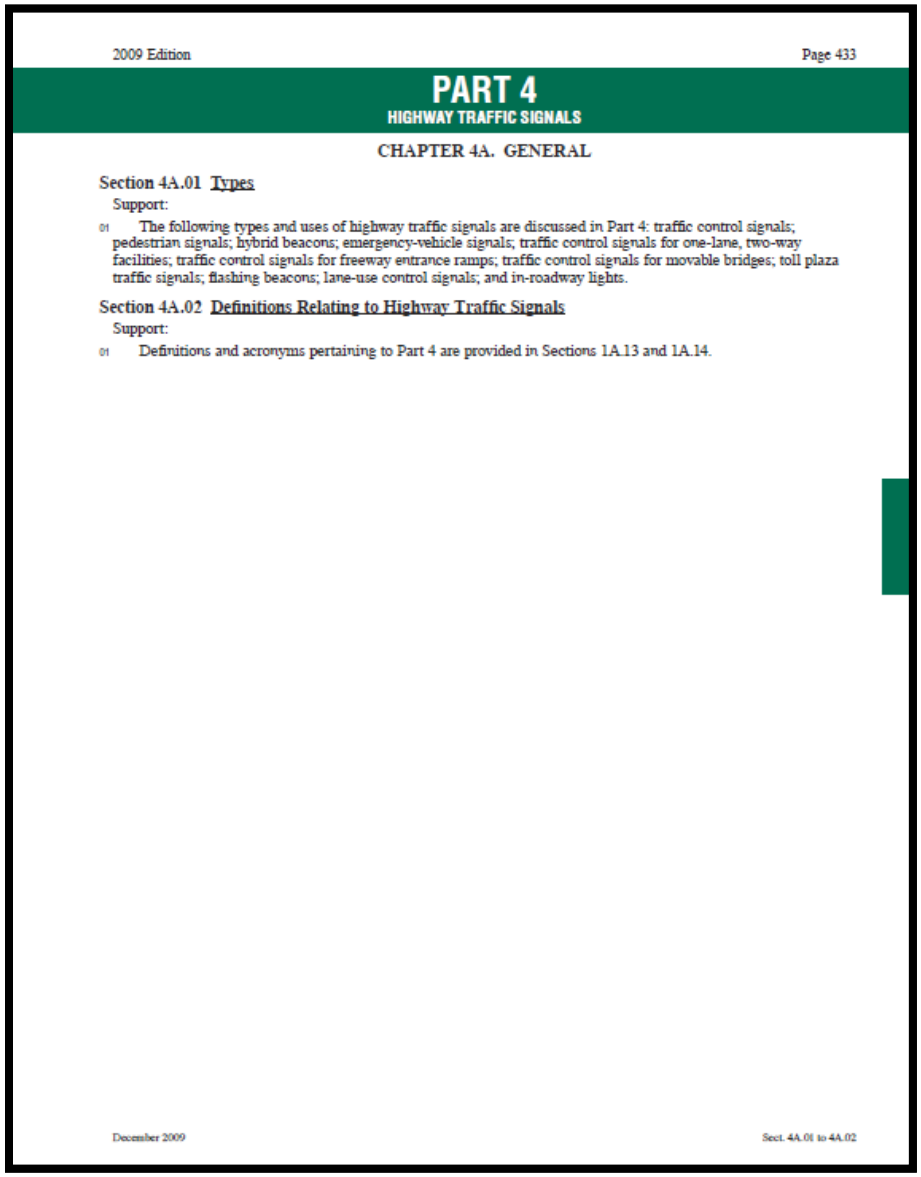
FDOT

Traffic Signal Publications and Laws



Traffic Engineering and Operations Office

FDOT



2009 Edition Page 433

PART 4
HIGHWAY TRAFFIC SIGNALS

CHAPTER 4A. GENERAL

Section 4A.01 Types

Support:

01 The following types and uses of highway traffic signals are discussed in Part 4: traffic control signals; pedestrian signals; hybrid beacons; emergency-vehicle signals; traffic control signals for one-lane, two-way facilities; traffic control signals for freeway entrance ramps; traffic control signals for movable bridges; toll plaza traffic signals; flashing beacons; lane-use control signals; and in-roadway lights.

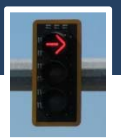
Section 4A.02 Definitions Relating to Highway Traffic Signals

Support:

01 Definitions and acronyms pertaining to Part 4 are provided in Sections 1A.13 and 1A.14.

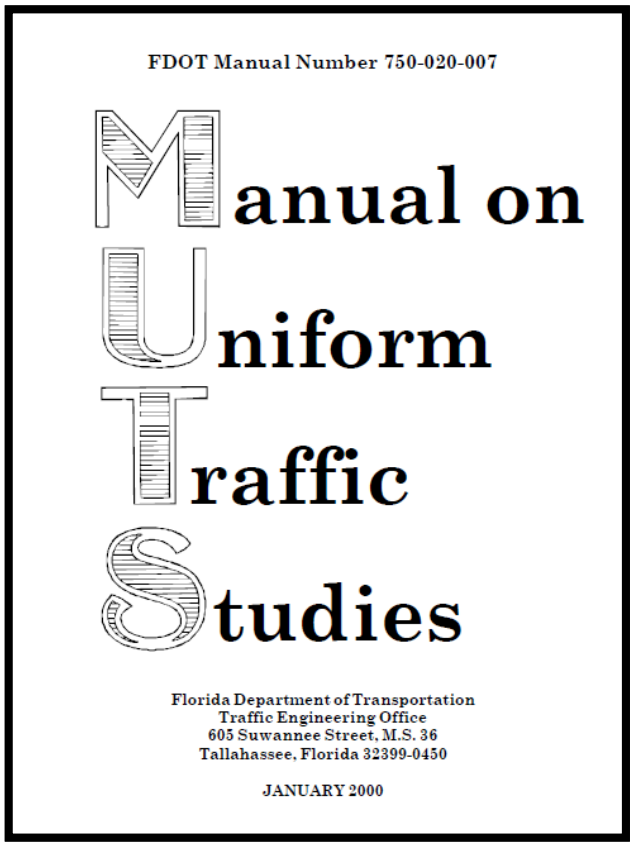
December 2009 Sect. 4A.01 to 4A.02

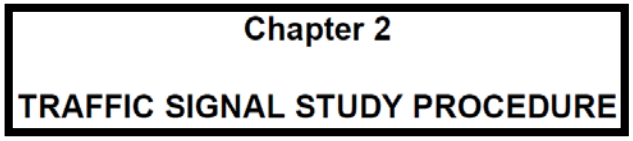
Traffic Signal Publications and Laws



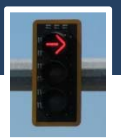
Traffic Engineering and Operations Office

- Manual on Uniform Traffic Studies
  - The purpose of the Manual on Uniform Traffic Studies (MUTS) is to establish minimum standards for conducting traffic engineering studies on roads under the jurisdiction of the Department of Transportation





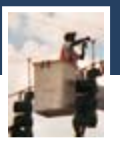
Traffic Signal Purpose



- The MUTCD defines a traffic control signal as:
  - Any highway traffic signal by which traffic is alternatively directed to stop and permitted to proceed
  - Traffic is defined as pedestrians, bicyclists, ridden or herded animals, vehicles, streetcars, and other conveyances either singularly or together while using any highway for purposes of travel

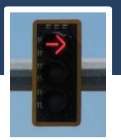
Traffic Signal Purpose





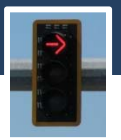
- It is with this need to assign the right of way at locations that we consider the dual purpose of traffic signals
  - Efficiency
  - Safety
- In some cases the above seem to be conflicting

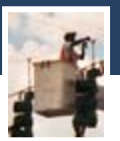
Traffic Signal Purpose



- The MUTCD describes that traffic control signals can be
  - Ill-designed
  - Ineffectively placed
  - Improperly operated, or
  - Poorly maintained, with resulting outcomes of excessive delay, disobedience of the indication, avoidance and increases in the frequency of collisions

Traffic Signal Advantages

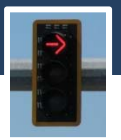


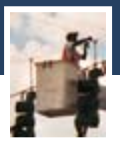


Traffic Engineering and Operations Office

- A traffic signal that is properly designed and timed can :
  - Provide for the orderly and efficient movement of people
  - Effectively maximize the volume movements served at the intersection
  - Reduce the frequency and severity of certain types of crashes
  - Provide appropriate levels of accessibility for pedestrians and side street traffic

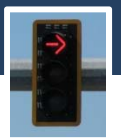
Traffic Signal Disadvantages



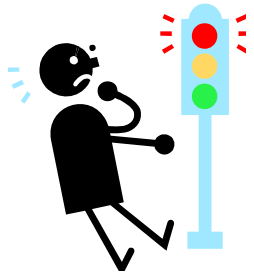


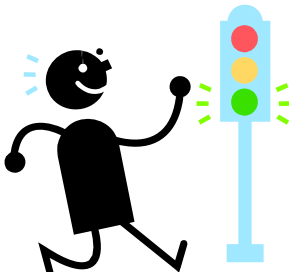
- Traffic control signals can have the following disadvantages:
  - Excessive delay
  - Excessive disobedience
  - Increased use of less adequate routes
  - Significant increases in the frequency of collisions (especially rear-end collisions)

Traffic Signal Initiation



- Who initiates a signal?
  - Developer
  - City/County
  - Politician
  - Public
  - State





Traffic Engineering and Operations Office

Traffic Signal Warrants



Traffic Engineering and Operations Office

FDOT

Warrant	Name	Description
Warrant 1	Eight-Hour Vehicular Volume	This warrant is used when a large volume of intersecting traffic or where the traffic volume on the major street is so excessive that traffic on the minor street suffers undo delay. This warrant requires at least eight hours' worth of traffic volume data.
Warrant 2	Four-Hour Vehicular Volume	The Four-Hour Vehicular Volume signal warrant conditions are intended to be applied where the volume of intersecting traffic is the principal reason to consider installing a traffic control signal. This warrant requires at least four hours' worth of traffic volume data.
Warrant 3	Peak Hour	The Peak Hour signal warrant is intended for use at a location where traffic conditions are such that for a minimum of 1 hour of an average day, the minor-street traffic suffers undue delay when entering or crossing the major street. This warrant requires just one hour of data and is often used for land use or impact studies; however, Department approval is required if this is the only warrant that is used to justify the signal.
Warrant 4	Pedestrian Volume	The Pedestrian Volume signal warrant is intended for application where the traffic volume on a major street is so heavy that pedestrians experience excessive delay in crossing the major street.

Traffic Signal Warrants



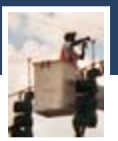
Traffic Engineering and Operations Office

FDOT

Warrant	Name	Description
Warrant 5	School Crossing	The School Crossing signal warrant is intended for application where the fact that schoolchildren cross the major street is the principal reason to consider installing a traffic control signal. For the purposes of this warrant, the word “schoolchildren” includes elementary through high school students.
Warrant 6	Coordinated Signal System	Progressive movement in a Coordinated Signal System sometimes necessitates installing traffic control signals at intersections where they would not otherwise be needed in order to maintain proper platooning of vehicles.
Warrant 7	Crash Experience	The Crash Experience signal warrant conditions are intended for application where the severity and frequency of crashes are the principal reasons to consider installing a traffic control signal.
Warrant 8	Roadway Network	Installing a traffic control signal at some intersections might be justified to encourage concentration and organization of traffic flow on a Roadway Network.
Warrant 9	Intersection Near a Grade Crossing	The Intersection Near a Grade Crossing signal warrant is intended for use at a location where none of the conditions described in the other eight traffic signal warrants are met, but the proximity to the intersection of a grade crossing on an intersection approach controlled by a STOP or YIELD sign is the principal reason to consider installing a traffic control signal.

TEM Chapter 3 – SIGNALS





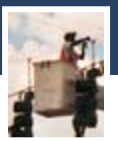
Traffic Engineering and Operations Office

FDOT

Chapter 3
SIGNALS

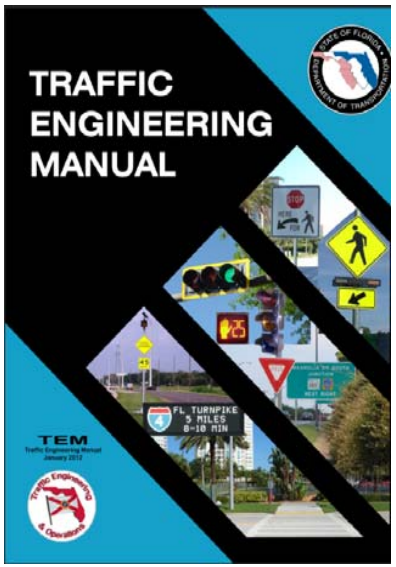
One Application – Mid-Blocks





Traffic Engineering and Operations Office

- Section 3.8: Mid-Block Pedestrian Crosswalks
- Purpose: To establish criteria for the installation and operation of mid-block pedestrian crosswalks
- Section defines mid-block crosswalks; ped attractors/generators; Ped hybrid beacons; RRFBs etc.
- Procedure notes that uncontrolled location on SHS shall be reviewed and approved by District Traffic Ops
- If available information supports the installation of a mid-block ped crosswalk based upon the criteria in Section 3.8.5, then a full engineering study may be conducted.



•TEM …….. Definitions



Traffic Engineering and Operations Office

- **Marked crosswalk.** Any portion of a roadway at an intersection or elsewhere distinctly indicated for pedestrian crossing by lines or other markings on the surface. Marked crosswalks serve to highlight the right-of-way where motorists can expect pedestrians to cross and designate a stopping location.
- **Mid-block location.** Any location proposed for a marked crosswalk on a roadway with an uncontrolled approach.
- **Pedestrian attractor.** A residential, commercial, office, recreational, or other land use that is expected to be an end destination for pedestrian trips during a particular time of day.
- **Pedestrian generator.** A residential, commercial, office, recreational or any other land use that serves as the starting point for a pedestrian trip during a particular time of day.

TEM …….. Definitions

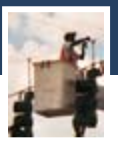


Traffic Engineering and Operations Office

- **Pedestrian Hybrid Beacon.** An experimental pedestrian actuated traffic control device that provides a dark indication to motorists until activated by a pedestrian at which time a solid red indication is provided to motorists to direct them to stop. The solid red indication advances to a flashing red indication that allows motorists to proceed with caution once a pedestrian is clear.
- **Rectangular Rapid Flashing Beacon.** An (RRFB) consists of two rapidly and alternately flashing rectangular yellow indications having LED-array based pulsing light sources that function as a warning beacon.
- **Two-stage marked mid-block crosswalk. A marked crosswalk that is designed** to require pedestrians to cross each half of the street independently, with the median serving as a refuge area for pedestrians to wait before completing the crossing.

Standard Crosswalk



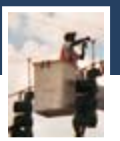


Traffic Engineering and Operations Office

FDOT

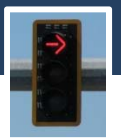
Marked Crosswalks





Traffic Engineering and Operations Office

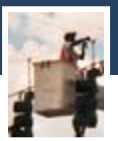
Procedure (3.8.4)



- Review by District Traffic Ops
- If review supports installation, an engg study must be conducted.
- Study criteria contained in 3.8.5
- If evaluation results in a decision NOT to consider the mid-block crosswalk, the reasons must be documented.
- Prior to approval, coordination between Traffic Ops and local agencies is needed to establish maintenance responsibility.

Criteria and Considerations





Traffic Engineering and Operations Office

- Factors to consider: Proximity to generators, ped demand, crash history, distance between crossing locations
- Sufficient demand needs:
  - Minimum 20 peds during an hour
  - Minimum 60 peds during any 4 hours of the day
- Location characteristics:
  - Minimum vehicular volume of 2,000 ADT
  - Min. distance to nearest crossing location = 300’ (PPM; section 8.3.3.2)
  - If proposed location is between intersections, min. block length = 660’ (PPM; section 8.3.3.2)

TEM – Safety Considerations



- The location should be conducive to providing ped safety
- The location must provide adequate stopping sight distance; i.e., parking restrictions near the marked mid-block crosswalk required. (PPM, section 2.7)
- If sidewalks connecting the crosswalk to ped generators and attractors are not already present, they should be provided. (PPM, section 8.3.1)
- Crosswalk illumination shall be provided on all newly constructed mid-blocks or uncontrolled approach crosswalks except in environmentally sensitive areas or on facilities open during daylight hours only.
- When volumes exceed 12,000 ADT or where crossing distances exceed 60', a refuge island or raised median should be provided unless controlled by ped signal or ped hybrid beacon.
- Locations with nearby bus stops should be actively considered.

TEM – Treatments



- 10-foot wide Special Emphasis Crosswalk markings Std Index 17346.
- Curb extensions, raised crosswalks, speed reduction treatments, addl. S&PM, flashing beacons, or signal control may be considered.
- If ped volumes are high, ped bridge or tunnel in lieu of an at-grade marked mid-block crossing may be considered.
- Pedestrian Traffic Control Signal
- Pedestrian Hybrid Beacon
- Supplemental Beacons - Flashing Yellow Warning Beacons; RRFB
- In-Roadway Lighting; Supplemental Signing and Markings

Ped Hybrid Beacon and RRFB



Traffic Engineering and Operations Office

FDOT

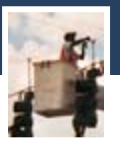
Rectangular Rapid Flashing Beacon



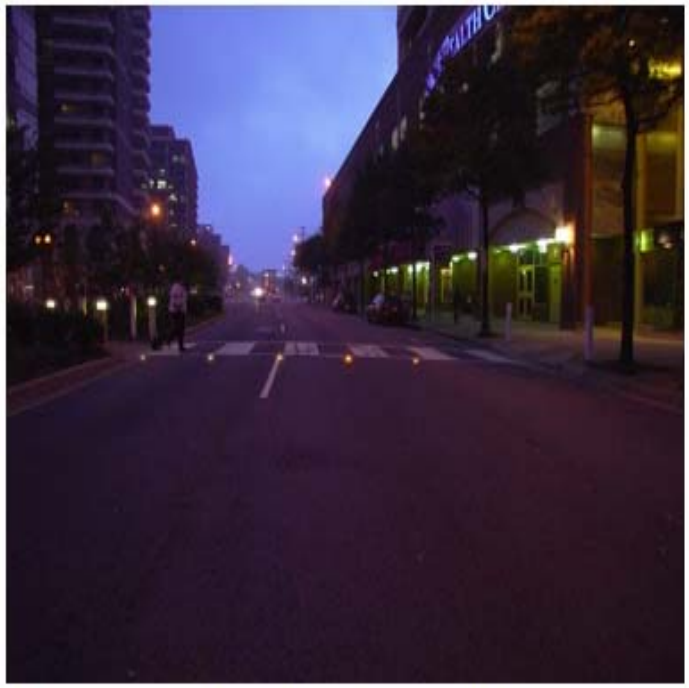
Traffic Engineering and Operations Office

In-Roadway Lighting





Traffic Engineering and Operations Office



This night photo shows a lighted crosswalk in a northern Virginia suburb.
All photographs: Ted Shafer

- Source: FHWA – seeing crosswalks in a new light

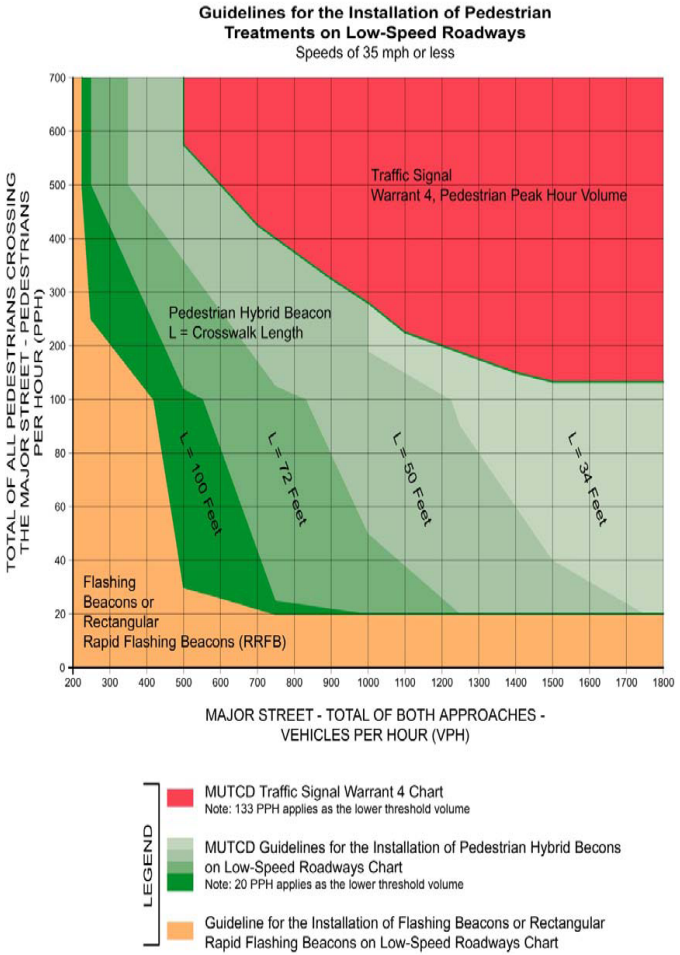
A pedestrian crosses a lighted crosswalk at night.

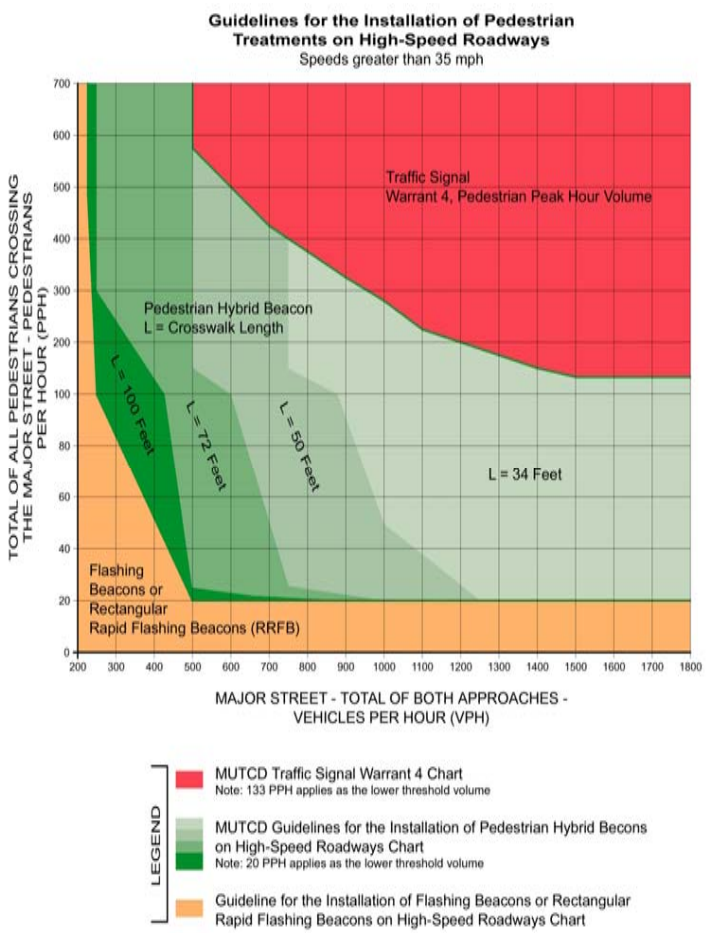
TEM – Guidance in Treatments



Traffic Engineering and Operations Office

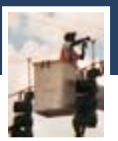
FDOT





Plans Prep Manual - Midblock Crosswalks





Traffic Engineering and Operations Office

8.3.3.2 Midblock Crosswalks

Midblock crosswalks can be used to supplement the pedestrian crossing needs in an area between intersections. This can provide pedestrians with a more direct route to their destination. Midblock crosswalks should be illuminated, marked and signed in accordance with the *MUTCD*, *Traffic Engineering Manual, (Section 3.8)* and *Design Standards Index 17346*. Pedestrian-activated, signalized midblock crosswalks may be appropriate at some locations, but the locations must meet the warrants established in the *MUTCD*.

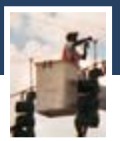
In addition to the requirements in ***Section 8.3.3.1***, the following conditions also apply:

1. Midblock crosswalks should not be located where the spacing between adjacent intersections is less than 660 feet
2. Midblock crosswalks should not be located where the distance from the crosswalk to the nearest intersection (or crossing location) is less than 300 feet
3. Midblock crosswalks shall not be provided where the crossing distance exceeds 60 feet (unless a median or a crossing island is provided)
4. Midblock crosswalks shall not be provided where the sight distance for both the pedestrian and motorist is not adequate (stopping sight distance per ***Table 2.7.1***)
5. Midblock crosswalks shall not be located where the ADA cross slope and grade criteria along the crosswalk cannot be met (per ***Section 8.3.2***).

An engineering study is required before a marked midblock crosswalk is installed at an uncontrolled location. This study shall examine such factors as sight distance for pedestrians and vehicles (stopping sight distance), traffic volume, turning volumes near proposed crosswalk location, roadway width, presence of a median, lighting, landscaping, drainage, traffic speed, adjacent land use (pedestrian generators / destinations), pedestrian volume and existing crossing patterns. Midblock crosswalks should only be used in areas where the need truly exists, and the engineering study will help to determine if an uncontrolled midblock crosswalk is a viable option. Refer to the Department's *Manual on Uniform Traffic Studies (MUTS)*.

If any problem areas are identified that would preclude the placement of a justified midblock crosswalk, additional features must be included in the design to remedy those problem areas before a midblock crosswalk can be placed at that location. Features like overhead signing can help alert motorists and be used to light the crossing. Curb extensions or bulb-outs can improve sight distance and decrease the crossing distance. Adjustment of the profile on the roadway crossing may be required to improve the cross slope of the crosswalk.





Questions?