





Intermediate Refresher



Maintenance of Traffic Training


Florida Department of Transportation




MOT & TTC

The FDOT considers the terms Maintenance of Traffic (MOT) and Temporary Traffic Control (TTC) synonymous. They may be used interchangeably in the field and throughout the course of this presentation.

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Session 1



**Introductions
Course Overview
Policies**

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Introductions

Instructor

Name

Organization

WZ Experience



Participants

Current valid certificate/card is required to take this Course

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Course Goal

Upon completion of this Course, you will be able to:

- Select appropriate Standard Plans Index
- Correctly place, maintain and remove temporary traffic control devices
- Inspect placement and operational functions of traffic control devices
- Instruct individuals in Flagger training administration

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Participant Responsibilities



Maintain a valid Maintenance of Traffic qualification

Keep updated on all changes to standards and related documents

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National Manuals

-  Manual on Uniform Traffic Control Devices (MUTCD)
-  Roadside Design Guide (RDG)
-  Policy on Geometric Design of Highways and Streets (AASHTO Green Book)

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State of Florida Manuals

- Standard Plans**
 - Standard Plans Revision
- FDOT Design Manual**
 - Design Bulletins
- Standard Specifications**
 - Special Provisions & Supplements

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End of Session 1



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Session 2



Fundamental Principles of Temporary Traffic Control Zones

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Principles of Traffic Control Design for Safety

- Workers
- Motorist
- Bicyclist
- Pedestrian, including disabled
- Enforcement/Emergency Officials
- Transit Needs (Bus, Rail, etc.)

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Principles of Traffic Control Selection of Devices

FDOT Device Uniformity		
Design of Device	Placement of Device	Maintenance of Device
<ul style="list-style-type: none"> • Specifications • Approved Products List (APL) 	<ul style="list-style-type: none"> • Contract Plans • Standard Plans • MUTCD 	<ul style="list-style-type: none"> • Spec 102 • ATSSA Guidelines

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**Principles of Traffic Control
Selection of Devices**

- Fulfill a Need
- Command Attention
- Convey a Clear & Simple Meaning
- Command Respect
- Provide Adequate Response Time

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**Principles of Traffic Control
Design Considerations**

Guide Traffic and Maintain Work Zone

Provide adequate warning, delineation, and channelization to assist in guiding road users

Remove or cover inappropriate devices or markings

Monitor work zones under varying conditions

Keep clear zone free of equipment and materials

Maintain good communication with public and agencies

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End of Session 2



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Session 3
**Temporary Traffic Control
Control Devices**
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Temporary Traffic Control Devices
All temporary traffic control devices shall be on the Department's Approved Products List (APL)

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Approved Products List (APL)
Products approved for use in Florida based on:

 Specifications	 Standard Plans	 Vendor Drawing
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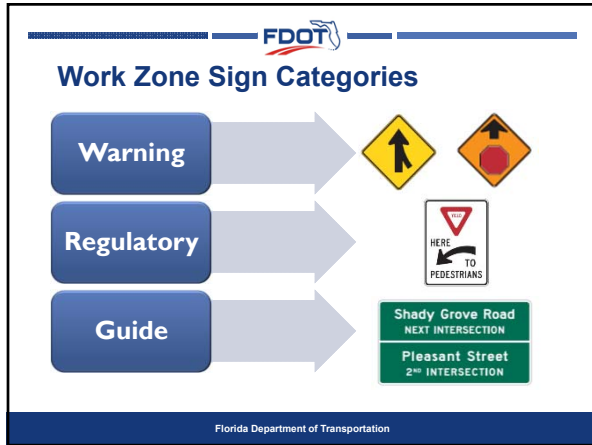
APL Website



<https://fdotwp1.dot.state.fl.us/ApprovedProductList/Specifications>

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Work Zone Sign Categories



Warning

Regulatory

Guide


Shady Grove Road
NEXT INTERSECTION

Pleasant Street
2nd INTERSECTION

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Warning Signs

- Diamond is basic shape
- Temporary warning signs black legend and border on fluorescent orange background
- Must be at least 48 inches X 48 inches
- Permanent warning signs yellow background with black legend may remain in work zone if still applicable



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Regulatory Signs

- Generally rectangular with longer vertical dimension black legend and border on white background
- Impose legal obligations and/or restrictions on all traffic
- STOP, YIELD, DO NOT ENTER, and WRONG WAY signs have white legend on red background

DO
NOT
PASS

STOP

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Guide Signs

- Rectangular shape with long horizontal dimension
- Basic color white on green
- At work zones may be black on orange to indicate routing changes due to maintenance activity

← PHOENIX
TUCSON →

ROAD
CONSTRUCTION
NEXT 13 MILES

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Sign Placement

Sign supports must not be located on sidewalks, bicycle facilities, or areas designated for pedestrian or bicycle traffic.



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Work Zone Sign Supports

Temporary Post-Mounted

Work operations exceed 1 day



Temporary Portable

Work operations less than 1 day

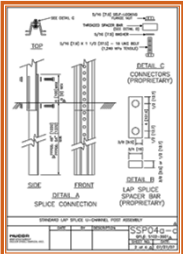


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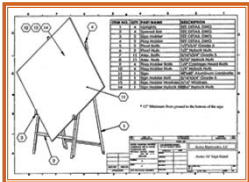
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Work Zone Sign Supports- APL Drawings

Temporary Post-Mounted



Temporary Portable



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Channelizing Devices

- Cones, Drums
- Tubular Markers
- Longitudinal Channelizing Devices (LCD's)
- Vertical Panels
- Barricades ,Types 1 & 2
- Barricades, Direction Indicator
- Barricades, Type 3

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Function of Channelizing Devices

- Warn road users of conditions created by work activities in or near the roadway.
- Guide and direct drivers, bicyclists and pedestrians safely through the work zone.

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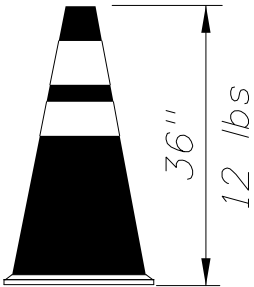
Temporary Warning Lights

- All Temporary Warning Lights have been omitted beginning January 1st 2016.

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Cones



36"
12 lbs

CONE SIZE:
Florida requires 36-inch, 12-lb cones on state roads.

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Tubular Marker

4" Diameter

Non-fixed tubular markers to be used during daylight hours only.

36" Min.

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Drums

18" Diameter

36" Min.

Drums are highly visible devices, have good target value and give the appearance of being formidable obstacles; therefore they command the respect of motorist.

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Vertical Panel

Vertical panels may be used for channelization, and are particularly appropriate for traffic separation or in other locations where lateral space is restricted.

12" Max. 12" Max. 36" Min. 12" Max.

A-FRAME POST MOUNT

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Type I Barricade

Type I: One horizontal retroreflective rail
Type I: Minimum length of three feet

General: Markings shall slope downward at a 45° angle toward the direction to which traffic is to pass.

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Type II Barricade

Type II: Two horizontal retroreflective rails
Type II: Minimum length of two feet

General: Ballast shall not be placed on top rails or any striped rails or higher than 13 inches above the driving surface.

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Direction Indicator Barricade

May be used in tapers & transitions
 If used, shall be in a series

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Type III Barricade

If road closure signs are mounted on a Type III Barricade they shall be installed in accordance with manufacturer's vendor drawing shown on the APL.

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Vehicle & Pedestrian Longitudinal Channelizing Devices (LCD's)

Vehicle & Pedestrian Longitudinal Channelizing Devices (LCD's) are to be used as indicated in Index 102-600.

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Barrier Delineators


Description	<ul style="list-style-type: none"> • Yellow or White • 3 inches wide by 4 inches high Sheeting • Type IV or XI Sheeting
Placement	<ul style="list-style-type: none"> • On top of temporary barrier wall or LCD
Purpose	<ul style="list-style-type: none"> • Placed in a line to delineate the travelway

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Arrow Boards

- Supplement other warning devices
- Provide additional advance warning
- Used for lane closures on multi-lane roadways




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Arrow Boards

- Multiple lane closures use multiple arrow boards
- Reduce intensity of flashers during darkness
- Delineate with temporary traffic control devices




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Portable Changeable Message Signs (PCMS)

- Programmable messages that advise the road user of unexpected situations
- Provide additional advance warning
- Used for night time work within 4' of edge travelway



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Portable Changeable Message Signs (PCMS)

Typical Uses:

- Speed is expected to drop substantially
- Queuing and delays expected
- Changes in alignment or surface condition
- Advance notice of closures (ramp, lane..)
- Changes in road user pattern


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Portable Changeable Message Signs (PCMS)

Message Design

- Message Panel
 - 8 characters per line
 - 3 lines per phase
- Each message shall consist of either 1 or 2 phases
- Each phase conveys a single thought
- Phase Layout
 - Top line - Present the problem
 - Center Line - Present the location of distance ahead
 - Bottom line - Present recommended driver action



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Radar Speed Display Unit

Used as part of the Motorist Awareness System

Driver Speed Display

Regulatory Speed Limit Sign

Your Speed Sign



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Portable Regulatory Sign

Used as part of the Motorist Awareness System

Flashing Lights

Regulatory Speed Limit Sign


When Flashing Sign



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Truck/Trailer Mounted Attenuators (TMA'S)




- Truck or Trailer Mounted
 - Listed on APL
- Indexes 102-607 & 102-619
- Mounted by Manufacturer's Recommendations

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Temporary Lane Separator



Tubular Marker

Vertical Panel

Opposing Traffic

3 Approved Fixed Channelizing Devices

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Painted Pavement Markings



Centerlines, lane lines, edge lines, stop bars and turn arrows will be required in work zones prior to opening the road to traffic.

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Raised Pavement Markers



RPM's shall be installed as a supplement to:

- a) All lane lines.
- b) Edge lines in transition & approach areas.
- c) Edge lines of gore areas.

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Pavement Markings - Conflicting Markings




Remove all pavement markings (paint, tape, thermoplastic, raised pavement markers, etc.) that conflict with the adjusted vehicle or pedestrian paths.

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Temporary Signals

- Traffic Signals
 - Temporary
 - Existing



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End of Session 3



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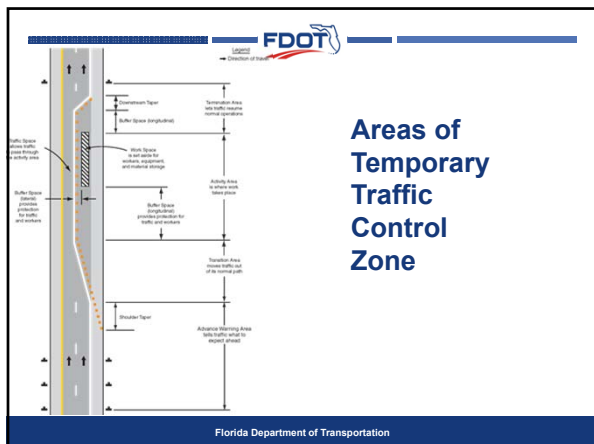
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TRAFFIC CONTROL ZONE

Session 4

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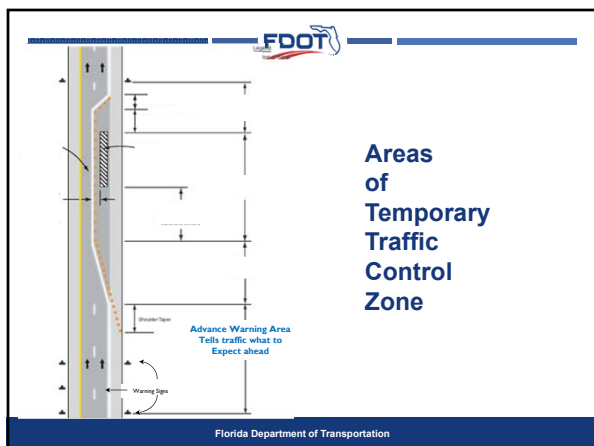
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Advance Warning Area

- First indication to motorists of unusual situation; alerts them work operations will occur short distance ahead
- Signs properly positioned and spaced to give motorists adequate time to respond

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The slide features the FDOT logo at the top. Below it is the title 'Advance Warning Area'. A bulleted list describes the purpose and placement of these signs. To the right is a photograph of an orange diamond-shaped sign that says 'ROAD WORK AHEAD'. A red circle with a diagonal slash is superimposed over the sign, indicating it is a warning sign.




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Transition Area

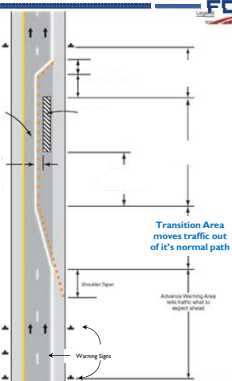
Direct motorist from one lane to another in a smooth and gradual transition with channelizing device

Use shadow vehicle during moving operations to warn and guide traffic in proper lane



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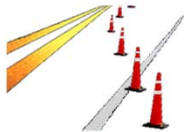
Areas of Temporary Traffic Control Zone

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Taper

- Series of channelizing devices and/or pavement markings placed on angle to move traffic out of or into normal path



- Formula to calculate taper length found in taper table section of various Indexes in the Standard Plans, 102-600 Series.

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Two-Lane Two-Way / Down Stream Taper

Two-Lane Two-way Taper - Used for flagging operations

Down Stream Taper – used at the downstream end of work area to direct drivers to move back into lane that was closed

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Merging Taper

A merging taper is used to close a lane on a multilane roadway and to direct traffic in the closed lane to merge into the adjacent lane.

40 mph or less $L = \frac{WS^2}{60}$	45 mph or greater $L = WS$
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Shifting Taper

A shifting taper is used to move traffic into a different travel path when a merge is not required.

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Shoulder Closure Taper

A shoulder taper is used to close a shoulder.

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General 102-600 Series Indexes

Table for Device Spacing

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General 102-600 Series Indexes

Device Spacing is determined by:

- Speed
- Type of Device (Cone or Tubular Marker) (Barricade, Vertical Panel or Drum)
- Location of Device Taper or Tangent

Table I
Device Spacing
Max. Distance Between Devices (ft.)

Speed (mph)	Cones or Tubular Markers		Type I or Type II Barricades or Vertical Panels or Drums	
	Taper	Tangent	Taper	Tangent
25	25	50	25	50
30 to 45	25	50	30	50
50 to 70	25	50	50	100

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Activity Area

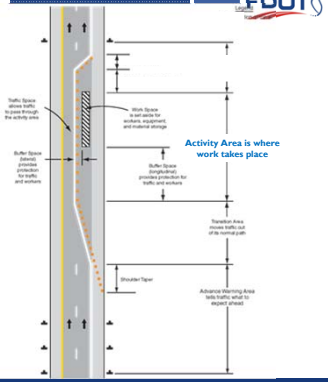
Section of highway where work activity takes place consists of:

- **Buffer Space**
 - Longitudinal
 - Lateral
- **Work Space**
- **Traffic Space**



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Areas of Temporary Traffic Control Zone

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Buffer Space

- **Longitudinal Buffer Space**
 - Allow motorists extra space to regain control if they missed warning signs
 - Provides room for motorist to stop before reaching work area
- **Lateral Buffer Space**
 - Used to separate traffic space from the work space and provides protection for traffic and workers
- **Keep buffer space free of equipment, workers, materials, and workers' vehicles**

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End of Session 4



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SET-UP OF A TRAFFIC CONTROL ZONE

Session 5

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Safety Principles of TCZ Implementation


- Follow Standard Plans and MUTCD
- Minimize traffic conflicts
- Close and re-open lanes as soon as practical
- Speed reductions can only be made due to changes in design geometry or the use of Index 102-670

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Safety Principles of TCZ Implementation

- Use effective traffic control devices
- Avoid traffic delays that could cause backups
- Avoid scheduling work during peak hours, weekends, and holidays
- Give high priority passage to emergency vehicles




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Safety Principles of TCZ Implementation

- Maintain access to emergency services, such as police, fire stations, fire hydrants, and hospitals
- Equip work vehicles with flashing lights
- Keep equipment in good condition, replacing or repairing as needed



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Clothing Requirements



- ANSI/ISEA 107-2004/107-2010 High-Visibility Safety Apparel:
 - Standard Class 2 for Day
 - Standard Class 3 for Night
- Required within Right-of Way
- Hard hat (recommended)




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TCZ Set-up Procedure

- **PHASE I - Pre-Survey**
 - Determine amount of right-of-way needed and materials required

- **PHASE II - Implementation Basic steps for set-up and removal of work zone**

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End of Session 5



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Session 6

Standard Plans




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**INSTRUCTOR - Click Book to Launch
Standard Plans Index 102-600
PowerPoint Presentation**



Students - Open your copy of the
Standard Plans to Index 102-600

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End of Session 6




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Session 7
FLAGGER OPERATIONS
(Flagger Training)



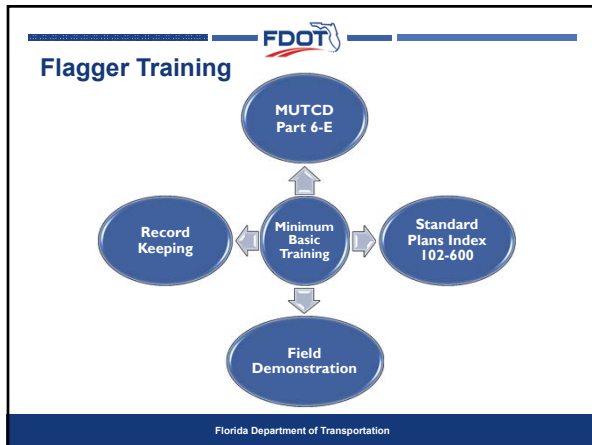
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Objectives



- 1 • Perform as Flagger
- 2 • Implement Emergency Procedures
- 3 • Plan flagging Operations
- 4 • Select potential Flaggers
- 5 • Train Flaggers

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Flagger Responsibilities



Public Safety		
Communication	Traffic Control	
Maneuver	Guidance	Recognize/Warn

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Flagger Priorities

Self

Project Personnel

Drivers

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Emergency Procedures

Escape Routes

Warn Crew

Vehicle & Driver Description

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Flagging Tips

Alert

Facing Oncoming Traffic

- Highly Visible Location

NEVER in path of Approaching Vehicles

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Flagging Tips

- NEVER** turn back to Traffic
- NO** other activities while Flagging
- Breaks**
 - Notify Supervisor/ Crew Leader

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Rules of Conduct

Be alert to needs of emergency vehicles and crews	If driver refuses to obey instructions, report car information to supervisor
Remove or cover Flagger sign when Flagger is not present	Do not lean on any vehicle, always stand alone; never mingle with work crew, traveling public, or other people

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Flagger Station

- Site Conditions**
 - Curves, Intersections, etc.
- Visibility**
 - Site Distance
- Speed**
- Traffic Volume**
- Road Conditions & Work Type**

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Two Flaggers

Lead Flagger

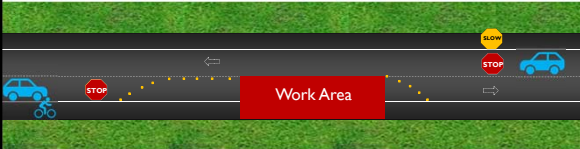
Communication

- Two-Way Radios
- Hand Signals

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Two Flaggers – Accommodations for Bicyclists



After bicyclists have crossed, release opposing traffic.

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Flagger Clothing

- ANSI/ISEA 107-2004/107-2010 High-Visibility Safety Apparel:
 - Standard Class 2 for Day
 - Standard Class 3 for Night
- Required within Right-of Way
- Hard hat (recommended)



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Flagger Equipment

24" Stop
Slow Paddle

Night Well-
lighted

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Stop/Slow Paddle

STOP

Proceed

Slow Down

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Right Equipment for Right Time


- The Stop/Slow paddle is the primary traffic control device.
- Flag use is limited to immediate emergencies, intersections, and when working on the centerline or shared left turn lanes where two (2) flaggers are required and there is opposing traffic in the adjacent lanes.
- Flashlight, lantern or other lighted signal that will display a red warning light shall be used at night.

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Using Flags




STOP



SLOW DOWN

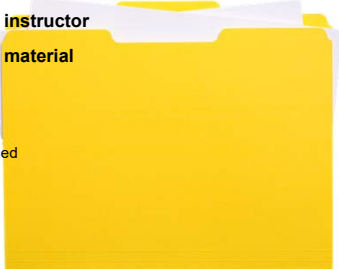
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Flagging Administration



Administration file includes:

- Qualification of instructor
- Copy of course material
- Keep record of:
 - Date of training
 - Individuals trained



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End of Session 7



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Session 8

Questions, Review and Qualification Exam

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Referenced Webpage Links

Maintenance of Traffic Related Webpage Links	
Description	Web page link
MUTCD	http://mutcd.fhwa.dot.gov/
Florida Department of Transportation	http://www.fdot.gov/
Standard Plans	http://www.fdot.gov/design/StandardPlans/DS.shtm
MOT Training Course Providers	http://www.motadmin.com/find-a-training-provider.aspx
FDOT Design Manual	http://www.fdot.gov/roadway/FDM/
Specification Book	http://www.fdot.gov/programmanagement/Specs.shtm
APL (Approved Products List)	https://fdotwp1.dot.state.fl.us/ApprovedProductList/Specifications
Survey Safety Handbook	http://www.fdot.gov/geospatial/documentsandpubs/surveysafetyhandbook.pdf
Maintenance of Traffic Training Procedure	http://fdotwp1.dot.state.fl.us/ProcedureInformation/ManagementSystem/Internet/FormsAndProcedures/ViaWebDocumentTopicNum=625-010-010
MOT Administration Website	http://www.motadmin.com/home.aspx

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A TIN# is the first 9 numbers (no letters) of a State Driver's License, ID, or Passport used to post grades. **ADD zeros at the end to complete 9 numbers.**
 List how many correct bubbles in each digit group.

TIN #

1st digit: 0-9 bubbles
 2nd digit: 0-9 bubbles
 3rd digit: 0-9 bubbles
 4th digit: 0-9 bubbles
 5th digit: 0-9 bubbles
 6th digit: 0-9 bubbles
 7th digit: 0-9 bubbles
 8th digit: 0-9 bubbles
 9th digit: 0-9 bubbles

Course Information

Provider Name: _____

Instructor Name: _____

Location of Class:

Intermediate

Intermediate Refresher

Advanced

Advanced Refresher

Print clearly to ensure your information on Certificate is correct.

Candidate Information

First Name: MI Last

Street Address

City State Zip


Cell Phone

Email: _____


Note: This is mandatory. Exam will be used for instructions to login to www.sosfla.com to see exam results and expiration reminders only.

Instructions on filling in scantron:
 Please fill in bubble completely.
 If you erase, make sure it is erased completely.
 Review your scantron at end of exam and make sure you have not filled in 2 bubbles to a question.

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**Any questions BEFORE we
start the Exam?**



- Open Book and Notes
- 2 hours
- Instructor is not allowed to discuss or answer ANY type of question
- 70% score to pass

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