TTC Module 2

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Welcome to the Florida Department of Transportation's: Temporary Traffic Control for Designer Training Series. This Design Materials Module is the second in a series of computer-based trainings covering the Department's Policy for the implementation of Transportation Management Plans and development of Temporary Traffic Control Plans.

This informational resource contains audio and interactive elements, so please adjust your speakers accordingly. An alternate version is available on the resources page. To begin, select the start button or press Shift + N on your keyboard.

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The primary learning objectives for this module are:

- Learn where to find Temporary Traffic Control design policy and guidance information in the FDOT Design Manual (FDM), Standard Plans, Standard Specifications, and the Manual on Uniform Traffic Control Devices (MUTCD).
- Understand what types of information are contained in each of the documents.
- And finally, learn how these documents work together in the design, installation, and maintenance of Temporary Traffic Control.

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The first document, and the basis for all FDOT Traffic Control design policy, is the Manual on Uniform Traffic Control Devices. Also referred to as the MUTCD. The MUTCD is the minimum standard for all traffic control devices installed on any street, highway, bikeway, or private road open to public travel. This manual includes policies and procedures established to ensure uniformity of all traffic control devices.

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You might ask yourself why? Well, this uniformity is very important in establishing consistent user behavior and expectancy. In other words, we want the users of our national transportation system to encounter similar signs, pavement markings, and channelizing devices wherever they travel throughout the nation.

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It's also important to know that the MUTCD is the law governing all traffic control devices. Non-compliance with the MUTCD ultimately can result in the loss of federal-aid funds as well as a significant increase in tort liability.

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Part 6 in the MUTCD contains the fundamental principles for Temporary Traffic Control and standards for the various devices found in a work zone, which include the equipment, signs, signals, and channelizing devices. As well as typical layouts for various work zone TTC configurations. Referred to as "Typical Applications"

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The significance of the MUTCD cannot be understated. While in many cases FDOT policy documents cover the same information as the MUTCD, they do not replace it. FDOT policies only seek to clarify intent, standardize options, or impose stricter requirements, as agreed upon by the Federal Highway Administration. Any deviations from FDOT policy must still meet MUTCD minimum standards.

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There are also topics that FDOT policy does not address. For example, flagging procedures are not covered. Instead, the FDOT Standard Specifications refer to Part 6 of the MUTCD. As such the MUTCD is included in all FDOT Design, Construction, and Maintenance Contacts through reference in the FDOT Design Manual and Standard Specifications.

A free version of the MUTCD is available on the FHWA website. A link to the website can be found on the resources page.

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Some topics included in Part 6 of the MUTCD Include: Definitions and Terminology. For example, Figure 6C-1, which illustrates the various components of the overall work zone. Please note one difference in terminology between the MUTCD and FDOT documents is the term defining the actual work limits.

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The MUTCD refers to this area as the "Work Space", whereas FDOT standards and specifications define it as the "Work Area".

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The MUTCD defines the different types of Tapers and their minimum lengths. The manual includes standardized work zone signs. Minimum standards for channelizing devices, which includes their size, shape, and color.

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Various "Typical Applications" are also included in the MUTCD. For example, Typical Application TA-10 for a lane closure of a two-lane road using flaggers. These applications are the basis for many of the standard layouts included in the FDOT Standard Plans.

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However, you will notice that FDOT standards include additional devices which are considered "guidance" or "optional" in the MUTCD. Buffer Space for example, is considered "Optional" in the MUTCD but is required when implementing the FDOT standards.

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In summary, the MUTCD sets the minimum standards and provides guidance to ensure uniformity of traffic control devices across the nation. The use of uniform traffic control devices helps reduce crashes and congestion and improves the efficiency of the surface transportation system. Uniformity also helps reduce cost.

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While the manual is the basis for much of FDOT's policy and standards, it also includes procedural and policy standards not found anywhere else. Therefore, it is important everyone involved with Temporary Traffic Control be familiar with the MUTCD.

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The Next Policy Document we will review is the FDOT Design Manual, also known as the FDM.

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The FDM, contains roadway geometric and other design criteria, as well as procedures, for FDOT projects. The information contained in the FDM applies to the preparation of contract plans for roadways and structures.

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The FDM has four sections. The first section covers the various roadway project development tasks and processes. The second section covers the design criteria. The third section covers plans production. With the exception of Design Build projects, the FDM is not a construction document and is intended for use by designers when developing project plans.

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The chapters listed here are those which contain Temporary Traffic Control criteria. Wherever the FDM includes design criteria (e.g., geometric values) they must be met, or a Design Variation is required.

Please note that the FDM will be covered in more detail in subsequent modules of this training series. This module is only intended to provide a basic overview of the contents included in each Chapter.

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FDM Chapter 240 contains the requirements and components for Transportation Management Plans. A Transportation Management Plan (TMP) is required for minimizing construction related traffic delay and crashes.

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The goal of a TMP is to reduce congestion during construction by managing traffic through the project, while also evaluating the impacts to the surrounding area. The TMP also promotes innovative public information and construction operations strategies. On larger projects this will involve traffic modeling studies to determine travel delays impacted from lane closures and detours.

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FDM 240 also contains requirements and guidance for the following:

- Design Controls for TTC projects;
- Criteria for Detours, Diversions, and Lane Shifts;
- Guidance for bike/ped accommodations;
- Temporary Traffic Control Device requirements;
- Temporary Lighting criteria; and
- Information on Operations and Public Information Plans.

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FDM Chapter 241 provides the requirements and procedures for conducting a Lane Closure Analysis. A lane closure analysis is a process used to calculate the peak hour traffic volume and the restricted capacity for open road and signalized intersections. The analysis will determine if a lane closure should be allowed and the time period a lane closure could occur without excessive travel delay.

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FDM Chapter 242 covers Traffic Pacing design. Traffic pacing is a temporary traffic control technique that allows short duration work operations by pacing traffic at a slow speed upstream of the work zone to create a sufficient period of time and gap in traffic to allow for a short-term work operation to be performed.

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The Department frequently allows this technique for:

- Installing overhead sign structures
- Replacing sign panels
- Placing bridge beams, and
- Installing utility crossings

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FDM Chapter 243 covers Portable Changeable Message Signs (also referred to as PCMS), and contains the criteria for PCMS placement, messages, and abbreviations. Designers need to use caution in the placement of these systems to avoid them becoming a hazard, to ensure adequate visibility, and prevent blocking pedestrian access or bicycle routes.

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FDM Chapter 321 contains the criteria for developing TTC plan sheets and details. The Temporary Traffic Control Plan is used to describe the actions to be taken by the Contractor to minimize traffic impacts while conveying traffic through a work zone.

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The Temporary Traffic Control Plan may include the following: General Notes and Phasing Notes, Phasing Typical Sections, Phasing Plan-Profile Sheets, Signalization Plans, Special Details, and Sectional Views.

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While the content in the plans will vary greatly depending on the complexity of the project. It's important to know that a project-specific Temporary Traffic Control Plan is required for all construction projects.

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The minimum requirements for the Temporary Traffic Control Plans and examples of varying project complexity will be covered in more detail in a subsequent Temporary Traffic Control Plan Development Training Module.

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The next design materials document we are going to cover is the FDOT Standard Plans for Road and Bridge Construction; formerly referred to as the Design Standards. The Standard Plans are standard construction details that are published as sets of Indexes.

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The Standard Plans provide consistent designs and details for the preparation of construction contract documents. Standard Plans are developed with consideration for durability, maintainability, and broad applicability. However, they may not be suitable for use on all projects or site conditions. The Engineer of Record (EOR) must determine the appropriate application of Standard Plans for each project, and design site specific plans where needed.

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The Standard Plans are updated and published yearly for clarification, innovation, or changes in FDOT policy. Current and Historical versions of the publication can be found on the Standard Plans Website. A link to the website can be found on the resources page.

For additional information on the use of Standard Plans within FDOT Contract Plans, including the responsibilities of the EOR, please refer the FDM, Chapter 115.

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In the Standard Plans, Temporary Traffic Control (also known as Maintenance of Traffic) is covered in the 102 *(One-O-Two)* Series of Indexes. This series provides rudimentary typical applications for various common work zone traffic control operations.

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The 102 series offers simple and consistent details to help communicate the basic intent of typical TTC applications. These standards are commonly used in combination with a projects Temporary Traffic Control Plan or can be used as the bases to develop project-specific TTC Plans.

It's important to understand that every project is unique in some ways and the Standard Plans do not address all possible site-specific scenarios.

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Index 102-100 *(One-O-Two, One-hundred)* – Provides general information for the use of temporary barriers, including; offset, setback, and pavement surface requirements. As well as provisions for Anchored versus Free-Standing Barriers

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Index 102-110 – Provides fabrications and usage criteria for the Department's non-proprietary Type-K concrete barrier system.

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Index 102-120 – Provides usage criteria for the standard concrete Low Profile Barrier system used for low-speed conditions.

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Next in the 102 series is Standard Plans, Index 102-600. This is the primary reference Index for all of the 102 Series. 102-600 contains various requirements used for Temporary Traffic Control. For example:

- Device Spacing and Length Tables
- Clear Zone Widths for Work Zones
- Speed Reduction Signing
- Lane Widths
- Drop-Off Condition Requirements
- Temporary Pavement Marking Placement Details

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Also provided with Index 102-600 is the link for a TTC Quick Reference Sheet. This two-page reference document contains all the tables included within Index 102-600 in an easily viewable reference sheet. These tables apply to all applications of Temporary Traffic Control.

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Indexes 102-601 through 102-680 contain FDOT Standard Typical Applications for various common work zone traffic control operations. These applications often must be used in combination or can be used to develop project specific TTC Plans for complex projects.

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In addition to the Indexes, FDOT also develops and publishes "Standard Plans Instructions" also known as SPI, which provide instructions for incorporating the Standard Plans into the Contract Plans. Standard Plans Instructions include design criteria, usage limitations, plan content requirements, and pay item information. They may also provide examples and sample drawings.

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For example, the Standard Plans Instructions (or S.P.I.) for Index 102-100 contains additional temporary barrier guidance and design limitations for items such as:

- Applicability of the Indexes,
- Length of Need Determination,
- Minimum Barrier Lengths,
- And Plan Content Requirements.

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Another Example, the SPI for Indexes 102-660 and 102-661 provides design limitations for the some of the optional layouts included in the Indexes.

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There are also Standard Plans for temporary bridge construction. These are located on the Standard Plans website with the Standard Plans for Bridge Construction section. A link to the website can be found on the resources page.

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A more detailed overview of the Standard Plans 102 Series will be provided in a separate training module.

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The next document to discuss is the FDOT Standard Specifications for Road and Bridge Construction. The Standard Specifications is a construction contract document that provides directions, provisions, and requirements for:

- the manner of performing specific construction activities,
- the quantities and qualities of materials, and
- the basis of payment for the work done on a construction project.

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The Standard Specifications also provide the requirements by which products may be listed on the Department's Approved Products List (aka, A.P.L.). Many of the Temporary Traffic Control Devices refenced in the FDOT Standard Plans and Specifications are proprietary devices listed on the APL.

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Specification, Section 102 - Maintenance of Traffic, contains most of the requirements for temporary traffic control. However, there are other Specification Sections with relevant information. For Example, Section 7 – "Legal Requirements and Responsibility to the Public" and Section 8 – "Prosecution and Progress" both contain provisions for limiting Traffic Interference, which directly relate to Traffic Control.

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Also, Specification Section 990 – "Temporary Traffic Control Materials", provides the material requirements for many of the Temporary Traffic Control Devices provided on the APL.

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While the Specifications are primarily a Construction Document with instructions to the Contractor, it is still very important that Designers be familiar with and understand the requirements it includes.

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Without an understanding of how contractors preform various construction operations and the requirements placed on them by the Specifications; a designer will not be able to adequately account for those operations in their Temporary Traffic Control Plans.

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It must also be acknowledged that the Contractor's specific "means and methods" for performing certain work may be unknown to the Designer; and the contractor's selected "means and methods" may require temporary traffic control beyond what can be reasonably accounted for in a projects TTC Plan.

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For this reason, the Specifications provide comprehensive requirements for Temporary Traffic Control operations to the contractor. These requirements may appear to place the responsibility of accounting for various activities on the contractor. However, the presence of these requirements does not relieve the Designer of their responsibility to provide complete and comprehensive TTC Plans.

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For Example, Specification, Sub-article 102-3.4 "Pedestrian and Bicycle Accommodations". This specification sub-article calls for bicycles and pedestrians to be accommodated through or around work zones. However, the inclusion of these requirements does not relieve the Designer of the responsibility of included these Bike and Pedestrian accommodations in their TTC Plan.

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Other TTC topics of importance include, but are not limited to:

- Number of Traffic Lanes, which provides minimum requirements for the number of lanes that may be closed.
- Requirements for accommodating and signing for Intersecting and Crossing traffic and access for Residence and Business.
- Removal of Conflict Pavement Markings
- Allowances for temporary openings on along Limited Access facilities.
- The construction and maintenance of Detours, which include Diversions and Lane Shifts.
- Operations that require uniformed law enforcement officers for "Traffic Control Officer" duties.
- Usage requirements for the various types of Temporary Traffic Control Devices, including the requirement that all TTC Devices used by the Contractor must be listed on the APL, and
- Work Zone Pavement Marking material and application requirements.

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The remaining sub-articles to Specification 102 include the Method of Measurement and Basis of Payment. Both articles should be understood by Designers to ensure that the proper pay items are included in the contract documents and that those pay items are accurately qualified and quantified.

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As a design aid, the Basis of Estimates Manual (also known as, B.O.E.) and Design Quantities and Estimates Application (also known as, D.Q.E) were created to assist Designers in the selection and quantification of pay items.

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The Basis of Estimates Manual (BOE) sets forth the standard methods of documenting design quantities, as well as selection criteria, for pay items for FDOT projects. Pay items are used to define, quantify, and pay for items of work to be completed on Department Contracts.

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The Design Quantities and Estimates (DQE) is a list of all current Pay Items and includes guidance for their use. For example, the Pay Item for "Maintenance of Traffic, Lump Sum" provides additional guidance beyond that provided in the Specifications to ensure the Designers understands what included under the payment for with item.

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As previously mentioned, the Specifications require that Temporary Traffic Control Devices used by the contractor must be listed on the Approved Products List (APL). There are a few exceptions to this policy, which include:

- The use of Temporary Type-K and Low Profile Concrete Barriers,
- Products approved by Permit, or
- Products allowed through Special Provision to the Specifications (including MSPs, TSPs, and Developmentals)

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For devices to get listed on the APL they must meet the requirements in Specification 990: Temporary Traffic Control Device Materials.

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The Approved Products List is organized by the Specification Section number. As such, since Specification 102 contains the primary requirements for the use and workmanship of Temporary Traffic Control Devices, almost all relevant products are included under "102 – Maintenance of Traffic"

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Channelizing Devices makeup of the vast majority of the APL for TTC Devices and for the most part, Designers would not need to be overly familiar with the differences in the individual products on the APL. However, there are some categories of devise, which under certain circumstances Designers need to be familiar with unique characteristics of the different products.

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Temporary Barriers and Crash Cushions are the two most common APL devices for which Designers should be familiar, as site specific constraints might limit the use of certain options or alternatives.

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For Example, Temporary Steel Barriers are longer, lighter, and contain less anchorage than concrete barrier alternatives, which mean they can be installed and removed more quickly.

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It should also be noted that each product on the APL has a unique certification number and listing that also includes system drawings, photographs, and installation manuals, as appropriate.

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There is an abundance of additional information and guidance on the Design, Installation, and Maintenance of Temporary Traffic Control. Much of that information is cataloged on the "National Work Zone Safety Information Clearinghouse" and "American Traffic Safety Services Association" Websites.

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The American Traffic Safety Service Association (ATSSA) produced the Work Zone Road Safety Audit Guidelines document. This document contains concepts and strategies that can help with assessing safety needs at each project phase. Including Design. A link to the website can be found on the resources page.

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Specifically, Part 5 of this guidance contains checklists for each phase of the project development to help designers and planners consider the potential safety needs during the design of Temporary Traffic Control.

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In summary, this module covered:

- Where to find Temporary Traffic Control design materials in the FDOT Design Manual (FDM), Standard Plans, Specifications, and the Manual on Uniform Traffic Control Devices (MUTCD). What chapters affect which part of the project, etc.
- We learned about the design materials. In other words, the background behind the different manuals.
- We learned how the manuals work together. For example, the Standard Plans may adopt a Typical Application from the MUTCD and show the work zone signs and devices needed for the TTC then the FDM would give the lane closure analysis data and other roadway criteria, and the Specifications would give you what work is included in which pay item.
- And we learned where to find the Approved Product list (APL) and discuss TTC related products, and crash testing requirements.

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MUTCD

FDOT Design Manual (FDM)

FDOT Standard Plans

FDOT Standard Specifications

FDOT Basis of Estimates (BOE)

FDOT Design Quantities and Estimates (DQE)

Approved Products List (APL) https://fdotwp1.dot.state.fl.us/ApprovedProductList/Specifications

National Work Zone Safety Information Clearinghouse

American Traffic Safety Services Association (ATSSA): Guidance Documents

Slide 73 Conclusion

This concludes the Temporary Traffic Control for Designers – Module 2. Thank you for your time and attention.