Temporary Traffic Control Design Specialist Training Course

U.S. Department of Transportation
Federal Highway Administration

ATSSA
SAFER ROADS SAVE LIVES

©
About This Course

This material is based upon work supported by the Federal Highway Administration (FHWA) under grant agreement No. DTFH61-06-G-00004
Developed & Presented by

American Traffic Safety Services Association
About this course

Based on the 2003 Edition of the *Manual on Uniform Traffic Control Devices*

Intended for engineers and others responsible designing of Traffic Control Plans (TCP)
About this course

This course assumes no previous knowledge about work zone design.

If you are an ATSSA Traffic Control Supervisor (TCS) charged with a "design" responsibility, a 1-day course is available.
TCDS Training Course

- Two-day course
- Begins promptly at 8:00 AM
- Ends no later than 5:00 PM

Flexible schedule!!
Upon completion, you will be able to:

- Recognize the design elements of work zone traffic control
- Know the TTC standards & guidelines that govern the design of TCPs
- Apply these to real-world scenarios
- Know techniques and procedures for designing effective, efficient and safe TCPs, including nighttime work zones
Course Materials

- Course notebook
- MUTCD (Parts 1, 5, 6)
- Quality Guidelines for Work Zone Traffic Control Devices
- Pencil
- Tent name sign

Yours to keep!
# Course Schedule

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Exam

- 40 multiple choice questions
- 2.5 pts each = 100 pts
- 60 minutes
- Open book, open notes
- Passing grade = 80%
-MODULE 1-
Introduction
Module Objectives

- Define work zone traffic control and its impact on safety and mobility
- Discuss the designer’s role in proper work zone traffic control
- Discuss Transportation Management Plans (TMP)
- Discuss the source of TTC standards and guidelines
What is Temporary Traffic Control (TTC)?

The planning, design & preparation of contract documents necessary to control traffic temporarily in areas affected by:

- Construction and reconstruction
- Highway maintenance
- Incident management
- Utility operations
- Special events
Conflicting goals?

- Maintain traffic flow
- Keep costs down

Maximum levels of safety

TTC impact on traffic flow is important, but not at the expense of safety!
The Designer’s Dilemma

Safety vs. cost

Safety is essential!
Work Zone Costs

Indirect costs
- Crashes, injuries, fatalities
- Property damage
- Delays
- Vehicle costs
- Fuel consumption
- Quality of life

Direct costs
- Labor and materials

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S A F E R  R O A D S  S A V E  L I V E S
The Designer’s Role

- Critical to work zone safety
- Assess and consider ALL factors that may impact the safety of all people within the work zone
  - Motorists
  - Pedestrians
  - Cyclists
  - Workers
The Designer’s Role

To consider **ALL** factors and **ALL** users involved, the standards and guidelines, and apply engineering judgment to develop the **BEST** possible **Traffic Control Plan**
Engineering Judgment

An engineer’s evaluation of available pertinent information, and the application of appropriate principles, standards, guidance, and practices for the purpose of deciding upon the applicability, design, operation, or installation of a traffic control device.

MUTCD Definition 25, Page 1A-11

This course discusses these principles, standards and practices!
How do we make work zones safer?

- Improving communication with road users (“positive guidance”)
- Following applicable standards and guidelines
- Conducting inspections
- COMMON SENSE!
- Doing more than the MINIMUM!
- Having an effective TCP!
What is a TCP?

- A set of drawings and other information detailing how the work will be accomplished.
- A plan for maintenance and control of traffic during work.
- Part of a “Transportation Management Plan” (TMP).
What is a TMP?

- A set of coordinated transportation management strategies
- Describes how they will be used to manage the work zone impacts of a road project.
- The TCP is just one part
-MODULE 2-
Fundamental Principles
Module Objectives

- Discuss the seven fundamental principles of TTC
- Describe their application
Provide a “guiding philosophy”
If followed, will:
- Protect road users
- Protect workers
- Improve safety!
The MUTCD includes 7 fundamental principles

Under "GUIDANCE"

Steps we should take on every project

Not requirements
-MODULE 3-
Human Factors
Module Objectives

- Discuss how human factors impact TTC design
- Discuss design keys
- Discuss the “Design Driver” concept
What are Human Factors?

The study of how humans behave physically and psychologically in relation to particular environments, in this case, the highway environment.
Factors Affecting Crashes

VEHICLE
HIGHWAY
DRIVER

+/− 85%
Perception/Reaction (P/R) Cycle

- **P**erception (Situation detected)
- **I**ntellection (Situation identified and analyzed)
- **E**motion (Decision on action made)
- **V**olition (Action executed)
1. Traffic Simulation: e.g., CORSIM

- A great tool to assess the impact of the work zone on traffic flow BEFORE construction begins
- Enables adjustments to design
- Great for public hearings!
CORSIM Screen

Closed lane

“Rubbernecking”
MODULE 4 - Component Parts of a Temporary Traffic Control Zone
Module Objectives

- Define temporary traffic control zone (TTCZ)
- Discuss its four component parts
- Discuss requirements of each component part
- Discuss tapers in detail
TTCZ Definition

- The entire section of roadway between
- The first advance warning sign (or device)
- Through the last traffic control device, where traffic returns to its normal path
Types of Tapers

Merging

Shifting

Shoulder
Min. Length (L) of a MERGING Taper

\[ L = WS \quad (45 \text{ mph or more}) \]
\[ L = \frac{(WS^2)}{60} \quad (40 \text{ mph or less}) \]

Where:
L = length of the MERGING taper in ft;
W = width lateral displacement in ft;
S = Speed in mph
MODULE 5 - Traffic Control Devices
Module Objectives

- Define traffic control devices and their requirements
- Discuss signs, channelizing devices, arrow panels and pavement markings, PCMS, barriers, impact attenuators, and their requirements
What are Traffic Control Devices?

- "Things" used to implement a TTC plan in the field
- **Objects** motorists see and respond to when they drive through a TTCZ
- Shall be approved in the MUTCD
Design

- Color
- Size and shape
- Retroreflective or illuminated
- Safe if struck
- "Crashworthy"
Crash Testing Requirements

**FHWA 1997 Guidance Memo:**

“All work zone devices used on National Highway System (NHS) shall be crash tested to meet NCHRP Report 350 requirements”
What is the NCHRP?

National Cooperative Highway Research Program (NCHRP)

- Conducts research
- Part of TRB
**NCHRP Report 350**

- "350-compliant"
  - Crash tested
  - Crashworthy
  - Meets the requirements of NCHRP Report 350
Proper Height?
Vertical Panels

- Stripes slope down toward side traffic is to pass
- Ballast: Rubber bases and sand bags

Traffic to pass this way!
MODULE 6 - Types of TTC Activities
Module Objectives

Discuss three factors used to categorize TTC zone applications:
1. Duration
2. Location
3. Work type
1. Work Duration -

- A major factor in determining TTC
- Defined relative to the length of time a work operation occupies a spot location
MUTCD Categories of Work Duration

A. Long-term stationary
B. Intermediate-term stationary
C. Short-term stationary
D. Short duration
E. Mobile
-MODULE 7-
TTC Design Strategies
Module Objectives

- Discuss planning considerations
- Discuss design strategies:
  1. Enforcement
  2. Phasing/Staging
  3. Contracting
Planning Considerations

- Gather available data
- Assess roadway characteristics
- Identify all agencies that may have jurisdiction
- Coordinate with local officials
Design Strategies to Discuss

1. Use of police services
2. Phasing
3. Contracting
Module Objectives

- Discuss strategies used in developing an effective TCP
- Discuss TCP requirements
- Discuss component parts of a good TCP
The Traffic Control Plan

- Describes temporary traffic control measures to be used for facilitating road users through a work zone.
- Specific requirements may be detailed in various publications, depending on the state.
The TCP...

- Must be consistent with the MUTCD and the RDS
- May be incorporated in the TMP by reference
- May also be specifically designed for individual projects
Keys to TCP Development

- Understand the project
- Gather the necessary data
- Develop specific objectives
- Evaluate and brainstorm multiple alternatives
- Develop a **detailed TCP** that would meet the project’s objectives re: safety, mobility and cost
-MODULE 9- Nighttime Work Zones
Module Objectives

- Discuss factors that influence the design and operation of nighttime work zones
- Discuss work zone lighting requirements
- Discuss possible night work enhancements
Nighttime Work Zones

- Becoming more common due to:
  - Daytime congestion
  - Reduced business impact
  - Reduced community impact
Objectives of Nighttime Temporary Traffic Control

- Provide high levels of safety for workers and the public
- Minimize congestion and community impact
- Provide adequate access to the roadway
Conditions for Nighttime Work

1. Reduced traffic volumes
2. Easy setup and removal of the traffic control on a nightly basis
## Recommended Min. Illuminance Levels & Categories for NWZ

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<th>LEV.</th>
<th>Min. Illuminance Level, lx (fc)</th>
<th>Area of Illumination</th>
<th>Examples of Activities</th>
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<tbody>
<tr>
<td>I</td>
<td>54 (5)</td>
<td>Throughout spaces</td>
<td>Excavation, sweeping &amp; cleanup, movement area in work zone, movement between two tasks</td>
</tr>
<tr>
<td>II</td>
<td>108 (10)</td>
<td>Of tasks and around equipment</td>
<td>Paving, milling, concrete work, around paver or miller</td>
</tr>
<tr>
<td>III</td>
<td>216 (20)</td>
<td>Illuminance on task</td>
<td>Crack filling, pot filling, tasks requiring extreme accuracy and attention</td>
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MODULE 10 - Legal Aspects of Temporary Traffic Control
Module Objectives

- Discuss legal aspects of TTC
- Define litigation
- Define legal terms
- Explain the civil lawsuit process
- Provide tips to minimize liability exposure
What is Litigation?

A procedure for the settlement of civil claims, generally involving two or more parties.
Legal Terms to Define

- Plaintiff
- Defendant
- Tort
- Liability
- Standard of Care
- Negligence
- Interrogatories
- Subpoena
- Subpoena Duces Tecum
- Deposition
- Summary Judgment
- Trial
- Perjury
A person who brings an action

The party who complains or sues in a civil action and is so named on the record

Who could be a plaintiff?
Civil Lawsuit Process

Crash/Injury

Claim

Hire Lawyers

Complaint

Discovery

Mediation

Trial

Plaintiff

Drop Claim

Plaintiff Lawyer
File complaint

Drop Case

Defendant

Settle Claim

Settle Case

Defense Lawyer
File motion to dismiss

Settle Case

Drop Case

Settle Case
-MODULE 11-
Other Considerations
Module Objectives

Discuss “other” considerations

1. Work in urban areas
2. Pedestrian considerations
   • ADA
3. Motorcycle considerations
4. Bicycle considerations
1. Urban Areas

May be problematic for work zones due to unique conditions and restricted spaces
What is an Urban Area?

An area normally characterized by:
- Relatively low speeds
- Wider range of traffic volumes
- Narrower lanes
- Frequent intersections & driveways
- Significant pedestrian traffic
- More businesses & houses

Source: 2003 MUTCD
**Problems with Urban Work Zones**

- Restricted spaces
- Heavy traffic
- Signals
- Restricted sight distance
- Parking
- Conflicts with pedestrians
- Conflicts with “other” vehicles
  - Delivery trucks, utility
  - Bicycles, buses
-CLOSING-
Module Objectives

- Review the “Parking Lot”
- Review course objectives
- Complete course evaluation form
- Take exam
- Adjourn!