TRAFFIC CONTROL STRATEGIES FOR SHORT-TERM, SHORT-DURATION, AND MOBILE WORK ZONES

Training Program
Opinions, findings, and conclusions expressed in this presentation are those of contractors and not necessarily those of USDOT or FHWA.

Materials prepared under contract with FHWA.

Content is ‘living’ and subject to change.
OUTLINE

- Background
- Purpose and Objectives
- Unique characteristics of Short-Term, Short-Duration, and Mobile Work Zones
- Temporary traffic control strategies
- Steps for TTC plan development
- Example plans
Aging infrastructure = More work zones

Two primary work zone objectives:
- Maintain safety for ALL ROAD USERS
- Maintain acceptable levels of mobility

Objectives don’t necessarily go hand-in-hand

Careful planning, design, and implementation of work zone is key
MUTCD Chapter 6 presents

- **Temporary traffic control (TTC)** for work zones, incidents, etc.
- **Typical Applications (TAs)** of common work zone TTC scenarios

TAs should be adjusted to fit actual conditions

- What aspects may be modified?
- Under what conditions?
PURPOSE AND NEED

- MUTCD gives limited TA modification guidance
  - Need for additional detail beyond the MUTCD

This training session provides:

- Issues to expect
- Strategies to address these issues
- How to select and modify a TA
- Example of modified TTC plans
MUTCD WORK DURATIONS COVERED HERE

- Short-term stationary occupies location > 1 hr within a single daylight period
- Short-duration occupies location ≤ 1 hr
- Mobile moves intermittently or continuously
Intermediate-term stationary occupies location

- 1 - 3 days (daytime work) or
- >1 hr (nighttime work)

Long-term stationary occupies location >3 days

MUTCD WORK DURATIONS NOT COVERED HERE
OTHER GUIDELINES AND TRAINING

Other guidelines/training developed under this grant

- Urban Work Zone TTC
- Utility Work Zone TTC
Primary concern noted in MUTCD:

“It often takes longer to set up and remove the temporary traffic control zone than to perform the work. Workers face hazards in setting up and taking down the temporary traffic control zone. Also, since the work time is short, delays affecting road users are significantly increased when additional devices are installed and removed” – 2009 Federal MUTCD

Paradox

- Don’t put workers at risk with lengthy TTC setup
- Don’t compromise safety by using inadequate TTC setup

How can we minimize exposure while providing adequate TTC?
CHARACTERISTICS AND ISSUES

Short-Term, Short-Duration, and Mobile Work Zones
OVERVIEW

Unique set of characteristics with STSDM
- Typically related to the nature of the work
- Issues that must be addressed during TTC layout

UPCOMING SLIDES
- Characteristics and associated issues

LATER ON
- Methods for addressing issues with appropriate TTC
UNIQUE CHARACTERISTICS OF STSDM

1. The work may be unanticipated and/or urgent
2. Setup and removal of TTC may take longer than the actual work
3. The work may involve constant or intermittent movement
4. Specialized vehicles or equipment may be utilized
5. Accessibility issues may occur
Certain events may require immediate repair or other attention, such as:

- Utility failures or damage
- Fallen trees or branches
- Signal head failures
- Localized pavement failures
1. UNANTICIPATED OR URGENT WORK

- Crews must quickly mobilize to perform the fix
  - Little time for preparation
  - TTC aspects may be overlooked

- Adequate advance notification may not be possible
  - Drivers will not expect work zone
  - Agencies may not be prepared
    - Police/fire
    - Transit
2. VERY SHORT DURATION WORK

Certain work zones may take longer to setup and/or remove TTC then to perform the actual work:

- Tree trimming
- Debris clearing
- Localized pavement maintenance or repair
- Surveying

Specific to short-duration operations
2. VERY SHORT DURATION WORK

- Minimize TTC setup and removal time
  - Minimize delays and worker exposure
- Ensure adequate TTC regardless of duration
  - Tendency to become complacent as duration decreases
  - Drivers will not expect such short duration work
- Simplification of TTC is key
3. CONSTANT OR INTERMITTENT MOVEMENT

MUTCD defines mobile work as work which moves continuously or intermittently, rarely stopping for more than a few minutes, such as:

- Roadway striping
- Certain paving operations
- Pavement crack or joint sealing
- Pothole filling
- Street sweeping or other debris cleaning
- Tree trimming or vegetation clearing
- Storm drain cleaning
4. SPECIALIZED VEHICLE OR EQUIPMENT

Specialized equipment is often necessary to minimize the work duration and provide worker protection:

- Striping trucks
- Aerial lift trucks
- Pavers
- Convoys

These vehicles may require special TTC when in use.
5. ACCESSIBILITY ISSUES

Although STSDM work period is short, it may still impact:

- Pedestrians
- Bicyclists
- Access to homes and businesses
- On-street parking
- Public transit stops

Users may not know how to proceed if access is blocked.

Workers should be prepared to deal with these issues in the field if adequate preparation time is not available.
TRAFFIC CONTROL STRATEGIES

Short-Term, Short-Duration, and Mobile Work Zones
TRAFFIC CONTROL STRATEGIES

Unique issues may be addressed through proper TTC strategies.

Specific guidance is provided relating to:

1. Minimizing time to setup and remove TTC
2. Managing TTC for unexpected or emergency work
3. Managing constant or intermittent movement
4. Maintaining access to intersections, driveways, and parking
5. Accommodating pedestrians and non-motorized users
6. Temporary re-opening of travel lanes
7. Providing positive guidance
8. Accommodating special vehicles (striping trucks, aerial lifts)
1. MINIMIZING TIME FOR SETUP/REMOVAL

As work duration decreases, so should TTC setup time

- Minimize worker exposure
- Minimize delays

Methods to minimize TTC setup time:

- Reducing the number of TCDs
- Not covering/Removing permanent TCDs
- Reducing the spacing of channelizing TCDs

Certain criteria must be met
1. MINIMIZING TIME FOR SETUP/REMOVAL – DOMINANT DEVICES

- Dominant vehicle-mounted devices may replace TTC devices for certain short-duration or mobile operations
  - High-intensity rotating, flashing, oscillating, or strobe lights
    - Does NOT include hazard flashers
  - Arrow boards or PCMS
  - Retro-reflective markings on appropriately colored vehicles
1. MINIMIZING TIME FOR SETUP/REMOVAL – ELIGIBLE CASES FOR DOMINANT DEVICES

Short-duration shoulder work
- No lane encroachment -> Signs and channelizing devices may be omitted
- Lane encroachment -> Taper and channelizing devices may be omitted with shadow vehicle

Short-duration intersection work
- Channelizing devices may be omitted

Short-term/short-duration work beyond shoulder
- Signs and channelizing devices may be omitted

Consider other types of short-duration on case-by-case basis
I. MINIMIZING TIME FOR SETUP/REMOVAL – ALTERNATIVES TO COVERING PERMANENT TCDS

Some permanent TCDs provide messages that are inconsistent with work zone

- As work duration decreases, covering devices is not practical
- Use high visibility devices which emphasize proper path

Short-term work

- Use channelizing devices with closer spacing
- Spacing (in feet) = 0.5*speed (in mph)
- Taller cones (36 inches or greater) may be used in lieu of drums
2. MANAGING URGENT/UNEXPECTED WORK

Little time to plan/prepare for work zone setup
- Details of site condition may be limited
- Full compliment of TCDs may not be readily available
- Ensure that vehicle mounted devices are available and working

Work crews must be prepared to react to field conditions
- Expand/move TTC
- Modify TTC if work takes longer than expected
  - Nighttime work
  - Overnight shutdown
3. MANAGING CONTINUOUS MOVEMENT - USING FULLY MOBILE TCDS

Often not practical to provide stationary TTC for:
- Advance warning messages
- Channelization

MUTCD allows for dominant, vehicle-mounted TTC in lieu of stationary TTC devices:
- PCMS or Static Signs
- Arrow Boards
- High-intensity rotating, flashing, oscillating, or strobe lights
3. MANAGING INTERMITTENT MOVEMENT - MOBILE VS. STATIONARY TCDS

Moving short-duration operations

- Some may be more well-suited for complete mobilization of TTC
- Others may move so slowly that retrieving stationary devices is more efficient

Considerations for mobile vs. stationary TCDs:

- Duration of each stop
- Spacing between stops
- Speed of the work zone while in motion
- Overall distance covered by the operation
3. MANAGING MOVING WORK ZONES - VEHICLE CONVOYS

A convoy of multiple vehicles may be necessary

- Typically use shadow vehicle especially at high speeds or volumes
- Some operations require multiple vehicle convoy

Work convoys may provide several distinct advantages:

- Additional protection of workers
- Enhanced work zone conspicuity
- Extended work area provides additional time for materials to dry
- Staggering of vehicles allows for more effective channelization
3. MANAGING MOVING WORK ZONES - CAUTION WITH MOBILE CONVOYS

Protect convoy against unsafe passing and errant vehicles
- Buffer spaces and shielding
- Truck-mounted arrow boards or PCMS
- Truck-mounted attenuators
- Roll-ahead distances
- Pull over periodically to allow queues to pass
- Perform work during off-peak (daytime) hours
4. MAINTAINING ACCESS

Maintain access to intersections, driveways, and on-street parking if possible

Driveway/intersection closure
- Divert to an alternative entry point if possible
- Consider the development of queues
- Signed detours are impractical for such a short work period

On-street parking closure
- Minimize the number of stalls closed in high-demand areas
- Ensure shielding of workers with devices and buffer spaces
5. ACCOMMODATING PEDS, BIKES & TRANSIT

- Identify presence of peds, bikes, and transit stops in work zone
- Determine how work activity will impact ped/bike movement
  - Sidewalks/crosswalks
  - ADA accommodation
  - Bike lanes/paths
  - Transit stops
- Use TCDs to provide safe diversion route
  - Even for short-duration operations
  - Separate motorized and non-motorized traffic streams
6. TEMPORARY RE-OPENING OF TRAVEL LANES

Some states and local jurisdictions may restrict certain types of planned maintenance work to off-peak periods:

- Re-open affected travel lanes during peak periods

If work is not complete:

- Move work crews, equipment, and devices off the roadway
- Cover or shield of any holes or other defects in the pavement.
- Maintain appropriate TCDs to alert of any remaining hazards or pavement/shoulder defects
- Work may be finished after peak period
7. PROVIDING POSITIVE GUIDANCE

- Road users will be often unaware of STSDM work zones
  - Effective positive guidance becomes even more critical
- Draw attention to work zone
  - Dominant high intensity vehicle lighting
  - PCMS
- Provide taper and lane designation guidance
  - Channelizing devices
  - Arrow boards
Aerial trucks (bucket trucks, cherry pickers, or scissor lifts) are commonly used in STSD work zones. Often require specialized TTC:
- Refer to state and local standards
NEVER extend a bucket over an active traffic stream:
- Use flaggers to close lanes if necessary
Use TMA at non-intersection locations
TEMPORARY TRAFFIC CONTROL PLAN DEVELOPMENT

Short-Term, Short-Duration, and Mobile Work Zones
1. Collect necessary characteristics about the site and work scenario
2. Determine appropriate TA for scenario
3. Modify TA based on unique characteristics of STSDM work
4. Develop appropriate TTCP
5. Review and modify TTC in the field as necessary
STEP 1: OBTAIN SITE & WORK CHARACTERISTICS

Site Characteristics

- Geometric characteristics (lane width, number of lanes, etc.)
- Existing traffic control (placement of devices, posted speed limit, etc.)
- Traffic characteristics (both motorized and non-motorized)
- Environmental or other surrounding characteristics

Work Characteristics

- Proposed work activity
- Proposed work duration (including upper and lower bounds)
- Necessary workers, vehicles, and equipment
- Additional special considerations
STEP 2: SELECT APPROPRIATE TYPICAL APP.

Select appropriate Typical Application from the MUTCD

- Consider state MUTCDs, standard plans, local regulations
- TA or Example Plan from the TTCP Selection Software

Selecting a TA or Example Plan is NOT the last step

- Must be modified to fit actual field conditions, as well as specific characteristics of the work
STEP 3: MODIFY TA FOR SITE AND WORK CHARACTERISTICS

- Consider supplementary notes provided by the MUTCD or state/local guidance
  - Also included for Example Plans in TTCP Selection Software
- Consider how the field conditions vary from the scenario depicted in the TA
- Consider the unique characteristics of STSDM work zones
- Apply strategies outlined within this training
STEP 4: DEVELOP TTCP

Lack of adequate planning time for urgent work may limit ability to develop complete TTCP

Should include:
- Detailed schematic of TTC
- Instructions for field personnel
- Project coordination strategies

These types of work zones will typically not require the additional components or regulations that apply to longer duration work zones
STEP 5: MODIFY BASED ON FIELD CONDITIONS

- Site conditions may be different than anticipated
- Work area may be larger/smaller than expected
- Additional workers, equipment, or vehicles may be needed
- Unexpected access issues may arise
- Modify TTC throughout duration as conditions change
SHORT-TERM WORK ZONE EXAMPLES

Temporary Traffic Control Plans
SHORT-TERM WORK ZONES

Work that occupies a location for more than 1 hour within a single daylight period

Some ambiguity between definition of “short-term” and “short-duration” work zones

- Utility work zones
- Various highway maintenance operations
- Asphalt pavement patching and preventative maintenance operations
- Traffic signal maintenance
Asphalt paving operations are a common short-term work zone.

Consider roll-ahead distances of work/shadow vehicles equipped with TMAs.

Use taller (36") cones instead of barrels.

Keep vehicles and equipment to one side if possible.

Never assume shoulders are safe work areas.
MAINTENANCE OPERATION NEAR SIGNALIZED INTERSECTION

- May include maintenance of signal, sign, detector
- Truck-mounted attenuator is optional
- Use high-intensity warning lights on work vehicles to provide 360° warning
- Advance warning signs should be on portable stands to reduce setup time
- NEVER extend a bucket over an active traffic stream
Flagger control is necessary due to providing only a single lane.

Reduce setup time:
- Portable warning signs
- Taller (36”) cones instead of barrels

Optional buffer spaces help reduce risks to highway workers due to errant vehicles.
MAINTENANCE WORK NEARBY INTERSECTION ON LOW-VOLUME ROADWAY

- Note the optional pavement markings and devices
  - Likely inefficient for this application for short-term work
  - Type 3 Barricade is required

- Road users must be able to see approaching vehicular traffic beyond the work site in order to safely yield
  - Volume must be low enough for sufficient gaps to exist for yielding traffic
SHORT-DURATION WORK ZONE EXAMPLES

Temporary Traffic Control Layout
SHORT-DURATION WORK ZONES

Work that occupies a location up to one hour

- Traffic signal maintenance
- Pavement patching or other repair operations
- Surveying operations
- Bridge or other highway element inspections
- Loading or unloading equipment or other pre-work operations
- Utility work zones
- Tree trimming operations
SHORT-DURATION TRAFFIC SIGNAL MAINTENANCE

- Use high-intensity warning lights and retroreflective markings on work vehicles to provide 360° warning.
- 10 feet of paved traveled way must remain.
- Advance warning signs should be on portable stands to reduce setup time.
- **NEVER** extend a bucket over an active traffic stream.
SURVEYING OPERATION

Centerline:
- Cones should be placed 6-12” on either side of the centerline

Shoulder:
- Flaggers may be omitted
- **DO NOT** assume shoulders areas are automatically safe

Consider:
- “BE PREPARED TO STOP” signs
- High-level warning devices to protect the survey equipment
TREE TRIMMING OPERATIONS

**DO NOT** assume shoulders areas are automatically safe work areas

Use additional traffic control if necessary to prevent falling limbs from injuring workers, pedestrians or motorists

- Consider the optional lateral buffer space for this application

Traffic cones should be utilized as channelizing devices instead of barrels
MID-BLOCK MAINTENANCE OPERATION

- Examples include tree trimming or utility work
- Truck-mounted attenuator is optional
  - Include on high speed and/or high volume roadways
- Advance warning signs should be on portable stands to reduce setup time
- 10 feet minimum lane width is required to maintain travel in the lane adjacent to the work area
- **NEVER** extend the bucket over an active traffic stream
Consider joining several short-duration work areas together into a single stationary work zone of longer duration.

- For example, reducing several lane or shoulder closures over a larger area to a single closure.

- Separate arrow boards must be used for each closed lane.
MOBILE WORK ZONE EXAMPLES

Temporary Traffic Control Layout
MOBILE WORK ZONES

Work that moves *intermittently* or *continuously*

- Sweeping, debris removal, or other cleaning activities
- Pavement marking installation or removal
- Asphalt cold patching operations
- Rumble strip installation
- Various preventative maintenance operations
Vehicle mounted signs must not be obscured by equipment or supplies

Arrow board is optional

- **Caution mode must be used!**

Vehicle’s hazard warning lights not acceptable alone

- High-intensity rotating, flashing, oscillating, or strobe lights **required**
Both shadow and work vehicles SHALL display high-intensity rotating, flashing, oscillating, or strobe lights.

- Truck-mounted PCMS may be used in lieu of arrow boards
  - “WET PAINT / KEEP RIGHT”

- Work convoy should pull over to allow vehicles to pass WHERE PRACTICAL
  - “DO NOT PASS” signs should be used otherwise

- Arrow panel facing oncoming traffic is OPTIONAL but recommended
Space between vehicles should be minimized to deter road users from driving in between convoy.

Work should be performed during off-peak daylight hours if possible.

Truck-mounted attenuators are required for shadow vehicles in traveled way.

- Optional for vehicle in shoulder/work vehicle.

Arrow boards shall be used for freeway lane closures.

- One arrow board for each lane.
Further information on highway work zone safety can be found through the following organizations:

- American Road and Transportation Builders Association: http://www.artba.org/
- Federal Highway Administration: http://www.fhwa.dot.gov/
- Institute of Transportation Engineers: http://www.ite.org/
- Occupational Safety and Health Administration: http://www.osha.gov/
- Texas Transportation Institute: http://tti.tamu.edu
- Transportation Research Board: http://www.trb.org/
TEMPORARY TRAFFIC CONTROL PLAN SELECTION SOFTWARE
Opinions, findings, and conclusions expressed in this presentation are those of contractor(s) and not necessarily those of USDOT or FHWA.

Was prepared in cooperation with USDOT and FHWA.

The Temporary Traffic Control Plan Selection Software is a ‘Living Document’ and may be modified and updated as needed.
PURPOSE

Training Program for Temporary Traffic Control Plan Selection Software

Applicable for:
- Safety Professionals
- Highway Workers
- State and Local Road Agencies
- Permit Granting Agencies
INTRODUCTION

- SAFETEA-LU (2005)
  - FHWA Work Zone Safety Grant Program

- 2006 Work Zone Safety Grant
  - WSU - Utility Work Zone TTCP Software Tool

- 2011 Work Zone Safety Grant
  - WSU - Development of Comprehensive Tool
Part 6 of the MUTCD

- Temporary Traffic Control

Guidance, Standards, Devices, etc.

2009 MUTCD Includes 46 ‘Typical Applications’
Cover a “variety of situations commonly encountered”

Not every possible situation can be addressed

Some scenarios require combining components of two or more typical applications

For example:
- Closure at the Side of an Intersection (TA-27) WITH
- Sidewalk Detour or Diversion (TA-28)
Typical applications include:

- Necessary Temporary Traffic Control Devices
  - Signs
  - Channelizing Devices
  - Optional Devices
- Dimensions for TTC Layout
  - Placement of Advance Warning Devices
  - Taper Lengths
  - Spacing Between Channelizing Devices
- Special Notes
Notes for Figure 6H-28—Typical Application 28
Sidewalk Detour or Diversion

**Standard:**
1. When crosswalks or other pedestrian facilities are closed or relocated, temporary facilities shall be detectable and shall include accessibility features consistent with the features present in the existing pedestrian facility.

**Guidance:**
2. Where high speeds are anticipated, a temporary traffic barrier and, if necessary, a crash cushion should be used to separate the temporary sidewalks from vehicular traffic.
3. Audible information devices should be considered where midblock closings and changed crosswalk areas cause inadequate communication to be provided to pedestrians who have visual disabilities.

**Option:**
4. Street lighting may be considered.
5. Only the TTC devices related to pedestrians are shown. Other devices, such as lane closure signing or ROAD NARROWS signs, may be used to control vehicular traffic.
6. For nighttime closures, Type A Flashing warning lights may be used on barricades that support signs and close sidewalks.
7. Type C Steady-Burn or Type D 360-degree Steady-Burn warning lights may be used on channelizing devices separating the temporary sidewalks from vehicular traffic flow.
8. Signs, such as KEEP RIGHT (LEFT), may be placed along a temporary sidewalk to guide or direct pedestrians.
2009 National MUTCD minimum national standard for all facets of temporary traffic control

- States must either:
  - Adopt National MUTCD
  - Adopt National MUTCD with State Supplements
  - Adopt State MUTCD in “substantial conformance” with 2009 National edition

National MUTCD is the minimum standard

- State-level MUTCD or supplement may be more rigorous
GAPS IN TYPICAL APPLICATIONS

- Only 46 ‘Typical Applications’
  - DO NOT cover all of the frequently encountered work zone scenarios

- Can be incorrectly implemented “As Is”
  - TA’s must be tailored to the specific work zone scenario encountered
    - Rarely verbatim the same as generalized scenario shown in TA
WSU-TRG developed 72 “Example” Plans

- Supplement the existing 46 TAs
- Cover many additional work zone scenarios that are frequently encountered
- Based on state of the art and practice in highway work zones
  - Best practices in individual states
  - Up to date research literature
- Reviewed by the FHWA, national focus group, and experienced professional work zone consultant
TEMPORARY TRAFFIC CONTROL SELECTION SOFTWARE

Combination of:

- 46 ‘Typical Applications’ from 2009 MUTCD
- 72 additional “example” plans
- State-specific standard drawings

Separated into EIGHT distinct modules

Users navigate flow chart logic to arrive at appropriate plan

- Additional drop down menus for site-specific information
STATE-SPECIFIC WORK ZONE MODULE

- Comprehensive list of the plans available for each state
  - Should always be checked first for appropriate state-level plans
- Standard plans are updated periodically by WSU-TRG

INSTRUCTIONS

Select items from the following dropdowns to find relevant standard plans or typical applications maintained by each state.

Wayne State University - Transportation Research Group updates these state related links on a periodic basis. The date WSU-TRG last updated each of the state’s links is shown. The "State DOT’s Standards" button links directly to the state’s standards web page which should be checked for changes that affect the relevance of these plans.

Select the State

Select
STATE-SPECIFIC EXAMPLE

Assuming that the State of Florida is selected:

INSTRUCTIONS

Each state maintains a series of state-specific temporary traffic control plans. These are included in either: (1) a state-specific Manual of Uniform Traffic Control Devices (MUTCD); (2) a series of independently prepared standard plans; or (3) a combination of the two. The following menus will direct the user to these state-specific TTCPs from either source. Please start by selecting the state of interest.

Select the State

- Alabama
- Alaska
- Arizona
- Arkansas
- California
- Colorado
- Connecticut
- Delaware

Florida
- Georgia
- Hawaii
- Idaho
- Illinois
- Indiana
- Iowa
- Kansas
- Kentucky
- Louisiana
- Maine
Each state’s standard plans are categorized in the same manner in which they are presented on their website, including “All Standard Plans” which includes every standard plan.
Clicking any one of the links will direct the user to a PDF of that plan.
STATE-SPECIFIC EXAMPLE

Remember to always check for state-specific versions of the work zone scenario!

GENERAL NOTES

1. Only the signs controlling pedestrian flow are shown. Other work zone signs will be needed to control traffic on the street.

2. For spacing of traffic control devices and general TCE requirements refer to Index No. 400. Minimum spacing between full circuits, vertical panels, signs or lateral markers shall not be greater than 25'.

3. Screen lighting should be considered.

4. For nighttime closures use Type A flashing warning signs on both sides supporting signs and constants. Use Type C already-erected signs on chain-link 6' separators separating the work zone from vehicular traffic.

5. Pedestrian traffic signals controlling closed pedestrian shall be controlled.

6. Road Work Signs located near or adjacent to a sidewalk shall have a 3' minimum clearance from the outer edge of the sidewalk.

7. When construction activities may affect should be made to stagger out of service at the same time.

8. In the event that sidewalks are to be closed, the sidewalk shall be closed around the curb.

9. Temporary walkways shall be a single lane with a minimum 4.5' width lower than 5' in width and passing to a maximum 10'. Temporary walkways specified in Index No. 394. TCE shall be flexible, rigid, or non-flexible. The width of the sidewalk shall be at least 5'6".

10. Temporary curbs and temporary replacing of the sidewalk using materials associated with large.

SYMBOLS

- Work Area
- Controlling Device (See Index No. 460)
- Work Zone Sign
- Movement/Direction for Periodic Temporary or Permanent Creek Ramps
- Lane Identification / Direction of Traffic
“Example” plans originally developed as a part of 2006 FHWA Work Zone Safety Grant

Similar to “Typical Application’ counterpart in the MUTCD

- Temporary traffic control devices geared towards utility work zones
- Short or intermediate term operations
- Still compliant to National MUTCD
UTILITY WORK ZONE MODULE

Clicking an object in the flow chart will skip to that portion of the logic.

Advance through flow chart logic to appropriate TTCP

Users will be re-directed to the appropriate module as necessary.
Once an object is clicked on any flowchart, the user will be prompted with questions about the roadway and work site in question.
Suppose a TTCP is required for the following utility work zone:

- Utility work on shoulder of a two lane roadway
- Work does not encroach onto roadway
- Urban roadway with 45 MPH posted speed limit
- Moderate traffic volumes
- 11’ wide travel lanes with 3’ paved shoulders
Begin at the **Main Module** of the TTCP Software

Since this is a Utility Work Zone, the **Utility Work Zone Module** should be selected
This will lead to the **Utility Work Zone Module** where all plans relevant to utility work zones will be found.

The user may either answer every question in the logic or skip ahead by clicking the appropriate question object.
The first relevant question for this example involves the location of the utility work.

Given that we know the work in question is taking place on the shoulder only, selecting "On Shoulder" is appropriate.
In addition to the eight modules of the software, there are many ‘sub-modules’ for specific roadway scenarios.

- **Utility Work Zone “On Shoulder” Sub-Module**
  - Introduce a new flowchart specific to that roadway scenario.

Given that we know the work is taking place on a two-lane roadway and does not have low volumes and low speed, **Figure D3** is the most appropriate TTCP.
DYNAMIC QUESTIONS

Additional information about the work being performed or roadway conditions may be necessary after the appropriate plan is selected.

This information can be entered via the drop down menus.
DISPLAY OF TTCP

A table will be shown which displays the appropriate dimensions for the layout of TTCDs.

<table>
<thead>
<tr>
<th>DIMENSIONS</th>
<th>FEET</th>
</tr>
</thead>
<tbody>
<tr>
<td>A (Distance Between Signs)</td>
<td>350</td>
</tr>
<tr>
<td>L (Merging Taper Length)</td>
<td>135</td>
</tr>
<tr>
<td>1/3 L (Shoulder or Parking Lane Taper Length)</td>
<td>45</td>
</tr>
<tr>
<td>Maximum Taper Channelizing Device Spacing</td>
<td>45</td>
</tr>
<tr>
<td>Maximum Tangent Channelizing Device Spacing</td>
<td>90</td>
</tr>
</tbody>
</table>

Please note that this plan is an "Example" Typical Application developed by the WSU-TRG as a part of the 2011 FHWA Work Zone Safety Grant and may be used as a basis for preparing a temporary traffic control plan.

The appropriate plan will be displayed on screen, including all required devices.

Buttons are included at the top which allow the user to:

- Return to Work Zone Safety Homepage, the Main Module, or the previous module
- A display of the legend/symbols
- Printing and zoom functions
INTERSECTION MODULE

- Includes ‘typical applications’ and “example” plans appropriate for use in the vicinity of highway intersections.

- Incorporates the **Roundabout Work Zone** sub-module, including “example” plans developed specifically for roundabouts.
  - Not covered in the 46 TAs.
Suppose a TTCP is required for a signalized intersection:

- Two approach lanes in the direction where the work is occurring
- Work on the far side of the intersection in the left lane
- Urban area with 40 MPH posted speed limit
- No shoulder with 11 foot wide travel lanes
- Work will interfere with the crosswalk
Following through the flow chart logic within the **Intersection Module**, the user will be directed to dynamic questions page for TA 6H-23

Enter the additional work and site characteristics to determine the appropriate plan.
A button is included which will display the typical application for pedestrian detours since crosswalks are affected.
The **Roundabout Module** can be found within the intersection module.

Suppose a TTCP is required for a single-lane roundabout with the following characteristics:

- Urban roadway with 40 MPH posted speed limit
- 11 feet wide travel lanes with no shoulders
- 7 foot closure within the circulating lane
A button is included which will display the typical application for roundabout detour due to the closure.
Includes ‘typical applications’ and “example” plans specific to mobile work zone operations

Generalized plan for mobile striping operations not included in the MUTCD

Expansion of TA 6H-35 for two and three lane scenarios
WORK ZONE DETOUR MODULE

- Includes the ‘typical applications’ for detours required for various types of highway work zone scenarios.

- Specific plans are included for roundabouts and pedestrians detours as necessary within the software.
Includes ‘typical applications’ and “example” plans specific to operations taking place on the freeway.

“Example” plans greatly expand on the variety of possible roadway geometries and work locations involved in freeway operations beyond the MUTCD.
Suppose a TTCP is required for shoulder work on an urban freeway

- Left shoulder work (median side)
- 6 feet wide shoulder with 12 feet wide travel lanes
- Complete closure of shoulder
- 70 MPH posted speed limit

Within the **Freeway Module**, shoulder only work can be selected.
Whenever an “example” plan is shown, a disclaimer will indicate that the plan is not a TA from the MUTCD.
TWO-LANE WORK ZONE MODULE

- Includes ‘typical applications’ and ‘example’ plans specific to operations taking place on two-lane roadways.

- “Example” plans for haul roads beyond TA 6H-14, for long-term and short-term scenarios.
Includes ‘typical applications’ and “example” plans specific to operations taking place on multi-lane highways.

Does not cover work zone scenarios beyond three lanes in one direction.

Specific plans for short, intermediate, and long term scenarios.
MULTI-LANE EXAMPLE

Suppose a TTCP is required for a multi-lane highway which includes a two-way left turn lane

- Five foot closure within the two-way left turn lane
- Rural highway with posted speed limit of 40 MPH and 11 feet wide travel lanes

Skip to the portion of the multi-lane module which relates to highways with two-way left turn lanes
Optional TTC may also be shown in the plan, such as the optional flaggers shown in Example Plan 321.
SYSTEM REQUIREMENTS

Web-based software tool compatible with:

- Personal computers (Windows, and Apple OS)
- Tablets and mobile devices (iOS, Android, Windows Mobile)

Compatible browsers include:

- Mozilla Firefox
- Google Chrome
- Microsoft Internet Explorer
- Apple Safari
WZ Home button will return the user to the homepage from any of the Work Zone Safety Grant products.
WORK ZONE SAFETY
COMPRENDIUM OF DOCUMENTS
SEARCH ENGINE
DISCLAIMER

Opinions, findings, and conclusions expressed in this presentation are those of contractor(s) and not necessarily those of USDOT or FHWA.

Was prepared in cooperation with USDOT and FHWA.

The Work Zone Safety Compendium of Documents Search Engine is a ‘Living Document’ and may be modified and updated as needed.
WORK ZONE SAFETY COMPENDIUM OF DOCUMENTS SEARCH ENGINE

- Workzone.eng.wayne.edu
- Developed as a part of the 2011 FHWA Work Zone Safety Grant
- Customized search engine of all documents relating to highway work zones
WORK ZONE SAFETY COMPENDIUM OF DOCUMENTS SEARCH ENGINE

- STATE STANDARD PLANS
- STATE WORK ZONE PRACTICES
- MUTCD & STATE SUPPLEMENTS
- RESEARCH REPORTS
- STANDARDS & SPECIFICATIONS
- SAFETY MANUALS
- PUBLIC AWARENESS & OUTREACH
- LAWS & REGULATIONS
- TOOLS & GUIDELINES
- TEMPORARY TRAFFIC CONTROL PRODUCT INFORMATION
- JOURNAL ARTICLES & CONFERENCE PROCEEDINGS
Please note:

- Certain results may appear in multiple categories to ensure users find what they are looking for.

- WSU updates the document database on a regular basis – however – some documents may become out of date.

- Document database should be comprehensive – however – some items may be missing.
  - Please alert WSU if you are aware of any document that needs to be added.