Tools for Work Zone Traffic Impact Analysis
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Developed & Presented by

American Traffic Safety Services Association

SAFER ROADS SAVE LIVES
Course Objectives

To provide guidance to agencies and/or individuals considering modeling and simulation tools for work zone traffic impact analyses.

To provide a broad, fundamental understanding of how these analytical tools can be used to support work zone design.
To list and discuss some available tools for work zone traffic impact analysis
This Course:

- Discusses the classes of **analytical tools** available to support work zone analyses
  - Strengths
  - Weaknesses
  - Level of detail
This Course:

Explores the factors to find the best match between the project requirements and available tools, considering:

- Data availability and quality
- Work zone characteristics
- Measures of effectiveness
- Resources available
Intended Audience

- Engineers and others responsible for deciding upon work zone strategies to implement
- Decision-makers considering work zone analytical tools
Course Goal

To enable participants to understand how available analytical tools can be used to assess and evaluate the impact of highway work zones on safety and mobility.
Course Materials

- Course notebook
- Work Zone Impacts Assessment

Yours to keep!
# Course Modules

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Exam

- 25 True/False questions
  - 4 pts each = 100 pts
- 30 minutes
- Open book, open notes
- Passing grade = 80%
About the Tools Discussed

- The course will highlight tools developed by the public sector.
- Privately developed software may also be available and may be mentioned in the course.
MODULE 1 - Background & Challenges & Issues
Module Objectives

- Discuss why and when to consider work zone traffic impact analysis
- Discuss issues and challenges associated with highway work zones
- Discuss the Transportation Management Plan (TMP) requirements
WZ Issues and Challenges

- Safety (users and workers)
- Mobility
  - Improper designs
- Public relations
- Others?

WZ traffic impact analysis can help improve these!
When to Consider Analytical Tools

- To compare multiple TTC strategies
  - Example: Day versus Night work
- To justify additional funds
- To minimize the WZ impact
Why Work Zone Traffic Impact Analyses?

- To gain a clear understanding of the project’s **mobility & safety** issues
- Constructability
- Identify management strategies
- May be required!
It is important to systematically assess the work zone impacts of projects and take appropriate action to manage these impacts.
Putting it all Together

- Traffic impact analysis
- Project characteristics
- Travel/traffic characteristics
- Work zone design
- Procurement options
- Constructability
- TTC, TO, PI
- Engineering judgment
- Community issues
Module Recap

Why do we need to analyze WZ traffic impacts?

Approximately, how many work zone fatalities are there in the USA?

What is the WZ designer’s role?

What is a TMP and its TO component?

What is a “Significant Project”? 

0-21
MODULE 2 - WZ Traffic Impact Analysis Fundamentals
Module Objectives

- Discuss impact analysis assessment process
- During the project life cycle
Work Zone Impacts Assessment

An Approach to Assess and Manage Work Zone Safety and Mobility Impacts of Road Projects

Developed to provide guidance

Module is based on this report
What is WZ Impacts Assessment?

The **process of understanding** the safety and mobility impacts of a road construction/maintenance/rehabilitation project.
What is a WZ impacts assessment?
When do we perform a WZ impacts assessment?
During which part of the project should we perform a WZ impacts assessment?
What constitutes a WZ impacts assessment?
MODULE 3 - Analysis Approaches and Methodologies
Module Objectives

- Discuss analysis (problem-solving) approaches and their application to WZ analysis.
- Discuss methodologies used when deploying work zone impact analysis tools.
- Discuss various tools available for work zone impact analysis: Strengths and weaknesses.
Impact Analysis
Methodologies and Tools

Several, varying in level of complexity & capabilities, are available

Some designed specifically for WZ applications

Others, although not designed specifically for WZ, can be used
Three Levels of Detail

- **ESTIMATES**
  - Increasing accuracy

- **DETERMINISTIC TOOL**
  - Increasing complexity

- **SIMULATION MODEL**
Mesoscopic Models

- Macro level with the ability to “zoom” areas to a micro level
- Represent the flow of vehicles on a link, but not individually
**CORSIM**

- CORridor micro SIMulation model developed by FHWA
- Part of the **TSIS** Suite
- NETSIM + FRESIM
- FRESIM component has WZ applications, programmed as “incidents”
1. QuickZone
2. QUEWZ-98
3. Construction Analysis for Pavement Rehabilitation Strategies (CA4PRS)
4. Dynasmart-P
5. IDAS
Challenges and Limitations

1. Availability of quality data
2. Limited empirical data
3. Limited funding
4. Training limitations
5. Limited resources
6. Data input and the diversity and inconsistency of data
Module Recap

- What’s the difference between deterministic and stochastic models?
- What’s the difference between microscopic and macroscopic models?
- Name the three modeling methodologies
- Name three challenges and limitations in the use of traffic analysis tools
MODULE 4 - Result Application
Module Objectives

- Discuss the application of work zone traffic impact analysis (and tools)
- Discuss how to use (apply) the results given by the models
Now that we have results, what can we do?

- Revise the design/construction strategy
- Revise the staging approach for the project
- Answer key questions
Results Help With Design Decisions

- Reassess and confirm whether the project is a “Significant Project”
- Develop recommendations for final construction approach and construction staging
- Identify final design and contracting strategies – consider innovative design and contracting approaches
Module Recap

What can we do with the results of the analysis tools?

How can the model results help shape a TMP? A TCP?

Provide a few examples
MODULE 5 - Tool Selection Considerations
Module Objectives

- Discuss factors that must be considered when deploying analytical tools
- Discuss questions to ask when choosing an analytical tool
- Present a methodology for selecting an analytical tool
Deployment of Analytical Tools

- Best accomplished when the analytical capability is well-matched to the context for analysis
- The tool must match the needs
Factors to Consider

1. Data availability and quality
2. Work zone impact area geography
3. Agency resources
4. Measures of effectiveness
Possible WZ Performance Measures

- Will the model report the MOEs that are important to you and your objectives?
- Important to set acceptable levels
  - Example: Certain LOS requires night work
- Let’s look at typical WZ MOEs
Tool Selection Principles

- No single tool can do everything
- Multiple tools may be necessary at different levels of project development
- FHWA does not require a specific tool be used
- Select the simplest tool that best matches the needs of your project
Module Recap

- Name the 4 factors to consider when considering WZ impact analysis tools
- How do data needs affect model selection?
- Name the three network typologies
- Which are some of the questions to ask when selecting a tool?
Module Objectives

Provide snapshots of successful case studies that utilized the tools we have discussed
QuickZone Case Study Snapshots

- FHWA Website includes eight
- Three will be highlighted here
- For others:
  - www.tfhrc.gov/its/pubs/quickzone.htm
Snapshot #1: I-40 Full Closure Feasibility Assessment

- Rehabilitation project on I-40 east of downtown Knoxville, TN
- TDOT considered the use of a full closure
Module Recap

What have these case studies demonstrated re: WZ analytical tools?
## End of Course

| 1 | Background – Challenges & Issues |
| 2 | Impact Analysis Fundamentals      |
| 3 | Approaches & Methodologies        |
| 4 | Result Applications               |
| 5 | Tool Selection Considerations     |
| 6 | Case Study Snapshots              |
Module Objectives

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