SHRP 2 Renewal Project R11

Instructor Guide

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Introduction

The U.S. highway system is aging and must be rebuilt while we are driving on it and living next to it. Research in the SHRP 2 renewal focus area therefore addresses the need to develop a consistent, systematic approach to completing highway projects quickly and cost-effectively while simultaneously minimizing, managing, and mitigating disruption to the community and adjacent land uses. Over the last several years, the transportation planning community has begun using the concept of corridor and network management to describe the current status and future needs for transportation improvements. However, the transportation corridor and network analysis at the planning stage may not consider the impact that renewal projects may have on existing traffic. The analysis may not consider the impact that different maintenance of traffic strategies can have on the overall budget, disruption to the traveling public, disruption to commerce, and impacts on the local community during construction of the program of improvements. Decisions made during planning may not fully recognize the redistribution of traffic due to restrictions or closures, may not adequately recognize or mitigate disruptions, and may not minimize costs in contractor overhead, materials, or the driving public's user costs. These decisions may also overlook opportunities to minimize both the number and the duration of construction or maintenance stoppages. It is the purpose of this project to provide the tools and training necessary to close this gap.

The overall WISE (Work Zone Impact and Strategy Estimator) software development process follows the "V" diagram as shown below. The V diagram is a useful software/model development life-cycle process, which starts from identifying the user needs, followed by specifying the use requirements and using these requirements for specification design. The actual coding of the software takes place after these steps. Once the software is produced, several subsequent steps also are commenced to ensure the robustness and validity of the developed software that is consistent with the original defined needs and functional requirements.
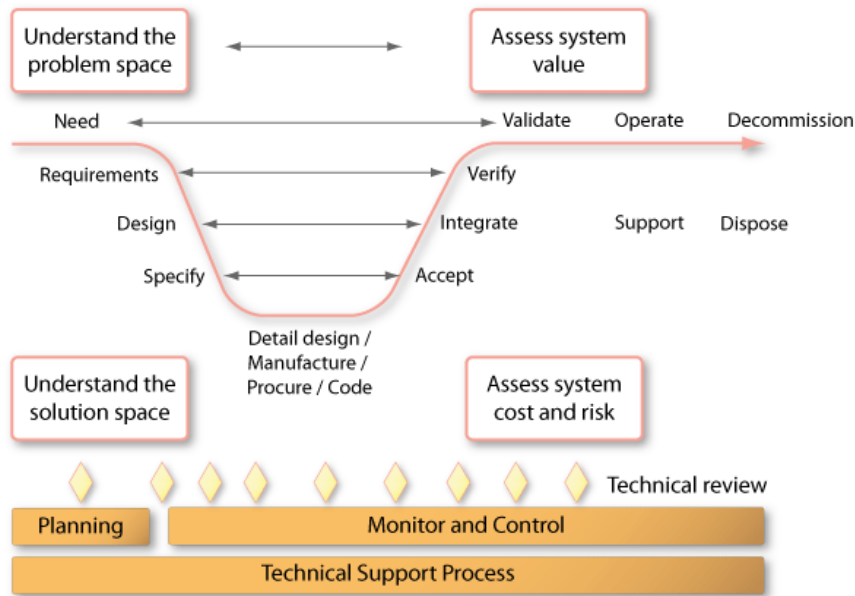
Figure 1. WISE software development process.

Course Content

This course presents material in a 3-day instructor-led training (ILT). The sessions are as follows:

- Session 1 – Introduction
  - What is WISE?
  - Purpose and Application
  - Limitations
- Session 2 – Getting Started
  - System Requirements
  - Minimum Data Requirements
  - Getting a Dataset Into WISE (Converting to NEXTA Formats)
  - GUI Tools
- Session 3 – Creating/Opening a WorkSpace
- Session 4 – Planning Module (Inputs)
  - Importing a Network
  - Importing Traffic Information
  - Planning Characteristics
    - Seasonal Factors
    - Start/End of Program

Value of Time (Road User Costs)

Analysis Periods (Number of Hours)

Project Description

Project Strategies

Building Your Strategies Library

Demand-Based Strategies

Trip Reduction/Radius of Effect/Strategy Cost

Duration-Based Strategies

Duration Reduction/Strategy Cost

Project Information

Project Name

Earliest/Latest End Dates

Project Duration

Project Precedence

Project Link

Capacity/Speed/Number of Lanes

Total Project Construction Cost

Daytime/Nighttime

Identify Project Strategies

Traffic Diversion

User Supplied/WISE Supplied/Traffic Operations Software
Supplied

Project Info Tools

- Session 5 – Running the Algorithm

Validation of the Planning WorkSpace

The Sequencing Algorithm

Display/Interpretation of Results

Optimization of Project Sequence

- Session 6 – Operation Module

The Hand-Off Between Planning and the Traffic Operations Software

Dynamic Traffic Assignment (DTA)

Running a WISE Project in Traffic Operations Software

Traffic Diversion by DTA

- Session 7 – Back to the Planning Module

Automatic Population of Operations Diversion in Planning

Re-run of Sequencing Algorithm

Participants will be given the opportunity to demonstrate mastery of course outcomes through numerous interactivities and exercises and by completion of a case study.

Target Audience

The target audience profile is identified to help ensure that the instruction will meet the learner's needs and fill performance gaps. This section defines the target audience for this course. Since so many people can be involved in the development of renewal programs, the list below is fairly diverse and represents many of the people who could potentially be involved in program development. However, it is acknowledged that in some agencies, one person may be assigned to all, or many, of these roles or there may be no one individual specifically responsible for overseeing the implementation of innovations.

The target audience for this course consists of individuals at the MPO or DOT responsible for

- The identification of renewal needs;
- The initial scoping of renewal projects;
- The initial sequencing of renewal programs;
- The public process for the refinement of renewal programs;
- The refinement of scope and sequence;
- The selection of renewal strategies for minimization, management, and mitigation of renewal impacts; or
- The ongoing management and administration of renewal programs.

While there are no prerequisites for this course, participants should possess basic computer skills.

About This Guide

This Instructor Guide has been assembled as a companion to the PowerPoint files for the training course. It has been developed to assist instructors in leading course presentations and managing communication with the National Highway Institute (NHI) and with learners. The Instructor Guide mirrors the information presented in the workbook but includes more detail on instruction and specific information about presentation of the material and facilitation of exercises. The Course Content section of this guide consists of the following items, organized by session:

- Learning outcomes;
- A description of the instructional method;
- Key message and background information;
- Interactivity used;
- Time allocation for each module;
- Practice exercises; and
- Review of learning outcomes.

Course Schedule

This instructor-led course is taught over three consecutive days. An alternate schedule can be used with approval from the NHI Training Program Manager. The recommended schedule below provides the approximate starting time for each module. The actual times for each of these activities may vary.

Recommended Delivery Schedule

Day and Time Event
Day 1, 8:30 a.m. to 4:30 p.m.

Day 2, 8:30 a.m. to 4:30 p.m.

Day 3, 8:30 a.m. to 4:30 p.m.

ILT Course Administration

ILT Overview
This course is comprised of three days of Instructor-Led Training. At the end of the three days participants will have undertaken a number of individual computer exercises, including a case study. Session 4 represents the main focus of the course: the Planning Module of the WISE tool. Specifically this session has topics dealing with the individual components of the Planning Module and the considerations participants will have to take into account when creating the inputs for the sequencing function, including the development of the strategies library. This session relies on participants having basic computer skills and will require participants to use their individual workstations to apply the information regarding the inputs to create their own WISE WorkSpace. Session 6 provides an introductory discussion of the Traffic operations platform and the fundamentals of dynamic traffic assignment. The materials also include discussion of the "hand-offs" from the Planning Module to the Operation Module and back again to allow the user to re-run the sequencing algorithm for the renewal program.

Instructor-Led Training Session Course Agenda

Day One

Time	Lesson Title	Length (min.)
8:30 – 9:15	Welcome and Introductions of Instructors and Participants	(:45)
9:15 – 9:30	Completion of Registration Paperwork	(:20)
9:30 – 10:00	Session 1: Introduction to WISE	(:30)
10:00 – 10:20	Break	(:20)

10:20 – 11:30	Session 2: Getting Started in WISE	(:70)
11:30 – 12:00	Session 3: Creating/Opening a WorkSpace	(:30)
12:00 – 1:00	Lunch	(:60)
1:00 – 2:30	Session 4: Planning Module (Inputs)	
	- Importing a Network	(:15)
	- Importing Traffic Information	(:15)
	- Planning Characteristic Inputs (Seasonal Factors, Start/End of Program, Value of Time, Road User Costs, Analysis Periods, Project Description)	(:60)
2:30 – 2:50	Break	(:20)
2:50 – 4:20	Session 4: Planning Module (Inputs) (Cont'd)	
	- Building Your Strategies Library	(:20)
	- Demand-Based Strategies	(:35)
	- Duration-Based Strategies	(:35)
4:20 – 4:30	Day 1 Wrap-Up	(:10)

Day Two

Time	**Lesson Title**	**Length (min.)**
8:30 – 8:45	Day 1 Review	(:15)
8:45 – 10:00	Session 4: Planning Module (Inputs) (Cont'd)	
	- Inputs of Project Information	
	- Project Name; Earliest/Latest End Dates, Project Duration	(:15)
	- Project Precedence	(:20)
	- Project Link (Capacity/Speed/Number of Lanes)	(:20)
	- Total Project Construction Cost (Day/Night)	(:20)
10:00 – 10:20	Break	(:20)
10:20 – 12:00	Session 4: Planning Module (Inputs) (Cont'd)	
	- Selection of Project Strategies	(:45)
	- Traffic Diversion (User Supplied/WISE Supplied/Traffic Operation Software)	(:40)
	- Project Info Tools	(:15)
12:00 – 1:00	Lunch	(:60)

Time	Lesson Title	Length (min.)
1:00 – 2:15	Session 5: Running the Algorithm	
	- Validation of the Planning WorkSpace	(:30)
	- The WISE Sequencing Algorithm	(:45)
	- Executing the Process	
2:15 – 2:35	Break	(:20)
2:35 – 4:15	Session 5: Running the Algorithm (Cont'd)	
	- Display/Interpretation of Results	(:55)
	- Optimization of Project Sequence	(:45)
4:15 – 4:30	Day 2 Review and Conclusion	(:15)

Day Three

Time	Lesson Title	Length (min.)
8:30 – 8:45	Day 2 Review	(:15)
8:45 – 10:00	Session 6: Operation Module (Traffic Operations Software)	
	- The Hand-off Between Planning & Operation	(:15)
	- Transmodeler, DynusT, or Other Operational Software	(:60)
10:00 – 10:20	Break	(:20)
10:20 – 12:00	Session 6: Operation Module (Cont'd)	
	- Dynamic Traffic Assignment (DTA)	(:50)
	- Running a WISE Project in Traffic Operations Software	(:50)
12:00 – 1:00	Lunch	(:60)
1:00 – 2:15	Session 7: Back to the Planning Module	
	- Automatic Population of Operations Diversion in Planning	(:30)
	- Re-run of Sequencing Algorithm	(:45)
2:15 – 2:35	Break	(:20)
2:35 – 3:00	Applications of WISE and Review	(:25)
3:00 – 4:30	Case Study Wrap-up/Review/Conclusion	(:90)

Class Size

For training to be effective, the suggested class size should not exceed 20 people; however, the target class size is 10 to 15 participants, with a minimum class size of 8.

Instructor Presentation Requirements

Two Weeks before the Training Event

- Confirm the training dates, location, and number of participants (20 is the maximum number of participants).
- Ensure you have a copy of this Instructor Guide, PowerPoint presentations, and Lesson Plan for each instructor.
- Verify the host agency is providing an LCD projector, cables, and computers for presenting the material and for participants.
- Verify with the host agency that the materials have arrived from NHI.
- Request a list of course participants that includes their names, positions, responsibilities, and experiences.
- Review any background material provided on the host agency's innovation. implementation program.
- Review the course materials.

Immediately Before the Training Event

- Arrive early. Give yourself plenty of time to get organized.
- Verify that the necessary equipment is available, including LCD projector, computer, cables, spare bulb, electronic remote device to advance slides, projection screen, power strip, extension cord, flip charts (two preferred), large markers (black for name tents and color for illustrations), masking tape, and push pins.
- Ensure the room is set up properly (i.e., tables and chairs are arranged to maximize interaction, projectors do not block participants' lines of sight, flip charts are convenient to you and visible to the participants).
- Test the equipment.
- Arrange materials so they are convenient for you and the participants. Ensure that each participant has a workbook, a tent card, and a black marker for each table.
- Write the instructors' names, course title and number, and session number on a flip chart.
- Post ground rules on a flip chart page (cover the ground rules with the flip chart pad's cover or a blank flip chart page, and leave it covered until you review it during the training event. Then post it on the wall so it is visible during the entire event. Ground rules should include
    - Be on time.
    - Questions are encouraged and participation is essential.
    - Parking lot concept.
    - Respect class schedules—and others.
    - Complete all paperwork.

- o Attend all sessions.
- o Limit distractions (such as cell phones, pagers, and laptops).

During the Training Event

- Start on time and stay on track. Always start on time, even if only one participant is in the room.
- Keep exercises within their time limits. End discussions when they cease to be productive. Lead participants from digressions and tangents, and back to the module.
- The instructor must advise participants at the beginning of the session that an assessment of individual learning will take place by the end of the class. This assessment will consist of an End-of-Course Assessment. All of those attending will be expected to participate, but only those wanting CEUs will have their assessment recorded. In addition to the assessment to receive CEUs, there must be 100% attendance by participants applying to receive CEUs.
- Be available during breaks and after class for questions.
- Mentor participants during the exercises. Walk among groups as they work on their activities, and answer questions and offer guidance as appropriate. Ensure participants are on track as they work. Give constructive feedback during the exercise presentations and discussions.
- Review the learning outcomes at the beginning of each module. Make sure participants are aware of the topics to be addressed in the module.
- Ask questions at the end of each module to reinforce the learning outcomes for that module and to connect to the upcoming material. As a general rule, review or discussion questions should be asked every six to eight slides. Avoid "yes" or "no" questions and try to use open-ended questions to draw participants into the material. Sample review questions are available in the Instructor Guide; however, the instructor may also develop additional questions. Make sure all questions directly relate to and support the learning objectives.

After the Training Event

- Collect completed course evaluations and participant registration forms.
- Take down all posted flip chart sheets.
- Clean the room.

Lesson Plans
Lesson plans are included in a separate document. Each session plan outlines

- The learning outcomes for the module.

- The topics that will be covered.
- The amount of time allocated to the module.
- The plan for evaluating participants' success at meeting the learning objectives.

In addition, a design plan is included at the beginning of each lesson. It includes the information listed above, as well as the following:

- The instructional method used to present the materials.
- References that will be used in preparing the course materials.

Enabling Learning Outcomes (ELO)
Upon completion of this course the learner will be able to

- Define WISE and explain its purpose and application.
- List and explain the limitations of the WISE program.
- Identify and explain system requirements of the WISE tool.
- Identify and explain the minimum data requirements for the WISE tool.
- Create a WISE WorkSpace or open an existing WorkSpace.
- Explain the process for importing a transportation network into WISE.
- Explain the process for importing basic traffic information into WISE.
- Understand and explain the input of planning characteristics, including seasonal factors, start/end of program, value of time, analysis periods, and project description.
- Explain how to build the WISE strategies library.
- Understand and explain how to enter, and the distinction between, demand-based and duration-based strategies.
- Understand and explain the input of project information, including project name, earliest/latest end dates, project duration, project precedence, project link, and project construction cost.
- Explain the selection of demand-based and duration-based strategies for each project.
- Understand and explain the three types of traffic diversion present in the WISE tool.
- Understand and explain the project information tools in WISE.
- Explain the WISE validation functions prior to sequencing.
- Understand, at a high level, the WISE sequencing algorithm.
- Understand and be able to explain the results of the WISE sequencing algorithm.
- Understand, at a high level, the traffic operation program's function in the WISE architecture.
- Understand the interaction between the planning and operation functions of WISE.
- Understand, at a high level, the dynamic traffic assignment function of traffic operations software.

- Explain the substitution of DTA diversion in WISE and the re-running of the sequencing algorithm.