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DEVELOPMENT OF A HIGHWAY INCIDENT MANAGEMENT OPERATIONAL AND TRAINING GUIDE: PHASE II

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16. Abstract

The overall goal of both phases of this project was to reduce responder fatalities and injuries, as well as to prevent secondary crashes, especially those involving incident responders. The phases of this project worked toward this goal by creating training materials to help incident responders work more safely and effectively.

To address the need for promptly training all traffic incident responders in the state of Illinois, Phase II of this project created online modules to supplement the in-class training developed in Phase I. Based on the recommendations of the Technical Review Panel, responder feedback, and suggestions from the Federal Highway Administration, we identified material that could be presented online as a prerequisite to the classroom-based training.

Additionally, this project modified the existing in-class training to obtain endorsement by the Federal Highway Administration as equivalent to their national program. The researchers created 11 online training modules, each lasting between 15 and 30 minutes, to allow responders to view a whole module in one sitting. The researchers also created an online training video game and an in-class trivia game. The video game allows responders to refine their traffic control and vehicle-positioning skills. The trivia game helps reinforce knowledge gained during the in-class training.

Together, the online and in-class training materials created throughout both phases of this research project can provide education to those responding to traffic incidents in Illinois. It is expected that as more responders completing this training program, their incident-scene safety will also improve.

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DISCLAIMER

The contents of this report reflect the view of the authors, who are responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the Illinois Center for Transportation, the Illinois Department of Transportation, or the Federal Highway Administration. It is expected that as more responders completing this training program, their incident-scene safety will also improve.

EXECUTIVE SUMMARY

The overall goal of both phases of this project was to reduce responder fatalities and injuries, as well as to prevent secondary crashes, especially those involving incident responders. The phases of this project worked toward this goal by creating training materials to help incident responders work more safely and effectively.

To address the need for promptly training all traffic incident responders in the state of Illinois, Phase II of this project created online modules to supplement the in-class training developed as Phase I. Based on the recommendations of the Technical Review Panel, responder feedback, and suggestions from the Federal Highway Administration, we identified material that could be presented online as a prerequisite to the in-class training.

Additionally, this project modified the existing in-class training to obtain endorsement by the Strategic Highway Research Program II (SHRP-II) as equivalent to their national program. The researchers created 11 online training modules, each lasting between 15 and 30 minutes, allowing responders to view the training modules in multiple sessions as necessary. The researchers also created an online video game and an in-class trivia game. The online video game allows responders to refine their traffic control and vehicle-positioning skills. The trivia game helps reinforce knowledge gained during the in-class training.

Together, the tools created throughout both phases of this research project can provide education to those responding to traffic incidents in Illinois. It is expected that increased training will improve responder safety.

CONTENTS

LIST OF ABBREVIATIONS

EMS	Emergency medical services
EV	Electric Vehicles (EV)
FHWA	Federal Highway Administration
HAZMAT	Hazardous material
HEV	Hybrid Electric Vehicle
ICS	Incident command system
IDOT	Illinois Department of Transportation
IM	Incident management
LMS	Learning management system
LODD	Line of Duty Deaths
MUTCD	*Manual on Uniform Traffic Control Devices*
NFPA	National Fire Protection Association
NIMS	National Incident Management System
NUG	National Unified Goal
SIUE	Southern Illinois University Edwardsville
SOP	Standard operating procedure
TCD	Traffic control devices
TIM	Traffic incident management
TIMA	Traffic incident management areas
TRAA	Towing and Recovery Association of America
TRP	Technical Review Panel
TTC	Temporary traffic control

CHAPTER 1 INTRODUCTION

The second phase of the traffic incident management (TIM) project was focused on the development of online modules to reduce the in-class training time for responders. Agencies had reported difficulties in sending responders to an all-day training course, given the limited resources, personnel, and funding in their sectors.

The online modules were developed to give responders an awareness of best practices and terms in incident response. Each online module contains information that the Technical Review Panel (TRP) identified as being beneficial to responders. These online modules are intended to be completed before a participant attends the in-class session.

Chapter 2 of this report describes the steps taken to ensure this training was equivalent to that being developed by second Strategic Highway Research Program (SHRP-II) L12 project. Chapter 3 reports the responses of those trained with the in-class material created during Phase I of this research. Next, Chapter 4 details the material covered in the online training modules and how that material was refined throughout Phase II. Chapters 5 and 6 describe the design of the two educational games created to aid in the training processes. Last, Chapter 7 concludes with the major findings of this study.

CHAPTER 2 DEVELOPMENT OF ONLINE TRAINING

2.1 CONTENT SELECTION

The online training material was developed to reduce the in-class training time, to overcome common issues with limited staff time and funding for training classes. The online training material is a precursor to the in-class section, introducing responders to the basics of incident response and the key terms they should know before attending the in-class training.

The online training material was selected based on the comments of survey responders and the suggestions of the TRP after reviewing the comments. Some new material was identified for inclusion in the online section based on the TRP's recommendation. Some material was taken from the in-class section and moved to the online section, and other material was added to comply with the new SHRP-II training.

The material was divided into 11 categories and organized based on suggestions from the TRP. The modules were titled based on the overall content and are listed in Table 1.

Table 1. Online Module Titles

	Course Navigation Instruction
Module 10	Introduction to Incident Management
Module 20	Laws and Policies
Module 30	Roles and Responsibilities
Module 40	Incident Classification
Module 50	Highway Terms
Module 60	Traffic Incident Management Areas
Module 70	Temporary Traffic Control Devices
Module 80	Introduction to Safe Vehicle Positioning
Module 90	Towing and Recovery Association of America Vehicle Classification
Module 100	Electric Vehicle Training
Module 110	Cable Barrier System

For numbering the online modules, increments of ten were used to accommodate future expansions. If needed, the tens numbering system allows placement of additional materials within the learning management system (LMS) between the existing modules.

2.2 MODULE CONTENT

Because the online training platform will be new to many of the training participants, researchers developed a brief module describing how to navigate within each module and throughout the course. The description includes the function of each button, the operation of the slides within each module, and the organization of the course grade book. This navigation module takes less than five minutes and can be skipped with users are already familiar with LMS.

Module 10 offers an introduction to incident management. The objectives of module 10 are to give responders an overview of traffic incident management, explain the impacts of traffic incidents,

explain the uniform approach to incident response, and give an overview of national standards related to incident management. This module takes about 15 minutes to complete and includes a video.

Module 20 gives the responders an introduction to some of the laws and policies at the state and federal levels that they should be aware of while working incidents on roadways. One law in particular explains when it is permissible for fire departments to assume the role of traffic control. Laws protecting incident responders and the chain of command at the incident scene are also covered in this module. Responders are introduced to the *Manual on Uniform Traffic Control Device* (MUTCD), a document that must be followed when altering the flow of traffic on roadways; a survey of participants in classroom-based training revealed many responders had no prior knowledge of the manual. The time needed to complete module 20 is about 15 minutes.

In module 30, the roles and responsibilities of each response agency are covered in detail, something that took up much of the in-class session to discuss. Fifteen slides are used in this module to explain the role and responsibilities of law enforcement, fire and rescue, emergency medical services, transportation, towing and recovery, special/extreme circumstance responders, public safety communications (dispatch), and traffic information providers. The module takes responders about 20 minutes to complete.

For module 40, the focus turns to incident classification, aimed at giving responders knowledge of a uniform way to describe incident scenes for the purpose of ensuring the proper agencies are notified quickly. The FHWA classification system is used, in which incidents are classified based on the estimated duration. Module 40 takes about 15 minutes to complete.

Module 50 covers common highway terms that can be used to describe an incident location. Standard terminology, lane referencing, and rural roadway response terminology are all covered in this module. Module 50 takes responders about 10 minutes to complete.

Module 60 provides responders with an understanding of the traffic incident management area. The advanced warning, taper, transition, buffer, and work and termination areas are clearly defined and examples are given. The importance of the advanced warning to prevent secondary incidents and traffic cone placement are stressed in this chapter. Module 60 takes responders about 20 minutes to complete.

Module 70 describes the four common traffic control devices used at incident scenes and their placement. Effective emergency lighting placement and intensity at the scene are also discussed. The setup of a MUTCD-compliant helicopter landing zone is provided to responders, along with procedures for providing landing instructions. Module 70 takes 30 minutes to complete.

The important safety factor of vehicle placement is covered in module 80. Responders learn where to place vehicles at the incident scene and the importance of protecting responders. A video shows the impact that poor vehicle placement has on congestion and the potential for secondary incidents. Module 80 takes responders 25 minutes to complete.

Module 90 discusses the importance of identifying disabled vehicles for the purpose of quick clearance by towing and recovery personal. The Towing and Recovery Association of America’s vehicle and tow truck classifications are described in detail in this module. Module 90 takes responders about 12 minutes to complete.

In module 100, responders are given a basic overview of how to disable the electrical system on electric vehicles, including hybrid electric, plug-in hybrid electric, and electric vehicles. Module 100 takes responders 15 minutes to complete.

The final module, 110, provides the information necessary to deal with cable barrier systems that are located along roadways. The four options to safely relieve cable tension are discussed. Module 110 is the shortest module and takes responders 10 minutes to complete.

All of the modules end with a quiz to test responder's retention of the material that must be passed before moving on to the next module. One quiz question is also placed within the modules to keep responders focused on the training session.

Each module begins by listing the learning objectives that responders should accomplish before completing the modules. Table 2 lists these module-specific learning objectives. The goal of the training is to provide responders with an awareness of the best practices to follow when responding to traffic incidents, such as vehicular crashes, on our nation's roadways.

Table 2. Online Training Module Objectives

Module 10	Evaluate the impacts of traffic incident management
	Provide a uniform approach to incident response
	Introduce national standards
Module 20	Describe key state laws and polices
	Describe key federal laws and polices
Module 30	Discuss the roles of each agency
	Discuss the responsibilities of each agency
Module 40	Describe incident classification method
	Classify incidents by estimated duration
Module 50	Define standard highway terminology
	List lane referencing
	Define rural road response terminology
Module 60	List the parts of a traffic incident management area
	Establish advanced warning placement
	Identify the taper area
	Identify the transition area
	Identify the buffer area
	Identify the work area
	Identify the termination area
Module 70	Establish an understanding of four types of traffic control devices
	Describe effective emergency lighting
	Describe the selection of proper helicopter landing zones
Module 80	Describe the impacts of unsafe vehicle positioning
	Demonstrate how to protect incident scene
	Define “shadow vehicle”
	Describe safe ambulance positioning
Module 90	Identify common communication problems
	Classify vehicle using TRAA categories
	List the three classes of tow trucks
	Recall the number of vehicle classes
Module 100	Identify vehicle types
	Identify electrical hazards
	Define disabling procedures
Module 110	Define cross-median crashes
	Define cable barrier
	List 4 options for relieving tension in cable barriers to free vehicles

2.3 MODULE REFINEMENT

After the modules were built and narrated in Microsoft Office PowerPoint, members of the TRP reviewed them and suggested refinements. After these revisions were completed, TIM trainers from throughout Illinois were invited to view the modules and suggest revisions.

Each time a change was made to any module, the research team undertook the following process. Each module was imported as a PowerPoint file into Adobe Captivate software and exported as a Flash video file and the associated html files. Flash files have the extension swf, and html files work with swf files on the web; therefore, users with standard web browsers can view the training with common and free software (Flash player). These Flash files of the modules play like a movie recording of the module.

To ensure the Flash files display properly, researchers needed to set the module timeline, verify the width of any click-boxes, fix any incompatibilities between PowerPoint and Captivate (such as sound file types), and adjust the timeline on the final slide. Specifically, presentation content including hyperlinks to websites, links to video clips, or mid-module questions required unique modification of these click-boxes.

After each module was recreated in Adobe Captivate, researchers published the file and reviewed that all aspects operated correctly. Next the Flash files were uploaded to the IDOT learning management system, then published to course enrollees.

Because of the multiple steps required to make revisions to each module, the timeline between revisions was between one and two weeks. Nine full revisions were made to the content prior to public release in spring 2014. A summary of these revisions is provided in Appendix B.

CHAPTER 3 DEVELOPMENT OF A GAME FOR HIGHWAY INCIDENT RESPONDER TRAINING (HIRT)

3.1 INTRODUCTION

The highway incident response training (HIRT) game is designed as a supplement to the online and in-class Traffic Incident Management Training program. The HIRT was developed as a tool for all incident responders to practice the safe positioning of their vehicles while using proper traffic control devices to assemble a temporary traffic control zone. The primary purposes of the game are (1) to help educate users who are new to safe vehicle positioning, (2) to refresh the knowledge of those with experience in traffic incident management, (3) to provide a safe environment for practicing safe positioning procedures, and (4) to develop a responder's awareness of the roles that each agency plays during traffic incident management.

For the most benefit, users should play the game after completing the online and in-class training sessions. Users could benefit from the simulated experience related to the safe positioning of their vehicles at incident scenes. Traffic control devices that can be used to prevent injuries and keep traffic flowing efficiently are included in the game. Many of the incident scenes in the game's higher levels were based on real Illinois incident scenes where responders where killed. The game system has three levels of incident severity, based on the categories from the *Manual on Uniform Traffic Control Devices* (MUTCD) (FHWA 2009.) These categories include minor (30 minutes or less), intermediate (30 minutes up to 2 hours), and major (2 hours or more.) Although catastrophic incidents are also defined in the MUTCD, that category was not included in the game because the traffic control would no longer be considered "temporary" and would follow the procedures for work zones.

3.2 DESIGN TOOL

Adobe Flash CS5.5 software is an effective tool and was used to design the HIRT game. Flash is a multimedia platform used to add animation, video, and interactivity to web pages. This software is frequently used for advertisements, games, and animations. More recently, it has been identified as a tool for "rich Internet applications." Flash manipulates vector and raster graphics to provide animation of text and drawings, as well as still images. It supports bidirectional streaming of audio and video; and it can capture user input via mouse, keyboard, microphone, and camera. Additionally, Flash contains an object-oriented language called Action Script, which supports automation via the JavaScript Flash language. Content can be displayed on various computer systems and devices by using Adobe Flash player, which is available free on common web browsers, some mobile phones, and other electronic devices (using Flash Lite).

The game can be operated within common web browsers because it was created by Flash, and its files are stored on a remote server. Users may need some time to download the game to their computers. The download time depends on the Internet speed.

3.3 GAME DESIGN

The several parts to the game design include structure, interface, and the welcome page. An overview of steps taken by the research team to develop the game is given in the following sections of the report.

3.3.1 Game Structure

Because the game's design is based on diverse incident scenes and vehicle crashes, there are different levels of complexity in the game. For example, each scenario might have a different number of lanes, a different density of traffic, and different severity of the traffic incident. The different levels of the game are connected by the link in the level-selection page. To make the game as realistic as possible, we show brief video clips before users enter the response part of the game. These videos illustrate what has happened and why a response is needed. After the user has a chance to respond by positioning the appropriate response vehicles, he or she can view another video clip demonstrating the best practice for positioning vehicles at that particular incident scene.

The game includes three levels of traffic incident severity. Each severity level contains six case examples. Each example has a video clip of the incident itself; an interactive part, allowing users to place response vehicles and traffic control devices; and a movie clip showing the best practices. For some cases in Level 3, the research team also included an option to look at an incorrect response that had occurred in real life, resulting in a responder fatality. Overall, the games in this project followed procedures commonly used in the game-design process such as scenario design, system design, content design, code writing, level design, user interface design, and audio design (e.g., Bates 2004, Bethke 2003, Brathwaite and Schreiber 2008, Moore and Novak 2009, Rollings and Adams 2003, and Salen and Zimmerman 2003). Appendix C include screen shots illustrating various aspects of the game.

3.3.2 Interface Design

For users to see the traffic incident and be able to respond efficiently and effectively, five parts need to be designed. These parts include a welcome page, level-selection pages, crash movies, response pages, and answer movies. When users launch the game, they are presented with a welcome page. This page includes the game title, a start button, a help button for users to get information on playing the game, and a button that displays the game credits and acknowledgments. Figure 1 is an image of the welcome page.

Figure 1. Highway Incident Response Trainer welcome page.

After users select the start option, they are guided to a level-selection page. This page is described in the following section.

3.4 LEVEL-SELECTION PAGES

Each of the three level-selection pages is used to present the six cases with that particular incident's severity level. Figures 2 through 4 show images of the level-selection pages. The background of each scenario was taken from incident scene photos of an Illinois incident scene.

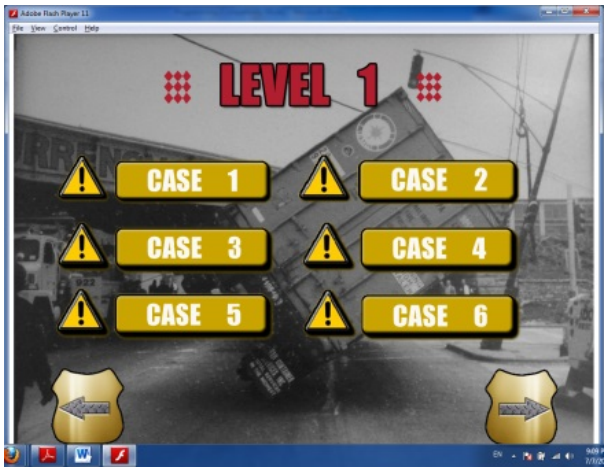

Figure 2. HIRT Level 1 selection page.

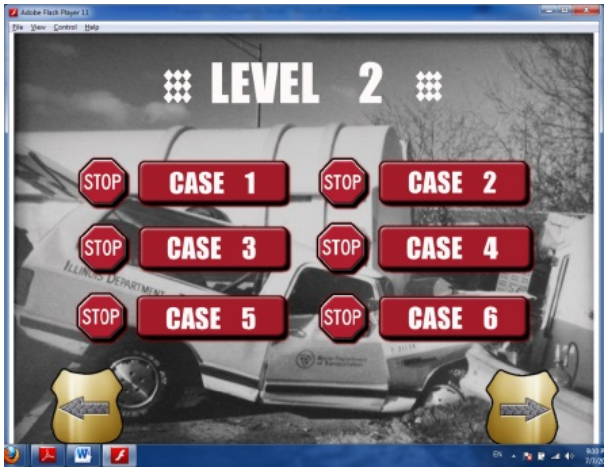

Figure 3. HIRT Level 2 selection page.

Figure 4. HIRT Level 3 selection page.

3.6 CRASH MOVIE

The crash movies were based on actual traffic incidents common on roadways. The types of incidents include “Wrong-way driving,” “Rear end collision,” “Crash on fixed object,” etc. An incident’s severity, the lighting conditions, and the description of the crash are also presented in the movie. To avoid copyright issues, the researchers created the image of road surface and each vehicle shown in the videos. Figure 5 shows an example of what users see just after the crash movie.

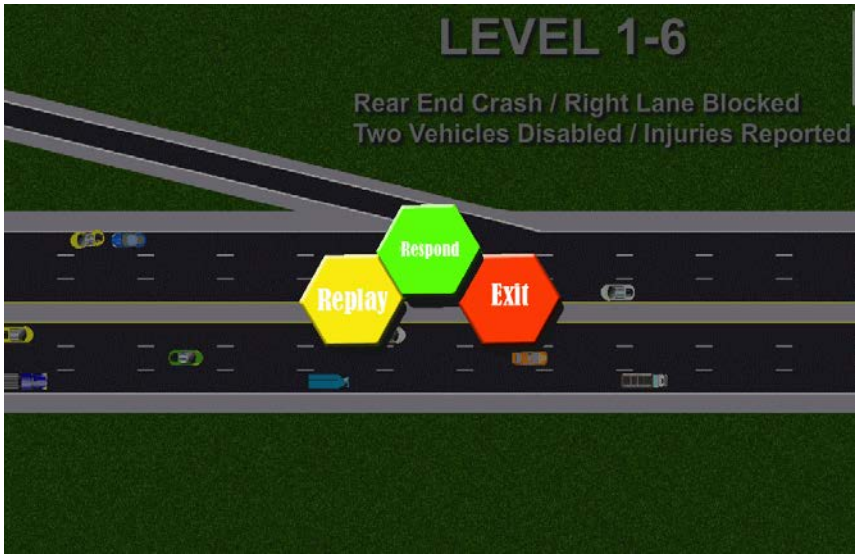

Figure 5. Example crash-scene game display.

After the movie is complete, the incident information panel shows the case and the users are asked whether they would respond to this accident. If they choose yes, the response page will be shown; and the timer will be activated showing a countdown for the responder vehicles to shown up. Different responder vehicles will have a different numbers of tools (such as cones or flares).

3.7 EXAMPLE OF CRASH-RESPONSE PAGE

After viewing the crash movies, players are allowed to practice responding to the incident scene. Buttons are aligned in the screen area below the incident scene image. These buttons include Information, Tools, Start, Finish, Zoom In. and Zoom Out. After the “Start” button is clicked, the vehicle-selection panel will be presented as one of the tools, and the vehicles on the panel can be dragged to the game area (i.e., roadway). If the information button is clicked, the incident introduction is presented on the Information panel. Zoom In and Zoom Out buttons are used to change the map size. The scale of the tools and the vehicle on the map changes as the size of the map changes. The tools available are similar in type and quantity to what would be available during that level and type of incident. An example of this game interface can be seen in Figure 6.

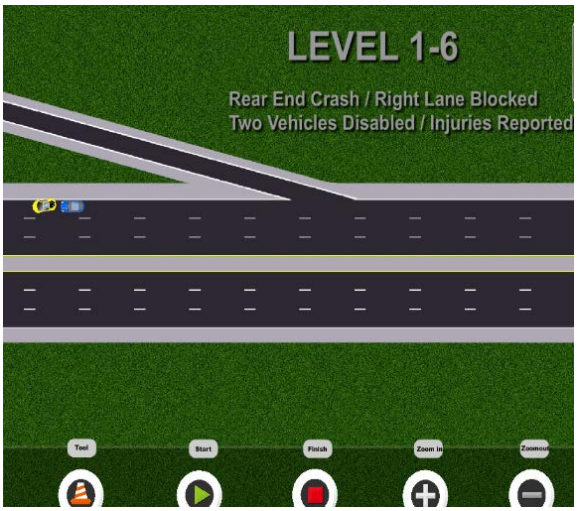

Figure 6. Example of game interface for incident response.

Users can place Police, IDOT, tow, and/or fire department vehicles on the roadway. For each of these vehicles, users can angle the parking position to protect the incident scene. Angling is done by using the “←” button to rotate vehicles counterclockwise and “→ ” to rotate vehicles clockwise. Users can access these items in a tools panel and vehicle-selection panel.

Tools in the panel include cones, drums, stop signs, and flares, and are available after users select a responder vehicle. When tools are dragged from the panel, the total numbers of available tools will be reduced, but they will be increased as new vehicles arrive at the incident scene.

The users can drag the response vehicle directly from the vehicle selection panel to the accident area. Users have to click the Finish button to end the case.

3.8 ANSWER MOVIE

After the user finishes the game, he or she can select an option to view a video clip that shows the best practices for positioning the response vehicle(s) and traffic control devices at each incident scene. The user can then return to the incident scene that he or she created, to see how it differed from the best practices shown.

3.9 ASSESSMENT OF GAME PERFORMANCE

On November 19 and 20, 2012, the principal investigator (PI) and the research team met with IDOT staff to discuss the project progress in Springfield and/or Chicago, IL. Overall, IDOT liked the project design and progress but made a number of suggestions for improving the project game design in each case and each level. In addition, the PI solicited feedback from IDOT in June 2013 for a revised version of the game. Feedback received from IDOT staff members was addressed accordingly by the research team. From then to August 2013, the team revised each case in each level based on all feedback.

During this period, the research team members discussed the project progress and revised the game design every week. In addition, the project team conducted a formal internal assessment among seven graduate students at SIUE. These graduate students were studying Instructional Technology and were familiar with best practices of digital educational tools and had never seen the game before. During this assessment, the graduate students used the newly developed Assessment Rubric for Game of Highway Incident Response Training in July 2013. The rubric was developed by an external consultant in instructional technology at SIUE.

- Organization (15%): Appropriate sequencing of content, details, explanations, and balance of content emphasis
- Content (20%): Appropriate inclusion and balance of correct content and applications
- Problem-solving focus (20%): Requiring cognitive effort, critical thinking, exploration of concepts, building connections, and encouraging self-monitoring
- Media use (15%): Appropriate use of art, narration, animations, or sound effects
- Navigation (15%): The navigation tools (buttons, bars, clips, links) are logical and easy to use
- Appearance (15%): Appropriate use of the words and visuals, colors, patterns, titles, and headings

Overall, the results indicated the project was of good quality, with an overall rating of B in spite of some suggestions for continuous improvement. The suggestions fall under each of the six major categories. The project team addressed those suggestions and revised the games accordingly since July 2013.

CHAPTER 4 TRAFFIC INCIDENT MANAGEMENT CHALLENGE GAME DEVELOPMENT

4.1 DISCUSSION OF TRIVIA FORM

The research team and two Technical Review Panel members met with Tim Paegent at IDOT District 8 on August 30, 2011, because he had created a trivia game for his class based on Chapter 63 of the IDOT Bureau of Design and Engineering (BDE) manual. Although the tool was slightly different than what the researchers sought to create, they obtained several valuable pieces of information about copyrighting, game software, and the value of in-class use. Based on subsequent discussions of the Technical Review Panel at the November 3, 2011, meeting, the research team worked to create an in-class version of the trivia game. During subsequent meetings, the research team was guided to incorporate questions for the online training directly into the assessment, instead of having a trivia game online as well.

4.2 QUESTION DEVELOPMENT

The research team created questions from the most important materials from the in-class highway incident management training. Several questions were created for each category and value level so that each class might see different questions and have variety.

4.3 GAME PROGRAMMING AND REFINEMENT

Because of limited in-class time, the game was designed with only four categories of questions: incident clearance, initial scene response, policies and procedures, and traffic management. Each category has five levels of difficulty with different point values (100, 200, 300, 400, and 500); each time the game is played, it presents 20 possible questions selected at random from the database.

The game was created to allow up to four teams to play against each other and to function on any PC or Mac with an Internet browser. The graphical user interface was designed to allow the presenter to click the question with a mouse and then select the team to add or deduct points for their score.

The research team included programming ensuring that each time a particular category and value was selected, the question was randomly selected among the two or three possibilities. Additional programming was also completed to allow certain questions to include images. To allow this and other functionality, the research team created the game using Adobe Flash player.

Several iterations were completed during the summer of 2012 to refine the graphical user interface. These refinements included the color scheme, placement of buttons, functionality, and user options. After an acceptable draft was created, the Technical Review Panel members were sent a copy for review and comment in fall 2012. This draft version was used during a training class to evaluate its functionality and ease of use. Only minor refinements were required during winter 2012.

CHAPTER 5 SHRP-II COMPLIANCE

5.1 FEDERAL REVIEW

Concurrent with this project, the Transportation Research Board of the National Academies of Science had commissioned a project, SHRP-II Reliability Project L12, Improving Traffic Incident Scene Management. Their program manager and research team showed interest in our project during Phase II. The goal of the SHPR II program was to reduce nonrecurring congestion that impacts the quality of life, focusing on locations were trip times are greatly increased by congestion caused by traffic incidents.

Per a SHRP-II request, an independent third party reviewed the material and identified any gaps that would help the research described herein comply with the SHRP-II L12 objectives. Each of the in-class modules was reviewed and a report given on the National TIM Responder Training Objectives vs. the Illinois TIM content.

The following sections describe how the in-class and online modules were modified to address the comments and to ensure that this training was equivalent with the SHRP-II L12 training program. After the requested changes were made to the training modules, SHRP-II managers fully endorsed the project as equivalent to the national training.

5.2 MODULE CHANGES

In contrast to the TIM content developed in Illinois, the SHRP-II L12 training program was divided into eight lessons. The following text describes the findings from the equivalency review and how each item was addressed.

When reviewing the equivalencies in this chapter, consider that the material is divided into lessons and objectives, for which 1.2 means lesson one, objective two. For each objective, the review team noted either E, P, or M; in which **E** means that the IDOT training was equivalent to the SHRP-II L12 objective, **P** means that the IDOT training partially meets the SHRP-II objective, and **M** indicates that the material to meet this objective is missing from the IDOT training. Additionally, note that SHRP-II L12 is divided into lessons, while the IDOT training is divided into modules.

Reviewers first considered the learning objectives from SHRP-II L12 Lesson 1: Statistics, Terminology, and Standards. They suggested that we add more statistics on incidents and more specific reference to the MUTCD's Chapter 6i. Slides were also added showing the number of responder deaths at the national level, the impacts of delay, and the timeline of TIM. These changes and the associated learning objectives are displayed in Table 3.

Table 3. SHRP-II L12 Lesson 1 Equivalency

#	National TIM Responder Training Lesson Objective	IDOT HIMT Equivalent	Response and Online Equivalent
1.1	Recognize incident statistics [Refer to slides 1-4 through 1-25]	P: Slides 1-5 through 1-9 Consider adding 2–3 slides	Added 2 slides: in-class 1-8 and 1-9 and online 10-4 through 10-11.
1.2	Restate NIMS-compliant core industry terminology for each discipline group	— N/A —	
1.3	List the principle laws that relate to quick clearance [Refer to slides 1-28 through 1-30]	E: M2 O2, slides 2-23 through 2-27	
1.4	Recall the terminology used to describe roadways [Refer to slides 1-31 through 1-51]	E: Slides 4-8 through 4-16	
1.5	Identify the principles discussed in the MUTCD [Refer to slides 1-54 through 1-55]	P: Slides 2-16 through 2-21 Add more specific reference to Chapter 6i	Added a slide 2-16 on Chapter 6i
1.6	Arrange the phases of incident response or duties in chronological order, as taught in the course [Refer to slide 1-56]	P: Slide 4-3 Review for consistency	Changed slide 4-3 to list the duties consistent with national TIM training lesson

After review of SHRP-II L12 Lesson 2, “Notification and Response,” only minor revisions were suggested by the SHRP-II review team. Namely, two slides were added or revised to stress the importance of keeping the communication center informed of on-scene activity. The research team addressed these items by adding one slide and by adding key points onto the slides from the instructor notes. This change enables responders attending the training to refer to these key pieces of information at a later date. The changes are described in Table 4.

Table 4. SHRP-II L12 Lesson 2 Equivalency

#	National TIM Responder Training Lesson Objective	IDOT HIMT Equivalent	Response and Online Equivalent
2.1	List the sequence of events that occur up to the point when responders first arrive at the incident scene [Refer to slides 2-4 through 2-8]	P: Slide 4-4 Consider adding key message from notes to a slide	Added a slide 4-5 on verification by communication center. Added key message to slide 4-4
2.2	Recognize the importance of the role that dispatchers or traffic control center operators play in the notification process [Refer to slide 2-9]	E: Slide 2-10	

The review team compared the SHRP-II L12 Lesson 3, “Arrival,” with IDOT’s TIM training and suggested several additions. Most of the additions focused on traffic control and were addressed by adding information to IDOT’s Module 6. Additionally, one slide was added to IDOT’s Module 4 to address situational awareness (see Table 5).

Table 5. SHRP-II L12 Lesson 3 Equivalency

#	National TIM Responder Training Lesson Objective	IDOT HIMT Equivalent	Response and Online Equivalent
3.1	Differentiate between ‘Move It’ and ‘Work It’ incidents [Refer to slides 3-4 through 3-8]	P: Slides 4-21 through 4-26 Add ‘Move It’ and ‘Work It’ definitions	Added a slide 4-24 on ‘Move it’ and ‘Work it’ definitions.
3.2	Restate the steps required to achieve vehicle positioning that complies with MUTCD standards [Refer to slides 3-9 through 3-23]	P: M6 O1, slide 6-18 Add concept of lane+1	Added 3 slides, 6-22 through 6-24, for lane+1 concept
3.3	Restate the correct approach methods when arriving at a scene, including safely parking the responder unit and use of emergency lighting [Refer to slides 3-27 through 3-52 and slide 3-54]	P: M4 O2, slides 4-5 through 4-7; M6 O1, slides 6-11 through 6-17 Refer to MUTCD 6i.05 on slide and considering adding concept of zero buffer	Added 2 slides, 6-25 and 6-26, for zero buffer concept
3.4	Summarize communications that may occur during the arrival phase of incident response [Refer to slide 3-53]	E: M4 O3, slides 4-17 through 4-20	
3.5	Describe the characteristics of the three classes of ANSI 107 standard highway safety vests (PPE) and describe characteristics of ANSI 207 standard highway safety vests [Refer to slides 3-56 through 3-73]	P: Slides 6-5 through 6-10 Add vest end-of-service-life information	Added a slide, 6-11, for vest end-of-service-life information
3.6	Enumerate the ways in which responders can retain situational awareness when exiting their vehicle and approaching the incident [Refer to slides 3-75 and 3-76]	M Review Wisconsin Module 3 for additional materials	Added a slide, 4-9, on exiting responder vehicles

The review of SHRP-II L12 Lesson 4, whose topic was initial size-up, found that all of the required learning objectives were already included in IDOT's TIM training program. No additional material was requested (see Table 6).

Table 6. SHRP-II L12 Lesson 4 Equivalency

#	National TIM Responder Training Lesson Objective	IDOT HIMT Equivalent	Response and Online Equivalent
4.1	Describe the core factors to review when performing an initial size-up of the scene [Refer to slides 4-4 through 4-9, slide 4-14]	E: M4 O3, slides 4-17 through 4-20	
4.2	Recall the importance of determining whether hazmat responder involvement is required [Refer to slides 4-12 and 4-13]	E: Slide 4-19	

Next, the review team evaluated SHRP-II L12 Lesson 5, "Command Responsibilities." To address gaps identified, the SIUE research team added seven new slides to IDOT's Module 3. See Table 7 for details.

Table 7. SHRP-II L12 Lesson 5 Equivalency

#	National TIM Responder Training Lesson Objective	IDOT HIMT Equivalent	Response and Online Equivalent
5.1	Recall the importance of establishing and participating in the ICS {Reference slides 5-3 through 5-14]	P: Slides 3-8 and 3-9 Consider adding overview of ICS structure	Added information about ICS unified command structure in a new slide, 3-9
5.2	Discuss the communications that should occur with command, public information officer (PIO), and dispatch [Reference slide 5-8]	M	Added slide 3-10
5.3	Discuss how to plan for physical organization of the scene and describe the need for diversion routes or staging areas [Reference slides 5-15 through 5-21]	M Consider adding Hazelwood, MO, case study and review Wisconsin Module 10 for materials related to establishing emergency alternate routes	Added the case study to slides 3-12 through 3-16
5.4	Describe how to designate the staging area location for additional resources/ responders	— N/A —	
5.5	Recount when to proceed to the staging area	— N/A —	

The SHRP-II L12 training program's Lesson 6 focused on safety, patient care, and investigation. Because IDOT's focus was on a brief training, most of this material was not included in existing training modules. Material was added to both in-class and online modules to address these deficiencies. Examples include adding a slide detailing high-visibility markings on responder vehicles, adding a slide describing distances and safety precautions for landing a helicopter at an incident scene, and adding an entire online module on electric vehicle precautions (see Table 8).

Table 8. SHRP-II L12 Lesson 6 Equivalency

#	National TIM Responder Training Lesson Objective	IDOT HIMT Equivalent	Response and Online Equivalent
6.1	List the types of high-visibility markings on responder vehicles [Refer to slides 6-4 through 6-9]	M	Added slide 2-24
6.2	Recount best practices for working with hazmat and non-hazmat spills at an incident scene [Refer to slides 6-11 through 6-36]	M	Added slides 5-9 and 5-10 Added slides 12 and 15 to module 40 online
6.3	Identify the concerns in responding to an incident that involves vehicular fire [Refer to slides 6-37 through 6-41]	M	Added instructor notes to slide 4-29
6.4	List the concerns in responding to incidents involving hybrid electric and electric vehicles [Refer to slides 6-42 and 6-43]	M	E: An online training module, 100, was developed for hybrid and electric vehicle
6.5	Restate responsibilities of responders not involved in extrication while extrication tasks are being performed	— N/A —	
6.6	Restate the protocols that should be followed before and during a medical helicopter on-scene arrival [Refer to slides 6-53 through 6-57]	P: Slide 6-42 Add text about considering off-highway landing zones	Added slide 6-52 on the off-highway landing zone
6.7	Identify the primary investigation goal at an accident scene and how each discipline can contribute to an efficient and effective investigation [Refer to slides 6-58 through 6-72]	M	Added slide 7-17

The SHRP-II L12 Lesson 7 on traffic management included additional information on traffic incident management areas (TIMA) and MUTCD lighting sources. To address these topics, the research team added/revised several slides to the IDOT in-class training Module 6 and added one slide to online Module 70. Details are shown in Table 9.

Table 9. SHRP-II L12 Lesson 7 Equivalency

#	National TIM Responder Training Lesson Objective	IDOT HIMT Equivalent	Response and Online Equivalent
7.1	Describe the proper use and monitoring of traffic control devices used at an incident scene [Refer to slides 7-4 through 7-42]	P: M6 O1, slides 6-20 through 6-33	Added instructor notes to module 6-30
7.2	Recognize the components of a traffic control zone during an incident [Refer to slides 7-7 through 7-8]	P: Slides 6-34 through 6-41 Refer to as traffic incident management areas (TIMAs)	Changed “Temporary Traffic Control Zone” to “Traffic Incident Management Area” on slides 6-43 and 6-44
7.3	Recognize circumstances at an incident scene that would require the advanced warning area to be extended [Refer to slides 7-51 through 7-61]	P: Slides 6-23 and 6-24	Added slide 6-33
7.4	List best practices of light management upon scene arrival and during the course of the incident Refer to slides 7-43 through 7-49]	P: Slides 6-11 through 6-14 Refer to MUTCD 6i.05 on slide	Included in slide 6-12.
7.5	Recall the traffic management elements that need to be communicated and monitored during an incident [Refer to slide 7-62]	M	Added a slide 6-53 Added slide 14 of Module 70 online.

Next, the review team identified that half of the objectives in the SHRP-II L12 training were equivalent to the IDOT training. To address the remaining objectives, the research team added instructor notes to Module 7 of the in-class training and added a slide to Module 40 of the online training. Details are shown in Table 10.

Table 10. SHRP-II L12 Lesson 8 Equivalency

#	National TIM Responder Training Lesson Objective	IDOT HIMT Equivalent	Response and Online Equivalent
8.1	List the principle laws that relate to quick clearance	E: M2 O2, slides 2-23 through 2-27	
8.2	Identify the procedures for removing cargo and cleaning up spilled liquid or debris from the accident scene [Reference slides 8-29 through 8-34]	M	Added instructor notes to slide 7-16 Added slide 10 to Module 40 online
8.3	Describe best practices for ensuring that the appropriate towing vehicle for the damaged vehicle is dispatched [Reference slides 8-35 through 8-37]	E: M7 O2, slides 7-3 through 7-14	
8.4	Recount the necessary communications for a successful scene clearance egress and wrap-up [Reference slides 8-38 through 8-39]	M	Added instructor notes to slide 7-16

The SHRP-II L12 Lesson 9 focused on the termination of an incident scene. The independent review team found that two of the three objectives were partially met with the IDOT in-class training. To address the missing items, the research team added three slides to IDOT Module 7. See Table 11 for details.

Table 11. SHRP-II L12 Lesson 9 Equivalency

#	National TIM Responder Training Lesson Objective	IDOT HIMT Equivalent	Response and Online Equivalent
9.1	Name the cleanup procedures necessary for proper scene termination [Refer to slides 9-4 and 9-5]	P: M7 O1, slide 7-3 Consider adding termination checklist	Added slide 7-18 for termination check list
9.2	Explain the procedure for reopening traffic lanes [Refer to slides 9-6 through 9-8]	P: Slide 7-17	Added slide 7-20 for reopening traffic lane and repositioning TCDs
9.3	Summarize the procedure for communicating traffic restoration, including the appropriate parties to be notified [Refer to slides 9-9 through 9-10]	M	Added slide 7-21 for termination communication

Continuing with SHRP-II L12 Lesson 10, the reviewers found that the IDOT training had equivalent hands-on activities. IDOT's in-class TIM training included tabletop exercises, and the current phase is creating computer games for responders to practice vehicle placement and traffic control. Lesson 10's learning objective is illustrated in Table 12.

Table 12. SHRP-II L12 Lesson 10 Equivalency

#	National TIM Responder Training Lesson Objective	IDOT HIMT Equivalent	Response and Online Equivalent
10.1	Demonstrate an ability to appropriately clear all given incident types in the set of scenarios provide [Refer to slides 10-5 through 10-85]	E: M8 O1, slides 8-3 through 8-7	E: The ongoing education game ("Highway Incident Response Trainer") includes 18 cases on how to clear different types of incidents.

Lesson 11 from the SHRP-II L12 training program focused on situational awareness. To meet the objectives of this lesson, the researchers added and/or revised slides for in-class Modules 4 and 8. The additions included instructor notes about exiting a response vehicle, information about the TIM timeline, and specifics about cone placement at an incident scene. Details are shown in Table 13.

Table 13. SHRPT II L12 Lesson 11 Equivalency

#	National TIM Responder Training Lesson Objective	IDOT HIMT Equivalent	Response and Online Equivalent
11.1	Visualize reinforcement of selected competencies involved in incident response to increase responder situational awareness [Refer to slides 10-89 through 10-92]	M Review Wisconsin Module 3 for additional materials	Added instructor's note to slide 4-8 to cover the exiting a vehicle. Added slide 8-3 for TIM timeline and 8-4 for cone placement.

All of the comments were addressed to make the IDOT TIM training compliant with the SHRP-II L12 training. See Appendix A for a slide-by-slide comparison of the SHRP-II L12 training and the IDOT TIM training materials.

CHAPTER 6 SURVEY OF TRAINED RESPONDERS

6.1 INTRODUCTION

To track the training's effectiveness and to improve its quality as needed, IDOT requested that responders be surveyed after completing the in-class training. As part of Phase II of the research project, surveys were conducted at nine locations, where 250 responders out of 447 gave feedback on the training modules.

IDOT's PM ES 2197 survey form was used, allowing responders to rank the instructors and the training material, and to give input on other useful material that should be included. A copy of the survey form can be found in Appendix D. The instructors selected to present the training were all veterans of incident response from law enforcement, fire and rescue, transportation, and the towing and recovery sectors. Table 14 summarizes the overall ranking of all instructors that presented the training at the nine locations. Responders ranked the instructors on a scale from 1 to 5, with 5 being the highest score. As can be seen in the results, instructors received a high ranking for each of the areas asked about.

Table 14. Instructor Survey Results

Knowledgeable on topic	4.8
Related to work situation	4.7
Interesting and enthusiastic	4.8
Visual aids and handout use	4.7
Group exercises effective	4.7

The training content was also surveyed and ranked using the same scale. Responders gave high rankings to the training's organization and development; and felt the training to be interactive, filled with applicable and useful information. The results of the training ranking can be seen in Table 15.

Table 15. Training Survey Results

Well organized	4.5
Well developed	4.6
Interactive	4.7
Applicable information	4.5
Useful information	4.6

Additional comments were received from the responders during the survey. Some responders requested more training and that more responders be trained from each sector. Shortening the in-class training to half a day by having material online was another common request. It was also noted through the survey that many responders reported having no prior knowledge of the *Manual on Uniform Traffic Control Device* (MUTCD), a document that must be followed when altering the flow of traffic on a roadway (FHWA 2009).

As of October 2013, 657 responders have been trained in the state of Illinois. Fifty-two trainers have been trained on disseminating the modules' information to responders. Law enforcement, fire/rescue, and DOT/transportation departments have been most active in seeking the training; however, all of

the intended agencies are being reached in some capacity. Table 16 shows the training statistics and responders trained, by occupation.

Table 16. Training Statistics and Responders Trained

TIM Responder Training at a Glance				
Training Statistics		**Responders Trained by Discipline**		
		Discipline	**Number**	**Percent**
Train-the-Trainer Sessions Conducted	1	Law Enforcement	173	26%
Number of Trainers Trained	52	Fire/Rescue	173	26%
		Towing and Recovery	71	11%
TIM Responder Training Sessions Held	21	EMS	42	7%
		DOT/Transportation	117	18%
Number of Responders Trained	657	Other Disciplines	81	12%
		Total	**657**	**100%**

CHAPTER 7 CONCLUSIONS AND FUTURE WORK

The expected impacts of the training are to (1) decrease responders' fatalities and injuries at incidents scenes, (2) decrease secondary incidents, and (3) reduce travel time related to congestion caused by nonrecurring events.

The research team at SIUE created 11 online training modules to reduce in-class training time and to provide responders with a more in-depth understanding of incident management. Information that was not included in the original face-to-face training included helicopter landing zones, cable barrier systems, and electric vehicle training.

The Federal Highway Administration (FHWA) took interest in the project and requested an external review be conducted to identify whether the material was in compliance with SHPR-II. Minor adjustments were made to the training modules to comply with SHRP-II, at which time the Federal Highway Administration fully endorsed the project for use at the national level.

The project included the development of a game "Highway Incident Responder Training" (HIRT), which provides responders a chance to test their retention of the material presented in the modules. The trivia game format provides responders an opportunity to interact with other responders in a classroom setting or as a group of coworkers.

The final deliverable was the creation of the "Traffic Incident Management Challenge," an interactive video game that challenges responders to practice safe parking at incident scenes, given key information on an incident's severity and location. Responders are provided with key feedback on their parking decisions by viewing a video showing the best placement of vehicles, traffic control devices, and (in some instances) personnel. The more severe crash scenes are based on real incidents involving the death of incident responders.

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APPENDIX A COMMENTS FOR SHRP-II EQUIVALENCY

During the equivalency evaluation, SHRP-II reviewers provided a table of the National TIM Responder Training slides. The research team has subsequently identified how the materials between the two training parallels. Note that not all National material was required and not all Illinois material is in the National training. The IDOT HIMT training modules 1-8 are in class and modules 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, and 110 are online.

Slide #	National TIM Responder Training PPT	IDOT HIMT Equivalent
Lesson 1: Statistics, Terminology, and Standards		
1-1	National TIM Responder Training Title Slide	None
1-2	Lesson 1 Title Slide	None
1-3	Lesson 1 Objectives	Refer to Table 3
1-4	The Crash Pyramid	None
1-5	Injury Crash—Responder Requirements 1	None
1-6	Injury Crash—Responder Requirements 2	None
1-7	“D” Drivers	None
1-8	“Struck-by” Incidents	Module 1 slide 8
1-9	A “Routine” Incident—Lionville Incident	Module 10 slides 9-12
1-10	Lionville Incident Overview	
1-11	Lionville Incident 1	
1-12	Lionville Incident 2	
1-13	Lionville Incident 3	
1-14	Lionville Incident 4	
1-15	Struck-By Incidents—Lionville Aftermath	
1-16	Law Enforcement Line of Duty Deaths (LODDs)	Module 1 slide 7
1-17	EMS “Struck-By” LODDs	
1-18	Oklahoma Double “Struck-By”	
1-19	Recent Tow Operator “Struck-By”	
1-20	Department of Transportation “Struck-By”	
1-21	LODD Emphasis	
1-22	Sources of Information	Module 10 slides 13-15
1-23	Reducing LODDs	Module 1 slide 8
1-24	TIM Timeline	Module 10 slide 16
1-25	Sources of Congestion	Module 10 slides 5-7
1-26	Safe, Quick Clearance	Module 1 slides 13 and 23-29
1-27	Safe, Quick Clearance—Goals	
1-28	Move-Over Laws	

Slide #	National TIM Responder Training PPT	IDOT HIMT Equivalent
1-29	Driver Removal	
1-30	Authority Removal	
1-31	Lane Designation Terminology	Module 50 slide 6
1-32	Common Response Terminology	
1-33	Lane Designation Example	Module 50 slide 9
1-34	Nonbuffered HOV Lane Example	None
1-35	Buffered HOV Lane Example	None.
1-36	Lane Designation Example	Module 50 slide 10
1-37	Two Left Lanes Designation Example	Module 50 slide 11
1-38	Two Center Lanes Designation Example	None
1-39	Two Right Lanes Designation Example	None
1-40	Lane-Numbering Example	Module 50 slide 11
1-41	Student Activity	Module 8
1-42	Upstream and Downstream	Module 4 slide 12, Module 50 slide 7
1-43	Traffic Queues	None
1-44	Common Response Terminology—Interchange	Module 50 slide 14
1-45	Interchange Terminology Example 1	Module 50 slide 14
1-46	Interchange Terminology Example 2	Module 50 slide 15
1-47	Interchange Terminology Example 3	Module 50 slide 16
1-48	Interchange Terminology Example 4	Module 50 slide 17
1-49	Interchange Terminology Example 5	None
1-50	Rural Roads Response Terminology 1	Module 50 slide 12
1-51	Rural Roads Response Terminology 2	Module 50 slide 13
1-52	Communication	Module 3 slide 5
1-53	TIM Timeline	Module 10 slide 16
1-54	MUTCD	Module 10 slide 15
1-55	MUTCD TIMA	Module 20 slide 13
1-56	Student Activity	Module 4 slide 3
1-57	Lesson 1 Objectives	Refer to Table 3
Lesson 2: Notification and Response		
2-1	National TIM Responder Training Title Slide	—
2-2	Lesson 2 Title Slide	—
2-3	Lesson 2 Objectives	Refer Table 4
2-4	Verification	Module 4 slide 10
2-5	Determining the Incident Location 1	Module 4 slide 18

Slide #	National TIM Responder Training PPT	IDOT HIMT Equivalent
2-6	Determining the Incident Location 2	Module 4 slide 23
2-7	Accuracy and Detail	Module 2 slides 21-22
2-8	Detection to Response Reflex Time	None.
2-9	Communicate with Dispatch	Module 4 slide 24
2-10	Here's Your Crash… Example 1	Module 4 slide 27
2-11	Here's Your Crash… Example 2	Module 4 slide 28
2-12	Were their actions safe? Example 1	Module 4 slide 29
2-13	Were their actions safe? Example 2	Module 4 slide 30
2-14	What actions would correct the situation?	Module 4 slide 31
2-15	TIM Timeline	Module 10 slide 16
2-16	Lesson 2 Objectives	Refer to Table 4
Lesson 3: Arrival		
3-1	National TIM Responder Training Title Slide	—
3-2	Lesson 3 Title Slide	—
3-3	Lesson 3 Objectives	Refer to Table 5
3-4	Move It or Work It?	Module 10 slide 27
3-5	"Move It" or "Work It?" Example 1	Module 10 slide 28
3-6	Move It	Module 10 slide 27
3-7	"Move It'" or "Work It?" Example 2	Module 10 slide 29
3-8	"Move It" or "Work It?" Example 3	Module 10 slide 30
3-9	Linear/Block Tactical Positioning	Module 80 slide 8
3-10	"Linear" or "Block" TIM Example	Module 80 slide 10
3-11	A "Linear" Truck Fire Repair Call	None
3-12	A "Linear" Tow Truck Service Call	None
3-13	"Linear" Service Patrol	None
3-14	A "Linear" EMS Call	None
3-15	A Very Dangerous "Linear" EMS Incident 1	Module 5 slide 28
3-16	A Very Dangerous "Linear" EMS incident 2	None
3-17	Ambulance Linear Crash Scene	Module 6 slide 33
3-18	Lane +1 Blocking	Module 6 slides 20-26
3-19	"Lane +1" Blocking Example 1	
3-20	"Lane +1" Blocking Example 2	
3-21	"Lane +1" Blocking Example 3	
3-22	"Lane +1" Blocking Example 4	
3-23	Progressively Reopen Lanes	Module 80 slide 8

Slide #	National TIM Responder Training PPT	IDOT HIMT Equivalent
3-24	Minivan Fuel Tank Failure	None
3-25	Vehicle Fire Case Study 1	None
3-26	Vehicle Fire Case Study 2	None
3-27	Blocking Example	Module 80 slide 8; Module 6 slide 20
3-28	Blocking Definition	Module 6 slide 18 and 19
3-29	Fire Apparatus as Blocking Vehicle	Module 6 slide 21
3-30	Blocking Creates a Protected Work Area	None
3-31	Lane +1 Blocking - Shoulder as Lane	Module 6 slide 22
3-32	MUTCD Recommended Blocking	None
3-33	Linear Law Enforcement Blocking	None
3-34	Block to the Right	None
3-35	Law Enforcement Unit “Safe Positioning”	None
3-36	Ambulance “Safe Positioning”	Module 4 slide 5
3-37	Ambulance Block to the Left	
3-38	MUTCD TIMA Components	Module 60 slides 3-7
3-39	TIMA Buffer Spaces	
3-40	Critical Wheel Angle	Module 4 slide 6
3-41	What is your agency’s policy?	
3-42	All “Blocks” Have a “Zero” Buffer…	Module 6 slide 26
3-43	Zero Buffer	
3-44	Avoiding the Zero Buffer Area	
3-45	The ”Zero Buffer” Zone	
3-46	A ”Zero Buffer” Struck-By Video 1	None
3-47	A ”Zero Buffer” Struck-By Video 2	
3-48	Two-Lane Rural Road Example 1	
3-49	Two-Lane Rural Road Example 2	
3-50	Two-Lane Rural Road Example 3	
3-51	Two-Lane Rural Road Example 4	
3-52	Two-Lane Rural Road Example 5	
3-53	Communications Upon Arrival	Module 4 slide 4
3-54	On-Scene Emergency Lighting	Module 70 slide 12
3-55	TIM Timeline	Module 10 slide 16; Module 1 slide 9
3-56	National Unified Goal - ‘Responder Safety’	Module 10 slide 14
3-57	23 CFR, Part 634—1	Module 2 slide 22
3-58	23 CFR, Part 634—2	

Slide #	National TIM Responder Training PPT	IDOT HIMT Equivalent
3-59	MUTCD 2009	Module 2 slide 16; Module 10 slide 15
3-60	Typical U.S. Crash Scene	None
3-61	Typical European Crash Scene	None
3-62	Highway Safety Vests (PPE)	Module 2 slide 22
3-63	Class II Safety Vest	
3-64	Class III Safety Vest	
3-65	Miscellaneous Recovery Pictures	None
3-66	… and the Shortcoming of Wearing NO Vest!	Module 6 slide 10
3-67	ANSI 107/207	Module 2 slide 22
3-68	Vehicle Fire Picture	Module 2 slide 22
3-69	Part 634: Revised Final Rule	None
3-70	Exemption for Tactical Operations	None
3-71	Need a Vest Policy…?	None
3-72	End of Service Life	Module 2 slide 22
3-73	High Visibility	None
3-74	TIM Timeline	Module 10 slide 16; Module 1 slide 9
3-75	Exiting Responder Vehicles 1	Module 4 slide 8
3-76	Exiting Responder Vehicles 2	
3-77	Lesson 3 Objectives	Refer to Table 5
Lesson 4: Initial Size-Up		
4-1	National TIM Responder-Training Title Slide	—
4-2	Lesson 4 Title Slide	—
4-3	Lesson 4 Objectives	Refer to Table 6
4-4	What is initial size-up? 1	Module 4 slide 18
4-5	What is initial size-up? 2	
4-6	The 15-Minute Size-Up Rule	
4-7	Estimation of Incident Clearance Time	Module 4 slide 19
4-8	Safe, Quick Clearance	Module 2 slide 25 and Module 10 slide 6
4-9	Size-Up Reports	Module 4 slides 20 and 21
4-10	MUTCD Incident Classifications	Module 5 slide 3
4-11	Duration of the Incident	Module 5 slide 3
4-12	Hazmat 1	Module 5 slide 10
4-13	Hazmat 2	
4-14	Initial Size-Up Report	Module 4 slide 20
4-15	Typical F/R On-Scene Report	

Slide #	National TIM Responder Training PPT	IDOT HIMT Equivalent
4-16	What is your on-scene report? Example 1	Module 4 slides 24 to 29
4-17	What is your on-scene report? Example 2	
4-18	What is your on-scene report? Example 3	
4-19	What is your o-scene report? Example 4	
4-20	What is your on-scene report? Example 5	
4-21	What is your on-scene report? Example 6	None
4-22	What is your on-scene report? Example 7	None
4-23	What is your on-scene report? Example 8	None
4-24	TIM Timeline	Module 10 slide 16; Module 1 slide 9
4-25	Lesson 4 Objectives	Refer to Table 6
Lesson 5: Command Responsibilities		
5-1	National TIM Responder Training Title Slide	—
5-2	Lesson 5 Title Slide	—
5-3	Lesson 5 Objectives	Refer to Table 7
5-4	Unified Command	None
5-5	Multiple Responders Involved	Module 20 slide 8
5-6	Requirements—ICS	Module 20 slide 10
5-7	Incident Command Training	Module 20 slide 9
5-8	ICS General Staff	Module 20 slide 12 and Module 3 slide 10
5-9	ICS for Initial Response	None
5-10	ICS Structure	None
5-11	ICS Case Study 1	None
5-12	ICS Case Study 2	None
5-13	Unified Command	Module 20 slide 11 and Module 3 slide 9
5-14	Incident Action Plan	Module 3 slide 6
5-15	Physical Organization	Module 3 slide 11
5-16	Rural Staging Area Scenario	None
5-17	TIM Case Study—Hazelwood, MO 1	Module 3 slide 12
5-18	TIM Case Study—Hazelwood, MO 2	Module 3 slide 13
5-19	TIM Case Study—Hazelwood, MO 3	Module 3 slide 14
5-20	TIM Case Study—Hazelwood, MO—Video	Module 3 slide 15
5-21	TIM Case Study—Hazelwood, MO—Outcome	Module 3 slide 16
5-22	TIM Timeline	Module 10 slide 16; Module 1 slide 9
5-23	Lesson 5 Objectives	Refer to Table 7

Lesson 6: Safety, Patient Care, and Investigation		
6-1	National TIM Responder Training Title Slide	—
6-2	Lesson 6 Title Slide	—
6-3	Lesson 6 Objectives	Refer to Table 8
6-4	Retro-Reflective Chevron Marking	Module 2 slide 24
6-5	NFPA Standard 1901—2009 Edition	Module 2 slide 24
6-6	Improved U.S. Vehicle Marking	None
6-7	New Markings vs Old Markings—Day	None
6-8	New Markings vs Old Markings—Night	None
6-9	Vehicle Markings	None
6-10	TIM Timeline	Module 10 slide 16; Module 1 slide 9
6-11	Hazmat	Module 40 slide 17 and Module 4 slide 21
6-12	Hazardous Materials or Not?	Module 40 slide 17
6-13	Hazard Placards	None
6-14	Quick Clearance—Hazmat	None
6-15	What requires a hazmat response?	Module 40 slide 17
6-16	Actions—Hazmat	Module 5 slide 9
6-17	Tools—Hazmat	
6-18	Steps—Hazmat	
6-19	What can be done in this situation?—Hazmat	
6-20	Use of Absorption Pads—Hazmat	
6-21	Containment—Hazmat	
6-22	Wearing Appropriate PPE—Hazmat	
6-23	Absorption or traction?—Hazmat	
6-24	Spill Control—Hazmat	
6-25	Defensive Strategy—Hazmat	
6-26	Real-World Spill—Hazmat	Module 5 slide 16
6-27	Pinching the Fuel Line—Hazmat	None
6-28	Hazmat SOP	None
6-29	Hazmat SOP Student Activity	None
6-30	Hazmat Placard Review Activity	None
6-31	Hazmat Placard Example 1	None
6-32	Hazmat Placard Example 2	None
6-33	Hazmat Placard Example 3	None
6-34	Hazmat Placard Example 4	None
6-35	Hazmat Placard Example 5	None

6-36	Hazmat Placard Example 6	None
6-37	Burning Vehicle Danger Zone	Module 4 slide 28
6-38	Strut Explosion Picture	None
6-39	Preferred Fire-Suppression Approach	Module 4 slide 28
6-40	Dangers of Working Near Traffic When Extinguishing a Fire	None
6-41	Vehicle Fires	Module 4 slide 28
6-42	Electric Vehicles (EV) and Hybrid Electric Vehicles (HEV)	Module 100 slides 12 and 13
6-43	Fire crews will not be shocked or electrocuted.	Module 100 slides 14 and 15
6-44	Safety: Fire and Rescue	Module 100 slides 14 and 15
6-45	Safety: Fire Suppression	None
6-46	Extrication	Module 100 slide 15
6-47	Extrication—Complete Tasks Simultaneously	Module 100 slide 15
6-48	TIM Timeline	Module 10 slide 16; Module 1 slide 9
6-49	Patient Care	None
6-50	Approaching an Injured Motorist	None
6-51	Response Picture	None
6-52	Approaching an Injured Motorist	None
6-53	Landing on highway is high risk.	Module 70 slides 21 and 22 Module 6 slides 51 and 52
6-54	Highway landings adversely impact quick clearance strategies.	
6-55	Consider Off-highway Landing Zone Locations	Module 70 slide 23
6-56	Implications of Helicopter Malfunction	Module 6 slide 52
6-57	Complete Tasks Simultaneously	None
6-58	Investigation Duties	None
6-59	Primary Goals of Investigation	Module 7 slide 17
6-60	Point of Impact	None
6-61	Evidence or Debris?	Module 2 slide 4
6-62	Even fluids count.	None
6-63	Landing Place/Marking Evidence	None
6-64	Extrication vs. Investigation	None
6-65	Map areas where incidents frequently occur.	None
6-66	Photogrammetry	None
6-67	Scene Mapping—Clearance/Safety Implications	None
6-68	Complete Tasks Simultaneously	None

6-69	Fatality Investigation	None
6-70	Kansas City Police Case Study 1	None
6-71	Kansas City Police Case Study 2	None
6-72	Kansas City Police Case Study 3	None
6-73	TIM Timeline	Module 10 slide 16; Module 1 slide 9
6-74	Lesson 6 Objectives	Refer to Table 8
Lesson 7: Traffic Management		
7-1	National TIM Responder Training Title Slide	—
7-2	Lesson 7 Title Slide	—
7-3	Lesson 7 Objectives	Refer to Table 9
7-4	Secondary Collisions	Module 1 slides 14 to 16
7-5	Traffic Control Devices	Module 70 slide 4
7-6	Kerri Crane Story	None
7-7	TIM Traffic Areas 1	Module 6 slide 43
7-8	TIM Traffic Areas 2	None
7-9	TIM Traffic Area—Safe Positioning	Module 6 slides 16 to 18
7-10	TIM Traffic Area—Vehicle on Fire	Module 6 slide 24
7-11	TIM Traffic Area—Vehicle with Medical Emergency	Module 4 slide 6
7-12	Incident Scene	None
7-13	Fire Apparatus Block	Module 6 slide 21
7-14	Blocking and Traffic Management	Module 4 slide 7
7-15	Temporary Traffic Control Devices	Module 6 slide 30
7-16	Traffic Cones	
7-17	Cone Use: Daytime and Night	
7-18	Flares and Light Sticks	
7-19	Pink Emergency Scene Ahead Sign	Module 6 slide 33
7-20	Deployable Sign 1	
7-21	Deployable Sign 2	
7-22	TIMA Component Distances Table	Module 6 slide 37 (partial)
7-23	Cone Tapers	Module 6 slide 30
7-24	Taper Characteristics	
7-25	Cone Tapers	
7-26	Cone Taper Example 1	
7-27	Cone Taper Example 2	
7-28	Cone Taper Set Up Illustration	Module 6 slide 41

7-29	Cone Taper Pace	
7-30	Five-Cone Taper Example	None
7-31	Arrow Board Placement Example 1	Module 6 slides 34, 35, 46, and 47
7-32	Arrow Board Placement Example 2	
7-33	Arrow Board Placement Example 3	
7-34	Flaggers	Module 6 slide 42 (partial)
7-35	Intersection Incident Example 1	Module 4 student activity
7-36	Intersection Incident Example 2	Module 4 student activity
7-37	Intersection Incident Example 3	Module 4 student activity
7-38	Incident Gap Example 1	Module 70 slide 17
7-39	Incident Gap Example 2	None
7-40	Incident Gap Example 3	None
7-41	Intersection Incident Example 4	None
7-42	Changeable Message Signs	Module 70 slide 5 and Module 2 slide 7
7-43	TIM Timeline	Module 10 slide 16; Module 1 slide 9
7-44	”Light Shedding” and Lighting Management	Module 6 slide 12 to 15
7-45	On-Scene Lighting Example 1	
7-46	On-Scene Lighting Example 2	
7-47	On-Scene Lighting Example 3	
7-48	”Light Shedding” and Lighting Management	
7-49	Driver Reaction and Stopping Distances	Module 6 slides 5 to 8
7-50	Safe, Quick Clearance	Module 2 slide 25 and Module 10 slide 6
7-51	Incident Effect on Passing Traffic Example 1	None
7-52	Incident Effect on Passing Traffic Example 2	None
7-53	Advanced Warning Adjustments	Module 6 slide 53
7-54	Advanced Warning Considerations 1	None
7-55	Advanced Warning Considerations 2	None
7-56	Sun Effects as “Bad Weather”	None
7-57	Effective Blocking and Hydroplaning	None
7-58	Limited Sight Distances	Module 6 slides 31 and 32
7-59	Gwinnett County, GA Incident—1	None
7-60	Gwinnett County, GA Incident—2	None
7-61	Blocking Close Call	None
7-62	Communications and Monitoring	Module 6 slide 53
7-63	First-on-Scene Positioning	Module 4 slide 6
7-64	Incident Considerations 1	Module 4 slide 27

7-65	Incident Considerations	
7-66	Incident Considerations—Curve 1	Module 6 slide 32
7-67	Incident Considerations—Curve 2	
7-68	Incident Considerations—Intersection	Module 4 student activity
7-69	Incident Considerations—Full Closure	Module 6 slide 50
7-70	Incident Considerations—Median	Module 4 slide 27
7-71	Incident Considerations—HOV Lane 1	None
7-72	Incident Considerations—HOV Lane 2	None
7-73	Incident Considerations—Bridge	Module 4 slide 23
7-74	Incident Considerations—Tunnel	None
7-75	Incident Considerations—Elevated Interstate	None
7-76	Incident Considerations—Toll Booth	None
7-77	Incident Considerations—Motorist Crossing 1	None
7-78	Incident Considerations—Motorist Crossing 2	None
7-79	Incident Considerations—Semi Rollover	Module 2 slide 8
7-80	TIM Timeline	Module 10 slide 16; Module 1 slide 9
7-81	Lesson 7 Objectives	Refer to Table 9
Lesson 8: Removal		
8-1	National TIM Responder Training Title Slide	—
8-2	Lesson 8 Title Slide	—
8-3	Lesson 8 Objectives	Refer to Table 10
8-4	Activity—Seattle Wave	Module 80 slide 3
8-5	Activity—Seattle Wave	Module 80 slide 3
8-6	What issues do you see?—Seattle Wave	Module 80 slide 3
8-7	Remaining Capacity Statistics	None
8-8	Effect of Blocked Lane	None
8-9	Quick Clearance Decisions	Module 4 slide 23
8-10	Push Bumper Example 1	None
8-11	Push Bumper Example 2	None
8-12	Push Bumper Example 3	None
8-13	Push Bumper Example 4	None
8-14	Quick Clearance—Dragging Vehicle 1	None
8-15	Quick Clearance—Dragging Vehicle 2	
8-16	Quick Clearance—Dragging Vehicle 3	
8-17	Quick Clearance—Dragging Vehicle 4	
8-18	Quick Clearance Extrications	Module 4 slide 25

8-19	Quick Clearance—Fire Extrication	Module 4 slide 28
8-20	Quick Clearance—Intersection	Module 4 student activity
8-21	Quick Clearance—Semi Rollover into Ditch	None
8-22	Quick Clearance—Jackknifed Semi	Module 2 slide 8
8-23	Quick Clearance—Nighttime Incident	Module 6 slide 10
8-24	Quick Clearance—Severely Damaged Vehicle	Module 4 slide 27
8-25	Quick Clearance—Jackknifed Tanker 1	None
8-26	Quick Clearance—Jackknifed Tanker 2	
8-27	Quick Clearance—Jackknifed Tanker 3	
8-28	Quick Clearance—Jackknifed Tanker 4	
8-29	Cargo Removal	Module 7 slide 17
8-30	Spilled Liquid and Debris	None
8-31	What is debris and what is evidence?	Module 2 slide 4
8-32	Debris Removal 1	Module 7 slide 17
8-33	Debris Removal 2	None
8-34	Spilled Liquid	Module 7 slide 16
8-35	Towers depend on timely and accurate info.	Module 7 slide 5
8-36	Tower Awareness of Quick Clearance Goals	Module 1 slide 19
8-37	TRAA Vehicle Identification Guide	Module 7 slides 7 to 14
8-38	Clearance Communications 1	Module 7 slide 19
8-39	Clearance Communications 2	Module 7 slide 20
8-40	TIM Timeline	Module 10 slide 16; Module 1 slide 9
8-41	Lesson 8 Objectives	Refer to Table 10
Lesson 9: Termination		
9-1	National TIM Responder Training Title Slide	—
9-2	Lesson 9 Title Slide	—
9-3	Lesson 9 Objectives	Refer to Table 11
9-4	Termination Checklist	Module 7 slide 18
9-5	Termination	Module 7 slide 19
9-6	Reopening Travel Lanes	Module 7 slide 20
9-7	What is your reopening plan?	None
9-8	Safe, Quick Clearance	None
9-9	Termination Communication	Module 7 slide 21
9-10	Leaving the Scene	Module 7 slide 21
9-11	Lesson 9 Objectives	Refer to Table 11

Lesson 10: Hands-On Activity		
10-1	National TIM Responder Training Title Slide	—
10-2	Lesson 10 Title Slide	—
10-3	TIM Timeline	Module 10 slide 16; Module 1 slide 9
10-4	Lesson 10 Objectives	Refer to Table 12
10-5 to 10-9	Scenario 1—Stalled Passenger Vehicle in Buffered HOV Lane w/ Barrier Wall Dividers	Module 8 slide 8
10-10 to 10-12	Scenario 2—Debris Blocking Multiple General Travel Lanes	None
10-13 to 10-20	Scenario 3—Vehicle Fire with Right Lane and Right Shoulder Obstructed	HIRT Game
10-21 to 10-30	Scenario 4—Multi-Vehicle Injury Collision w/ Spilled Fluid in Travel Lanes	HIRT Game
10-31 to 10-40	Scenario 5 —"Split Scene," Multi-Vehicle Injury Collision w/Lanes Obstructed	HIRT Game
10-41	Scenarios 1–5 Summary	-
10-42 to 10-50	Scenario 6—Two-Lane Rural Road, Multi-Vehicle Injury Collision with Lane Obstructed	Module 8 slide 9
10-51 to 10-60	Scenario 7—Multi-Vehicle Injury Collision in Expressway Off-Ramp	Module 8 slide 6
10-61 to 10-69	Scenario 8—Commercial Vehicle Rollover on Expressway Off-Ramp	None
10-70 to 10-77	Scenario 9—Multi-Vehicle Injury Collision on City Surface Street in Four-Way Intersection	Module 4 student activity
10-78 to 10-85	Scenario 10—Multi-Vehicle Injury Collision on City Surface Street in Multi-Lane Intersection	HIRT Game
10-86	Lesson 10 Objectives	Refer to Table 12
Lesson 11: Situational Awareness		
10-87	Lesson 11 Title Slide	—
10-88	Lesson 11 Objectives	Refer to Table 13
10-89	Parking Position	Module 8 slide 21
10-90	Windshield Size-Up	Module 4 slide 8
10-91	Safely Exiting the Vehicle	Module 4 slide 8
10-92	Cone Placement	Module 8 slide 4
10-93	Lesson 11 Objectives	Refer to Table 13

APPENDIX B SUMMARY OF REFINEMENTS TO ONLINE TRAINING PROGRAM

B.1. GLOBAL CHANGES

- Added “Test Your Knowledge” slides that displayed answers after click rather than immediately
- Added course navigation instructions before Module 10, including warning about the fast forward button, the need to advance slides within modules, as well as general control help
- Changed how modules interact with videos and hyperlinks so that links are clickable even after the slide has timed out, thus fixing all hyperlink/video problems
- Added end-of-module slides
- Manually added narration to modules in cases for which incompatibilities between new versions of PPT (which records sounds in .wma) and Captivate (which does not accept .wma files) caused Captivate to discard narrations during the import process
- Fixed narration problems in which Captivate did not visibly indicate that certain slides had sounds. This point, in combination with the previous one, sometimes caused “double” speak of two instances of narrators or caused the narration to be unstoppable even by pause
- Modified version numbers and cleaned up previous versions of modules on the LMS
- For questions that had 1 or 0 for answers, the answers were changed to True or False.
- Appended answer letters to all answers

B.2. CHANGES TO SPECIFIC MODULES

Module 10

- Changed slide narration to clarify congestion cost vs. total cost
- Changed location of “Test Your Knowledge” slide
- Fixed a narration error directing the user to view Module 10 again
- Cleaned up some quiz questions (grammar)
- Revised quiz question 1 in totality

Module 20

- Renarrated slide one to say “Traffic Incident Management”
- Clarified differences between slides 11 and 12
- Normalized sound between slide 1 and the rest of the module
- Modified quiz question 2 to refer to both law enforcement and transportation

Module 30

- Revised question 1’s answer to be more general
- Revised question 2’s answer to be more intuitive

Module 40

- Fixed a problem in which the module did not display properly
- Fixed numerous narration problems, such as cutoffs on slide 16, lack of introduction, and normalization of narration between slides
- Fixed an error in quiz question 1; answer should be 3 rather than 0.3
- Modified how picture questions are shown; now imbedded as part of quizzes

Module 50

- Normalized narration between slides, especially background noise
- Modified narration to redirect to link rather than spelling it out in narration
- Fixed an error in which slide 12 required multiple clicks before advancing properly
- Clarified slide 16 to better match the narration dialogue

Module 60

- Normalized narration between slides, especially background noise
- Slides 3 through 6 fused so that the arrows on the diagrams are displayed automatically instead of step by step
- Slide 21 changed to address all areas that are discussed by narrator

Module 70

- Normalized background noise
- Revised helicopter landing area to 100 by 100 feet
- Recorded another narration regarding the helicopter landing area size.
- Fused slides so that the four traffic display signs are displayed immediately

Module 80

- Corrected a problem in which sound did not play for slides 1 and 2
- Corrected solution for quiz question 2
- Removed quiz question 3 and renumbered remaining questions

Module 90

- Normalized background noise
- Edited animation of Module 90 to better match the timing of the narration
- Modified quiz question 4 to better match module content

Module 100

- Changed the size of pictures on slide 12
- Fixed a bug in which sound sometimes did not play

Module 110

- Renarrated first slide to remove mention of Highway Incident Management Training

APPENDIX C GAME DESIGN

Figure C1. Introduction page.

Figure C2. Level select.

Figure C3. User response tool menu.

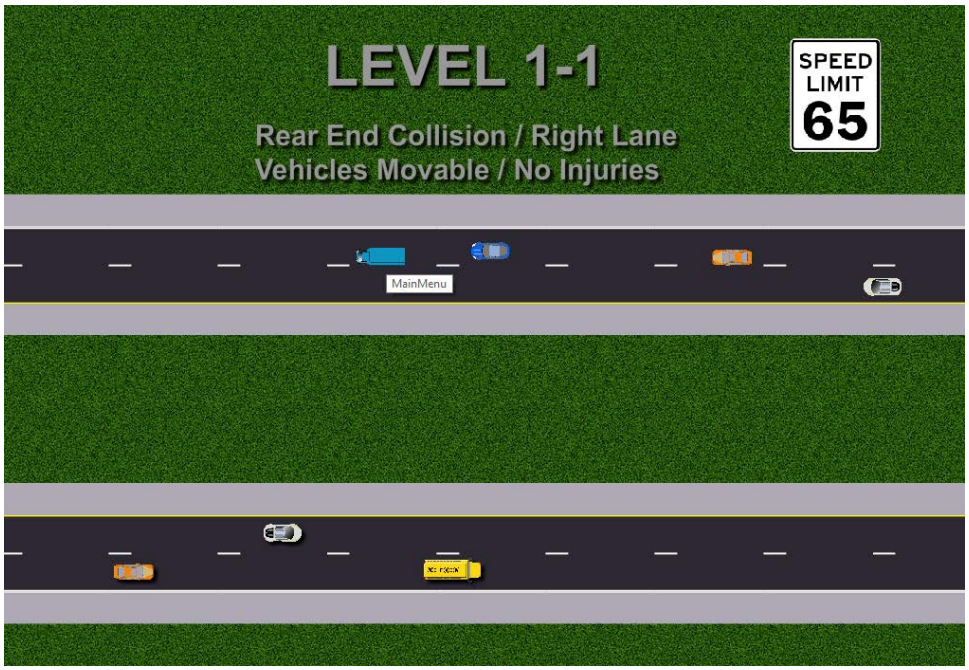

Figure C4. Animation before crash.

Figure C5. Animation after crash.

APPENDIX D SURVEY FORM

Illinois Department of Transportation

Course Evaluation

Course Title: _____ Date: _____

Your Name (optional, but preferable): _____ Classification: _____

Course Location: _____

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

Please indicate the extent to which you **agree** or **disagree** with the following statements:

_____ The seminar was well organized.
_____ The various points in the seminar were well developed.
_____ There was adequate opportunity and encouragement for participants to express ideas or ask questions.
_____ Information presented was applicable to IDOT.
_____ The knowledge and skills developed in this seminar will be useful.

Instructor	Instructor	Instructor	Instructor	Instructor	
					Instructor was knowledgeable and effective in conveying his/her knowledge.
					Instructor related course content to work situation.
					Instructor was interesting and enthusiastic.
					Instructor used visual aids and handouts effectively.
					Instructor used individual or group exercises effectively.

General Observations

What was the most valuable information you learned from this seminar?

What suggestions would you make for improving this seminar?

What is your overall assessment and evaluation of this course?

What is your evaluation of the seminar location and facility?

Were the course objectives accomplished?

What specific job title or classification would benefit most from this class?

What other training courses would you like to see offered?

Would you like more information on becoming a member of the cadre? Yes ☐ No ☐

Additional Comments:

(Use reverse side for additional comments)

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