Texas Tech University
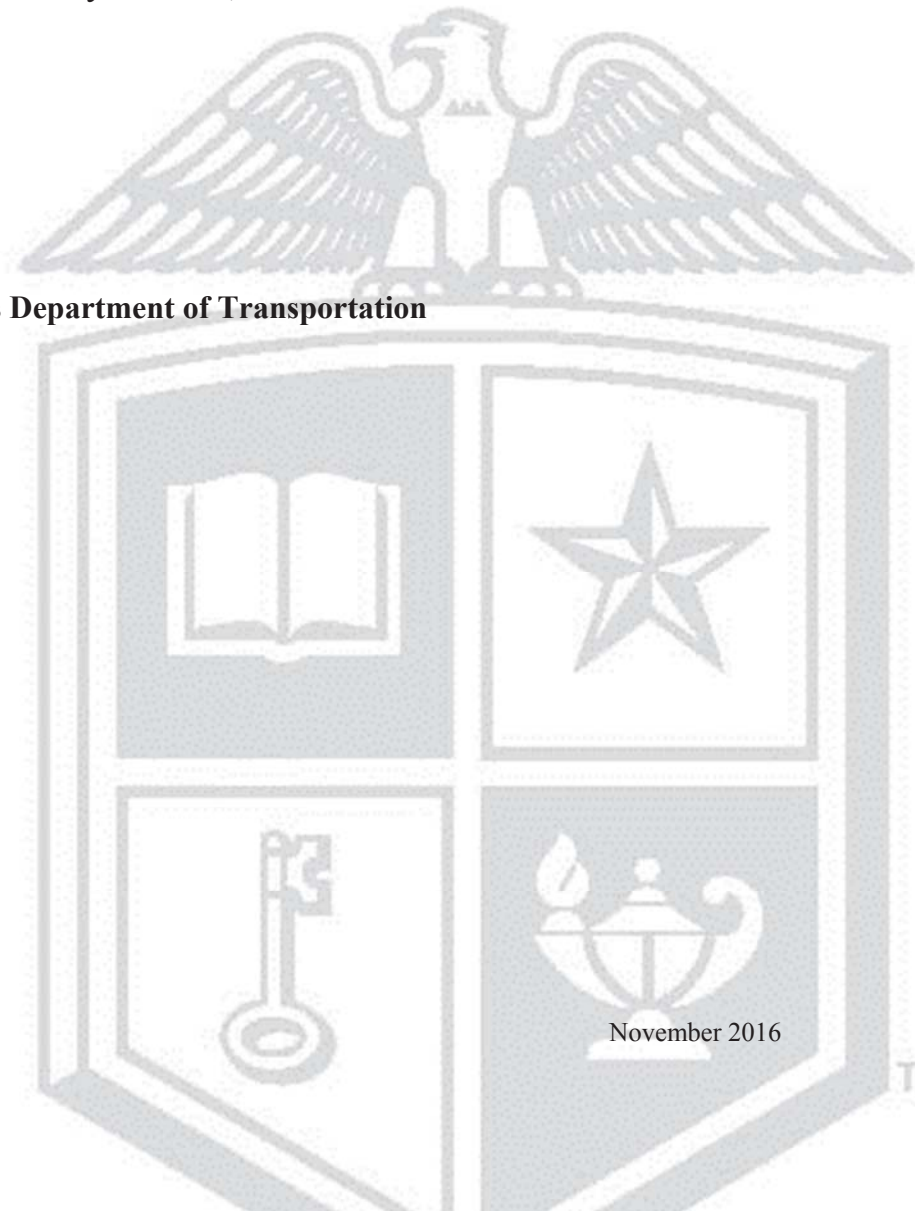# Multidisciplinary Research in Transportation

TxDOT Wildland Fire Management Training

Phillip T. Nash, Sanjaya Senadheera, Wesley Kumfer,

Micah-John Beierle

**Performed in Cooperation with the Texas Department of Transportation
and the Federal Highway Administration**

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16. Abstract

  In 2011, the Texas Tech Center for Multidisciplinary Research in Transportation (TechMRT) was contracted by the Texas Department of Transportation (TxDOT) to analyze best practices for the department in responding to wildfires. This project (0-6735) was adapted into an implementation project in order to provide a training workshop for TxDOT employees on wildland fire management. The target audience of this workshop was TxDOT Directors of Operations (DOOs), Directors of Maintenance (DOMs), Area Engineers (AEs), maintenance managers, maintenance supervisors, assistants, and crew chiefs. A total of nine workshops were held beginning in March, 2014 and ending in June, 2014. Workshops were conducted in Lubbock, Alpine, San Antonio, Houston, Corpus Christi, Dallas, Fort Worth, and Brownwood. At least 557 TxDOT employees attended the workshops. During the course of these nine training workshops, evaluation sheets were distributed. The TechMRT project team received 527 total evaluations, and the responses were tallied and analyzed. Respondents were asked to indicate whether they strongly disagreed, disagreed, had no comment on, agreed, or strongly agreed with a number of different responses. Nine responses related to the general instruction and efficacy of the training workshops. Five responses related specifically to learning objectives that the project team wanted the attendants to master during the workshops. To evaluate the efficacy of the workshops, numerical values were assigned to each possible rating for every question, ranging from 1 for a strong disagreement to 5 for a strong agreement. Overall, every question received a rating between 4.22 and 4.49. These results indicate that the majority of students either agreed or strongly agreed with the efficacy of the workshops and felt they were equipped with new skills and a better understanding of their roles in wildland fire management.

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Chapter 1: Introduction

In 2011, the Texas Tech Center for Multidisciplinary Research in Transportation (TechMRT) was contracted by the Texas Department of Transportation (TxDOT) to analyze best practices for the department in responding to wildfires. This project (0-6735) was adapted into an implementation project in order to provide a training workshop for TxDOT employees on wildland fire management. The target audience of this workshop was TxDOT Directors of Operations (DOOs), Directors of Maintenance (DOMs), Area Engineers (AEs), maintenance managers, maintenance supervisors, assistants, and crew chiefs. A total of nine workshops were scheduled at the following locations on the following dates:

1. Lubbock (3/12/2014)
2. Alpine (3/26/2014)
3. San Antonio (4/9/2014)
4. Houston (5/20/2014)
5. Houston (5/21/2014)
6. Corpus Christi (6/6/2014)
7. Dallas (6/10/2014)
8. Fort Worth (6/11/2014)
9. Brownwood (6/12/2014)

Each workshop was hosted at a District office or an off-campus site if the attendance exceeded the capacity at the office training facility. These sites were chosen by the project team's TxDOT liaison, Gilbert Jordan, who serves as the TxDOT representative on the State Emergency Management Council (SEMC). These workshop locations were chosen to allow Districts not hosting workshops to send their employees to one of the nearby locations.

The workshops consisted of six modules, covering the following topics relevant to wildland fire management:

Module 1: Introduction

Module 2: Organization and Communication

Module 3: Resources and Equipment

Module 4: Safety

Module 5: Documentation and Data Collection

Module 6: Training Programs

These modules were designed to cover the topics discussed during the original research project and to provide helpful resources for TxDOT employees who may participate in wildland fire

management and response. In addition to the training workshop, instructor manuals, student manuals, and pocket guides were developed for this implementation project. The student manuals and pocket guides were distributed to the workshop attendees, as well as a quick reference booklet based on the Incident Command System (ICS). Attendees were encouraged to keep these resources for future reference.

Each workshop featured a number of different speakers, both from the TechMRT project team and from TxDOT. The speakers for each module included:

Module 1: Phil Nash (TechMRT) and Darwin Lankford (TxDOT)

Module 2: Wesley Kumfer (TechMRT) and Gilbert Jordan (TxDOT)

Module 3: Micah Beierle (TechMRT)

Module 4: Micah Beierle

Module 5: Gilbert Jordan

Module 6: Micah Beierle

Additionally, two other speakers, both from TxDOT, spoke at one or more workshops. Jeannie Lecklider covered material for Gilbert Jordan at the Houston workshop on 5/21/2014, and Thomas Gilbert provided a comprehensive lesson on radio communication during the first and second Houston workshops on 5/20/2014 and 5/21/2014. Thomas Gilbert's lesson was videotaped, and this material was incorporated into future editions of the workshop.

Description of TxDOT Wildland Fire Emergency Response Trailer

The TxDOT Emergency Response Trailer was displayed during breaks at a number of the workshops. During the break period, workshop attendees were encouraged to tour the trailer and inspect the PPE and equipment contained within, including: Nomex safety suits, helmets, vests, fire shelters, cots, trash cans, an inflatable light, and first aid materials. During a number of the breaks, Gilbert Jordan instructed attendees on how to properly use this equipment and the importance of using PPE during a wildland fire event. The project team also filmed Gilbert performing a demonstration tour, and this video is included in the final workshop video presentation.

Figure 1: TxDOT Wildland Fire Emergency Response Trailer Demonstrated at the Maintenance Workshop

At each workshop, a course evaluation was distributed to the attendees. The first section of the evaluation are standard questions that TxDOT uses for all course evaluations, but the second category of questions were developed by TechMRT to assess the efficacy of the primary learning objectives of the workshop. Space was also provided for additional comments on how to improve the workshop and/or materials. This final report summarizes the proceedings of each workshop, including the evaluation scores and comments. Any significant changes made to the course materials after a workshop are also noted. The course evaluation sheets are provided in the appendix.

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Chapter 2: Lubbock (3/12/2014)

This first workshop in Lubbock served as the Pilot Workshop, and as such, a number of modifications were suggested to improve the training course for future attendees. In total, there were 134 attendees at the Lubbock workshop, making this the largest one taught. The project team received a total of 116 evaluation forms.

2.1: Evaluation Scores

Each course evaluation form asked respondents to indicate their degree of agreement with a statement in two different categories. The first category is comprised of general TxDOT statements indicating the efficacy and applicability of the workshop. The second category is composed of learning objectives considered by the TechMRT project team to reflect the primary goals of the training workshop curriculum. Respondents were asked to indicate response to each item as "Strongly Agree (SA)," "Agree (A)," "No Comment (NC)," "Disagree (D)," or "Strongly Disagree (SD)." For each of analysis, each type of response was assigned a numerical score ranging from 5 (SA) to 1 (SD). This numerical assignment allowed the project team to calculate an average score for each item at each workshop and to track the overall efficacy of the curriculum. There were nine general questions and five course objective questions. The questions provided on the evaluation forms are shown in Table 1.

Table 1: List of Evaluation Categories and Questions

1	General Questions (These questions apply to all TxDOT Classes)
1.1	The course improved my skills, knowledge, and abilities.
1.2	The course material was useful.
1.3	The information in this course is current.
1.4	The activities helped in learning the material.
1.5	The audio/visual aids improved the course.
1.6	The trainer(s) were knowledgeable about the topics.
1.7	The trainer(s) encouraged participation.
1.8	The trainer(s) provided feedback and answered questions.
1.9	Overall, I am satisfied with what I learned in this course.
2	Course Objectives (By the end of this course, I can…)
2.1	Explain TxDOT's role in wildland fire response.
2.2	Utilize data collection resources to communicate and catalog information regarding wildland fire events.
2.3	List and safely use the proper resources and equipment for wildland fire response.
2.4	Explain the basic fundamentals of fire behavior and fire safety.
2.5	Cooperate with other agencies at a wildland fire event.

The responses to this workshop were generally positive, as shown in Table 2. Only one respondent ranked any question with an SD (1.2: The course material was useful). The majority

of all responses ranked at NC or better. Overall, the average score for each question was above 4.0, indicating that the average responded overall agreed with the efficacy of this workshop.

Table 2: Summary of Response Scores for the Lubbock Workshop on 3/12/2014

SA	A	NC	D	SD	Sum	Score
28	84	4			116	4.21
28	82	5		1	116	4.17
26	86	4			116	4.19
23	79	13	1		116	4.07
36	70	9	1		116	4.22
49	63	4			116	4.39
39	71	6			116	4.28
41	73	2			116	4.34
29	79	6	1		115	4.18
33	77	5	1		116	4.22
24	82	10			116	4.12
27	83	6			116	4.18
23	88	5			116	4.16
27	85	3	1		116	4.19

As can be seen in Table 2, the lowest ranked question from Category 1 was "1.4: The activities helped in learning the material." The reason for the lower response may be due to the somewhat unwieldy nature of learning activities scheduled as part of the workshop at that point. These learning activities typically involved a question that respondents were to discuss among themselves before sharing with the class. With a workshop of this size, it is quite possible that these activities may have been distracting, and the implementation was a bit inconsistent between the different instructors. The most highly ranked question was "1.6: The trainer(s) were knowledgeable about the topics." Throughout the course of this implementation project, this item was routinely ranked highly, demonstrating that the participants responded well to the knowledge and experiences of the instructors.

The lowest ranked response from Category 2 was "2.2: Utilize data collection resources to communicate and catalog information regarding wildland fire events." In later workshops, this problem was addressed by having Gilbert Jordan give a live demo of how to use the TxDOT intranet for this purpose. The highest ranked response from Category 2 was "2.1: Explain TxDOT's role in wildland fire response." This was identified by the project management committee as the most important learning objective of the curriculum, because TxDOT needs to manage wildland fires appropriately and not put any employees in danger. Therefore, it is encouraging that the students agreed that they learned this concept well. The evaluation scores seem to indicate that overall, this workshop was a success. However, there were several

suggestions for improvements. These suggestions are covered in Section 2.2: Evaluation Comments.

2.2: Evaluation Comments

In addition to the evaluation questions shown in Table 1, the evaluation forms also provided a space for respondents to indicate any comments or suggestions on the workshop content and procedure. The students were encouraged to indicate any suggested changes both to the presentation materials and to the pocket guides and student manuals.

The following comments are presented as written on the course evaluations. Spelling errors are corrected, but grammatical and contextual problems have been left untouched. Multiple comments on the same evaluation form are presented separately if they appeared to indicate different comments.

Comments on Student Manual

- May need to make some of the slides in 3-ring binder bigger and easier to read.
- Module 1: Intro was good but a bit long, good presentation.
- Module 2: Good information, nice length.
- Module 3: Learn some things about maps. Good presentation but relax a bit. Maps, however, are just too small to see in student book.
- Module 4: Good place for reminders of PPE. A good length. Situation driving- would be good place to incorporate Smith System.
- Module 5: Data Collection- Most information was already known. Good to go over the NIMS and MNT websites.
- Module 6: LCES- Good thought; Fuel- ok- he did a good job presenting; Resources- It's good it is in there, but is not a point that needs to be discussed in detail; Equipment should be known to employees; Suppression- good topics; Fire shelter video- good instruction.
- I would move the green pg's in the manual, as they are in the back of each module, they do not get use like they should.
- Present examples of when "we" (TDOT) got it right, when we missed the mark.
- Knowing all fires are unique... but... suggested attack methods from a TxDOT stand point on a typical wildland fire.
- Update course book, few misspellings.
- Printing in the manuals is too small it makes them useless. In some of the slides.
- Make slides in student manual bigger so you can read along.
- Pictures in notebook need to be larger and more visible so they can be used for future reference.
- Pictures in the manual are too small, do use if you can't see them/ read them.

General Comments

- Good information
- Course was very good. Gives valuable information for TxDOT's firefighting role.
- Instructors were good and knowledgeable.
- Add actual videos of fighting fires to keep interested (from our area).
- Pictures of actual fires.
- Not a lot of participation due to class size.
- Instructors covered material in a timely manner.
- Breaks at the end of each module helped keep everyone fresh and energized.
- This was a much needed training.
- Very good training.
- Very informative.
- Good class!
- More videos.
- Too much fire fighting. More on TxDOT policy.
- Great to finally see this course offered to us. Since we are the ones on the ground during these fires.
- Great presentation!
- Have the class be more interactive.
- Fine
- Fire shelter video was good.
- Not sure about our course, on one hand we are not fire fighters but we are taught what to do.
- Need to add to class presentation: During TxDOT operation never leave personnel on foot without a vehicle.
- They all did a great job. Was able to enjoy class not having to worry about test.
- Manual and videos were very viable and taught very well.

No comments were made on the material covered in the spiral pocket guide. As can be seen from these comments, many of the general comments were positive. The few critiques that were raised for the course or manual were either addressable (such as the size of some pictures in the pocket guide) or were beyond the instructors' control (such as the interactivity of the students). Changes to the course materials made after this workshop are discussed in Section 2.3: Changes to Workshop Materials after Pilot Workshop

2.3: Changes to Workshop Materials after Pilot Workshop

After reviewing the comments from the pilot workshop, the project team made the following changes to the course material:

- Ensured that many graphics, including maps and charts, were available in the pocket guide, either printed or as a hyperlink.
- Emphasized the green sheets less.
- The TxDOT presenters discussed more of their own experiences with TxDOT responding appropriately or inappropriately.
- Edited some typographical errors in the manual.
- Added some tables from Module 2 and Module 5 to the references section of those chapters in the Student Manual to improve legibility.
- Emphasized the reason for explaining firefighting techniques.

Chapter 3: Alpine (3/26/2014)

The second workshop was hosted off-campus in Alpine on March 26, 2014. This workshop featured many of the corrections from the previous workshop. There were a total of 67 attendants, and 65 of those students submitted an evaluation form. This smaller crowd created a more manageable environment for the workshop that likely contributed to the high ratings.

3.1: Evaluation Scores

The scores for this workshop were higher than those for the pilot workshop. This could be due to the smaller crowd or due to the improvements to the curriculum. The evaluation scores for this workshop are shown in Table 3.

Table 3: Summary of Response Scores for the Alpine Workshop on 3/26/2014

Question	SA	A	NC	D	SD	Sum	Score
1.1	32	32	1	0	0	65	4.48
1.2	37	28	0	0	0	65	4.57
1.3	30	35	0	0	0	65	4.46
1.4	30	35	0	0	0	65	4.46
1.5	27	35	1	2	0	65	4.34
1.6	37	27	1	0	0	65	4.55
1.7	29	34	2	0	0	65	4.42
1.8	33	30	2	0	0	65	4.48
1.9	37	28	0	0	0	65	4.57
2.1	40	23	2	0	0	65	4.58
2.2	29	33	3	0	0	65	4.40
2.3	34	30	1	0	0	65	4.51
2.4	33	28	4	0	0	65	4.45
2.5	38	25	2	0	0	65	4.55

As can be seen in Table 3, the majority of respondents agreed or strongly agreed on the efficacy of this workshop. The lowest score given was a D on question 1.5. Only two Ds were given. The lowest ranked question for Category 1 was "1.5: The audio/visual aids improved the course." This lower ranking could be due to continued difficulties with playing the videos at the workshop or due to the environment of the room. Effort was made after this workshop to ensure that the videos used in the presentations ran smoothly. The most highly ranked questions from Category 1 are "1.2: The course material was useful" and "1.9: Overall, I am satisfied with what I learned in this course," both of which were ranked at 4.56. These scores are encouraging because they demonstrated a score leaning closer to SA for both course materials and the workshop overall. It seems that this class was receptive to the revisions made to the course material.

The lowest ranked question in Category 2 was "2.2: Utilize data collection resources to communicate and catalog information regarding wildland fire events." Again, this lower ranking may have been due to the difficulty of accessing and demonstrating the TxDOT intranet at the workshop site. This issue was addressed in future workshops. The highest ranked response for category 2 is "2.1: Explain TxDOT's role in wildland fire response." Again, this may be the most important concept for students to learn, so the project team is pleased that the students seemed to learn this lesson. The evaluation results for this workshop are some of the highest from any workshop, so this particular date seems to have been a success.

3.2: Evaluation Comments

The following comments are presented as written on the course evaluations. Spelling errors are corrected, but grammatical and contextual problems have been left untouched. Multiple comments on the same evaluation form are presented separately if they appeared to indicate different comments.

<u>General Comments</u>

- Great info
- Instructors and course were very good. Need more courses like this one.
- One of the courses that was very explainable to this class and understandable.
- Videos did not work well.
- Very well instructed and course very helpful.
- Good job by all.
- We need to have more training or get with local FD when they have wildland fire school's around your area so we can seen are crews to learn more about what they are getting themselves into and learn what fire behavior does and what your need to do out in the field when thing's go right or wrong.
- Talk to your Texas Fire Service about training.
- Clear eye opener.
- Did great.
- Excellent class
- Good class
- Class was good for information due fire today.

The comments from this workshop were extremely positive and demonstrate the relevance of the workshop. There were few critiques or suggestions for improvements.

3.3: Changes to Workshop Materials after Second Workshop

There were few suggestions for improvement after this workshop, but the project team did make one alteration to address the issue of technical difficulties with the training videos. The

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instructors brought DVDs to all remaining workshops and played videos manually at future workshops.

Chapter 4: San Antonio (4/9/2014)

The third workshop was conducted in San Antonio on April 9, 2014. There were a total of 51 attendants at this workshop, and 49 evaluation forms were submitted. The instructors felt that the crowd was less responsive at this workshop, so that may be a potential reason for the evaluation scores that were received.

4.1: Evaluation Scores

The scores for this workshop were slightly lower than those for the previous workshop, but the comments were still mostly positive. The evaluation scores for this workshop are included in Table 4.

Table 4: Summary of Response Scores for the San Antonio Workshop on 4/9/2014

Question	SA	A	NC	D	SD	Sum	Score
1.1	17	31		1		49	4.31
1.2	18	30	1			49	4.35
1.3	15	31	3			49	4.24
1.4	10	34	2	2		48	4.08
1.5	13	30	4	2		49	4.10
1.6	23	25	1			49	4.45
1.7	16	30	3			49	4.27
1.8	19	29	1			49	4.37
1.9	18	30		1		49	4.33
2.1	15	29	5			49	4.20
2.2	10	33	6			49	4.08
2.3	13	33	3			49	4.20
2.4	14	33	2			49	4.24
2.5	14	33	2			49	4.24

As can be seen from Table 4, there no respondents who ranked any question with SD, but there were several respondents who ranked four different questions with D. The lowest ranked question for Category 1 was "1.4: The activities helped in learning the material." In some regards, this question tracks the interaction between the instructor(s) and students. The attendees likely perceived that the learning exercises were not relevant, and this in turn resulted in an unresponsive crowd. Some learning exercises were abandoned at future workshops. The highest ranked question for Category 1 was "1.6: The trainers were knowledgeable about the topics." This response again indicates that perhaps the personnel instructing the course were appropriate and conveyed the knowledge in a meaningful way.

For Category 2, the lowest ranked question was once again "2.2: Utilize data collection resources to communicate and catalog information regarding wildland fire events." Instructors of future training courses should allow extra time on Module 5 in order to ensure that the crowd

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understands how to use the TxDOT intranet resources properly. The highest ranked questions from Category 2 for this workshop are "2.4: Explain the basic fundamentals of fire behavior and fire safety" and "2.5: Cooperate with other agencies at a wildland fire event." The high score for question 2.4 indicates that the extra emphasis added to the reasons for learning firefighting techniques was effective in conveying the importance of TxDOT's role in wildland fire management. Overall, the scores for this workshop were not as high as for the previous two, so additional changes were made after this workshop.

4.2: Evaluation Comments

The following comments are presented as written on the course evaluations. Spelling errors are corrected, but grammatical and contextual problems have been left untouched. Multiple comments on the same evaluation are presented separately herein.

Comments on Student Manual

- Suggestions: Diagrams showing "you are here" and where fire might go, to boost Micah's Fire Attack and Behavior lecture (Unit 6), or safety unit.
- Useful material.

General Comments

- Well thought out curriculum. Very specific info and not a bunch of unneeded "filler".
- Crown fire was great.
- Well presented.
- Both were good.
- Good course. Well instructed.
- Very understandable; spoke plainly; kept audience attentive; good use of classroom; not congested; temperature good; info all current.
- More subjected type's of fire video's.
- More info on general strategies regarding fighting fires given first then he in TxDOT's role.
- Good instructor.
- I'm explaining and answering???

The comments on the workshop materials were mostly positive, but a few helpful critiques were made. The alterations adopted after these critiques are listed in the next section.

4.3: Changes to Workshop Material after Third Workshop

After this workshop, a significant number of alterations were made to the presentation slides in order to address some issues. Specifically, these alterations were focused on the TxDOT intranet system, fire behavior, and radio communications. These alterations to the workshop materials include:

- New diagrams in Module 6 to explain the differences between direct, parallel, and indirect attacks.
- New slides in Module 5 to show the updated TxDOT intranet Crossroads system.
- New slides in Module 4 to show the updated radio protocols for TxDOT radio interoperability.

These new slides added a significant amount of depth to the modules and addressed some of the issues previously identified, particularly regarding data collection and fire behavior. Most of these updates were generated by TxDOT to address concerns under TxDOT responsibility. Unfortunately, not all of the updates could be incorporated into the printed manuals before the remaining workshops. However, the updated materials are available to students in electronic form so that they can print the necessary slides and update their manuals as they see fit.

Chapter 5: Houston (5/20/2014)

There was a significant gap between the San Antonio workshop and the first Houston workshop on May 20, 2014, so the project team was able to incorporate the changes referenced in Chapter 4 into the presentation materials. The first Houston workshop was significantly larger than the second workshop, with a total of 53 attendants on the first day. A total of 50 evaluation forms were completed. The comments and scores from those evaluations are discussed below.

5.1: Evaluation Scores

The evaluation scores for the first Houston workshop were generally higher than those of the San Antonio workshop. This may have been a combined effect of the modifications to the presentation material and to the general atmosphere of the class. The evaluation scores for this workshop are shown in Table 5.

Table 5: Summary of Response Scores for the Houston Workshop on 5/20/2014

Question	SA	A	NC	D	SD	Sum	Score
1.1	16	33	1			50	4.30
1.2	14	34	2			50	4.24
1.3	21	28	1			50	4.40
1.4	13	35	1	1		50	4.20
1.5	12	38				50	4.24
1.6	22	28				50	4.44
1.7	21	28	1			50	4.40
1.8	19	30	1			50	4.36
1.9	19	28	1	1		49	4.33
2.1	19	30	1			50	4.36
2.2	10	38	2			50	4.16
2.3	14	35	1			50	4.26
2.4	14	35				49	4.29
2.5	14	36				50	4.28

As can be seen in Table 5, the evaluation scores were generally positive. Only two respondents ranked any questions as D; the majority of respondents ranked all questions as either A or SA. The lowest ranked question for Category 1 was "1.2: The activities helped in learning the material." This question likely scored slightly lower than the others due to the fact that the learning exercises were emphasized differently by the different instructors. If the workshop is offered again in the future, all of the instructors should reach a consensus about how to perform the learning exercises. The highest ranked question from Category 1 was "1.6: The trainer(s) were knowledgeable about the topics." Again, the high score for this question reflects the appropriateness of each individual instructor for his assigned role.

The lowest ranked question from Category 2 was "2.2: Utilize data collection resources to communicate and catalog information regarding wildland fire events." Unfortunately, despite the changes to the presentation material, this question again ranked lower than the other questions. As mentioned, additional emphasis should be placed on this topic if this workshop is ever offered again. The highest ranked question from Category 2 was "2.1: Explain TxDOT's role in wildland fire response." As mentioned, this was identified as the most important topic covered in the workshop, so it is encouraging that the TxDOT students responded to this well. Overall, the response scores were on average between A and SA, so the workshops can be considered effective.

5.2: Evaluation Comments

The following comments are presented as written on the course evaluations. Spelling errors are corrected, but grammatical and contextual problems have been left untouched. Multiple comments on the same evaluation are presented separately herein.

General Comments

- Management on wildfire response covered but not info on actual duties/acts TxDOT has to perform.
- Would be nice to include: Why/how we doze fire breaks? How/what to have to maintain/use vehicles?
- Very good course and instructors.
- Did an excellent job. Good video's.
- Good course, very informative.
- Very knowledgeable of wildfires.
- Instructors were very knowledgeable about the materials presented.
- Good job.
- Class was very informative and information provided will be useful for future incidents.
- Instructor was very knowledgeable and communicated effectively.
- Good.
- Extremely boring presentation.

The comments on this workshop were mostly positive. Few critiques were raised, so no major alterations were made to the workshop materials. Additionally, the new segment of Module 4 covering radio communications was videotaped so that this new materials could be used at future workshops.

5.3: Changes to Workshop Materials after Fourth Workshop

Aside from filming the radio portion of Module 4 for future use, no major alterations were made to the workshop material after this workshop. The only changes were an increased emphasis on explaining what specific actions TxDOT takes at a wildland fire event and what types of attack

actions TxDOT should take. It should be noted that Micah Beierle, the instructor for Module 3, catered some of the diagrams in that module to be specific to that region. These diagrams changed for each workshop location.

Chapter 6: Houston (5/21/2014)

The second workshop on Houston was held on May 21, 2014. The attendance at this workshop was significantly smaller than the previous day's workshop. There were only 15 attendants at this workshop, and 14 of those attendants filled out evaluations. The scores and comments are discussed below.

6.1: Evaluation Scores

The scores at this workshop were a bit higher than those from the previous day's workshop. This may have been due to the smaller, more direct atmosphere created by a smaller number of attendants. The scores for this workshop are shown in Table 6.

Table 6: Summary of Response Scores for the Houston Workshop on 5/21/2014

Question	SA	A	NC	D	SD	Sum	Score
1.1	6	8				14	4.43
1.2	6	8				14	4.43
1.3	7	7				14	4.50
1.4	6	7		1		14	4.29
1.5	4	10				14	4.29
1.6	7	7				14	4.50
1.7	6	7	1			14	4.36
1.8	6	8				14	4.43
1.9	5	9				14	4.36
2.1	6	8				14	4.43
2.2	6	7		1		14	4.29
2.3	6	8				14	4.43
2.4	6	8				14	4.43
2.5	6	8				14	4.43

As can be seen in this table, the scores were fairly good, with only one respondent scoring any item lower than A. The lowest scored items in Category 1 were "1.4: The activities helped in learning the material" and "1.5: The audio/visual aids improved the course." The difficulties with the learning exercises have been discussed previously, but it is uncertain why there was a perceived difficulty with the audio and visual aids. Perhaps the students were simply unreceptive to the videos used. The highest scored question from Category 2 was "1.6: The trainer(s) were knowledgeable about the topics." Again, this item has been consistently rated highly, and it was encouraging to receive this feedback.

The lowest ranked question in Category 2 was "2.2: Utilize data collection resources to communicate and catalog information regarding wildland fire events." The issues with this item

have been discussed previously. All of the other items in Category 2 were ranked evenly at 4.43. This shows that almost all of the learning objectives were accomplished successfully at this workshop. Overall, the average scores were all between A and SA, so this workshop can be considered a success.

6.2: Evaluation Comments
The following comments are presented as written on the course evaluations. Spelling errors are corrected, but grammatical and contextual problems have been left untouched. Multiple comments on the same evaluation are presented separately herein.

General Comments

- Additional videos would improve the workshop.
- Thanks for your time!
- Start w/ a fire video.
- Need video examples.
- More videos, workshop.

As can be seen, the only major comment from this workshop is that additional videos would be beneficial. The other comment was positive, and the scores seem to indicate that the students found the workshop beneficial. A change was made after this workshop to address the concern over videos.

6.3: Changes to Workshop Materials after Fifth Workshop
To address the concern over a lack of videos, Micah Beierle, the instructor for Module 6 added another video to that module. This video covers the way that different fires move and spread. Additional videos beyond this one were deemed to be unnecessary and would only increase the already substantial length of the workshops.

Chapter 7: Corpus Christi (6/6/2014)

The sixth workshop was held in Corpus Christi on June 6, 2014. There were at least 53 attendees at this workshop, and 53 evaluation forms were submitted. The evaluations for this workshop were typically positive in a manner similar to the other workshops. The evaluation scores and comments are discussed below.

7.1: Evaluation Scores

Table 7 presents the evaluation scores from this workshop. As can be seen in the table, only two or three respondents indicated disagreement or strong disagreement with any of the questions provided. Overall, the average scores were positive.

Table 7: Summary of Response Scores for the Corpus Christi Workshop on 6/6/2014

Question	SA	A	NC	D	SD	Sum	Score
1.1	20	31	1	1		53	4.32
1.2	20	31		2		53	4.30
1.3	21	29	2		1	53	4.30
1.4	19	31	2	1		53	4.28
1.5	21	32				53	4.40
1.6	32	19	2			53	4.57
1.7	27	22	3	1		53	4.42
1.8	30	20	2			52	4.54
1.9	23	26	3			52	4.38
2.1	33	19			1	53	4.57
2.2	19	32	1		1	53	4.28
2.3	21	31	1			53	4.38
2.4	20	32	1			53	4.36
2.5	22	27	3	1		53	4.32

The lowest ranked question for Category 1 was "1.4: The activities helped in learning the material." The reasons for this low score were discussed previously. The highest ranked item from Category 1 was "1.6: The trainer(s) were knowledgeable about the topics." Again, this positive reinforcement was encouraging.

The lowest ranked item from Category 2 was "2.2: Utilize data collection resources to communicate and catalog information regarding wildland fire response." Potential reasons for this low score have been discussed previously, although the project team is uncertain why this issue was scored consistently lower. However, the remedial measures mentioned earlier still apply. The highest ranked item from Category 2 was "2.1: Explain TxDOT's role in wildland fire response." This item was scored more closely to SA than any other item, demonstrating the efficacy of this training workshop in educating the necessary roles of TxDOT. Due to this score

and the other positive feedback, it seems that this training workshop was a valuable resource to these TxDOT employees.

7.2: Evaluation Comments

The following comments are presented as written on the course evaluations. Spelling errors are corrected, but grammatical and contextual problems have been left untouched. Multiple comments on the same evaluation are presented separately herein.

Comments on Student Manual

- Update book to go with instructor presentation.
- Manual difficult to read-print too small.

General Comments

- This was my first training on wildland fire. I learn a lot of safety communication.
- Instructors instructed well and kept workshop interesting.
- Liked the video(s) and PPE trailer. Thanks!
- Needed this basic rundown about this situation.
- Reminded about NIMS.
- Education course.
- Good instruction.
- Great work, knowledgeable instructors that kept it as fun as possible.
- The last video that was shown, I learn a lot from it. Need to show more video's.
- N/A
- Excellent course. Gives us basic tools to be capable of assisting w/locals in fire suppression, and assist w/ other districts if need or called upon.
- Very good explanation of available resource such as TxDOT websites & NIMS courses.
- Try to have regional personnel in same class, where different type of areas flatland to mounds(?)
- Very helpful
- Trainers very knowledgeable good job!
- Good introductory course for wildfires.
- Would like to see fire basics along TxDOT ROW and SOP scenario coming from EOC to staff in the field scenario type issues.
- Very helpful for someone w/ no experience w/ wildfires.
- Very informative information provided.
- N/C
- Ensure your audience really wants to learn or they can leave so the rest of us that really want to learn can!
- Instructors help me to be safe on a wildflower and what to do in case we involve in one.

- Great information.
- Good course.

The majority of the comments on this workshop were positive, although a few critiques or suggestions were raised. A number of these items, namely the attitude of attendees and the regions represented, were beyond the control of the TechMRT project team. Additionally, the size of the print in the manual had been addressed previously, and this issue had not been raised since the earliest workshops. However, a few of the remaining comments, particularly the one relating to EOC staff, could be addressed.

7.3: Changes to Workshop Materials after Sixth Workshop

No major changes were made to the materials after this workshop except that the radio video was used at future editions. To address concerns over fire behavior and EOC representation, the instructors simply studied these topics and placed greater emphasis on them at the later workshops. A comment regarding the material in the student manual not being up to date was raised. Although this could not be addressed during the workshop, the project team will make the final version of the student manual available to TxDOT employees for download in the future.

Chapter 8: Dallas (6/10/2014)

The seventh workshop was held at the TxDOT Dallas district office on June 10, 2014. The evaluation scores and comments for this workshop were comparable to those from the previous workshops. This was the second largest workshop conducted, with a total of 82 attendants. There were 78 evaluation forms submitted. The scores and comments for this workshop are discussed below.

8.1: Evaluation Scores

The scores for this workshop were comparable to those of the previous workshops. It is worth noting that there were no SD scores, and only one question received a D score. The evaluation scores for this workshop are shown in Table 8.

Table 8: Summary of Response Scores for the Dallas Workshop on 6/10/2014

Question	SA	A	NC	D	SD	Sum	Score
1.1	25	53				78	4.32
1.2	20	58				78	4.26
1.3	22	56				78	4.28
1.4	18	52	6	1		77	4.13
1.5	27	49	2			78	4.32
1.6	36	42				78	4.46
1.7	30	48				78	4.38
1.8	33	45				78	4.42
1.9	23	54	1			78	4.28
2.1	31	46	1			78	4.38
2.2	21	56	1			78	4.26
2.3	30	47	1			78	4.37
2.4	26	52				78	4.33
2.5	29	48	1			78	4.36

The lowest ranked item from Category 1 was "1.4: The activities helped in learning the material." As has been mentioned previously in this report, this item was consistently ranked lower than other items and should be addressed carefully if future workshops are provided. The highest ranked item from Category 1 was once again "1.6: The trainer(s) were knowledgeable about the topics." This consistent comment has been discussed in previous chapters of this report.

The lowest ranked item from category 2 was "2.2: Utilize data collection resources to communicate and catalog information regarding wildland fire events." This item has been discussed previously in this report. The highest ranked comment from Category 2 is "2.1: Explain TxDOT's role in wildland fire response." As mentioned previously, this learning objective is the primary goal of the workshops, so the students' mastery of this topic is a good

indication of the success of the workshops. Overall, the evaluation scores were between A and SA, so the students appear to have been receptive to the workshop.

8.2: Comments on Evaluations

The following comments are presented as written on the course evaluations. Spelling errors are corrected, but grammatical and contextual problems have been left untouched. Multiple comments on the same evaluation are presented separately herein.

General Comments

- The instructor did a great job.
- Good class
- It a good class
- Class room was not big enough. Not enough tables.
- Smaller groups for training.
- Good class
- A very good class & instructor!
- Thanks a lot
- Good course
- Need more actual accounts of TxDOT actions in the field.
- Need more wildfire actual events to grab interest at beginning of course.
- The class was real informative.

There were only three critiques to this workshop. The first, relating to the size of the room, was beyond the control of the project team. The second, relating to actual TxDOT actions, was emphasized more strongly in the final two workshops. The third comment was not readily addressed because its meaning was a bit unclear. However, the TxDOT representative speaking during Module 1 did continue to address actual fire events at the remaining two workshops.

8.3: Changes to Workshop Materials after Seventh Workshop

There were no major changes to the workshop materials after this workshop. However, the TxDOT presenters did make an effort to emphasize TxDOT activities and wildland fire experiences at the final two workshops. The remaining workshops also had better facilities for the training.

Chapter 9: Fort Worth (6/11/2014)

A workshop was hosted in Fort Worth at the District office the day after the Dallas workshop. There were a total of 68 students in attendance at this workshop, and 66 evaluation forms were submitted. The response to this workshop was largely positive. The evaluation scores and comments are discussed below.

9.1: Evaluation Scores

The evaluation scores for this workshop were comparable to or greater than those from other workshops. Only one respondent ranked two items with D; the majority of respondents ranked all items with either A or SA. The evaluation scores for this workshop are shown in Table 9.

Table 9: Summary of Response Scores for the Fort Worth Workshop on 6/11/2014

Question	SA	A	NC	D	SD	Sum	Score
1.1	29	36	1			66	4.42
1.2	29	36	1			66	4.42
1.3	30	36				66	4.45
1.4	24	40	2			66	4.33
1.5	31	33	2			66	4.44
1.6	38	27	1			66	4.56
1.7	31	33	2			66	4.44
1.8	35	30	1			66	4.52
1.9	28	36	1			65	4.42
2.1	31	35				66	4.47
2.2	23	40	2	1		66	4.29
2.3	26	38	2			66	4.36
2.4	28	36	1	1		66	4.38
2.5	29	37				66	4.44

The lowest ranked item from Category 1 was question "1.4: The activities helped in learning the material." The reasons for this ranking are likely similar to those from the other workshops and have been discussed previously in this report. The highest ranked question from Category 1 was "1.6: The trainer(s) were knowledgeable about the topics." This consistent comment has been discussed in previous chapters of this report and reflects well upon the skill of the instructional team.

The lowest ranked question from Category 2 was "2.2: Utilize data collection resources to communicate and catalog information regarding wildland fire events." This item has been discussed previously in this report. The highest ranked question from Category 2 was "2.1: Explain TxDOT's role in wildland fire response." Again, this item has been discussed previously, but the high ranking is a good indication of the efficacy of and need for this workshop.

9.2: Evaluation Comments

The following comments are presented as written on the course evaluations. Spelling errors are corrected, but grammatical and contextual problems have been left untouched. Multiple comments on the same evaluation are presented separately herein.

- Room was too hot. A/C doesn't work very well.
- Outstanding course. Would really like to have a similar training session for hurricane preparedness.
- Very knowledgeable on all aspects
- Very informative
- Great class
- Great class very informative
- Very excellent class. Covered all aspects needed.
- Last video was very good.
- Good job teaching by committee
- Better understanding of my role as a TxDOT employee during wildfires.
- Safety! Safety! Safety!
- Make sure District Safety is invited to the training. They will be part of the incident. TxDOT should never deploy without a safety office from the District safety team.
- Add somewhere in the training the components of a safety briefing which is all was done at the beginning of the morning meeting.
- Good
- The instructors were very knowledgeable.
- Good information. Trainers were very knowledgeable.
- Thanks!
- Good course.
- Hot.
- Excellent course. It should be mandatory for all heavy equipment operators, who have the possibility to be deployed! We are a rural maintenance section and have had 2 major devastating wildfires in the last 10 years.
- I will also take what I've learned home to family and friends in our rural community in an effort to help save and protect my home and community.

The comments on this workshop were extremely positive, with the only negative point being that the room itself was too warm. An important and overlooked idea surfaced in these comments though. The project team neglected to include District Safety Officers in the list of potential attendees, although several did attend the workshops. If this course is offered in the future, safety officers should be included in the list of students. In addition to this, the safety briefings (which are only alluded to in Module 1) should be emphasized more fully in future editions of this workshop.

9.3: Changes to Workshop Materials after Eighth Workshop

There were no major critiques raised at the end of this workshop. Therefore, no major changes were made to the materials before the final workshop. However, future editions of the workshop should include safety officers and should emphasize safety briefings as an important component of preparation.

Chapter 10: Brownwood (6/12/2014)

The final workshop was hosted in Brownwood on June 12, 2014, the day after the Fort Worth workshop. There were 36 attendants at this workshop, all of whom submitted an evaluation form. Overall, the responses to this workshop were positive. The evaluation scores and comments are discussed below.

10.1: Evaluation Scores

The evaluation scores from Brownwood were some of the highest scores seen over the entire series of workshops. Only one item was ranked below NC, and the majority of all rankings were either A or SA. The evaluation scores are shown in Table 10.

Table 10: Summary of Response Scores for the Brownwood Workshop on 6/12/2014

Question	SA	A	NC	D	SD	Sum	Score
1.1	14	22				36	4.39
1.2	15	20	1			36	4.39
1.3	15	20				35	4.43
1.4	14	22				36	4.39
1.5	16	19				35	4.46
1.6	21	14				35	4.60
1.7	16	20				36	4.44
1.8	19	17				36	4.53
1.9	14	21	1			36	4.36
2.1	19	16		1		36	4.47
2.2	13	23				36	4.36
2.3	14	22				36	4.39
2.4	14	22				36	4.39
2.5	16	20				36	4.44

Interestingly, the lowest ranked item from Category 1 was "1.9: Overall, I am satisfied with what I learned in this course." The highest ranked item from Category 1 was "1.6: The trainer(s) were knowledgeable about the topics." This score of 4.6 was the highest rank that this item was given throughout the entire series of workshops, and it seems to indicate that the instructors were truly connecting with the students at the end of the workshop series.

The lowest ranked item from Category 2 was "2.2: Utilize data collection resources to communicate and catalog information regarding wildland fire events." This item has been discussed previously in this report. The highest ranked item from Category 2 was "2.1: Explain TxDOT's role in wildland fire response." Again, this item has been discussed previously, but the high ranking is a good indication of the efficacy of and need for this workshop.

10.2: Evaluation Comments

The following comments are presented as written on the course evaluations. Spelling errors are corrected, but grammatical and contextual problems have been left untouched. Multiple comments on the same evaluation are presented separately herein.

General Comments

- None, thanks!
- Why have we not had this sooner?
- Good class very informative
- Very informative class, lots of issues covered
- The course was well presented by the well trained instructors

There were no critiques or suggestions provided for this workshop. Therefore, the project team considers it a success.

10.3: Changes to Workshop Materials after Final Workshop

Although there were no suggestions for improvement after the final workshop in Brownwood, the project team made a few alterations to the student and instructors manuals to ensure that future installments of the workshop would have up-to-date materials and so that TxDOT employees could download and access the final versions. These revisions include:

- Changes to Module 4 in the Student Manual to reflect the new radio communication protocols and practices
- Changes to Module 5 in the Student Manual to reflect the changes to the TxDOT intranet Crossroads system
- Changes to Module 6 in the Student Manual with the new fire behavior and attack diagrams and visuals
- Changes to the Instructor Manual to be consistent with the changes to the Student Manual
- Revision of typographical errors in both manuals

Essentially, these modifications brought the manuals up-to-date with the material presented at the final three workshops. Additionally, typographical and grammatical errors were revised. It is the project team's hope that this material becomes available both for TxDOT employees to use as necessary and for future installments of this workshop.

Chapter 11: Conclusions

Texas experienced a significant number of wildland fires during 2011, and TxDOT employees expressed concern over their personal safety, equipment use, and roles in wildland fire response. In response to this, TxDOT approached the TechMRT project team to study the circumstances surrounding TxDOT District deployments during 2011 and to develop a list of best practices. During the course of this research project, it was discovered that TxDOT maintenance personnel who respond to wildland fires would benefit significantly from a training workshop, so an implementation project for wildland fire management training launched at the end of the research project.

This report documents the instruction of the nine training workshops that were hosted across Texas for TxDOT employees to learn wildland fire management. These workshops were hosted in Lubbock, Alpine, San Antonio, Houston, Corpus Christi, Dallas, Fort Worth, and Brownwood. The workshops were open to a number of different TxDOT personnel involved in wildland fire response, including maintenance, engineering, and safety employees. Student manuals and pocket guides were developed for these TxDOT employees to keep and use for future reference. A total of at least 557 TxDOT employees attended the workshops.

During the course of these nine training workshops, evaluation sheets were distributed. The TechMRT project team received 527 total evaluations, and the responses were tallied and analyzed. Respondents were asked to indicate whether they strongly disagreed, disagreed, had no comment on, agreed, or strongly agreed with a number of different responses. Nine responses related to the general instruction and efficacy of the training workshops. Five responses related specifically to learning objectives that the project team wanted the attendants to master during the workshops. To evaluate the efficacy of the workshops, numerical values were assigned to each possible rating for every question, ranging from 1 for a strong disagreement to 5 for a strong agreement. The average score for each question based on this rating system is shown in Table 11 for each workshop, in addition to a total average for all evaluations. Overall, every question received a rating between 4.22 and 4.48. These results indicate that the majority of students either agreed or strongly agreed with the efficacy of the workshops and felt that were equipped with new skills and a better understanding of their roles in wildland fire management.

In addition to completing this report, the project team has also finalized the instructor manual, student manual, and spiral pocket guide for electronic distribution. The project team also finalized a video document of one of the workshops. It is the project team's hope that TxDOT employees will be able to access these materials in the future and either update their own materials or supplement their knowledge. If this training workshop is offered again in the future, the project team will attempt to address two of the major critiques of the workshop. First, future instructors should work closely with TxDOT to revise Module 5 in such a way that it is more useful to TxDOT employees and better explains the data collection and documentation process of wildland fire response. Second, future instructors should plan accordingly before the

workshops on how to emphasize and proceed through learning activities so that they are performed consistently and effectively. Overall, the nine workshops offered were considered a success, but further improvements could benefit future students.

Table 11: Summary of Evaluation Scores for Every Workshop

1	General Questions (These questions apply to all TxDot Classes)	Lubbock	Alpine	San Antonio	Houston 1	Houston 2	Corpus Christi	Dallas	Fort Worth	Brownwood	Average
1.1	The course improved my skills, knowledge, and abilities.	4.21	4.48	4.31	4.30	4.43	4.32	4.32	4.42	4.39	4.33
1.2	The course material was useful.	4.17	4.57	4.35	4.24	4.43	4.30	4.26	4.42	4.39	4.32
1.3	The information in this course is current.	4.19	4.46	4.24	4.40	4.50	4.30	4.28	4.45	4.43	4.33
1.4	The activities helped in learning the material.	4.07	4.46	4.08	4.20	4.29	4.28	4.13	4.33	4.39	4.22
1.5	The audio/visual aids improved the course.	4.22	4.34	4.10	4.24	4.29	4.40	4.32	4.44	4.46	4.30
1.6	The trainer(s) were knowledgeable about the topics.	4.39	4.55	4.45	4.44	4.50	4.57	4.46	4.56	4.60	4.49
1.7	The trainer(s) encouraged participation.	4.28	4.42	4.27	4.40	4.36	4.42	4.38	4.44	4.44	4.37
1.8	The trainer(s) provided feedback and answered questions.	4.34	4.48	4.37	4.36	4.43	4.54	4.42	4.52	4.53	4.43
1.9	Overall, I am satisfied with what I learned in this course.	4.18	4.57	4.33	4.33	4.36	4.38	4.28	4.42	4.36	4.34
2	Course Objectives (By the end of this course, I can...)	Lubbock	Alpine	San Antonio	Houston 1	Houston 2	Corpus Christi	Dallas	Fort Worth	Brownwood	Average
2.1	Explain TxDOT's role in wildland fire response.	4.22	4.58	4.20	4.36	4.43	4.57	4.38	4.47	4.47	4.39
2.2	Utilize data collection resources to communicate and catalog information regarding wildland fire events.	4.12	4.40	4.08	4.16	4.29	4.28	4.26	4.29	4.36	4.23
2.3	List and safely use the proper resources and equipment for wildland fire response.	4.18	4.51	4.20	4.26	4.43	4.38	4.37	4.36	4.39	4.32
2.4	Explain the basic fundamentals of fire behavior and fire safety.	4.16	4.45	4.24	4.29	4.43	4.36	4.33	4.38	4.39	4.31
2.5	Cooperate with other agencies at a wildland fire event.	4.19	4.55	4.24	4.28	4.43	4.32	4.36	4.44	4.44	4.34

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Appendix: Course Evaluation Form

Texas Department of Transportation

Please answer all questions by choosing either Strongly Agree (SA), Agree (A), No Comment (NC), Disagree (D), or Strongly Disagree (SD).   Thank You for Your Feedback!

Mark as shown: ☐ ☒ ☐ ☐ ☐ Please use a ball-point pen or a thin felt tip. This form will be processed automatically.

Correction: ☐ ■ ☐ ☒ ☐ Please follow the examples shown on the left hand side to help optimize the reading results.

1. General Questions: (These questions apply to all TxDOT classes)

		SA	A	NC	D	SD
1.1	The course improved my skills, knowledge, and abilities.	☐	☐	☐	☐	☐
1.2	The course material was useful.	☐	☐	☐	☐	☐
1.3	The information in this course is current.	☐	☐	☐	☐	☐
1.4	The activities helped in learning the material.	☐	☐	☐	☐	☐
1.5	The audio/visual aids improved the course.	☐	☐	☐	☐	☐
1.6	The trainer(s) were knowledgeable about the topics.	☐	☐	☐	☐	☐
1.7	The trainer(s) encouraged participation.	☐	☐	☐	☐	☐
1.8	The trainer(s) provided feedback and answered questions.	☐	☐	☐	☐	☐
1.9	Overall, I am satisfied with what I learned in this course.	☐	☐	☐	☐	☐

2. Course Objectives: (By the end of this course, I can..)

		SA	A	NC	D	SD
2.1	Explain TxDOT's role in wildland fire response.	☐	☐	☐	☐	☐
2.2	Utilize data collection resources to communicate and catalog information regarding wildland fire events.	☐	☐	☐	☐	☐
2.3	List and safely use the proper resources and equipment for wildland fire response.	☐	☐	☐	☐	☐
2.4	Explain the basic fundamentals of fire behavior and fire safety.	☐	☐	☐	☐	☐
2.5	Cooperate with other agencies at a wildland fire event.	☐	☐	☐	☐	☐

3. Comments: (On the Instructor and on the Course.)

3.1