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**PROJECT SUMMARY OF IMPROVING PROCESSES FOR OBTAINING AND
UTILIZING TRAFFIC DATA FOR HIGHWAY DESIGN**

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Report 5-1801-01-1
Project Number 5-1801-01
Implementation Project Title:
Improving Processes for Obtaining and Utilizing Traffic Data for Highway Design

Performed in Cooperation with the
Texas Department of Transportation
and the
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September 2004

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Disclaimer

The contents of this report reflect the views of the authors, who are solely responsible for the facts and accuracy of the data, the opinions, and the conclusions presented herein. The contents do not necessarily reflect the official views or policies of The Texas Department of Transportation (TxDOT), Federal Highway Administration (FHWA), the Texas A&M University System, or the Texas Transportation Institute (TTI). This report does not constitute a standard or regulation, and its contents are not intended for construction, bidding, or permit purposes. The use of names or specific products or manufacturers listed herein does not imply endorsement of those products or manufacturers. The engineer in charge of the project was Jason A. Crawford, P.E. (Texas License # 83241).

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Project Background

The Texas Department of Transportation (TxDOT) Transportation Planning and Programming Division (TPP) is the sole source of TxDOT archived traffic data. The Traffic Analysis Section of TPP [TPP(T)] has traditionally provided the service of statewide and special count traffic data collection and reporting traffic data and will continue to provide other divisions, agencies, and the public with traffic data necessary for their efforts.

TxDOT Project 5-1801-01, “Improving Processes for Obtaining and Utilizing Traffic Data for Highway Design,” implemented recommendations from TxDOT Project 0-1801, “Evaluate and Develop an Improved System for Collecting and Reporting Traffic Loads to Better Meet the Needs of Bridge and Pavement Designers.” The Texas Transportation Institute (TTI) performed both projects. Project 0-1801 had two primary objectives:

- compare current TxDOT procedures and protocols with the state-of-the-practice and the needs of its data customers; and
- develop enhanced traffic collection, archival, analysis, forecasting, and reporting methodologies.

TxDOT had been concerned about the process, consistency, accuracy, and timeliness of traffic load forecast estimates for pavement design. The research included a literature review and an evaluation of the state-of-the-practice for traffic data collection equipment, data collection and archiving protocols, forecasting methodologies, and reporting methods. This project produced two products:

- Recommendations for Enhancing TxDOT’s Current Traffic Forecasting Process (0-1801-P1), and
- Traffic Data Request Guide for Highway Pavement and Geometric Design (0-1801-P2).

One recommendation of the research was to implement findings through improvements to the *Traffic Data Request Guide for Highway Pavement and Geometric Design (Guide)*. Educating district staff on the issues and process of traffic data collection and traffic data requests offers substantial opportunities for an improved and coordinated process in the future.

Implementation of the *Guide* included an outreach and training program designed to educate districts and other divisions on the *Guide*, traffic data collection processes, and the procedures to follow when requesting traffic data. The training mechanism was envisioned as a workshop. The target audience was identified as TxDOT TPP traffic analysts, as well as district pavement or geometric designers that request traffic data for design purposes. The workshop training materials would include a PowerPoint® presentation and an instructor/facilitator notebook.

Project Results

Project 5-1801-01 created two primary products. First, the *Traffic Data Request Guide for Highway Pavement and Geometric Design* initially drafted within the research project was updated and transformed into an attractive and reader-friendly format, with an accompanying

CD-ROM. Second, a complementary training workshop was created and delivered four times to TxDOT staff from many districts.

Traffic Data Request Guide for Highway Pavement and Geometric Design

The *Guide* was initially drafted as part of the originating research project. Under this implementation project, researchers updated the *Guide* expanding the scope of discussion to other data collection types beyond the weigh-in-motion data collection solely discussed in the initial draft. Discussion was also expanded on districts' use of forms to request data or special traffic data collection studies. At the inception of this implementation project, both TTI and TxDOT staff conceived that the *Guide* content would benefit from the development of the integrated online forms initiative within TxDOT. Though the expected level of integration of these forms was not reached, this project and its products helped TxDOT standardize and promote these forms.

TTI conducted interviews with various TPP(T) staff to expand the content and provide information critical to accurately update previous discussions in the *Guide*. The draft created during the research project discussed only weigh-in-motion data collection. The updated *Guide* includes discussion on speed, short-term volume, continuous volume, and manual and automated vehicle classification. It includes information on site requirements, monitoring methods, capabilities, limitations, and costs for each data collection type presented. TPP(T) provided updated permanent traffic data station maps which are included in the *Guide*.

A CD-ROM was created to accompany the publication. [Figure 1](#) displays the interface screen. The CD-ROM contains portable document format (PDF) files of the *Guide* and edit-ready traffic data request forms. Providing these forms on the CD-ROM allows another access point to the forms beyond the Forms Online Library and via Microsoft Word templates available through the TxDOT system. These forms can be completed and electronically mailed from the preparer's desk for review and processing.

The publication was creatively transformed from its original research report format into a very attractive and reader-friendly, spiral bound booklet. Color graphics on the cover, shown in [Figure 2](#), blend a traffic data collection cabinet with streams of binary numbers to provide a subtle tone of the *Guide's* purpose and content. The use of bold red and blue colors accentuates the *Guide's* message and delineates the various sections within the document.

The *Guide* was provided to TxDOT in three media: spiral-bound hardcopy, PDF, and an electronic version compatible with the TxDOT online manual system. TTI recommended producing several copies of the *Guide* and distributing them through each district planning office out to district headquarter and area office staff.

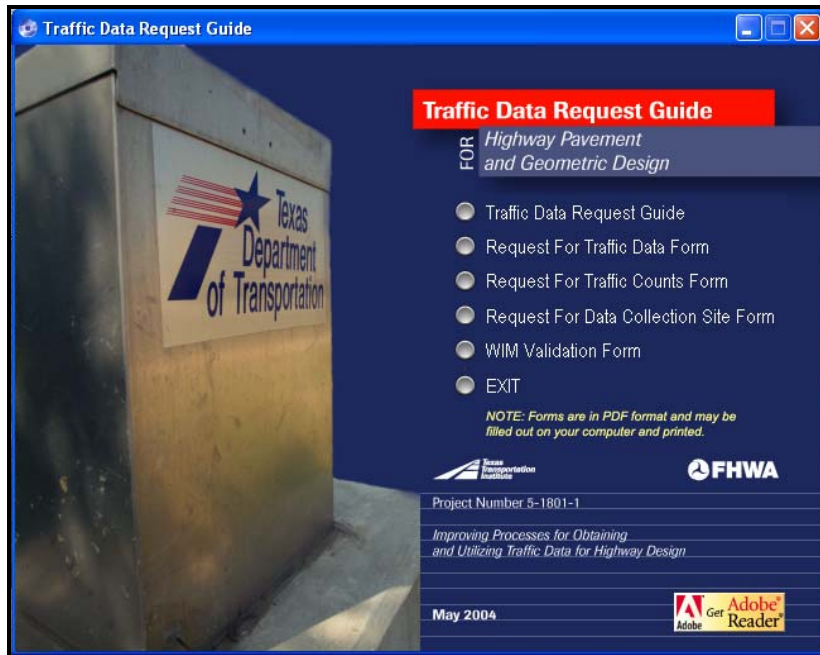


Figure 1. Accompanying CD-ROM Interface.

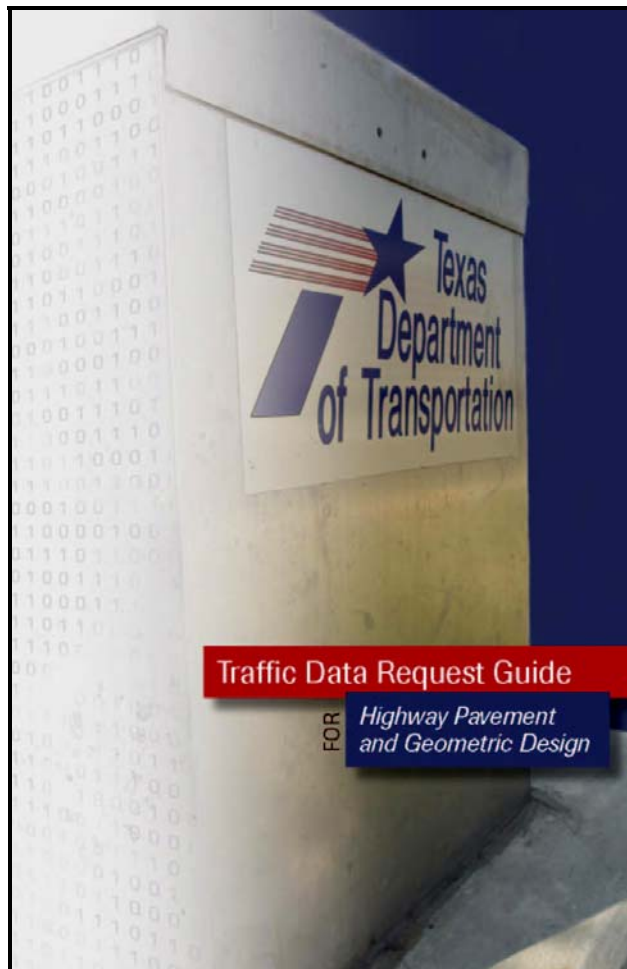


Figure 2. Cover of the Completed Guide.

Workshop on Traffic Data Request Guide for Highway Pavement and Geometric Design

Researchers developed a complementary workshop to be delivered in half a day. The workshop used a 10:00 a.m. to 3:00 p.m. schedule, allowing TxDOT staff working within the region time to travel to the training location and return afterwards, minimizing the need for overnight travel. The entire workshop could also be delivered either in the morning or afternoon.

The workshop content conveys the important points from the *Guide*. It provides ample time for participants to familiarize themselves with the traffic data request forms and to understand commonalities and differences between the various data collection methods. Each lesson clearly identifies the learning objectives and provides exercises that allow the participants to measure their learning. Exercises use individual and small or large group dynamics.

Through the use of pre- and post-assessment tests, the workshop measures the participants' incoming knowledge level on this subject and the knowledge they acquire. Participants typically find they know some or none of the course content; but as a result of the workshop, they gain an important understanding of the various traffic data collection methods, their site requirements, and purposes for the request forms.

Visual themes from the *Guide* were carried over into the workshop, as shown in [Figure 3](#). TTI created an Instructor Notebook and Participant Notebook (5-1801-01-P2). The Instructor Notebook can be used by future instructors to understand the objectives of each lesson, the recommended teaching methods, key points to relay to participants tied to content shown on the visual aid, and exercises reinforcing the learning objectives. The Participant Notebook contains copies of the visual aids: one visual aid per page with ample lined, note-taking space below the graphic.

Four half-day workshops were held in Austin, Tyler, Abilene, and Arlington. TTI provided an announcement inviting participants from the following 13 TxDOT districts: Abilene, Atlanta, Austin, Brownwood, Dallas, Fort Worth, Lufkin, Odessa, Paris, San Angelo, San Antonio, Tyler, and Waco. TTI coordinated with local district staff at each location to secure training space and encourage participation.

Forty-eight attendees participated in the four workshops. TxDOT staff represented area offices, district transportation planning and development sections, and district design sections. The mix of participants was conducive to their learning, through sharing of information or questions about the material.

During this project, two instructors delivered the course by dividing responsibility for the content before and after the 60-minute lunch break. One instructor is capable of delivering the entire course at future offerings.

In two workshop deliveries, a TPP(T) staff member was present. Participants found this staff member's presence to be beneficial, providing additional discussion of course content or clarification of TPP(T) procedures and processes. Future workshop offerings should include an invitation for TPP(T) staff to participate as observers.

The participants' goals and expectations were recorded during the workshop introduction and reviewed at the end of the course. In general, the participants' workshop goals were met through the course content. As with many learning situations, participants' expectations deviate slightly from the course content. Additionally, the workshop instructors facilitated an informal verbal review of the workshop at its conclusion. One instructor acted as the facilitator and the

other instructor as the scribe, recording ideas on a flip chart. [Appendix A](#) provides ideas captured through these recording sessions. A combined summary of the participants' written evaluations of the workshop is provided in [Appendix B](#).

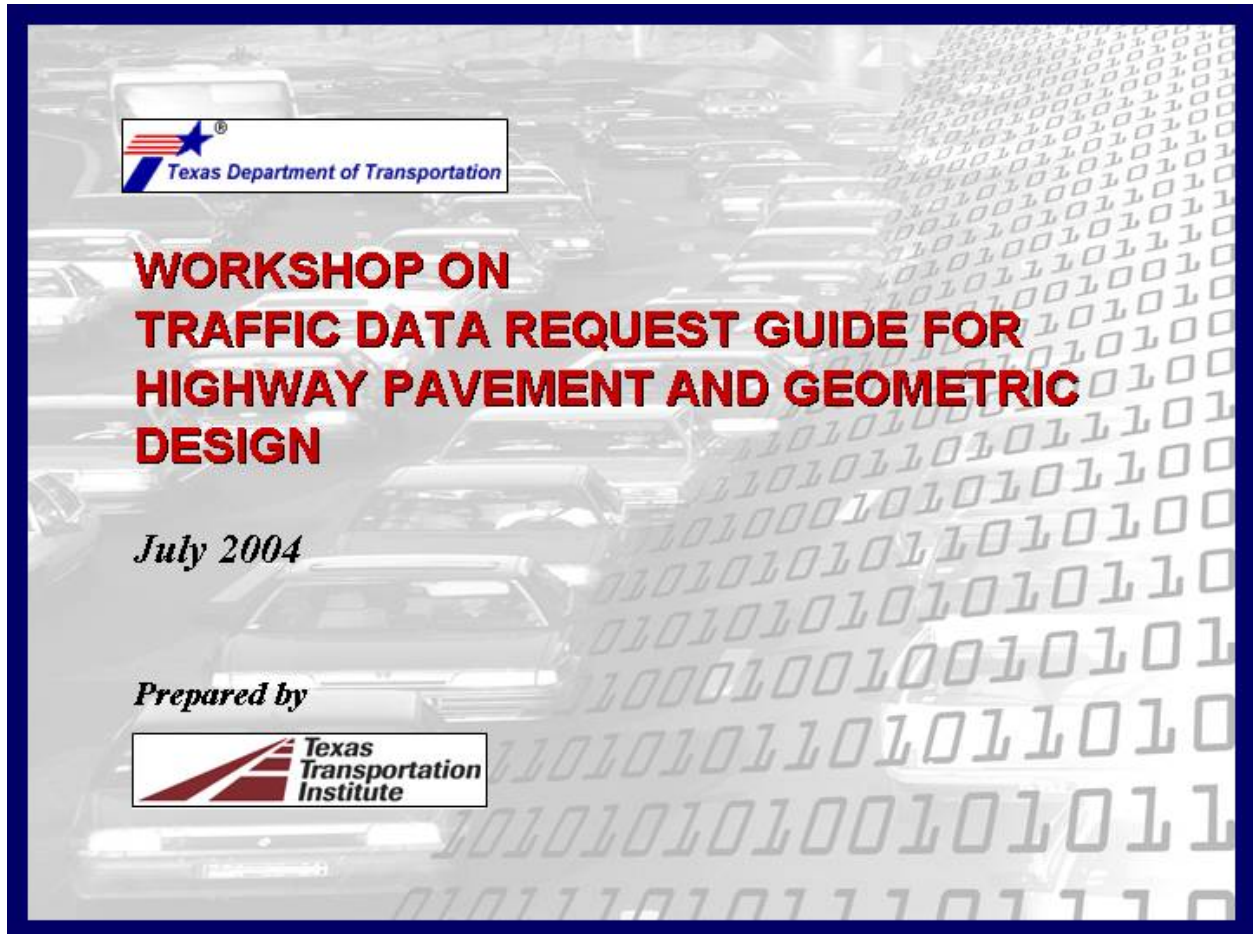


Figure 3. Opening Screen of Workshop Visual Aids.

Summary

This implementation project created two products. An updated *Traffic Data Request Guide for Highway Pavement and Geometric Design* was prepared and formatted into an attractive and reader-friendly format, with an accompanying CD-ROM. Outreach was developed and conducted on four occasions to 48 TxDOT staff from many districts through a complementary training workshop. Training materials were produced for instructors' and participants' use at future offerings.

Appendix A. Combined Workshop Participant Stated Goals and Suggestions

Note: These are the original, unedited comments by the participants.

| Location | Participant Comments | |
|-----------|--|---|
| | Workshop Goals | Workshop Suggestions |
| Abilene | <ul style="list-style-type: none"> • Traffic data for ramps • When to submit diagrams • How data is generated • What data to send to TPP • How much lead time is needed | Make request guide available on-line Improve content on intranet site |
| Austin | <Not retained> | Didn't Work <ul style="list-style-type: none"> • More advance notice • Make announcement more clear • Exercises (dialog most valuable) • Spend more time on discussion • Spend more time reviewing forms to update them Did Work <ul style="list-style-type: none"> • TPP(T) Presence \ interaction \ faces on people • Keep it short • 10-3 • Communication • Area for notes |
| Arlington | <ul style="list-style-type: none"> • Any changes (& improvements) to request forms • What data are available? • Data interpretation • Differences in data • Data request process in TPP • Increased turnaround • Appeal process | Like: <ul style="list-style-type: none"> • Learn the process • Comprehensive subject Dislike: <ul style="list-style-type: none"> • Travel time • Could this be online? • Forms and detailed instruction online • Longer, paid lunch |
| Tyler | <ul style="list-style-type: none"> • Proper procedures • Timing of data request • Forms for design data | <Not captured> |

Appendix B. Combined Workshop Assessment Results

Note: These are the unedited, written comments by the participants.

As a direct result of this workshop, my knowledge about this subject has increased:

| | Less | | | | | More | | | | |
|------------------|------|---|----------|---|----------|----------|----------|-----------|----------|----------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| <i>Abilene</i> | | | | | | | 2 | 4 | | 1 |
| <i>Austin</i> | | | | | | 1 | 1 | 2 | | |
| <i>Arlington</i> | | | 1 | | 1 | 2 | 2 | 8 | 3 | 2 |
| <i>Tyler</i> | | | | | 1 | | 1 | 2 | 2 | 1 |
| Total | | | 1 | | 2 | 3 | 6 | 16 | 5 | 4 |

How likely are you to use the information presented in this workshop when you return to your office:

| | Less | | | | | More | | | | |
|------------------|----------|----------|---|----------|----------|----------|----------|----------|----------|----------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| <i>Abilene</i> | | 1 | | | 1 | | 1 | 3 | 1 | |
| <i>Austin</i> | | | | | | 1 | 2 | 1 | | |
| <i>Arlington</i> | 1 | 1 | | 1 | 4 | 2 | 3 | 2 | 2 | 3 |
| <i>Tyler</i> | | | | | 1 | 1 | 3 | | | 2 |
| Total | 1 | 2 | | 1 | 6 | 4 | 9 | 6 | 3 | 5 |

The most important idea I learned is:

Abilene:

- *Safety*
- *A form is available to request traffic data*
- *How to complete traffic data request*
- *Email form to Austin using standard forms*
- *Stimulated my thought process on how to improve the submission of request and dissemination of the reports to the appropriate personnel*
- *Fundamental workings of the process of getting traffic data was cleared up a little*

Austin:

- *Sites cost, requirements, district needs*
- *Identify locations early*

Arlington:

- *WIM*
- *More understanding in different types of traffic counts*
- *There is no real change in traffic requests. Forms are available online*
- *What goes into getting traffic data*
- *How the process works*
- *Different types of measurement, the equipment and processes*
- *The entire process*
- *Lead time*
- *Importance of early request*
- *Different types of traffic data*
- *How much it costs*
- *How to fill up form*
- *Requirements for different data requests*
- *Requirement for different data collection devices and error factors*
- *Different traffic collection methods*
- *What is needed to request data, where to find the forms, and who to talk to*
- *Different type of traffic counting methods and process of requesting traffic data*
- *Early requests*
- *How everyone works together*

Tyler:

- *TPP can provide more data than I was aware of*
- *There are multiple options and techniques for data gathering*
- *Dist. TP&D needs to prioritize requests*
- *WIM / Proper form for traffic data request*
- *Where to find new forms*
- *Good communication with TPP*

Please tell us what you liked best about this workshop:

Abilene:

- *Short*
- *Good general data*
- *Traffic data request guide*
- *Good general overview*
- *Preparation of a guidebook*
- *The instructors were up on the subject matter*

Austin:

- *Opportunity to talk through process with other districts, divisions and staff doing the study*
- *Manual / Dialogue between TPP and district*
- *The presentation provided a good understanding of data collection, type of collection and flow of the types needed*
- *Traffic data request guide / Conciseness of the workshop*

Arlington:

- *WIM info*
- *Good presentation*
- *Descriptions of different types of traffic data that can be obtained*
- *Appropriate time frame; some of discussion was informative*
- *Introduction to the process--as a designer it is helpful to know how the process works; learning about the different types of methods to obtain data*
- *Did not drag out for 8 hours*
- *Very informative; previously, all I knew was that I submitted a form to district to request counts*
- *Size, location, instructors and information (hand-outs)*
- *Various methods of data collection*
- *Not too long, just right; I have a better understanding of different methods used and requirements for each*
- *The open discussion*
- *Understanding of process needed to obtain good data*
- *Instructors' knowledge; open; information was interesting*
- *Comprehensive coverage of subject*
- *Having someone from TPP at the class to answer questions*
- *Not longer than four hours*
- *10 am to 2 pm; driving time*

Tyler:

- *Good information*
- *Talking with other districts / Open discussion*
- *Interaction with other district personnel / Getting perspective from others*
- *Traffic data request discussion*
- *Requirements for various types of counting systems*
- *Contents in manual covered*

Please tell us what you liked least about this workshop:

Abilene:

- *No breaks*
- *Too much on request traffic counts and WIM*
- *Short lunch*
- *A little long / Too many workshops*
- *Not really geared to my position as a designer*

Austin:

- *Exercises could be reduced*
- *Learning objectives / Review exercises*

Arlington:

- *Need more time for lunch*
- *A little long*
- *Too many activities*
- *From an area office standpoint, the information was not very useful*
- *Hour drive to and from class*
- *Nothing was interesting*
- *Not enough traffic data request guides*
- *Need a little more information (elaborate) in the notes*
- *Too long; module objectives/results; group exercises*
- *Not enough traffic data request guide book*
- *Not very open-minded*

Tyler:

- *Lack of pictures: pictures of different methods would be a benefit*
- *Length*
- *Use of acronyms*
- *Some pictures needed*

Please tell us how you would improve this workshop:

Abilene:

- *Talk more on traffic request: most important to designers and planners*
- *Spend more time explaining individual items on forms, or provide a form with each item and definition*
- *Show how some of the data is generated: Example – ESAL calculation*
- *Shorten the course or add more technical substance to the presentations and material*

Austin:

- *Increase notice time – more details on what workshop would include so different district staff could be encouraged to attend*
- *More time for dialogue / Have a TPP representative*
- *Use some anecdotal stories regarding TFC / Data Study, requests*

Arlington:

- *More physical/written examples*
- *Make it a little shorter; have sufficient booklets for class size*
- *Instead of providing actual information that could be used as a reference in slides, slides were broad in description. Actual needs for each situation should have been provided.*
- *I would not include area office designers, maybe area engineers*
- *By filling at least “traffic data request form” (which is most common request) based on actual project, and give a filled-out sample of all forms to be used as an example in the future.*
- *I think this could be converted to an online course without much loss of quality. Emphasize coordination with district TP&D office, which was done at end*
- *Void this workshop*
- *Use a larger room*
- *Expatiate more about the topics in the notes.*
- *Maybe shorten to 2 hours*
- *This seminar should be restricted to persons whose jobs might require this information*
- *Send form with detailed instructions*

Tyler:

- *Have someone from TPP present*
- *Add pictures / This subject could be lecture without classic format using exercises*
- *Shorten the presentation*
- *Sample project for traffic data request / Pictures of various types of traffic data collectors*
- *More specific information on actual traffic count analysis*

Were the break times during the workshop sufficient?

Abilene:

- *No (1)*
- *Yes (6)*

Austin:

- *Yes (3)*
- *One 10-minute afternoon break would be nice*

Arlington:

- *Yes (11)*
- *No break time*
- *No! Need at least one 10-min. break every 2 hours*

Tyler:

- *Yes (7)*

Do you approve of the facility/classroom? If not, why?

Abilene:

- *Yes (6)*
- *Too cold*

Austin:

- *Yes (4)*

Arlington:

- *Yes (7)*
- *No-room too small (11)*
- *Would be better to have class at the district*
- *Facility was okay; Regional Training Center in FW would be a better location*

Tyler:

- *Yes (7)*

How would you rate the instructors?

| | Poor | | | Average | | | | Excellent | | |
|------------------|------|---|---|---------|---|---|---|-----------|----|----|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| <i>Abilene</i> | | | | | | | | 4 | 2 | 1 |
| <i>Austin</i> | | | | | | | 1 | 1 | 2 | |
| <i>Arlington</i> | | | | | 1 | | 3 | 5 | 5 | 6 |
| <i>Tyler</i> | | | | | | 1 | 1 | 2 | 1 | 2 |
| Total | | | | | 1 | 1 | 5 | 12 | 10 | 9 |

Would you recommend this workshop to colleagues?

Abilene:

- *No (1)*
 - *Not unless they were directly involved with the traffic portion of projects*
- *Yes (6)*
 - *To all designers in the district*
 - *Only to engineers, district, personnel, etc.*

Austin:

- *Yes (4)*

Arlington:

- *Yes (13)*
 - *To other designers/engineers in our district*
 - *To designers*
 - *But only to those who need it in their current job*
 - *If they are working with traffic requests*
- *No (5)*
 - *Not necessary for most personnel*
 - *Not unless shortened*
- *Maybe (1)*

Tyler:

- *Yes (6)*
 - *If I had a new employee in TP&D/Planning*

