

FINAL REPORT ~ FHWA-OK-16-09

Oklahoma Public and Tribal Transportation Infrastructure Employee Occupational Safety and Health Training and Evaluation – Phase 1

Douglas Wright, Director
Center for Local Government Technology
College of Engineering, Architecture and Technology
Oklahoma State University
Stillwater, Oklahoma

Neal Carboneau, CEO, Member
Transportation Training Institute, LLC
West Lafayette, Indiana

October 2016



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OKLAHOMA PUBLIC AND TRIBAL TRANSPORTATION INFRASTRUCTURE EMPLOYEE OCCUPATIONAL SAFETY AND HEALTH TRAINING AND EVALUATION – PHASE 1

FINAL REPORT ~ FHWA-OK-16-09
ODOT SP&R ITEM NUMBER 2300(16-03)

Submitted to:

Dawn R. Sullivan, P.E.
Director of Capital Programs
Oklahoma Department of Transportation

Submitted by:

Douglas Wright, Director
Center for Local Government Technology (CLGT)
College of Engineering, Architecture and Technology (CEAT)
Oklahoma State University
and
Neal Carboneau, CEO, Member
Transportation Training Institute, LLC



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16. ABSTRACT The objective of this project was to reduce the number and severity of incidents to Oklahoma's public and tribal sector workforce that has responsibilities for working on the road while gaining a better understanding of the need for worker safety training to help drive future decision making processes. The need was to be identified through the participants' understanding of basic hazards and prevention measures in their workplace using OSHA's 10 Hour Outreach Training Program customized under FHWA's Work Zone Safety Grant by ARTBA in conjunction with the Roadway Safety Consortium for the roadway industry. The course was further customized during this project to more closely meet the needs of the specific participants relating to their activities in infrastructure management. Audience response systems were used to allow for participant assessment, survey, engagement, evaluation and post training perspective. The results provide both a quantitative and qualitative impact of the participants' understanding of basic course information. The participants' average pretest score was 57% and their perspective on their understanding of the content prior to the course was an average score of 62%. The average post test score was 86% with a post course perspective on their understanding of 84%. The course and instructor rating of 4.54 out of 5 also identifies the quality and impact of the training. A post training follow up by TTI-LLC, independent of this research showed 1 in 4 participants of a similar course surveyed one year following training indicated that they thought about the information contained in the course often. Approximately one in three thought that the course provided a definite improvement of safety on their jobs. The final component of the project was to identify future needs; and, based on course discussions and data collected, advanced temporary traffic control training was identified as a need for the participants targeted for this training.					
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SI* (MODERN METRIC) CONVERSION FACTORS

APPROXIMATE CONVERSIONS TO SI UNITS				
SYMBOL	WHEN YOU KNOW	MULTIPLY BY	TO FIND	SYMBOL
LENGTH				
in	inches	25.4	millimeters	mm
ft	feet	0.305	meters	m
yd	yards	0.914	meters	m
mi	miles	1.61	kilometers	km
AREA				
in ²	square inches	645.2	square millimeters	mm ²
ft ²	square feet	0.093	square meters	m ²
yd ²	square yard	0.836	square meters	m ²
ac	acres	0.405	hectares	ha
mi ²	square miles	2.59	square kilometers	km ²
VOLUME				
fl oz	fluid ounces	29.57	milliliters	mL
gal	gallons	3.785	liters	L
ft ³	cubic feet	0.028	cubic meters	m ³
yd ³	cubic yards	0.765	cubic meters	m ³
NOTE: volumes greater than 1000 L shall be shown in m ³				
MASS				
oz	ounces	28.35	grams	g
lb	pounds	0.454	kilograms	kg
T	short tons (2000 lb)	0.907	megagrams (or "metric ton")	Mg (or "t")
TEMPERATURE (exact degrees)				
°F	Fahrenheit	5 (F-32)/9 or (F-32)/1.8	Celsius	°C
ILLUMINATION				
fc	foot-candles	10.76	lux	lx
fl	foot-Lamberts	3.426	candela/m ²	cd/m ²
FORCE and PRESSURE or STRESS				
lbf	poundforce	4.45	newtons	N
lbf/in ²	poundforce per square inch	6.89	kilopascals	kPa
APPROXIMATE CONVERSIONS FROM SI UNITS				
SYMBOL	WHEN YOU KNOW	MULTIPLY BY	TO FIND	SYMBOL
LENGTH				
mm	millimeters	0.039	inches	in
m	meters	3.28	feet	ft
m	meters	1.09	yards	yd
km	kilometers	0.621	miles	mi
AREA				
mm ²	square millimeters	0.0016	square inches	in ²
m ²	square meters	10.764	square feet	ft ²
m ²	square meters	1.195	square yards	yd ²
ha	hectares	2.47	acres	ac
km ²	square kilometers	0.386	square miles	mi ²
VOLUME				
mL	milliliters	0.034	fluid ounces	fl oz
L	liters	0.264	gallons	gal
m ³	cubic meters	35.314	cubic feet	ft ³
m ³	cubic meters	1.307	cubic yards	yd ³
MASS				
g	grams	0.035	ounces	oz
kg	kilograms	2.202	pounds	lb
Mg (or "t")	megagrams (or "metric ton")	1.103	short tons (2000 lb)	T
TEMPERATURE (exact degrees)				
°C	Celsius	1.8C+32	Fahrenheit	°F
ILLUMINATION				
lx	lux	0.0929	foot-candles	fc
cd/m ²	candela/m ²	0.2919	foot-Lamberts	fl
FORCE and PRESSURE or STRESS				
N	newtons	0.225	poundforce	lbf
kPa	kilopascals	0.145	poundforce per square inch	lbf/in ²

*SI is the symbol for the International System of Units. Appropriate rounding should be made to comply with Section 4 of ASTM E380. (Revised March 2003)

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1.0 BACKGROUND

Workplace injuries and fatalities impact the employee, their family, the employer and the general public. Workers and their families are impacted both emotionally and financially by the incident. Employers are impacted financially in both tangible and in-tangible ways. Co-workers of the personnel injured or killed can also be personally impacted by the incident. The general public is impacted indirectly through insurance costs and tax liability; so, emphasizing worker safety, evaluating methods to provide training and the impacts of training are all critical components in developing an effective program to combat these issues.

Oklahoma Department of Labor (ODOL) has a “Safety Pays” document with data from Liberty Mutual and the US Department of Labor (USDOL) which indicates that “for every \$ 1.00 invested in safety, there is a return between \$ 3.00 and \$ 6.00 on the investment.” The Occupational Safety and Health Administration’s (OSHA) “Safety and Health Add Value Publication” # 3180 also indicates that:

- Businesses spend \$170 billion a year on costs associated with occupational injuries and illnesses
- Workplaces that establish safety and health management systems can reduce their injury and illness costs by 20 to 40%
- Injuries and illnesses increase workers’ compensation and retraining costs as well as absenteeism
- Workers who suffer a disabling injury can lose 40 percent of their income over five years
- Families can lose even more because of the increased stress, conflict, and divorce associated with occupational injury and illness

These statistics reinforce the impacts of incidents identified and show the safe way is the cheapest way.

2.0 INTRODUCTION

The Bureau of Labor and Statistics (BLS) article by Shannon Maloney titled “Nonfatal Injuries and Illnesses among State and Local Government Workers” from March 2014 indicates that: “Local government workers accounted for 16.8 % of all injuries and illnesses reported for State, Local and Private Industry workers.” Prior to 2008, the BLS “Survey of Occupational Injuries and Illnesses” did not include information regarding state and local government workers; although many state agencies were tracking data on their own workers. Oklahoma’s Public Employees Occupational Safety and Health (OKPEOSH) Division within Oklahoma Department of Labor is one agency which has tracked data and used that data to focus their activities.

Worker safety training programs have been primarily developed based on the incidents identified in private sector data. Research regarding incidents involving public employees has been limited, but recent BLS statistics indicate that “public sector employees experienced a higher incidence rate of work-related injuries and illnesses than their private industry counterparts.” It is apparent that an ongoing program for public worker training addressing tasks specific to those workers is necessary to better impact these statistics.

3.0 OBJECTIVE

This project proposed to continue a program meant to reduce the frequency and severity of public and tribal sector highway worker incidents through hazard recognition and prevention. The goal was to combine both research and implementation to identify areas of emphasis while delivering needed training in which data could be collected for these workers.

The research component of the project had several components including:

- identifying topics from Oklahoma data to emphasize within the Occupational Safety and Health Administration Outreach Training Program for the Construction Industry
- assessing attendees' understanding of critical components of the course prior to its delivery
- customizing course content based on the participants understanding, responsibilities and environment
- re-assessing the attendees understanding of the critical components following the course to allow for continuous improvement of the course content based on the results and
- evaluating the instructor and key components regarding delivery of the course to allow for continuous improvement of the course delivery.

4.0 WORK PLAN

The plan to provide the research, course customization, training, data collection and evaluation was developed based on a similar effort in the 2015 Fiscal Year in which Federal, State, Local and Tribal employees were trained using the OSHA Outreach Training Program for the Construction Industry provided by the American Road and Transportation Builders Association (ARTBA) which had been customized for the roadway construction industry. The plan for this project included:

- the initial research of specific Oklahoma public sector incident data
- customization of ARTBA's OSHA 10 Hour Construction Industry Course for the public and tribal sectors
- training at sixteen locations throughout Oklahoma
- collecting data from those courses
- evaluating the data and
- modifying the courses based on the data for continuous improvement throughout the project.

The sixteen training locations were provided throughout the state to provide diversity in date, geography, participant type and responsibilities. Two full days of training were to be provided at each location to allow for the 10 hour minimum contact time required for issuance of the OSHA 10 Hour Construction Industry Card, allow ample time for interaction, provide regular breaks to improve the learning environment and provide the additional time necessary for data collection and evaluation. Specific components of the data that were to be collected and evaluated were to be determined in the initial research period and were represented by the following:

- Participants' perspective of incident data
- Participants' present understanding of minimums according to code (Pre-Test)
- Evaluation of participants' understanding after training (Post-Test)
- Perceived understanding before and after training to provide a qualitative comparison of the participants understanding
- Participants' preferences for learning and future use of materials
- Evaluation of the course and instructor

An audience response system was used to collect and assemble the data

5.0 ANTICIPATED BENEFITS

The anticipated benefit of this project was broadening the breadth and depth of understanding throughout Oklahoma's public and tribal sectors' workforce of the hazards and prevention measures covered in the OSHA Outreach 10 Hour Construction Industry Program with an emphasis on how those topics relate to the specific activities of these workers. The approach to improve this understanding was to insure the training content was relevant to the participants, emphasized the personal and financial impacts of injuries and convinced the audience to use the prevention measures because they want to protect themselves, their livelihood, their families, their co-workers, their employers and the travelling public.

This benefit was anticipated to lead to:

- A reduction in the number and severity of incidents in the public and tribal sectors
- An increase in the frequency of discussions relating to these topics within these sectors
- An emphasis on continued training, planning and implementation of concepts identified in Federal, State and Tribal regulations throughout these sectors

Additional benefits include:

- Course customization through research and data collection
- Confirmation of the need for training
- Better understanding of challenges and best practices for delivery and continuous improvement
- Ability to provide recommendations for future work based on data collected during the project

6.0 TASKS AND OBSERVATIONS

The tasks performed included the following:

1. Brief collection of state specific incident information
2. Update the basic training program with audience specific topics
3. Create slide notes and key topic handout for participants
4. Make PDF versions of key topics available to participants
5. Provide 16 training events with data collection
6. Summarize data collected
7. Propose future phases based on results

6.1 Task 1 - Brief collection of state specific incident information and

6.2 Task 2 - Update basic training program with audience specific topics

The initial task for this project was to review incident information as well as information collected under previous initiatives for the public and tribal sectors in Oklahoma. The second task was to customize the content within the OSHA Outreach 10 Hour Construction Industry Program customized under the Federal Highway Administration's (FHWA) Work Zone Safety Grant by the American Road and Transportation Builders Association (ARTBA) in conjunction with the Roadway Safety Consortium. The customization for the training to be conducted during this project included using ARTBA's course materials, OSHA's designated Outreach training topics, OSHA's resources to assist Outreach trainers in their preparation for conducting Outreach training classes as well as products and information from a number of sources detailed in the materials with the goal of more closely meeting the needs of the specific participants relating to their activities in infrastructure management.

Materials from the following organizations were used in this review and customization:

- American Road and Transportation Builders Association (ARTBA)
 - Preventing Runovers and Backovers Courses prepared by the American Road and Transportation Builders Association and the Roadway Safety Consortium under OSHA's Susan Harwood Training Grant Program
 - Roadway Safety + Software and Tool Box Talks by the American Road and Transportation Builders Association and the Roadway Safety Consortium under the Federal Highway Administration 's Work Zone Safety Grants
 - Roadway Safety, Temporary Traffic Control and Flagger Training Program from the Transportation Training Institute, LLC.
- Association of County Commissioners of Oklahoma (ACCO)
 - County agency employee injury and fatality information provided by Dale Frech from the Association of County Commissioners of Oklahoma (ACCO) to identify focus areas for the training based on the types of work being performed, incident types and their associated rates.

- Oklahoma Department of Labor (ODOL), Public Employees Occupational Safety & Health Division (PEOSH)
- Oklahoma Department of Labor (ODOL), Statistical Research Division
 - Oklahoma Department of Labor (ODOL), Statistical Research Division, collects data and reports statistics based on that information as well as other data from the BLS and their Census of Fatal Occupational Injury & Illness (CFOI).
 - The agency’s website as well as other publications such as their “Safety Pays” flyer, “Looking SHARP” publication, specifically Volume 15, Issue 2 from the Summer of 2015.
- Transportation Training Institute, LLC (TTI-LLC)
 - “Managing Flagging Operations on Low Volume Roads,” guidance document by the American Road and Transportation Builders Association and the Roadway Safety Consortium in conjunction with the Transportation Training Institute, LLC under the Federal Highway Administration ‘s Work Zone Safety Grants
- US Bureau of Labor Statistics (BLS)
 - The US Bureau of Labor Statistics (BLS) in its November 2010 Monthly Labor Review contains statistics in its “Fatal occupational injuries at road construction sites” article for the period from 2003 through 2007 by Stephen Pegula.
 - The BLS also has pertinent information in their Spotlight on Statistics, March 2014 issue regarding “Nonfatal Injuries and Illnesses among State and Local Government Workers” by Shannon M. Maloney.
- US Department of Labor (USDOL), Occupational Safety and Health Administration (OSHA)
 - Occupational Safety and Health Administration’s Outreach Training Resources
 - Occupational Safety and Health Administration’s Construction Industry Outreach Program, Customized by the American Road and Transportation Builders Association and the Roadway Safety Consortium under the Federal Highway Administration ‘s Work Zone Safety Grants
- US Department of Transportation (USDOT), Federal Highway Administration (FHWA)
 - The US Department of Transportation (USDOT), Federal Highway Administration (FHWA), Work Zone Mobility and Safety Program website as viewed in 2014 contains an overview of these and other statistics from the BLS regarding incidents in work zones.

The materials from these sources were used modify the course content within OSHA’s 10 Hour Construction Industry Designated Training Topics as identified in the following mandatory, elective and optional topics:

- Introduction to OSHA
- OSHA Focus Four Hazards
 - Falls
 - Electrocution
 - Struck By
 - Caught in or Between

- Personal Protective and Lifesaving Equipment
- Health Hazards in Construction
- Excavations
- Stairways and Ladders
- Other construction industry hazards: As they relate to temporary traffic control and flagging as identified in the Manual on Uniform Traffic Control Devices.
- Signs and Barricades (Temporary Traffic Control)
- Signaling (Flagging)

Appendix A includes the topic outline and agenda based on the designated topics and durations, Appendix B includes some of the specific modifications and focal points to the program identified here, and Appendix C includes a copy of the course handout which details the major topics, objective and specific prevention measures.

6.3 Task 3 - Create slide notes and key topic handout for participants

A student handout was created which included the “Introduction to OSHA Student Handout” as well as information from each module detailing the objectives, common hazards from OSHA’s resources as well as items identified in the initial research with their associated prevention measures. The handouts include key notes and topics from the slides as well as supplemental information from tool box talks prepared for the Roadway Safety Plus program by the ARTBA and the Roadway Safety Consortium.

The intent for this handout was for use during the course as well as use on the job and as tool box talks to refresh the participants’ memory of the hazards discussed and their associated prevention measures. The participants were anticipated to include a mixture of workers, crew leaders, supervisors, managers, engineers, risk management professionals and administrators, so the handouts were structured to be used by a multitude of personnel in various positions.

A Dropbox folder was also populated with key documents the audience could use to get more detailed information on the specific topics from the course; including, the sources of the information used to customize the course content. The link was included in the training materials for their reference (<http://goo.gl/tz9DxY>). The final four courses offered in addition to the original planned courses were delivered in September of 2016 by which time, Dropbox updated their access requirements to require individuals accessing a folder to have an account. Up until that time, more than 100 people had accessed the folder. Current course participants were notified of the change and encouraged to sign up for a free account for access to the materials as well as learn the benefit of cloud based storage and backup. Other future options could include use of Google Drive or similar cloud based storage which provide access without a requirement for registration by viewers.

6.4 Task 4 - Make PDF versions of key topics available to participants

The handouts and Dropbox link created under Task 3 were provided to participants during the training for their future reference as detailed in the Task 3 summary.

6.5 Task 5 - Provide 16 training events with data collection

Sixteen events were originally planned around Oklahoma within the scope of this project. One additional course was added as an in kind contribution in Concho, Oklahoma to accommodate the additional attendees expected in excess of OSHA's 40 person course maximum. Four additional courses were offered with remaining funds in September 2016 as a combination of in kind contribution and remaining project funds bringing the total number of courses delivered under this project to 21.

ODOT's Office of Safety within the Human Resources Division as well as Oklahoma Local Technical Assistance Program (OKLTAP) and Southern Plains Tribal Technical Assistance Program (SPTTAP) have worked in conjunction since November of 2014 on an effort to improve the understanding of Oklahoma's public and tribal sector road workers regarding the hazards and associated prevention measures covered in OSHA's Construction Industry Outreach 10 Hour Program. This initiative used Federal Highway Administration (FHWA) Work Zone Safety Grant Funds for fourteen courses from November 2014 through May 2015, delivered throughout Oklahoma. Based on the success of those courses, ODOT's Planning and Research Division worked with Center for Local Government Technology (CLGT) at Oklahoma State University (OSU) on this project to expand on the initiative and incorporate a research component to identify the need and content of future training options. Within this project, the 21 courses that were delivered around Oklahoma included the research and data collection identified in this work plan. Additional requests were made to OKLTAP and SPTTAP during this time frame for which another 4 courses were delivered using a combination of FHWA WZ Safety Grant funding and CLGT funding through OKLTAP and SPTTAP. One of the courses was provided in Mayetta, Kansas for the Prairie Band Potawatomie Tribe which is within the SPTTAP's region. Thirty nine total courses have been delivered under this initial effort.

The following are the number of OSHA 10 Hour Construction Industry Cards Issued as a result of this initiative:

Funding	Classes	Cards Issued
FHWA WZ Safety Grant	14	339
ODOT SPR Project	21	479
FHWA/OKLTAP-SPTTAP Funding	4	108
Total	39	926

Figure 1 Number of Classes and Associated 10 Hour Cards Issued for Initiative

The 21 courses delivered under this project were located in the following cities and towns:

Oklahoma Public and Tribal Sector Training Locations for OSHA Outreach Construction Industry 10 Hour Program
1. Guymon, Oklahoma
2. Elk City, Oklahoma
3. Duncan, Oklahoma
4. Ada, Oklahoma
5. Antlers, Oklahoma
6. Muskogee, Oklahoma
7. Pryor, Oklahoma
8. Stillwater, Oklahoma
9. Concho, Oklahoma
10. Concho, Oklahoma (In-Kind)
11. Elk City, Oklahoma
12. Duncan, Oklahoma
13. Ada, Oklahoma
14. Antlers, Oklahoma
15. Muskogee, Oklahoma
16. Pryor, Oklahoma
17. Stillwater, Oklahoma
18. Oklahoma City, Oklahoma (Partial In Kind)
19. Tulsa, Oklahoma (Partial In Kind)
20. Tahlequah, Oklahoma (Partial In Kind)
21. Alva, Oklahoma (Partial In Kind)

Figure 2 Project Course Locations

The events provided in Concho, Oklahoma were requested by the Cheyenne Arapaho Tribe, and based on the anticipated attendance were scheduled back to back to accommodate the numbers in conjunction with other local agencies. The courses in Concho replaced a course originally scheduled in Guymon, Oklahoma. A lack of registrations at the time of that event prompted an investigation into alternatives, and with the request by the Cheyenne Arapaho and one by Panhandle State University for CDL training in Guymon, CLGT changed the locations of the courses to better fit the needs and requests at the time of the events.

6.5.1 Advertizing

CLGT, ODOT and TTI-LLC made a concerted effort to notify potential agencies, departments and tribal personnel of the training with website notices, training calendar postings, e-mail, faxes, phone contacts and in person discussions. Associations, as well as the Bureau of Indian Affairs (BIA) were contacted to broaden the advertisement of the training to the membership and close contacts of those groups. Specifically:

- CLGT posted all of the events on their website and training registration pages as well as emailed their database of contacts flyers detailing the course information as well as dates and locations of the courses. Examples of the flyer and website postings are shown in Appendix D.
- ODOT provided information internally to the appropriate personnel within each Division regarding the content of the courses as well as dates and locations.
- CLGT and TTI-LLC provided a number of associations and tribes around the state with the materials to notify their membership and contacts to help broaden the awareness of the training within the specific groups in the public and tribal sectors. A short list of these contacts are provided below:
 - Associations of Governments (Planning and Municipal Organizations)
 - Association of County Commissioners of Oklahoma
 - Bureau of Indian Affairs
 - City Management Association of Oklahoma
 - Oklahoma Chapter of the American Public Works Association
 - Oklahoma Cooperative Circuit Engineering Districts Board and associated districts
 - Oklahoma Municipal League which encompasses the Mayors Council of Oklahoma and the Oklahoma Municipal Utility Providers as well as city managers and economic development personnel.
 - Oklahoma Rural Water Association
 - Technology Centers in the areas of the training
- TTI-LLC contacted each ODOT Division Risk Manager or an associated representative by e-mail and phone to make them aware of the training and follow up on potential attendees.
- CLGT personnel also made contacts and followed up by phone with a number of agencies in the immediate areas of the training in an effort to increase the participation by local agencies.
- CLGT personnel advertized the training at events including the Association of County Commissioners of Oklahoma's conference in Norman and the Tribal Safety Champions Workshop in Oklahoma City.

6.5.2 Data Collection

The project included data collection at the 21 locations identified to fulfill multiple goals:

- Understanding the participants' knowledge of key points prior to the course.
- Measuring the participants' understanding of key points after the course to evaluate course effectiveness and key component retention. Both qualitative and quantitative measures were used for a better understanding of the impact of the training.

- As an additional method to maintain participant engagement throughout the course while providing the instructor real time data of participant understanding to allow for further explanations as necessary.
- Course customization based on participants’ backgrounds, knowledge base and responsibilities; Allowing the instructor to know areas of exposure for the participants prior to the course provides a method to further emphasize topics of concern for those individuals.
- Course and instructor evaluation to provide feedback on areas to be improved as well as areas being handled successfully. Paper evaluations also provided additional data including written comments regarding the course and instructor for qualitative input.

The goals were intended to help insure the impact and retention of the material by the participants using performance measures for the participants, the course and the instructor.

6.5.3 Audience Response System

The system used for data collection was a traditional audience response system from Turning Technologies, LLC. Additional information regarding this specific system can be obtained at [Turning Technologies product website \(https://www.turningtechnologies.com/\)](https://www.turningtechnologies.com/), but several proprietary audience response systems exist that could be investigated for potential future use.

This graphic from the Turning Technologies, LLC website shows their perspective of the effectiveness of the audience response system and supplements the data collected regarding effectiveness of using audience response.



Figure 3 Turning Technologies Audience Response Effectiveness Information

The Turning Technologies, LLC system used for this project included the participants’ response card, a USB receiver and software plug in for Microsoft PowerPoint for ease of use:



Figure 4 Turning Technologies Response Card and Receiver

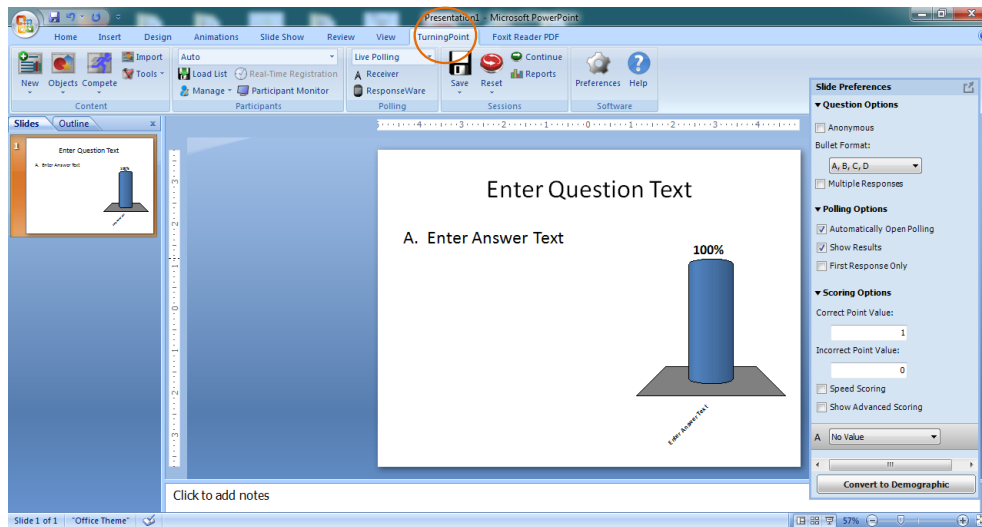


Figure 5 Turning Technologies PowerPoint Software Plug-in Screenshot

This figure shows the new tab in PowerPoint added from the Turning Technologies, LLC software plug in and an example question slide. The software also comes with a dashboard for simple review and export of data. The tables shown in Appendix E were generated from a summary of the Turning Technologies data stored during each course using Microsoft Excel.

6.6 Task 6 – Summarize Data Collected

Task 6 was intended to provide a summary of the data collected using the audience response system. The data includes results from the sixteen originally scheduled events with the additional course in Concho, Ok as well as the four additional courses provided in September 2016 within the scope of the project. Charts with additional detail on the data collected are provided in Appendix D.

The following are the categories of data collected for the project:

- Participants' perspective of incident data
- Participants' present understanding of minimums according to code (Pre-Test)
- Evaluation of participants' understanding after training (Post-Test)
- Perceived understanding before and after training for a qualitative evaluation
- Participants' preferences for learning and future use of materials
- Evaluation of the course and instructor

The following summarizes the results of the major items collected:

Class Participants' Employers

- 32% State Employees
- 41% County Employees
- 16% City Employees
- 6% Tribal Employees
- 3% Bureau of Indian Affairs Employees
- 2% Private Contractor Employees

Class Participants' Positions

- 53% Workers
- 30% Crew Leaders, Supervisors or Managers
- 9% Construction Inspectors
- 7% Safety Managers or Administrators

Approximately 34% of the attendees had 1 to 5 years of experience, 42% had 6 to 20 and 24% had 21+ years of experience.

The primary areas of concentration for the personnel involved primarily road work (65%) and construction management (9%) with a few being responsible for management, bridges, safety, facilities, equipment as well as some sanitation, vegetation and other local agency utility operations.

The data collected included questions relating to the participants' main safety concerns. Being struck by a motorist was not included in the data collection to avoid skewing the data since that is a primary concern of workers in public and tribal sector positions. Of the other hazards provided, the following are primary concerns of the participants surveyed to date:

- Being backed over by a truck or machine (44%)
- Falls (19%)
- Being struck by a flying object (6%)
- A trench collapse (4%)
- Chemicals, Dusts or Fumes (5%)
- Electricity (4%)

Of all people surveyed, 18% indicated that something else was their largest concern with the majority of those emphasizing that motorists are their biggest concern. Many participants also indicated that they selected "being backed over by a truck or machine" thinking it related to motorists; which, combined with the others that were concerned about being struck by an employer's truck or machine mirrored statistics which show these being the largest hazard statistically to the workers on the road.

The participants were also asked of the topics to be covered in the course, which one they would want to spend more time on. The following are the primary topics identified:

- Temporary Traffic Control (31%)
- The Roadway Safety + Software and Associated Tool Box Talks (25%)
- Preventing Runovers and Backovers (18%)
- Trenching and Excavations (8%)
- Health Hazards (5%)
- Flagging (5%)
- PPE (3%)
- Falls & Ladder Safety (2%)
- Electrical Safety (2%)
- Confined Spaces as they relate to trenches and excavations (1%)

The participants were tested to identify their knowledge of the basic course materials prior to the course and following the course to get a quantitative evaluation of their knowledge of many of the minimums identified in the standards prior to the course and then their ability to identify those numbers following the course.

The participants had a pre-test score average of 57% and a post-test score of approximately 88%.

The following are the topics with the most incorrect answers: (Not in order by number missed)

- Safety Data Sheet and Label Information
- Anti fog spray availability for use on face shields or goggles.
- Hazard prioritization. What fatalities are most common.
- Minimum OSHA dimensions:
 - Minimum distance from electrical lines
 - Height requiring for fall protection
 - Excavation sloping or shoring depth
 - Confined space requirements
 - Ladder use
- Shadow Vehicle Use and Positioning

Minimum dimensions are commonly not known. The handouts for the course were purposely developed in a concise format with critical dimensions readily available. The participants are encouraged to keep the information with them “in the glove box of the truck” for easy access and reminders.

The participants were also asked about their understanding of the OSHA and TTC topics on a scale of 1 to 5 with 1 being low and 5 being high before the class and at the end of the class to get a qualitative evaluation of their understanding of these topics before the course and then after training.

The participants identified having a pre-course understanding of OSHA’s minimum safety requirements of 2.9 out of 5 and a post-course understanding of 4.2 out of 5.

The participants identified having a pre-course understanding of TTC requirements of 3.3 out of 5 and a post-course understanding of 4.3 out of 5.

To equate the quantitative and qualitative results:

Pre-Course 57% quantitative versus 62% qualitative

Post-Course 88% quantitative versus 84% qualitative

The participants were also surveyed on their preferences for additional training:

On a scale of 1 to 5 with 1 being low and 5 being high, the average response on their preference for more training was 3.2 out of 5. Regarding topics preferred for future training, the following indicates the breakdown of votes between topics:

1. The Roadway Safety + Software and Tool Box Talks (17.7%)
2. Advanced Temporary Traffic Control (15.9%)
3. Preventing Runovers and Backovers (11.3%)
4. Flagging (11.3%)
5. Mobile Operations (10.3%)
6. Operations Topics: Winter Maintenance (Snow and Ice Control) (9.4%)
7. Mgmt/Constr Topics (Quantity Calculation, Estimating ...) (8.5%)
8. Operation Topics: Joint Seals, Chip Seals, Surface Seals ... (8.3%)
9. Detailed OSHA Training: Confined Spaces, Excavations ... (8.0%)

The participants were asked to evaluate the course and the instructor in a number of areas to provide performance measures from which future adjustments could be made to improve the learning experiences for the audience. Of all the metrics identified, the course and instructor received a score of 4.54 out of 5 with 1 being low and 5 being high or excellent.

Approximately 10% of course participants took the extra time to hand write a positive comment; some of which are provided below.

- The best class I have ever been to. Very Informative.
- Insight, info and equipment spot on.
- I was made to feel like there were no dumb questions.
- I was really impressed with the class. Thank You!
- The instructor's knowledge of our work was excellent.
- Classroom environment was great and everyone was involved in the conversation.
- Was well organized! It was a quality 2 day course.
- Had a good time, didn't sit all the time. Class time and breaks well spaced.
- The instructor was very knowledgeable and passionate about the material.
- It was a pleasure to attend.
- I liked the testing portions. (The audience response system)

The audience response system provided the instructor with real time feedback to the instruction which allowed for customization of the course for the needs of the group as well as concepts for continued course improvement as identified in Task 5. The instructor also reviewed all of the evaluations and data collected following each event and made minor adjustments throughout the course to provide continuous improvement of the course content and methods as identified in the project proposal.

6.7 Task 7 - Propose future phases based on results

Task 7 was intended to use the data to evaluate participants' strengths and weaknesses as well as preferences for future training to provide a perspective on potential areas for future training based on necessity and the desires of the workforce. Previous training on this initiative has shown that advanced temporary traffic control (TTC) techniques including mobile operations and flagging are of interest to course participants and are often necessary to provide guidance for the multitude of situations in which operations take place.

6.7.1 Advanced TTC, Mobile Operation and Flagger Training

The previous observations were confirmed during this project as advanced TTC, mobile operation and flagger training were three of the top five topics the audience felt additional training was necessary. Course observations and discussions also reflected that a basic understanding of these operations was common amongst participants, but hazards or other conditions which require on site modification of plans beyond the basic needed additional guidance for the participants.

The partners to this project pursued grants for providing advanced TTC, mobile operation and flagger training. As of the date of this report, a proposal to the Federal Highway Administration for their Work Zone Safety Training Grants is the most likely funding for this training. The proposal submitted is in the award process and is anticipated to be awarded for the 2017 and 2018 Federal fiscal years provided no unforeseen circumstances.

The proposal to the FHWA titled “Implementing Safe Work Zone Operations Strategies” is intended to develop coursework and provide training based on the guidance document titled “Managing Flagging Operations on Low Volume Roads” for operations managers and future TTC instructors. The content of the courses will be applicable for all roads, and not just low volume roads for which the guidance document was developed. The courses will also focus on standard operating procedures with guidance on modifying TTC plans based on the site conditions, anticipated or observed. The challenge with TTC for daily operations is that the conditions under which the operations are taking place can change drastically within a single day. Variables such as sunlight, visibility, traffic volumes and weather can all impact decisions on the job, so guidance is necessary to provide personnel with strategies, based on engineering judgment, that meet the needs of the site conditions.

6.7.2 Additional Safety Training

The data and course observations also showed that additional safety training and guidance on safety refreshers or tool box talks are of interest to the participants and necessary. The partners to the project anticipated these needs and strived to offer options and emphasize their use during the training in an effort to get the participants to use available resources and seek additional training on the necessary topics. The handouts were intended to provide refreshers and to be used as tool box talks for the key topics discussed in the training. A Dropbox folder was established with plans from the OKPEOSH Division, additional roadway specific tool box talks and other guidance on a number of topics to make it simple for participants to go to one place to get many of the items they need to continue the learning process as well as have items that can be used directly in their programs. The multitude of specific safety training opportunities available to the participants were also discussed. Oklahoma LTAP and Southern Plains TTAP have a number of free offerings regarding safety which were discussed with the participants. The availability of training through local technology centers, community colleges and the multitude of universities and satellite campuses as well as private training options give the participants a wide variety of options for training in differing locations and price ranges depending on their needs and budgets.

Options for additional safety training were also considered. Grants were investigated and felt less likely to be successful than the FHWA grant identified above, so the focus was placed on the FHWA grant option. Ideally, future safety training will focus on educating individuals with the qualifications and interest to provide training to their personnel and in their surrounding regions to reach a broader audience at a potentially lower cost. OSHA’s Outreach Training Program is an excellent start for these individuals with the potential to expand training opportunities through local education centers.

6.7.3 Operations and Other Training Topics

Management and operations training are also typically popular topics as they help build skills for operational performance. Management, estimating, infrastructure maintenance and snow and ice control are all topics of interest to the participants. As with the safety training topics, offerings from CLGT programs as well as the other educational institutions were recommended for future training.

6.7.4 By Product Use in Infrastructure Management

CLGT also prepared a draft proposal which could help in a number of industries in Oklahoma. It was titled “Evaluating Options for Snow and Ice Control on Oklahoma’s Roadways,” and would ultimately need to be further discussed and included in the traditional competitive State funding process for research and implementation. The goal of this study as well as others which address by product use in infrastructure management was to find safe, effective and efficient methods to maintain transportation infrastructure investments and operations as well as human and natural resources while also reducing the volume of materials entering the waste stream. It was intended to be a synthesis of existing research and best practices in the use of production fluids from the oil and gas industries to reduce the need for injection or disposal of those fluids while improving the safety of the travelled way for both motorists and road workers through the use of the brines for snow and ice control as well as the potential for dust control on un-paved roads.

6.7.5 Summary of Future Considerations

This project took a creative approach to research and implementation in which the knowledge and opinions of practitioners were studied in combination with their training on the same topics to both impact the field while identifying deficiencies and providing data driven recommendations for future actions regarding safety and operations topics for the workforce. The project was combined with other initiatives and resources to expand the breadth and depth of impact while increasing both the quantitative and qualitative data collected for future decision making.

As identified in the recommendations for future work above, a number of strategies, funding sources and potential paths are available for improving the safety, effectiveness and efficiency of Oklahoma’s public and private sector workforce as well as the infrastructure for which they are tasked with maintaining while reducing risk for the travelling public.

7.0 PROBLEMS ENCOUNTERED

Initial course attendances in the October 2015 reporting period were low. It is presumed that the short notice on the initial courses impacted potential participants’ knowledge of the course or ability to schedule time for training. A number of potential participating agencies and tribes indicated they wanted to have individuals attend, but were not able to make the initial dates work. The second round of events for the early locations had better responses than those in the first round except for the Guymon course which was moved to the Cheyenne Arapaho Tribal Community Center in Concho, Oklahoma due to their interest and number of attendees. A second consecutive course was scheduled at no cost to accommodate the number registered. CLGT offered a CDL course in Guymon in lieu of the OSHA 10 Hour training due to the specific request and need for the course.

Tribal participation was an issue early, but additional efforts to improve attendances were effective. These efforts increased the attendance to 9% of the total number of participants including Bureau of

Indian affairs employees. Additional advertising, email, fax and personal contacts were made in an attempt to increase the number of participants in the events. The two courses in Concho were scheduled to directly impact that population and the reach of the courses. The Bureau of Indian affairs (BIA) participated by advertizing the events and encouraging their own personnel to attend. The BIA's partnership has been an important component in extending the knowledge of the topics throughout the Native American community.

Attendance at training events can be problematic for many reasons:

- Interest in the topic or event
- Day of the week: Often Mondays present problems. Fridays can also present problems for organizations that work four ten hour days in lieu of five eight hour days.
- Time of the year: Summer is often a busy time on the road and employers must make a concerted effort to have people attend if events are scheduled during the summer season. Winter can also be problematic when snow or other winter weather events occur and reduce the attendance. Spring is typically the best time of year for training. Fall can also be a good time.
- Individual event dates can also be problematic as other training, events and meetings can overlap reducing turnout. Efforts are made to reduce conflicts, but inevitably they still occur.
- Event locations in less populated areas can also be problematic. Improving the reach of training is an important component since travel funds are often constrained. Areas with lower populations can also inherently have lower attendances.

The problems identified are common and understood, so efforts were made to reduce the impacts of these issues as much as practical within the constraints of the project. Additional advertizing, calls and other discussions with potential employers and participants significantly improved the attendance. Oklahoma Turnpike Authority and ODOT also had champions who emphasized the importance and improved the turnout. Ultimately, the average turnout was typical for these types of courses, but as with the other components of the project, striving for continuous improvement was the impetus to find better ways and provide more emphasis on advertizing.

8.0 CONCLUSION

The main objective of the project was to reduce the number and severity of incidents to the workforce from these employers that have responsibilities for working on the road. As a part of this objective, gaining a better understanding of the need for worker safety training was to help drive future decision making processes. The need was to be identified through the participants' understanding of basic hazards and prevention measures in their workplace using OSHA's 10 Hour Outreach Training Program.

The research component of the project was to identify this need through testing of the audiences' basic understanding as well as surveying their perceived understanding of both safety and temporary traffic control topics.

The partners to the project also understand well, the need for performance measures in measuring impact and quality. This project was to use audience response systems to allow for participant assessment, survey, engagement, evaluation and post training perspective.

Another critical component of adult education is insuring that the course content is relevant, practical, engages the audience with multiple methods of delivery and provides information that can be used beyond the classroom. The project approached this need in multiple ways: Through nationally recognized content; A literature and data review specifically related to the conditions under which the participants perform their work; Content customization based on the research; A nationally recognized instructor who's experience in the field and an affinity for explaining both how and why with examples that fits the audiences' background; Relevant and useful handouts as well as easy access to other pertinent information; and Use of an audience response system in conjunction with the other engagement methods to keep the participants' attention, allow the instructor to understand in real time the audiences background, preferences, knowledge and understanding of key topics discussed. Real time continuous improvement in conjunction with the performance measures was an extension of the ability to gauge participants' understanding, preferences and perspectives throughout the courses.

The combination of these goals, methods and outcomes with a network of interested stakeholders shows how a well planned approach, additional effort and a method for real time measurement can turn a traditional training program into an effective research and implementation program with data driven results and long term impact.

The effort to engage partners was of critical importance to the success of the project. Personnel from Tribal, Local, State, Turnpike and Federal agencies were invited to participate in the same classrooms and training. A wide range of personnel at all levels of those organizations and within multiple departments addressing a variety of responsibilities were targeted to not only have diversity in organization but also responsibility at the same events.

This mixing of organizations, positions and responsibilities provides an excellent networking opportunity for the participants allows for a peer exchange of means and methods and provides a better understanding of the similarities and differences between those means and methods.

The effectiveness of these goals and methods is exemplified in the data collected and personal perspective of the participants. The testing results provide both a quantitative and qualitative impact of the course with a 57% pretest score and 88% post test score and a 62% pretest perspective on knowledge and an 84% post test perspective on knowledge. A course and instructor rating of 4.54 out of 5 also clearly identifies the quality and impact of the training. Statements such as "the best class I have ever been to," "insight, info and equipment spot on," "the instructor's knowledge of our work was excellent" and "the classroom environment was great and everyone was involved in the conversation" all reinforce the evaluation data collected.

An observation from TTI-LLC which was independent of the training also provides perspective on the long term impact of these courses. TTI-LLC had performed an OSHA Construction Industry Outreach 10 Hour Training Program for an employer prior to the start of this project. On year later, TTI-LLC provided a follow up refresher course and used the audience response system to identify the impact of the training the prior year. The results showed:

- 23% thought about the class information often (almost 1 in 4)
 - 40% thought about the class information a few times
 - 33% thought about the class information a couple of times
-
- 13% used the class handouts a few times
 - 47% used the class handouts a couple of times
-
- 30% thought that the class provided a definite improvement of safety on their jobs
 - 58% thought that the class provided some improvement of safety on their jobs
 - 12% thought that the class had provided a minor improvement of safety on their jobs

The results from these courses as well as perspective on the future impact potential of these courses helps show, using data driven methods, how the statement from the OKDOL's Safety Pays document which indicates that \$ 1.00 of investment in safety can provide a return of \$3.00 to \$6.00 can become a reality. Literature from the National Local Technical Assistance Program website shows similar returns on investment for training through LTAPs and TTAPs. The results of this project as well as these statistics verify the effectiveness, economy and impact of programs like Oklahoma Local Technical Assistance Program and Southern Plains Tribal Technical Assistance Program within the Center for Local Government Technology at Oklahoma State University. The combination of a foundation of practical information, understanding and excellence in adult education, a network of relationships and partnerships, pooling of funds and simple cost effective technology can turn an ordinary initiative into an impactful, scalable, program.

9.0 RECOMMENDATIONS - COMMENTARY

Oklahoma has an excellent educational system to meet the needs of the broad range of interests and the needs of its population. Training for private industry, vertical construction and associated industries have been well established for years and continue to grow with technology and improved methods. Public sector transportation infrastructure construction, maintenance and management is a growing field with a multitude of information and research, but lacking in standardization, cooperation and collaboration in many areas.

The Federal Highway Administration in its most recent Work Zone Safety Grant program and OSHA's Susan Harwood Training Grant Program both strive to use existing materials, updated or customized as necessary for specific groups and delivered under training grants to employers at need. Their efforts to reduce duplication, improve cooperation and expand upon the culture of collaboration within organizations they work with are an example of best practices for continuing to provide effective and efficient training programs for both the public and private sectors.

The partners to this project understand these concepts well and implemented these concepts with the nationally recognized content from these and other organizations within the scope of this project. LTAP and TTAP centers such as those within CLGT at OSU are well established organizations, with a broad network allowing them to provide this type of training and technical assistance for the local and tribal sectors they represent. The network of contacts these organizations have provides an excellent ability to mobilize personnel and resources to assist in the delivery of services. These organizations also understand the struggles all public and tribal sector organizations have with budgets and travel constraints for their personnel and strive to make as many courses available throughout their region as possible. This understanding and effort is key to improving the participation of the workforce throughout the region; but with declining budgets, other strategies need to be considered to continue the content development and training for these sectors of workers and their employers.

This project demonstrated a creative approach to expand on a current statewide initiative to offer broader availability of the training and impact the workforce throughout the organizational structures of the employers targeted. The network of contacts was leveraged for funding and in kind contributions of both effort and facility use. Moving forward, similar efforts can be as successful as those of this project and as identified above.

The next step in broadening the breadth and depth of impact of training would be to use these concepts for instructor training. Providing train the trainer programs over a wide region would allow a wider impact; while also, providing a more access to the workforce for that depth of impact. OSHA's Outreach Training Program is a good example of this type of effort and impact.

National research and training also often constitute funding from a number of sources, or pooled funding. These types of funding efforts allow efforts to begin or continue that might not otherwise due to a lack of funding. A combination of dedicated funding sources, grant sources and pooled funding efforts can be combined to make programs available where they may not be otherwise.

Improved collaboration between educational partners along with creative funding mechanisms can also help broaden the availability of both worker and instructor training to continue the effort for a broad but also deep organizational impact; but, cooperation and a coordinated structure would be necessary to improve the effectiveness and economy of delivery. This project continued the efforts of LTAPs and

TTAPs in these activities and demonstrated the next step in expansion using the national concepts identified, reducing duplication of effort and broadening the impact of the funds available.

Expanding on these efforts is not only necessary for improving the knowledge and skill sets of workers in the public and tribal sectors, but also broadening the availability of the training to help offset the impact of turnover within those organizations. As described in this report, the return on the investment of these types of efforts is many times that of the investment and given the multitude of strategies demonstrated by this project, can continue the improvement of the management and operation of the entities responsible for a transportation infrastructure.

10.0 APPENDICES

[10.1 Appendix A Topic Outline and Agenda](#)

[10.2 Appendix B Course Modifications and Focal Points](#)

[10.3 Appendix C Course Handout](#)

[10.4 Appendix D Example Flyer and Website Posting](#)

[10.5 Appendix E Results of Data Collection](#)

10.1 Appendix A Topic Outline and Agenda

OSHA 10 Hour – Construction Industry Course Agenda

Day 1

Module Title	Time
Welcome, Pre-Test, Intro to OSHA (.5)	8:30 – 9:30 am
Break	9:30 – 9:40 am
Introduction to OSHA (1)	9:40 – 10:40 am
Break	10:40 – 10:50 am
Introduction to OSHA (.5)	10:50 – 11:30 am
Lunch	11:30 – 12:30 pm
Struck By – Preventing Runovers and Backovers (1)	12:30 – 1:30 pm
Break	1:30 – 1:40 pm
Caught in Between – Equipment (.75)/Signs & Barricades – TTC (.25)	1:40 – 2:40 pm
Break	2:40 – 2:50 pm
Signs & Barricade – TTC (.5)/Signaling – Flagging (.5)	2:50 – 3:50 pm
Day 1 Evaluation and Dismissal	3:50 – 4:00 pm

Day 2

Module Title	Time
Electrical (1)	8:30 – 9:30 am
Break	9:30 – 9:40 am
Fall Prevention and Protection (1)	9:40 – 10:40 am
Break	10:40 – 10:50 am
Fall Prevention and Protection (.25)/Ladders and Stairs (.5)	10:50 – 11:35 am
Lunch	11:35 – 12:35 pm
Excavation (1)	12:35 – 1:35 pm
Break	1:35 – 1:45 pm
Excavations (.5)/PPE (.5)	1:45 – 2:45 pm
Break	2:45 – 2:55 pm
Health Hazards (.5)	2:55 – 3:25 pm
Exam and Evaluation	3:25 – 4:00 pm

10.2 Appendix B Course Modifications and Focal Points

10.2.1 Introduction to OSHA

- Discussions of CFR 1926, associated letters of interpretation and the Manual on Uniform Traffic Control Devices (MUTCD) as they relate to the “Construction Industry” and its relation to road work for the public and tribal sectors.
 - Specific discussions relating both the regulations in CFR 1926 and the MUTCD to hazards and prevention for topics which complement each other as it relates to struck by and caught in and between incidents were included to further customize the content for work in an around equipment and vehicles within the work space as well as road users.
- Discussions of building a culture of safety and taking personal responsibility
- Emphasis on injuries and fatalities and their associated impacts on the audience personally including personal, emotional and financial impacts of these incidents
- Dispelling of myths that working safely costs more
 - “For every \$1 invested in safety, there is a return between \$3 and \$6 on the investment,” as detailed in ODOL’s Safety Pays literature from Liberty Mutual and the USDOL.
- Incidents which occurred within Oklahoma just prior to and during the project were used as examples which directly relate to the operations of the participants identified here.

10.2.2 Struck By or Caught In or Between (Focus Four)

Including statistics which supplemented the Introduction to OSHA, emphasized methods for preventing runovers and backovers with internal traffic control, training, refreshers and temporary traffic control planning and implementation.

- Statistics within the Introduction to OSHA as they relate to the public and tribal sector workers from the FHWA, the OKPEOSH, the BLS and the ACCO.
 - From the Federal Highway Administration’s Website
 - About 50% of work zone fatalities are employees struck by a vehicle or machine in the work zone
 - 1/2 were caused by dump trucks backing in the work space
 - In many of the instances that either the backup horn was not operational or did not get the worker’s attention
 - Incident data from the ACCO and the FHWA also lead to the need for emphasis on simple prevention measures such as seatbelt use in vehicles and equipment as well as proper mounting and dismounting methods.
 - A number of injuries come from transportation incidents and the lack of seatbelt use.
 - Lack of seatbelt use has also impacted injuries from incidents involving equipment.

- Many incidents regarding falls from trucks and equipments are simply the result of incorrect mounting and dismounting using three points of contact as well as climbing facing the truck or machine.
- Proper use of signs and barricades as well as other countermeasures identified in the MUTCD were emphasized to reduce the probability and severity of a struck by or caught in or between incident.
 - Specific discussions were included addressing the necessity of “Competent Persons” for temporary traffic control operations as with other operations and the necessity for using engineering judgment as well as “modifications to fulfill special needs” for addressing changing site conditions as necessary; supplementing traditional temporary traffic control plans to reduce hazards identified below.
 - Discussions of proper placement of devices, visibility and the time for motorists to react and stop their vehicles if necessary including its relation to “Stopping Sight Distance” were emphasized to improve the attendees understanding of specific road user related hazards and prevention measures.
 - Countermeasures to address situations in which road users are distracted, fail to yield, have an equipment malfunction or a condition which impairs their ability were emphasized. Shadow vehicles, buffer space, air horns or other devices to alert road users and workers are all prevention measures described as ways to prevent an incident or reduce its severity should it still occur.
- Signaling as it relates to flaggers in the MUTCD was also emphasized with specific discussions of best practices for flagger placement and flagging to reduce the hazards associated with temporary traffic control. The FHWA guidance document developed by the ARTBA and the Work Zone Safety Consortium regarding “Managing Flagging Operations on Low Volume Roads” was used as source for these strategies.

10.2.3 Electrocutation (Focus Four)

- Electrocutation was also emphasized as an issue in the public and tribal sectors from overhead and underground power lines as well as portable power used on the job.
 - Public and tribal sector operations such as paving and chip seals which involve dumping trucks were included as focal points for the attendees due to their common use in this industry as well as the prevalence of overhead power in the areas in which these operations take place. Transportation of the materials from the plants to the jobsite can also present problems for trucks entering and exiting those facilities. Since drivers in this industry commonly transport their own materials, hazards and prevention for entering and exiting these facilities were also discussed.
 - Electrocutation from working around trees in close proximity to power lines was also emphasized as a common hazard for workers in this industry.

- Electrocutation from driving sign posts through underground power lines was also mentioned as electrical lines for road and street lighting that is owned and maintained by a government entity often do not get located when an underground plant protective service (811) is contacted for locates. The government entity must often be contacted independently to have their lines located.

10.2.4 Falls (Focus Four) – Stairways and Ladders

- Falls as they relate to specific issues in this industry were also emphasized. Common hazards such as falls during work on bridges, wing walls, large culverts, retaining walls, signs, signals and from trucks and equipment were all discussed. The use of ladders and their relation to these items were also covered.

10.2.5 Excavations

- Trenches and excavations for the structures identified such as bridges, wing walls, retaining walls and culverts were all emphasized as specific areas in which public and tribal sector workers perform their duties and are at risk from the hazards identified. Work relating to water and sewer systems present similar hazards in this industry and were emphasized along with the associated hazards. Trenches and excavations also have characteristics of confined spaces, so hazards and prevention measures associated with confined spaces in trenches and excavations were also discussed.

10.2.6 Health Hazards in Construction

- Health hazards such as silica, lead and even asbestos are often a part of the structures on which public and tribal sector workers perform removal operations. The potential for infections such as cryptococcosis from bird feces are also a potential hazard during bridge and other structure removal operations. These hazards as well as other common hazards associated with chemical use were discussed along with the hazard communication program and its recent updates.

10.2.7 Personal Protective and Lifesaving Equipment

- Personal protective equipment such as hard hats, hearing protection, eye and face protection, hand, leg and foot protection as well as respiratory protection were all discussed in the PPE module. High visibility apparel was also emphasized to improve visibility and reduce the probability of struck by and caught in or between incidents among other countermeasures.

OSHA 10 Hour for the Roadway Construction Industry

- Introduction to OSHA (Pages 3-13)
 - OSHA Training Institute materials, modified to include Oklahoma PEOSH forms
 - OSHA and PEOSH Posters
 - Your rights as a whistleblower
 - Refusing to work because conditions are dangerous
 - Employers must provide and pay for most PPE
 - Safety and health resources
 - Navigating the OSHA website
 - Identifying safety and health problems in the workplace
 - Filing an OSHA complaint
- Struck by / Caught in or between (Pages 14-23)
 - Preventing Runovers and Backovers
 - Equipment Safety
 - Temporary Traffic Control
- Health Hazards and Personal Protective Equipment (Pages 24-26)
- Electrical Safety (Page 27-29)
- Fall Protection, Ladders and Stairs (Pages 30-32)
- Excavations and Confined Spaces (Pages 33-35)
- Common Dimensions (Page 36)
- Day 2 Paper Evaluation (Page 37)
- Day 1 Paper Evaluation (Page 39)
- Mailing Information (Page 41)

This course was developed by the American Road and Transportation Builders Association with grants from the Federal Highway Administration and OSHA's Susan Harwood Program. It follows OSHA's instructor guidelines for 10 hour courses, but has been modified by the Transportation Training Institute, LLC to reflect the specific issues faced by public sector road workers. Most of the materials are copyrighted by the respective parties. Links identified in this document will take you to the websites for the respective parties and will allow you to obtain additional resources from those organizations. Many of the documents have been placed on the TTI-LLC Dropbox for ease of access at <http://goo.gl/tz9DxY>. Note this website address is case sensitive.

Disclaimer

This course provides an overview of the topics identified, methods for finding information for future reference and discussions of best practices. Due to the extent of the regulations associated with these topics and the multitude of situations in which these principles can be applied, the coursework only provides the basic principles on which additional training must be added and decisions are to be made.

The employee and their employer are ultimately responsible and assume the liability for their comprehension of the principles, additional training, review, planning and practice of the information and skills in their work. Specific follow up training is necessary in all topics to insure the proper level of knowledge, proficiency in its application and an understanding of the applicable laws and regulations.

Workplace safety controls must be applied in accordance with applicable laws and regulations including but not limited to applicable occupational safety and health regulations discussed in this course. The Manual on Uniform Traffic Control Devices (MUTCD) is also discussed here and represents the requirements associated with the code in which it is provided. It should be noted that the MUTCD requires that temporary traffic control planning (TTC Planning) shall be performed in accordance with the MUTCD and requires that "TTC plans should be prepared by persons knowledgeable (for example, trained and/or certified) about the fundamental principles of TTC and work activities to be performed. The design, selection, and placement of TTC devices for a TTC plan should be based on engineering judgment" which constitutes "the evaluation of available pertinent information, and the application of appropriate principles, provisions, and practices as contained in" the MUTCD "and other sources, for the purpose of deciding upon the applicability, design, operation, or installation of a traffic control device. Engineering judgment shall be exercised by an engineer, or by an individual working under the supervision of an engineer, through the application of procedures and criteria established by the engineer. Documentation of engineering judgment is not required."

It is necessary to have competent persons with the appropriate credentials involved in the processes from concept to completion as well as individuals with specific site condition experience to provide a comprehensive plan based on knowledge, experience and anticipated conditions.

Posters



All workers have the right to:

- A safe workplace.
- Raise a safety or health concern with your employer or OSHA, or report a work-related injury or illness, without being retaliated against.
- Receive information and training on job hazards, including all hazardous substances in your workplace.
- Request an OSHA inspection of your workplace if you believe there are unsafe or unhealthy conditions. OSHA will keep your name confidential. You have the right to have a representative contact OSHA on your behalf.
- Participate (or have your representative participate) in an OSHA inspection and speak in private to the inspector.
- File a complaint with OSHA within 30 days (by phone, online or by mail) if you have been retaliated against for using your rights.
- See any OSHA citations issued to your employer.
- Request copies of your medical records, tests that measure hazards in the workplace, and the workplace injury and illness log.

This poster is available free from OSHA.

Contact OSHA. We can help.

1-800-321-OSHA (6742) • TTY

Employers must:

- Provide employees a workplace free from recognized hazards. It is illegal to retaliate against an employee for using any of their rights under the law, including raising a health and safety concern with you or with OSHA, or reporting a work-related injury or illness.
- Comply with all applicable OSHA standards.
- Report to OSHA all work-related fatalities within 8 hours, and all inpatient hospitalizations, amputations and losses of an eye within 24 hours.
- Provide required training to all workers in a language and vocabulary they can understand.
- Prominently display this poster in the workplace.
- Post OSHA citations at or near the place of the alleged violations.

FREE ASSISTANCE to identify and correct

PUBLIC EMPLOYEE JOB SAFETY & HEALTH PROTECTION

The Oklahoma Occupational Health & Safety Standards Act of 1970 provides job safety and health protection for public workers by promoting safe and healthful working conditions. As authorized by the Act, rules have been adopted to prevent accidents in all public work places, including public schools and all political subdivisions of city, county and state government. These rules include standards contained in the Federal Occupational Safety & Health Act of 1970 (OSHA) and other safety and health standards derived from national consensus standards.

EMPLOYERS

Each public employer shall establish and maintain safe and healthful workplace conditions. Appropriate safety devices shall be used where necessary to protect the life, health and safety of all public employees. No employer shall interfere with the use of any method or process adopted for the protection of an employee or any other person lawfully within such place of employment. No employer shall fail to obey orders necessary to protect the life, safety and health of public employees. Public employers must allow their employees to participate in mandatory training and education programs.

EMPLOYEES

No public employee shall willfully remove, displace, damage, destroy, carry off or in any way interfere with the use of any safety device or safeguard furnished or provided for use in any place of public employment. No employee or agent of employees shall interfere with any method or process adopted for the protection of any employee or any other person lawfully within such place of employment.

PROPOSED PENALTIES

The Attorney General, upon request of the Commissioner of Labor, shall bring an action against any person who violates any of the provisions of the Act or violates any order or determination of the Commissioner promulgated pursuant to the Act. Any public employer or political subdivision failing to comply with any standards or interfering with, impeding or in any manner obstructing the administration of standards pursuant to the provisions of the Act may be charged with a misdemeanor. Additionally, such employers or political subdivisions may be prevented, by cease and desist orders, from continuing such violation(s). Each day in which each violation occurs shall constitute a separate violation.

VOLUNTARY COMPLIANCE

Safety and health education and training is the best way to help prevent and control occupational accidents. The Department of Labor provides public employers with free consultation services. The Department recognizes the outstanding efforts of participating employers.

RECORDKEEPING REQUIREMENTS

Public employers must maintain accurate work-related injury, illness and illness incident records. Employers are to use the OSHA recordkeeping system or its substantial equivalent. Calendar totals (excluding names of employees) must be posted no later than February 1st of the year following the calendar year to which the records apply. This information must remain posted through the 15th of April. Public employers are required to maintain written injury and illness records.

POSTING INSTRUCTIONS

This poster must be displayed in one or more conspicuous places accessible to employees as customarily posted. For assistance with additional information, contact:

Oklahoma Department of Labor
Public Employee Occupational Safety & Health

Oklahoma City
307 North Tulsa, Suite 100
Oklahoma City, OK 73105
405-521-4100
888-269-5353



Mark Costello
Commissioner of Labor

Department of Labor

10V

Public Employees Have a Right to a Safe & Healthful Workplace

The Oklahoma Occupational Health & Safety Standards Act of 1970 provides job safety and health protection for public workers. Rules have been adopted which include both employer and employee responsibilities. These include state, county, city and public school agencies and certain public trusts.

Responsibility of Employers

Public employers are responsible for workplace safety and health of employees. This includes written programs, processes and training.

Responsibility of Employees

Employees are responsible for following safety and health rules. This includes using equipment and personal protective devices properly.

Unsafe Equipment and/or Procedures

You have the right to bring unsafe equipment and/or procedures to the attention of a supervisor or the designated safety officer.

Adverse Action Remedy

You have the right to file a complaint with the Oklahoma Department of Labor for any adverse action taken against you for reporting hazards.

Employees' Right to File Complaint

You have the right to file a complaint with the Oklahoma Department of Labor concerning investigations of unsafe working conditions.

Employees' Right to View Certain Records

You have the right to view certain records regarding workplace injuries, illnesses, or fatalities for your agency. A summary of this information must be posted at your work site each year from February through April.

Employees' Right to View Their Files

You have the right to view or make copies of your medical records or records of your exposure to toxic and harmful substances or conditions.

Required Posting of this Notice

This notice must be posted in your workplace.

Contact Information

You may contact the Oklahoma Department of Labor at the website and toll-free number below or contact the Department direct: **Oklahoma City office**, 3017 North Stiles, Suite 100, Oklahoma City, OK 73105, 405-521-6100

IT'S THE LAW!

1-888-269-5353
www.labor.ok.gov

Oklahoma Department of Labor
Public Employee Occupational Safety & Health Unit



OSHA[®] FactSheet

Your Rights as a Whistleblower

You may file a complaint with OSHA if your employer retaliates against you by taking unfavorable personnel action because you engaged in protected activity relating to workplace safety or health, asbestos in schools, cargo containers, airline, commercial motor carrier, consumer product, environmental, financial reform, food safety, health insurance reform, motor vehicle safety, nuclear, pipeline, public transportation agency, railroad, maritime, motor vehicle safety, and securities laws.

Whistleblower Laws Enforced by OSHA

Each law requires that complaints be filed within a certain number of days after the alleged retaliation

- *Asbestos Hazard Emergency Response Act* (90 days)
- *Clean Air Act* (30 days)
- *Comprehensive Environmental Response, Compensation and Liability Act* (30 days)
- *Consumer Financial Protection Act of 2010* (180 days)
- *Consumer Product Safety Improvement Act* (180 days)
- *Energy Reorganization Act* (180 days)
- *Federal Railroad Safety Act* (180 days)
- *Federal Water Pollution Control Act* (30 days)
- *International Safe Container Act* (60 days)
- *Moving Ahead for Progress in the 21st Century Act* (motor vehicle safety) (180 days)
- *National Transit Systems Security Act* (180 days)
- *Occupational Safety and Health Act* (30 days)
- *Pipeline Safety Improvement Act* (180 days)
- *Safe Drinking Water Act* (30 days)
- *Sarbanes-Oxley Act* (180 days)
- *Seaman's Protection Act* (180 days)
- *Section 402 of the FDA Food Safety Modernization Act* (180 days)
- *Section 1558 of the Affordable Care Act* (180 days)
- *Solid Waste Disposal Act* (30 days)
- *Surface Transportation Assistance Act* (180 days)
- *Toxic Substances Control Act* (30 days)
- *Wendell H. Ford Aviation Investment and Reform Act for the 21st Century* (90 days)

Unfavorable Personnel Actions

Your employer may be found to have retaliated against you if your protected activity was a contributing or motivating factor in its decision to take unfavorable personnel action against you. Such actions may include:

- Applying or issuing a policy which provides for an unfavorable personnel action due to activity protected by a whistleblower law enforced by OSHA
- Blacklisting
- Demoting
- Denying overtime or promotion
- Disciplining
- Denying benefits
- Failing to hire or rehire
- Firing or laying off
- Intimidation
- Making threats
- Reassignment to a less desirable position, including one adversely affecting prospects for promotion
- Reducing pay or hours
- Suspension

Filing a Complaint

If you believe that your employer retaliated against you because you exercised your legal rights as an employee, contact OSHA as soon as possible because you must file your complaint within the legal time limits.

An employee can file a complaint with OSHA by visiting or calling the local OSHA office or sending a written complaint to the closest OSHA regional or area office. Written complaints may be filed by facsimile, electronic communication, hand delivery during business hours, U.S. mail (confirmation services recommended), or other third-party commercial carrier. The date of the postmark, facsimile, electronic communication, telephone call, hand delivery, delivery to a third-party commercial carrier, or in-person filing at an OSHA

office is considered the date filed. No particular form is required and complaints may be submitted in any language.

For OSHA area office contact information, please call 1-800-321-OSHA (6742) or visit www.osha.gov/html/RAmapp.html.

Upon receipt of a complaint, OSHA will first review it to determine whether it is valid on its face. All complaints are investigated in accord with the statutory requirements.

With the exception of employees of the U.S. Postal Service, public sector employees (those employed as municipal, county, state, territorial or federal workers) are not covered by the *Occupational Safety and Health Act* (OSH Act). Non-federal public sector employees and, except in Connecticut, New York, New Jersey, the Virgin Islands, and Illinois, private sector employees are covered in states which operate their own occupational safety and health programs approved by Federal OSHA. For information on the 27 State Plan states, call 1-800-321-OSHA (6742), or visit www.osha.gov/dcspp/osp/index.html.

A federal employee who wishes to file a complaint alleging retaliation due to disclosure of a substantial and specific danger to public health or safety or involving occupational safety or health should contact the Office of Special Counsel (www.osc.gov) and OSHA's Office of Federal Agency Programs (www.osha.gov/dep/enforcement/dep_offices.html).

Coverage of public sector employees under the other statutes administered by OSHA varies by statute. If you are a public sector employee and you are unsure whether you are covered under a whistleblower protection statute, call 1-800-321-OSHA (6742) for assistance, or visit www.whistleblowers.gov.

How OSHA Determines Whether Retaliation Took Place

The investigation must reveal that:

- The employee engaged in protected activity;
- The employer knew about or suspected the protected activity;
- The employer took an adverse action; and
- The protected activity motivated or contributed to the adverse action.

If the evidence supports the employee's allegation and a settlement cannot be reached, OSHA will generally issue an order, which the employer may contest, requiring the employer to reinstate the employee, pay back wages, restore benefits, and other possible remedies to make the employee whole. Under some of the statutes the employer must comply with the reinstatement order immediately. In cases under the *Occupational Safety and Health Act*, *Asbestos Hazard Emergency Response Act*, and the *International Safe Container Act*, the Secretary of Labor will file suit in federal district court to obtain relief.

Partial List of Whistleblower Protections

Whistleblower Protections under the OSH Act

The OSH Act protects workers who complain to their employer, OSHA or other government agencies about unsafe or unhealthful working conditions in the workplace or environmental problems. You cannot be transferred, denied a raise, have your hours reduced, be fired, or punished in any other way because you used any right given to you under the OSH Act. Help is available from OSHA for whistleblowers.

If you have been punished or discriminated against for using your rights, you must file a complaint with OSHA within 30 days of the alleged reprisal for most complaints. No form is required, but you must send a letter or call the OSHA Area Office nearest you to report the discrimination (within 30 days of the alleged discrimination).

You have a limited right under the OSH Act to refuse to do a job because conditions are hazardous. You may do so under the OSH Act only when (1) you believe that you face death or serious injury (and the situation is so clearly hazardous that any reasonable person would believe the same thing); (2) you have tried, where possible, to get your employer to correct the condition, and been unable to obtain a correction and there is no other way to do the job safely; and (3) the situation is so urgent that you do not have time to eliminate the hazard through regulatory channels such as calling OSHA. For details, see www.osha.gov/as/opa/worker/refuse.html. OSHA cannot enforce union contracts or state laws that give employees the right to refuse to work.

Whistleblower Protections in the Transportation Industry

Employees whose jobs directly affect commercial motor vehicle safety or security are protected from retaliation by their employers for, among other things, reporting violations of federal or state commercial motor carrier safety or security regulations, or refusing to operate a vehicle because of violations of federal commercial motor vehicle safety or security regulations or because they have a reasonable apprehension of death or serious injury to themselves or the public and they have sought from the employer and been unable to obtain correction of the hazardous condition.

Similarly, employees of air carriers, their contractors or subcontractors who raise safety concerns or report violations of FAA rules and regulations are protected from retaliation, as are employees of owners and operators of pipelines, their contractors and subcontractors who report violations of pipeline safety rules and regulations. Employees involved in international shipping who report unsafe shipping containers are also protected. In addition, employees of railroad carriers or public transportation agencies, their contractors or subcontractors who report safety or security conditions or violations of federal rules and regulations relating to railroad or public transportation safety or security are protected from retaliation.

Whistleblower Protections for Voicing Environmental Concerns

A number of laws protect employees from retaliation because they report violations of environmental laws related to drinking water and water pollution, toxic substances, solid waste disposal, air quality and air pollution, asbestos in schools, and hazardous waste disposal sites. The *Energy Reorganization Act* protects employees from retaliation for raising safety concerns in the nuclear power industry and in nuclear medicine.

Whistleblower Protections When Reporting Corporate Fraud

Employees who work for publicly traded companies or companies required to file certain reports with the Securities and Exchange Commission are protected from retaliation for reporting alleged mail, wire, bank or securities fraud; violations of SEC rules or regulations of the SEC; or violations of federal laws relating to fraud against shareholders.

Whistleblower Protections for Voicing Consumer Product Concerns

Employees of consumer product manufacturers, importers, distributors, retailers, and private labelers are protected from retaliation for reporting reasonably perceived violations of any statute or regulation within the jurisdiction of the Consumer Safety Product Safety Commission.

More Information

To obtain more information on whistleblower laws, go to www.whistleblowers.gov.

For assistance, contact us. We can help. It's confidential.



U.S. Department of Labor
www.osha.gov (800) 321-OSHA (6742)

DWP FS-3638 02/2013

This is one of a series of informational fact sheets highlighting OSHA programs, policies, or standards. It does not impose any new compliance requirements. For a comprehensive list of compliance requirements of OSHA standards and regulations, refer to Title 29 of the Code of Federal Regulations. Because some of these whistleblower laws have only recently been enacted, the final regulations implementing them may not yet be available in the Code of Federal Regulations but the laws are still being enforced by OSHA. This information will be made available to sensory-impaired individuals upon request. Voice phone number: (202) 693-1999; teletypewriter (TTY) number: (877) 889-5627.

Refusing to Work because Conditions are Dangerous

Workers have the right to refuse to do a job if they believe in good faith that they are exposed to an imminent danger. "Good faith" means that even if an imminent danger is not found to exist, the worker had reasonable grounds to believe that it did exist.

The United States Supreme Court, in the Whirlpool case, issued the landmark ruling which more clearly defined a worker's right to refuse work where an employee has reasonable apprehension that death or serious injury or illness might occur as a result of performing the work. **However, as a general rule, you do not have the right to walk off the job because of unsafe conditions.**

REFUSING WORK IS PROTECTED IF:

Your right to refuse to do a task is protected if **ALL** of the following conditions are met:

- ✓ Where possible, you have asked the employer to eliminate the danger, and the employer failed to do so; **and**
- ✓ You refused to work in "good faith." This means that you must genuinely believe that an imminent danger exists. Your refusal cannot be a disguised attempt to harass your employer or disrupt business; **and**
- ✓ A reasonable person would agree that there is a real danger of death or serious injury; **and**
- ✓ There isn't enough time, due to the urgency of the hazard, to get it corrected through regular enforcement channels, such as requesting an OSHA inspection.

CONDITIONS ARE MET, NEXT STEPS:

When all of these conditions are met, you take the following steps:

- ✓ Ask your employer to correct the hazard;
- ✓ Ask your employer for other work;
- ✓ Tell your employer that you won't perform the work unless and until the hazard is corrected; **and**
- ✓ Remain at the worksite until ordered to leave by your employer.

The table below offers a few "IF/THEN" scenarios to follow.

IF	THEN
You believe working conditions are unsafe or unhealthful.	Call your employer's attention to the problem.
Your employer does not correct the hazard or disagrees with you about the extent of the hazard.	You may file a complaint with OSHA.
Your employer discriminates against you for refusing to perform the dangerous work.	Contact OSHA immediately.

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Source: <http://www.osha.gov/as/opa/worker/refuse.html>

Employers Must Provide and Pay for Most PPE

Personal Protective Equipment (PPE)

The Occupational Safety and Health Administration (OSHA) requires that employers protect you from workplace hazards that can cause injury or illness. Controlling a hazard at its source is the best way to protect workers. However, when engineering, work practice and administrative controls are not feasible or do not provide sufficient protection, employers must provide personal protective equipment (PPE) to you and ensure its use.

PPE is equipment worn to minimize exposure to a variety of hazards. Examples include items such as gloves, foot and eye protection, protective hearing protection (earplugs, muffs), hard hats and respirators.

Employer Obligations	Workers should:
✓ Performing a "hazard assessment" of the workplace to identify and control physical and health hazards.	✓ Properly wear PPE
✓ Identifying and providing appropriate PPE for employees.	✓ Attend training sessions on PPE
✓ Training employees in the use and care of the PPE.	✓ Care for, clean and maintain PPE, and
✓ Maintaining PPE, including replacing worn or damaged PPE.	✓ Inform a supervisor of the need to repair or replace PPE.
✓ Periodically reviewing, updating and evaluating the effectiveness of the PPE program.	

Employers Must Pay for Personal Protective Equipment (PPE)

On May 15, 2008, a new OSHA rule about employer payment for PPE went into effect. With few exceptions, OSHA now requires employers to pay for personal protective equipment used to comply with OSHA standards. The final rule does not create new requirements regarding what PPE employers must provide.

The standard makes clear that employers cannot require workers to provide their own PPE and the worker's use of PPE they already own must be completely voluntary. Even when a worker provides his or her own PPE, the employer must ensure that the equipment is adequate to protect the worker from hazards at the workplace.



Examples of PPE that Employers Must Pay for Include:

- Metatarsal foot protection
- Rubber boots with steel toes
- Non-prescription eye protection
- Prescription eyewear inserts/lenses for full face respirators
- Goggles and face shields
- Fire fighting PPE (helmet, gloves, boots, proximity suits, full gear)
- Hard hats
- Hearing protection
- Welding PPE

Employers Must Provide and Pay for Most PPE

Payment Exceptions under the OSHA Rule

Employers are not required to pay for some PPE in certain circumstances:

- Non-specialty safety-toe protective footwear (including steel-toe shoes or boots) and non-specialty prescription safety eyewear provided that the employer permits such items to be worn off the job site. (OSHA based this decision on the fact that this type of equipment is very personal, is often used outside the workplace, and that it is taken by workers from jobsite to jobsite and employer to employer.)
- Everyday clothing, such as long-sleeve shirts, long pants, street shoes, and normal work boots.
- Ordinary clothing, skin creams, or other items, used solely for protection from weather, such as winter coats, jackets, gloves, parkas, rubber boots, hats, raincoats, ordinary sunglasses, and sunscreen
- Items such as hair nets and gloves worn by food workers for consumer safety.
- Lifting belts because their value in protecting the back is questionable.
- When the employee has lost or intentionally damaged the PPE and it must be replaced.

OSHA Standards that Apply

OSHA General Industry PPE Standards

- 1910.132: General requirements and payment
- 1910.133: Eye and face protection
- 1910.134: Respiratory protection
- 1910.135: Head protection
- 1910.136: Foot protection
- 1910.137: Electrical protective devices
- 1910.138: Hand protection

OSHA Construction PPE Standards

- 1926.28: Personal protective equipment
- 1926.95: Criteria for personal protective equipment
- 1926.96: Occupational foot protection
- 1926.100: Head protection
- 1926.101: Hearing protection
- 1926.102: Eye and face protection
- 1926.103: Respiratory protection

There are also PPE requirements in shipyards and marine terminals and many standards on specific hazards, such as 1910.1030: Bloodborne pathogens and 1910.146: Permit-required confined spaces.

OSHA standards are online at www.osha.gov.

Sources:

- *Employers Must Provide and Pay for PPE, New Jersey Work Environment Council (WEC) Fact Sheet*
- *OSHA Standards, 1910.132(h) and 1926.95(d)*
- *Employer Payment for Personal Protective Equipment Final Rule, Federal Register: November 15, 2007 (Volume 72, Number 220)*

Safety and Health Resources

Government Resources

OSHA: <http://www.osha.gov/> Contact the OSHA Office nearest you or contact the toll free number: 1-800-321-OSHA (6742)

NIOSH: <http://www.cdc.gov/niosh/> Phone NIOSH at 1-800-CDC-INFO (1-800-232-4636) or Email at: cdcinfo@cdc.gov

NIOSH is a part of the Centers for Disease Control and Prevention (<http://www.cdc.gov/>). CDC has extensive information on health and safety topics.

COSH GROUPS

COSH groups are private, non-profit coalitions of labor unions, health and technical professionals, and others interested in promoting and advocating for worker health and safety. *If you don't see a COSH group in your area, check the NATIONAL COSH website for local COSH groups.*

NATIONAL COUNCIL FOR OCCUPATIONAL SAFETY & HEALTH National COSH is a federation of local and statewide "COSH" groups: <http://www.coshnetwork.org/>

CACOSH - Chicago Area Committee on Occupational Safety and Health: <http://www.cacosh.org/>

MASSCOSH - Massachusetts Coalition on Occupational Safety and Health: <http://www.masscosh.org/>

NYCOSH - New York Committee for Occupational Safety and Health: <http://www.nycosh.org/>

PHILAPOSH - Philadelphia Area Project for Occupational Safety and Health: <http://www.philaposh.org/> Prevention (<http://www.cdc.gov/>).

Universities

CORNELL UNIVERSITY
School of Industrial and Labor Relations: <http://www.ilr.cornell.edu/healthSafety/>

LABOR OCCUPATIONAL HEALTH PROGRAM, University of California at Berkeley: <http://www.lohp.org/>

NATIONAL LABOR COLLEGE, George Meany Center: <http://www.nlc.edu/>

UCLA, Labor Occupational Safety and Health (UCLA-LOSH): <http://www.losch.ucla.edu/>

Unions

The following is a sample list of unions with links to useful health and safety information.

AFL-CIO: <http://www.aflcio.org/Issues/Job-Safety>

AFSCME: <http://www.afscme.org/issues/73.cfm>

eLCOSH - The Electronic Library of Construction Safety and Health is a collection of information on construction safety and health developed by CPWR - Center for Construction Research and Training, with funding by NIOSH: <http://www.elcosh.org/>

SEIU (Service Employees International Union) Health and Safety Department: <http://www.seiu.org/a/members/safety-and-health.php>

UAW Health and Safety Department: <http://www.uaw.org/healthsafety>

<http://www.osha.gov>

<http://mutcd.fhwa.dot.gov/>



Or just search for your topic
"OSHA," "PEOSH," "FHWA MUTCD,"
"Roadway Safety+" ...

Dropbox folder with
many resources

<http://goo.gl/tz9DxY>



[http://www.ok.gov/odol/Services/Safety_and_Health_\(PEOSH\)/](http://www.ok.gov/odol/Services/Safety_and_Health_(PEOSH)/)

Identifying Safety and Health Problems in the Workplace

Identifying health and safety problems can be as easy as answering basic questions. To determine if there are health and safety problems that need to be addressed in your workplace, use these questions:

- Do you or your co-workers have injuries or health complaints? If so, what types?
- Who has been hurt or is having symptoms?
- When do you or your co-workers feel these symptoms?
- Where in the workplace are safety or health problems occurring?
- What are the conditions that are causing problems?



The following “**Caution Health Hazards**” and “**Caution Safety Hazards**” tables provide more information.



CAUTION: Health Hazards

Common types of health hazards in the workplace are:	
<ul style="list-style-type: none"> • Chemical (asbestos, solvents, chlorine) • Biological (tuberculosis, HIV, hepatitis, molds) • Physical (noise, heat and cold, radiation, vibration) • Ergonomics or Repetitive Strain Injuries (carpal tunnel syndrome, back injuries) • Psychological (stress) 	
How health hazards enter your body:	
<ul style="list-style-type: none"> • Breathing (inhalation) • Swallowing (ingestion) • Skin (absorption) • Cuts (injection) 	
Harm caused by health hazards depends on:	
<ul style="list-style-type: none"> • Strength, or potency, of the agent. • Amount of the agent that is present. • How long you are exposed to the agent. • Part of your body that is exposed. 	
Types of health effects:	
<ul style="list-style-type: none"> • Acute: the effect shows up right away. • Chronic: problems show up after a long period of exposure and/or long after the exposure ends. • Local: only the part of the body that was exposed is affected. • Systemic: an agent enters the body and affects other parts of the body. 	
Cancer	
<ul style="list-style-type: none"> • Cancer is a term for many diseases in different parts of the body. • Carcinogens are agents that cause cancer. • There is no totally safe level of exposure to something that causes cancer. • Cancer from a workplace exposure may develop 10, 20 or more years after exposure. 	
Sensitization	
<ul style="list-style-type: none"> • You may become allergic or sensitive to some agents you work with. Sensitization can develop over time. • For example, a health care worker may develop a serious allergic reaction to latex used in gloves. 	
Reproductive effects	
<ul style="list-style-type: none"> • Both men and women can be affected by reproductive hazards at work. • Reproductive hazards cause miscarriages and birth defects. 	9

Identifying Safety and Health Problems in the Workplace

CAUTION: Safety Hazards

Common types of safety hazards in the workplace are:

- Slips, trips and falls
- Being caught in or struck by moving machinery or other objects
- Fire and explosions
- Transportation and vehicle-related accidents
- Confined spaces
- Violence

Slips, Trips and Falls

- Bad housekeeping and poor drainage can make floors and other walking surfaces wet and slippery.
- Electrical wires along the floor pose a tripping hazard.
- You can fall if you are not provided with fall protection equipment, guardrails, and safe ladders.

Caught In or Struck By Moving Machinery/Objects

- Machinery can cause injuries in different ways:
- You can get parts of your body caught in or struck by exposed moving parts if machines are not properly guarded, or not locked out when being repaired.
- You can be struck by flying objects from machines without protective guards.

Fire and Explosions

- Improper labeling, handling or storage of certain materials can pose a risk of fire or explosion.
- Every workplace should have an evacuation plan for getting people out of a building in case of fire and an alarm or alert system to quickly inform employees of an emergency.
- Every worker should be trained on what to do in case of an emergency.

Transportation and Vehicle-Related Accidents

- Operators of vehicles and equipment can be injured or cause injury to pedestrians if equipment is unsafe or if adequate training has not been provided.
- You can be seriously injured or killed after being hit by a vehicle while repairing roads or doing other work in traffic zones. This danger exists when traffic is not properly routed and/or adequate barriers are not placed between the workers and the traffic.

Confined Spaces

- A confined space is an area with small openings for a worker to enter and exit and is not designed for regular work. Examples of confined spaces include manholes, sewer digestors and silos. There are many hazards in confined spaces.
- Workers can become unconscious and die from a lack of oxygen.
- There may be too much oxygen, or other chemicals that can catch fire or explode.
- Poisonous gases and vapors, such as hydrogen sulfide or carbon monoxide, may also build up in a confined space.
- Confined spaces can also pose physical hazards. They can be very hot or cold, very loud, or slippery and wet.
- Grain, sand or gravel can bury a worker.

Violence

- Violence on the job is a growing problem.
- Homicides are the second leading cause of workplace fatalities. Workplace violence includes physical assault as well as near misses, verbal abuse and sexual harassment.



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Source: Safe Jobs Now: An AFSCME Guide to Health and Safety in the Workplace

Submit by Email Print Clear



Public Employee Occupational Safety & Health
Complaint Form
Notice of Alleged Safety & Health Hazards
www.labor.ok.gov

OKLAHOMA DEPARTMENT OF LABOR

3017 N. Stiles, Suite 100
Oklahoma City, OK 73105
405-521-6100
FAX 405-521-6020

Mark Costello, Commissioner

Diana Jones, Director

Establishment Name
Site Address City Zip Code
Type of Facility County
Management Contact Name Title Phone Fax
Additional Management Contact Name Address City Zip Code

Hazard Description & Location

Please briefly describe the hazard(s) which you believe exist. Include the approximate number of employees exposed to or threatened by each hazard. Specify the particular building, location or worksite where the alleged violation exists.

Are you an: Employee: [] Employee representative: [] Other, please specify: []
Has this condition been brought to the attention of: employer? [] Other government agency? (specify): []
A copy of this form may be provided to the employer upon request per 51 O.S.24A.1 et.seq.

The undersigned believes that a violation of an occupational safety or health standard exists which is a job safety or health hazard at the establishment indicated on this form (above).

Name of Complainant Date
Occupation County
Address City Zip
Signature of Complainant Phone Fax

If you are an authorized representative of employees affected by this complaint, please state the name of the organization that you represent and your title.
Name of Organization Authorized Representative's Title

Caught In or Between & Struck By

Learning Objectives/Outcomes

- What are common types of caught-in or –between and struck by hazards in construction?
 - Machinery that has unguarded moving parts
 - Buried in or by
 - Pinned between
 - Struck-by
 - Flying object
 - Falling object
 - Swinging object
 - Rolling object
 - Equipment or motor vehicles
- How can I protect myself from caught-in or -between and struck by hazards?
 - Use machinery that is properly guarded
 - Ensure that excavations and machinery are supported, secured or otherwise made safe
 - Protect yourself from being pinned between equipment. Stay outside safety circles.
 - Wear proper PPE including High Visibility Apparel
 - Use toe boards, equipment barricades, spotters or signalers
 - Use Temporary and Internal Traffic Control
 - Get the appropriate training and have tailgate talks

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Supervisor Safety Tips

- Ensure personnel have proper training
- Follow up training with regular tailgate talks
- Plan operations
- Include both temporary traffic control and internal traffic control plans
 - Discuss these plans with all stakeholders
 - Transmit to quarries, ready mix and asphalt suppliers to pass on to drivers
 - Include site specific information
 - Access and egress points
 - Traffic patterns that minimize backing
 - Potential interaction points with workers on foot and countermeasures
 - On site communication methods, including flaggers
 - Remind to avoid distractions
 - » Radios off, windows down
 - On-site hazards (Overhead Power Lines and Ground Mounted Markings ...)
- Reduce the amount of backing necessary in operations
- Control backing, use spotters
- Emphasize clear and continuous communication between operators and workers on foot
- Designate worker free areas and safety circles

15

Operator / Truck Driver Safety Tips

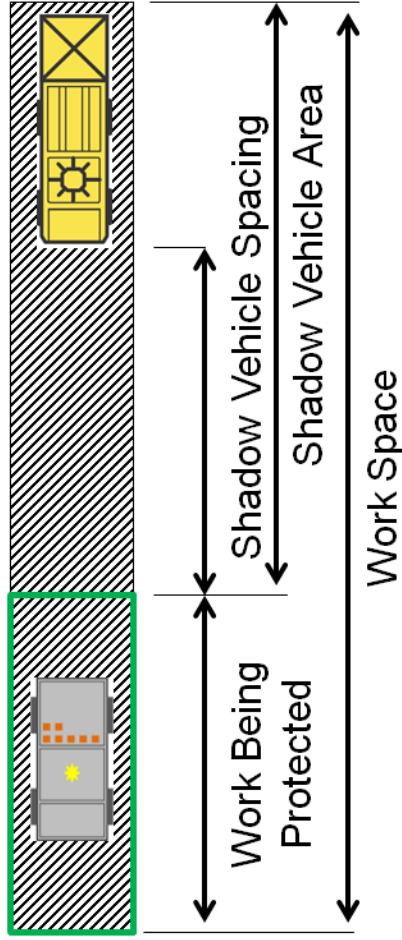
- Only operate trucks or equipment for which you are trained and clearly understand limitations: Gradeability, Capacities ...
- Be aware of site conditions
 - Low or soft shoulders or grade, wet or slick slopes
- Be constantly aware of your surroundings. Read and review labels. Use reminders – Signs, Placards ...
- Consider routes and site conditions when planning operations
 - Hills, curves, slick slopes, dawn – dusk visibility ...
- Back into parking spaces so the first move is forward. Pull straight through if possible.
- Control backing and speed of travel / operation
- Avoid backing whenever Possible
- Get out and look behind the truck if you don't know what is there (**Get Out And Look – G.O.A.L.**)
- Use spotters for frequent backing operations
- Have clear continuous communication with workers on foot
- Check behind the truck prior to backing
- Don't back up immediately upon shifting into reverse. Wait for backup horn to sound and give a worker on foot or pedestrian a chance to get out of the way if they inadvertently walked in.
- Don't put the truck or machine in reverse unless backing
- Don't leave trucks and equipment in reverse. Continually sounding backup alarms become background noise and lessen effectiveness.
- Do a pre-job equipment inspection
 - Include mirror adjustment / cleaning
 - Keep windshields clean and dash boards clear of papers
 - Include checks of brakes and backup alarms
- Bring maintenance needs to the attention of your supervisor immediately. Do not operate trucks or equipment which need repair.
- Know where all of the workers in your vicinity are
- Lockout – Tagout Equipment for Repairs

16

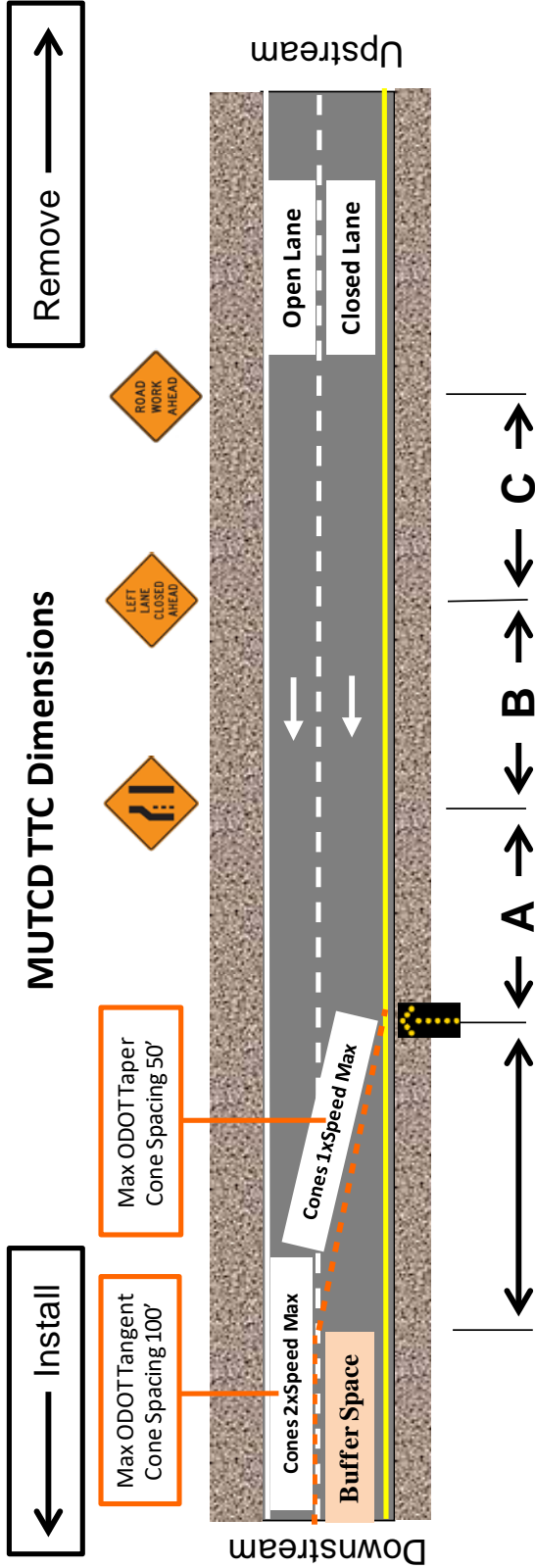
Workers on Foot – Safety Tips

- Understand blind spots
 - Exercises that allow workers to see or visualize blind spots can be helpful learning tools
 - Sit in a truck or machine during a tailgate talk to visually understand blind spots
 - Set cones around a truck or machine indicating blind spots to understand the limits of blind spots
- Remember the common phrase “If you cannot see the driver, the driver cannot see you.”
- Stay out of blind spots
- Constantly be aware of surroundings
- Look when you hear a backup horn
- Get a driver or operator’s attention and approval before approaching a truck or machine
- Stay out of areas where trucks and machines are operating
- Stay out of safety circles
- Don’t enter live traffic lanes
- Wear and maintain your PPE
- Always wear your high visibility apparel
- Keep your high visibility apparel closed in the front
- Attend and pay close attention to safety training and tailgate talks
- Notify your supervisor of safety concerns immediately

AASHTO Shadow Vehicle Positioning



Shadow Vehicles Weighing 22,000 lbs or More		
Operating Speed Limit	Stationary	Moving < 15.5 MPH
≥ 55 MPH	150 Feet	172 Feet
45 - 50 MPH	100 Feet	150 Feet
< 45 MPH	74 Feet	100 Feet
Shadow Vehicles Weighing 9,900 lbs to 22,000 lbs		
Operating Speed Limit	Stationary	Moving < 15.5 MPH
≥ 55 MPH	172 Feet	222 Feet
45 - 50 MPH	123 Feet	172 Feet
< 45 MPH	100 Feet	100 Feet



Merging Taper Length (L)

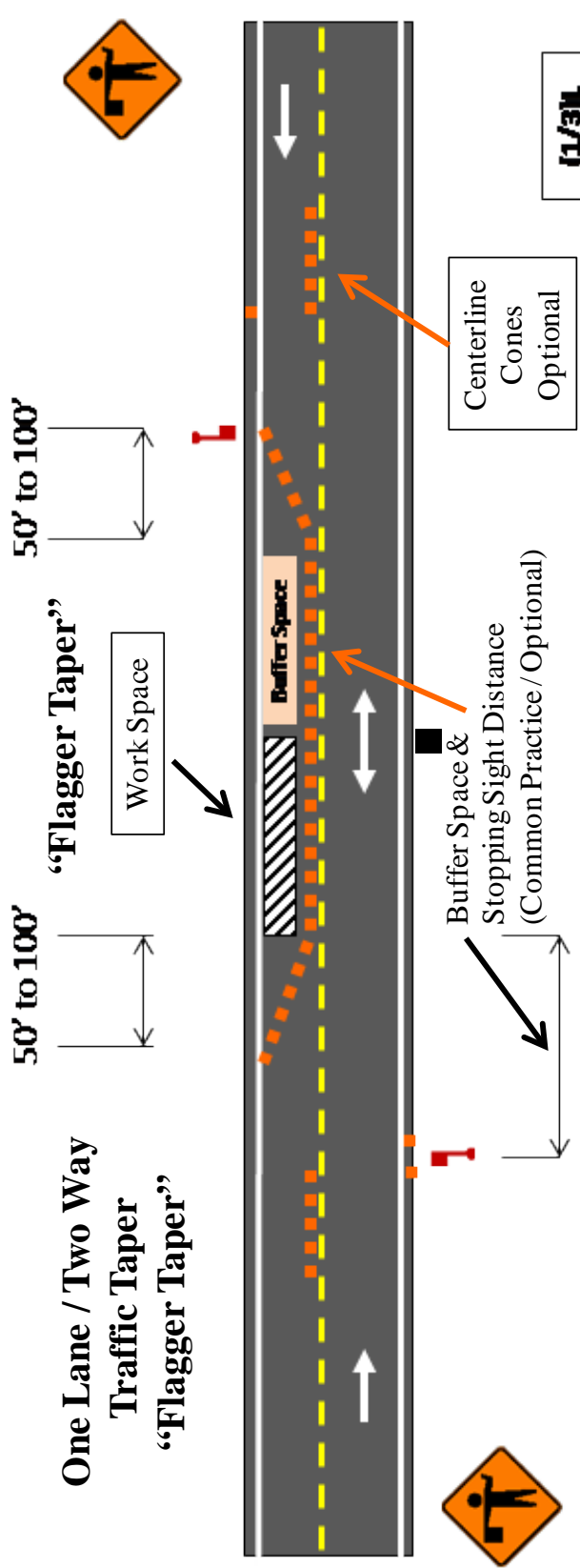
Road Type	Distance Between Signs		
	A	B	C
Urban (Low Speed)	100	100	100
Urban (High Speed)	350	350	350
Rural	500	500	500
Expressway / Freeway*	1000	1500	2640

* Divided Highways, Expressways & Freeways
 Partial Access Control (A= 1000, B= 1500, C= 2640)

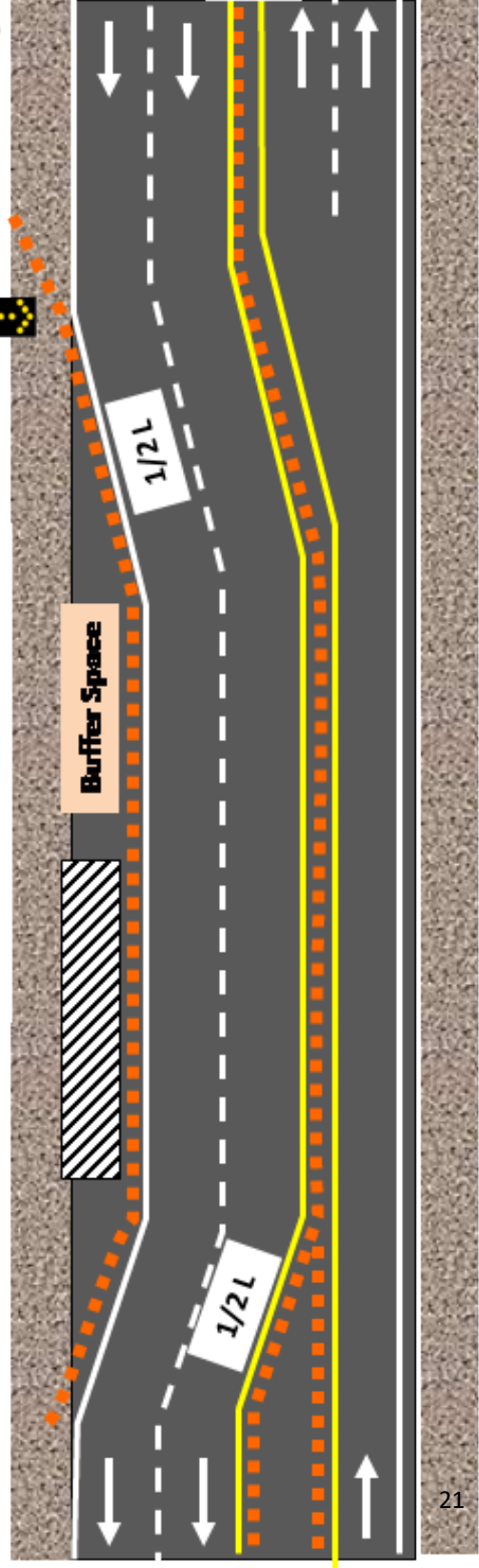
Speed in Miles Per Hour	Sign Spacing Based on Speed *				Buffer Space Stopping Sight Distance in Feet
	4 x Speed Limit Urban Min	8 x Speed Limit Urban Max Rural Min	12 x Speed Limit Rural Max		
20	100	160		115	
25	100	200		155	
30	120	240		200	
35	140	280		250	
40	160	320	480	305	
45		360	540	360	
50		400	600	425	
55		440	660	495	
60		480	720	570	
65		520	780	645	
70		560	840	730	
75		600	900	820	

Speed in Miles Per Hour	MUTCD Maximum Cone Spacing		Example Dimensions for a 12' Lane		
	Taper 1 x Speed Limit (ODOT Max.)	Tangent 2 x Speed Limit (ODOT Max.)	MUTCD Merging Taper Length (L) in Feet	MUTCD Shoulder Taper Length (.33L) in	MUTCD Shifting Taper Length (.5L) in Feet
20	20	40	80	27	40
25	25	50	125	42	63
30	30	60	180	60	90
35	35	70	245	82	123
40	40	80	320	107	160
45	45	90	540	180	270
50	50	100	600	200	300
55	55 (50)	110 (100)	660	220	330
60	60 (50)	120 (100)	720	240	360
65	65 (50)	130 (100)	780	260	390
70	70 (50)	140 (100)	840	280	420
75	75 (50)	150 (100)	900	300	450

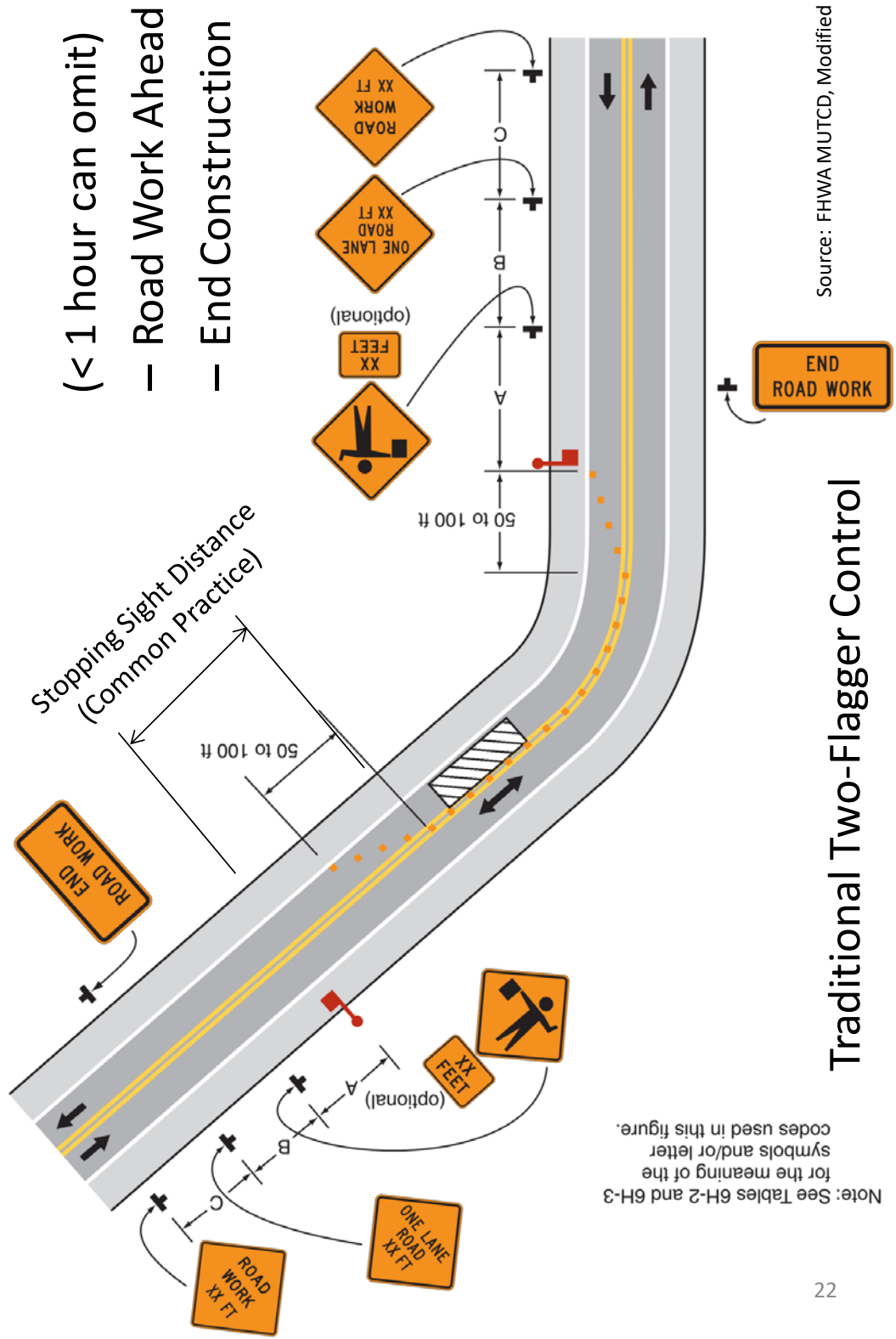
**One-Lane Two-Way (Flagger) Taper: 50' Min. to 100' Max.
Typically 6 Cones: 5 spaces @ 10' = 50' 5 Spaces @ 20' = 100'**



Shifting Taper

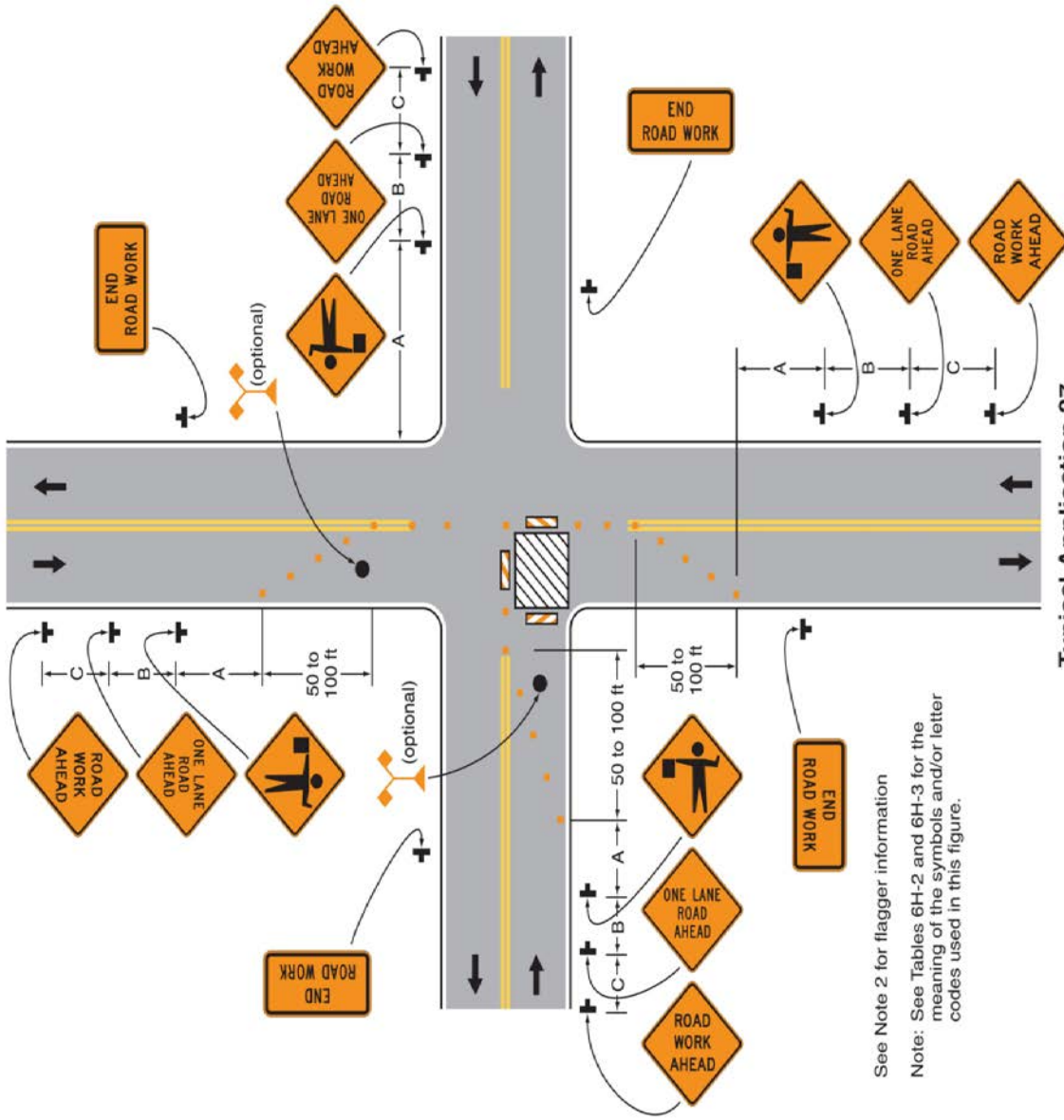


MUTCD TA 10 with Flagger Spacing



Traditional Two-Flagger Control

- (< 1 hour can omit)
- Road Work Ahead
- End Construction



Typical Application 27

Closure at the Side of an Intersection (TA-27)

Health Hazards and Personal Protective Equipment

Learning Objectives/Outcomes

- Parts of an appropriate employee protection program
 - Assessment of the workplace for hazards
 - Use of engineering and work practice controls to eliminate or reduce hazards before using PPE
 - Selection of appropriate PPE to protect employees from hazards that cannot be eliminated
 - Training of the employees
- What are engineering and work practice controls
 - Engineering Controls.
 - Change the machine or work environment
 - Prevent exposure to a potential hazard
 - Isolate, change or enclose the process
 - Consider design specifications
 - Substitute less harmful material
 - Work Practice Controls
 - Remove employees from exposure to the potential hazard
 - Use of wet methods to suppress dust
 - Personal hygiene
 - Housekeeping and maintenance
 - Job rotation of workers

Health Hazards and Personal Protective Equipment

– Training Topics

- Why training is necessary
- The health hazards
 - Common Roadway Issues
 - » Chemicals and associated Safety Data Sheets
 - Herbicides, Pesticides, Bonding compounds
 - Curing compounds, Concrete
 - Asphalt materials
 - Cleaning agents
 - Anti-De Icing Materials / Chemicals
 - » Silica
 - » Lead and other fumes from repair work
 - » Bird / Bat nests, feces
 - » Gasoline / Diesel Fuel / Oils - Fluids
 - » Carbon Monoxide
- Using Safety Data Sheets
- How the PPE will protect the wearer
- What the PPE's limitations are
- When and how to wear the PPE
- How to put on and remove PPE
- How to identify signs of wear
- How to clean and disinfect the PPE
- The useful life of the PPE
- How to dispose of used, contaminated or damaged PPE

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Health Hazards and Personal Protective Equipment

- Types of Personal Protective Equipment
 - High visibility apparel (Class 2 Min, Class 3 Preferred)
 - Hard hats/helmets (Including for Electrical Work)
 - Safety goggles/glasses , face shields, welding shields
 - Anti fog wipes & sprays for glasses / shields
 - Safety boots (Steel Toe, Metatarsal Protection)
 - Gloves (Anti-Vibration, Rubber, Leather ...)
 - Long sleeves, leggings, chain saw chaps, coveralls
 - Retroreflective, fire resistant ...
 - Body Suits – Tyvex ...
 - Hearing protection
 - Respiratory protection
 - Dust masks, respirators, supplied air
 - Fall protection

Electrocution

Learning Objectives/Outcomes

- Understanding the major types of electrocution hazards in construction
 - Contact with power lines
 - Contact with energized sources
 - Improper use of extension and flexible cords
- How can I protect myself from electrocution hazards?
 - Maintain safe distance from overhead power lines
 - Use ground-fault circuit interrupters (GFCI)
 - Inspect portable tools and extension cords
 - Use power tools and equipment as designed
 - Follow lockout/tagout procedures
- How must employers protect workers from electrocutions?
 - Ensure overhead power line safety
 - Isolate electrical parts
 - Supply GFCI
 - Establish and implement an Assured Equipment Grounding Program
 - Ensure power tools are maintained in safe working order
 - Ensure proper guarding
 - Provide training
 - Enforce safety-related work practices

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Electrocution

What to do if contact with electrical power happens while in a truck or machine

- Try to break the connection
 - Lower a boom if operating a crane or machine
 - Back away if in a truck with the dump bed raised
- Stay in the truck or machine and don't touch any metal
- If a fire starts and you must get out
 - Jump down
 - Keep arms and legs together
 - Shuffle away (Remember, the ground can be energized around the truck or machine.)

What to do if you are on the ground when someone comes in contact with a power line:

- Stay away from the person or machine
- Don't touch any person or machine in contact with a power line
- Call 911 and the power company immediately
 - Have contact cards in your wallet with emergency contact numbers
 - Get the power de-energized as soon as possible

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Electrocution

- Rules of thumb
 - Stay at least 20' from distribution lines with $\leq 350,000$ volts (350 KV)
 - Stay at least 50' from transmission lines with $>350,000$ volts (350KV)
- You must have specific electrical training to work near electric power
- Organizations can get specific power line information from electrical engineers at the power company for work locations to get closer to power lines than the rule of thumb dimensions above. See the chart below.

Table A - Minimum Clearance Distances	
Voltage (nominal, kV, alternating current)	Minimum clearance distance (feet)
up to 50	10
over 50 to 200	15
over 200 to 350	20
over 350 to 500	25
over 500 to 750	35
over 750 to 1,000	45
over 1,000	(As established by the utility owner/ operator or registered, qualified professional engineer.)
Note: The value that follows "to" is up to and includes that value. For example, over 50 to 200 means up to and including 200kV.	

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Fall Protection

Learning Objectives/Outcomes

- Four methods of fall protection
 - Guardrails (Including)
 - Temporary for retaining / wing wall construction
 - Permanent at retaining walls, wing walls ...
 - Tank / equipment access
 - Covers
 - Including temporary covers
 - » Manholes, inlets, catch basins, openings
 - Safety Nets (Specialty bridge work)
 - Personal Fall Arrest Systems
 - Bridge work, manlift / bucket truck use
 - In a pre-engineered forklift man-basket
 - Specialty methods (Controlled access, spotters)
- The main criteria that prompts use of fall protection for construction workers.

When the danger of falling more than 6 feet exists, workers must be protected from falls using the method that best matches working conditions and fall protection requirements found in the standard related to the type of construction being performed.

Remember: You can be injured or killed from falls from heights less than 6 feet.

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Ladders and Stairs (Including Slips, Trips and Falls)

Learning Objectives/Outcomes

- Primary Methods of Protection
 - Protect employees from fall hazards of 6 feet or more
 - Install handrails that are at least 3” from the wall
 - Handrails must withstand a side force of 200 pounds at the top of the rail
 - Install handrails on stairways of 4 or more steps (30”)
 - Typically tool trailers, access platforms ...
 - Job built steps / stairs - Platforms
 - Should be between 30 and 50 degrees
 - Should have uniform riser height and tread depth variation of less than ¼ “
 - Where doors or gates open directly on a stairway, provide a platform that extends at least 20” beyond the swing of the gate.
 - Fix slippery conditions before using ladders, stairs, platforms and other surfaces
 - Ensure ladders, stairs, platforms and other parts are free of projections

Ladders and Stairs (Including Slips, Trips and Falls)

Safe Ladder Use Practices

- Housekeeping
 - Keep the area around the top and bottom of ladders, stairs and platforms clear
 - Ensure rungs, cleats and steps are level and uniformly spaced for job built ladders, stairs and platforms
 - » (See OSHA Standards for Additional Requirements)
 - Keep ladders, stairs, platforms and other surfaces free from slipping hazards
- Inspect before use
- Use for the purpose for which they were designed
- Don't load beyond the maximum intended load
- Secure to prevent accidental movement
- Use on level surfaces or use proper adjustable legs for slopes
- Barricade to keep traffic away
- Be sure ladders are used at the correct angle
 - Extension ladders 1:4 pitch. Rule of thumb: Put feet at base and hold arms straight out to touch ladder
- Extension ladders must extend 3' above the level it is to serve
- Use 3 points of contact to climb and descend ladders
- Don't lean off the ladder. Do not allow your belt buckle to pass the side rails.
- Exercise caution when ladders are in use around energized electrical equipment
 - Be properly trained to work around electric
 - Where ladders may come in contact with energized electrical equipment, ensure side rails are wood or fiberglass
 - Remember: Anything can conduct electricity when wet

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Excavations

Learning Objectives/Outcomes

Cave-ins are perhaps the most feared trenching hazard; But, other potentially fatal hazards exist, including asphyxiation due to lack of oxygen in a confined space, inhalation of toxic fumes, drowning, etc. Electrocution or explosions can also occur when workers contact underground utilities or ignite an explosive atmosphere.

OSHA requires that workers in trenches and excavations be protected, and that safety and health programs address the variety of hazards they face.

The primary methods for protecting employees from cave-ins include sloping, shoring and shielding.

Important considerations other than sloping, shoring and shielding:

- Assignment of a Competent Person
- Assessment of the hazards, conditions and systems by the competent person
- Water, its source and subsequent stability
- Proper drainage and protective system
- Vehicle and equipment proximity to the excavation
- Protection from falls
- Noise
- Caught in or Between, Struck By

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Excavations

Requirements for competent persons

- Trained and knowledgeable in
 - The requirements of the standard
 - Site evaluation and planning
 - Soil analysis
 - Use of protective systems and requirements

- Complete understanding of necessary steps
 - Utility contact and location
 - Inspection daily, after rain, high winds or other conditions which might change the conditions of the soils or structure
 - Assessment based on existence of water
 - Re-assessment for changed or changing conditions
 - Confined space accommodations

Excavations and Confined Spaces

Confined space issues present another critical component of excavation safety. Competent persons must be involved in the evaluation and accommodation of the confined space hazards in the excavation.

Confined space planning and procedures must include , but not be limited to

- Elimination or control of the hazards in the space
- Planning / Permitting (Including Hot Work Permits)
- Access and Egress
- Air Monitoring and Ventilation
- Rescue
- Training and Certification

The new Confined Spaces Construction Standard requires

- Employers to ensure that their workers know about the existence, location, and dangers posed by each permit-required confined space, and that they may not enter such spaces without authorization.
- Employers must train workers involved in permit required confined space operations so that they can perform their duties safely and understand the hazards in permit spaces and the methods used to isolate, control or protect workers
- Workers not authorized to perform entry rescues must ³⁵ be trained on the dangers of attempting such rescues.

Common Dimensions

≥ 6' Fall Protection is Required

≥ 5' Sloping or Shoring

≥ 4' Excavations = Confined Space

≥ 3' Ladder Extension

≥ 2' Spoil Pile Set Back

1 ½ : 1 Class C Soil Slope

1 : 1 Class B Soil Slope

¾ : 1 Class A Soil Slope

Day 2 Paper Evaluation



Evaluation Questionnaire – Quality Assessment OSHA 10 HOUR COURSE

Instructor Name(s): Neal Carboneau

Date: _____

Location: _____

Participant Name: _____

1. Please indicate the extent to which you agree or disagree with the following statements about the content and organization of the Roadway Construction OSHA 10 Hour program:

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Was well organized	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Provided me with new information	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Assumed the right amount of my previous knowledge	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Contained about the right amount of complexity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Was pertinent to my needs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2. Please indicate how useful each of the following program elements was in helping you learn about work zone safety:

	Very Useful	Useful	Neutral	Not too Useful	Not Useful At All	Did not use
Course instructor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Student handouts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hands-on exercises	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PowerPoint Note Pages	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3. Please indicate your OVERALL assessment of the OSHA 10 Hour training program:

	Very High	High	Moderate	Low	Very Low
Quality of program	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Effectiveness of program in providing practical knowledge for working safely in a work zone environment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Usefulness of program in giving you better understanding of Runover and Backover safety issues	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please provide comments on this course below and on the back if necessary:

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Day 1 Paper Evaluation

Instructor: Neal Carboneau



ROADWAY SAFETY - FILL BOXES IN BLACK INK

1. What is your job position?
 Contractor/Manager Supervisor/Foreman Safety/Compliance Engineer
 Inspector Trade Worker Other

2. Please describe your employment:
 Private Constr. Firm Barricade Contractor Pvt. Engr. Consult. Pvt. Safety Consult.
 National Government State Government County/Municipal/Local Government

3. The overall length of the workshop was:
 Much Too Short A Little Short Just Right A Little Long Much Too Long

	Poor	Fair	Good	Excellent
4. The presenters for this session were:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. The presentation materials used in the session were:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. The hand-outs for this session were:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. The facilities for this session were:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

8. Compared with other sessions on these topics that I've attended in the past, this session was:
 Worse The Same Better Not Applicable

9. I learned at least one thing in this session that I will be able to use immediately in my work.
 Strongly Agree Agree Disagree Strongly Disagree

10. I expect to tell others about this program and materials.
 Strongly Agree Agree Disagree Strongly Disagree

11. I expect to share what I have learned with others I work with:
 Strongly Agree Agree Disagree Strongly Disagree

12. Not counting yourself, how many are employed in your company or organization?
 0 1 - 20 21 - 50 51 - 100 101+

13. Estimate how many people you believe you could inform/train using these materials?
 0 1 - 20 21 - 50 51 - 100 101+

14. Please provide comments/recommendations. Use the reverse side of page if needed. Thank you.

Email:

First Name: Last Name:

Co./Org.:

Date: _____

Location: _____

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Mailing Information

Please Print Clearly

Enter your name the way you want to see it on your OSHA 10 Hour Card

Name (Print): _____

Home Address: _____

Phone: _____

Organization: _____

Date: _____

Location of Training: _____

OSHA 10 Hour cards can take 30 to 90 days for delivery. The cards are sent by certified mail, so please do not refuse the letter. You may need to go to the post office to get the letter if you are not home when the letter is delivered. If your card is returned to us, it may take a considerable amount of time for us to verify your address and may need to contact you by phone or regular mail for confirmation.

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Oklahoma LTAP & Southern Plains TTAP
**OSHA 10-HOUR
ROADWAY CONSTRUCTION**



OSHA 10-Hour Roadway Construction Workshops

This is a safety course workshop that was developed to provide road construction crews with the knowledge they need to stay safe on the job-site.

Workshops are here!

ATTACHED IS THE
**OSHA 10-HOUR ROADWAY
CONSTRUCTION**

TRAINING SCHEDULE WITH THE
DATES AND LOCATIONS OF THE
WORKSHOPS.

Intended Audience

This revolutionary program for owners, safety managers, supervisors, and workers is focused directly on the hazards and situations that roadway construction workers face every day. From work-zones to night work, this training sets the standard for the entire industry!

- Roadway Inspectors
- Roadway Construction Crews
- Roadway Maintenance Personnel
- Roadway Equipment Operators

Learning Objectives

OSHA 10-Hour Roadway Construction Workshop

You will learn about OSHA's fall protection standard, work-zone safety, the OSHA excavation standard and work practices that promote safety during road construction activities.







Course Topics

- Introduction to OSHA
- Fall Protection
- Excavations
- Work-zone Traffic Control
- Roadway Construction Common Hazards
- Roadway Construction Health Hazards
- Roadway Special Considerations

<http://ltap.okstate.edu>

...or call for more information

Center for Local Government Technology ~ 405.744.6049

LOCATION	DATE	REGISTER	MAP
ODOT Field Division 8 4002 N. Mingo Valley Expressway Tulsa, OK 74116	Wednesday, Thursday September 14-15, 2016		
		http://goo.gl/eVvLn6	http://goo.gl/AvpDGB
Cherokee Nation OSIYO ROOM 17725 S. Muskogee Ave. Tahlequah, OK 74464	Tuesday, Wednesday September 20-21, 2016		
		http://goo.gl/eVvLn6	http://goo.gl/Hi2Cpm
Circuit Engineering Distict 8 850 Kraft St. Alva, OK 73717	Wednesday, Thursday September 28-29, 2016		
		http://goo.gl/eVvLn6	http://goo.gl/Zliz96

[Skip to Content](#)



Center for Local Government Technology 5202 N. Richmond Hill Drive
Stillwater, OK 74078

[Advanced Search](#)

LTAP Classes

Course	Location	Begins	Ends	Meets	Fee
Leadership Principles for Difficult Conversations	Stillwater - CLGT Classroom	10/20/15	10/20/15	Tu from 8:30 AM to 4:00 PM	0.00
MUTCD Part 6 - Roads Scholar Course 4	Stillwater - CLGT Large Classroom #125	10/21/15	10/22/15	W and Th from 8:30 AM to 4:00 PM	0.00
OSHA 10-Hour Training/Roadway Construction	Guymon, OK - Guymon Public Library	10/26/15	10/27/15	M and Tu from 8:30 AM to 4:00 PM	0.00
Equipment Maintenance - Roads Scholar Course 6	Okmulgee - OSU Institute of Technology	10/27/15	10/27/15	Tu from 8:30 AM to 3:30 PM	0.00
Plan Reading - Roads Scholar Course 8	Stillwater - CLGT Classroom	10/28/15	10/29/15	W and Th from 8:30 AM to 3:30 PM	0.00
OSHA 10-Hour Training/Roadway Construction	Elk City - Western Technology Center	10/29/15	10/30/15	Th and F from 8:30 AM to 4:00 PM	0.00
OSHA 10-Hour Training/Roadway Construction	Duncan -Red River Technology Center	11/02/15	11/03/15	M and Tu from 8:30 AM to 4:00 PM	0.00
OSHA 10-Hour Training/Roadway Construction	Ada - Pontotoc Technology Center	11/05/15	11/06/15	Th and F from 8:30 AM to 4:00 PM	0.00
OSHA 10-Hour Training/Roadway Construction	Antlers, OK - Kiamichi Technology Center	11/09/15	11/10/15	M and Tu from 8:30 AM to 4:00 PM	0.00
OSHA 10-Hour Training/Roadway Construction	Muskogee, Oklahoma - TBA	11/12/15	11/13/15	Th and F from 8:30 AM to 4:00 PM	0.00
OSHA 10-Hour Training/Roadway Construction	Pryor - Northeast Technology Center	11/16/15	11/17/15	M and Tu from 8:30 AM to 4:00 PM	0.00
Tribal Safety Champions Workshop	Okla. City - Aloft Hotel	11/17/15	11/18/15	Tu-9:00 AM to 3:00 PM and W-9:00 AM to 3:00 PM	50.00
Defensive Driving - Seminole Nation	Seminole County Sheriffs Department	12/01/15	12/01/15	Tu from 8:30 AM to 3:00 PM	0.00
OSHA 10-Hour Training/Roadway Construction	Stillwater - CLGT Large Classroom #125	12/03/15	12/04/15	Th and F from 8:30 AM to 4:00 PM	0.00
OSHA 10-Hr./Disaster Response	Claremore - Northeast Technology Center	12/07/15	12/08/15	M from 8:30 AM to 4:00 PM and Tu 8:30 - Noon	0.00
OSHA 10-Hr./Disaster Response	Eastern Oklahoma County Tech Center	12/09/15	12/10/15	W from 8:30 AM to 4:00 PM and Th 8:30 - Noon	0.00
Chili Time at CLGT	Stillwater - CLGT Large Classroom #125	12/11/15	12/11/15	F from 11:00 AM to 2:00 PM	0.00
OSHA 10-Hr./Disaster Response	Mayetta, Kansas - The Rock House	12/14/15	12/15/15	M from 8:30 AM to 4:00 PM and Tu 8:30 - Noon	0.00
Bridge Welding Certification	Yukon, Oklahoma - Canadian Valley Tech	12/21/15	12/22/15	M and Tu from 8:30 AM to 4:30 PM	0.00
OSHA 10-Hour Training/Roadway Construction	Guymon, OK - Guymon Public Library	01/21/16	01/22/16	Th and F from 8:30 AM to 4:00 PM	0.00

10/12/2015

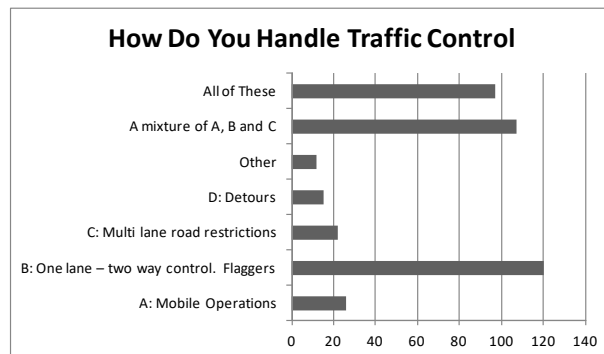
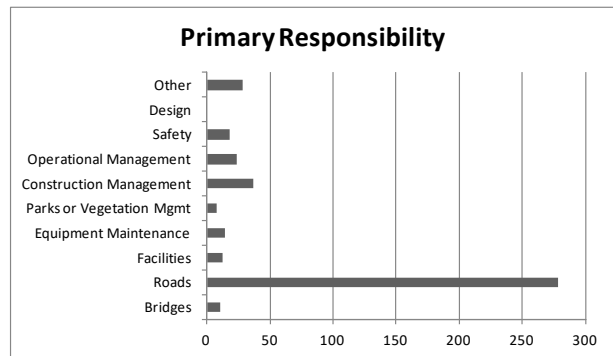
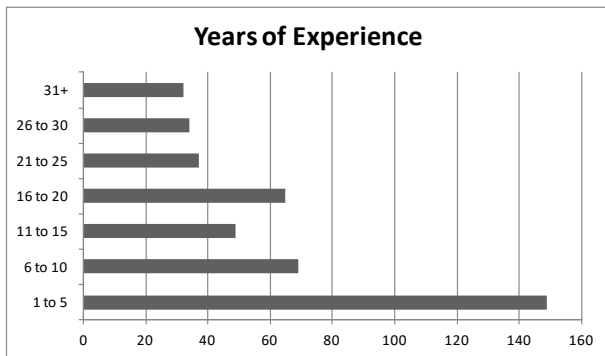
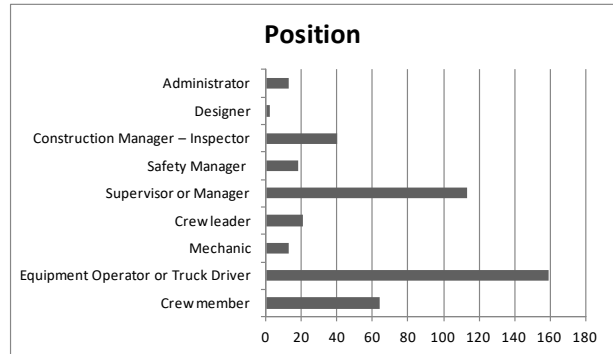
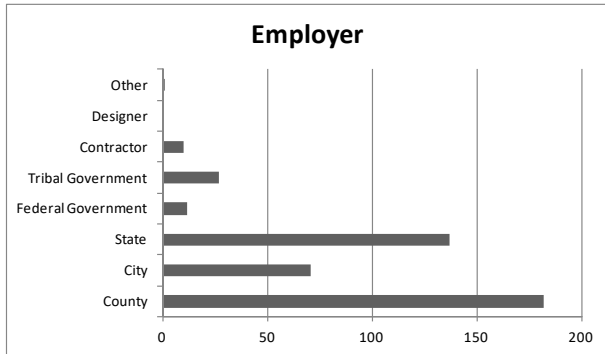
LTAP Classes

OSHA 10-Hour Training/Roadway Construction	Elk City - Western Technology Center	01/25/16	01/26/16	M and Tu from 8:30 AM to 4:00 PM	0.00
OSHA 10-Hour Training/Roadway Construction	Duncan -Red River Technology Center	01/28/16	01/29/16	Th and F from 8:30 AM to 4:00 PM	0.00
OSHA 10-Hour Training/Roadway Construction	Ada - Pontotoc Technology Center	02/01/16	02/02/16	M, Tu and Su from 8:30 AM to 4:00 PM	0.00
OSHA 10-Hour Training/Roadway Construction	Antlers, OK - Kiamichi Technology Center	02/04/16	02/05/16	Th and F from 8:30 AM to 4:00 PM	0.00
OSHA 10-Hour Training/Roadway Construction	Muskogee, Oklahoma - TBA	02/08/16	02/09/16	M and Tu from 8:30 AM to 4:00 PM	0.00
OSHA 10-Hour Training/Roadway Construction	Claremore - Northeast Technology Cener	02/11/16	02/12/16	Th and F from 8:30 AM to 4:00 PM	0.00
OSHA 10-Hour Training/Roadway Construction	Stillwater - CLGT Large Classroom #125	02/22/16	02/23/16	M and Tu from 8:30 AM to 4:00 PM	0.00
Motor Grader Operator	Choctaw - Eastern Okla. County Tech Cntr	05/10/16	05/12/16	Tu, W and Th from 8:30 AM to 4:00 PM	0.00
Surveying - Roads Scholar Course 5	Stillwater - CLGT Large Classroom #125	05/17/16	05/20/16	Tu, W, Th and F from 8:30 AM to 4:30 PM	0.00
Surveying - Roads Scholar Course 5	Stillwater - CLGT Large Classroom #125	05/24/16	05/27/16	Tu, W, Th and F from 8:30 AM to 4:30 PM	0.00
Surveying - Roads Scholar Course 5	Stillwater - CLGT Large Classroom #125	05/31/16	06/03/16	Tu, W, Th and F from 8:30 AM to 4:30 PM	0.00

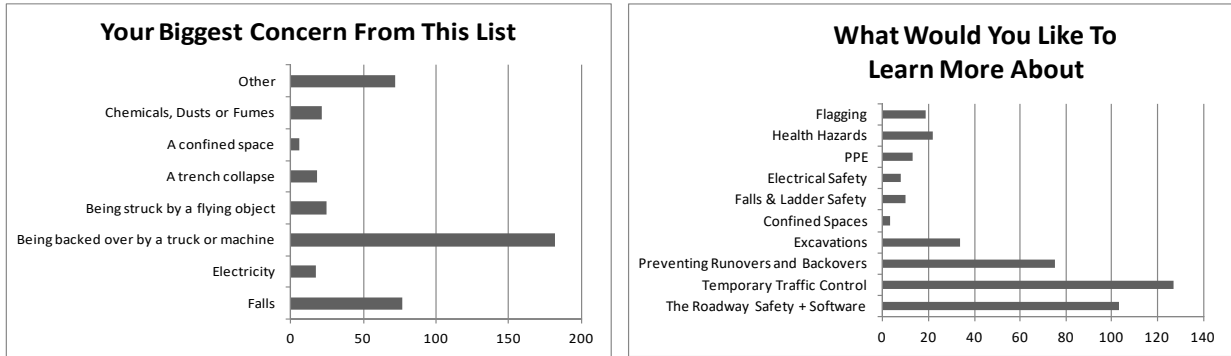
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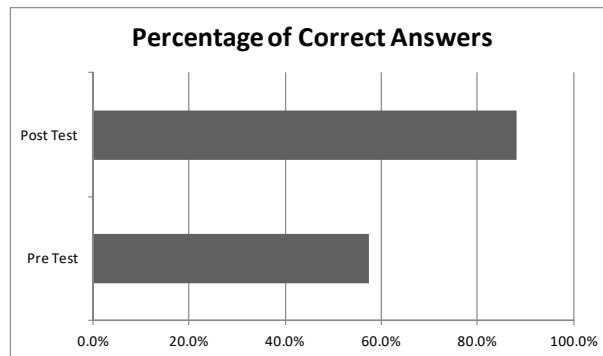
10.5 Appendix E Results of the Data Collection



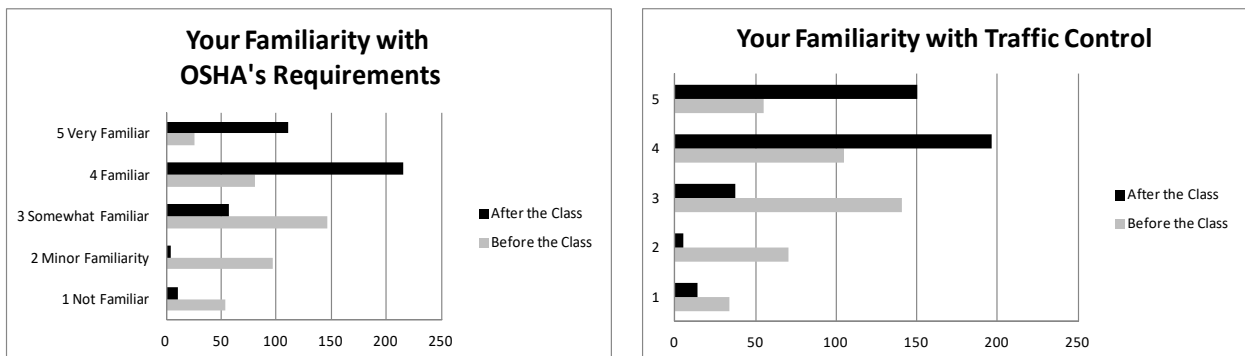
Participants' Perspective of Incident Data



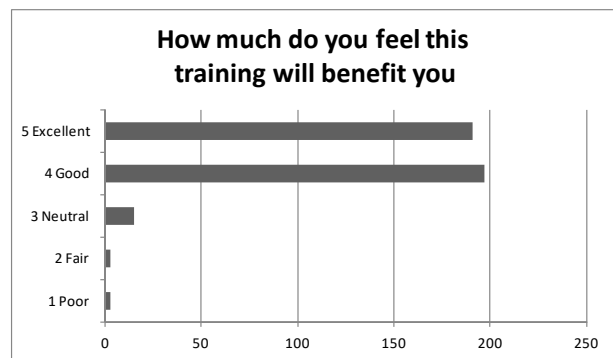
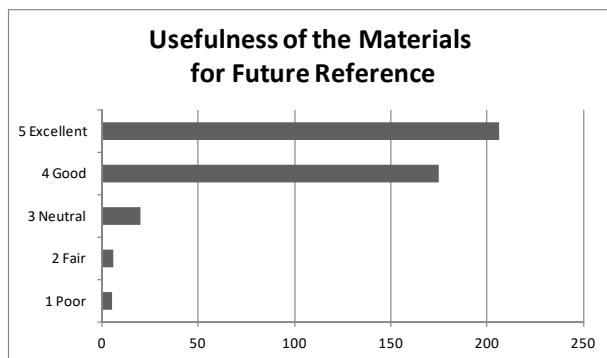
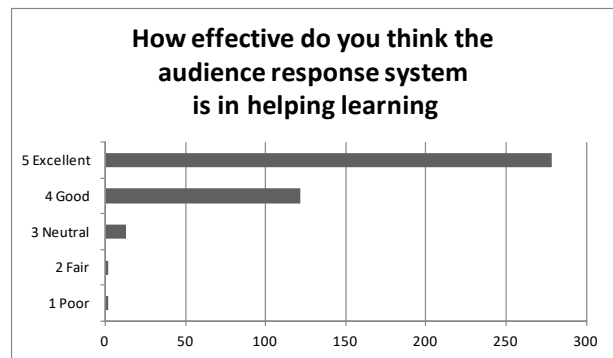
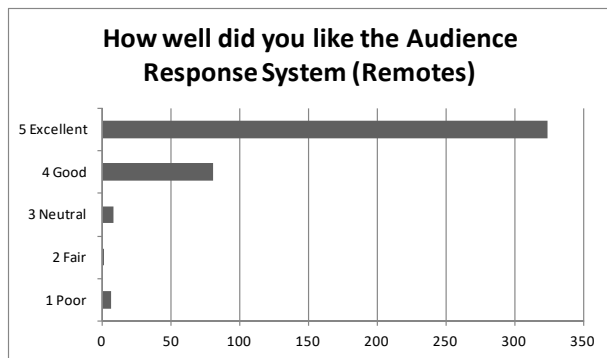
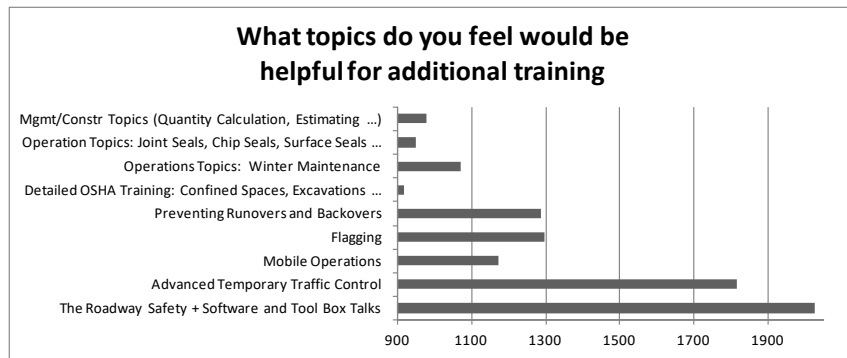
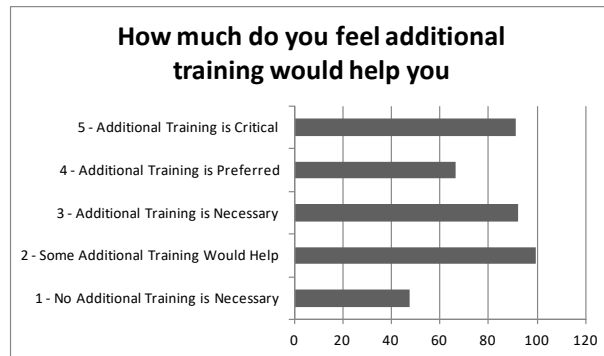
Participants' Understanding of Minimums According to Code (Pre-Test) Evaluation of Participants' Understanding After Training (Post-Test)



Perceived Understanding Before and After Training For a Qualitative Evaluation of the Participants' Understanding



Participants' Preferences for Learning and Future Use of Materials



Evaluation of the Course and Instructor (Performance Measures for Continued Improvement)

