

Refresher Training

Considerations in the Public Sector

By James H. Olds

The working world consists of two groups, the public sector, which includes all levels of government (including tribal organizations), and the private sector, which includes all other businesses (including multinational corporations). While OSHA oversees and enforces workplace safety regulations in most settings, the OSH Act does not delineate enforcement authority over employees of the state or its political subdivisions. However, Section 18 (paragraph b) of the OSH Act allows states to assume responsibility for development and enforcement of standards relating to occupational safety or health with respect to which a federal standard has been promulgated. In short, states may adopt federal OSHA regulations or establish a state agency to enforce safety standards based on those regulations that require the same (or a higher) degree of safety.

In Florida, the state legislature created the Division of Safety to regulate safety for state employees and employees of any political subdivision of the state (e.g., counties, cities, school districts). However, on July 1, 2000, the division was *sunsetted*, a term used to mean shut down via a state statute (F.S. 442).

As a result, SH&E professionals working within state agencies or their political subdivisions must enforce their own safety standards and procedures. At times, this can be challenging, particularly given constrained budgets. However, this does not eliminate the need for personnel to attend safety training and refresher training. Professional groups such as law enforcement and electrical line workers must demonstrate proficiency in first aid/CPR each year. Additionally, safety-related requirements such as fire extinguisher training, HazCom and bloodborne pathogens affect public-service personnel and require refresher training.

Nine years ago, the city of Lakeland, a medium-size municipality located in central Florida, instituted a training program to fulfill refresher training requirements identified in the city's policies and procedures manual. These requirements are based on industry standards and OSHA regulations.

To qualify, employees must complete initial training in specific safety standards (Table 1). All classes are based on commercially available standardized training products with student manuals, quizzes, instructor guides and subject-specific DVDs/videos. To improve these products, the group adds items such as subject-specific student training booklets. The intent is to provide trainees (city employees) with information that is relevant to their specific area of work; create a vehicle that can be readily updated; and reduce overall program cost.

To best support the training program, the city strives to ensure that certified/authorized instructors are available to conduct each session and to underwrite the entire safety program. Therefore, all safety team members—four safety coordinators and one safety manager—are authorized instructors in accordance with the OSHA 500 and OSHA 501 courses. Each team member also must maintain an active forklift instructor certification through National Safety Council (NSC), and first-aid/CPR instructor certification through a nationally recognized organization. Since the team has only five members, city personnel with specific expertise are asked to voluntarily assist in refresher training. For example, lifeguards from the city's Aquatic Division are first-aid/CPR instructors/evaluators, and the individual in charge of process safety management (PSM) at the city's main electric power plant is the PSM evaluator.

Program Challenges

Three stumbling blocks were encountered when creating this program. The first emerged while the city was attempting to establish first-aid/CPR refresher training. Several certifying agency programs (e.g., NSC, American Red Cross, Citizen CPR) were evaluated. Most require that refresher training be conducted in a similar manner to initial training. City officials envisioned a condensed training program in which participants could demonstrate skills and satisfy requirements deemed critical by the certifying agency for refresher training. The program chosen provided the best fit.

IN BRIEF

• Training the public sector is not easy, particularly in states that do not have an agency to enforce safety standards.

• As a result, SH&E professionals may spend much time simply convincing others about the need for training.

• Once an SH&E professional convinces public-sector employees/managers about the need for training, s/he must then stress the importance of refresher training, as this case example illustrates.

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Another stumbling block involved backhoe operator refresher training. No safety team member had solid backhoe operator experience. To fill this void, the five (of 18) departments with backhoes were asked to designate at least one experienced operator for additional training. These individuals were sent to a local equipment company that either sold or leased backhoes and had a nationally recognized backhoe training program. Upon completion of the specialized training, each individual was considered a subject-matter expert (SME) for backhoe operations. Instructors for backhoe refresher training were chosen from this group.

The final roadblock was to identify skill sets needed to exercise effective refresher training. In some areas, the OSHA standard provided guidance. For example, OSHA's standard for portable fire extinguisher use (29 CFR 1910.157) states that the employer will ensure that those employees expected to use a fire extinguisher attend annual refresher training that covers fire extinguisher use and the hazards associated with the incipient-stage firefighting. Other standards are less specific while other tasks introduce hazards that are not regulated (e.g., heat stress).

In such cases, the city had to establish the skill sets to be demonstrated during refresher training. To achieve this, SH&E professionals met with SMEs for specific tasks, such as a foreman or supervisor who routinely works in confined spaces, or personnel whose occupations require advanced education in a specific skill (e.g., city nurse discussing heat stress, laboratory personnel from wastewater facility discussing HazCom). Others who routinely perform specific duties, such as a PSM coordinator, may be called on as well. These individuals help identify the skills to be addressed in refresher training. Once these skills are identified, the method of how to test those skills must be determined. Then, these skill sets are added to a safety scorecard (Figure 1, p. 46).

Although not a stumbling block, scoring criteria were a concern. Specifically, the concern was testing individuals at the same time that they read the material (essentially an open-book test). To offset this and given that employees had completed initial training and regularly performed the skills to be tested, a written quiz passing score was established at 80% or higher; for a few specific tasks, the written quiz score was set at 100% depending on the criticality of the skill sets.

Initially, the team felt delivery method could affect training quality, but this was mitigated by creating a one-on-one relationship between employee and evaluator. When subjects were presented in a large classroom, employees were reluctant to ask questions; this was especially true for those with limited speaking ability or for whom English is a second language.

However, in the refresher training setting, employees were less reluctant to ask questions and often had pointed inquiries. Another benefit was that the employee could take as long as needed to review the information and was asked to perform

Table 1
Initial Training Requirements

Class name	Class length
HazCom	1 hour
Bloodborne pathogens	1 hour
First aid/CPR/AED	4 to 5 hours
Respiratory protection	1 hour
Fire extinguisher training	1 hour
Confined space training	24 hours
Trenching and shoring	16 hours
Backhoe operations	2 hours
Forklift operation	4 hours
Heat stress	1 hour
Pole-top rescue/harness inspection	4 hours
Maintenance of traffic	16 hours
Process safety management	2 hours

at least one hands-on component at the evaluator table. In addition, employees learn from others in this setting.

Once initial subject-specific safety training is conducted, results are added to a computerized training record for each individual by department. Refresher training is conducted at an annual safety fair. During the fair, evaluation stations are erected for each refresher subject.

At each table or booth, an employee receives a booklet containing information and a written exam. The employee reads the information and completes the exam, then returns it to the station monitor. The monitor then reviews answers with the employee on a one-on-one basis. To award a passing score (or a "go") at each station, the monitor may ask an employee to perform an additional set of task-specific skills. For example, an employee may be asked to conduct a preoperational forklift inspection; maneuver the forklift between a series of cones and stack pallets; operate a confined space air monitor (four-gas meter); or read and correctly interpret an MSDS.

The retraining process is based on preprinted scorecards, color-coded to identify an individual's city department [e.g., police personnel receive dark blue scorecards; water department employees receive light blue (freshwater) or a light green (wastewater); public works, orange; parks department, dark green; linemen, red]. On the scorecard, each foreman circles the particular tasks each employee is to complete during the safety fair based on that employee's craft or trade.

Tasks that everyone must complete are designated with an asterisk. Each station consists of a table, and at least one station monitor/evaluator subject-specific booklets with attached quiz and supporting material. Where appropriate, small items the employee must use are available as well (e.g., hand sanitizer at the bloodborne pathogen station, one-way valve at the first-aid/CPR station).

Figure 1 Safety Scorecard

Topic	Score		
	Pass	Fail	Needs Training
Heat Stress RMHEAT			
1. Successfully answers 8 out of 10 true/false questions on the back of his/her booklet			
2. Describes symptoms of heat stress (stroke or exhaustion)			
3. Describes how much fluid should be consumed in a 20-30 minute period for proper hydration			
Overall			
First Aid/CPR/RMCPRR			
1. Identifies the need for basic life support			
2. Performs one person CPR for three cycles			
3. Performs the Look & Feel method of injury identification			
4. Properly treats for shock			
5. Properly administers treatment for skin burns or applies pressure bandage			
Overall			
Candidate must pass in two CPR tasks & two First Aid tasks			
AED RMAED			
1. Performs CPR until AED is set up			
2. Turns on power			
3. Correctly attaches electrodes			
4. Clears victim and follow machine prompts			
BBP RMBBPR***			
Accurately describes protective measures required to limit exposure to blood and bodily fluids			
Trenching and Shoring RMTREN			
1. Correctly identifies the trench as requiring a ladder or similar egress device			
2. Correctly identifies the need for cave-in protection and call for locate			
3. Correctly identifies the need for the spoils pile to be moved			
Overall			
Confined Space RMCREF			
1. Correctly places the air monitor into service and describes what he/she would monitor the atmosphere for			
2. Correctly identifies the safe levels of oxygen			
3. Describes the need and duties of the attendant			
4. Correctly completes permit			
Overall			
Respiratory Protection RMRESR			
1. Accurately obtain a positive seal on their issued respirator			
2. Accurately finds at least two items that are unserviceable on the respirator at the station			
3. Describe how to clean their own respirator and how often this is to be done			
Overall			
Fire Extinguisher Training RMFIRE***			
1. Accurately identifies proper extinguisher for use based on info provided by station monitor			
2. Properly places the extinguisher into operation and extinguish fire			
3. Informs supervisor that fire existed			
Overall			
Forklift RMFLR			
1. Performs pre-use inspection based on pre-printed form			
2. Properly powers up equipment			
3. Demonstrates maneuverability while carrying a load			
Overall			
Pre-trip Inspection-CDL Vehicles RMPRET			
1. Correctly inspects all seven items required in pre-trip inspection in accordance with FMCSR			
Overall			
Hazardous Communication RMHAZR**			
1. Id's product with the MSDS			
2. Describes safe handling			
3. Describes PPE required			
4. Describes disposal criteria			
Overall			
Fall Protection RMFALL			
Annual Harness Inspection			
MOT Refresher RMMOTR			
Annual Refresher			
Equipment Use* RMEQUI			
Chain Saw			
Line Trimmer			
Stick Edger			
Back-pack Blower			
Walk Mowers			
Hedge Trimmers			
Overall			

* To pass this station the employee must conduct a pre-use inspection correctly, identify the appropriate PPE and place it into operation



Photo 1: Employees begin the safety fair refresher training by presenting their scorecards at the sign-in station.

Station Operation Sign In

The first station is the sign-in table (Photo 1). An employee presents his/her scorecard, which is checked for accuracy and to ensure that the employee's name and employee number are on the card. The employee then prints his/her name on a roster (to help the safety team track the number of people at each station). Once signed in, the worker moves to whichever station s/he wishes to visit first.

Hazardous Communications

The employee receives a booklet and quiz, then completes the quiz and returns it to the station evaluator for grading. For each incorrect answer, the evaluator reviews the question and explains the correct answer. The employee must then review an MSDS and identify the particular hazard(s) associated with the product and any required PPE. Police officers and anyone with a HazMat endorsement also must identify a placard by use of the emergency response guide.

The station evaluator is a safety professional, a police trainer or an individual with HazMat experience. To pass this station, an employee must score at least 80% on the written quiz, properly identify a

product with the MSDS, discuss safe handling procedures for the product, describe proper PPE and discuss any disposal criteria.

First-Aid/CPR/Automated External Defibrillator

Everyone must complete the first-aid/CPR/automated external defibrillator (AED) station (Photo 2); linemen [29 CFR 1910.269(b)(10)] and law enforcement personnel must certify each year that they can perform CPR, while other city employees must demonstrate their ability to use an AED. The certifying agency used allows refresher training to be accomplished by scoring 80% or higher on a multiple-choice test for first aid and CPR.

Upon completion of the test, an employee must properly demonstrate, to the station evaluator's satisfaction, at least two CPR skills and two first-aid skills. To facilitate this process, the test is provided through a proxy 2 weeks before the safety fair. Those who do not pass the multiple-choice test are noted on a roster for the station evaluator to check before the individual completes the hands-on portion of the test. If an employee could not take the test before the fair, additional testing is available that day, but this is discouraged due to time constraints. If the employee passes both the written and hands-on test, his/her first-aid/CPR card may be renewed. However, if the individual does not score at least 80% on the multiple-choice test or fails to properly perform the hands-on tasks



correctly, s/he is tabbed for additional training (usually a 4- to 5-hour class).

Typically, this station is manned by a certified lifeguard from the city's Aquatic Division; it features a full-size resuscitation manikin and a moulage kit to resemble injuries to be treated for first aid. It also features an AED trainer for testing. The city has 22 AEDs in various locations and the trainer is a replica of those units. To pass, the employee must turn on the unit and understand the instructions it provides. Employees also receive a small disposable one-way valve.

Respiratory Protection

In accordance with 29 CFR 1910.134(f)(2), employees who must wear a tight-fitting air-purifying respirator must be fit tested annually. Thus, the respiratory protection station evaluator is the city's respiratory program administrator who has advanced training in the subject. To participate at this station (Photo 3), an employee must bring his/her personal respirator as well as documentation which confirms that his/her annual medical evaluation has been completed and that s/he is qualified for fit testing.

Again, the employee receives an informational booklet and quiz. The station evaluator grades each quiz and reviews any incomplete answers. To complete this station, an employee must score at least 80% on the written quiz; properly don his/her assigned respirator; obtain a positive seal; identify at least two unserviceable items on an unserviceable respirator provided by the evaluator; and describe proper cleaning methods for the assigned respirator and how often such cleaning is to be performed. Finally, fit testing is conducted utilizing irritant smoke.

Fire Extinguishers

In accordance with 29 CFR 1910.157(g)(2), anyone expected to use a fire extinguisher must complete training to become familiar with operation of the extinguisher. Thus, all city employees must complete the fire extinguisher station (Photo 4). Some personnel in the Facilities Maintenance Division are certified to work on fire systems such as portable fire extinguishers, hood systems, sprinkler systems and alarms (the "Fire Team"). Evaluators at this station are drawn from this team or may be supported by the local fire department.

Originally, this station featured standard ABC dry chemical fire extinguishers and a propane burner. The group eventually switched to a BullEx training system. Several factors prompted this change. Use of dry chemical extinguishers can affect employees with respiratory difficulties, and the dry chemical can be corrosive to painted surfaces. A site also must consider the effect of taking active extinguishers out of service (use/refilling) to support training.

To pass the station, the individual must pass the written quiz, accurately identify proper extinguisher based on fire type, put the extinguisher into operation and extinguish the flame. Finally, the employee must state that s/he would report the fire incident to the supervisor.

Confined Spaces

Lakeland has more than 800 confined spaces that city workers must regularly enter; these include underground utilities, storm water inlets, wastewater lines and access to mechanical devices at various power plants. Therefore, city personnel whose job function routinely requires confined space entry must complete this station. The station evaluator typically has extensive experience with permit-required confined spaces, and may come from the city's power plant or wastewater group, or may serve on the fire department's technical rescue team.

Once the quiz is passed, the employee must turn on a gas meter, walk through the process of monitoring atmospheric conditions and explain how to properly complete a confined space permit. In addition to scoring at least 80% on the quiz, an employee must properly operate the air monitor and describe what s/he is monitoring; correctly state the safe level of oxygen; describe the needs and duties of the attendant or entrant; and correctly complete a confined space permit.

Trenching & Shoring

For the trenching and shoring station, a trench with several intentional flaws is dug near the location of the safety fair. Any employee who either digs or works in a trench must complete this station (Photo 5, p. 48). The station evaluator has extensive trenching knowledge and typically is a foreman who routinely performs such work.

Once the employee completes the quiz and reviews any incorrect answers with the station evaluator, s/he must correctly identify at least three problem areas in the trench in order to pass. Standard problem areas include soil pile should be moved back from the edge; trench must have a ladder; cave-in protection; and call for a utility location before digging.

Backhoe Operation

The backhoe operation station is set up in conjunction with the trenching and shoring station (Photo 5, p. 48). Any city employee who operates a backhoe must complete this station. As noted, individuals with extensive backhoe-operating experience complete a vendor course to ensure that they know proper operating procedures. Despite extensive use, an employee may not operate the equipment correctly. So, before an individual be-

(From left): Employees rotate through the first-aid/CPR/AED (Photo 2), respiratory protection (Photo 3) and fire extinguisher (Photo 4) stations at the annual fair.



Specialty topics covered during the fair include trenching/shoring and backhoe operation (Photo 5, left) and pole-top rescue (Photo 6, right).

comes a backhoe evaluator or instructor, s/he must first be considered a qualified operator.

An employee receives a booklet of information and a short quiz. To pass this station, a worker must score 100% on a 10-question quiz, properly perform an initial operation inspection, properly mount and dismount the backhoe, and explain how to use hand controls. Furthermore, the employee may be asked to explain how to identify underground hazards such as power lines, underground type lines or fiber optics. Finally, the employee must discuss proper methods for moving the backhoe onto a trailer.

Forklift Operation

The forklift operation station evaluator is selected from a pool of NSC-authorized instructors for forklifts/powered industrial trucks. Employees who operate a forklift must complete this station. As before, the employee gets a booklet and a quiz, and must discuss any incorrect answers with the station evaluator. After scoring at least an 80% on the quiz, the employee must demonstrate the ability to properly enter/exit the forklift, conduct a preuse inspection, pick up a pallet and maneuver through a short course marked with traffic cones.

Heat Stress

The heat stress station's evaluator has experience working outside in the heat for extended hours. Given Lakeland's location in central Florida, all city employees must process through this station. As with other stations, an employee must score 80% or higher on the quiz; s/he also may be asked to identify dehydration limits using a color-coded urine chart (readily available online). Before leaving the station, the employee receives a small packet of sunscreen, a wallet-size card depicting the urine color chart or a cooling device.

Pole-Top Rescue & Harness Inspection

In accordance with 29 CFR 1910.269(a)(2)(i), electrical transmission and distribution personnel must demonstrate each year the ability to rescue an individual who is in an elevated position such as on a pole top. Linemen practice this procedure and are graded by supervisors on their proficiency. Additionally, supervisors inspect individual body harnesses to ensure serviceability.

To pass this station (Photo 6), an employee must score 100% on a 10-question quiz, accurately describe emergency notification procedures and properly demonstrate successful rescue operations

from pole top and from a bucket using appropriate tools and within time limits.

Traffic Maintenance

The traffic maintenance station is based on current requirements listed in the *Manual on Uniform Traffic Control Devices*. The evaluator must be at least a foreman and must have extensive experience in properly positioning traffic control devices.

An employee receives a booklet of information and a quiz, as well as a page from the design standards. In addition to passing the quiz, the employee must correctly identify what types of traffic control devices are required and proper spacing depending on the posted speed limit. Additionally, local vendors may provide new types of traffic control devices for display.

Process Safety Management

In accordance with 29 CFR 1910.119(g), five city locations have active PSM programs. All city employees who work at or have access to these locations must pass this station. The evaluator is the PSM program administrator at one of the five locations. An employee must correctly identify the chemical hazard at each location, score at least 80% on a written quiz, and accurately describe evacuation procedures and conjugation sites for their particular plant.

Commercial Driver's License Pretrip Vehicle Inspection

Per Federal Motor Carrier Safety Regulation 49 CFR 390.3(f)(2), employees of the federal and state government, and political subdivisions of the state are exempt from most commercial driver's license (CDL) requirements. Areas that apply to these employees are the requirements to obtain a CDL, and annual drug and alcohol testing.

Therefore, the performance of the daily inspection on a commercial motor vehicle [any vehicle with a gross vehicle weight rating (GVWR) of at least 26,001 lb, which hauls hazardous materials that requires placarding or carries 16 or more passengers] would be a mandatory requirement by DOT.

As such, all city employees who require a CDL for their job must complete this station, which consists of a station evaluator and a commercial motor vehicle that is at least a Class B vehicle (e.g., straight truck, such as a garbage truck, dump truck or similar vehicle with a GVWR of at least 26,001 lb). The prospective candidate must point out what seven items are required for a pretrip inspection on a daily basis, and how those items are inspected.

Bloodborne Pathogens

The bloodborne pathogens station may be a stand-alone station or it may be incorporated into the first-aid/CPR/AED station. For Lakeland's annual safety fair, it is a stand-alone station because the first-aid/CPR/AED station is typically crowded. This set-up also allows for more one-on-one interaction and teaching, particularly for those with job-

related risks of exposure, such as members of law enforcement. Skills tested include donning/doffing of barrier devices and proper disposal techniques. In addition to passing the written quiz, an employee must properly describe protective measures necessary to limit exposure to blood and bodily fluids. Additionally, police officers must demonstrate how to properly don/doff protective gloves.

Wrap Up

Once an employee completes all tasks highlighted on the scorecard, s/he returns the scorecard to the sign-in desk, where its completeness is verified. The employee also receives a raffle ticket. One part of which is used for door prizes, which typically focus on a safety-related topic and may include items

such as smoke detectors, fire extinguishers or emergency kits. The other half of the ticket is used for admission to lunch, which is provided each day of the fair by the city-owned golf course. The event is considered an incentive to participate.

Looking to the Future

Using this 4-day training fair approach, the city of Lakeland provides refresher training for up to 850 employees. The city may expand the fair to include topics such as blood pressure, substance abuse awareness, employee assistance programs, sexual harassment, diversity, workplace violence, personal security, stormwater pollution control awareness and incident command. **PS**

Supporting Statistics: Assessing a Key Correlation

To assess the effectiveness of this type of training, a hypothesis was proposed that no direct correlation existed between the refresher training with active participation in the fair and reduction of injuries in the departments that participate.

Water Department employees work at wastewater and freshwater treatment facilities, perform water engineering or lay/repair underground water systems. The linemen group consists of linemen, substation workers and electrical engineers. Parks and recreation (P&R) employees work at various recreation centers, ball fields, golf course, cemeteries and gymnasiums, and public works (PW) employees are involved in roadway maintenance, traffic signals and fleet operations. The police group includes only individuals on the day shift (sworn and unsworn).

Data were collected over the past 5 years, and this formula was used for correlation coefficients:

$$\rho = 1 - \frac{6 \sum d_i^2}{n(n^2 - 1)}$$

A simple Spearman correlation coefficient was conducted. The value of this correlation may run from -1.00, meaning a negative correlation (data do not correlate) to +1.00 indicating a positive correlation between the training and reduced number of reportable injuries (Newmark, 1988). As shown in Table 2, the data indicate a strong correlation between participation in the safety fair and overall reduction of reportable injuries within the departments that regularly participate; the greater the participation, the lower number of reportable injuries.

However, correlation coefficients cannot always be accepted at face value. These coefficients generally only take two variables into consideration, an X variable (in this case average attendance) and a Y variable (the average number of reportable injuries). Often, other variables must be considered, such as improper equipment, poor weather conditions and supervisory priorities.

One aspect that stands out is that employees know what to do and have demonstrated proficiency in following correct procedures.

In the future, other areas will be tested, such as drawing larger samples or the use of questionnaires. With respect to the police group, many of their injuries occur during arrests, which can become physical. Therefore, some information contained in Table 2 may be somewhat skewed. To determine the validity or reliability of this correlation factor, a reliability test was conducted utilizing the formula:

$$r = \frac{N \sum XY - (\sum X)(\sum Y)}{(\sqrt{[N \sum X^2 - (\sum X)^2]} \sqrt{[N \sum Y^2 - (\sum Y)^2]})}$$

The closer the data are to +1.00, the more reliable the correlation is considered. In this case, the resulting value of 0.163 indicates that other variables are possibly affecting and, thus, skewing the data.

Newmark, J. (1988). *Statistics and probability in modern life* (4th ed.). New York, NY: Saunders College Publishing.

Table 2

Spearman's Correlation Coefficient

	Department percentage	Average attendance	Average attendance rank (X)	Average number of reportable injuries	Incident ranks (Y)	(X-Y)	(X-Y) ²
Water	0.76	155	2	12.4	2	0	0
Linemen	0.87	181	1	9	1	0	0
P&R	0.42	155	5	28	4	1	1
PW	0.62	166	3	21.8	3	0	0
Police	0.58	202	4	48.8	5	-1	1

$$1 - \frac{[(6 \times 2) / 5(25 - 1)]}{5} = 0.9$$