

# ENVIRONMENTAL TRAINING

## GOAL

Provide construction personnel with the knowledge to identify environmental issues and best practice methods to minimize environmental impacts.

## CREDIT REQUIREMENTS

Provide an environmental training plan that is customized to the project, including:

1. List of the types of project personnel to be trained. This may be a list by job-type or by employer need not contain actual employee names.
2. Description of the types, goals and objectives of training to be given.
3. A process to track training efforts, including dates, means (e.g., online, classroom, field training), topics, the identification of those participating in training, and attendance numbers
4. A process to measure of training effectiveness such as self-assessment, pre-test and post- test, and productivity measurement.

### Details

The environmental awareness training plan shall address the following training elements, or state why any are inappropriate:

- a. Permit conditions, performance standards, environmental commitments, and environmental regulations related to the project
- b. Overall importance of environmental issues (i.e., ecological impact of actions)
- c. Identifying work activities that present the greatest risk for compliance (i.e., specific environmental sensitivities of the project)
- d. Required environmental qualifications and certifications
- e. Environmental records management
- f. Environmental compliance monitoring and reporting procedures
- g. Unanticipated historic resource or archaeological discoveries
- h. Environmental notification triggers and emergency response procedures
- i. Oil spill prevention and response procedures
- j. Construction stormwater management (including monitoring sites and monitoring and reporting procedures)
- k. Erosion and sediment control procedures (including dust mitigation)
- l. In-water work
- m. Reduction of air pollution
- n. Management of known or suspected contamination
- o. Waste management and recycling
- p. Hazardous materials management
- q. Management of noise impacts
- r. Littering and good housekeeping
- s. Plan for training subcontractors and field personnel not immediately involved at project start or planning. These personnel must also receive training.

## DOCUMENTATION

- A copy of the environmental training plan and any updates to that plan that occur throughout the construction.
- A signed letter from an owner's representative stating that the contractor(s) followed the environmental training plan as submitted and updated.



CA-2

1 POINT

### RELATED CREDITS

- ✓ PR-11 Educational Outreach
- ✓ EW-1 Environmental Management System
- ✓ CA-1 Quality Management System

### SUSTAINABILITY COMPONENTS

- ✓ Ecology
- ✓ Equity
- ✓ Expectations
- ✓ Experience
- ✓ Exposure

### BENEFITS

- ✓ Reduces Air Emissions
- ✓ Reduces Water Pollution
- ✓ Reduces Solid Waste
- ✓ Improves Human Health & Safety
- ✓ Improves Accountability
- ✓ Increases Awareness

## APPROACHES & STRATEGIES

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- Provide environmental training as part of standard orientation training to a construction project. Done in combination with construction health and safety training can ensure that all personnel are reached before entering the work site, and can reduce training cost by avoiding multiple training sessions.
- Deliver activity-specific toolbox or tailgate talk topics onsite, targeting the pertinent construction personnel prior to each new activity. Toolbox environmental talks might rely on commercially available presentations, supplemented by customized project and work location-specific topics.
- Deliver environmental training on regular or as-needed bases via teleconferences, periodic e-mail environmental alerts, environmental awareness meetings, design review meetings, weekly project meetings, pre-construction meetings for each work phase/activity, and field discussions during site monitoring and inspection.
- Focus environmental training components on target audiences with appropriate frequencies as follows:
  - Environmental Stewardship training: Discuss stewardship principles at the construction kick-off meeting.
  - Baseline environmental awareness training: Provide environmental orientation for all field personnel, personally delivered prior to entry into work phases via a consistent audiovisual presentation; address permit conditions, performance standards, environmental commitments, environmental regulations, and overall importance of environmental issues.
  - Environmental design training: Deliver this training to designers at design review/validation meetings during the construction phase (i.e., design-build projects).
  - Project management team training: Conduct training during steering meetings. Discuss upcoming construction schedule and corresponding environmental compliance challenges. Address environmental commitments and applicable content of environmental guidance manuals. Orient discussion to the specific and appropriate work stages, time of year, or work activity.
  - Construction training: Meet onsite to give construction workers tool box/tailgate training in specific activities prior to initiating construction. Highlight pre-construction and awareness of compliance needs and how to support the zero violations goal. Provide pre-activity environmental compliance pocket checklists for improved environmental performance.
  - Environmental staff training: Provide the environmental team with bi-weekly or as-needed specific instruction in monitoring tasks, performance documentation and compliance, and environmental compliance support procedures.
  - Skill- and need-specific training: Ensure competency among selected environmental staff and crews in water quality monitoring procedures, erosion and sediment control inspections, in-water work, etc.

### Examples

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#### Washington State Department of Transportation (WSDOT)

WSDOT's Environmental Management System delivers environmental training to provide tools and information to assist staff in ensuring that projects stay in compliance with environmental laws, regulations, and policies (WSDOT, 2008a). A key component of their Construction Environmental Management Program is training the appropriate personnel on the applicable procedures to ensure compliance with environmental requirements during construction. Training sessions target various audiences, including environmental practitioners, construction staff, and maintenance and operations staff. For example:

- Drainage design lead engineers who are responsible for stormwater design (including downstream analysis, bridge scour analysis, and floodplain fill and hydraulic impact mitigation evaluations) must complete WSDOT's training course in the Highway Runoff Manual.
- WSDOT trains contractors to ensure water quality is monitored in accordance with the Highway Runoff Manual protocols, project-specific permit conditions, performance standards, and environmental commitments.
- Erosion and sediment control design must be prepared by an individual who has successfully completed WSDOT's Construction Site Erosion and Sediment Control course.

Some types of environmental training are required by regulation. For example, spill prevention, containment, and response training for all spill responders is required in Washington in accordance with Washington Administrative Code (WAC) 296-824. Hazardous materials surveys, including asbestos containing materials/lead based paint (ACM/LBP) must be completed by an Asbestos Hazard Emergency Response Act (AHERA)-certified inspector.

### Measuring Performance of Environmental Training

Research suggests that environmental training as a component of environmental management systems (e.g., ISO 14001 standards) improves: (1) employee awareness, (2) operational efficiency, (3) managerial awareness, and (4) operational effectiveness (Rondinelli & Vastag, 2000; Sroufe, 2003).

DOTs prepare quarterly and annual reports on program-wide environmental performance. For example, Washington DOT's *Gray Notebook* indicates environmental performance through Environmental Compliance Assurance metrics (WSDOT, 2008b). Washington DOT believes that its Environmental Compliance Assurance Procedures and the environmental compliance for construction inspectors training course have raised the general awareness of non-compliance events, with events being cited and quickly resolved with increasing numbers.

## POTENTIAL ISSUES

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1. Construction personnel may turn over during the project.
2. Some subcontractors, operators and drivers may be onsite only once or infrequently.

## RESEARCH

This research section covers the idea of environmental training in two distinct sections. First, the value of training in general is addressed (e.g., why should any organization spend money on training?) and then examples of and reasons for construction-related environmental training are discussed.

### The Value of Training in General

Knowledge is a vital organizational asset. This is the essential unstated assumption associated with almost all training discussions. While American corporations spend in excess of \$50 billion annually on training (Galvin, 2002) and numerous authors espouse the virtue and necessity of training, few make an effort to actually show its value. This section highlights the fundamental premise for continued and even increased support for training: it is an investment in a valuable commodity that produces high returns.

#### Knowledge is Valuable

Today, in the information age, organizations are routinely valued not on their physical but rather their intellectual capital. Edvinsson and Malone (1997) define intellectual capital as “the possession of the knowledge, applied experience, organizational technology, customer relationships and professional skills that provide [an organization] with a competitive edge in the market.” Bassi and Van Buren (1999) point out that “intellectual capital is the only source of competitive advantage within a growing number of industries.” For instance, the market value of Microsoft far exceeds the value of its physical assets. To be sure, much of this value is based on speculation, but much is also based on Microsoft’s intellectual capital – what it knows.

Training is one of the chief methods of maintaining and improving intellectual capital. Because of this, an organization’s training can affect its value. Bassi and Van Buren (1999) found training as a percentage of payroll to be significantly correlated with the market-to-book value of publicly traded companies. Where the average U.S. employer spent about 0.9% of payroll on education and training (Bassi et al., 1996), training magazine’s 2002 top 100 training companies averaged 4% with Pfizer ranking first at 14%.

### Training is an Investment

General accounting standards classify training as an expense. However, training is really an investment: an organization typically invests upfront to train its employees (in the form of enrollment fees, travel expenses and opportunity cost of the employees' time) and, in return, expects future returns (in the form of increased knowledge, skills and productivity). As with any other investment, if the returns outweigh the investment, training is a worthwhile endeavor.

Training is also an investment from the employee's perspective. Training increases skills and knowledge, which can lead to better pay or promotion. So who benefits most from the training investment: the employee with increased wages and/or promotion or the employer with increased productivity? Loewenstein and Spletzer (1998) researched this question and concluded, "...the effect of an hour of training on productivity growth is about five times as large as the effect on wage growth." Therefore, employers "reap almost all the returns to company training" (Bartel, 2000). This may be oversimplifying because employees generally view training as either a gift from the employer or at least a sign of commitment on the part of the employee, which is important to job satisfaction (Barrett & O'Connell, 2001).

In sum, both the employee and employer benefit from the training investment. The question now shifts to one of measurement: do the returns on training outweigh the investment?

### Training Return on Investment (ROI)

When calculated using sound methodology, training has been shown to provide significant return on investment: on the order of 5 to 200 percent. The problem is that methods used to quantify training ROI can often be suspect or even outright self-promotion. Furthermore, it is often very difficult to quantify the effects of training. For instance, one of training's effects can be increased job satisfaction, which is difficult if not impossible to quantify. Intuitively we know this is important in retaining good employees; however it will not show up on a ROI calculation.

In 2000, Bartel provided one of the best objective looks at the value of training to the employer. She looked at 10 large data set surveys and 16 individual case studies in an attempt to determine the employer's return on investment for employee training. She found the following:

- Methods using large data sets to compare many different organizations estimated training ROI from 7 to 50 percent.
- Individual case studies estimated training ROI from 100 to 5900 percent. Bartel believes the high ROIs in this category are based on faulty methodology. Her in-depth analysis of two well-constructed internal case studies revealed a 100 to 200 percent ROI.

Therefore, even the most conservative estimate puts training's ROI at 7 percent – an acceptable rate of return by most standards. Additionally, although it is not appropriate to generalize based on the results of two case studies, it can be said that based on Bartel's in-depth analysis of two well-constructed internal case studies, training's ROI can be much higher: approaching 100 to 200 percent.

### Summary

Training is a valuable commodity that, if viewed as an investment rather than an expense, can produce high returns. While it is true that training costs money and uses valuable employee time and resources, studies tend to show training provides a positive return on investment – sometimes in the neighborhood of several hundred percent. Therefore, although training might seem like a luxury expense in tight financial times, it is, in fact, one of the most sure and sound investments available.

### Environmental Training

Environmental training is, for the most part, a response to public demand for better environmental performance in infrastructure construction. This is generally seen in two ways: (1) public owner agencies have begun to require not only that projects meet environmental regulations but also that they incorporate employee environmental training

in order to improve understanding and compliance, and (2) private firms (e.g., construction firms) using training programs as a way to gain competitive advantage based on owner requirements and also as a component in their approach to addressing owner and shareholder (in the case of public companies) demands for environmental accounting.

#### Owner-Agency Training and Required Training for Contract Work

Many state departments of transportation (DOTs) provide environmental training to their employees and some are beginning to require training of certain key personnel from contractors working on public projects. In a 2002 survey of state DOTs (Venner Consulting & Parsons Brinckerhoff, 2004), 24 were performing general nature resources and/or regulatory training for engineers and/or construction personnel; while about 60% offered general training in the National Environmental Policy Act (NEPA), public involvement, environmental processes and best management practices (BMPs) for maintenance and water quality.

It is also becoming more common for owner-agencies to require contractor training in stormwater pollution prevention methods, commonly referred to as temporary erosion and sediment control (TESC) on construction sites. Typically a supervisor NPDES to have a trained erosion and sediment control person on-site to manage a project's temporary erosion and sediment control efforts. For example, for construction in high quality or impaired waters, Tennessee requires the contractor's erosion prevention and sediment control inspector and environmental supervisor to have completed a specified formal course (or equivalent) (TDOT, 2005).

#### Construction Firm Training

Construction firms have begun to recognize a need to formally manage their impact on the environment and have included training programs (both company-wide and project-specific) to help. Reasons for having an environmental training program include:

- a. **Compliance help.** The number and complexity of existing U.S. environmental regulations and their associated costly fines if violated (see U.S. EPA, 2005) necessitates an organized approach to understanding and complying with these regulations. In a Hong Kong study (Tam et al., 2006) "management and training" was identified as the most important evaluation factor for assessing environmental issues in construction projects.
- b. **Showing commitment to the public.** Publicly held companies, especially those listed in European exchanges, are under pressure to show their sustainability efforts to their stockholders. These often include "environmental management systems" (EMS) – see EW-1. A fundamental component of an EMS is an employee training plan (Christini et al., 2004). Thus, those companies with EMSs or those progressing towards them have a need for environmental training.
- c. **Competitive advantage.** Some public contracts, especially design-build ones, have a scoring system that awards environmental considerations beyond regulatory compliance. Also, some clients may soon require contractors to have an EMS (including the training component) in place (Christini et al., 2004).

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