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Foreword

The charter of the American National Standards Committee Z490 on Criteria for Accepted Practices in Safety, Health and Environmental Training was accredited by the American National Standards Institute on September 19, 1997. This Standard grew out of the recognized need for improvement in safety, health, and environmental training. Quality training is required to ensure that workers and safety, health, and environmental professionals have the knowledge, skills, and abilities necessary to protect themselves and others in the workplace.

Safety, health, and environmental training is an important element of an effective overall safety, health, and environmental program.

Historically, safety, health, and environmental training has been specifically addressed by only a few regulations with limited scope, such as asbestos, hazard communication, and storm water management. The regulations usually specify the technical topics to be covered in a training course, but do not stipulate how to adequately design, develop, deliver, and evaluate training.

This Standard covers all facets of training, including training development, delivery, evaluation, and management of training and training programs. Thus, the criteria were developed by combining accepted practices in the training industry with those in the safety, health, and environmental industries. The Standard is intended to apply to a broad range of training and training programs.

Industry employers may use this Standard to assess the services of external training providers or to audit or improve their own corporate training programs. Training providers may use the Standard to assess and improve their training services. This Standard may also be used as a basis for development and management of training and training programs, with the annexes and references providing additional information and detail.

Governmental regulations specify mandatory requirements for various safety, health, and environmental training. Likewise, the training program may be embedded in a larger safety, human resources, or other organizational structure. As a broad-based voluntary consensus standard, this document complements the regulations and organizational policies. However, compliance with this Standard does not assure compliance with governmental regulations or organizational policies, or vice versa.

The Z490 Committee solicits public input that may suggest revisions to the Standard. Such input should be sent to the Secretariat, American Society of Safety Engineers, 1800 East Oakton Street, Des Plaines, IL 60018-2187.

This Standard was developed and approved for submittal to ANSI by the American National Standards Committee on Criteria for Accepted Practices in Safety, Health, and Environmental Training, Z490. Committee approval of the Standard does not imply that all members voted for its approval. At the time of its approval, the Z490 Standards Committee consisted of the following members:

Steven F. Kane, Chairman
Frank Perry, Vice-Chairman
Thomas F. Bresnahan, Secretary
Timothy R. Fisher, Assistant Secretary

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<td>William G. Marquardt</td>
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American National Standard Z490.1-2001 uses a two-column format to provide both specific requirements and supporting information. The left column, designated “Standard Requirements,” is confined solely to these requirements and is printed in bold type. The right column, designated “Explanatory Information,” contains only information that is intended to clarify the Standard. This column is not a part of the Standard.
American National Standard
Criteria for Accepted Practices
in Safety, Health, and
Environmental Training

1. Scope, Purpose, and Application

1.1 Scope - This Standard establishes criteria for safety, health, and environmental training programs, including development, delivery, evaluation, and program management.

1.2 Purpose - The purpose of this Standard is to provide accepted practices for safety, health, and environmental training.

1.3 Application - This Standard is recommended for application by training providers of safety, health, and environmental training.

1.3.1 If any of the provisions of this Standard are deemed to not be applicable, the other requirements or recommendations of the Standard shall still apply.

1.3.2 This Standard applies to all safety, health, or environmental training, whether separate or a portion of other training.

2. Definitions

2.1 certificate: A written document attesting to the successful completion of an established training program by an individual trainee.

2.2 competent person: A person prepared by education, training, or experience to develop and implement various elements of a training program.

2.3 credit: A quantitative measure of units of training completed.

2.4 learning objectives: Written statements of the desired knowledge, skill, or ability to be demonstrated by trainees.

2.5 may: Denotes a permissive statement.

2.6 shall: Indicates a mandatory requirement.
E3 Training programs are most effective and efficient when managed under a well-defined and organized administrative system. Such a system is designed to assure that training is in an integrated program, rather than a series of non-related training events.

It is important to remember that training alone cannot assure a safe, healthy, and environmentally sound work environment, nor can it ensure regulatory compliance. See Annex A for references on training programs.

2.7 should: Indicates a recommendation which is advised but not required.

2.8 trainer: The person(s) who deliver(s) a training event and may also develop, evaluate, and manage training.

2.9 training: Any activity provided to trainees to gain, improve, or retain specified knowledge, skills, or abilities.

2.10 training course: Instructional materials designed to be delivered as a single unit of training.

2.11 training event: Each delivery of a course or portion thereof.

2.12 training program: An established system of designing, developing, delivering, monitoring, evaluating, documenting, and managing, safety, health and environmental training.

2.13 training provider: Any person, organization or other entity performing a training program activity. In some instances, different persons may perform portions of the role of training provider; in such instances, each person shall comply with those portions of this Standard applicable to his or her activities.

3. Training Program Administration and Management

This section provides criteria which are intended to provide the elements necessary for administration and management of a training program.

Training shall be integrated into an overall safety, health, and environmental program, including, in such a system, issues of:

• responsibility and/or accountability for the training program.

• resources available to the trainer and trainees.

• training, design, and development by appropriate, qualified people, using appropriate techniques.

• delivery strategy(ies) appropriate and effective for the learning objectives.

• appropriate evaluation strategy(ies) included in all training.

• overall quality of the program managed to assure consistency and continuous improvement.
3.1 Accountability and responsibility for each element of the training program shall be clearly defined.

3.2 The training program shall, at a minimum, include the following elements:
   — training development, including needs assessment, learning objectives, course content and format, resource materials, and criteria for course completion (see Section 4 of this Standard).
   — training delivery by competent trainers in a suitable training environment (see Section 5 of this Standard).
   — training evaluation and a continuous improvement system (see Section 6 of this Standard).
   — program documentation and record keeping (see Section 7 of this Standard).
   — a written training program plan documenting how the above elements will be accomplished.

3.3 Resource management and administration

   3.3.1 The training program shall be planned and implemented to assure that:
   — personnel are assigned and supported to ensure adequate program administration and management;
   — budgets are available to fund all elements of the training program;
   — sufficient personnel and expertise are available for the development, delivery, and evaluation of training;
   — the requirements of federal, state, and/or local agencies are met, if the training is required by such standard or regulation;
   — technical expertise and information references are sufficient for the development and delivery of training and for follow-up reference by trainees;
   — suitable facilities are available for all training events;
   — technology, such as presentation equipment, practice equipment, and personal protective equipment, is available to be used as needed for each training event;
   — adequate information is maintained to provide a history of training events and trainee completion.

3.4 Program evaluation

   3.4.1 The training provider shall periodically evaluate the training program.
3.4.2 The elements to be evaluated shall, at a minimum, include:
—training program management;
—training process;
—training results.

E3.4.2 When evaluating training program management, some of the functions to review include, but are not limited to:
—accountability;
—responsibility;
—development;
—delivery;
—evaluation processes.

When evaluating the training organization and administration, some of the elements to review include, but are not limited to:
—staffing;
—budgets;
—facilities;
—equipment;
—documentation;
—record keeping.

When evaluating the training process, some of the elements to review include, but are not limited to:
—clarity and appropriateness of training goals;
—relevance of training goals to trainees;
—learning objectives;
—content and methods that support the learning objectives;
—adequacy of the learning environment;
—training effectiveness.

Training results should be used to improve the training program. When analyzing training results, some of the elements to review include, but are not limited to:
—a definite plan of action for training employees;
—a plan for conducting regular needs assessments;
—support for lifelong learning;
—adequate funding;
—program manager competence;
—links among training program elements;
—the provision for training program long-term and strategic planning;
—a system for identifying competing demands, and the ability to set priorities.

4. Training Development

Training that will improve the occupational safety, health, or environmental knowledge, skills, or abilities used by the trainees in the performance of their jobs shall be developed.

4.1 Training development shall follow a systematic process, including needs assessment, learning objectives, course design, evaluation strategy, and criteria for completion.

E4 See Annex B for additional guidelines on approaches to training development.
4.2 Needs assessment

4.2.1 A determination shall be made as to whether training is the correct response to a given organizational need.

4.2.2 If training is the appropriate response, the training needs assessment shall include:
   — characterization of the training audience;
   — what trainees are required to know or do;
   — review of any available job analyses;
   — site specific information;
   — special trainee abilities or languages;
   — previous training provided to the trainees;
   — regulatory requirements.

4.3 Learning objectives and prerequisites

4.3.1 Learning objectives shall be written for each training course.

4.3.2 Learning objectives shall state:
   — the target audience;
   — the desired knowledge, skill, or ability to be learned by the trainee;
   — the conditions under which the knowledge, skill, or ability is to be demonstrated;
   — the criteria for determining that the learning objective has been achieved.

4.3.3 Learning objectives shall:
   — be observable and measurable;
   — consider the required background and experience of the trainees;
   — state any prerequisites.

4.4 Course design

4.4.1 Delivery method

Delivery methods appropriate to the target audience and stated learning objectives shall be specified.

The delivery method shall ensure adequate feedback mechanisms for trainee questions and concerns.

4.4.2 Content

Content shall consist of the information needed to achieve the stated learning objectives.
Content shall be based on current literature, recognized scientific principles, judgment of subject matter experts, site-specific issues, target audiences and regulatory requirements.

4.4.3 Instructional materials

Instructional materials appropriate to the target audience, delivery method, and stated learning objectives shall be specified or developed.

4.4.4 Trainer’s guide

A trainer’s guide or lesson plan shall be developed.

4.4.5 Physical environment

A safe physical environment appropriate for the target audience, delivery method, and stated learning objective shall be specified.

4.4.6 Time allocation

A training schedule appropriate for the target audience, delivery method, and stated learning objective, that is in compliance with regulatory requirements, shall be specified.

4.4.6.1 The training schedule shall include both an estimated total duration and time allocation for each training topic.

Time to address trainee questions and concerns shall be included in the time allocation for each training event.

4.4.7 Trainer criteria

The minimum trainer criteria for each training course shall be specified. The desired trainer-to-trainee ratio for each training event shall be specified.

4.5 Evaluation strategy

4.5.1 The training provider shall develop a strategy for evaluating the trainees’ achievement of the learning objective(s).

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4.5.2 The evaluation strategy shall be developed during training development.

4.6 Criteria for completion

4.6.1 Criteria for completing a training course or event shall be established by the training provider in advance of any training event. These criteria shall be uniformly adhered to in all training events. Criteria for completion shall indicate test scores or similar qualitative measure of success, including requirements for minimum attendance or participation.

4.7 Commitment to continuous improvement

4.7.1 Training course revisions shall be made on a periodic basis in accordance with the written training plan.

4.7.2 Training providers shall use information from training evaluations when revising a course.

5. Training Delivery

The purpose of this section is to describe acceptable criteria for safety, health, and environmental trainers, and to describe training material delivery requirements.

5.1 Trainer criteria

Criteria for safety, health, and environmental trainers shall be specified during training development. Criteria shall include subject matter expertise and training delivery skills.

5.1.1 Subject matter expertise: Trainers shall have an appropriate level of technical knowledge, skills, or abilities in the subjects they teach.

5.1.2 Training delivery skills: Trainers shall be competent in delivery techniques and methods appropriate to adult learning.

5.1.3 Continuing education: Trainers shall maintain their training skills by participating in continuing education, development programs, or experience related to their subject matter expertise and delivery skills.

5.1.4 The conformance of trainers to the defined trainer criteria shall be documented.

E4.6.1 Completion criteria may also include alternative procedures to follow in the event that a trainee fails to successfully complete the training, such as full retraining or other remedial actions.

E5.1.1 Knowledge, skills, and abilities may be gained through training, education, and/or experience.

E5.1.2 Competence can be acquired through training, education, and/or experience.

E5.1.3 Some governmental rules prescribe specific requirements for trainer continuing education.

E5.1.4 There are a number of ways to document trainer criteria, such as an experience sheet, résumé, continuing education course certificate, accredited or other certification adhering to accredited standards, licensing, registration, etc. This Standard does not mandate a specific method. Documentation is required; the method of such documentation is not.
5.2 Training delivery

Training delivery shall at a minimum include:
—trainer planning and preparation prior to delivery;
—managing the learning environment;
—effective use of delivery aids and learning technologies;
—application of adult learning principles appropriate for the target audience.

5.2.1 Trainer planning and preparation

The training provider shall ensure that the trainer planning and preparation is accomplished.

E5.2.1 Planning and preparation includes, but is not limited to, assuring that the trainer:
—meets the stated trainer criteria;
—understands completely the course learning objectives;
—is familiar with the course materials;
—is familiar with and practices using the primary and alternate delivery strategies.

5.2.2 Management of the training environment

5.2.2.1 The training location shall be suitable to meet the needs of the trainees. Whether it is a workplace location or a classroom, the training location shall be prepared before the training event, and it shall:
—be safe and free of obvious hazardous conditions;
—have access to water and restroom facilities;
—have suitable climate and/or indoor air quality;
—have adequate lighting for all training activities;
—have sufficient and adequate seating and/or work areas for all training activities;
—have a planned evacuation route and adequate emergency exits.

E5.2.2.2 Audio and visual aids, and training aids such as personal protective equipment, should be in good working order.

Multi-lingual materials, materials for non-readers, and for trainees with special needs should be available as required.

5.2.2.3 The training area and layout shall facilitate learning.

E5.2.2.3 The arrangement of seating should be suitable to the methods available. Trainees should be able to see and hear all training delivery, including demonstrations, audio-visual presentations, lectures, etc.

5.2.3 Effective use of delivery methods and materials

The trainer shall use the methods and materials specified in the course development in a manner that supports the learning objectives.

5.2.4 Adult learning principles

The trainer shall apply adult learning principles appropriate to the target audience and the learning objectives.

E5.2.4 In applying adult learning principles, the trainer should, at a minimum:
—treat the trainees with respect;
—recognize and respond to individual learning styles;
—exercise professional judgment in managing difficult situations or participants;
—show flexibility in tone and pace of subject delivery to accommodate the needs of the trainees;
—coach and counsel trainees to maximize the learning experience;
—encourage active participation from all trainees.

5.2.5 Feedback and communication

The trainer shall provide timely feedback to trainees’ questions and concerns.

6. Training Evaluation

Training evaluation tools may measure trainee, trainer, training event, or training program performance.

Training providers shall incorporate appropriate evaluation tools into each training event.

This section provides acceptable criteria for the different evaluation approaches.

6.1 General criteria

6.1.1 The evaluation approach(es) for each training event and the tools for implementing them shall be established during training development.

6.1.2 An evaluation shall be made of the trainee’s achievement of each learning objective, considering the performance, conditions, and criteria specified in the learning objective.

6.1.2.1 The evaluation tools used shall be reliable and valid measures of the trainee’s achievement of the learning objective.

6.1.2.2 Successful completion of each evaluation shall be specified during training development.

6.1.2.3 Training providers shall furnish trainees with the results of any test or task observation included as part of the evaluation.

E6 There are a wide range of outcomes that can be evaluated, such as:
— the trainee’s possession of some knowledge, skill, ability, and/or attitude;
— the trainer’s ability to effectively transfer knowledge, skills, abilities, or attitudes to the trainees;
— the trainee’s satisfaction with the training experience;
— the ability of the training to contribute to the organizational goals.

E6.1.1 Different evaluation approaches may be selected to evaluate each specific outcome mentioned above in E6. These approaches are described in Section 6.2.

E6.1.2 In some instances, trainees may be allowed to ‘test out,’ i.e. demonstrate achievement of the learning objective(s) without attending or participating in the training event. The criteria for ‘testing out’ should be specified during training development. Special care should be taken to ensure regulatory compliance.

E6.1.2.1 A “reliable measure” is one that gives consistent results over time. A “valid measure” is one that reflects the knowledge, skills, abilities, or attitudes specified in the learning objective.

E6.1.2.2 Successful completion of an evaluation will depend on a number of factors, including the evaluation approach and the importance of the learning objective(s). For example,
— successful completion of a test may be specified in terms of percent correct;
— successful completion of an observation may require the trainee perform the steps of a task in the proper sequence;
— successful completion of a project may require that all key elements be included as per instructions.

E6.1.2.3 The trainees may use the feedback for seeking more information or practice, and to contribute to a plan for future training. Supervisors, managers, and trainees may use the information for individual performance support, for job design issues, or other job-related issues.
6.1.4 Regulatory requirements often reflect the minimum acceptable level of training. The training may exceed required regulatory levels.

6.1.5 Periodic reevaluation should also be a part of training development and general requirements, including regulations mandating refresher training to occur at certain and specific cycle times.

6.2 Evaluation approaches

An evaluation shall be conducted using one or more of the following techniques.

6.2.1 Reaction survey

A reaction survey shall be designed to be easily administered, tabulated, and summarized, with space for written comments.

6.2.2 Evaluation of knowledge, skills, and abilities

An evaluation of knowledge, skills, and abilities shall take place while the trainee is in the learning environment.

6.2.3 Observation of performance

Observation of performance shall be used when it is necessary to verify that the trainee can demonstrate the targeted skills or abilities under actual work conditions.

E6.2.1 A reaction survey is a subjective evaluation of the training course by the trainees. Questions about trainer presentation skills, accommodations, pace, and difficulty and usefulness of content may be included in a reaction survey. Results from a reaction survey may be used by trainees to assess and report their learning, or by trainers to assess and improve the course design and delivery.

E6.2.2 Tools used to evaluate knowledge, skills, and abilities may take many forms, depending on the focus of the learning objective(s). These include:
- written test;
- oral examination;
- completion of an assigned project;
- demonstration of the skill in a simulated work setting;
- on-the-job demonstration of the skill in the trainer’s presence.

Note—Evaluations of knowledge, skills, or abilities may be administered as pre- and post-tests only, or self-administered evaluations. They may be automated, as technology permits.

E6.2.3 This approach may include pre- and post-test measures to link performance to training. Performance information may be collected from supervisors, coworkers, or customers, or from indirect measures such as those found in production records or safety reports.

When observation of performance reveals a gap between the desired performance and actual performance, the factors that prevented the desired performance should be identified. These may include problems with the training design or delivery. They may also include non-training issues, such as the availability of appropriate equipment on the job, con-
6.2.4 Organizational results

Measures of organizational results shall be used to link training to overall organization performance.

E6.2.4 To measure organizational results, training factors must be isolated from non-training factors. To do this, there is often a control group of workers who have not received the training.

Fundamental to this type of evaluation is an agreement on key business measures before the training takes place. These may include, but are not limited to:

— increase in safe behavior(s) by all trainees;
— increase in implemented preventive measures and controls;
— reduction in near hits, injuries, and illnesses;
— reduction in worker’s compensation claims;
— improved environmental compliance;
— higher return on investment (ROI).

6.3 Commitment to continuous improvement

6.3.1 The information from training evaluations shall be used for continuous improvement of the course content, delivery methods, collateral materials, and learning environment.

E6.3.1 Management may use the information to assess the effectiveness of the training program in meeting organizational goals and to determine the level of investment in training.

7. Documentation and Record Keeping

An important element of an overall training program management system is record keeping and documentation. Certain regulations require specific records be kept for proof of completion of required training. Organizations also may desire to keep additional records to demonstrate their training efforts for control of potential liability issues.

7.1 Systems and procedures

7.1.1 A record keeping system shall be established for controlling all records and documents required by this Standard to ensure that:

— they are retrievable, readily identifiable, and maintained in an orderly manner;
— they are current, accurate, legible, and dated (including revision dates);
— they are retained for a specified period;
— they meet applicable legislative or regulatory requirements.

E7.1.1 The retention time for records may be mandated by regulation, company policy, or both.

7.1.2 The written training program plan shall include procedures for document control.
7.2 Records

7.2.1 Development records shall identify:
— the target audience and stated learning objective(s);
— sources used to develop training materials;
— the persons designing and developing the training and their qualifications;
— all training materials developed for the course;
— plans for evaluation and continuous improvement of the course.

7.2.2 Delivery records for each training event shall identify:
— the date, location, and duration of the training;
— the name and description of the course;
— the names and qualifications of persons delivering the training;
— the delivery materials used;
— the trainees participating in the training;
— the trainees successfully completing the training.

7.2.3 Evaluation records shall be retained for:
— training evaluation;
— periodic reevaluation of a course.

7.2.4 Program management records shall include periodic evaluation of the training program.

7.3 Record confidentiality and availability

7.3.1 Records shall meet regulatory requirements for availability, disclosure, confidentiality, and protection of trade secrets.

7.3.2 The written training program plan shall include procedures for access, availability, and confidentiality of records.

7.4 Issuing Certificates

7.4.1 When a certificate or written documentation of successful course completion is issued to the trainee, it shall include:
— the trainee’s name;
— the course title;
— the date and hours of instruction;
— a statement that the trainee has successfully completed the course;
— the name and address of the training provider;
— the date the periodic refresher is due (if required) or expiration date;
— a unique trainee identification number;
— the level of training or type of certificate awarded (if applicable);
— any other information required by regulation;
— the number of credits, if issued.

E7.2.2 An individualized, unique number should be provided for each trainee.
7.4.2 If the training provider issues credits, they shall be issued in accordance with recognized established standards, regulations, or industry protocols.

7.4.3 No credits or certificate of training shall be issued unless the criteria for completion have been met by the trainee.
Preface to Use of Annexes

The annexes following here are not part of the Z490.1 standard, nor are they set forth as implementing the basic requirements of the standard. These annexes were agreed to by the membership of the Z490 standards committee as useful information for the presentation of various elements used in training. Each may fit a particular target audience from basic to advanced in various degrees of usefulness. The committee intent was never to present the definitive prescription of the subject areas addressed by the annexes. All or portions of each may be useful for particular needs. For these reasons, the annexes are included. And, as each edition/revision of the standard is developed, the annexes will, accordingly, be improved or recreated to meet the intent of the committee.

In brief, the annexes are not meant to be all things to all persons. Nor can it be assumed that all accepted training measures are contained in the annexes. Other or additional measures may be applicable under particular or exceptional circumstances. As stated in the Foreword, all questions about the standard, and particularly the annexes, should be directed to the secretariat, American Society of Safety Engineers.

Annex A
(Informative)

References

ISO 21.11: Guideline for Application of ISO Standards to Training and Education. (NK)

ISO 9001: Quality Systems. (The most current version of this document is recognized.)


ANSI Q9001: Quality Systems.

NIOSH 98-145: Assessing Occupational Safety and Health Training. (NK)

NIOSH 99-142: A Model for Research on Training Effectiveness. (NK)


Criteria and Guidelines for Use of the Continuing Education Unit. International Association for Continuing Education & Training (IACET); Washington, DC.


  Level 1 Evaluation: Reaction and Planned Action
  Level 2 Evaluation: Learning
  Level 3 Evaluation: Application
  Level 4 Evaluation: Business Results
  Level 5 Evaluation: Return on Investment


Annex B
(Informative)

Training Course Development Guidelines

B.1 Course Development Procedures

The procedure used to develop a course should define training in terms of measurable and observable performance, rather than theoretical, non job-related material. People involved with course development should allow members of the organization’s training department to participate in the design, development and validation of the course. Course developers should also consider the suggestions and comments of trainees and graduates when designing and revising courses.

B.2 Steps in Course Development

Course developers should adopt a systematic and objective procedure to design, implement, and validate training systems. The procedure should:

—determine training requirements;
—select training objectives;
—translate training objectives into performance terms;
—construct appropriate criterion measures;
—select and sequence the course content;
—select instructional strategies and methods;
—determine equipment requirements;
—determine the number and type of trainers required;
—establish course prerequisites;
—identify and procure training aids;
—develop instructional materials;
—establish time allocations;
—evaluate the course in trial operation;
—analyze test results and take actions indicated;
—follow up on course graduates.

B.3 Determine Training Requirements

When designing a training program to provide safety, health and environmental skills, knowledge, or abilities related to a job, it is essential to know how the job is actually performed as opposed to how the job should be performed. A needs analysis will identify the skills workers need to possess in order to do their jobs. It may also identify non-training problem areas that should be addressed in order to improve performance. The analysis results will help to determine which skills to include in a training program.

Analyzing and identifying the nature and cause of safety, health, and environmental training performance issues can be difficult; but it is not impossible if a systematic procedure is followed. This process is generally carried out by a performance consultant, who shares the data with the training developer.
B.4 Data Collection/Needs Analysis

Information should be collected from the following sources to serve as a basis for identifying training needs:

- on-site job task analysis;
- jobholder interviews and observations;
- jobholder questionnaires;
- job supervisor questionnaires;
- management interviews and regulatory analysis;
- surveys of injuries and illnesses;
- skills standards development;
- applicable regulations.

B.5 Review a Job Analysis

A job analysis (JA) identifies and records the following data:

- duties and tasks performed by experienced and qualified personnel;
- environmental factors surrounding the performance of duties and tasks, including safety;
- skills, knowledge, and abilities required to perform the duties and tasks;
- acceptable standards of performance for duties and tasks;
- frequency and criticality relevance, and importance of the performance of specific tasks;
- amount and kind of supervision provided in performing duties and tasks;
- hazard analysis and risk assessment associated with performing duties and tasks.

Duty and task data may be recorded in performance terms. Select tasks or jobholders who are representative of the job being analyzed. A statistically valid number of jobholders should be analyzed to ensure an unbiased, adequate sample.

A JA report may include the following items:

- a complete listing of duties and tasks for which jobholders are responsible, stated in performance terms, together with the conditions and criteria of acceptable performance;
- indices of priorities for each duty or task.

Job analysis schedules should be reviewed and approved by experienced training and operating personnel prior to their use in developing training systems.

If the results of the analysis are not used as instructional content, it is possible that the training program will include two design traps:

- spending a lot of time teaching something that is difficult to teach and nice (but not necessary) for the trainee to know;
- forgetting to include something that is very easy to teach but is absolutely essential to safe performance.
B.6 Incorporate Projected Operational Developments and Changes into the Training Course

When making changes to the training course, the developer should include the following:

—job data analysis so unnecessary or obsolete items of performance can be eliminated from the course;
—research and development reports and surveys;
—the organization’s plans and programs;
—operational divisions and departments reports and surveys;
—adding new knowledge, skill, and ability requirements needed to perform the job.

B.7 Write Learning Objectives

To write learning objectives, follow these steps:

1. Examine the trainees’ jobs, how well they must perform them, and under what conditions they must perform them.
2. Prepare a written list of learning objectives for each training course.
   Ensure the course contains only need-to-know information, and that specific learning activities are built into the training, including organizational and regulatory requirements.
   Write learning objectives clearly so that the training providers and trainees understand what the trainee is expected to do. Base the objectives on job data, not on conjecture or existing trainer guides. Ensure that the objectives specify the knowledge, skills, and abilities that make performing the task possible.
   Learning objectives should also describe the conditions of performance (what the trainee is given or not given in terms of tools, working aids, assistance, supervision, and the physical environment in which the trainee will perform).
   Learning objectives should establish criteria for acceptable performance (quantity and quality standards that describe how well the trainee must perform).
3. Describe the conditions under which the trainee must perform.
4. Identify and state any prerequisite information or experience necessary for the training event.
5. Identify what the trainee will be given to work with (equipment, tools, reference materials, etc.).
6. Describe the assistance (if any) that the trainee will receive.
7. Describe the amount and kind of supervision the trainee will receive.
8. Establish criteria that describe how well the trainee is expected to perform, as well as the minimum level of acceptable performance, in terms of quality, quantity, and time.
B.8 Select and Sequence Course Content

Course content should be of sufficient detail and organized in a manner suitable to attaining the course objectives.

Develop outlines of course content that describe all the knowledge, skills, and abilities involved in achieving the kind and level of performance required. Make sure that the concepts, principles, facts, and elements of the knowledge, skills, and abilities that comprise the content of the course are directly related and critical to safe job performance.

Eliminate unrelated materials from the course outline. Sequence content for ease of learning. Realize that trainees move from the simple to the complex, from the familiar to the unknown, and from the concrete to the abstract. Present tasks through a series of steps of gradually increasing difficulty. Topics should be oriented and sequenced so that relevance to the job can be demonstrated when introduced into the course.

Use current literature, recognized scientific principles, the judgment of subject matter experts, and regulatory requirements when developing the course content. Older learning serves as the basis for new learning. Review previously presented material when appropriate.

Orient trainees toward the total knowledge, skill, or ability to be learned.

Use the whole—part—whole method of training whenever possible.

B.9 Select and Prepare Training Aids

Use a variety of training aids to fill the gap between verbalization and direct, real-life experiences. Select them to complement and supply basic instructional strategies and objectives.

Establish criteria for the selection and use of specific types of visual and audio aids. Include trainers in the selection, preparation and planning of training aids. Select aids to fit the maturity, interests, and abilities of the trainee group, and select those that are most appropriate to the learning activity.

Select a balanced variety of aids; use them because of their instructional value, not just because they are available.

B.10 Determine Trainer Requirements

Use the content of a particular block of instruction, instructional strategy, and trainer capabilities to help determine the type of trainer to assign to that block.

Establish trainer workload standards by determining:

— the maximum and minimum number ratios of platform/preparation hours per day and per week for each instructional method and combination of methods for initial instruction;
— the maximum and minimum number ratios of platform/preparation hours per day and per week for each individual method and combination of methods for repeated instruction;
— the maximum and minimum trainer/trainee ratios for each instructional method or combination of methods.
B.11 Set Course Prerequisites

Establish prerequisites for each course to ensure that trainees have adequate knowledge, skills, abilities, and experience required to successfully complete the training.

B.12 Develop Training Materials

Prepare a trainer’s guide that brings all aspects of the training course into a readily usable form. Include a course outline for each instructional block and a program of instruction for the entire course.

Review each program of instruction for format, organization, currency, and adequacy of content from both an editorial and a doctrinal point of view.

Include reference materials or a list and location of reference materials.

B.13 Course Outline

Each course outline should contain the following data:

— course title and other identification;
— publication date;
— scheduled course length in weeks, days, or hours;
— purpose and any regulatory drivers;
— overall learning objectives in terms of anticipated behavior, working conditions, and performance;
— list of course attendance prerequisites;
— training locations;
— trainer requirements (training aids and operating equipment);
— equipment requirements (training aids and operating equipment);
— space requirements (by type, capacity and number);
— list of performance requirements in the form of required behavior, working conditions, and standards;
— list of learning objectives in terms of duties, tasks, and job elements;
— list of required reference materials;
— list of evaluation instruments;
— sequence of instruction by trainer guide title and number.
B.14 Trainer Guide

Each trainer guide should contain the following elements:
- course title and other identification;
- date of review and approval;
- time allocation in hours and minutes;
- primary and secondary (if any) instructional strategies;
- type and size of classroom, shop, or laboratory facilities required;
- evaluation strategy;
- number of trainers and assistant trainers needed;
- list of all required training aids and other types of equipment;
- list of specific references for trainees;
- list of references for trainers;
- list of required trainee supplies;
- list of trainee handouts to be distributed (outlines, advance sheets, programmed materials, etc.);
- transportation requirements, including vehicles, schedules, and location;
- names and signatures of trainer guide preparer, reviewer, and approver;
- copy of each trainee handout, worksheet, standard form, quiz, and graphic training aid used.

B.15 Establish Time Allocations

The purpose and nature of employee job assignments should be used to determine how learning and instructional activities are divided between classroom and on-the-job training (OJT).

Establish tentative time allocations for each instructional block after the trainer guide has been prepared. Base the time allocations on careful consideration of the following factors:
- trainee work schedules;
- trainee abilities and backgrounds;
- type of instructional materials;
- amount of detail (the number of facts, principles and concepts taught);
- content difficulty;
- instructional strategy used;
- evaluation strategy used;
- number of trainees;
- number of trainers;
- requirements for moving trainees from one training location to another;
- regulatory requirements.

Regularly review and revise time allocations on the basis of actual experience with trainee groups for which data has been systematically collected and analyzed.
Annex C
(Informative)

Training Delivery Guidelines

C.1 Trainer Effectiveness

Hallmarks for effectiveness of trainers are the ability to:

— establish a positive atmosphere or learning climate in which people can participate in a productive way;
— make participants aware that they are free to make mistakes and experiment with ideas and behaviors;
— describe his or her role as guide, facilitator, and trainer;
— express specifically that his or her priority is meeting the trainees’ learning needs;
— describe and have in writing the learning objectives;
— describe and have in writing an agenda of how the training will flow and be delivered;
— make efficient and effective use of provided training aids and materials;
— use all materials and aids designed for the course;
— solicit trainee responses to keep the session active and to be able to assess learning;
— have backup and contingency plans in place if the specified delivery is not effective;
— be able to manage the physical facility so that learning is promoted.
C.2 Planning and Preparation

Effective safety, health, and environmental training is preceded by careful planning and preparation. Safety, health, and environmental trainers often use checklists to help them meet training objectives and to ensure high quality presentations. Lesson plans and instructor presentations must be organized to include information that covers the following:

— Tasks to be taught and lessons to be learned;
— Target audience characteristics, learner needs and special learner considerations;
— The training environment (classroom, work area, computer applications and programs, in the field);
— Training materials and resources available (equipment media, audiovisuals);
— Presentation strategies (lecture, demonstration, computer-based guided discussion, role-play, learner discovery and individualized instruction);
— Evaluation strategy (quiz, demonstration, project completion, etc.).

C.3 Special Issues Involved in Different Training Delivery Techniques

There are many techniques used in delivery of safety, health, and environmental training. Three broad categories of delivery techniques are described below: on-the-job training (OJT), traditional training, and advanced technology training. Following the description of each category, advantages and special issues that trainers must consider when selecting and utilizing the various delivery technique categories are presented.

C.3a On-the-Job Training (OJT)

OJT is training done in the actual workplace, ranging from short training sessions (sometimes called toolbox or tailgate training) to long-term, formalized apprenticeship programs.

Advantages:
— Saves time and money because employees do not have to travel to a distant training location.
— Can use actual equipment present in the workplace. For example, the available brand(s) of respirators or other personal protective equipment can be demonstrated and used in practice.
— Training is immediately relevant and applicable to the trainee’s work.

Special issues to consider:
— Record keeping - This kind of training must be properly documented, e.g., date, attendees’ names, and training topics.
— Training objectives - If not considered during training development, objectives may be left to the discretion of the work foreman or supervisor.
— Location - While the workplace can be an excellent place to hold training, care should be taken to ensure that learning can occur. The work area should be quiet enough that the trainer can be heard. If materials are to be read during the training, there should be adequate lighting.
— Care should also be taken that OJT does not create a safety risk for the trainee or workers in the surrounding work environment.
C.3b Traditional Training

Traditional training typically occurs in a classroom setting but may include a wide array of techniques, including lecture, demonstration, discussion, practice, assignment of projects, etc.

Advantages:
—meets many regulatory requirements;
—meets many clients’ expectations;
—most trainers are familiar with the techniques.

Special issues to consider:
—Traditional techniques may not be the most effective way to communicate specific information to a particular group of workers.
—If training includes demonstration or practice, the equipment used must be similar (if not the same) as that to be used in the actual workplace. Otherwise, irrelevant or erroneous information may be taught.
—Trainees may not readily see the applicability of classroom training to their work setting.

C.3c Advanced Technology Training

Advanced technology training includes the myriad of alternative training delivery techniques that involve advanced technologies, e.g., distance learning (satellite or Internet training), computer-based training (CBT), video conferencing, and simulation or virtual reality. More advanced technologies are sure to come into existence in the next few years.

Advantages:
—Can allow training of persons from different facilities simultaneously. This can allow for sharing of experiences which can greatly enhance learning.
—Training can be self-paced, offered at any time of the day or night, and may not require the presence of an instructor.
—Record keeping can be automated.
—Some of these training delivery techniques are especially useful for refresher training.

Special issues to consider:
—Mechanisms for trainee feedback need to be assured. In the case of distance learning, trainee questions and concerns may be posed and responded to via email, chat rooms, or site facilitators.
—The cost for set up of these techniques can be high.
—Required hardware and software must be available.
—Trainees must be comfortable with and knowledgeable in how to use the technology, e.g., have the requisite computer skills, before training begins.
—The trainer must have adequate technical support.
—There should be technically feasible backup mechanism to deliver the training if the selected method is not effective.
—Generally ineffective for training that requires hands-on experience, e.g., forklift training. Although virtual training is available to overcome this problem, it is very expensive at the present time.
—Generic or packaged programs may be a poor fit for workers at different work sites, organizations, with specific job tasks, etc.
C.4 Other Considerations for Safety, Health, and Environmental Trainers

—Verify the class schedule and number of course participants, relevant background information, abilities and special needs (language, physical and learning disabilities).

—Have a contingency plan and coordinate with backup support resources, be ready for the unexpected.

—Know the availability of on-site training support personnel.

—Ensure that needed equipment and facilities is available and operable, and follow-up on all support resources, which includes copies of printed course materials for all class participants.

C.5 Key Points of Delivery

Safety, health, and environmental training includes the presentation of critical and non-critical information. If critical information is not properly presented, the consequences may include death, injuries and severe regulatory penalties. Non-critical information includes precepts or building blocks that may lead to critical consequences. In all aspects of safety, health, and environmental training, information presented must be correct and complete. In this regard, instructors may find it helpful to present safety, health, and environmental information using the following “Key Points of Delivery.”

Introduction - Present the overall picture.

Be brief and focus upon specific critical training objectives. Let the audience know how they will benefit from the training and what will be expected at the course completion. Tell course participants why they are being trained.

Main body - Present required and desired information.

This is where the majority of information is given. All regulatory, safe practices and best business management practices should be given during this portion of training. This is a good time to apply useful transitions and memory joggers. It is recommended not to wait until after lunch to begin this portion of training. Movies, lectures and sit-in-place activities should be avoided directly after course participants have eaten a heavy meal. Hands-on and motor skills training often works best directly after eating.

Conclusion - The conclusion should be planned and rehearsed.

An interested audience usually will remember a high impact closing statement. Remember that safety, health, and environmental training technical content is important, but it alone will not keep the interest of the audience. The final impression should be a lasting impression. Always try to restate the training objectives during closing statements. In an effort to make training more memorable, experienced trainers often use quiz games, hands-on scenarios and other group activities prior to closing remarks.

(Note: Some training environments and applications are changing with new technologies. Depending on the circumstances, some of these items may not be applicable to non-traditional training delivery.)
**Day of Training Checklist**

1. Is the training location adequate?
   - Adequate seating.
   - Adequate power sources and lighting.
   - Temperature control or other needed environmental controls.
   - Distractions that may hinder participants ability to listen.
   - Adequate space and appropriate level of comfort.

2. Check operation of equipment and training devices.
   - Video equipment.
   - Overhead projectors (do not forget an extra lamp).
   - Have a contingency plan (alternative equipment, marker board).
   - Have backup supplies for training devices, props, PPE, etc.
   - Computer projector.

3. Arrive before course participants arrive.
   - Inspect the training area.
   - Make adjustments.
   - Greet and visit with course participants.

4. Trainer’s first remarks should:
   - Introduce yourself.
   - Explain why training is being given and what should be expected.
   - Discuss what to do in the event of an emergency.
   - Discuss the break schedule and where breaks are to be held.
   - Tell where restrooms are located.
   (Note: Start on time and end early - if practical.)

5. Encourage audience participation.
   - Ask for comments.
   - Listen to replies.
   - Observe body language.
   - Show respect and accept respect.
   - Problems or personality conflicts? Handle during break time.
   - Monitor trainee progress during the course and review if necessary.

6. Be positive and stay on course.
   - Set the climate and classroom atmosphere.
   - Stimulate eye contact.
   - Make adjustments in delivery technique as required.
   - Stay close to the lesson plan and cover required/mandated materials.
7. Project an image of confidence.
   - Do not be overbearing, do not over-control activities.
   - Do not over dress, but be neat and dress at the level of the audience.
   - Speak on the same level as the audience, do not talk down to them.
   - Be honest, do not pretend.
   - Do not solicit sympathy from the audience.

8. Truthfully point out that no “one person” knows everything.
   - If you do not know the answer, admit it and find the answer later.
   - Recognize knowledgeable people.
   - Encourage experience sharing.
   - Stimulate networking.

9. Periodically evaluate your presentation.
   - Take note of bored or uneasy responses from the class.
   - Ask for opinions at break time.

10. Evaluate course effectiveness at the end of class.
    - Ask for written critiques.
    - Review comments listed on written critiques.
    - Make any adjustments that you can, before next class.
    - Make an effort to make marginal corrections.
    - Evaluate trainee achievement relative to course objectives.

11. Document the training.
    - Keep training materials and syllabus.
    - Keep exam results.
    - Keep attendee signature rosters.

12. Thank class participants.
    - Give a positive summary as a closing presentation.
    - Leave a desired lasting impression.