

OSH INFORMATION MEMORANDUM: 90-X-84

TO: All OSH Compliance Personnel

FROM: W. M. Lybrand

DATE: June 1, 1990

SUBJECT: Inspection Procedures for Enforcing the Excavation Standard, Subarticle 7, 1926, Subpart C

A. Background

The standard adopted by the State is the same as the Federal standard except for the definition of "competent person".

In Subarticle 7, Section 1926.650(b), the definition of "competent person" was revised to read as follows:

Competent person means one who is capable of identifying existing and predictable hazards in the surroundings, or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them. In order to be a competent person for the purpose of this standard one must have had specific training in, and be knowledgeable about, soils analysis, the use of protective systems, and the requirements of this standard.

B. Effective Dates

The revised Subpart P of 1926 with Appendices A through F were adopted on March 29, 1990, and became effective on April 27, 1990.

C. Inspection Guidelines (Compliance Procedures)

1. Excavation Protection Programs This standard provides requirements which allow employers flexibility in developing programs that provide effective protection for employees working in excavations. In addition to the standard itself, the preamble provides further guidance and rationale for changes in the existing standard.

2. Program Compliance. During all inspections at construction sites, where excavation standards are applicable, compliance personnel shall ensure that employers are complying with the standard.

a. This review shall include any documentation by employers of the methodology and background information used to determine whether shoring systems are required and the type of systems used.

b. The CO shall evaluate the employer's compliance with the specific requirements of the standard.

3. CO Responsibilities. The following procedural guidance provides a general framework that is designed to assist the CO with all inspections:

a. Ask the employer for the basis on which the employee excavation protection program related to the standard was developed.

b. Interview a representative cross-section of affected employees to verify the employer's program. This shall include an evaluation of the training of affected employees and the effectiveness of the employer's enforcement of its program. (See 1926.20(b)(1) and 1926.21(b)(2)).

c. Evaluate compliance with requirements for periodic inspection of excavations. (See 1926.651(k)(1)).

d. Identify all persons (competent person, registered professional engineer, etc.) responsible for excavation activities and/or operations.

e. Evaluate compliance with training requirements identified by periodic inspections or changes in equipment and/or procedures. This shall include an evaluation of the effectiveness of the employer's inspection procedures and training program for assessment and correction of situations resulting in near misses and/or injuries or circumstances indicating that modifications are necessary. (See 1926.20(b)(1) and 1926.21(b)(2)).

4. Specific Excavation Requirements

a. Scope and Application. This subpart applies to all open excavations made in the earth's surface. Excavations are defined to include trenches. All trenches are excavations: all excavations are not trenches. (See 1926.650(a)).

NOTE: If installed form work or other similar obstructions reduce the depth-to-width dimensions for a particular excavation, it may become a trench as defined later in the specific requirements of this instruction.

b. Definitions The definitions contained in the excavation standard shall be relied upon to interpret and apply the standard properly. In some cases terms within a definition are themselves defined within the same section.

(1) Accepted Engineering Practices. COs shall verify with the employer which aspects of the employee protection system have been designed or approved by a registered professional engineer.

(a) The CO shall obtain the name of the engineer, address, license number and state.

(b) Registered Professional Engineer. The CO shall determine that the Registered Professional Engineer of record is in fact working within a discipline applicable to the excavation work; i.e., it would be inappropriate for an electrical engineer to approve shoring design for an excavation. See also the definition for acceptable engineering practices in this instruction.

(c) Verification shall also be made for all other aspects of the onsite excavation conditions which the employer indicates are under the direct supervision of a registered professional engineer.

1. All inquiries relating to the adequacy of the engineering design shall be referred to Technical Support.

2. In appropriate cases, the Department may refer deficient or inadequate engineering designs of protective systems to the State Board of Certification and Registration for Professional Engineers.

(d) Any equipment, shoring devices, shields or other special aspects of an employer's excavation program in which the compliance investigation reveals the use of a registered professional engineer shall be so noted on the worksheet during the onsite investigation. If such devices, shields or other special aspects of the employer's program do not comply with the requirements of the standard, appropriate citations shall be issued.

(2) Competent Person. CO shall pay particular attention to the investigation and documentation of data to establish that any person serving in this capacity possesses the capability of identifying existing and potential hazards for workers.

(a) To be a "competent person" under this standard, a person must have had training in, and be knowledgeable about, soils analysis, the use of protective systems and the requirements of this standard.

(b) The competent person having such training and knowledge must be capable of identifying existing and predictable hazards in excavation work and have the authority to take prompt measures to abate these hazards. Thus, a backhoe operator who would otherwise meet the requirements of the definition is not a competent person if the person lacks the authority to take prompt corrective measures to eliminate existing or potential hazards.

(3) Hazardous Atmospheres. The CO shall check for hazardous or oxygen deficient atmospheres. For example, these include irritating atmospheres which could be encountered in areas close to a landfill, where it is not uncommon to encounter hydrogen sulfide (H₂S).

(4) Tabulated Data The CO shall examine and ensure that all tabulated data for protective systems are approved by a registered professional engineer.

NOTE: The use of tabulated data appearing in the appendices to this standard is excluded from this requirement.

c. General Requirements.

(1) Surface Encumbrances. The standard requires that all surface encumbrances that are located so as to create a hazard to employees shall have been removed or supported, as necessary, to safeguard employees. The requirement is the same as the existing 1926.651(b) and applies to all employees at the construction worksite. (See 1926.651(a)).

(2) Underground Installations. The estimated location of utility installations, such as sewer, telephone, fuel, electric, and water lines, or any other underground installations that reasonably may be expected to be encountered during excavation work, shall have been determined prior to opening an excavation.

(a) Utility companies or owners shall have been contacted, advised of the proposed work, and asked to establish the location of the utility underground installations prior to the start of actual excavation.

1. An employer need not contact utility companies where the excavation work is to be performed in a remote location where no underground installations are likely to be encountered and there are no features which would indicate the presence of underground installations.

2. When utility companies or owners cannot respond to a request to locate underground utility installations within 24 hours or cannot establish the exact location of these installations, the employer may proceed, provided the employer does so with caution, and detection equipment or other acceptable means of locating utility installations are used.

3. The employer is required, while the excavation is open, to ensure that underground installations are protected, supported, or removed to safeguard employees from hazards. (See 1926.651 (b)(2) and (3)).

(b) The CO shall ascertain whether the employer has contacted the appropriate utility companies to establish the location of underground installations that may be encountered.

(c) When excavation operations approach the estimated location of underground installations, the exact location of the underground installation shall be determined by means that are safe to employees. (See 1926.651(b)(4)).

(d) The CO shall determine that undergrounds installations have been protected, supported or removed as necessary to protect employees. (See 1926.651(b)(4)).

(e) The sloped end of a trench, e.g., an earth ramp, may be considered a safe means of egress only if employees are able to walk the ramp in an upright manner when entering or exiting the trench.

1. The CO shall consider such factors as the degree of the slope, depth of the excavation, soil and environmental conditions, and the presence of any obstructions in determining whether or not the earth ramp can be used for safe egress.

2. An employer may not use knotted rope lines to assist employees using sloped areas as access to trenches.

3. OSHA does not consider lifting equipment as “an other safe means of egress”. For example, employees riding in a backhoe basket to either enter or exit trench excavations, is not “other safe means of egress” for purposes of the standard. (See 1926.651(c)(2) and 54 FR 45918 (Oct. 31, 1989)).

(f) The prohibition against employees being under loads handled by lifting or digging equipment includes bath excavated materials and slung loads (pipe, etc.) (See 1926.651(e)).

(g) The CO shall ensure that an adequate warning system has been provided for mobile equipment operating adjacent to or without a clear view of the edge of excavations.

NOTE: This requirement does not apply to equipment used to push spoil back into the excavation for backfilling. (See 1926.651(f)).

(3) Hazardous Atmospheres. In addition to the requirements set forth in Subparts D and E of this part (1926.50 – 1926.107), to prevent exposure to harmful levels of atmospheric contaminants and to ensure acceptable atmospheric conditions, the following additional requirements apply: (See 1926.651(g)).

(a) Air quality tests shall be taken before employees enter excavations more than 4 feet in depth when a hazardous atmosphere exists or could be expected to exist.

(b) Tests shall be conducted as often as necessary to ensure the quality and quantity of the atmosphere. This includes checks for flammable gases and oxygen (O₂) deficiency.

(c) Where hazardous atmospheres exist or may reasonably be expected to exist, emergency rescue equipment must be on the worksite and readily accessible to employees. (See 1926.651(g)(2)(i)).

(d) Daily inspections must be conducted by a competent person. Evidence of the lack of such inspections may include indication of failure of protective systems or employees exposed to hazardous atmospheres. (See 1926.651(k)(1) and (2)).

d. Requirements for Protective Systems.

(1) When the employer has elected to protect employees by sloping, 1926.651(b)(1) requires that the slope be not steeper than 1.5H:1V “unless the employer uses one of the other options....”

The CO must document the depth of the excavation, and the width at the top and bottom.

(2) If the CO observes that a protective system appears inadequate or in danger of failure, the employer’s representative or in danger of failure, the employer’s representative or competent person shall be notified immediately so as to remove any employees in the excavation until such danger of failure has been abated. (See 1926.652(a)(2)).

(3) In evaluating the design of sloping and benching systems, the CO shall refer to the decision chart found in Figure 2 of Appendix F, Selection of Protective System. (See 1926.652(b)(1) through (b)(4)).

(4) In evaluating the design of support systems, shield systems and their protective systems, the CO shall refer to the decision chart found in Figure 3 of Appendix F, Selection of Protection Systems. (See 1926.652(c)(1) through (c)(4)).

(5) The CO shall examine appropriate structural members of any protective system for damage or defects. (See 1926.652(d)(1)).

(6) Observation by COs of excavations beneath the protective system requires confirmation that the support system was designed to resist forces calculated for the full depth of the trench. (See 1926.652(e)(2)(i) and (g)(2)).

e. Appendices in the Standard.

(1) The following compliance guidelines apply whenever COs encounter excavation operations where employers have elected to provide protective systems using the appendices in this standard. The CO shall provide documentation, including soil tests where applicable, to support or reject the employer's decisions on protective systems.

(2) When the employer elects to use sloping option 2 or support option 1, the soils classification procedures are mandatory. Employer guesses or other shortcuts taken in classifying soils do not meet the intent of the standard.

(a) Thus, citations shall be issued where one or more provisions of Appendix A have been violated even if the degree of sloping turns out to be appropriate.

(b) Example: A backhoe operator slopes an excavation at what turns out to be an appropriate slope, but the operator is not a competent person within the meaning of the standard, and his determination was not based on both one visual and one manual test. 1926.652(a) will be cited, but the gravity of the violation will be reduced. (See 1926.652(a)(1)).

f. Appendix A to Subpart P-Soil Classification. This appendix describes a method of classifying soil and rock deposits based on site and environmental conditions and on the structure and compaction of earth deposits. Appendix A contains further definition directly related to soil classification.

(1) The classification of soil and rock deposits shall be made based on the results of at least one visual and one manual test.

(a) Such analysis shall be conducted by a competent person using the tests described in paragraph (d) of this appendix.

(b) The specific soil tests referenced in this Appendix are given as examples for an employer to use in making a soil classification. However, other recognized methods of soil classification and testing, such as those adopted by the American Society for Testing Materials (ASTM), are acceptable for purposes of compliance with the standard.

(c) The competent person conducting the soil classification may not base a classification by "feeling" the strength or composition of the soil through the use of heavy equipment.

1. This method is not an acceptable “other recognized method” of soil classification and testing contemplated by Appendix A, (c)(2).
2. OSHA believes this is too indirect a method to classify properly the qualitative as well as the quantitative properties of soil.
3. For example, an employer may not classify the soil as Type A solely because its backhoe experienced difficulty digging the excavation.

(2) Each soil and rock deposit shall have been classified by a competent person as either stable rock, Type A, Type B, or Type C in accordance with the definitions set forth in paragraph (b) of Appendix A.

(3) In a layered system, the system shall have been classified in accordance with its weakest layer. However, each layer may be classified individually where a more stable layer lies under a less stable layer.

(4) If, after classifying soils and rock deposits, the properties, factors, or conditions affecting its classification change in any manner, such as after a rainstorm, such changes shall have been evaluated by the competent person on site. The soil and rock deposits shall have been reclassified as necessary to reflect any changed circumstances.

g. Appendix B to Subpart P – Sloping and Benching. Under Section (c)(3)(ii) of this Appendix, whenever surcharge loads from stored material or equipment, operating equipment, or traffic are to be present, the competent person’s determination of the degree to which the actual slope must be reduced below the maximum allowable slope shall have been based on the requirements set forth in (c)(3)(ii). The requirement to slope back in accordance with (c)(3)(ii) shall be triggered in situations where the surcharge loads cause signs of distress.

h. Appendix C to Subpart P – Tables. The compliance officer shall note that Tables C-1.1-1.3 are actual size measurements based on mixed oak or equivalent with a bending strength not less than 850 psi. On the other hand, Tables C-2.1, 2.2 and 2.3 are nominal (S4S- Surface 4 Sides) measurements based on Douglas fir or equivalent with a bending strength not less than 1500 psi.

i. Appendix D to Subpart P- Aluminum Hydraulic Shoring for Trenches. This Appendix contains criteria that can be used when aluminum hydraulic shoring is to be used as a method of protection in trenches not exceeding 20 feet in depth, in the absence of manufacturer’s tabulated data. The appendix is provided for those situations where manufacturer’s data, permitted under paragraph 1926.652(c)(2), has been lost or is otherwise not available. When referenced, Appendix D must be used in conjunction with Appendix A.

D. Citation Policy

1. If the employer attempted sloping, but the sloping is inadequate, a grouped violation [(1926.652(a) and 1926.652(b)] shall be issued.
2. If the employer attempted to use and is not in compliance with support systems, shield systems or other protective systems, a grouped violation, 1926.652(a) and (c) shall be issued.
3. Violations shall be classified in accordance with the Compliance Manual.

E. Other

1. Soil analysis is required if the employer elects to use option #2 under 652(b) or option #1 under support systems 652(c).
2. Violations involving head protection will be cited under 1926.100
3. Violations for means of egress from trenches will be cited under 1926.651(c)(2). For excavations cite 1926.450(a)(1).
4. Section 1926.651(f) does not apply to equipment being used to dig the trench.
5. All excavations greater than 20 feet deep shall be designed by a registered professional engineer.
 - (a) When sloping or benching cite 1926.652(b)(4). Enter in the “as follows” that excavation ____ feet deep was not designed by RPE in accordance with Appendix B.
 - (b) When timber shoring is used cite 1926.652(c)(4). Enter in the “as follows” that shoring in excavation ____ feet deep was not designed by RPE in accordance with Appendix C.
6. Excavated material, equipment or supplies not stored at least 2 feet from edge of excavation. 1926.651 (j)(2).
7. Employee working under loads handled by lifting or digging equipment. 1926.651 (e).
8. No warning system, barricade, stop log to keep mobile equipment from falling into excavation. 1926.651 (f).
9. No competent person on site. 1926.651 (k)(1).