



**DEPARTMENT OF BUSINESS AND INDUSTRY
DIVISION OF INDUSTRIAL RELATIONS
OCCUPATIONAL SAFETY & HEALTH ADMINISTRATION**

DATE: January 30, 2024
TO: Affected Employers in the Excavation/Trenching Industries
FROM: William Gardner, Chief Administrative Officer *wg* 1/30/2024
SUBJECT: Nevada OSHA Interpretation of Employer Responsibilities Under 29 CFR 1926.652(b)(4)

Do employers have a responsibility to ensure that an excavation plan designed by a registered professional engineer is compliant with 29 CFR 1926.652(b)(4)?

Trenching and excavation work presents serious hazards to all workers involved. Cave-ins pose the greatest risk and are more likely than some other excavation-related incidents to result in worker fatalities. The Nevada Occupational Safety and Health Administration (Nevada OSHA) enforces excavation standards contained in 29 Code of Federal Regulations (CFR) Part 1926, Subpart P.

29 CFR 1926.652(a)(1) requires that each employee in an excavation be protected from cave-ins by an adequate protective system except when excavations are made entirely in stable rock, or excavations are less than 5 feet in depth and examination of the ground by a competent person provides no indication of a potential cave-in. Paragraphs (b) and (c) of 29 CFR 1926.652 provide protection options that include, but are not limited to, adequate sloping, benching, shoring, shielding, and designs by a registered professional engineer.

It is the opinion of the Chief Administrative Officer of the Nevada Occupational Safety and Health Administration that when an employer relies on a protective system under 29 CFR 1926.652(b)(4), consisting of sloping and benching systems designed by a registered professional engineer during the scope of excavation activities, **the employer is responsible for ensuring that the content of the design plan is in compliance with 29 CFR 1926.652(b)(4)(i) – 29 CFR 1926.652(b)(4)(iii)**. These requirements are highlighted in yellow in the “Applicable Regulations” section below.

Moreover, as there is a substantial probability that death or serious physical harm could result from violations involving cave-in hazards, particularly in excavations at or over five feet in depth, citations will generally be classified as serious. It is also important to note that engineered designs created and implemented after employees have worked inside excavations will not absolve the employer of violations stemming from previous employee exposure(s).

Applicable Regulations

29 CFR 1926.652(a)(1) requires that each employee in an excavation must be protected from cave-ins by an adequate protective system designed in accordance with 29 CFR 1926.652(b) and (c) except when:

- The excavation is made entirely in stable rock; or
- The excavation is less than 5 feet (1.52m) in depth and examination of the ground by a competent person provides no indication of a potential cave in.

Pursuant to 29 CFR 1926.652(b), when the above conditions do not apply, an employer must select and construct sloping and benching systems in accordance with the slopes and configuration requirements of 29 CFR 1926.652(b)(1), (2), (3), or (4).

- 29 CFR 1926.652(b)(1) – Option (1)- Allowable configurations and slopes.
 - (b)(1)(i) - Excavations shall be sloped at an angle not steeper than one and one-half horizontal to one vertical (34 degrees measured from the horizontal), unless the employer uses one of the other options listed below.
 - (b)(1)(ii) - Slopes specified in paragraph (b)(1)(i) of this section, shall be excavated to form configurations that are in accordance with the slopes shown for Type C soil in appendix B to this subpart.
- 29 CFR 1926.652(b)(2) – Option (2)- Determination of slopes and configurations using Appendices A and B. Maximum allowable slopes, and allowable configurations for sloping and benching systems, shall be determined in accordance with the conditions and requirements set forth in appendices A and B to this subpart.
- 29 CFR 1926.652(b)(3) – Option (3)- Designs using other tabulated data.
 - (b)(3)(i) - Designs of sloping or benching systems shall be selected from and be in accordance with tabulated data, such as tables and charts.
 - (b)(3)(ii) - The tabulated data shall be in written form and shall include all of the following:
 - (b)(3)(ii)(A) - Identification of the parameters that affect the selection of a sloping or benching system drawn from such data;
 - (b)(3)(ii)(B) - Identification of the limits of use of the data, to include the magnitude and configuration of slopes determined to be safe;
 - (b)(3)(ii)(C) - Explanatory information as may be necessary to aid the user in making a correct selection of a protective system from the data.
 - (b)(3)(iii) - At least one copy of the tabulated data which identifies the registered professional engineer who approved the data, shall be maintained at the jobsite during construction of the protective system. After that time the data may be stored off the jobsite, but a copy of the data shall be made available to the Secretary upon request.
- 29 CFR 1926.652(b)(4) – Option (4)- Design by a registered professional engineer.
 - (b)(4)(i) - Sloping and benching systems not utilizing Option (1) or Option (2) or Option (3) under paragraph (b) of this section shall be approved by a registered professional engineer.
 - (b)(4)(ii) - Designs shall be in written form and shall include at least the following:
 - (b)(4)(ii)(A) - The magnitude of the slopes that were determined to be safe for the particular project;
 - (b)(4)(ii)(B) - The configurations that were determined to be safe for the particular project; and
 - (b)(4)(ii)(C) - The identity of the registered professional engineer approving the design.
 - (b)(4)(iii) - At least one copy of the design shall be maintained at the jobsite while the slope is being constructed. After that time the design need not be at the jobsite, but a copy shall be made available to the Secretary upon request.

Employer Guidance

An employer that makes the decision to select and construct the sloping and benching system based on a review of a design by a registered professional engineer pursuant to 29 CFR 1926.652(b)(4) must:

- Ensure that the design used is approved by a registered professional engineer pursuant to 29 CFR 1926.652(b)(4)(i)
 - An employer can verify the license status of a registered professional engineer by going to the Board of Professional Engineers and Land Surveyors website below.
- Ensure that the design contains, at minimum, the requirements outlined in 29 CFR 1926.652(b)(4)(ii)
- Maintain a copy of the design on-site when the excavation is being made pursuant to 29 CFR 1926.652(b)(4)(iii).
 - e.g., when the employer is making an excavation as defined by 29 CFR 1926.650.

Enforcement Guidance

Nevada OSHA conducts inspections of trenches and excavations in accordance with [CPL 02-00-161](#) National Emphasis Program on Trenching and Excavations.

During the scope of an inspection, when an employer indicates that the sloping and benching system was designed based on the parameters of an engineered design, the compliance officer may:

- Request a copy of the engineer's report and design specifications and verify compliance with 29 CFR 1926.652(b)(4).
- Make contact with the engineer identified on the report to verify the following:
 - The location where work was observed was within the scope of the engineer's report.
 - The conditions and configurations identified on the jobsite are consistent with the engineer's report.
- Obtain a soil sample from the excavation and verify that the soil characteristics match what is identified on the engineer's report.
 - The soil sample will be sent to an approved testing center.
- Verify the engineer on the report is currently licensed by the Board of Professional Engineers and Land Surveyors.
 - When an engineer is determined to not be licensed for the date listed on the report, a referral will be made to the aforementioned board.

References

Federal OSHA Publication 2226 - Trenching and Excavation Safety

Link: <https://www.osha.gov/sites/default/files/publications/osha2226.pdf>

Compliance Directive CPL 02-00-161 - National Emphasis Program on Trenching and Excavation

Link: <https://www.osha.gov/enforcement/directives/cpl-02-00-161>

Board of Professional Engineers and Land Surveyors Verification Page

Link: <https://nvbpels.org/find-engineers-land-surveyors/>