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Trench and Excavation Hazards:

Insight on Newly Acquired Data and Managing the Risks

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Session: 113

Trench and Excavation Hazards: Insight on Newly Acquired Data and Managing the Risks

Speakers:

Joe Wise, Regional Customer Training Manager, United Rentals

Eileen Betit, Research to Practice Director, CPWR-The Center for Construction Research and Training

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Topics

- Department of Labor Directive
- Underground Construction Safety Overview
- The Competent Person
- Required Training & Compliant Solutions
- Discoveries from CPWR Trench Survey

Department of Labor Directive

OSHA INSTRUCTION

U.S. DEPARTMENT OF LABOR

Occupational Safety and Health Administration

DIRECTIVE NUMBER: CPL-02-00-161 | EFFECTIVE DATE: 10/1/2018

SUBJECT: National Emphasis Program on Trenching and Excavation

ABSTRACT

Purpose: This instruction, *National Emphasis Program on Trenching and Excavation*, describes policies and procedures for continued implementation of an OSHA National Emphasis Program (NEP) to identify and to reduce hazards which are causing or likely to cause serious injuries and fatalities during trenching and excavation operations.

- OSHA is targeting workplaces of potential trench and excavation hazards for not only site inspections, but also for safety training outreach
- OSHA is working with industry associations and public utilities to create a public/private effort to impact worker safety
- OSHA will be updating their information system (OIS) to track abated trench and excavation hazards

Underground Construction Safety Overview

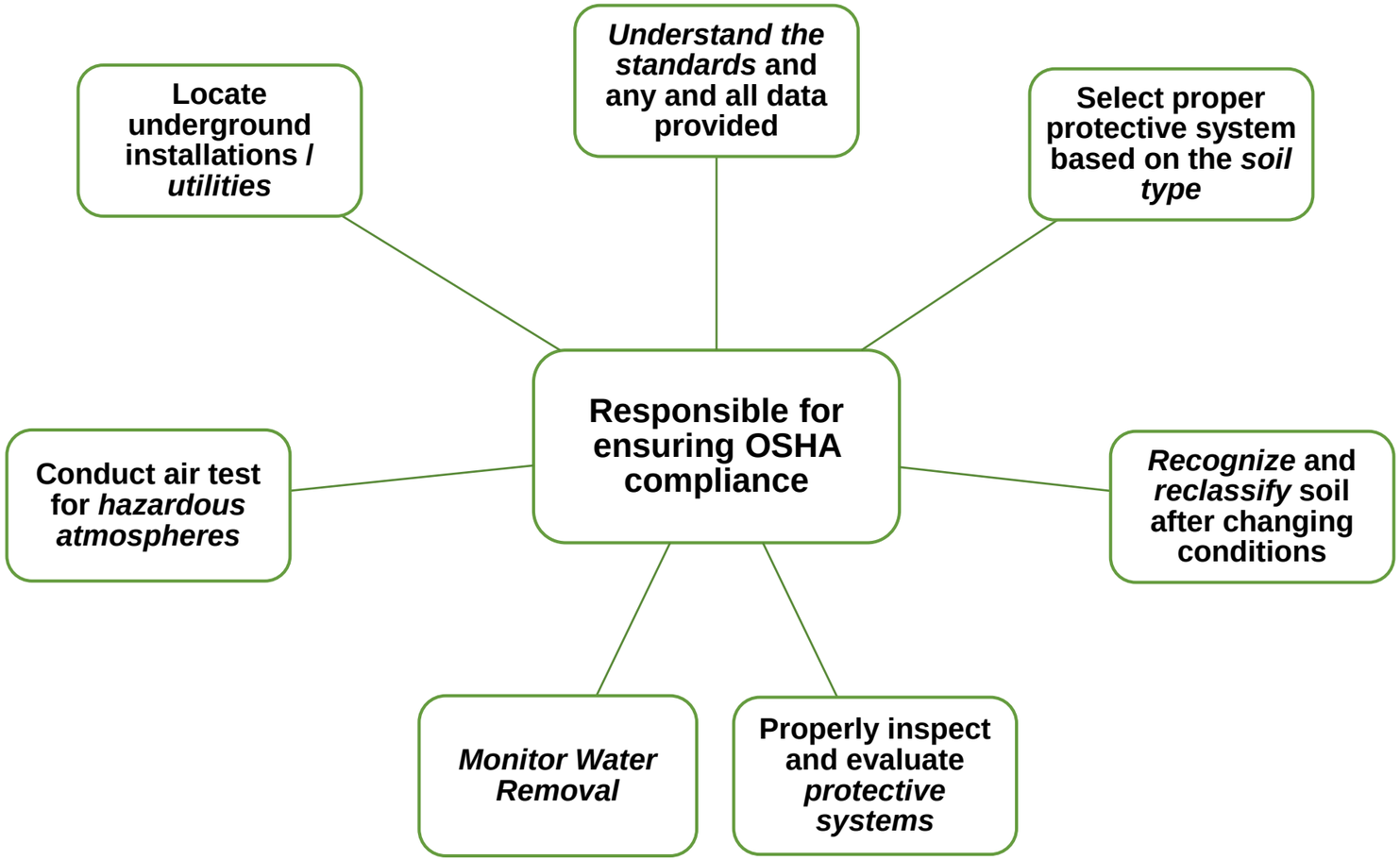
- Cave-Ins Are Preventable
- Injuries/Fatalities Occur Due To Lack Of Knowledge
- Injuries/Fatalities Occur Due To Willful Disregard
- Owners/Engineers/Supervisors/Foremen/ Competent Persons Are Held Accountable
- The Competent Person

The Competent Person

Definition 1926.650

The competent person is defined as 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 the authorization to take prompt corrective measures to eliminate them.

Competent Person - Responsibilities

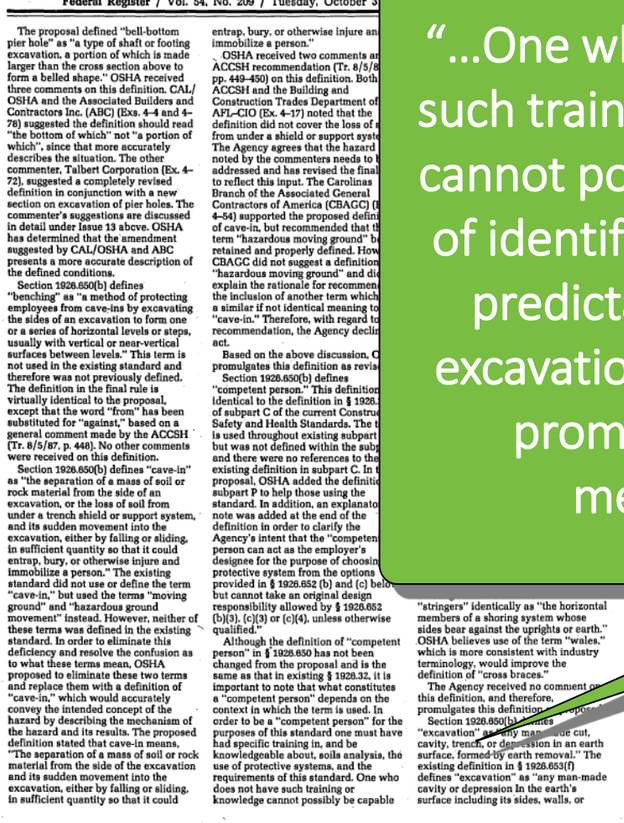


Competent Person - Duties

- All employees shall be protected from cave-ins (1926.652)(a)
  - Protective system mandatory at 5’ or more
  - Shallower if inspection yields potential for cave-in
- Protective system must have capacity to resist loads without failure
- Shield systems must not be subjected to loads exceeding design

Competent Person – Required Training

- Soils Analysis
- Use of protective systems
- Requirements of the standard 1926 Subpart P



Federal Register / Vol. 54, No. 209 / Tuesday, October 3

The proposal defined "bell-bottom pier hole" as "a type of shaft or footing excavation, a portion of which is made larger than the cross section above to form a belled shape." OSHA received three comments on this definition. CAL/OSHA and the Associated Builders and Contractors Inc. (ABC) (Exs. 4–4 and 4–78) suggested the definition should read "the bottom of which" not "a portion of which", since that more accurately describes the situation. The other commenter, Talbert Corporation (Ex. 4–72), suggested a completely revised definition in conjunction with a new section on excavation of pier holes. The commenter's suggestions are discussed in detail under issue 13 above. OSHA has determined that the amendment suggested by CAL/OSHA and ABC presents a more accurate description of the defined conditions.

Section 1926.650(b) defines "benching" as "a method of protecting employees from cave-ins by excavating the sides of an excavation to form one or a series of horizontal levels or steps, usually with vertical or near-vertical surfaces between levels." This term is not used in the existing standard and therefore was not previously defined. The definition in the final rule is virtually identical to the proposal, except that the word "from" has been substituted for "against," based on a general comment made by the ACCSH (Tr. 8/5/87, p. 448). No other comments were received on this definition.

Section 1926.650(b) defines "cave-in" as "the separation of a mass of soil or rock material from the side of an excavation, or the loss of soil from under a trench shield or support system, and its sudden movement into the excavation, either by falling or sliding, in sufficient quantity so that it could entrap, bury, or otherwise injure and immobilize a person." The existing standard did not use or define the term "cave-in," but used the terms "moving ground" and "hazardous ground movement" instead. However, neither of these terms was defined in the existing standard. In order to eliminate this deficiency and resolve the confusion as to what these terms mean, OSHA proposed to eliminate these two terms and replace them with a definition of "cave-in," which would accurately convey the intended concept of the hazard by describing the mechanism of the hazard and its results. The proposed definition stated that cave-in means, "The separation of a mass of soil or rock material from the side of the excavation and its sudden movement into the excavation, either by falling or sliding, in sufficient quantity so that it could entrap, bury, or otherwise injure an immobilize a person."

OSHA received two comments ar ACCSH recommendation (Tr. 8/5/8 pp. 449–450) on this definition. Both ACCSH and the Building and Construction Trades Department of AFL-CIO (Ex. 4–17) noted that the definition did not cover the loss of s from under a shield or support syste The Agency agrees that the hazard noted by the commenters needs to addressed and has revised the final to reflect this input. The Carolinas Branch of the Associated General Contractors of America (CBAGC) (4–54) supported the proposed defini of cave-in, but recommended that t term "hazardous moving ground" b retained and properly defined. How CBAGC did not suggest a definition "hazardous moving ground" and di explain the rationale for recommen the inclusion of another term which a similar if not identical meaning to "cave-in." Therefore, with regard t recommendation, the Agency declin act.

Based on the above discussion, C promulgates this definition as revis

Section 1926.650(b) defines "competent person." This definition identical to the definition in § 1926. of subpart C of the current Construc Safety and Health Standards. The t is used throughout existing subpart but was not defined within the subp and there were no references to the existing definition in subpart C. In t proposal, OSHA added the definiti subpart P to help those using the standard. In addition, an explanato note was added at the end of the definition in order to clarify the Agency's intent that the "competen person can act as the employer's designee for the purpose of choosin protective system from the options provided in § 1926.652 (b) and (c) belo but cannot take an original design responsibility allowed by § 1926.652 (b)(3), (c)(3) or (c)(4), unless otherwise qualified."

Although the definition of "competent person" in § 1926.650 has not been changed from the proposal and is the same as that in existing § 1926.32, it is important to note that what constitutes a "competent person" depends on the context in which the term is used. In order to be a "competent person" for the purposes 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. One who does not have such training or knowledge cannot possibly be capable

"stringers" identically as "the horizontal members of a shoring system whose sides bear against the uprights or earth." OSHA believes use of the term "wales," which is more consistent with industry terminology, would improve the definition of "cross braces."

The Agency received no comment on this definition, and therefore, promulgates this definition as propos

Section 1926.650(b) defines "excavation" as "any man-made cut, cavity, trench, or depression in an earth surface, formed by earth removal." The existing definition in § 1926.653(f) defines "excavation" as "any man-made cavity or depression in the earth's surface including its sides, walls, or

> "…One who does not have such training or knowledge cannot possibly be capable of identifying existing and predictable hazards in excavation work or taking prompt corrective measures…"

5 OSHA Compliant Solutions

Charts and Tables

1. Sloping and Benching
   Appendix B
2. Timber Shoring
   Appendix C
3. Aluminum Hydraulics
   Appendix D

Registered Professional Engineer

4. Manufacturer's Tabulated Data
5. Site-Specific Engineering

OSHA Charts valid only to 20'

Any deviation to OSHA Charts or Tabulated Data requires written PE approval regardless of depth

Trench Survey

OSHA-NIOSH-CPWR r2p Working Group

- *OSHA Construction Directorate*
- *NIOSH Office of Construction Safety and Health*
- *CPWR Research to Practice (r2p) Program*

Ruth Ruttenberg & Associates

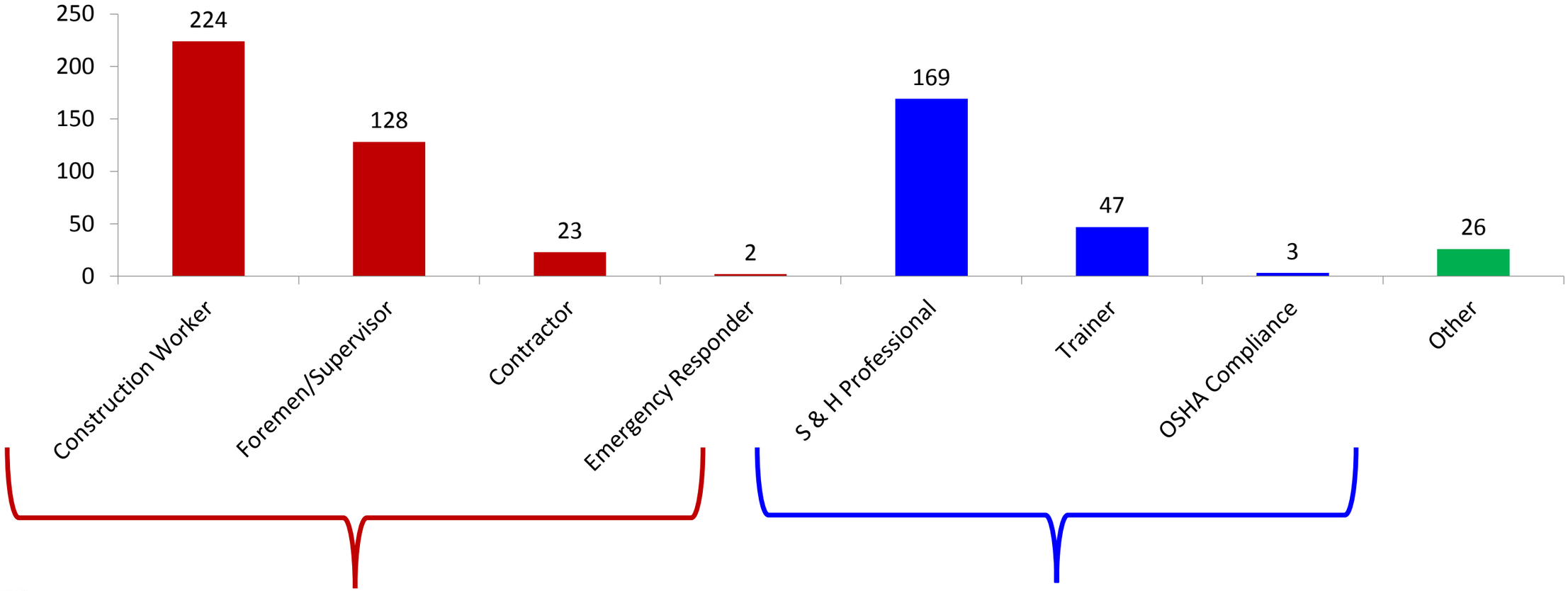
United Rentals

Speed Shore, Inc.

Trench Survey Responses

Sample	# Surveyed	# Responses	Response Rate
United Rentals – (Excavation Safety Training Classes)	461	411	89.2%
CPWR Outreach Database (convenience sample)	3,162	226	7.1%
Total	3,623	637	17.6%

Participants by current position

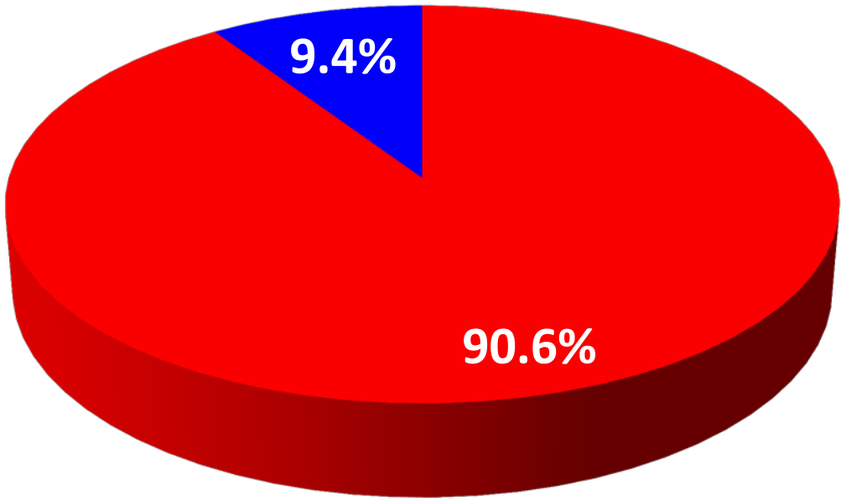


Perform Trench Work - "Industry" Group = 60.6%

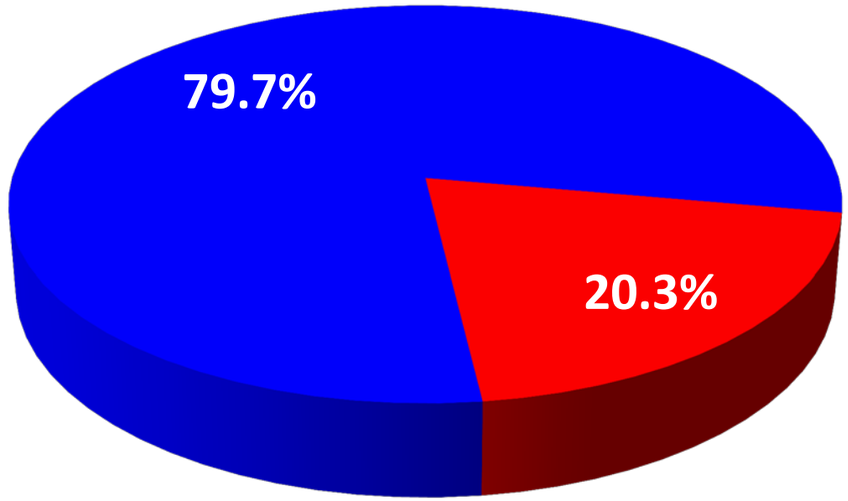
"Safety & Health" Group = 35.2%

Construction establishments by employment size compared to the size of survey participants' employers

Construction Industry

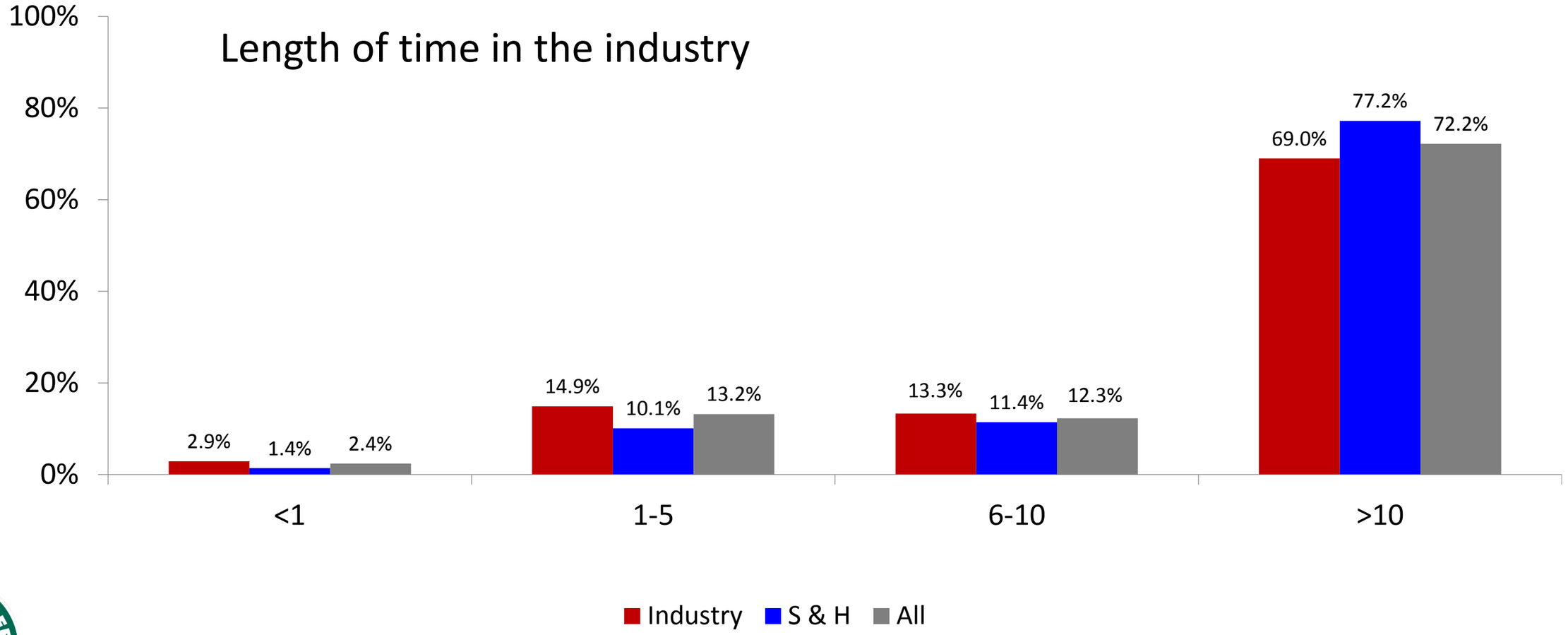


Survey Participants

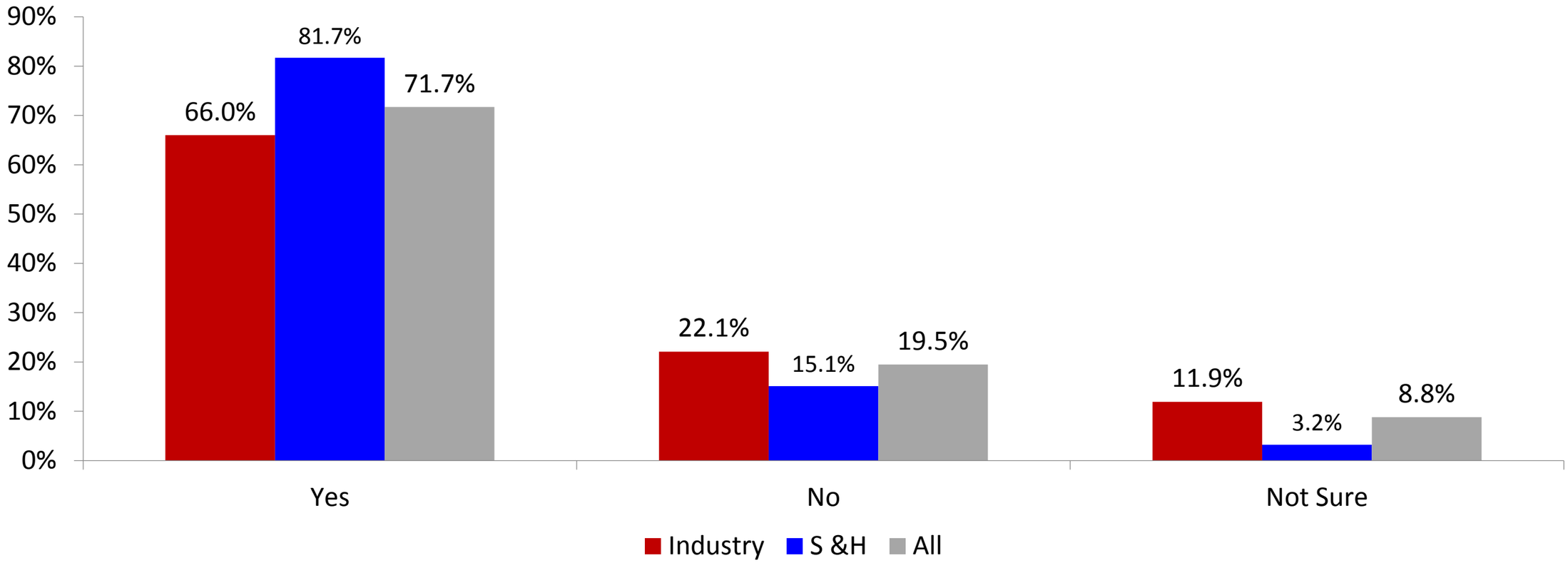


Source: CPWR Quarterly Data Report; 3rd Q 2018, Figure 1

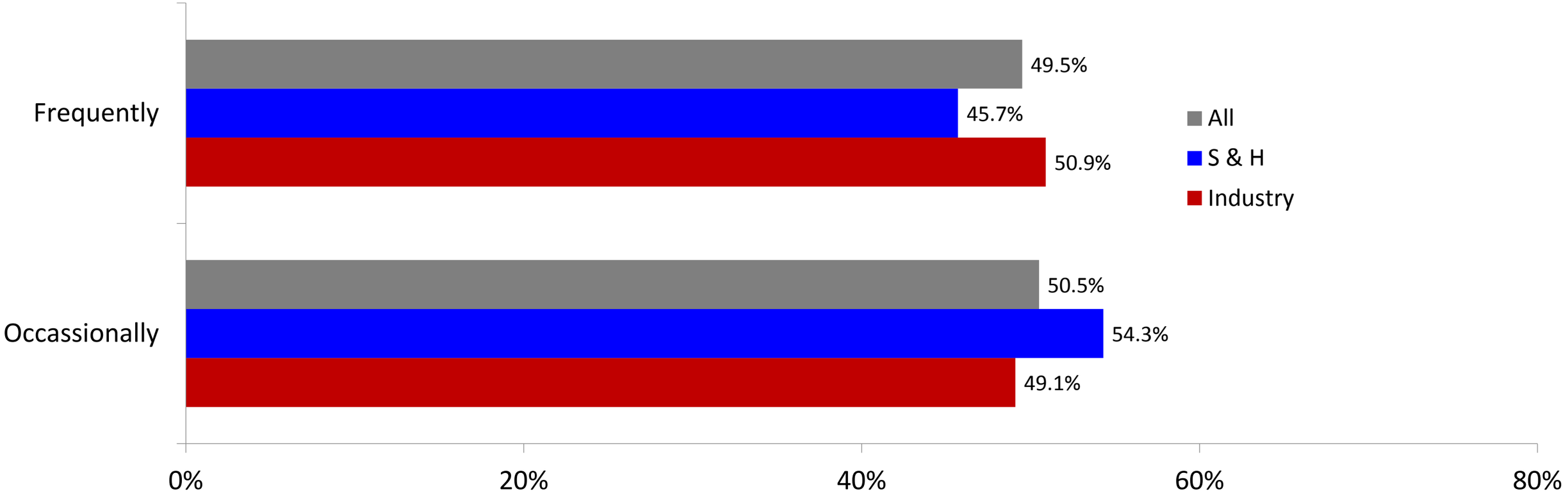
Participants' industry experience



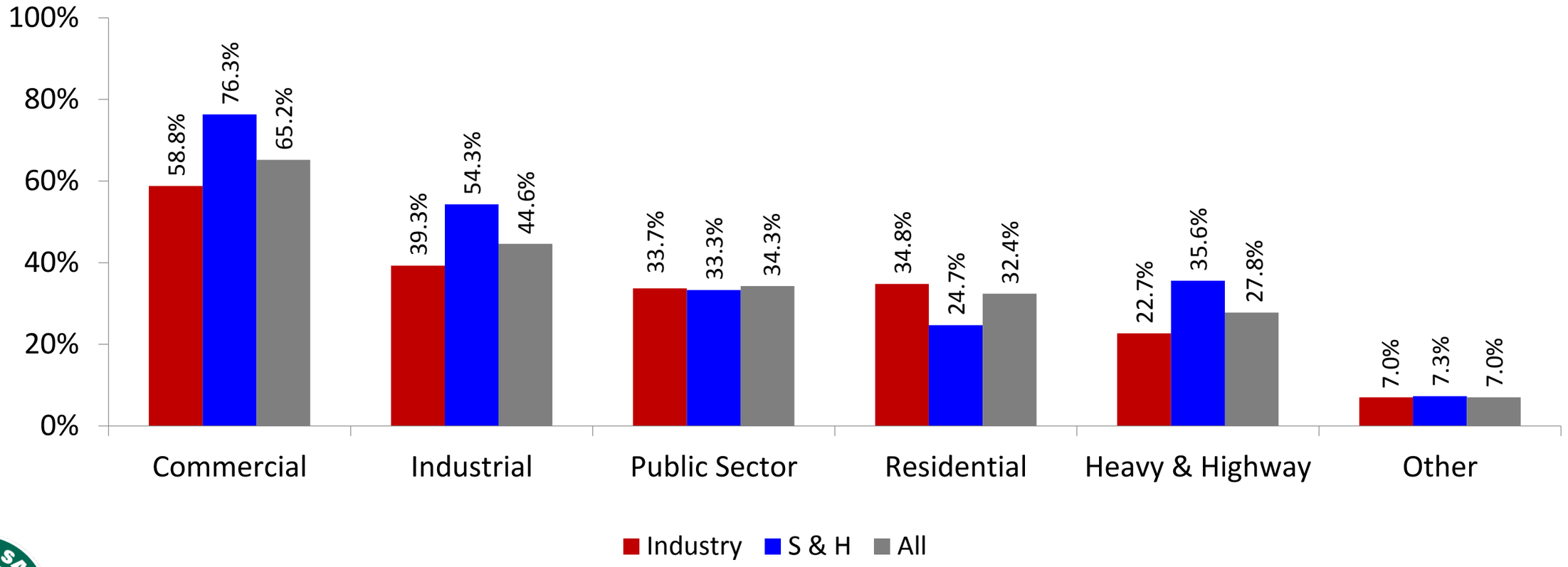
Do you qualify as a competent person for trench work?



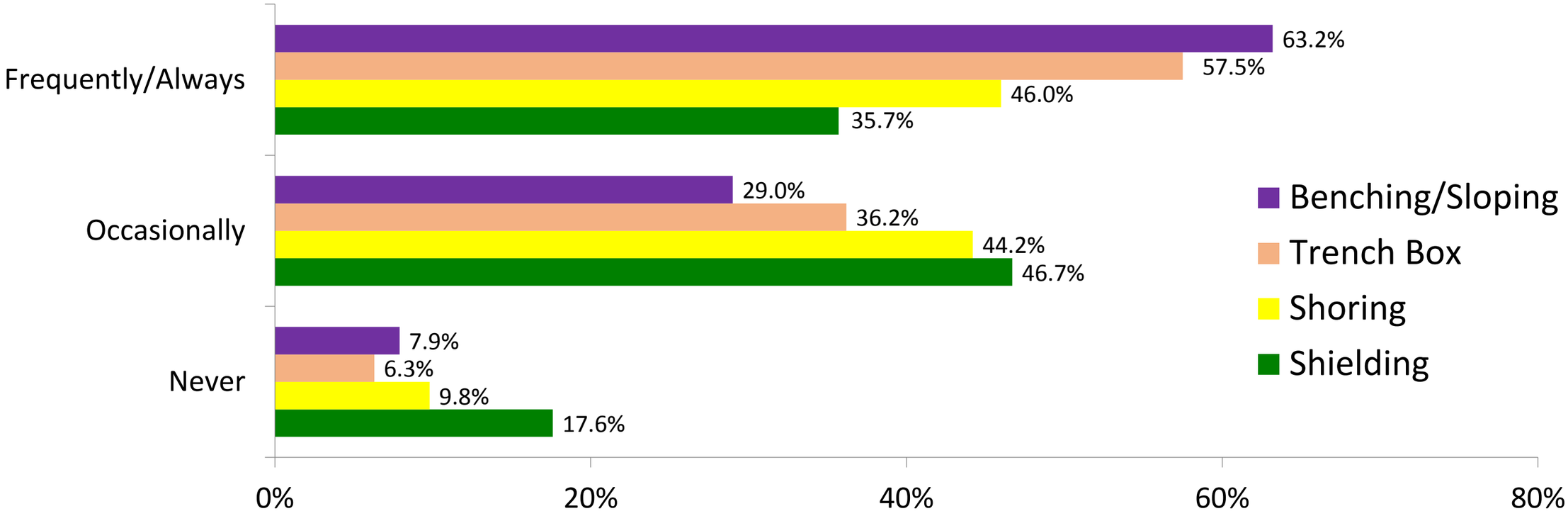
All participants engage in work that involves trenching



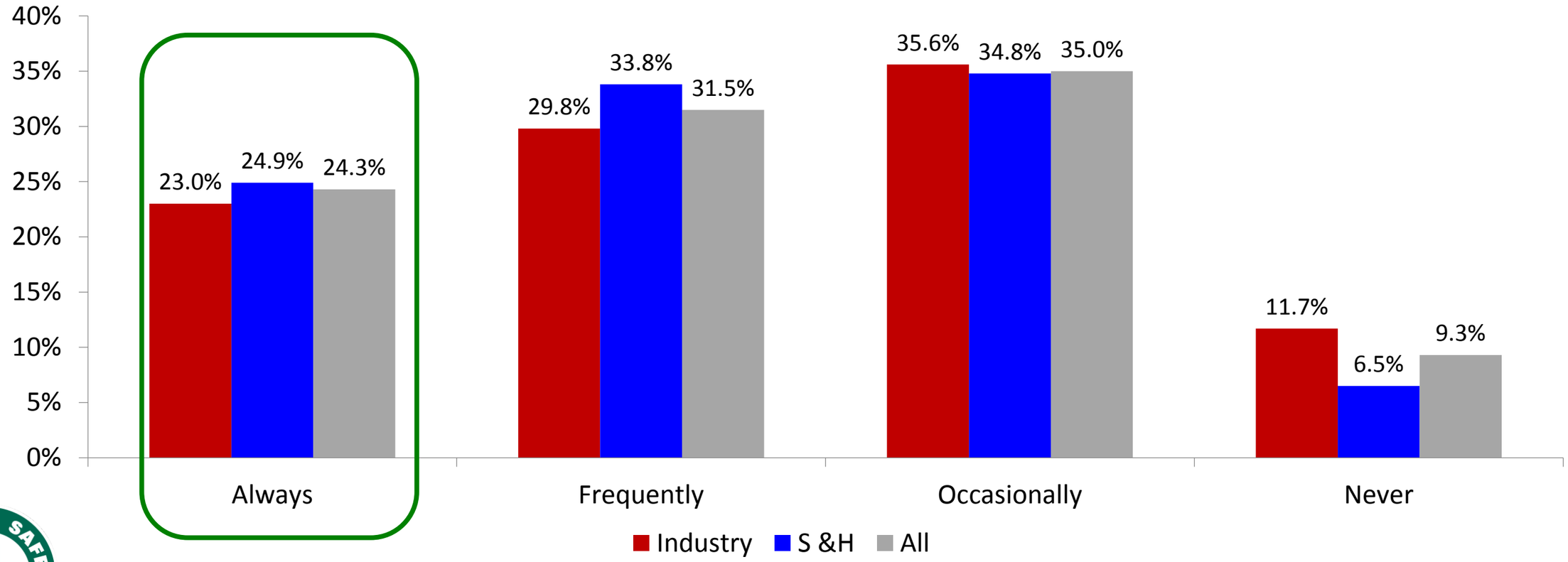
Types of projects participants work on where trenching occurs



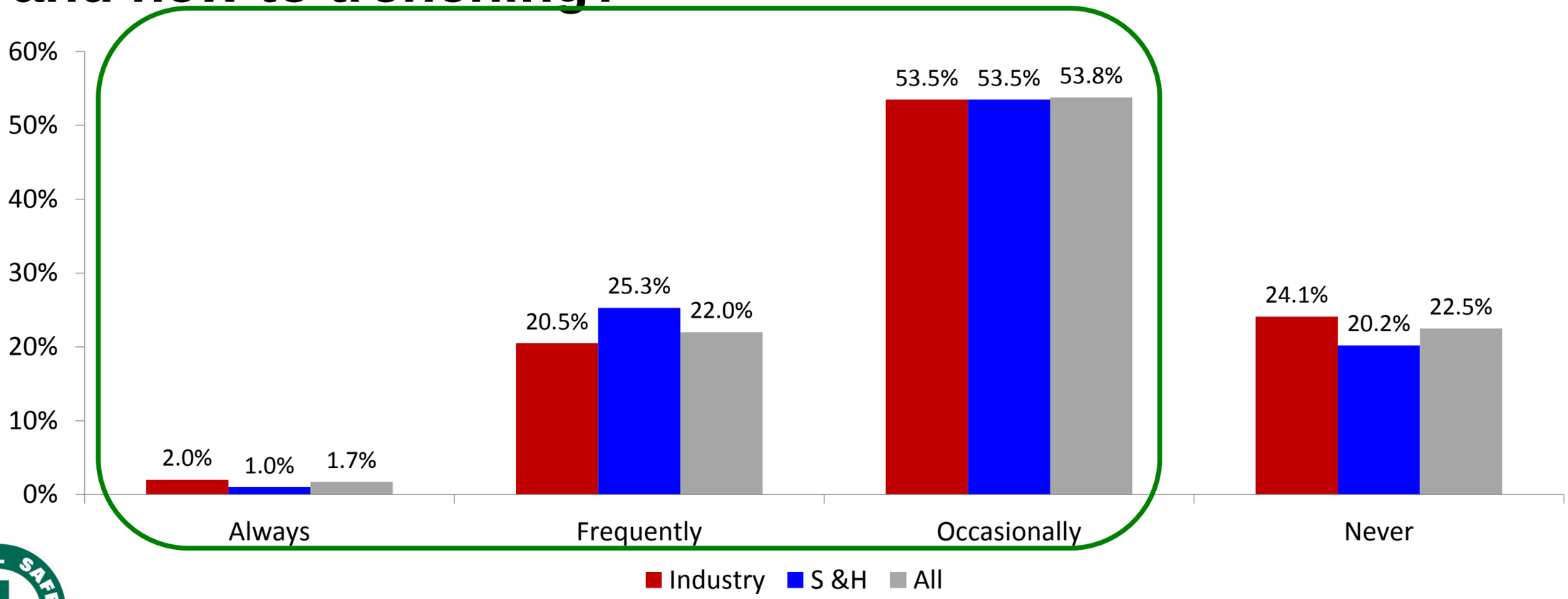
Types of trench protection seen most often



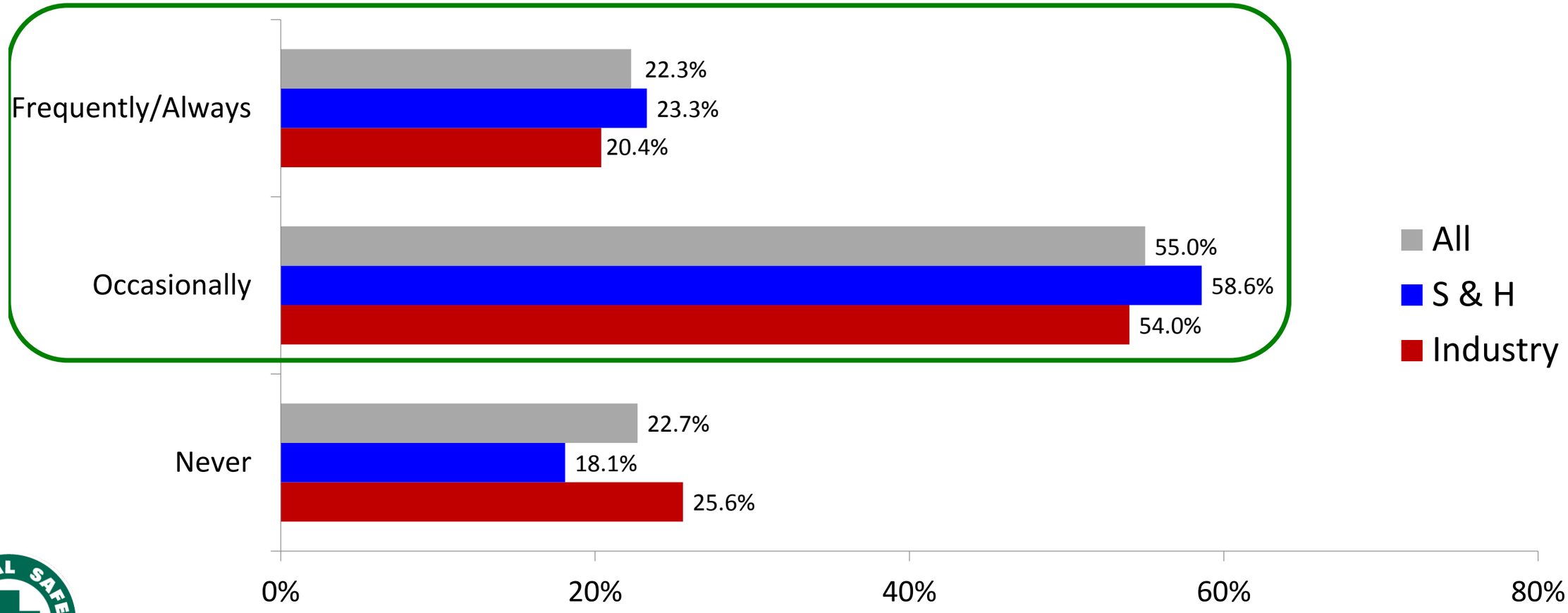
Is there sufficient pre-planning for trench work, with soil testing and trench protection needs addressed?



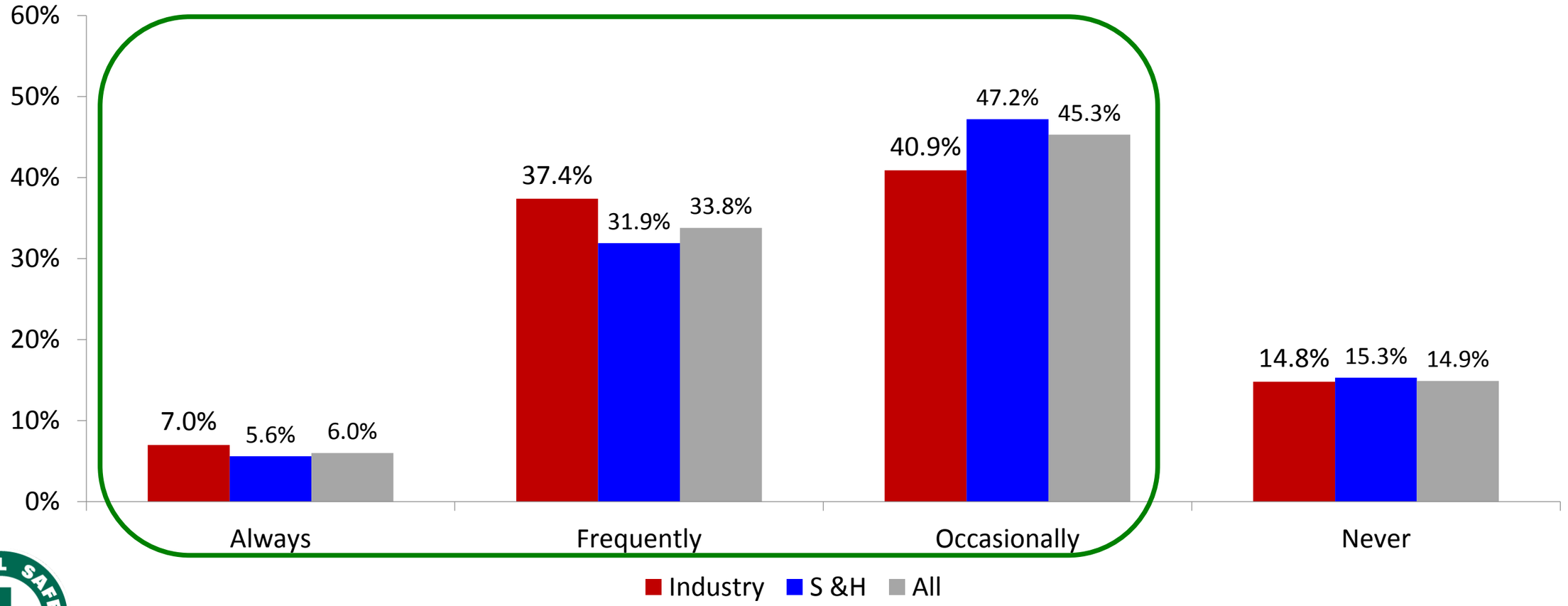
Do you see incidents where companies are inexperienced and new to trenching?



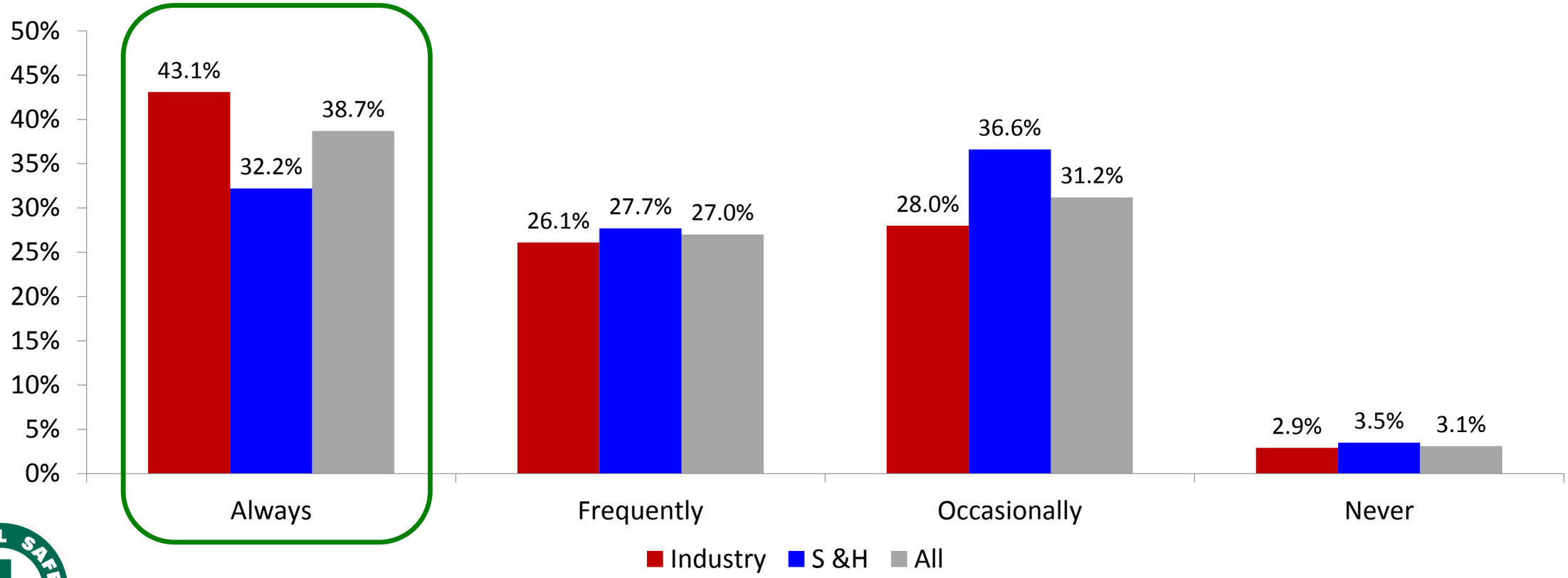
How often do they see no protection …



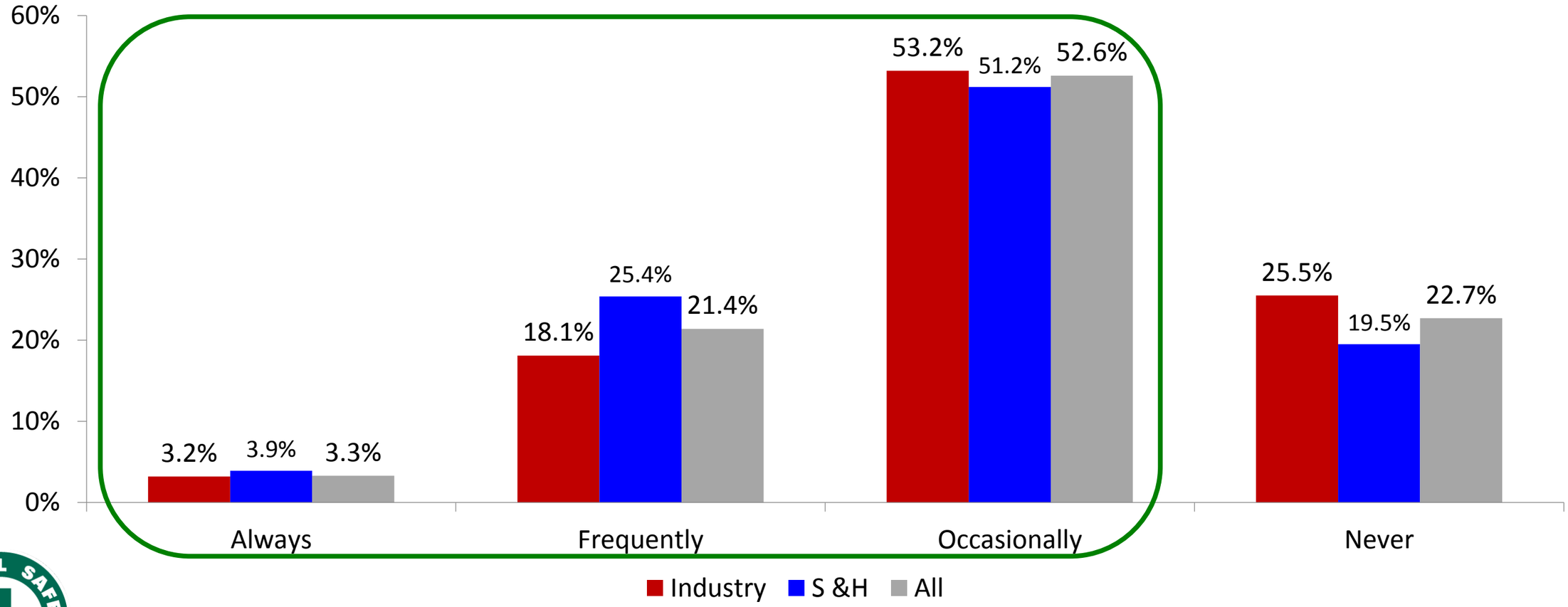
How often, when there was a collapse, did you see cross trenching or conduits or other signs that the soil had been previously disturbed?



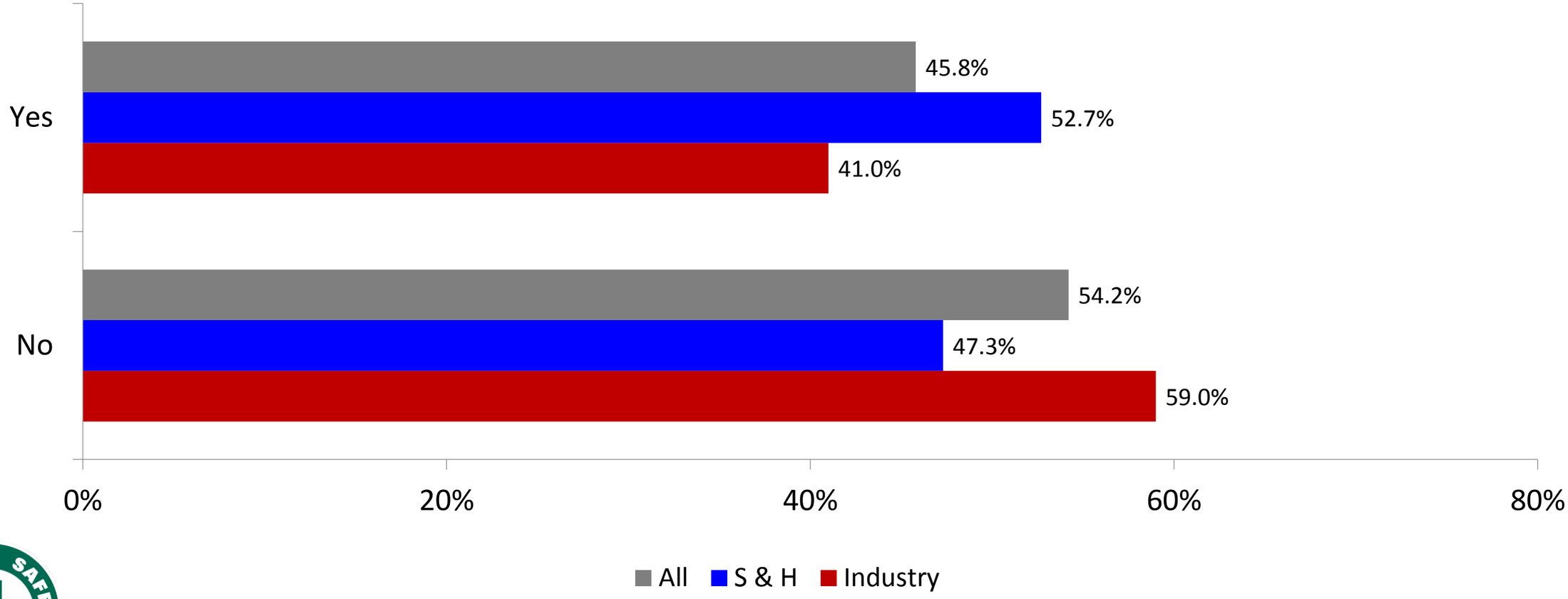
Is there a competent person trained in trenching on the job site?



Do you see incidents where new workers are exposed to trench/ excavation work without proper competent person supervision?

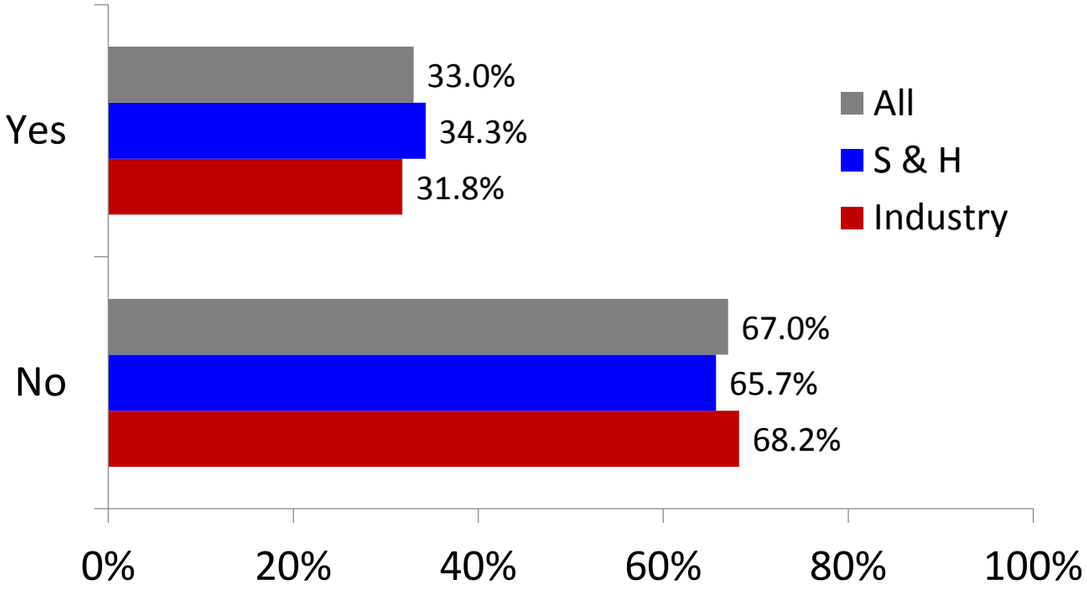


Have you or a co-worker ever refused to enter a trench because of unsafe conditions?

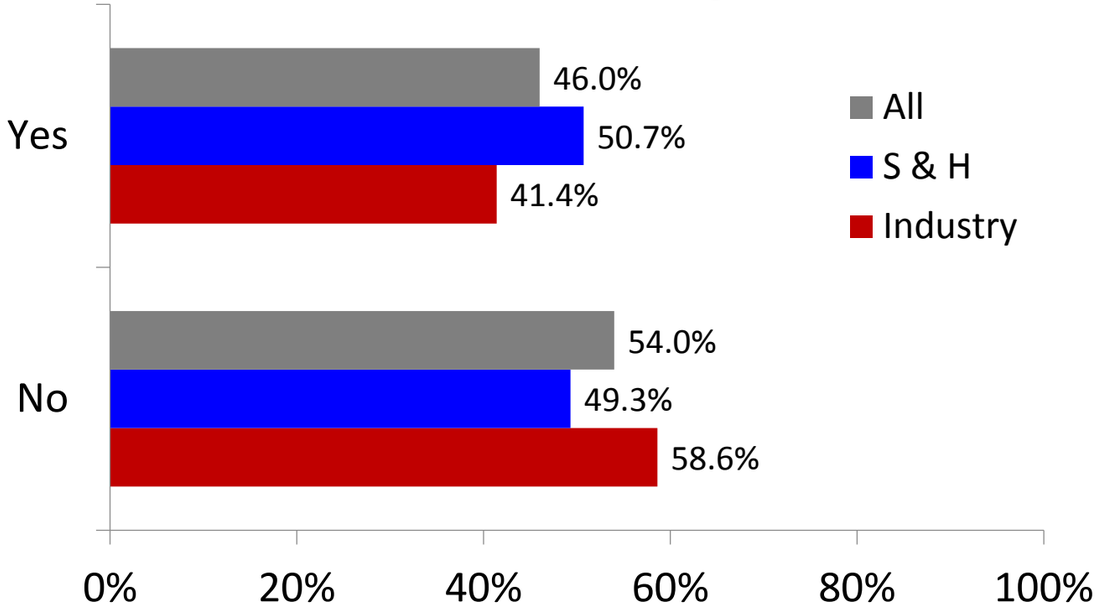


Experience with trench collapses and conditions

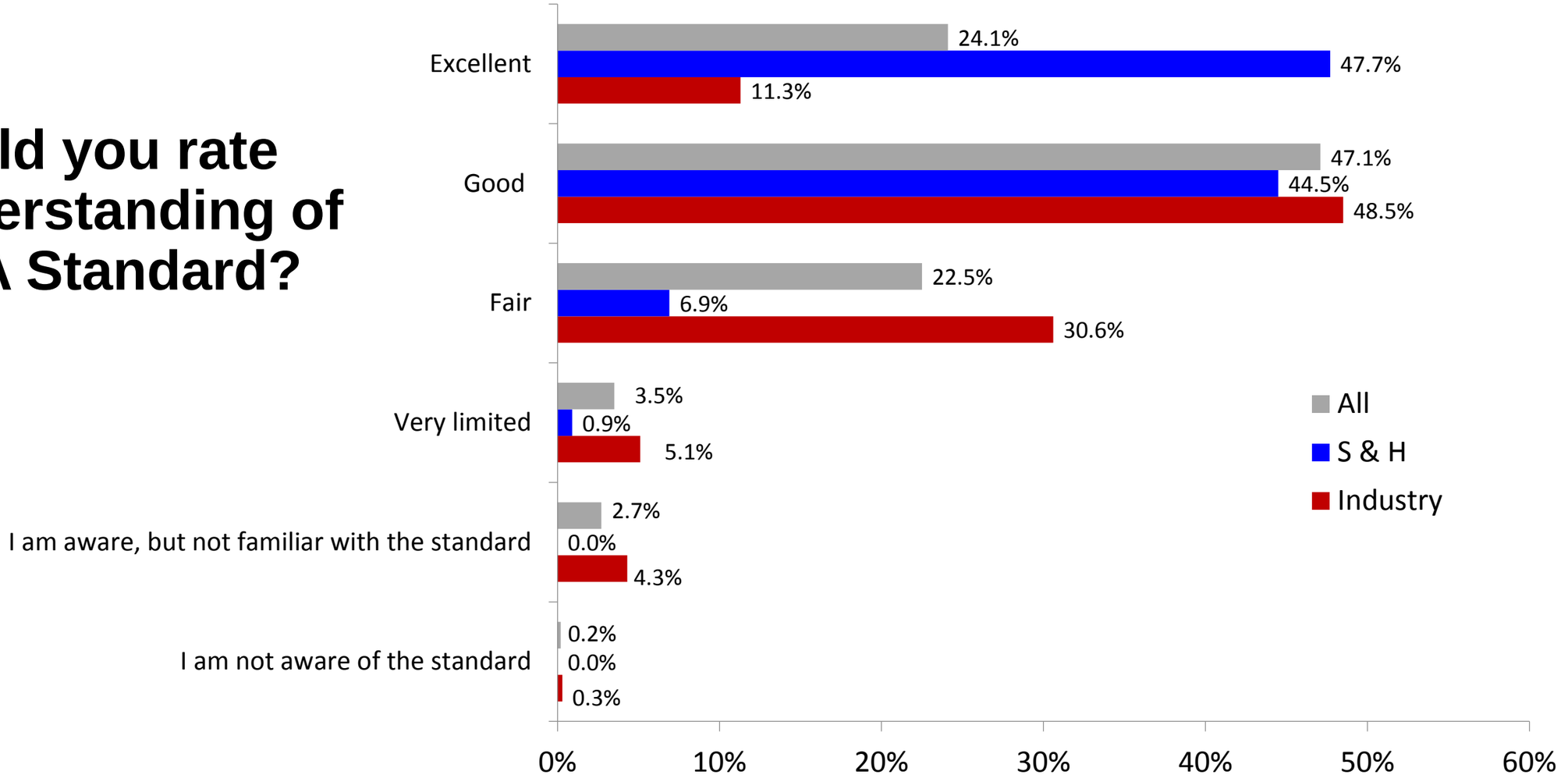
Have you ever been involved, witnessed, or inspected a trench collapse?



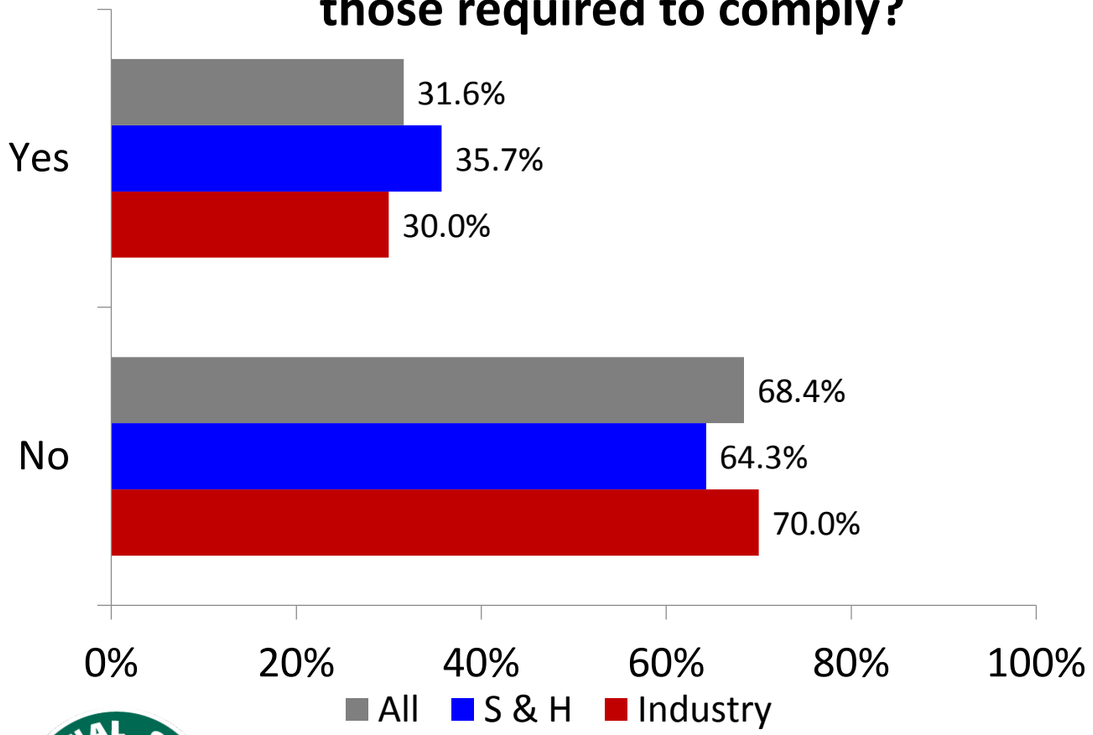
(If experience with a trench collapse) Were there conditions beyond noncompliance with the OSHA regulation?



How would you rate your understanding of the OSHA Standard?



Are there any parts of OSHA's Trench Standard that my be confusing to those required to comply?



If yes, which of the following parts of the standard are confusing?

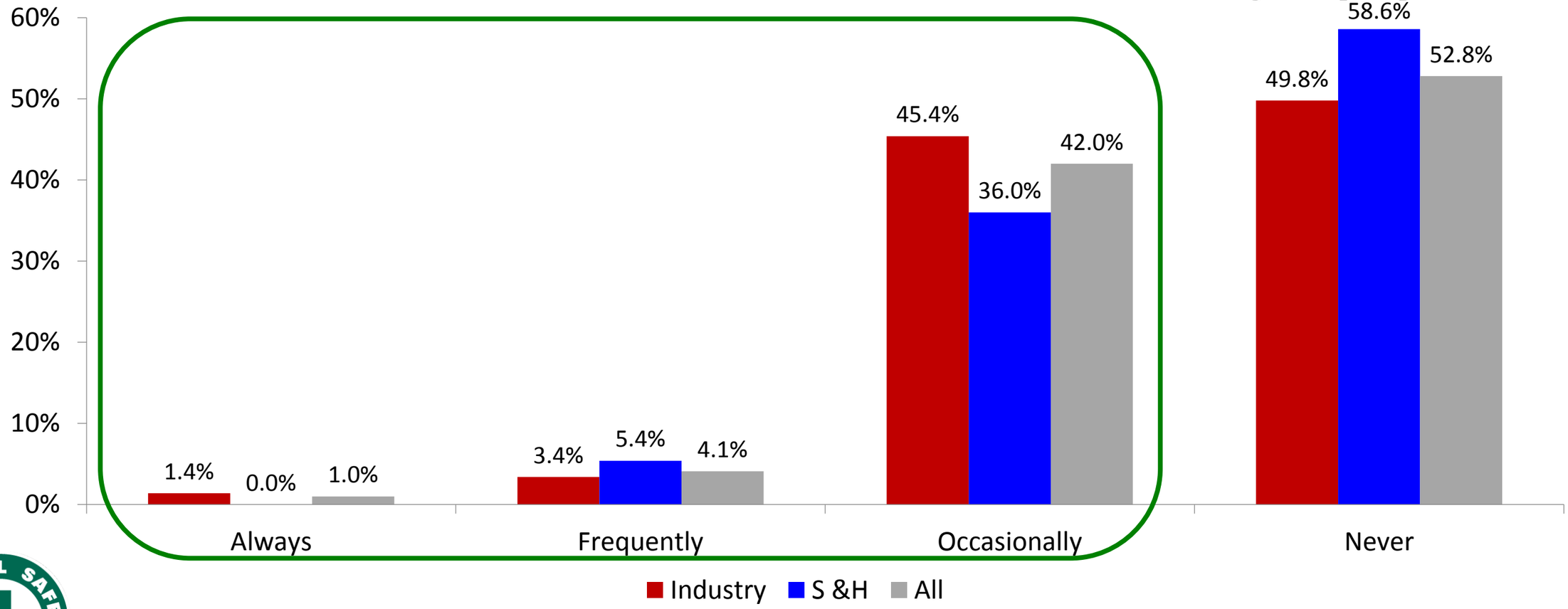
57.7% - Trench sloping and benching safety measures (depth and width requirements)

43.4% - Protective systems

33.7% - Competent Person's role and responsibilities

18.3% - Access and Egress

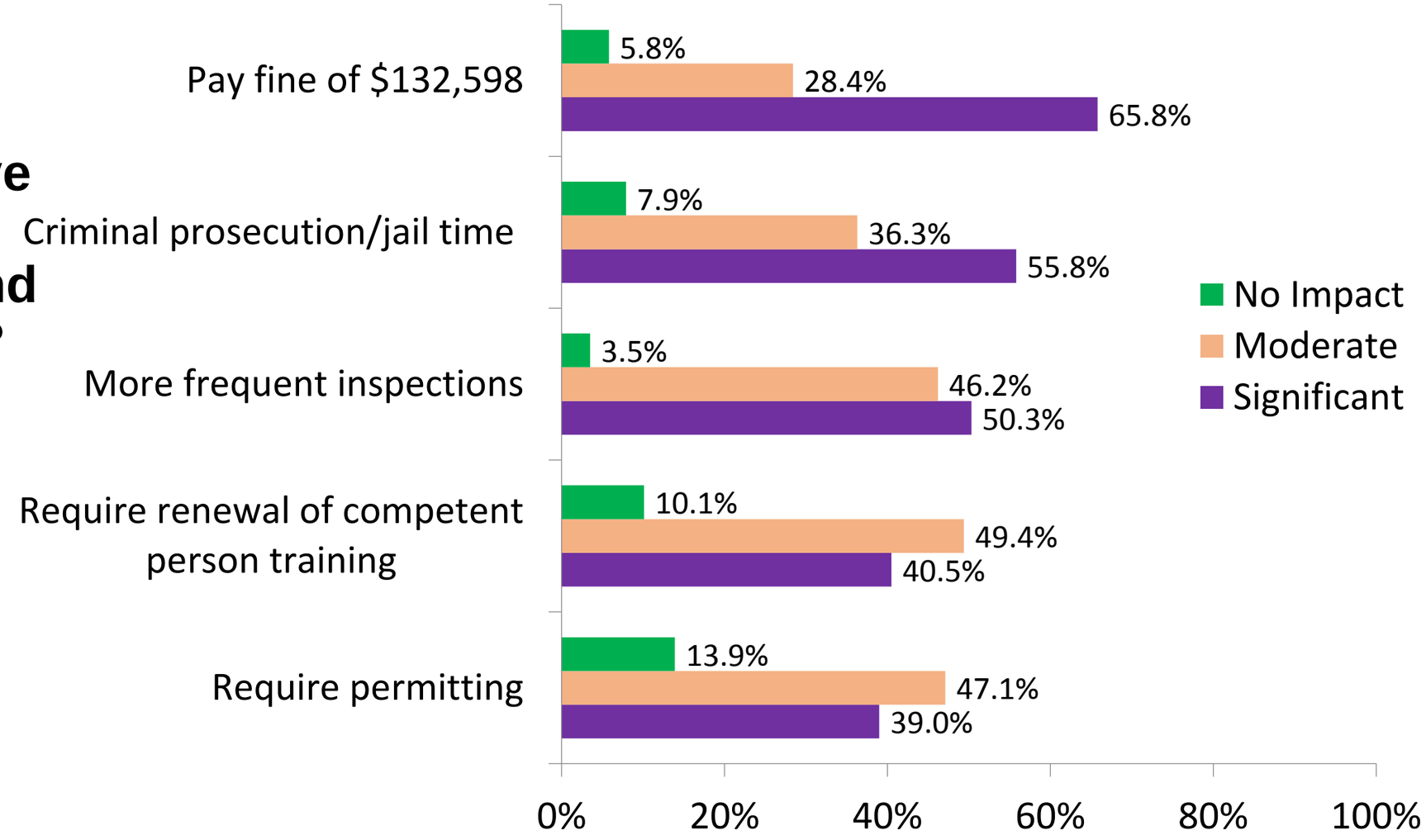
How often do you have trouble with proper installation, understanding manufacturers' tabulated data, and use of trench safety equipment?



Which of the following do you believe are the biggest contributors to trench incidents or collapses?

	Industry	Safety & Health	Total
Lack of training on trench safety (i.e., inspections, hazards)	66.6%	67.6%	67.0%
Trying to stay on schedule/production	65.2%	67.1%	66.0%
Indifference (i.e., it won't happen on my watch)	50.6%	70.5%	58.1%
Lack of knowledge of the OSHA 1926.650 trenching and excavation standard (i.e., requirements, soil analysis, and protective system solutions)	48.3%	58.6%	52.2%
Tight budgets (i.e., didn't estimate into job costs)	29.0%	43.8%	34.5%
Language barriers	18.8%	26.2%	21.3%
Other	6.9%	10.0%	8.4%

What degree of impact would the following have on reducing trench fatalities and injuries and increasing compliance?



What we learned…

- ✓More pre-planning is needed
- ✓Trenches often are unprotected and there is often not a competent person on site
- ✓Incidents often involve contractors who are inexperienced or new to trench work
- ✓New workers often lack proper competent person supervision
- ✓There is a need to increase training and education on the standard and safe practices

What's been done so far by OSHA…

- **Agency Priority Goal - Reduce Trenching and Excavation Hazards**
- **Trench Safety Initiative**
  - ❑ Increase awareness of hazards and requirements
- **Balanced Enforcement and Compliance Assistance**
  - ❑ Revised *National Emphasis Program for Trenching* - effective October 2, 2018
  - ❑ Onsite Consultation Program
  - ❑ Area Office Outreach Programs
  - ❑ Develop and Update Training and Outreach Materials
  - ❑ OSHA/Industry Stakeholder Outreach Events (Trench Safety Stand-Down, etc.)

By NIOSH …

Trenching and Excavation topic page

- NIOSH Science Blog - Preventing Trenching Fatalities (planning needs and solutions)
- Work Place Solutions - Preventing Worker Deaths from Trench Cave-ins
- NIOSH Alert - Preventing Deaths and Injuries From Excavation Cave-Ins
- Web-based training - Trench Safety Awareness
- Standard development - Development of Draft Construction Safety Standards for Excavations
- Research - Trench safety-using a qualitative approach to understand barriers and develop strategies to improve trenching practices

Preventing Trenching Fatalities

Posted on June 6, 2019 by CAPT Alan Echt, DrPH, CIH; Scott Earnest, P

Figure 1 – He lived [Photo Scott Haviland, Oregon Occupational Safety and Health]

By CPWR…

Resources to Promote Safe Work in Trenches

- Trenches Hazard Alert (also available in Spanish)
- Trench Safety Toolbox Talk (also available in Spanish)
- No New Year -- Trench Collapse Video (also available in Spanish)
- Practice Trench Safety. It Saves Lives Infographic (also available in Spanish)
- Trench Fact Sheet
- Strategies to Prevent Trenching-Related Injuries and Deaths Report

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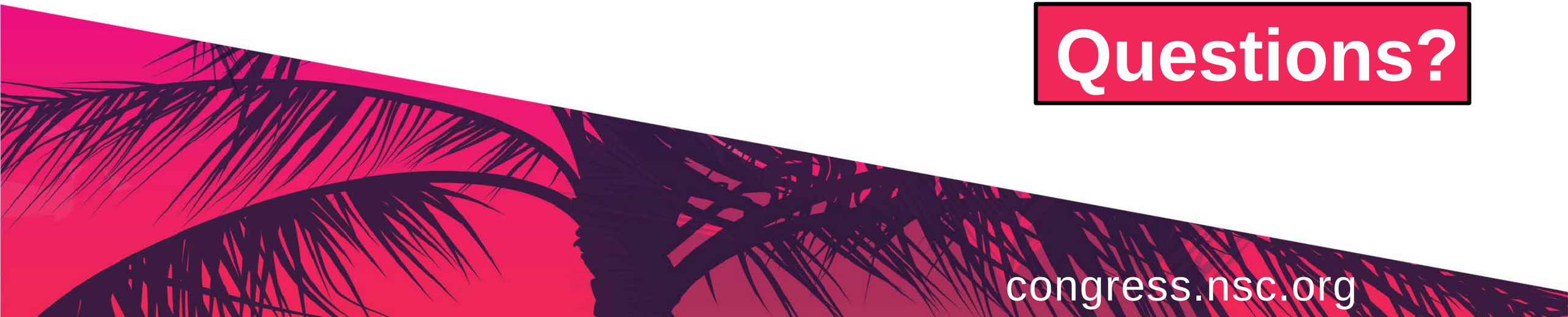
Thank you

Questions?



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