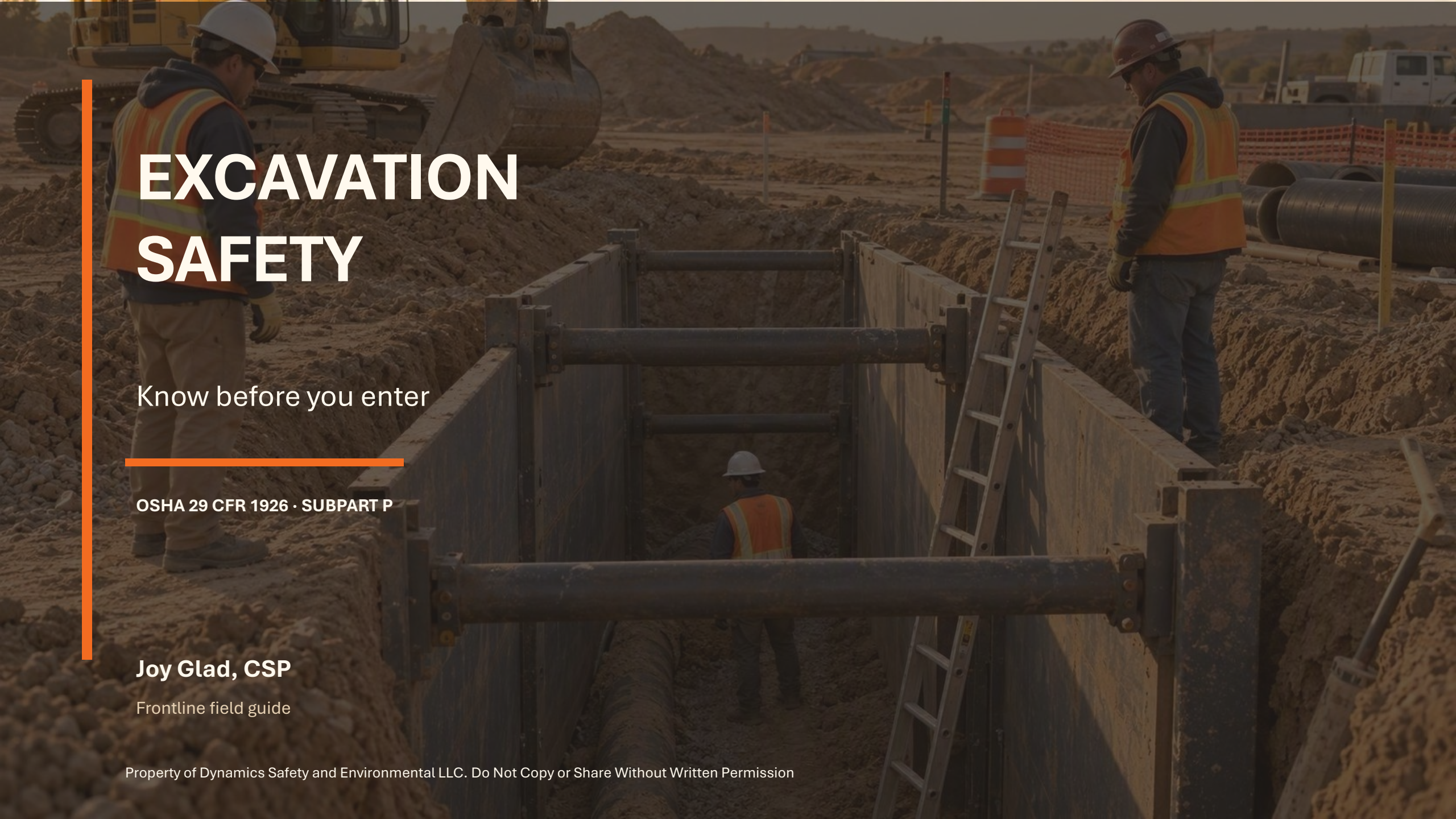


EXCAVATION SAFETY

Know before you enter

OSHA 29 CFR 1926 · SUBPART P

Joy Glad, CSP

Frontline field guide

Property of Dynamics Safety and Environmental LLC. Do Not Copy or Share Without Written Permission

By the end of this class, you can...

Recognize the conditions that make excavation work unsafe—and know when to stop.

01	**RECOGNIZE**	Spot cave-in, struck-by, water, atmosphere, access, and utility hazards.
02	**READ THE SOIL**	Explain how soil grades affect slope and protective-system decisions.
03	**VERIFY CONTROLS**	Check spoils, egress, water, air, traffic, equipment, and inspections before entry.
04	**KNOW THE SYSTEM**	Distinguish sloping and benching, shoring, and trench shields or boxes.
05	**ACT EARLY**	Exit, warn others, and notify the competent person when conditions change.

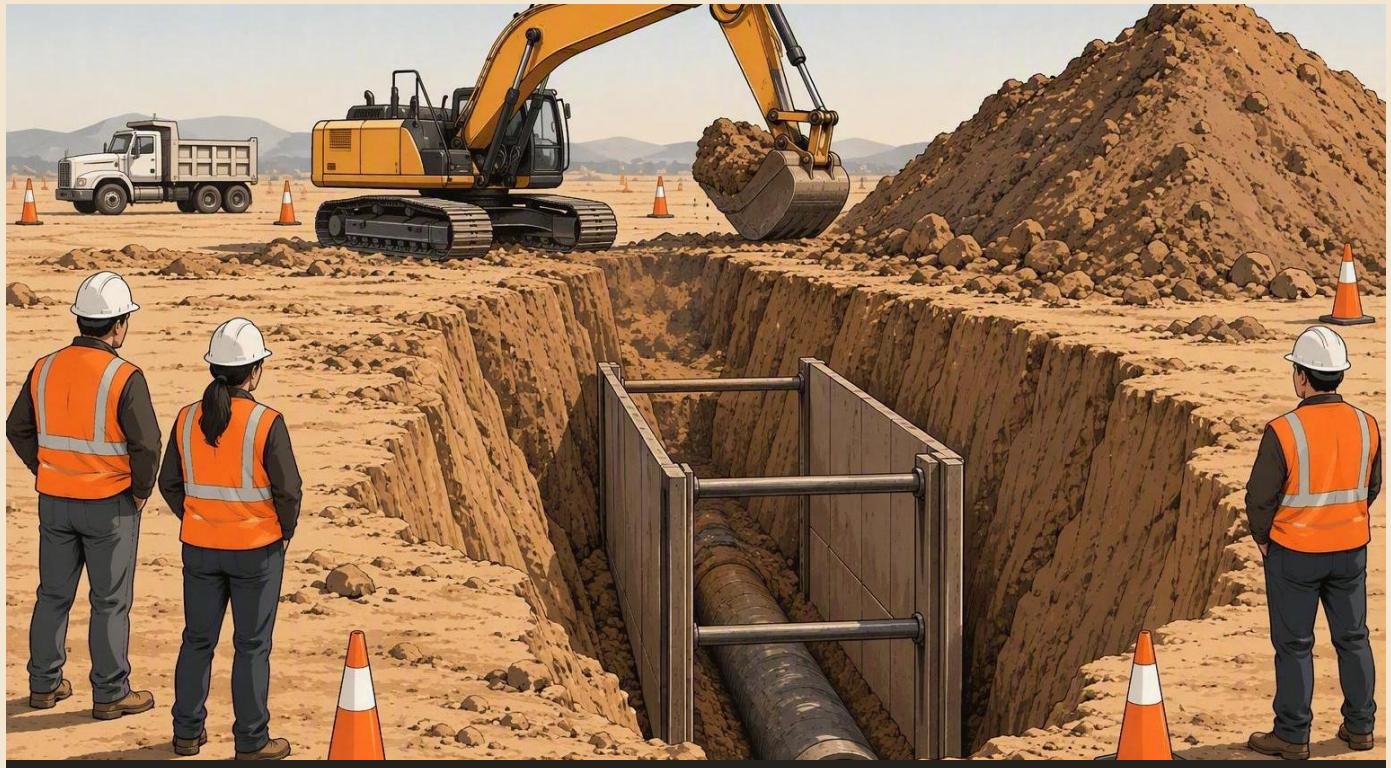
THE GOAL: EVERY WORKER GOES HOME — NO ENTRY WITHOUT VERIFICATION

Property of Dynamics Safety and Environmental LLC.
Do Not Copy or Share Without Written Permission

WHY THIS MATTERS

A trench can change in seconds

The hazard is not only the wall—it is everything acting on the excavation.



READ THE WHOLE SCENE — NOT JUST THE SOIL

CAVE-IN

Cracks, sloughing, bulging, vibration

STRUCK-BY

Spoils, loads, equipment, traffic

ATMOSPHERE

Low oxygen or hazardous gases

ACCESS

Blocked, distant, or unstable exit

Property of Dynamics Safety and Environmental LLC.
Do Not Copy or Share Without Written Permission

WORKER ENTRY CHECK

Stop, look, verify—then enter

Your job is to confirm the controls, not assume they were checked.

1

STOP

Do not enter until the competent person clears conditions.

2

LOOK

Check edge, walls, water, equipment, air, access.

3

VERIFY

Protective system fits the soil, depth, and site.

IF CONDITIONS CHANGE: EXIT AND SPEAK UP



OSHA 1926.651 · 1926.652

Property of Dynamics Safety and Environmental LLC.
Do Not Copy or Share Without Written Permission

The competent person controls the conditions

Inspection is active work—not a signature collected once a day.



BEFORE

work starts

DURING

the shift as needed

AFTER

rain or any hazard-increasing event

Authority matters This person can identify hazards and promptly correct them.

Property of Dynamics Safety and Environmental LLC.
Do Not Copy or Share Without Written Permission

SOIL GRADES

Soil type drives the protection

Classify the weakest relevant layer—and downgrade when site conditions demand it.

STABLE ROCK	TYPE A	TYPE B	TYPE C
Vertical if truly intact	Cohesive, ≥1.5 tsf*	>0.5 to <1.5 tsf*	≤0.5 tsf or granular/wet
90°	¾H : 1V	1H : 1V	1½H : 1V



TYPE A IS LOST when soil is fissured, previously disturbed, vibrating, or otherwise disqualified.

*Unconfined compressive strength. Classification requires accepted visual and manual tests.

[Watch on YouTube: How to Classify Different Soil Types? (6:41)]

OSHA Appendix A · Appendix B Table B-1

Property of Dynamics Safety and Environmental LLC.
Do Not Copy or Share Without Written Permission

Classify with eyes and hands—not assumptions

At least one visual and one manual analysis support the classification.



VISUAL

Layers · cracks · water · vibration · previously disturbed ground

MANUAL

Plasticity · dry strength · thumb penetration · ribbon or thread

DOWNGRADE

Choose the least stable condition present; recheck when conditions change

FIELD RULE: WATER + VIBRATION = REASSESS

Property of Dynamics Safety and Environmental LLC.
Do Not Copy or Share Without Written Permission

SLOPE GRADES

Weaker soil demands a flatter slope

Maximum allowable slopes shown for excavations under 20 ft when Appendix B applies.

ROCK

VERTICAL

90°

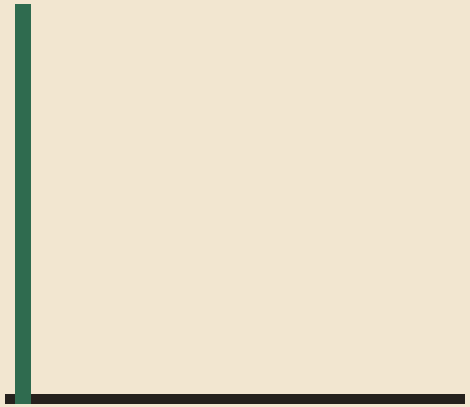


intact rock

TYPE A

¾ : 1

53°

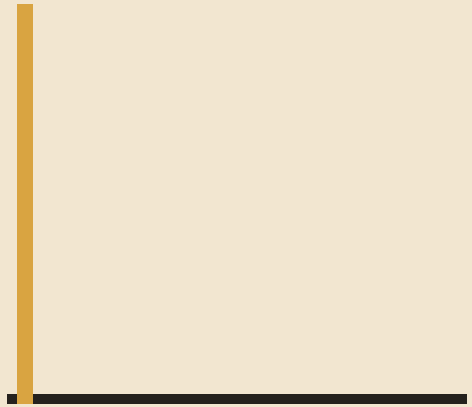


horizontal : vertical

TYPE B

1 : 1

45°

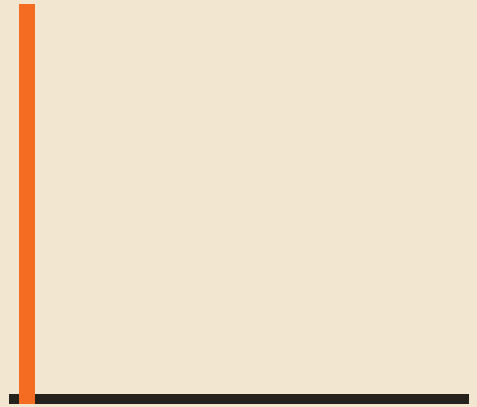


horizontal : vertical

TYPE C

1½ : 1

34°



horizontal : vertical

DEFAULT OPTION: 1½H : 1V (34°) UNLESS ANOTHER OSHA DESIGN OPTION IS USED

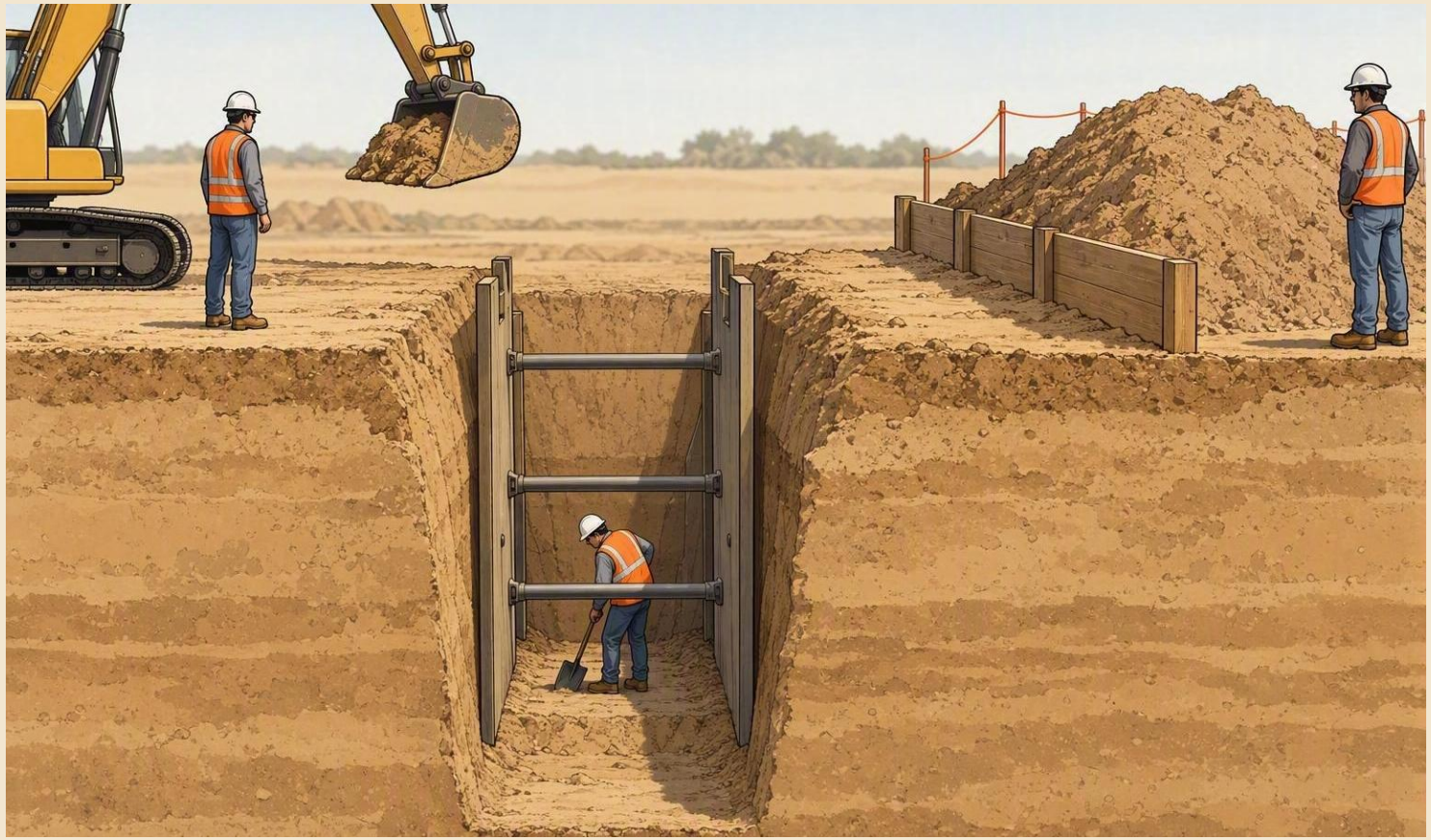
OSHA 1926.652(b) · Appendix B Table B-1

Property of Dynamics Safety and Environmental LLC.
Do Not Copy or Share Without Written Permission

SPOILS PILES

Keep the edge clear—at least 2 feet

Prevent materials and equipment from falling or rolling into the excavation.



2 FT

minimum setback

OR

Use retaining devices strong enough to keep material out.

Also control surcharge loads from equipment near the edge.

OSHA 1926.651(j)(2)

Property of Dynamics Safety and Environmental LLC.
Do Not Copy or Share Without Written Permission

Your exit is never more than 25 feet away

In trenches 4 feet or deeper, provide a safe means of egress.

4 FT

depth triggers egress

25 FT

maximum lateral travel

Stairway · ladder · ramp · other safe means

Keep the route clear, stable, and inside the protected area.



OSHA 1926.651(c)(2)

Property of Dynamics Safety and Environmental LLC.
Do Not Copy or Share Without Written Permission

Water changes the job

No work in accumulated or accumulating water unless adequate precautions protect employees.



CONTROL

Pump or divert water with monitored controls.

PROTECT

Use special support/shielding or lifeline where needed.

REINSPECT

After rain or any hazard-increasing occurrence.

RISING WATER? EXIT NOW.

Property of Dynamics Safety and Environmental LLC.
Do Not Copy or Share Without Written Permission

Air can become hazardous below grade

Test before entry where a hazardous atmosphere exists—or could reasonably be expected.

WHEN	**Excavation is over 4 ft and conditions could create hazardous air.**
TEST	Check oxygen deficiency and hazardous contaminants before entry.
CONTROL	Ventilate or use respiratory protection; keep testing as needed.
RESCUE	Have appropriate emergency equipment readily available.



Never trust smell as an air monitor.

OSHA 1926.651(g)

Property of Dynamics Safety and Environmental LLC.
Do Not Copy or Share Without Written Permission

Control the line of fire

Visibility, barricades, and exclusion zones prevent struck-by events.



MOBILE EQUIPMENT

Use warning systems when operators lack a clear view of the edge.

SUSPENDED LOADS

Never work under loads handled by lifting or digging equipment.

PUBLIC / CREW

Use barricades, handrails, and walkways where people can fall.

Property of Dynamics Safety and Environmental LLC.
Do Not Copy or Share Without Written Permission

Choose a cave-in system before entry

Required unless stable rock—or under 5 ft with no cave-in indication found by a competent person.

DEPTH + SOIL + SITE LOADS

SLOPE / BENCH

Cut the wall back to a safe configuration.

SHORE

Support the wall to prevent movement.

SHIELD / BOX

Protect people if soil moves.

OVER 20 FT

Protective-system design must be approved by a registered professional engineer.

Property of Dynamics Safety and Environmental LLC.
Do Not Copy or Share Without Written Permission

Sloping removes the collapse path

The configuration must match soil classification, depth, loads, and the selected OSHA design option.



SLOPING

Excavate the face back to the approved angle.

BENCHING

Build horizontal levels only in configurations allowed for the soil.

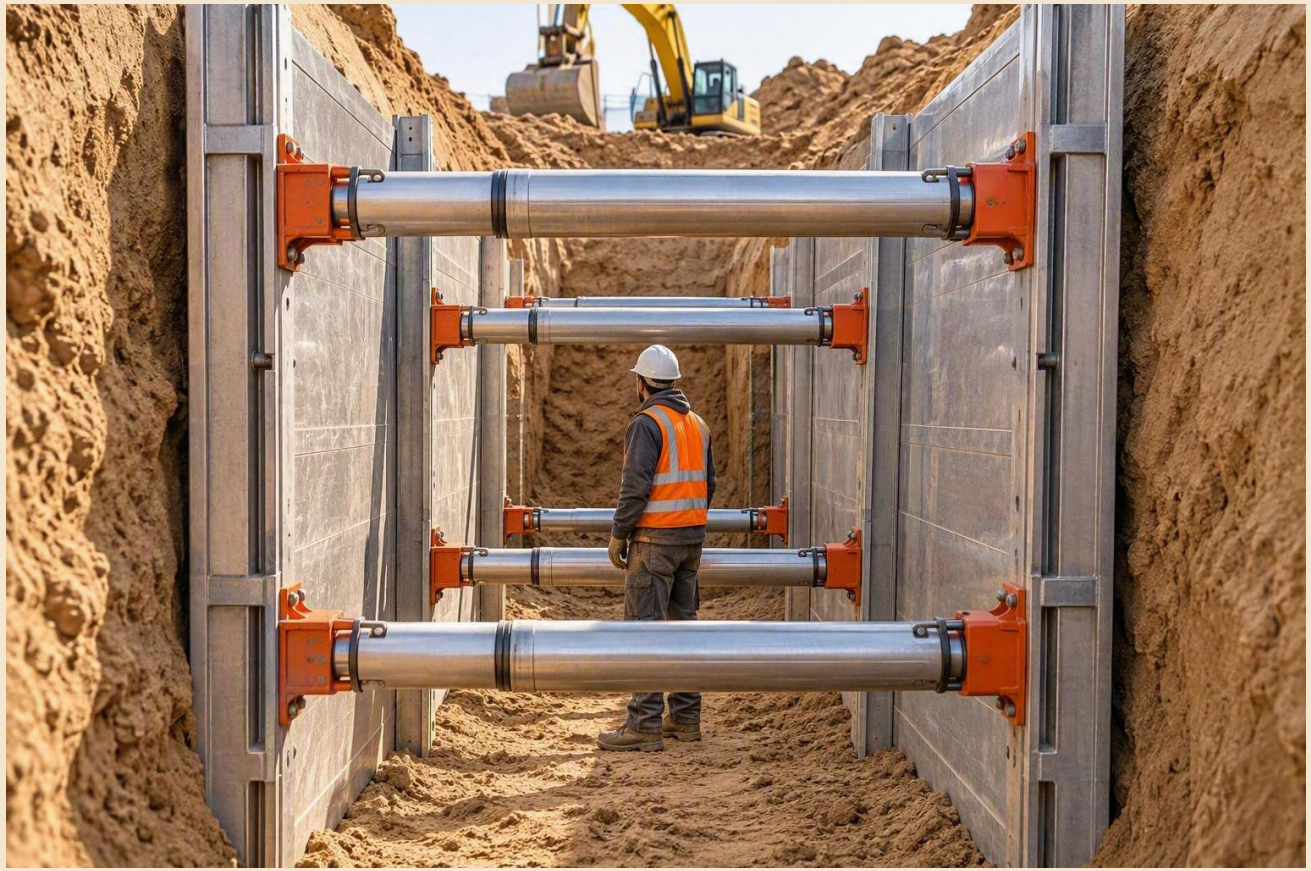
TYPE C

Do not bench Type C soil under Appendix B.

Property of Dynamics Safety and Environmental LLC.
Do Not Copy or Share Without Written Permission

Shoring supports the wall

Install, use, and remove support systems under approved tabulated data or engineered design.



HYDRAULIC

Pre-engineered cylinders and rails apply pressure to support sidewalls.

TIMBER

Member size and spacing depend on soil type and trench depth.

FIELD CHECK

Watch for leaks, damage, movement, and changing soil conditions.

Property of Dynamics Safety and Environmental LLC.
Do Not Copy or Share Without Written Permission

A trench box protects people—not the wall

It shields workers during a cave-in; it does not prevent one. Follow the manufacturer’s data.



INSIDE

Workers remain within the shield’s protected footprint.

NO RIDERS

Never occupy a shield while it is installed, removed, or moved vertically.

NO IMPROVISING

Do not exceed rated depth, modify the box, or ignore soil loss.

Shield systems must extend above the surrounding excavation when sloped faces could fail into the box.

Property of Dynamics Safety and Environmental LLC.
Do Not Copy or Share Without Written Permission

VIDEO CASE STUDY 1 OF 2

What fails first in an unprotected trench?

A non-graphic OSHA prevention video showing how recognizable hazards develop.



CLICK THE IMAGE TO WATCH ONLINE ↗

PUBLISHER

U.S. Department of Labor / OSHA

VIDEO

Excavations in Construction/Trenching

WATCH FOR

- Missing or inadequate protective systems
- Unsafe access and edge conditions
- Controls that prevent the event

Source: U.S. Department of Labor / OSHA · opens online

Property of Dynamics Safety and Environmental LLC.
Do Not Copy or Share Without Written Permission

VIDEO CASE STUDY 2 OF 2

How small decisions build toward a collapse

A non-graphic photo-and-animation reenactment based on a real trench incident.



CLICK THE IMAGE TO WATCH ONLINE ↗

PUBLISHER

CPWR—The Center for Construction Research and Training

VIDEO

No New Year — Trench Collapse

WATCH FOR

- The chain of decisions before entry
- Warning signs that should stop work
- How planning could change the outcome

Source: CPWR—The Center for Construction Research and Training · opens online

Property of Dynamics Safety and Environmental LLC.
Do Not Copy or Share Without Written Permission

ANSWER 1: C — TYPE C MAXIMUM IS 1½H : 1V (34°)

A 4½-ft-deep trench has spoils 1 ft from the edge. The nearest ladder is 40 ft away.

What must change before entry?

A Move spoils to 2 ft or use retaining protection

B Add/reposition egress so travel is no more than 25 ft

C Both A and B

PRESS SPACE BAR TO REVEAL THE ANSWER

Property of Dynamics Safety and Environmental LLC.
Do Not Copy or Share Without Written Permission

ANSWER 2: C — FIX BOTH SPOILS AND EGRESS BEFORE ENTRY

After overnight rain, water is collecting beside a trench box. The crew wants to climb in.

What is the safe first action?

A Enter quickly before water rises

B Stay out until the competent person reinspects and controls hazards

C Move the box while workers remain inside

PRESS SPACE BAR TO REVEAL THE ANSWER

Property of Dynamics Safety and Environmental LLC.
Do Not Copy or Share Without Written Permission

ANSWER 3: B — STAY OUT, REINSPECT, AND CONTROL THE WATER HAZARD

NO VERIFICATION.
NO ENTRY.



Before you enter, confirm:

- Competent-person clearance
- Correct protective system
- Safe access and clear edge
- Water, air, and equipment controlled

IF CONDITIONS CHANGE: EXIT. SPEAK UP.

Sources: OSHA 1926.650–.652 and Subpart P Appendices A–F · osha.gov

Property of Dynamics Safety and Environmental LLC.
Do Not Copy or Share Without Written Permission