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Steel (or Aluminum) Shields in Trenches

OSHA 29 CFR 1926 - Subpart P - EXCAVATIONS

Protection Using Shields

Baseline use of shields includes open ends for pipes.

Shields must be placed to restrict lateral movement, in case soil presses on the shield.

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Protection Using Shields

Ladders must be available to workers **AT ALL TIMES!**

Pipe spreaders serve to keep the shield walls parallel under load and cannot be loaded laterally.

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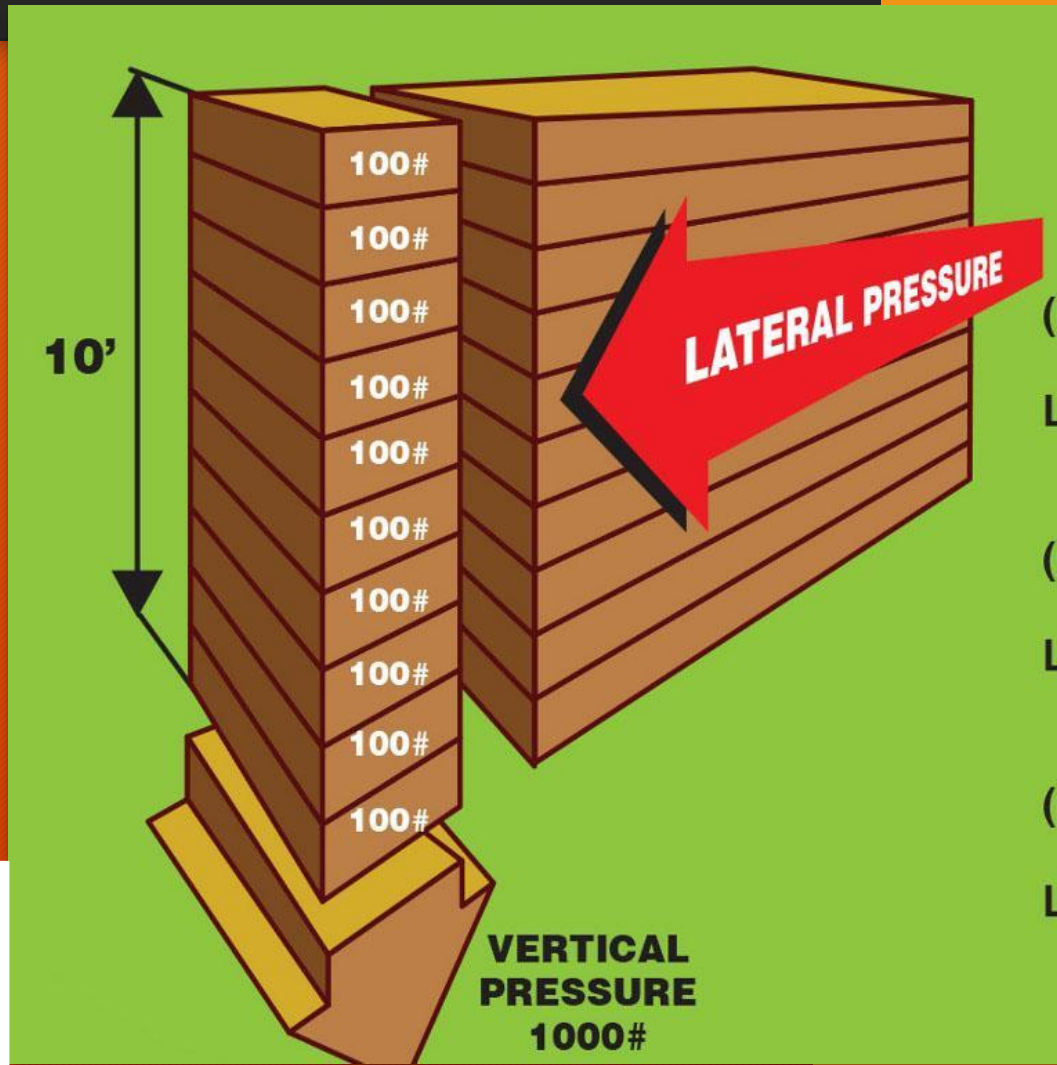
Determine Strength of Trench Shield

OSHA soil types tell us what lateral load is expected on a trench shield.



Type "A" Soil
(P.S.F. per ft. of depth) — 25
(Depth of trench) — X10 ft
Lateral earth pressure — 250 P.S.F.

Type "B" Soil
(P.S.F. per ft. of depth) — 45
(Depth of trench) — X10 ft
Lateral earth pressure — 450 P.S.F.

Type "C" Soil
(P.S.F. per ft. of depth) — 80
(Depth of trench) — X10 ft
Lateral earth pressure — 800 P.S.F.

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Proper Use of Trench Shields

Plates add additional load on a shield and are prohibited by tab data.

Site specific PE approval may be obtained to allow their use.

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Proper Use of Trench Shields

Surface encumbrances, like utility poles, must be supported or protected.

Surcharge loads should be kept away from the edge.

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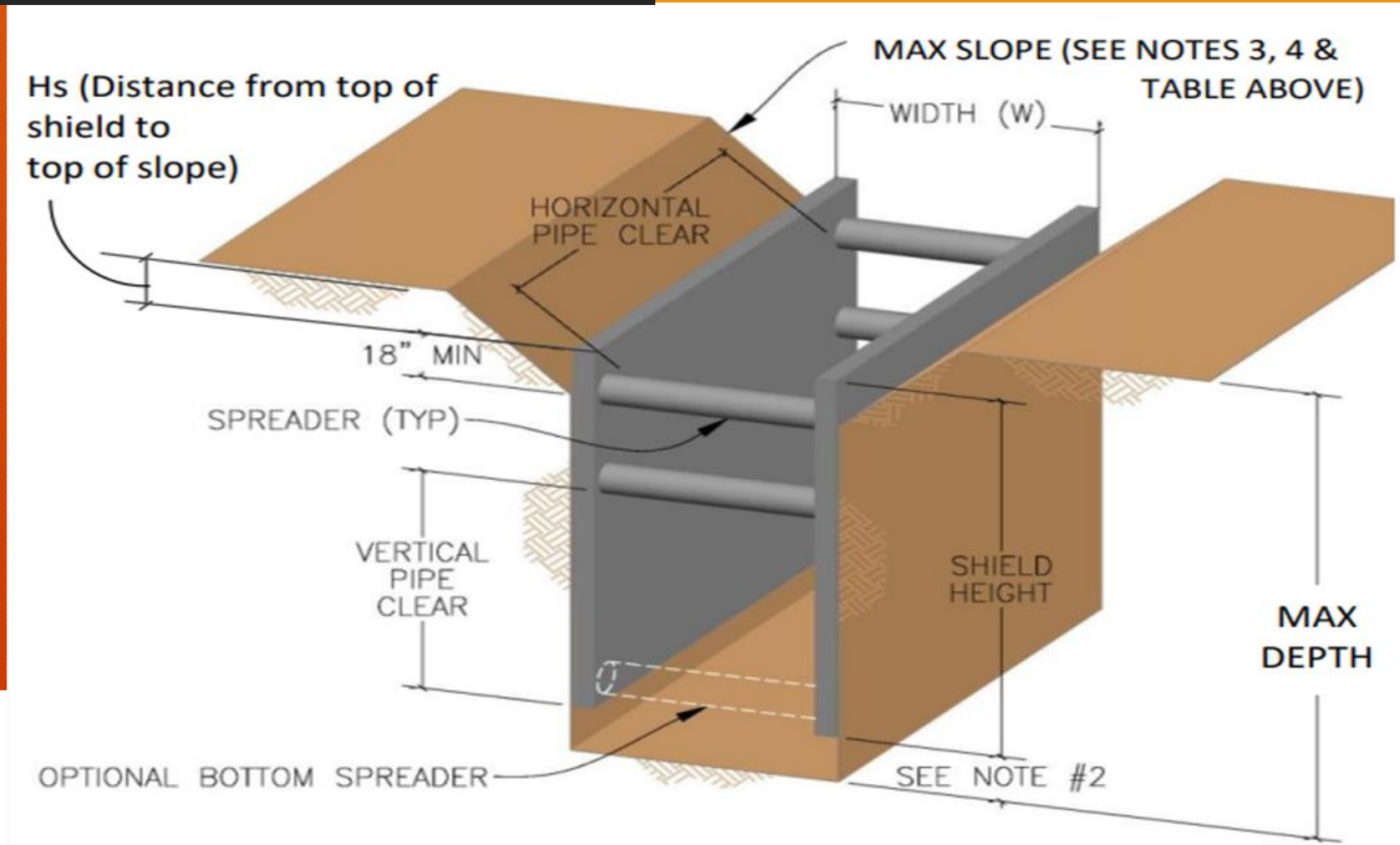
Proper Use of Trench Shields

Maximum shield depth includes any combined slope, not just the shield height.

Excavation 2 feet below shields is permitted with no indication of loss of soil behind or below.



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Determine Length of Trench Shield

The shield needs to be at least 4 feet longer than the pipe.

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Determine Width of Trench Shield

The shield needs to be at least 1 foot wider than the pipe or the bucket.

Spreaders are typically limited to 20 feet by tab data.

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Pipe Clearance

Shields must provide adequate pipe clearance, allowing the box to be pulled forward over newly laid pipe.

Typically, 64 inches on 8 feet

Typically, 84 inches on 10 feet

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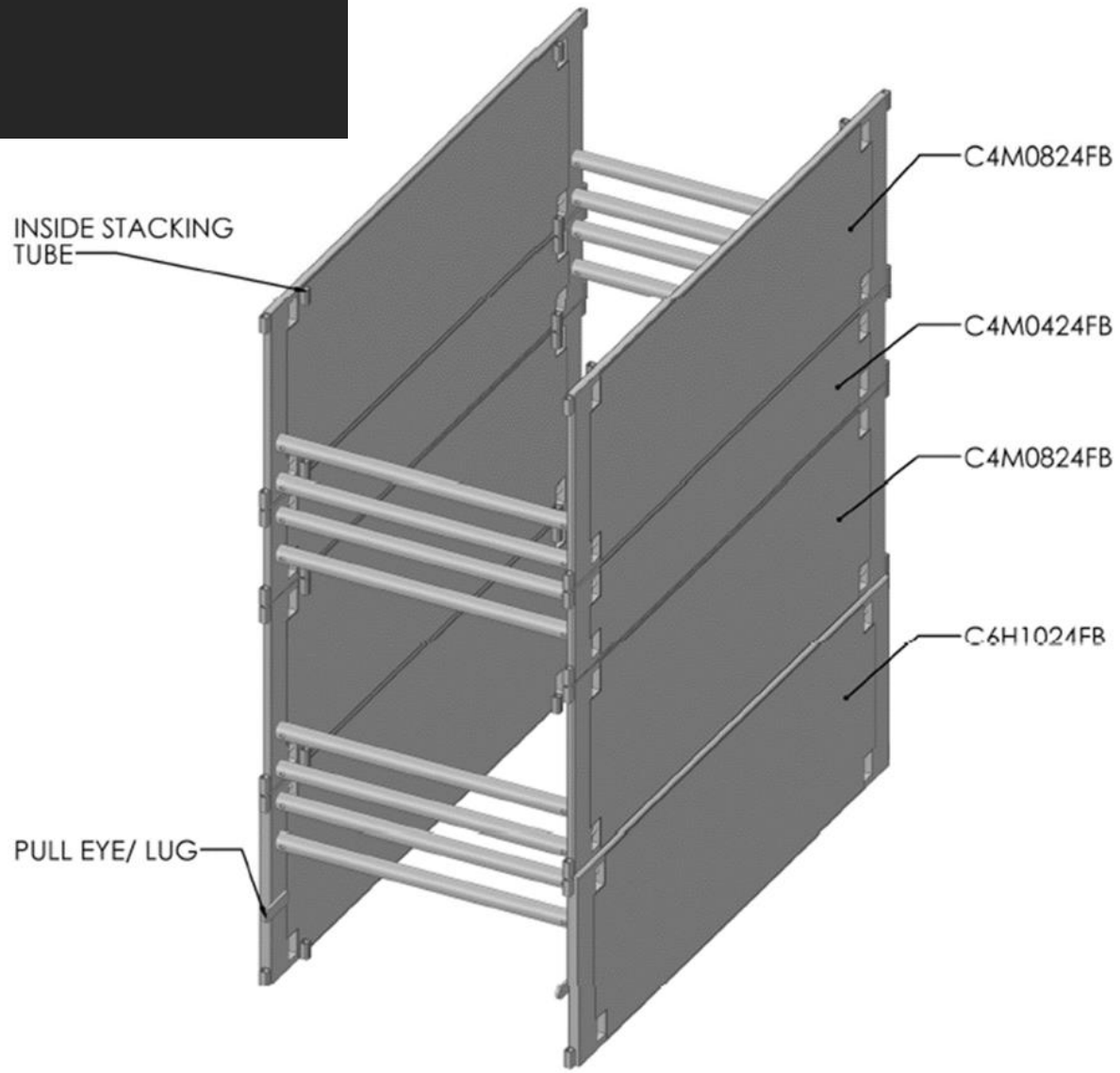
By OSHA Standard Interpretation

When shields are stacked, the standard only requires the bottom shield to be rated for the full depth of the trench. (1991-11-07) (1991-10-29)



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By OSHA Standard Interpretation

OSHA does not set a maximum distance between a shield and the trench face. (2013-03-11)

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By OSHA Standard Interpretation

Tabulated data using C-60 soil classification is an acceptable addition to the standard. (1991-10-01)

Manufacturer's tabulated data that exceeds the limitations of the various tables (20 feet) in the standard may be used. (1991-01-4) (1992-03-23)

TRENCH SHIELD TABULATED DATA

Model Number	0	Spreader Size	8" Sch. 80 Pipe	Pressure Rating	0 psf
Serial Number	0	Spreader Yield Strength	35 ksi	Weight	0 lb.
Height	0'	Max Spreader Length	20'	Vert. Pipe Clear	0"
Length	0'	Spreader Pin Diameter	2"	Horiz. Pipe Clear	0'
Wall Thickness	0"	Pin Yield Strength	90 ksi		

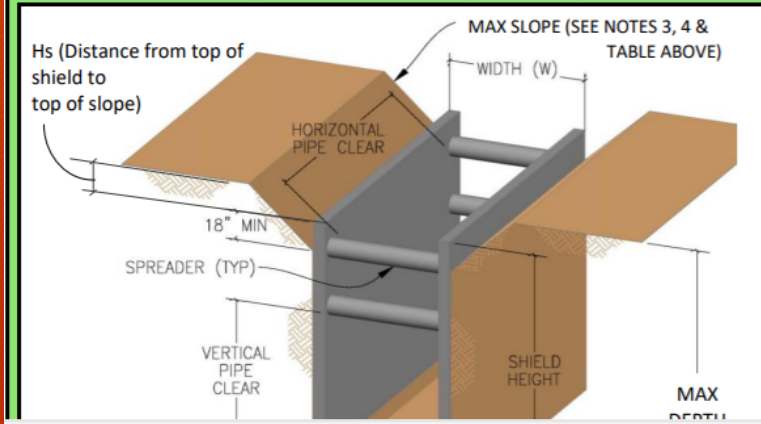
SOIL TYPE	Max Depth	Hs	Max Slope
A-25	0'	10.5'	3/4(Horiz.) : 1(Vert.)
B-45	0'	8.5'	1(Horiz.) : 1(Vert.)
C-60	0'	6.5'	1.5(Horiz.) : 1(Vert.)
C-80	0'	0'	Flat

Sloping & Shoring

1) "Max Depth" shall not exceed limits outlined in table for corresponding soil types.

2) If "Max Depth" is 20' or less, slope and shore per OSHA guidelines.

3) If "Max Depth" exceeds 20', slope angle shall not exceed "Max Slope", and distance from top of shield to top of slope shall not exceed "Hs", as outlined in table for corresponding soil types.



33% Shoring Use Factor Included in Max Depth Ratings	Yes
Surcharge Pressure Included in Max Depth Ratings*	72 psf

***All equipment and materials shall be kept a sufficient distance clear of the shoring, as directed by a licensed Professional Engineer, to ensure this surcharge limit is not exceeded.**

Soil shall be classified by a Competent Person as type A, B or C, as defined by OSHA regulations, except as noted below:

1) A type C-60 soil is defined as a clay or moist granular soil that is not flowing or submerged. This soil can be cut vertically and will stand long enough to safely install protective system

Corollary to the C-60 Soil Classification

29 CFR 1926 SUBPART P contains 4 soil classifications:

STABLE ROCK, TYPE A, TYPE B, TYPE C

C-60 is an additional - separate classification - added by industry - allowed by OSHA.

Type C soil is everything 0.5 TSF and less

Unless it meets the definition of C-60, it will stand up long enough for protection.

So, Type C is always C-80.

Cannot use hydraulics in Type C soil, but can in C-60.

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By OSHA Standard Interpretation

When you are using several shields of the same model:

Only one set of tabulated data for each different shield is required (1992-03-23) at the jobsite.

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By OSHA Standard Interpretation

Ladders may be secured to a shield as long as the effectiveness of either is not affected. (1992-03-23)

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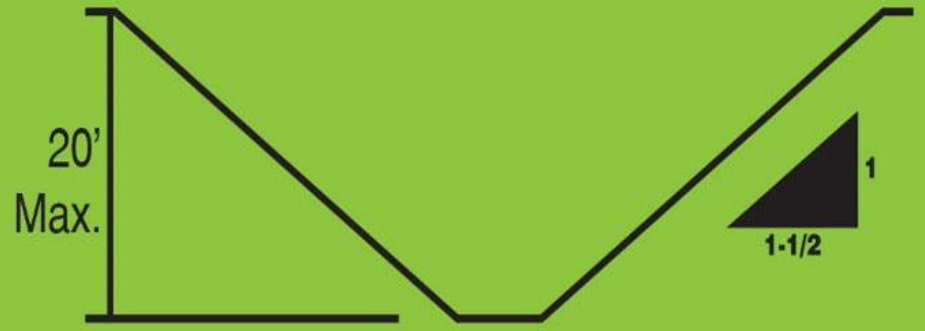
OSHA Additions in 1990

When a shield is used in combination with a slope, the soil must be no higher than 18 inches below the top on the shield.

For shields on level ground, see next slide.

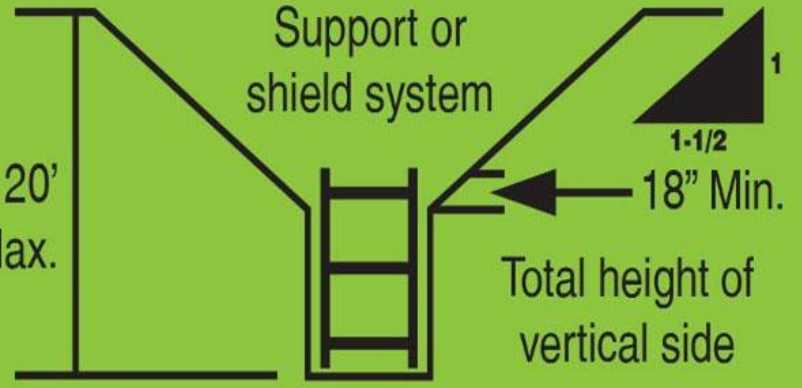
SIMPLE SLOPE

1. All simple slope excavations 20 feet or less in depth shall have a maximum allowable slope of 1½:1.



VERTICAL SIDED LOWER PORTION

2. All excavations 20 feet or less in depth which have vertically sided lower portions shall be shielded or supported to a height at least 18 inches above the top of the vertical side. All such excavations shall have a maximum allowable slope of 1½:1.



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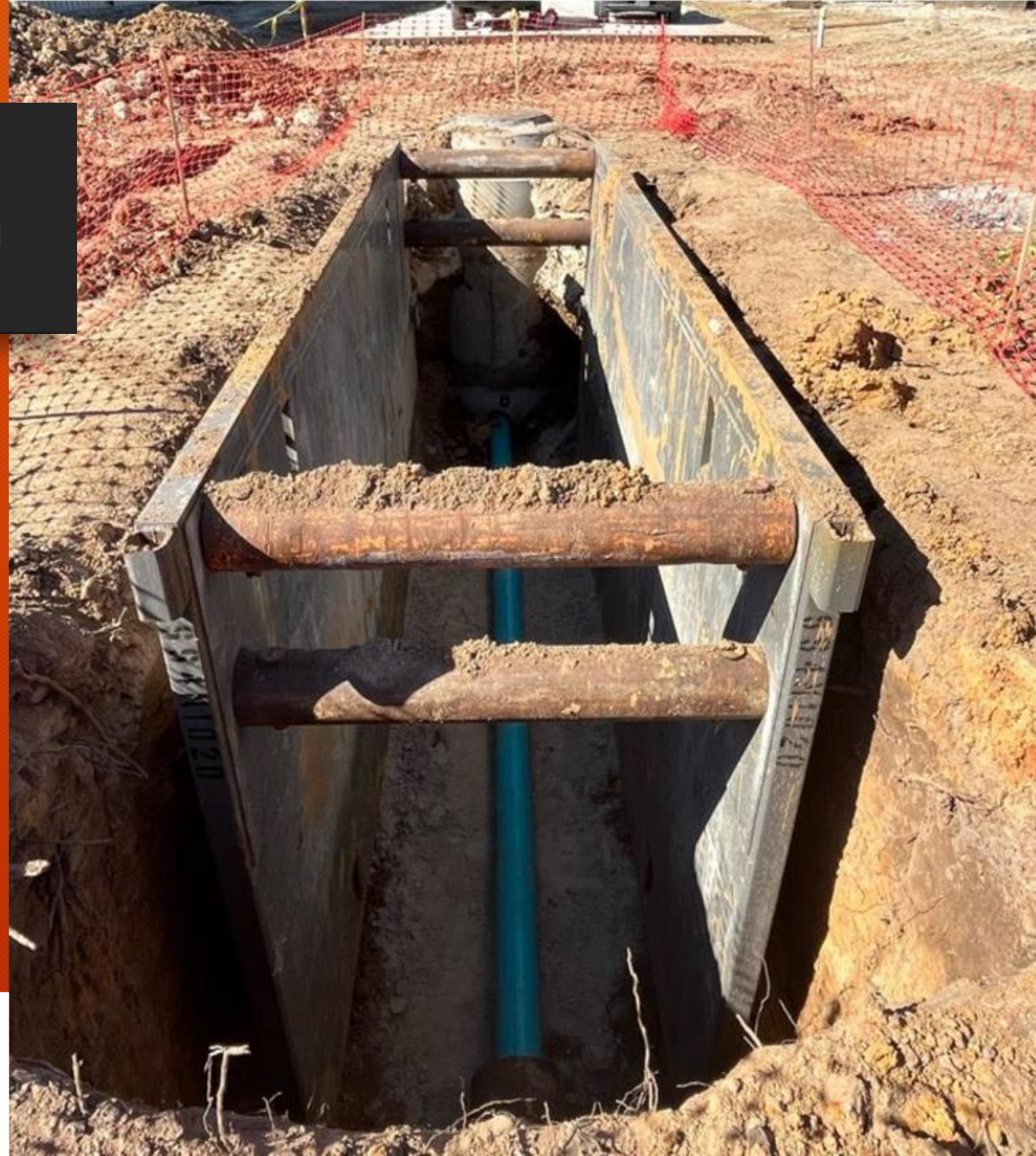
By OSHA Standard Interpretation

The standard does not require the top of a shield on level ground to be 18 inches above ground. (2000-08-10) (2003-11-14)



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Requirements for Protective Systems

Workers shall be protected from cave-ins.

Federal OSHA requires protection at 5 feet deep and greater.

Some state OSHA agencies require protection at 4 feet.

Protection must have the capacity to resist all loads expected in the soil that it is used.

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You have the right to a safe workplace.

You have the right to ask the Excavation Competent Person or Supervisor to explain how the protective systems in use are adequate for the trench or excavation and safe for entry.

OSHA's Whistleblower Protection Program enforces protections for employees who suffer retaliation for engaging in protected activities under more than 20 federal laws.

Find out more at: (https://whistleblowers.gov).

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