



2024 MNOSHA excavations

Minnesota OSHA

“To assure every worker in the state of Minnesota has safe and healthful working conditions.”



Excavations

Trench safety:

The time to think about worker protection in trenches is before digging even begins.



Excavations

Consider:

The trenching fatality rate is 112% higher than that for all construction accidents.



Excavations

Consider:

Fifty percent of those who perish in cave-ins were people attempting rescue.



Excavations

Consider:

The majority of trench fatalities happen in trenches 5 to 15 feet deep.



Excavations

Consider:

One cubic yard of soil weighs
approximately **3,000 pounds.**



Competent person

- Who is a competent person?
- Why do we need a competent person present when excavation is taking place?



Excavations

Competent person

- When applied to trenching and excavation operations, a competent person shall have specific training in and be knowledgeable about:
 - soil analysis;
 - the use of protective systems; and
 - the requirements of subpart P.



Competent person

1. One who is capable of **identifying existing or predictable hazards** during working conditions that are hazardous or dangerous to employees.
2. One who has the **authorization to take prompt corrective action** to eliminate them.



Competent person

- A competent person is the key to a safe excavation. The decisions they make will determine the safety of all employees working in and around trenches.



Excavations

Employee training

- Employees must be trained to recognize hazardous conditions pertaining to trench excavations.



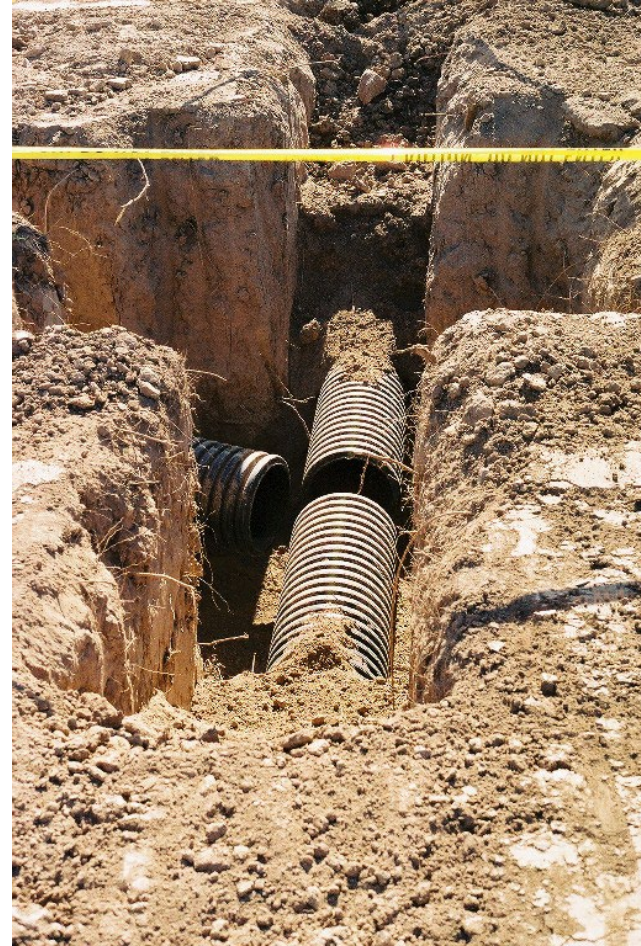
Soil classification

- Identify soil types to determine allowable slopes.
- Recognize layered soils.
- Soil types include A, B and C.



Type A soil

- Type A means cohesive soil with an unconfined, compressive strength of 1.5 tons per square foot.
 - Examples: clay, silty clay, sandy clay, clay loam, silty clay loam and, in some cases, sandy clay loam.



Type A soil

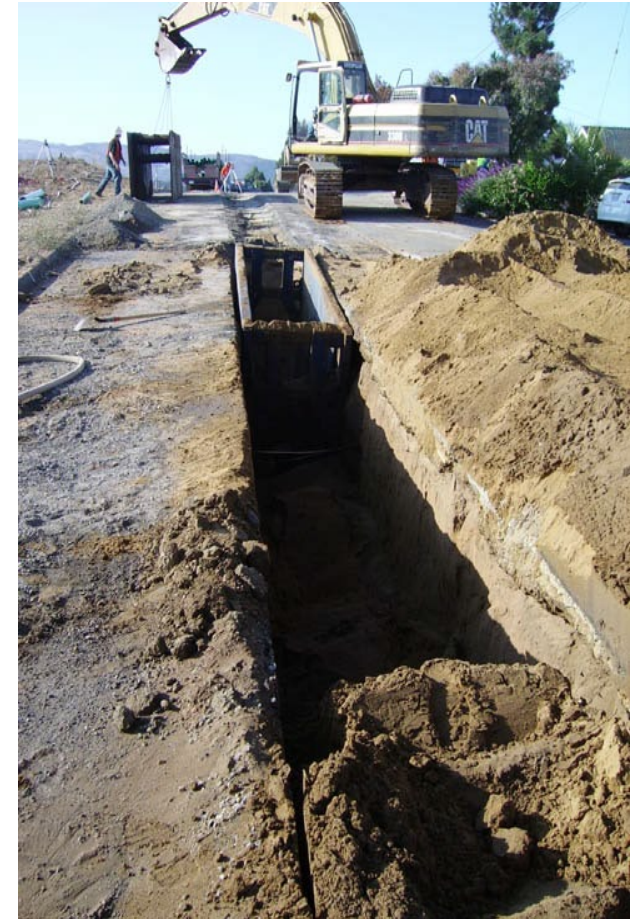
- No soil can be type A if:
 - the soil is fissured;
 - the soil is subject to vibration;
 - the soil has been previously disturbed;
or
 - other factors are possible.



Excavations

Type B soil

- Type B means cohesive soil with an unconfined, compressive strength between 0.5 and 1.5 tons per square foot.
 - Examples: angular gravel (similar to crushed rock), silt, silt loam, sandy loam, silty clay loam and sandy clay loam.



Type B soil

- Previously disturbed soils, except for those classified as type C.
- Silt that meets the compressive strength for type A, but is fissured or subject to vibration.
- Dry Rock that is not stable.



Type C soil

- Type C means cohesive soil with an unconfined, compressive strength less than 0.5 tons per square foot.
 - Examples: gravel, sand, loamy sand and submerged soil.
 - Where water is freely seeping.
 - Submerged rock that is not stable.



Soil classification

- Shall be made by a competent person.
- Based on at least one visual and one manual analysis.
- Layered systems classified in accordance with the weakest layer.
- Reclassified as necessary to reflect the changed circumstances.

Protective systems

- Sloping, shoring and shielding



Sloping

Soil type	Slope
Stable rock	Vertical (90 degrees)
Type A	3/4:1 (53 degrees)
Type B	1:1 (45 degrees)
Type C	1-1/2: (34 degrees)

1. Footnote – angles are shown in degrees from horizontal.
2. Footnote – short-term maximum allowable slope for type A is 1/2:1 (63 degrees) if 12 feet or fewer deep and open less than or equal to 24 hours.
3. Registered professional engineers needed if deeper than 20 feet.

Shoring

- **Two-inch cylinders** shall be a minimum two-inch inside diameter with a minimum safe working capacity of no less than 18,000 pounds.
- **Three-inch cylinders** shall be a minimum three-inch inside diameter with a safe working capacity of not less than 30,000 pounds.

Shoring



Shielding

- Do not subject the trench box to loads exceeding those the system was designed to withstand.
- Install and remove boxes in a manner that protects employees from cave-ins.



Shielding

- Backfill behind the box as the work is being completed.
- Do not allow employees in boxes when they are being installed, removed or moved vertically.



Trenching hazards

- Access egress – employees in a trench excavation 4 feet or more must have access to egress within 25 feet.
- Protective systems – employees in a trench excavation 5 feet or more must have an adequate protective system.
 - A competent person must inspect to ensure protection less than 5 feet deep.



Trenching hazards

- Keep materials and equipment at least 2 feet from the edge of the excavation.
- Keep spoil piles at least 2 feet from the edge of the excavation.



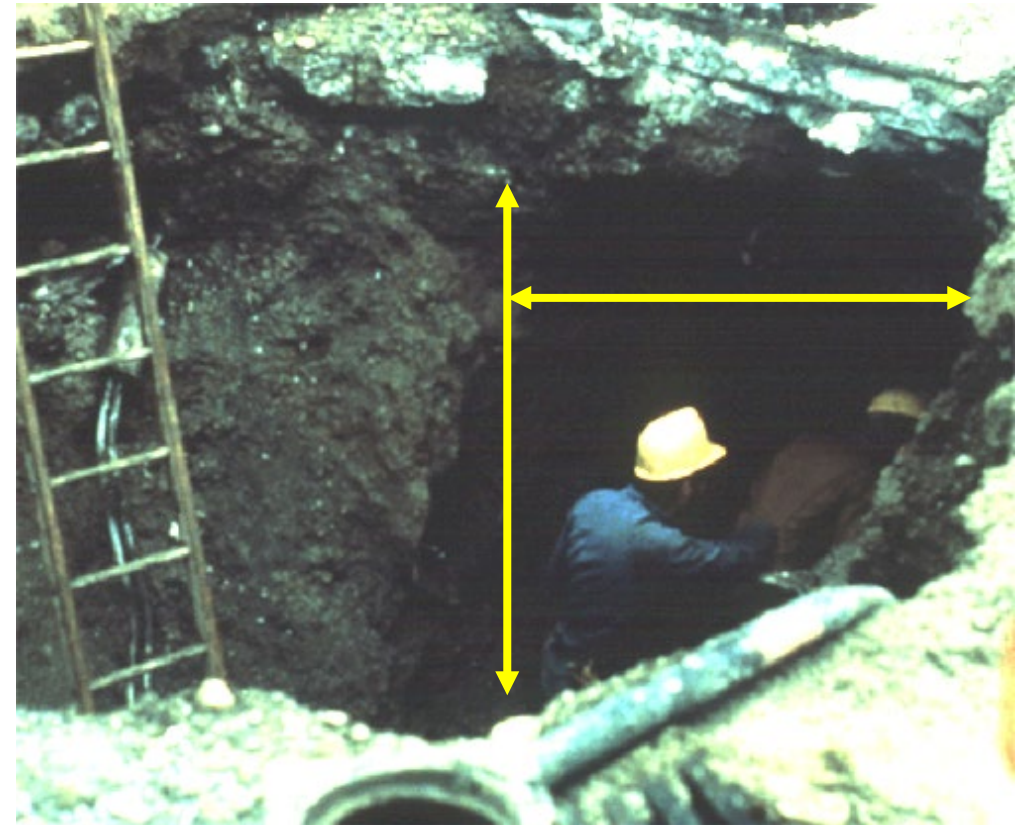
Trenching hazards

- Exposure to falling loads:
 - Do not permit employees to work underneath loads handled by lifting or digging equipment.



Trenching hazards

- Stability of adjacent structures:
 - Stabilize adjoining buildings, walls, footings, foundations, retaining walls, sidewalks or other structures.
 - Use shoring, bracing or underpinning.



Trenching hazards

- Warning system for mobile equipment:
 - When equipment operators do not have a clear and direct view of the edge of the excavation use barricades, hand or mechanical signals, or stop logs.



Trenching hazards

- Fall protection:
 - Walkways shall be provided when employees cross excavations.
 - Guardrails shall be provided where walkways are 6 feet or more above lower levels.



Operation of mobile earth-moving equipment

- Minnesota Rules 5207.1000, subpart 6:
 - If equipment is used and exposes other contractor's employees to a hazard, then the general contractor shall hold a joint contractor safety awareness meeting.
 - The meeting shall be documented, identifying when the meeting was held and who attended, including a summary of what was reviewed.
 - Documentation shall be retained for the duration of the project.

Inspections

- Inspections shall be made by a competent person:
 - When hazardous conditions exist.
 - Prior to the start of work.
 - After every rainstorm.
 - As needed.



Common citations, 2019 to 2024

- 29 CFR 1926.652(a) – 118 citations
 - Each employee in an excavation shall be protected from cave-ins by an adequate protective system.
- 29 CFR 1926.651(k) – 53 citations
 - Daily inspections shall be made by a competent person.
 - Competent persons shall take prompt corrective action when deficiencies are discovered.

Common citations, 2019 to 2024

- 29 CFR 1926.651(j) – 52 citations
 - Materials and equipment shall be kept at least 2 feet from the edge of the excavation.
- 29 CFR 1926.651(c) – 43 citations
 - Employees shall be provided access egress in trench excavations 4 feet or more in depth with no more than 25 feet of lateral travel.

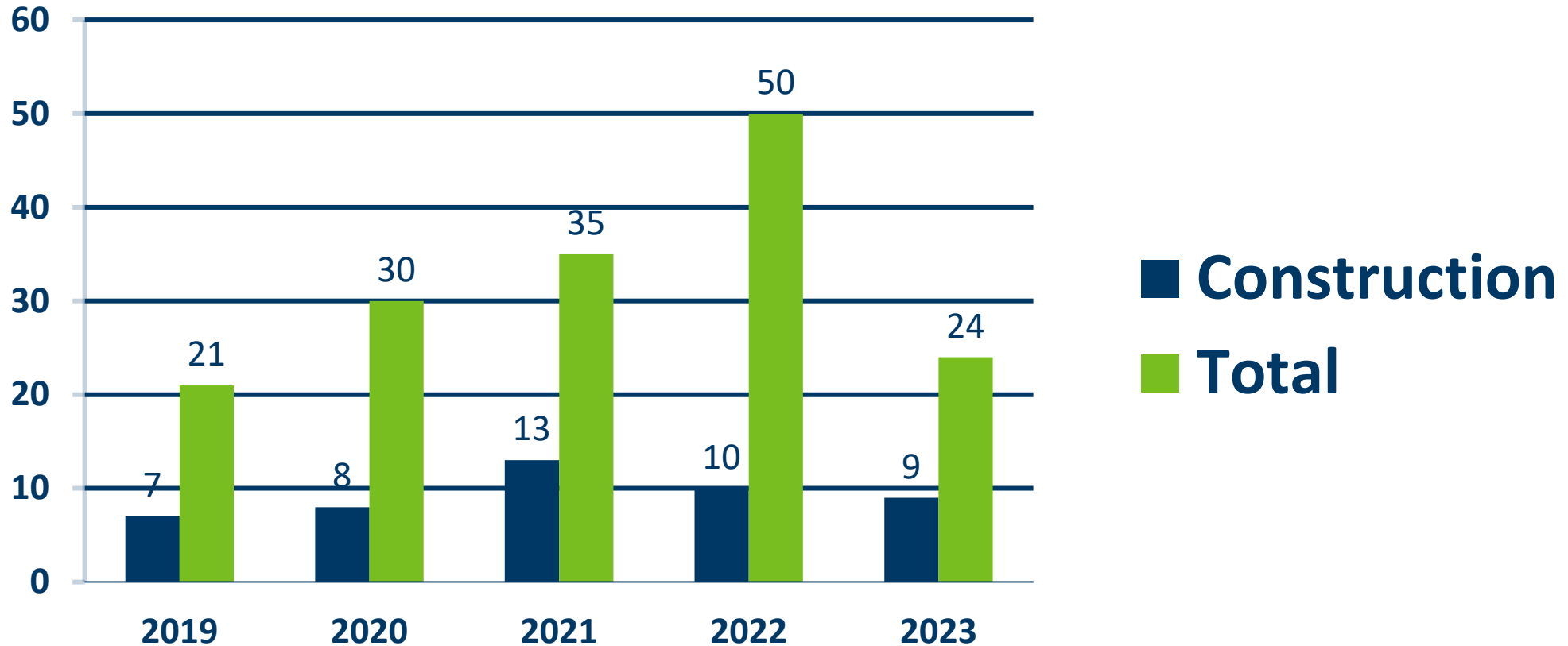
MNOSHA Compliance fatality investigations, federal-fiscal-years 2019 to 2023

During the period from Oct. 1, 2018 through Sept. 30, 2023, the annual average number of fatalities under Minnesota OSHA (MNOSHA) jurisdiction was 32.

The most common types of workplace fatalities were:

- **contact with an object or equipment** – average of nine workers each year; and
- **falls** – average of eight workers each year.

Construction fatalities, federal-fiscal-years 2019 through 2023



Fatal occupational injuries per 100,000 full-time-equivalent workers, 2021

State	Fatality rate
Iowa	3.3
Minnesota	2.8
North Dakota	9.0
South Dakota	4.7
Wisconsin	3.4

MNOSHA most frequently cited standards in construction, federal-fiscal-year 2023

Standard	Description	Frequency
1926.501	Fall protection	158
Minnesota Statutes 182.653, subdivision 8	A Workplace Accident and Injury Reduction (AWAIR) program	81
1926.1053	Ladders	52
1926.503	Fall protection training requirements	36
Minnesota Rules 5207.1100	Elevating work platform equipment	35
1910.1200 and 5206.0700	Hazard communication	34
1926.451	General requirement for scaffold	30
1926.651	Specific requirements for excavations	27
1926.652(a)(1)	Requirements for protective systems	26
1926.100(a)	Hard hats	18
1926.20(b)(2)	Frequent and regular inspections	18

OSHA federal penalty conformity

Effective July 1, 2023:

- Future penalty increases are indexed to inflation.

Minnesota OSHA penalties beginning July 1, 2023		
Type of violation	Maximum	Minimum
Willful or repeat	\$156,259	\$11,162
Serious, nonserious, failure to correct, posting	\$15,625	N/A

Preventing struck-by incidents

- Work plans
- Effective communication
- Cameras
- Alarms



MNOSHA Workplace Safety Consultation

Provides free voluntary and confidential workplace safety and health assistance to Minnesota businesses, with a priority for small businesses and high-hazard industries.

Services provided

- On-site consultation
- Hazard recognition
- Safety management effectiveness
- Training, education and outreach
- Technical assistance

Programs

- Safety grants
- Workplace violence prevention
- Ergonomics
- Labor-management safety committee
- Minnesota Safety and Health Achievement Recognition Program
- Minnesota STAR Program

How to stay current with MNOSHA?

Federal OSHA website

- [osha.gov](https://www.osha.gov)

MNOSHA website

- dli.mn.gov

Safety Lines newsletter subscription

- dli.mn.gov/business/workplace-safety-and-health/mnosha-compliance-safety-lines-newsletter

Thank you

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