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CEMETERY SAFETY

Working in and around graves is a necessary but potentially hazardous part of running a cemetery. Follow these guidelines to do it safely.

Working safely in and around graves

Cemetery work is very physical and can be hazardous. First and foremost are the dangers posed by digging and working in and around excavations. Other risks to cemetery personnel include lifting and ergonomics issues, management of memorial stones and trip hazards.

Fortunately, taking basic precautions can prevent injuries and accidents and save lives. Let's learn more about each of these hazards, and more important, what you need to do to protect your employees.

Graves are really excavations. An excavation is any human-made cut, cavity, trench or depression in the earth's surface formed by earth removal. Excavations are among the most dangerous of all occupational hazards.

When working in or around excavations, personnel risk exposure to falls, hazardous atmospheres, equipment hazards, falling loads, monument collapse and cave-ins.

OSHA has an extensive standard specifically developed to keep you safe while digging and when working in and around excavations. Let's touch on some of the highlights as related to cemetery operations.

Competent person

OSHA defines a competent person as an individual capable of identifying existing and predictable hazards in your working conditions.

The designated competent person at your cemetery must have training, experience and knowledge of the requirements of the OSHA Excavations Standard, including being able to detect conditions that could result in hazardous atmospheres, cave-ins and various hazards associated with confined spaces.

The designated competent person must also have the authority to take prompt corrective measures to eliminate existing and predictable hazards and to stop work when required.

Potential gravesite hazards

Falls. Open graves must be clearly identified to prevent falls and guard rails must be provided if the grave is 6 feet deep or more.

Hazardous atmospheres. Potentially hazardous gases that could be encountered when digging graves include carbon dioxide, which can create an oxygen deficient atmosphere; carbon monoxide; natural gas from potential leaks or cut lines; and methane from decayed matter.

A competent person must test the atmosphere of any excavation before any employee enters the grave in cases where:

- the excavation is deeper than 4 feet;
- an oxygen deficiency can occur;
- a hazardous atmosphere could be reasonably expected.

Continuous monitoring is required if conditions can change during the work.

When a hazardous atmosphere is present in a confined space, personal protective equipment is required, as well as stand-by lifesaving equipment, engineering controls (e.g., ventilation) and respiratory protection. All at-risk workers should be trained in rescue procedures, since 60 percent of all workers who die from hazardous atmospheres are the rescuers themselves.

Equipment hazards. Operators must have training on the use and maintenance of their excavating equipment and they must inspect their equipment before each use.

Swinging loads can catch a worker between the bucket and the machinery; everyone must be aware of the swing radius of the digging equipment.

Workers may trip on an uneven grade and be hit by or run over by equipment. Don't rely only on back-up alarms—always be sure the equipment operator is aware of everyone's position.

There is also the risk of exposure to falling loads. Employees must be protected from loads or objects falling from lifting or digging equipment. Employees are not permitted to work under raised loads and must stand away from equipment being loaded or unloaded.

Falling or rolling objects. While a worker is in an excavation, other employees should not work around the edge of the grave opening. Keep materials or equipment that might fall or roll into an excavation at least 2 feet from the edge, or use retaining devices. Protect employees from falling rock, soil, materials or tools. Workers should spend the minimum time possible in the excavation.

Monument collapse. Another risk when digging in a cemetery is monument collapse. Nearby monuments, masonry or headstones may threaten the stability of the worksite or may inhibit access.

Cave-ins. Cave-ins are the most common cause of worker fatalities in excavations. Soil is heavy; a cubic

Soil classification and related safety factors

Soil is a mixture of sand, gravel, silt, clay, water and air. The amount of each of these ingredients determines how well a soil will hold together (cohesiveness).

Soils are classified not only by how cohesive they are, but also by the conditions in which they are found.

The OSHA-defined *competent person* determines the soil type by using both manual and visual methods. OSHA classifies soils into four categories:

- **Solid rock**
- **Type A** is the most cohesive soil and includes clay, silty clay, or sandy clay. Soil cannot be considered Type A if it is fissured or cracking, previously disturbed or excavated, composed of layers of different soils, wet or has groundwater, or if it is subject to vibration from activities nearby.
- **Type B** soil includes both cohesive and non-cohesive soils, such as silt, sandy loams, medium clays and unstable rock. Soils that might be classified as A, but have fissures or other conditions may also be classified as B.
- **Type C** soil is the least stable and therefore the most dangerous of the four soil types. Soil is classified as Type C if there is standing water or water is seeping from the sides of the excavation, if the soil was previously dug up or if it is "layered" soil, where different soil types lay on top of each other.

If the soil type is uncertain, Type C should always be assumed and the most protective measures should be taken.

Other factors that affect the stability of the soil include:

Water content. Soil that's too wet does not hold together well and is particularly unstable and heavy. Soil that's too dry also does not hold together well.

Water accumulation in the grave. Employees are not allowed to work in excavations where water has accumulated without adequate precautions. Standing water can undermine the sides and make it more difficult to get out. Divert surface water to prevent it from entering the excavation. In extreme cases, a pump may be required.

Changes in weather and climate. The temperature outside can affect the water content of soil. Freezing and thawing can expand and contract soil and affect its cohesiveness. Heat will reduce the water content.

Other operations in the vicinity. Excessive vibration from construction equipment or vehicle traffic around the excavation can affect the stability of the soil. Stability can also be impacted when loads (monuments, equipment or excavated material) are too near the edge. ❑

foot can weigh as much as 140 pounds, and a cubic yard can weigh over 3,500 pounds!

A person buried under only a few feet of soil can experience enough pressure to prevent the lungs from expanding and suffocation can take place in as little as three minutes.

The designated competent person must have training, experience, and knowledge of soil analysis and the use of protective systems. He/she must be able to detect conditions that could result in cave-ins and failures in a protective system.

Regardless of the depth of the grave, your competent person must inspect conditions as frequently as necessary during the excavation to assure that the hazards are managed.

Cave-in prevention

OSHA requires that employees be protected whenever they could potentially be exposed to cave-ins. A protective system must be used for all excavations more than 5 feet deep.

OSHA regulations discuss three different types of protective systems: shielding, shoring and sloping.

- **Shielding** devices serve as "shields" to the workers within if a cave-in occurs. They are not designed to prevent a trench wall from collapsing. Shields are commonly called trench boxes.
- **Shoring** is the provision of a support system for trench faces used to prevent movement of soil. Shoring braces against and holds up the walls of an excavation.
- **Sloping** involves cutting back the trench walls at an angle so there is little chance for collapse. The angle required is dependent on the type of soil. Benching is similar to sloping. It involves making cuts in the side of the grave to form horizontal stabilizing steps.

It is critical to remember that shoring and shielding protect workers only when they stay within the confines of the systems. For this reason, sloping is OSHA's preferred protective system, but sloping is usually not practical for cemetery operations.

Vaults as protection. In an established cemetery with intermittent open grave sites, the surrounding vaults serve to create a trench box, almost as though you were excavating in solid rock. A protective system is required only when there are not nearby adjacent vaults.

The protective system used depends on many factors, including soil classification (see "Soil Classification," this page), water content of soil, changes due to weather and climate, depth of cut and other operations in the vicinity.

Entry and exit. Trenches 4 feet or more in depth must be provided with a safe means of entry and exit. Ladders must be secured and extend a minimum of 36 inches above ground level.

Other gravesite hazards

Working in a cemetery typically involves lifting and other ergonomic risks, use of lift assist devices, placement of memorial stones and various trip hazards posed by equipment, markers, tools or loose earth. Each cemetery must have a system for periodically assessing, identifying and eliminating hazards.

Ergonomics and musculoskeletal disorders (MSDs). Personnel must reach and lift when setting up chairs and awnings; placing heavy objects like caskets and markers; lifting plants, tree limbs and rocks; and using tools for extended periods of time. Injuries can easily result from doing these jobs with poor ergonomics.

MSDs occur when the physical capabilities of the worker do not match the physical requirements of the job. MSDs are injuries to the nervous system and soft tissues caused by stress on the body. These types of injuries can occur abruptly or slowly over time due to repetitive motion.

Avoiding musculoskeletal disorders. Good ergonomics means making the job fit the worker's capabilities. Adoption of ergonomically correct work practices can protect your health and safety and also contribute to your effectiveness as an employee.

Employees must be trained on safe lifting technique, proper positioning of the body when performing various tasks and the use of ergonomically correct tools. Lift assist equipment should be used whenever possible, and employees must be trained prior to using it.

Memorial stones. Memorial stones and monuments pose their own set of hazards. As time passes, the ground may soften or shift, causing monuments to become less stable.

Each cemetery should have a system for

checking all markers, headstones, etc., to ensure they do not pose a hazard when digging adjacent graves or doing grounds maintenance.

Trip hazards. Trip hazards are posed by tools and equipment, stones and uneven ground. Your cemetery should have an established work procedure for removing hazards when work shifts end, and also for systematically identifying and eliminating trip hazards before an incident occurs.

Avoiding accidents and injuries. Most incidents can be prevented by following common-sense measures. Preplan any work before digging.

Your competent person must determine the location of any underground utilities, assess the soil and weather conditions, determine the need for a protective system and consider nearby structures and other factors that could affect safety on the job.

Inspect equipment prior to each use. Only trained personnel should operate equipment.

Conduct hazard assessment on a routine basis, and establish safe work procedures for each task. The proper tools and any required personal protective equipment, such as gloves and a hard hat, should be used for each job.