

TECH TALK: Excavation safety

By Ed Sauter

Editor's note: As part of our partnership with the Concrete Foundations Association (CFA), the following article is the second in a series on the basics of concrete foundation construction.

It is not uncommon to see large holes in the earth's surface that have been carved out to form the shape of the future home's basement when driving through a new housing development. While this process may seem easy to the casual observer, foundation professionals know that careful and meticulous planning are involved with every excavation. Proper excavation procedures that stress safety as the primary concern provide the groundwork for a successful project.

The excavation process begins with a thorough understanding of the soil conditions at a job site. This understanding will help the foundation professional determine the best course of action for the excavation. What many fail to realize is the weight of soil.

According to the Ohio State University Extension Fact Sheet (www.ohioline.ag.ohio-state.edu), "Soil is an extremely heavy material and may weigh more than 100 pounds per cubic foot. A cubic yard of soil, which contains 27 cubic feet

of material, may weigh more than 2,700 pounds. That is nearly one and a half tons (the equivalent weight of a car) in a space less than the size of the average office desk." This analogy helps put into perspective the importance of safety when excavating a site.

"With the growing acceptance and demand of concrete poured wall foundations, it is important for all members of the construction team to keep safety as job one," said Jim Baty, technical director of the Concrete Foundations Association (CFA). "Excavation safety is one of the greatest concerns for every foundation contractor, making education in this area critical."

A variety of factors, which include both the crew and the equipment, must be considered when assessing the safety of an excavation site. In 1995, the Occupational Safety and Health Administration (OSHA) released a statement that regulation 29 CFR 1926.652 would not be applied to house foundation/basement excavations when certain conditions are met.

The first condition is that the house foundation/basement excavation must be less than 7.5 feet in depth. Excavations deeper than this must be "benched" or stepped with at least two feet of horizontal setback for every five feet or less of vertical height.

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The second condition entails that the minimum horizontal width (excavation face to formwork/wall) at the bottom of the excavation is as wide as practicable, but not less than 2 feet.

Third, there can be no water, surface tension cracks, nor other environmental conditions present that reduce the stability of the excavation.

Fourth, no heavy equipment can operate in the vicinity that causes vibration to the excavation while employees

are inside the excavation.

Fifth, all soil, equipment and material surcharge loads can be no closer in distance to the top edge of the excavation than the excavation is deep. For example, if the excavation is 7.5-feet deep, the rear wheels of the ready-mixed truck must be 7.5 feet away from the top edge of the site. However, when front-end loaders are used to dig the excavations, the soil surcharge load (closest point of load transfer from equipment to soil)

should be placed as far back from the edge of the excavation as possible, but never closer than 2 feet.

No consideration too small

The work should be planned and carried out in a manner to minimize the time employees are in the excavation. If all of these factors are present, the chance of a cave-in is greatly reduced. For poured wall basements, special consideration must be given to the ready-mixed truck that must access the site. According to Dan Bromley of ABI Corp. of Lee's Summit, Mo. and member of the CFA Board of Directors, the truck should not be placed parallel to the excavation site.

"The chances that the truck could roll over into the excavation site causing extensive damage to the forms, site and truck are increased when the truck is parallel to the site," Bromley said. "If the truck is perpendicular or diagonal to the excavation, the stability of the truck is improved."

"Professional wall contractors often go beyond the minimum requirements of OSHA to ensure that their employees are protected," Baty said. "Many have company regulations requiring that no one can enter an excavation without another company member in their vicinity. It is with practices such as this that CFA contractors are protecting their futures and their employees."

Excavation safety is important for all members of any residential project. Everyone involved in the project must become educated on the subject to fully understand the time it takes to ensure the highest safety levels. The results of hasty procedures or complacency can be both costly and tragic. Improper excavation procedures have been the cause of severe damage to sites and equipment, lengthy time delays, and even employee deaths. Industry associations, such as CFA, are valuable resources for information on proper procedures and safety precautions.

Ed Sauter is executive director of the CFA. He can be contacted at www.cfawalls.org or 319-895-6940. CH



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