

## 15.1: Introduction to Excavations

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### Introduction

Construction workers are frequently called upon to work within excavations and trenches. OSHA studies have confirmed that excavation and trenching work is some of the most dangerous construction work performed. In fact, despite enhanced efforts by OSHA, the fatality rate for excavation work is nearly twice that of regular construction. By Definition, an excavation is any man-made cut, cavity, trench or depression in the earth formed by earth removal. Trenches, on the other hand, are narrow excavations made below the surface of the ground. Generally, the depth of a trench is greater than the width, but the width of a trench is not greater than 15 feet.

### General

OSHA defines a competent person as one who is capable of identifying existing and predictable hazards and who has the authority to take prompt corrective measures to eliminate them.

One of the most important factors in reducing worker fatalities and injuries related to excavations and trenching is proper planning prior to the start of the job. The following factors need to be considered before starting the excavation: Surface Encumbrances, Underground Utilities, Access & Egress, Hazardous Atmospheres, Water Accumulation, Inspections, and Fall Protection.

### Surface Encumbrances

Surface encumbrances are anything that is located on the ground in the area of the excavation that may get in the way or create a hazard for those working in the excavation or trench. Examples of these encumbrances are street signs, traffic signals, lighting standards, trees sidewalks, etc. OSHA requires that all surface encumbrances that might pose a hazard shall be removed or supported to safeguard employees.

Another consideration when planning for surface encumbrances is the proximity of trenching and excavation work to adjacent structures. Subpart P requires that adequate means, such as shoring, supporting, bracing, etc., be taken when the stability of adjacent structures is endangered by excavation operations.

### Underground Utilities

#### Planning the work

In addition to the surface encumbrances, planning must consider those things under the earth that may be disturbed during the excavation. Utility installations are the most common and the most dangerous item to consider before beginning an excavation. Most states have a "Call Before you Dig" law and OSHA requires that the location of sewer telephone, electric, gas and other utility service installations must be determined prior to the opening of an excavation.

State or local ordinances usually determine the appropriate response time for utilities to identify their lines or piping. If the utility is unable to locate the line within 24 hours or whatever the period of time that state or local ordinances provide for, excavations can begin provided suitable detection equipment is used.

Keep in mind that the locations marked by the utilities are estimated locations only. Hand holes should be dug first to determine the exact location of the lines or piping.

### Access and Egress

#### Means of exit and entry

A means of exit and entry from a trench excavation shall be provided for trench excavations four ft. or more in depth. Ladders, stairways or ramps are permitted means of exit and entry and they must be installed such that any worker does not have to travel more than 25 ft. in a lateral direction to reach the exit.

#### Ramp design

If ramps are going to be used for employee access and egress, they must be designed by a competent person. If the ramps are going to be used for access and egress of equipment, they shall be designed by a competent person qualified in structural design and the ramp must be constructed in accordance with the design.

## Hazardous Atmospheres

One of the most frequently overlooked hazards in excavation and trenching work is hazardous atmospheres. Subpart P requires that where oxygen levels of less than 19.5 % are present or where such oxygen deficient conditions could reasonably be expected to exist, the atmosphere in the excavation or trench shall be tested prior to employees entering any excavations, deeper than four ft. Trenching in areas like landfills and other areas where hazardous substances are stored, are examples of the types of location that will require testing.

## Protection from Loose Rock or Soil

All materials removed from a trench or excavation must be kept back at least two ft. from the edge of the excavation or trench or by the use of retaining devices sufficient to keep materials and equipment from falling or rolling into the excavation.

## Inspection

Daily inspection of trenches and excavations shall be made by a competent person to ensure that there will not be any cave-ins, failures of protective systems, or hazardous atmospheres.

## Water Accumulation

One of the most important factors in maintaining the integrity of a trench or excavation is the control of water in and around the excavation. The presence of water in a trench or excavation heightens the possibility of wall failure and threatens the safety of every worker in the excavation. OSHA requirements in Subpart P that are related to water accumulation are as follows:

1. Employees shall not work in excavations in which there is an accumulation of water or water is accumulating, unless adequate precautions have been taken. In general, adequate protection would mean special support or shield systems, water removal systems and life safety systems such as body harness and lifelines.
2. If water removal equipment is used, the status of the removal shall be monitored by a competent person to ensure proper operation.
3. When the location of the excavation is such that it interferes with the natural drainage of surface water, diversion dikes ditches or other means shall be employed to prevent surface water from entering the excavation.

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