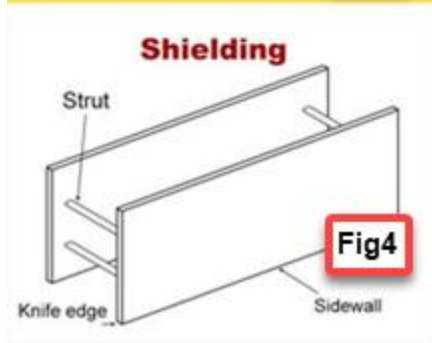
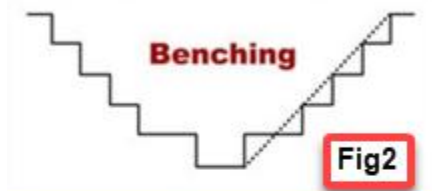


The Occupational Safety and Health Administration (OSHA) requires trenches and excavations five-feet deep or greater to have a protective system to safeguard employees from cave-ins. There are four basic methods to accomplish this: **sloping, benching, shoring, and shielding**.

Soil type, water levels, excavation depth and width, nature of the work, and nearby activities that could increase the risk of cave-ins are contributing factors to consider when selecting which method to use. The **competent person** has the responsibility of considering these factors and determining the appropriate protective system.



Sloping and Benching

Sloping: Requires forming sides that are inclined away from the excavation (Fig1). OSHA provides maximum allowable slope information. To use the maximum allowable slope site conditions must be ideal. If any signs of distress are observed, the actual slope is required to be less than the maximum allowable slope.

Benching: An excavation technique that leaves step-like appearance on the sides of the excavation (fig2). There are two types of benches: simple and multiple (detailed on page 2).

**Sloping and benching for excavations greater than 20 feet deep must be designed by a registered professional engineer per 1926.652(b) & (c).*

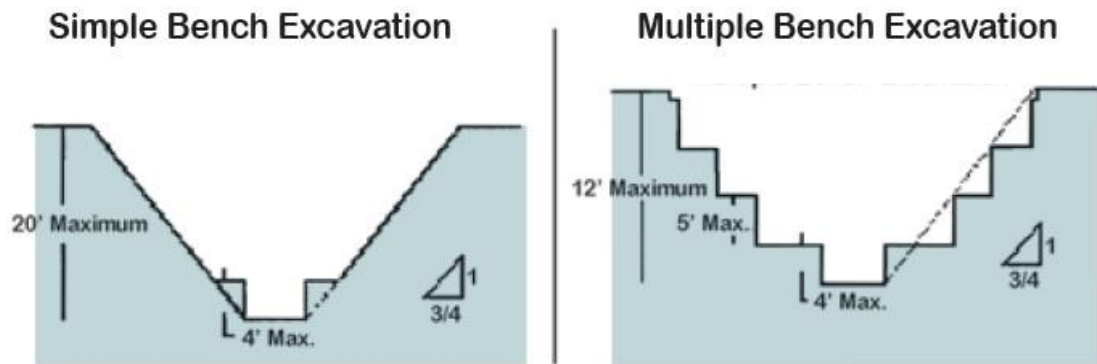
Shoring and Shielding

Shores: Vertical or horizontal supports that prevent the faces of an excavation from collapsing (fig3).

Shields: Provide employees a safe work area by protecting them from collapsing soil (fig4). Shields don't prevent cave-ins, but they do shield workers if a face collapses. They're usually placed in the excavation by heavy equipment.

Shoring and shielding systems are usually aluminum or steel. They're available from manufacturers in a variety of dimensions, or they can be custom-built from tabulated data approved by a registered professional engineer. The **competent person** should choose the correct protective system after carefully studying and understanding the manufacturer's tabulated data.

Type A soil: simple and multiple benches



Type B soil: simple and multiple benches

