In Michigan, from 2001-2005, 8 workers have been killed when a trench wall collapsed and buried the worker. Five of these workers were working on making sewer pipe taps. These include:

- 18-year-old male carpenter working on a sewer lead when a 9 ft trench wall collapsed.
- 22-year-old male construction worker replacing a sewer lead to a residence when an 8 ft trench wall collapsed.
- 37-year-old male plumber replacing a residential underground sewer pipe when a 9 ft trench wall collapsed.

IN ORDER TO PREVENT SIMILAR INCIDENTS IN THE FUTURE

- Designate a qualified person (QP).
- Locate underground utilities.
- Identify soil type.
- Determine angle of repose (benching, sloping) or supporting system (shoring) designed by the QP.
- Require appropriate angle of repose or supporting system for excavations when one side over 5' in depth. See Table 1.
- May Use portable trench box or sliding trench shields in place of shoring or sloping. Benching permitted when toe of trench box is not more than 2' above trench bottom. Extend trench box at least 18" above top of trench if trench is to be sloped above the box.
- Place spoils at least 2' away from excavation edge.
- Use ladder or other means of egress at least every 25' along an excavation which is 4' or greater in depth.
- Ensure ladder extends at least 3' above trench edge.

**TABLE 1**

MAXIMUM ALLOWABLE ANGLE OF REPOSE FOR DESIGNED SUPPORT SYSTEMS, AS MEASURED BY A PEDESTRIAN OR LABORATORY TEST

<table>
<thead>
<tr>
<th>System Description</th>
<th>Angle of Repose (°)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trench Box</td>
<td>18°</td>
</tr>
<tr>
<td>Vertical Support</td>
<td>30°</td>
</tr>
<tr>
<td>Horizontal Support</td>
<td>40°</td>
</tr>
</tbody>
</table>

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MIFACE: www.oem.msu.edu
FACEWeb: www.cdc.gov/niosh/facetools/
MOSHA Consultation, Education and Training Division: Click on MOSHA, then CET. www.michigan.gov/cet

DID YOU KNOW?

- Every trench is an unnatural condition and will collapse. It is just a matter of time!
- A trench is an excavation having a depth greater than its width measured at the trench bottom.
- Clay soils are the most deadly when trench walls collapse.
- One cubic yard of soil can weigh over 3000 lbs.
- Trenches less than 5' in depth need sloping or shoring if hazardous earth movement expected.
- Lack of slope/support of excavation over 5' deep and placement of spoils or obstructions within 2' of excavations are the most frequently cited violations by MOSHA.
- If different textured soils are encountered you must cut side to soil-required angle of repose.
- MOSHA CET has an excavation and trenching awareness training class.

TO REPORT A NEW WORKPLACE FATALITY TO MISHOA

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