

Lesson Plan 17: Excavating Latrine Pits



45 minutes total

Lesson Description



Participants learn how to determine the latrine pit and slab diameters based on the space needed for a person to dig. They also learn safe methods to excavate a latrine pit under normal conditions and in challenging conditions, such as high groundwater or unstable soil.

Learning Outcomes



At the end of this session participants will be able to:

1. Identify minimum latrine pit diameters and slab diameters.
2. Describe the methods and safety precautions to excavate a latrine pit in normal conditions.
3. Describe methods and safety precautions to excavate a latrine pit in challenging conditions.

Materials



- Flipchart paper
- Tape
- Markers
- Measuring tape
- Paper (1 per participant)
- Spoons (1 per group)
- Cardboard cylinders (inside of paper towel or toilet paper rolls) cut into 3 rings (1 set per group)
- Buckets filled with sand (1 per group)
- 4 shovels

Preparation



- Review topic in the Latrine Construction Manual
 - Write the heading “*Other Considerations for Pit Digging*” on flipchart paper
 - Write the heading “*Safety While Digging*” on flipchart paper
 - Gather materials needed for the activities
 - Optional: Write the learning outcomes on flipchart paper
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Introduction**10 minutes**

Optional: Go outside to an area where participants can actually dig into the ground, otherwise participants can pretend to dig a pit.



1. Divide the participants into 2 groups. Ask them to bring their chairs to their new group. Give each group 2 shovels.



2. Explain to participants that their challenge is to decide the minimum amount of space needed to dig a pit. They will do this by having one person as the digger who will have a shovel. The other participants will move their chairs into a circle around the person to simulate the feeling of being in a pit.

3. Once each group has decided on the pit size, measure the diameter of each pit and record it on flipchart paper.

4. Ask the participants to do the activity again. This time there should be two diggers with shovels in the pit at the same time.

5. Measure the diameter of each pit and record it on flipchart paper.

6. Explain that throughout the lesson you will come back to the pit size they selected for one person and for two people.

7. Present the lesson description or learning outcomes.

Digging in Normal Conditions**15 minutes**

1. Lock the measuring tape at a length of 0.9 metres. Place the measuring tape on the ground and ask the participants to make a circle of chairs around it at that diameter. Explain to the participants that this is the minimum diameter or width that a person needs to be able to dig. The size will depend on the person digging. Invite participants to enter the circle with a shovel to experience the size.

2. Discuss the difference between the pit diameters created in the introduction and 0.9 metres.



3. In pairs, ask the participants to discuss “How is the diameter of a pit related to the size of the slab?” Share some responses as a large group.

- *The slab must span the entire pit and also have a bearing (contact with solid ground) of at least 0.1 metres on all sides.*
- *Therefore for a 0.9 metre pit diameter, we need a 1.1 metre diameter dome slab or a 1.1 m x 1.1 m reinforced concrete slab.*

4. Explain that two people need 1.2 metres in diameter or width to be able to dig a pit together at the same time. Show this on the measuring tape and create a circle of chairs to represent the pit. Invite participants in pairs to enter the circle with a shovel to experience the size.

5. Discuss the difference between the pit diameters created in the introduction and 1.2 metres.

6. Ask the participants “What is the minimum size slab needed for a pit of 1.2 metres in diameter or width?”
- *The slab must span the entire pit and also have a bearing of at least 0.1 metres on all sides.*
 - *Therefore, we need a 1.4 metre diameter dome slab or a 1.4 m x 1.4 m reinforced concrete slab.*
7. Explain to the participants that this minimum diameter will become important when they are sizing their latrine pits or trying to site one with enough space. Also, mention that as the size increases so does the cost of materials to build the slab.
8. Ask the participants to stand up and show with their hands how deep they would dig until they felt unsafe. Their hand represents the top of the ground as if they are in a pit.
9. Use the measuring tape and lock it at a length of 1.2 metres. Hold the measuring tape up to your body and tell the group that this is how deep you would feel comfortable in a pit. Ask the participants “Why is this depth where I am comfortable?”
- *This is the average height of a person’s chest. If the pit collapses at this height, they can still breathe and hopefully have their arms and hands free.*
10. Discuss other considerations for digging a pit. Record main points on the “Other Considerations for Pit Digging” flipchart.
- *Objects can fall into the pit onto the digger’s head*
 - *Soil that is dug must be hauled out and disposed somewhere!*
 - *On average a person can dig 1 m³ of soil per day.*
 - *On average two people can dig 2 m³ of soil per day.*
11. In pairs, ask the participants to discuss: “What safety measures can be used when a person is digging deeper than 1.2 metres?” Share responses as a large group and record them on the “Safety While Digging” flipchart.
- *Tie a rope around the person’s waist or harness so they can be pulled out if there is an accident*
 - *Always have a person at the surface who can help in case of an accident*
 - *Wear safety equipment such as a hard hat and gloves*
 - *Communicate regularly and loudly with the person working in the pit*
 - *If the soil or pit walls are loose, they should be sloped or temporarily supported until the pit lining can be constructed.*
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Digging in Challenging Conditions**10 minutes**

1. Divide the participants into groups of 2–4 people. Give each group a bucket filled with sand. Ask the participants to dig a pit into the sand with their fingers.



2. Explain that this is what it is like to dig in unstable ground. Ask the participants “What could you do to safely dig a pit in unstable soil?” Share some responses as a large group.



3. Explain the shoring and caissoning methods to dig a pit in unstable soil. Write the words shoring and caissoning on paper and add them to the Word Wall.

4. Demonstrate the caissoning method using the cardboard rings, a bucket of sand and a spoon. Explain that the cardboard rings represent rings of concrete, clay or steel. The caissons become the lining of the pit. Once they go in they are not removed. It is important that the bottom caissons allow water to leave the pit and infiltrate into the soil. This can be done by using a porous material, drilling some holes or leaving the caisson’s slightly separated.

5. Hand out 3 rings to each group and ask them to try the caissoning method.

6. Emphasize that someone with excavation experience (like a local engineer) should be consulted before digging in unstable soil.



7. Summarize by saying that the safety precautions previously discussed should also be used when using shoring or caissoning.

Review**10 minutes**

1. Ask the participants to stand up and hold their hands at the height they could dig safely with minimal safety precautions.

2. Ask the participants to demonstrate with their arms how wide the pit needs to be for them to comfortably dig a pit alone.



3. Hand out a piece of paper to each participant. Ask participants to draw two safety precautions they should use when digging a pit deeper than 1.2 metres.

Reflections on Lesson