

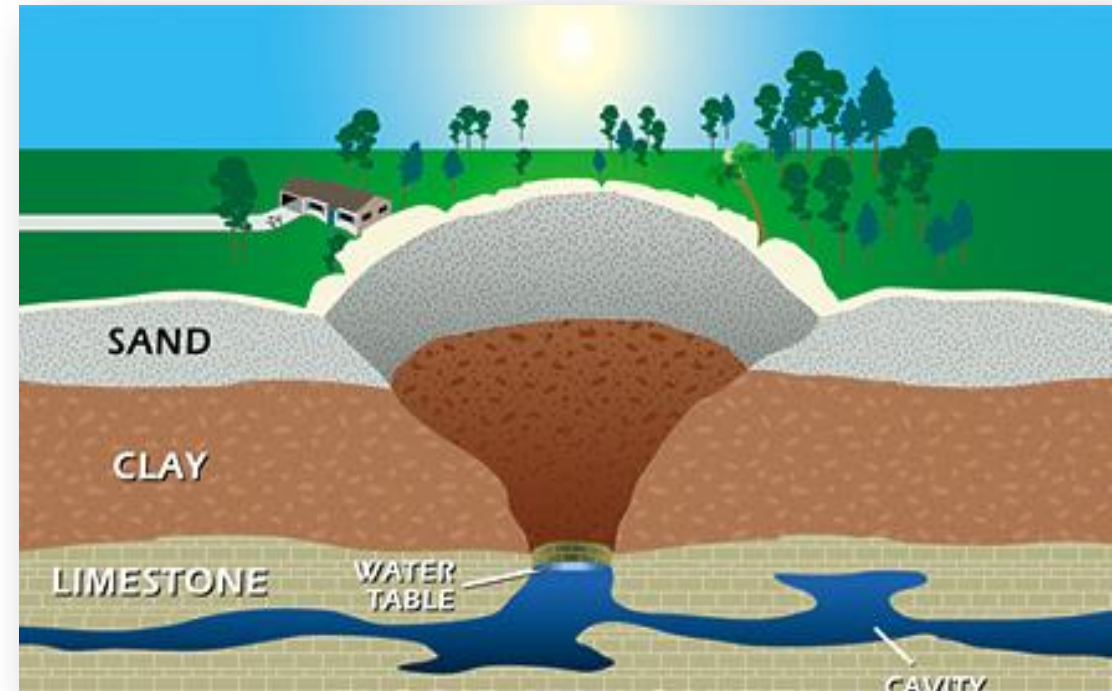


Sinkhole Formation

By: Eng.Hiwa Karim Saeed

What is a sinkhole?

A **sinkhole** is basically any collapsed or bowl-shaped feature that's formed when a void under the ground creates a depression into which everything around it drains.



The largest sinkhole in the world

(The one in Guatemala in 2010)

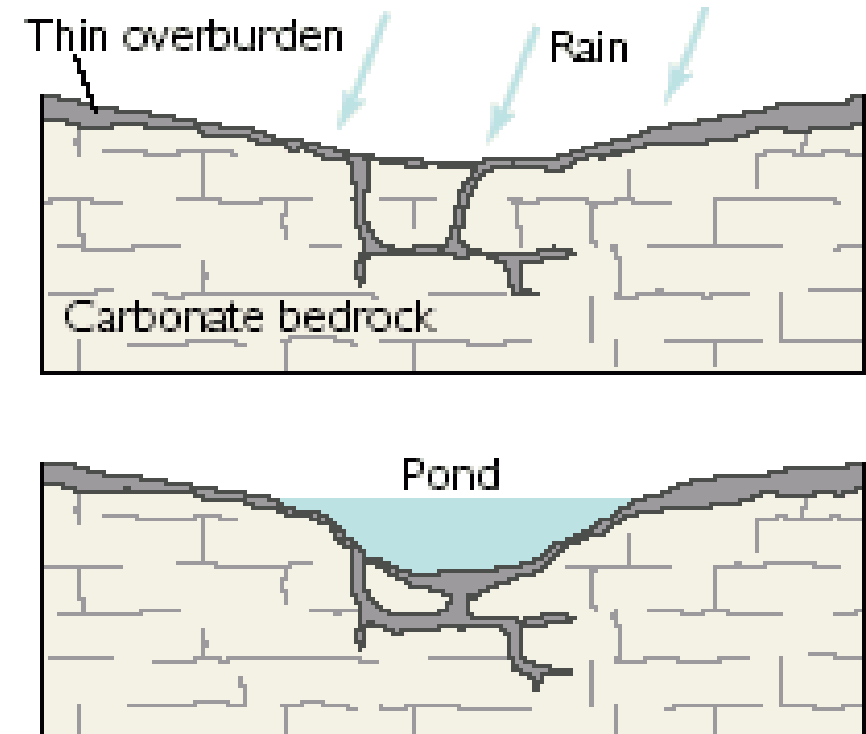
that was just an incredible, incredible hole that looked like it was bottomless. To [geologists], that one is probably one of the more spectacular. Of course, that wasn't in a karst area. That was because a big sewage line, or a big storm drain, was buried quite deeply.



Types of sinkholes:

1-Dissolution sinkholes:

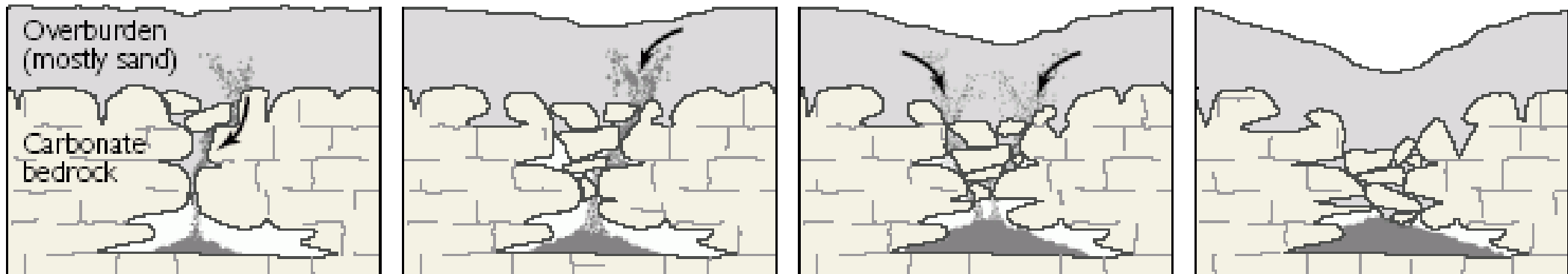
Dissolution of the **limestone** or **dolomite** is most intensive where the water first contacts the rock surface. Aggressive dissolution also occurs where flow is focused in preexisting openings in the rock, such as along joints, fractures, and bedding planes, and in the zone of water-table fluctuation where groundwater is in contact with the atmosphere.



Types of sinkholes:

2- Cover-subsidence sinkholes:

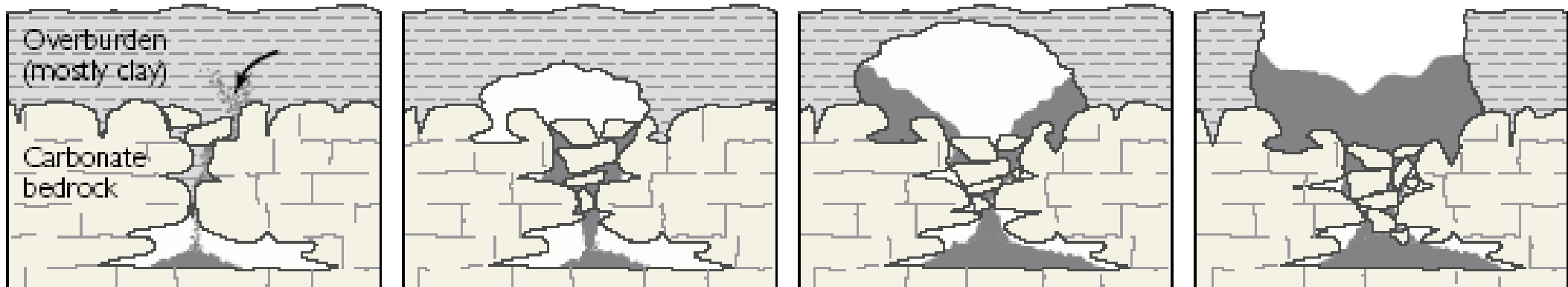
Cover-subsidence sinkholes tend to develop gradually where the covering sediments are permeable and contain sand. In areas where cover material is thicker or sediments contain more clay, cover-subsidence sinkholes are relatively uncommon, are smaller, and may go undetected for long periods.



Types of sinkholes:

3-Cover-collapse sinkholes:

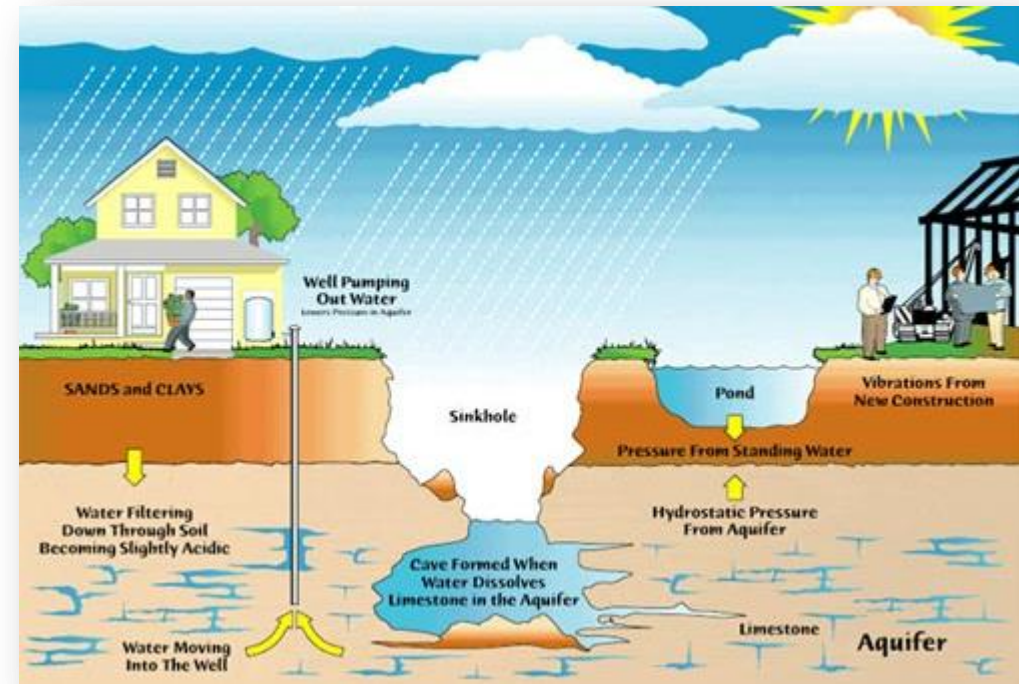
Cover-collapse sinkholes may develop abruptly (over a period of hours) and cause catastrophic damages. They occur where the covering sediments contain a significant amount of clay. Over time, surface drainage, erosion, and deposition of sinkhole into a shallower bowl-shaped depression.



Do any human activities induce sinkholes?

Sinkholes can be triggered by human activities such as:

- Over withdrawal of groundwater
- Diverting surface water from a large area and concentrating it in a single point
- Artificially creating ponds of surface water
- Drilling new water wells



Warning signs:

Some warning signs of a naturally occurring sinkhole include:

- Gradual localized ground settlement**
- Doors and windows fail to close properly**
- Cracks in a foundation**
- A circular pattern of ground cracks outlining the sinking area**
- Vegetation stress due to a lowered water table**
- Turbidity in local well water due to sediment washing into the limestone's pores**

What happens after a sinkhole is done collapsing?

Generally, if you don't do anything with it, the hole will plug itself with soil. But then it's a natural drain, so as it rains water flows into it, and it becomes a natural inlet into the groundwater.

Sometimes it'll become what we call an "**open throat**," where you can see the rock at the bottom, which can be an entrance into the cave system. Depending on the depth of the water table, it can also fill up with water. And then you have yourself a pond.



Some examples:

Sinkhole Near Structures, Stairs or Walkways



Some examples:

Sinkholes from Large Debris in the Yard



Some examples:

Sinkholes Under Sidewalks



Some examples:

Sinkholes Near a Buried Drainage Pipe, Water or Sewer Line



Prepared By
Eng.Hiwa Karim Saeed