

Question: what is worth teaching to everyone from Soil Mechanics?
(civil engineering subject)

Answer:

What happens when soil compresses¹

SUMMARY

¹ **compress:** to press or squeeze together, to undergo compression (Webster)

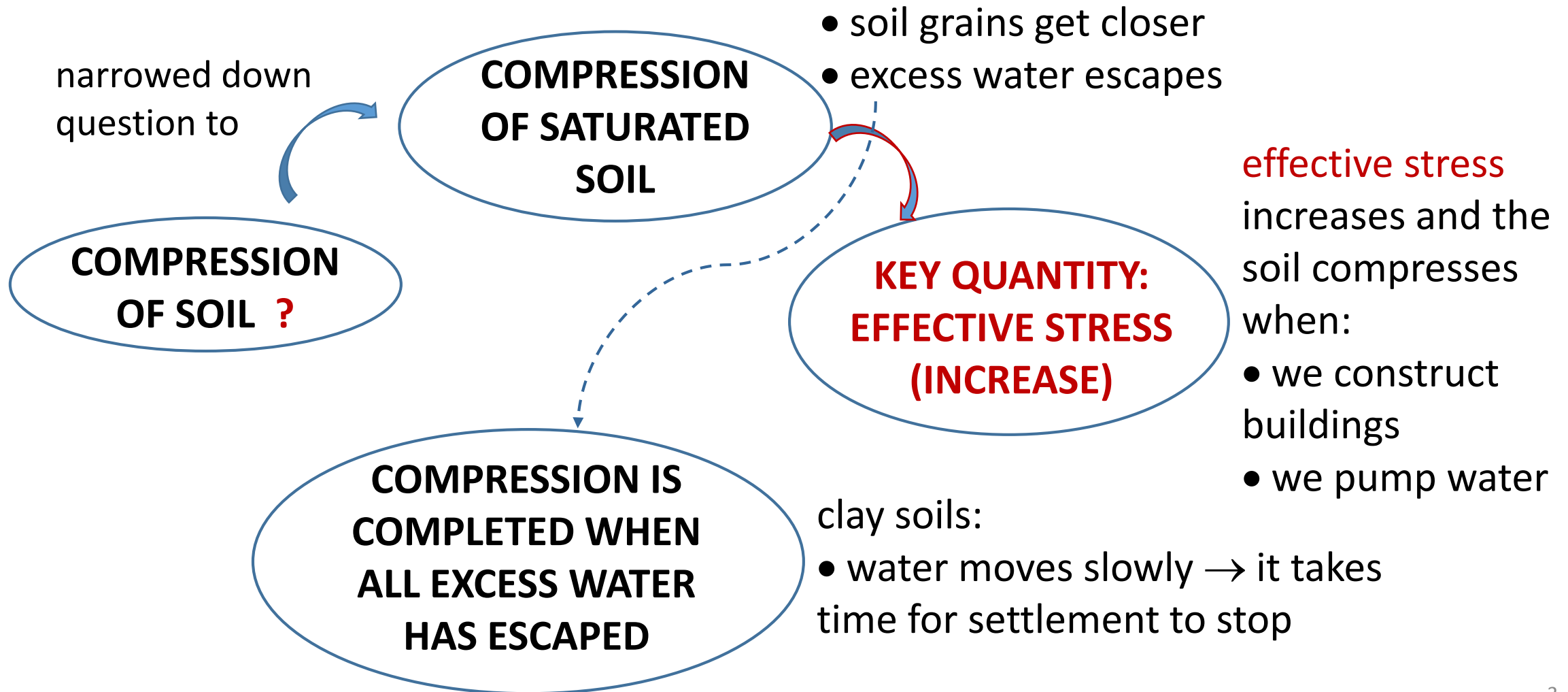
Goals of lesson in 3 parts + summary

- describe what happens when soil compresses
- link the description of soil settlement to the quantitative prediction of settlement (this is what civil engineers need to know)

SUMMARY

- WHAT DID WE LEARN ABOUT HOW SOIL COMPRESSES
- MORE GENERAL THINGS WE LEARNED WHILE LEARNING ABOUT HOW SOIL COMPRESSES

The engineer's answer to our **initial question**: when soil compresses effective stress increases



Impacts from engineering projects: prediction

**DESCRIPTION OF
PHENOMENON IN CAUSE-
AND-EFFECT ORDER: IMPACTS
SEEM TO BE APPARENT**

- Soil compresses → water leaves soil
- When we pump, water leaves soil → makes sense for soil to compress

PHENOMENON: PUMPING

- WE FOCUS ON WATER
- NOT OBVIOUS TO THINK ABOUT SOIL

**ENGINEER: PREDICTS
QUANTITATIVELY ALL
IMPACTS**

- Recognizes all undesirable possibilities
- Quantifies impacts
- Determines if impacts are acceptable
- If not, changes project design

In Venice and in Mexico City they thought about soil much later after settlements had occurred

How do the applied engineering sciences work?

Example: effective stress

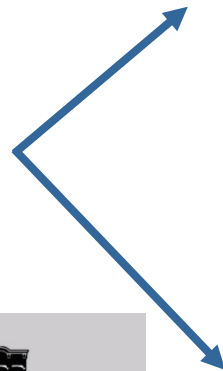


Seeks concepts and laws that explain phenomena with common characteristics

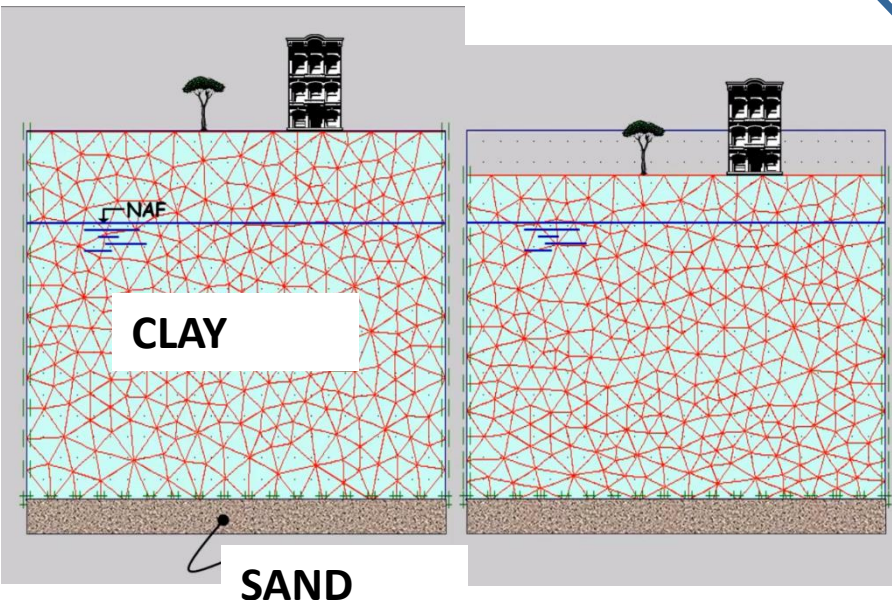


Example: loading of soil,
pumping of water

**ENGINEERING
SCIENCE**



Explanation of phenomenon →
mathematical description → calculation:
solution of equation analytically or
numerically using computers



Attribution of sources

- Slide 5: Auvinet, G., 2016, Geotechnical challenges in Mexico City clay, ISSMGE [Webinar](#)