An Introduction to Groundwater Issues at Mine Sites

Produced by:

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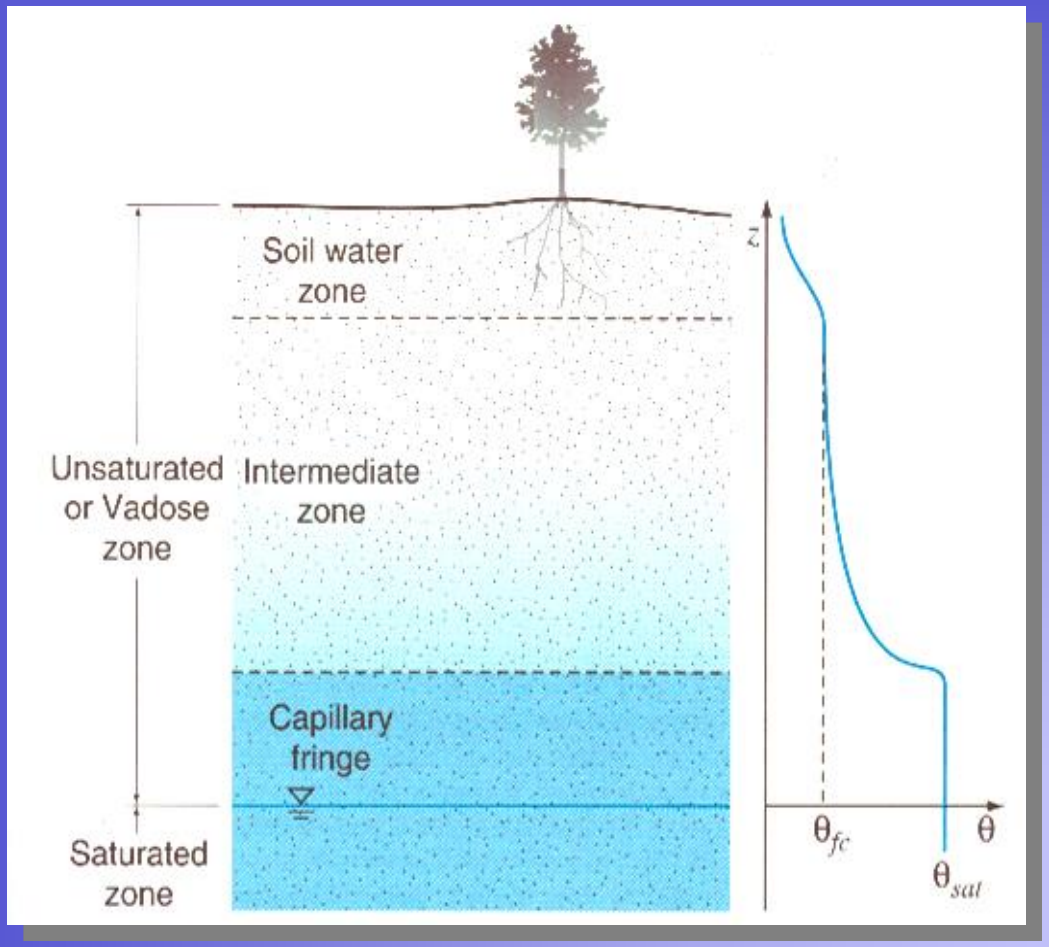
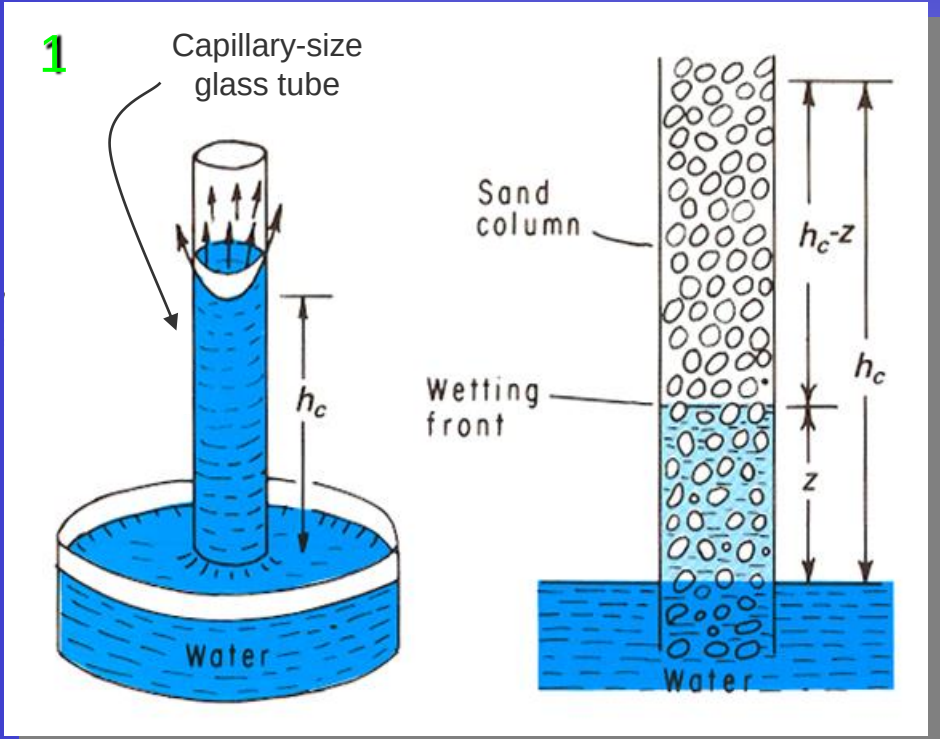
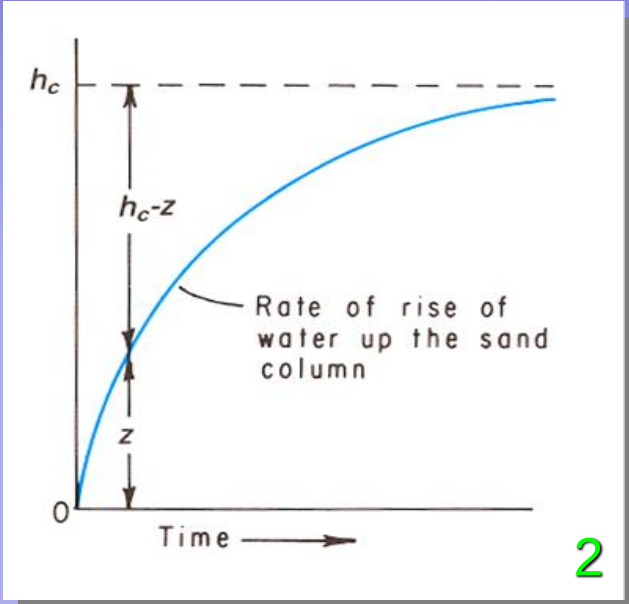
Topic 4:
The Vadose Zone – Conditions Above the Water Table

The Vadose Zone

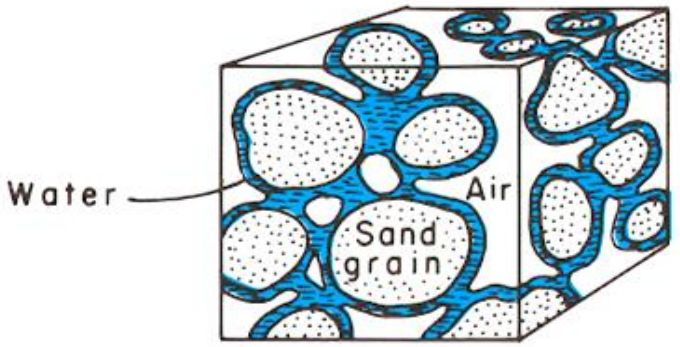


The Vadose Zone (con't)



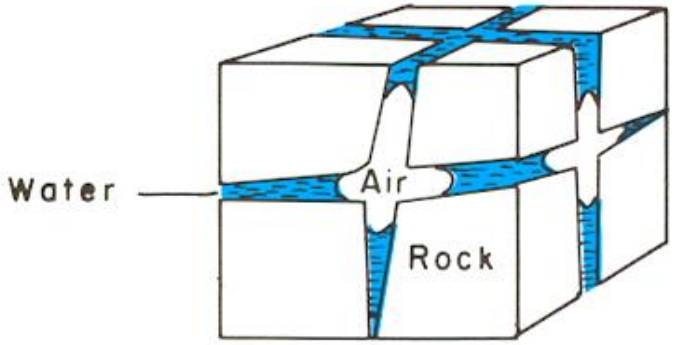


The Vadose Zone (con't)



GRANULAR MATERIAL

Water retained as a film on rock surfaces and in capillary-size openings after gravity drainage.

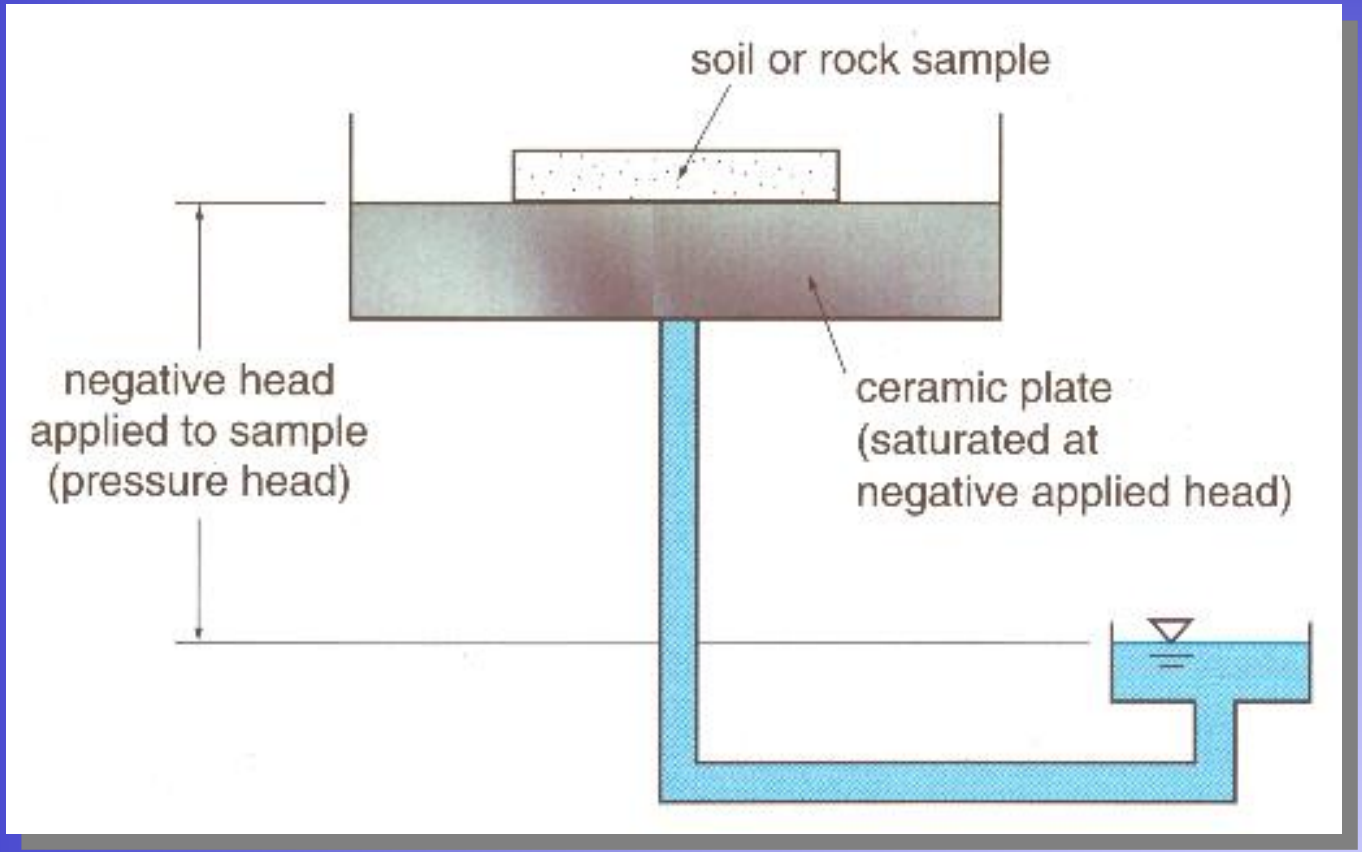


FRACTURED ROCK

Capillary Forces and Moisture Content

- Height of capillary “rise” of water is a function of pore radii in a simple homogeneous media
- Moisture content in the Vadose zone is a function of the height above the water table and the grain size of the media

Variation of Moisture Content above the Water Table



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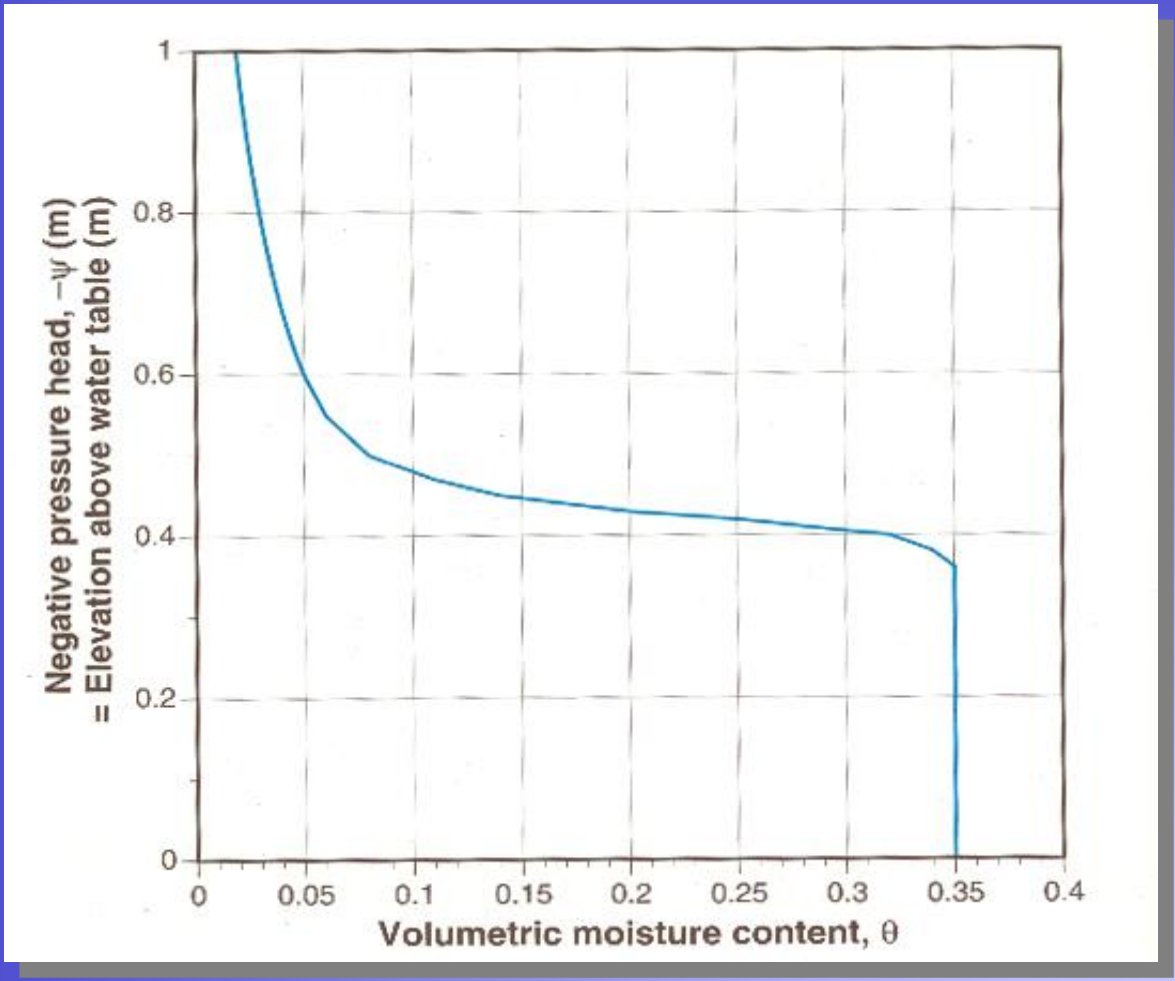
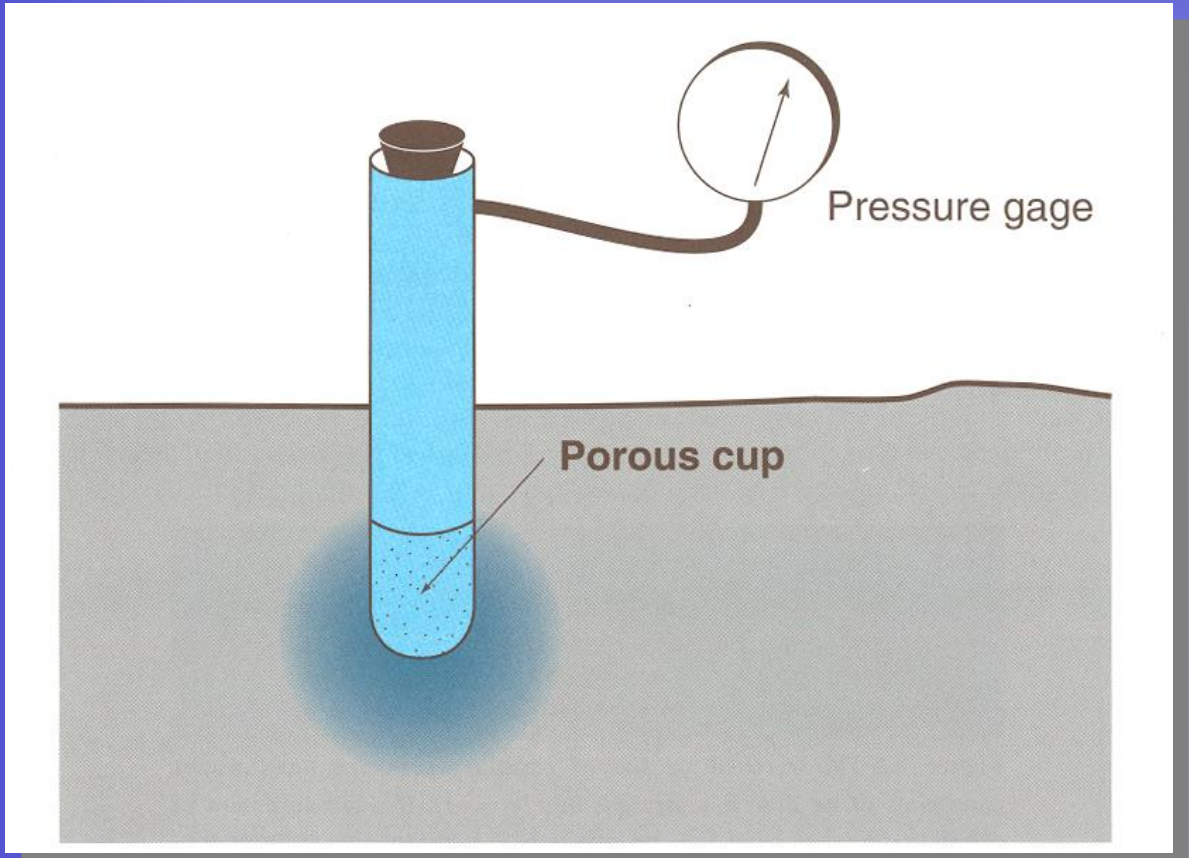


Measurement of Pressure (and Hydraulic Head) above the Water Table

- Tensiometers



Importance of the Vadose Zone

- Air content (pores contain air and water)
  - Allows oxygen entry into sulphide mine wastes
- Low water content causes low hydraulic conductivity (infiltration can be low for dry soils)
- Water content can vary significantly above the water table
  - Wet sediments can require time to drain
  - Dry sediments / rock piles can require time to wet up to field capacity (important for reactive rock)