Construction principles

- Sequence in the construction process

- Solid construction vs. Filigree construction
  - Strength and durability issues
  - Available natural resources
  - Flexibility and permanence
  - Solar gains management

Foundations

- Foundation requirements
  - Safe against structural failure
  - No differential settlement
  - Feasible technically and economically

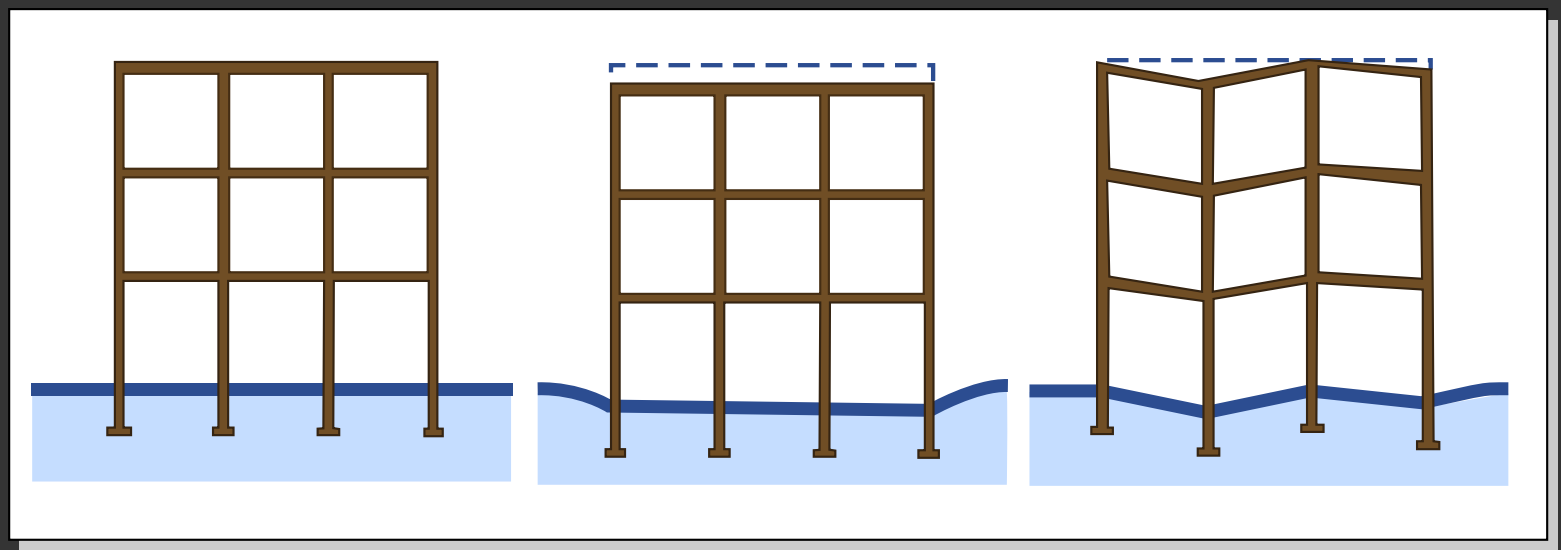
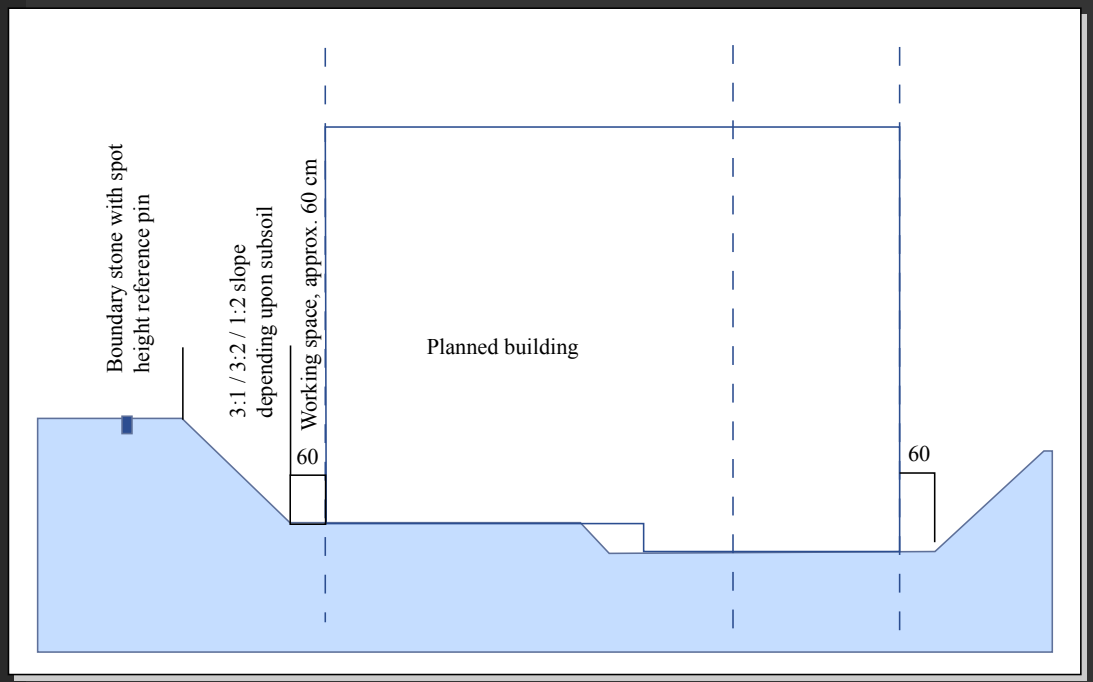


Image by MIT OCW.

Foundations

Excavation

- Constraints on slope from soil type
  - Cohesive soil
  - Frictional soil



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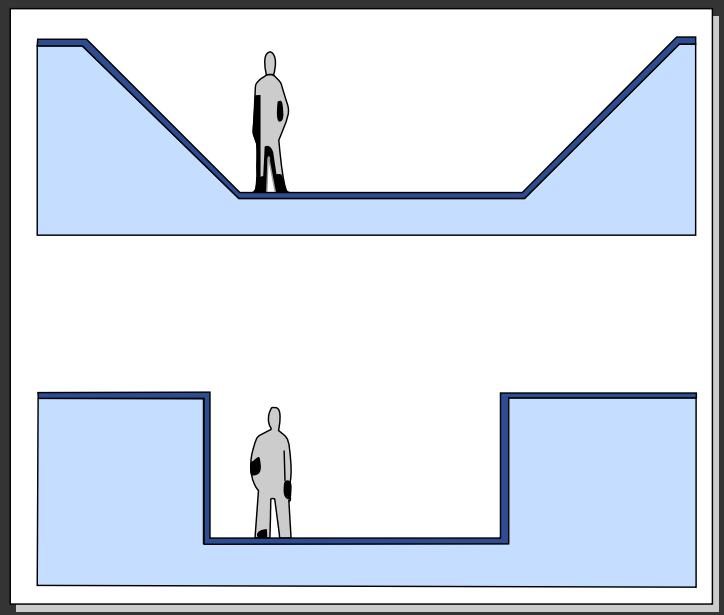

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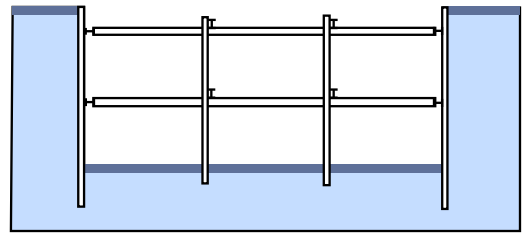
Foundations

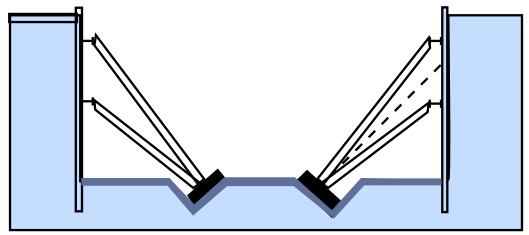
- Excavation
  - Constraints on slope from soil type
  - Constraints on slope from available space

Foundations

- Excavation
  - Sheeting and bracing
    - Soldier beams
    - Sheeting piling techniques



CROSSLOT BRACING



RAKERS

TIEBACKS

Foundations

- Excavation
  - Sheeting and bracing
    - Soldier beams
    - Sheeting piling techniques
    - Slurry wall

Foundations

- Excavation
  - Sheeting and bracing
    - Water table issue
  - Covering of base of excavation

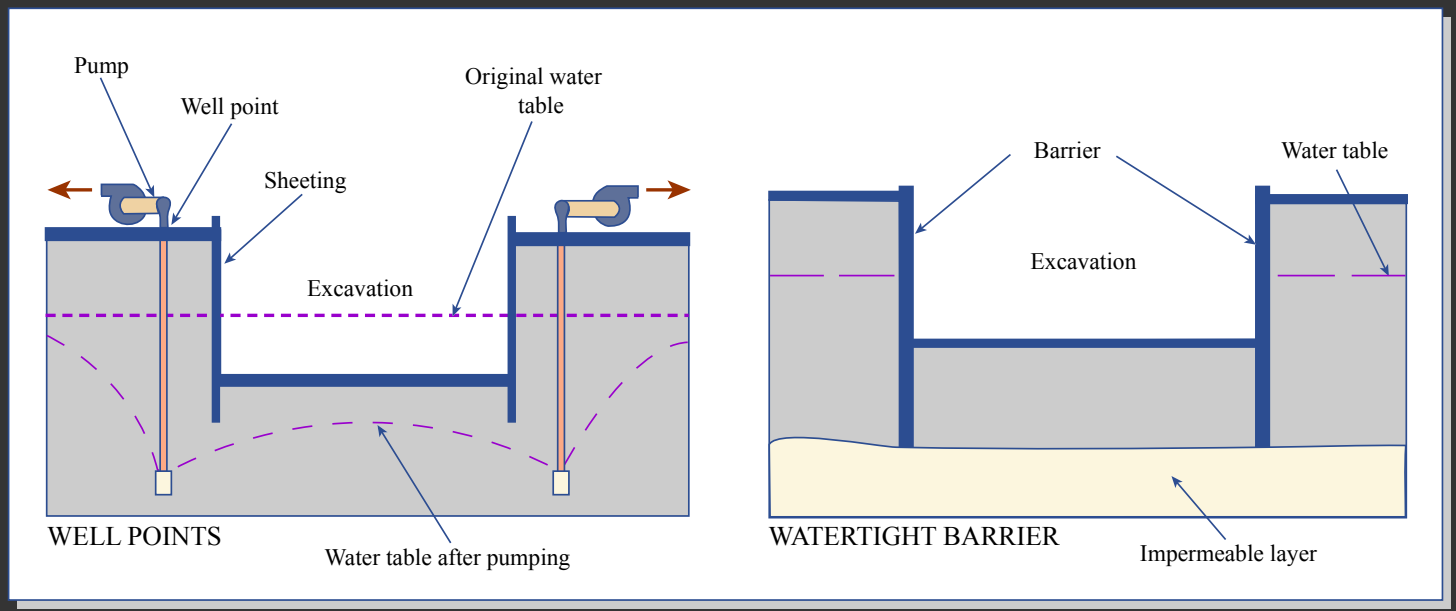


Image by MIT OCW.

Foundations

- Loadbearing elements and load-carrying soil
  - Shallow foundation
  - Footing
  - Deep foundation

Foundations

- Plinths
  - Protection of façade
  - Required for sloped topography

Foundations

Protection against humidity

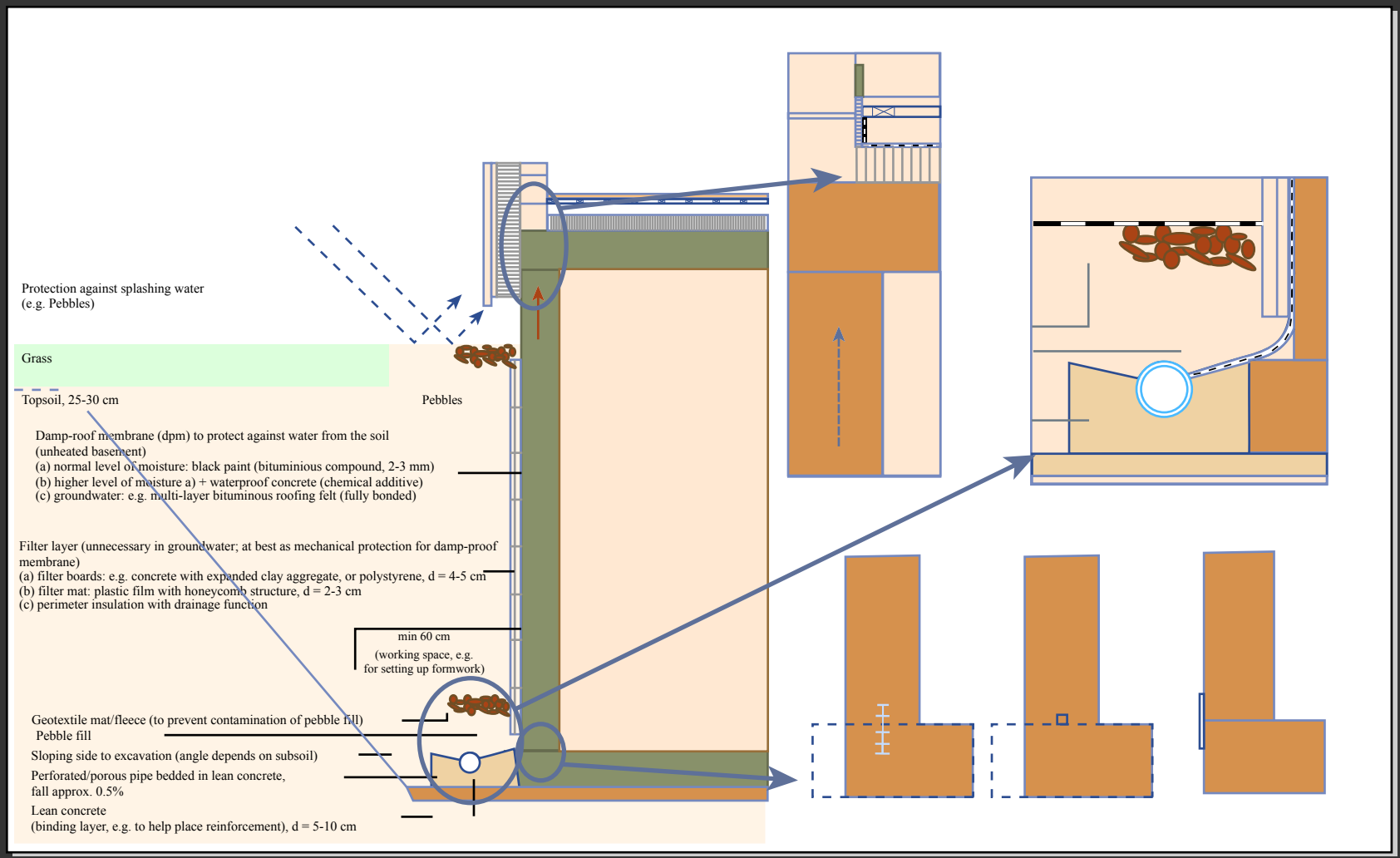
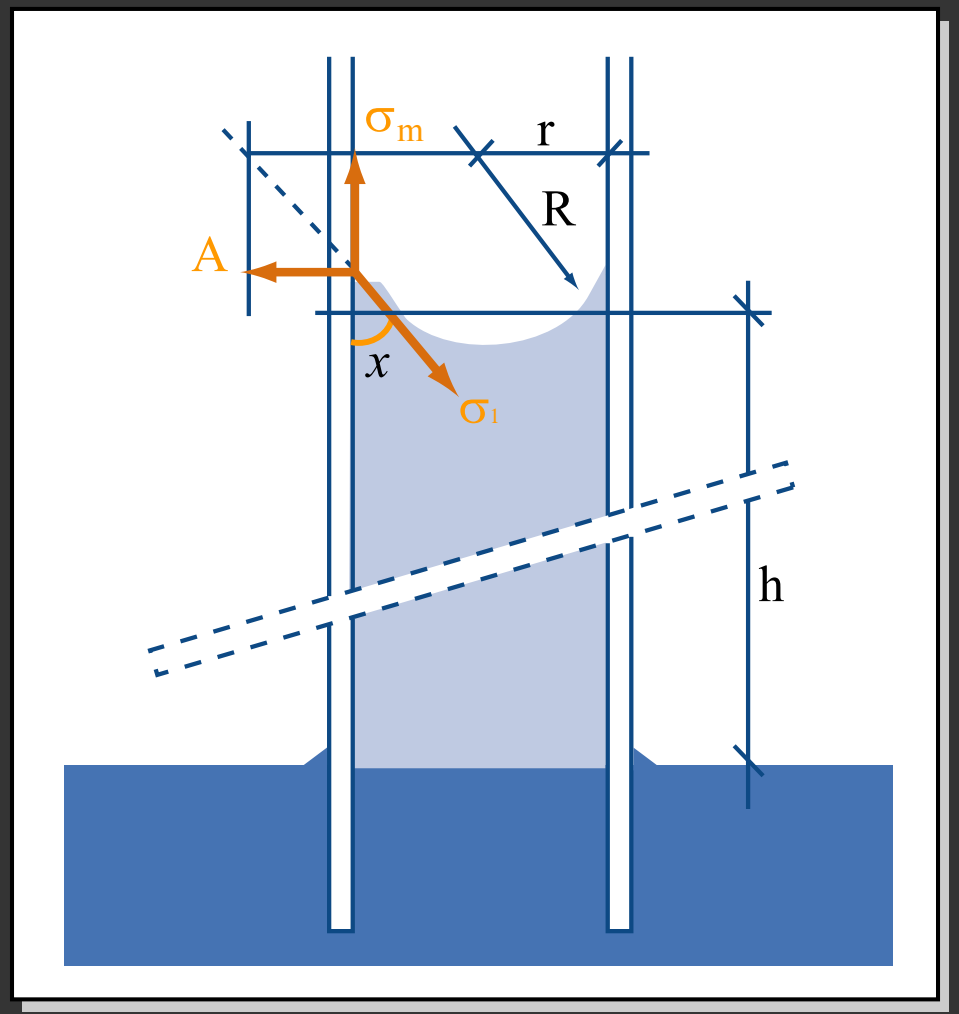


Image by MIT OCW.

Foundations

- Protection against humidity
  - Capillarity
    - F_c [N/m] = $2\pi r\ \sigma \cos\alpha$
    - $F_c / (\pi r^2) = \rho\ g\ h$



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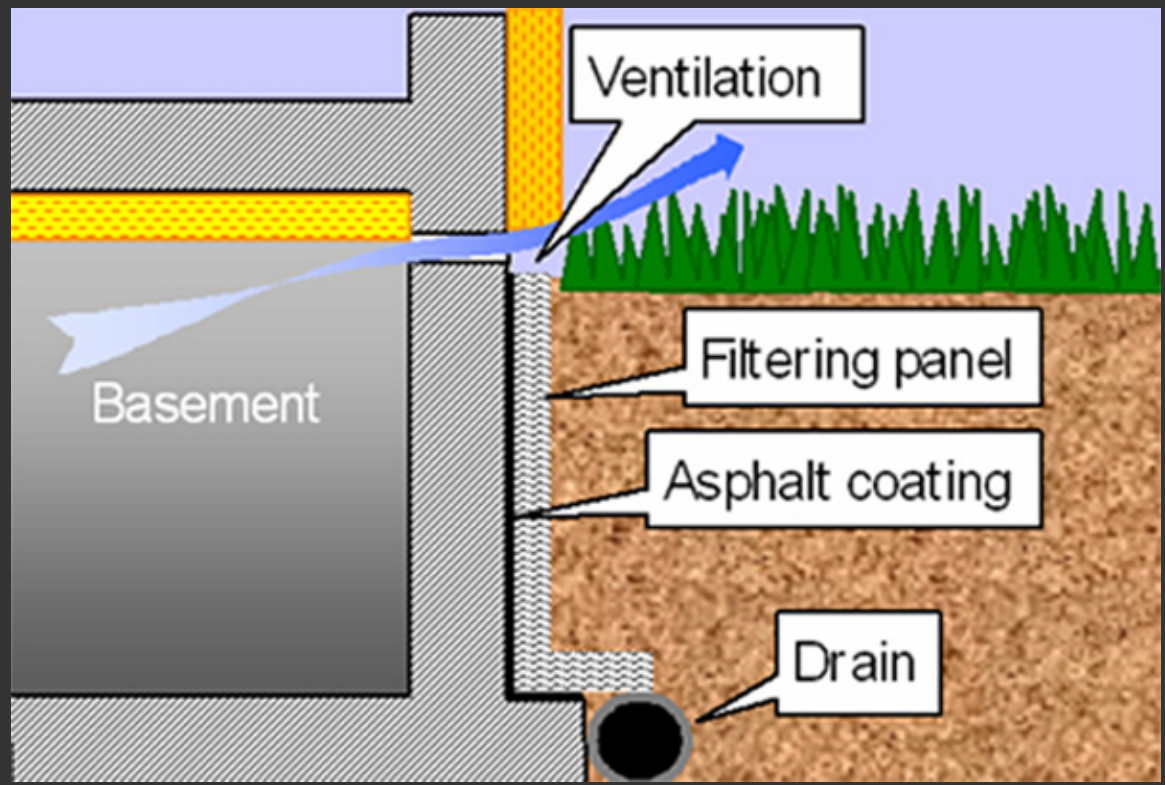
Foundations

- Protection against humidity
  - Capillarity
  - Prevention measures



Foundations

- Main reference for lecture contents:
  - “Constructing Architecture” by Deplazes: pp. 12-15 + 153-169 + 282-285
- Additional readings relevant to lecture topics:
  - "Fundamentals of Building Construction" by Allen: Chap. ...
  - "Building Construction Illustrated" by Ching & Adams: Chap ...