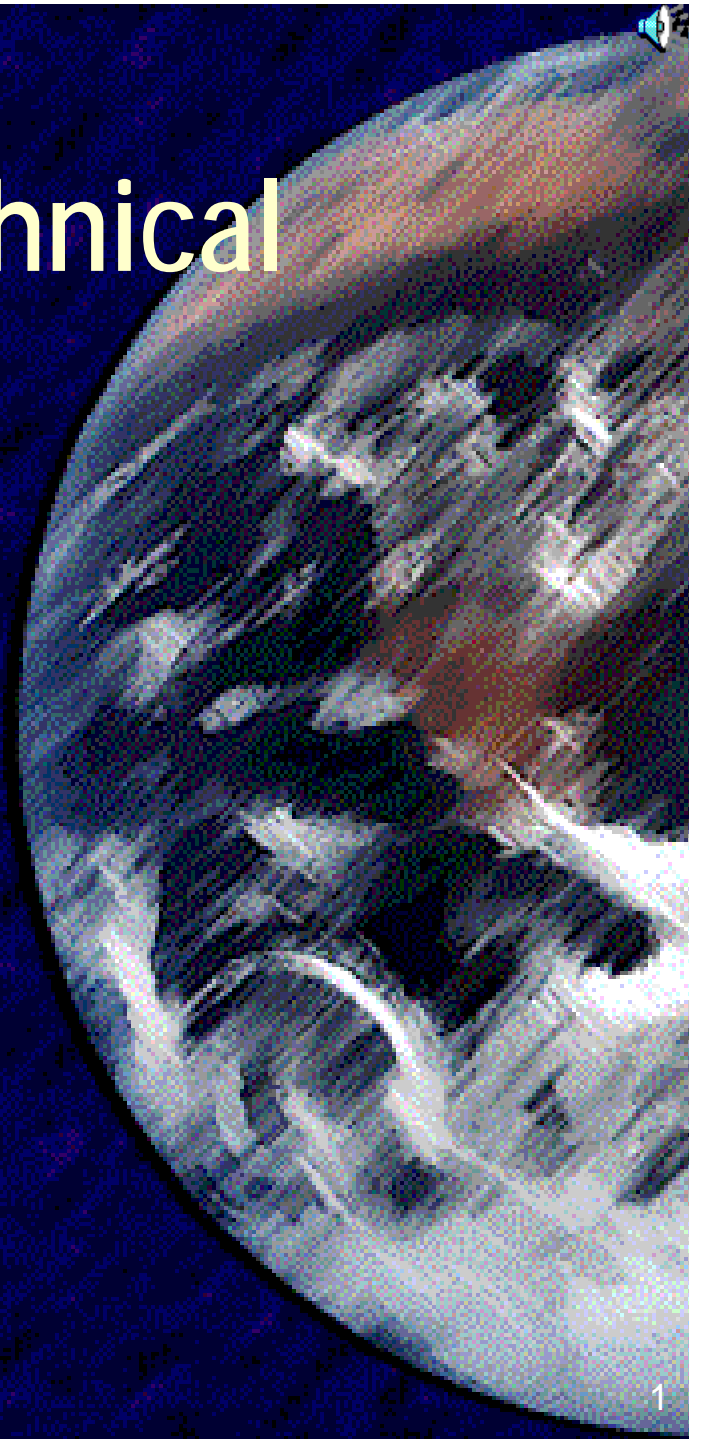


Introduction to Geotechnical Engineering



ground



Typical Geotechnical Project

Soils Laboratory
~ for testing

soil properties

Design Office
~ for design & analysis

soil samples

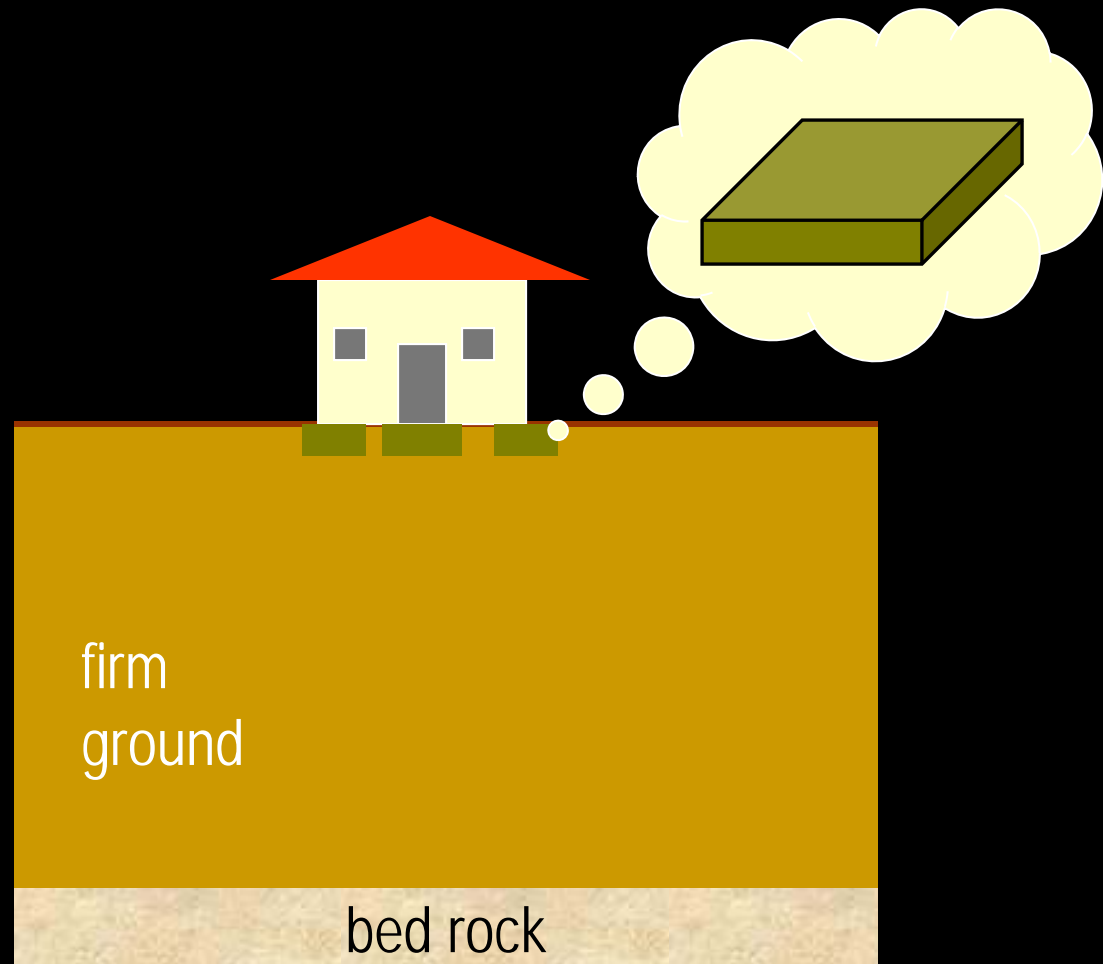
design details

Proposed construction site

Geotechnical Applications

Shallow Foundations

- ~ for transferring building loads to underlying ground
- ~ mostly for firm soils or light loads

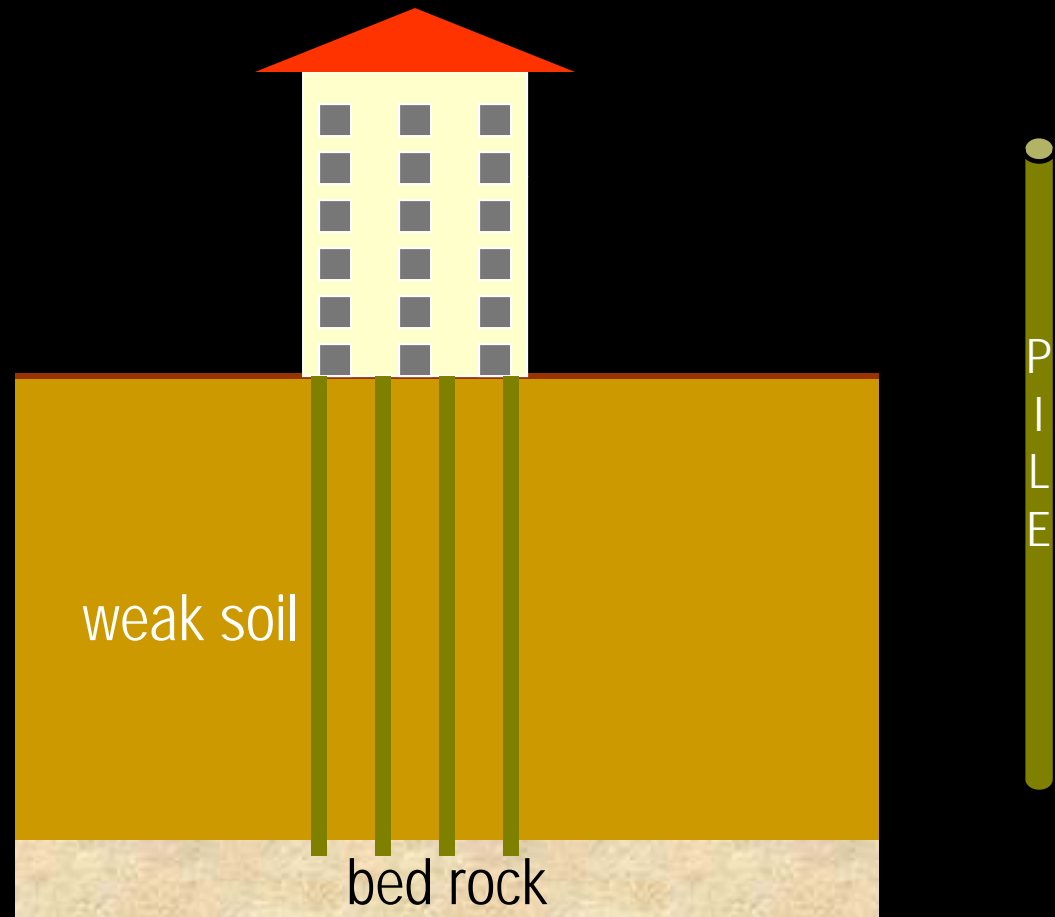


Shallow Foundations



Deep Foundations

- ~ for transferring building loads to underlying ground
- ~ mostly for weak soils or heavy loads



Deep Foundations



Driven timber piles, Pacific Motorway, Australia

Pier Foundations for Bridges



Millau Viaduct in France (2005)

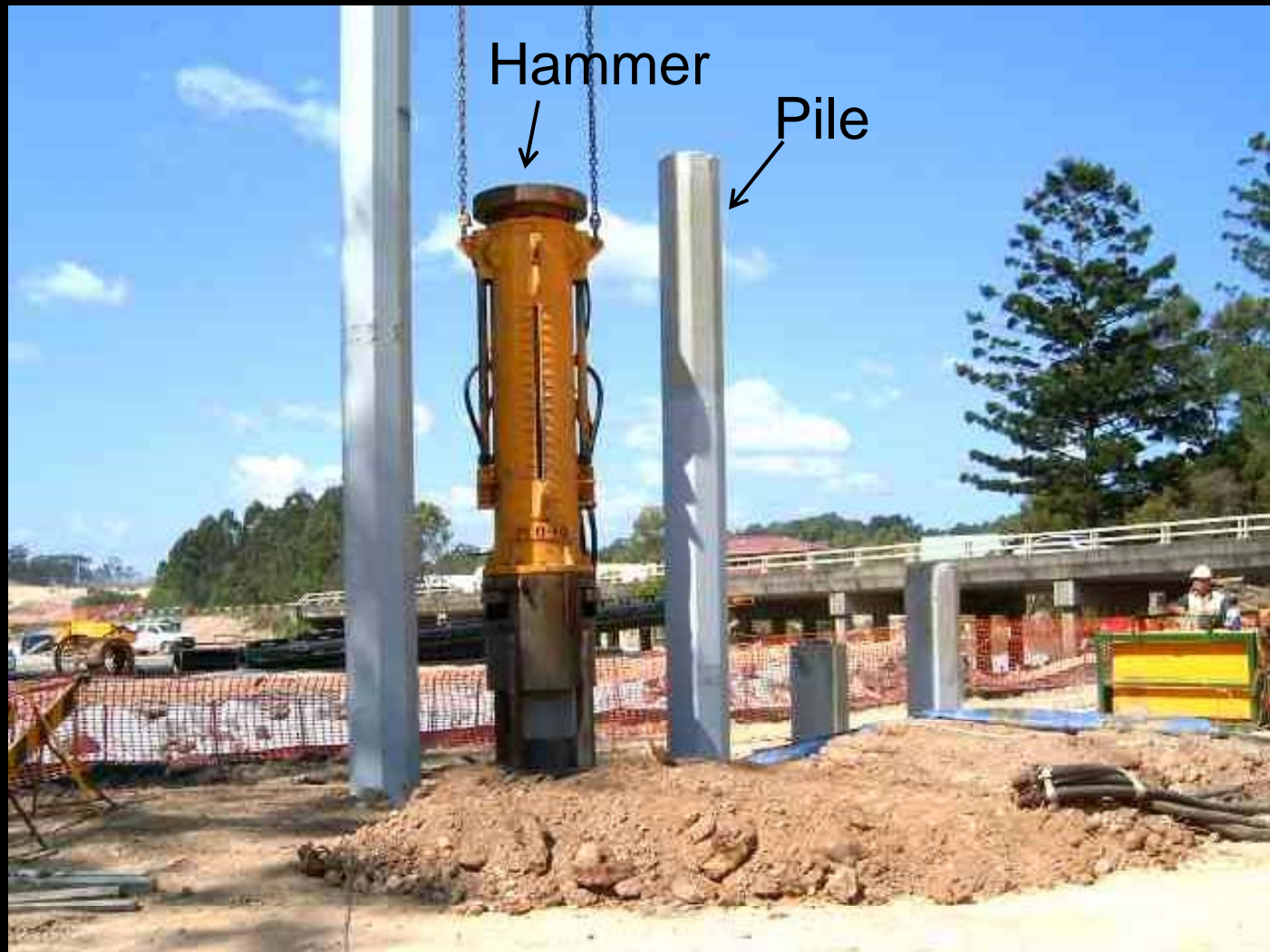
- Cable-stayed bridge
- Supported on 7 piers, 342 m apart
- Longest pier (336) in the world

Pier Foundations for Bridges



Millau Viaduct in France (2005)

Pile driving



At Ross River Dam, Townsville, Australia

Pile group for bridge abutment



Pile Load Test



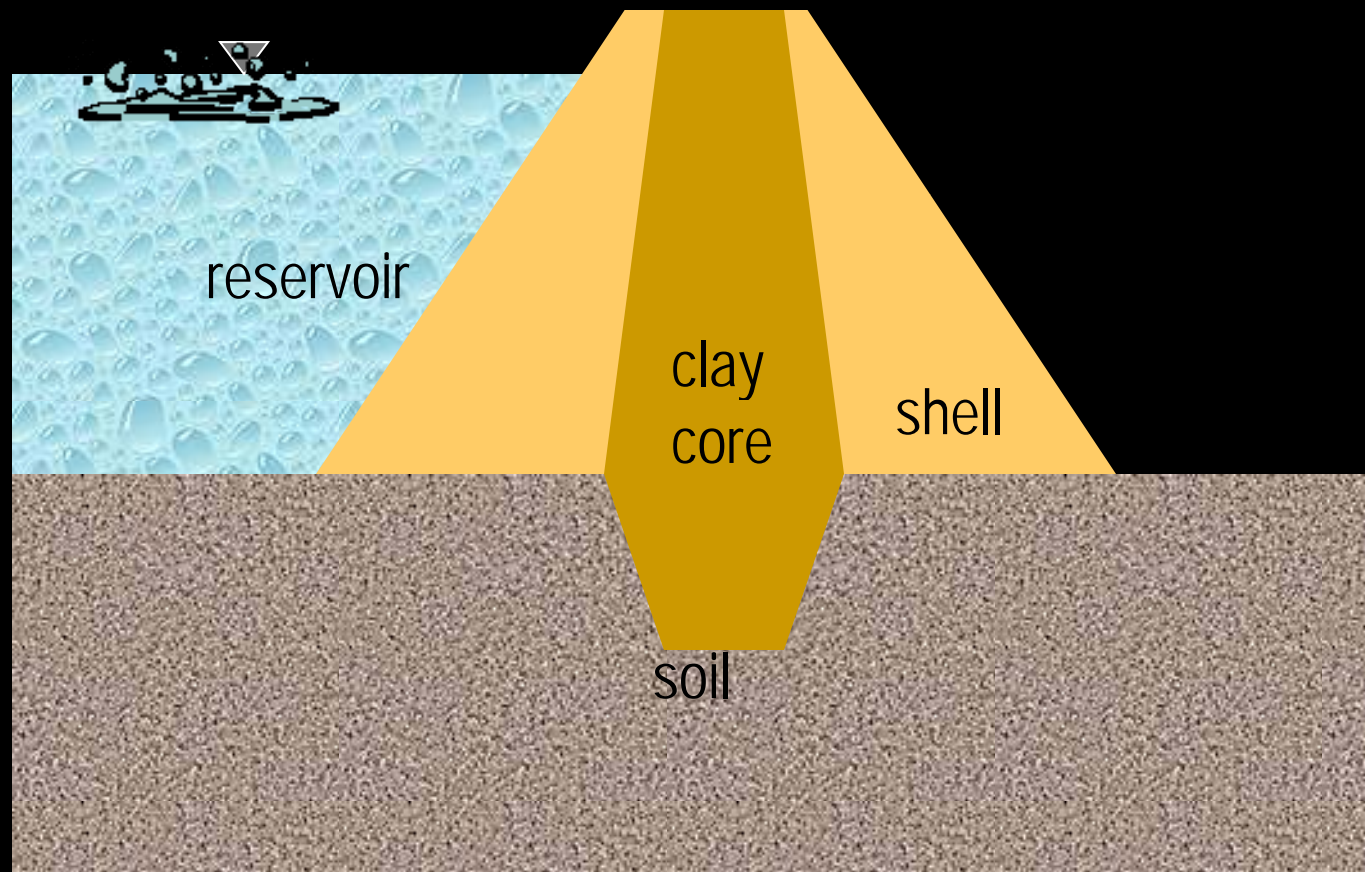
Retaining Walls

~ for retaining soils from spreading laterally

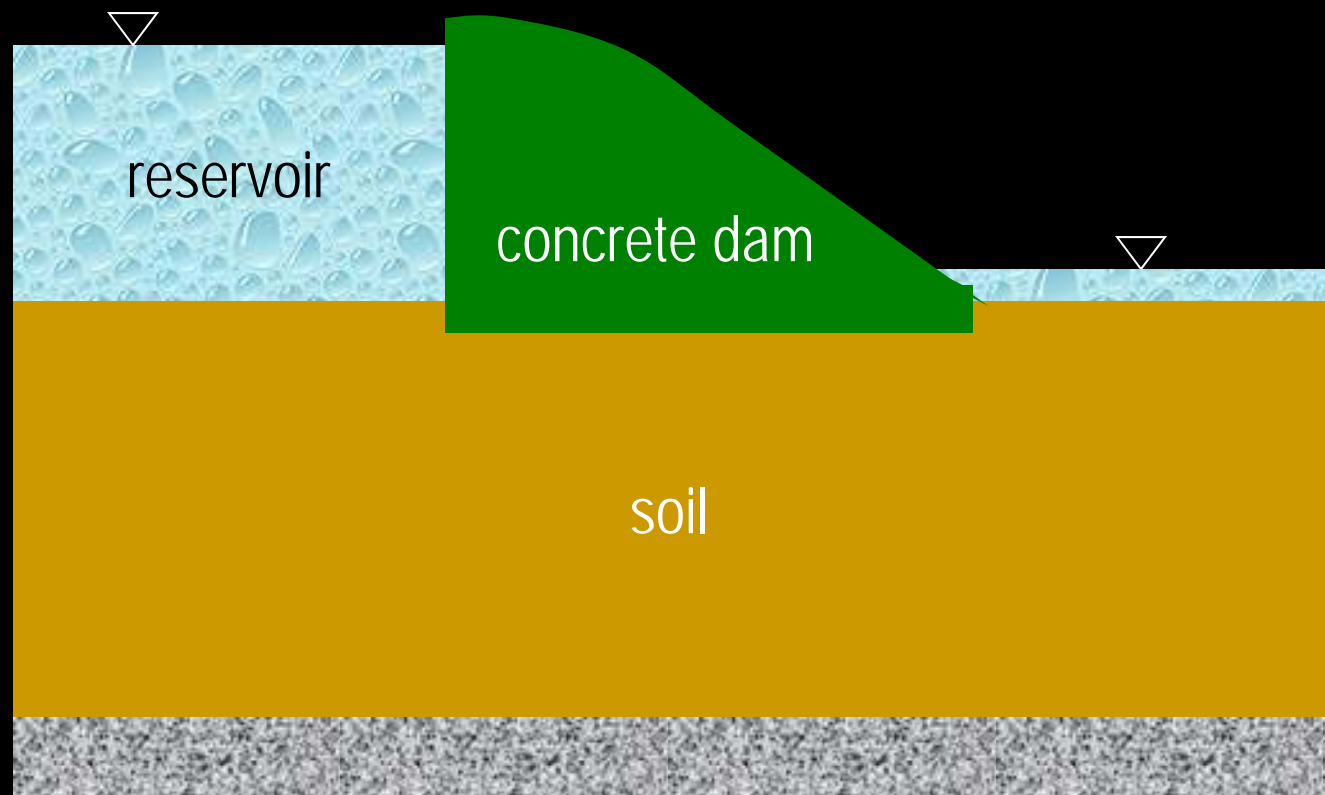


Earth Dams

~ for impounding water



Concrete Dams



Concrete Dams



Three Gorges Dam, Hong Kong

Concrete Dams



Earthworks

~ preparing the ground prior to construction



Roadwork, Pacific Motorway

Geofabrics

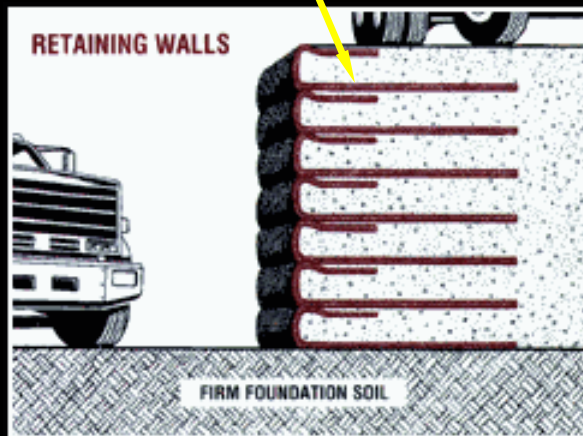
~ used for reinforcement, separation, filtration and drainage in roads, retaining walls, embankments...



Geofabrics used on Pacific Motorway

Reinforced Earth Walls

~ using geofabrics to strengthen the soil



Tunneling

MSE (Mechanically stabilised Earth) wall



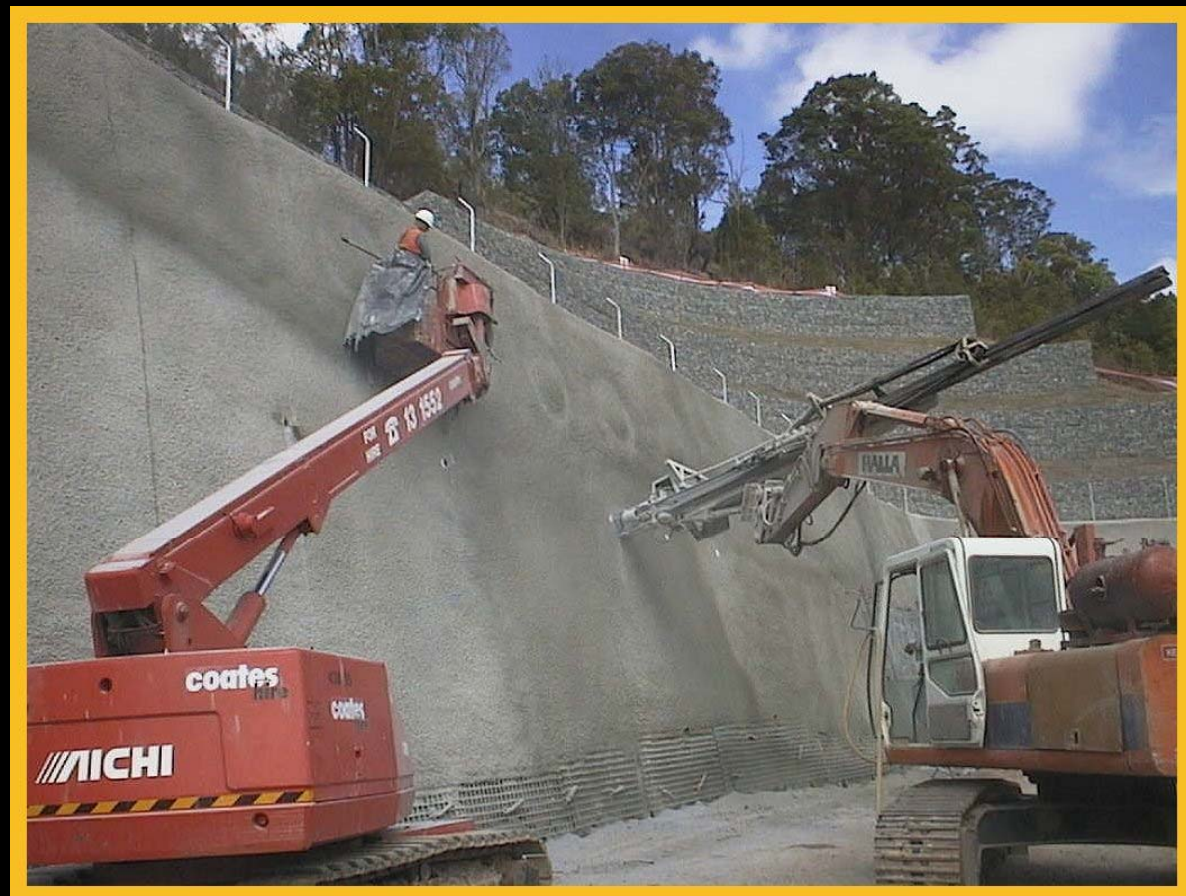
Chile (2006)

Tunneling



Soil Nailing

~ steel rods placed into holes drilled into the walls and grouted



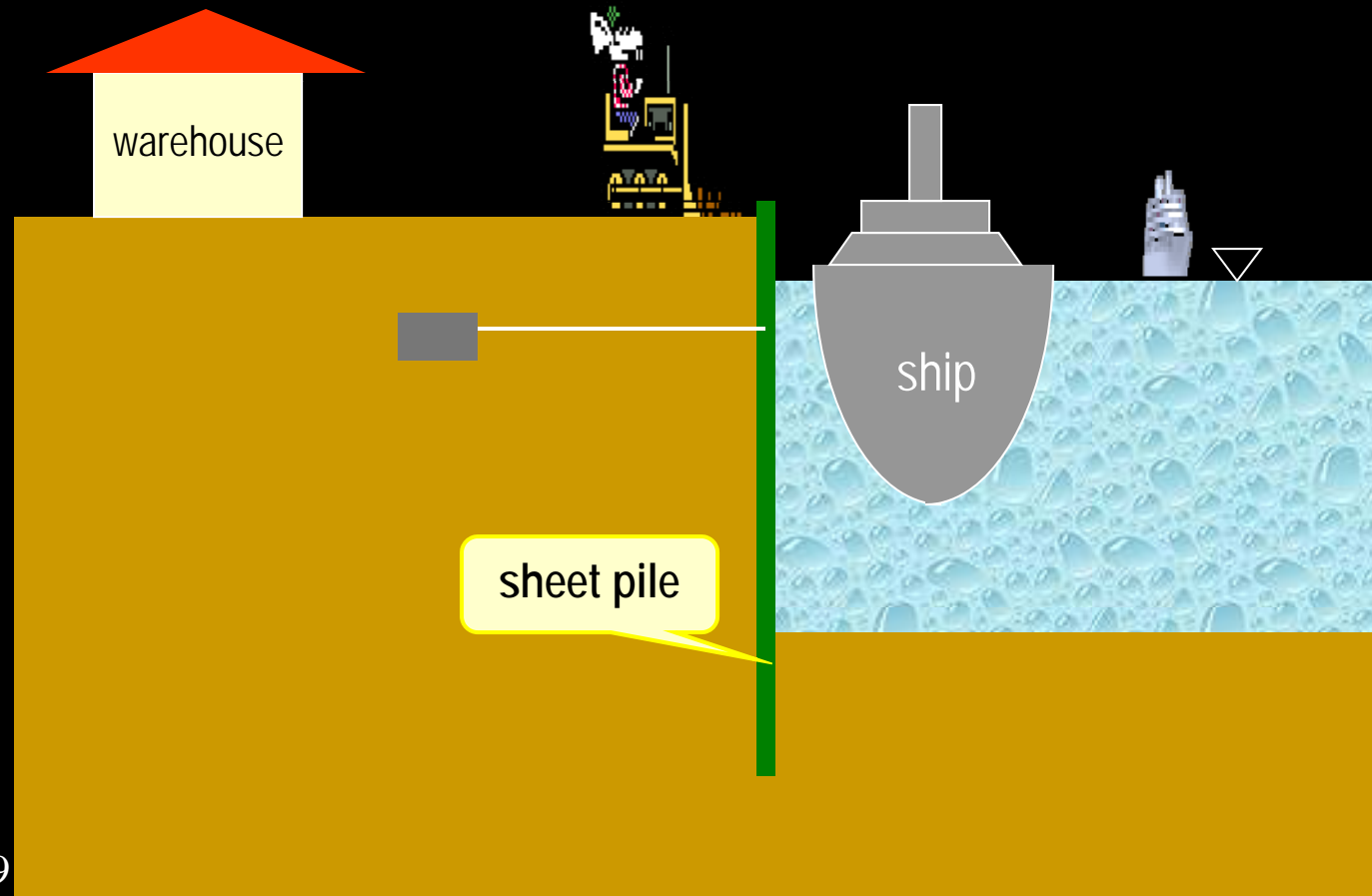
Retaining Walls



Rock anchors to support the vertical walls

Sheet Piles

~ sheets of interlocking steel or timber driven into the ground, forming a continuous sheet



Sheet Piles

- ~ resist lateral earth pressures
- ~ used in excavations, waterfront structures, ..



Sheet Piles

~ used in temporary works



Sheet Piles

~ interlocking sections



Sheet piles



..in Townsville, Australia

Cofferdam

~ sheet pile walls enclosing an area, to prevent water seeping in



Cofferdam

~ sheet pile walls enclosing an area, to prevent water seeping in



Slope Stability



Shoring

propping and supporting the exposed walls to resist lateral earth pressures



Excavations



Chile (2006)