SITING, DRAINAGE, SOILS and FOUNDATIONS

Siting and Drainage

Poor choice of site and drainage issues can lead to differential settlement of the house before an earthquake. This may lead to cracking of masonry walls, and the wall will be weaker when the earthquake strikes.

Bad Practice (Buruk)

No drainage

Bad Practice (Buruk)

Graywater draining into foundation

Soils Investigation

- A detailed soils investigation is strongly recommended prior to starting any construction project (e.g., CPT, SPT, vane shear)
- If budget is limited, can still do simple tests
  - Dig a pit (such as for the septic tank) to determine soil type, depth to water table
  - Do a sedimentation test – to estimate the percent clay, sand, silt
  - Do an expansion test – used to determine how much the clay shrinks when it dries
  - Push a 12mm diameter rod in the ground
- FOR MORE INFORMATION ON ANY OF THESE METHODS, PLEASE ASK

Avoid Soft and Expansive Clays

→ If soil is expansive clay (peat, black cotton soil – soil that shrinks and cracks when it dries), do not build a masonry structure!! Three options:

1. Find a new site

2. Build from lightweight, flexible materials (timber)

3. Excavate the expansive clay and fill with compacted fill soil

Avoid/Mitigate Liquefiable Sand

→ If soil is loosely compacted, sandy and water table is high → biggest hazard is liquefaction during the earthquake → causes settlement of house, which can result in cracking or collapse. Four options:

1. Find a new site
2. Build from lightweight, flexible materials (timber)
3. Improve the soil using densification or cement addition (expensive)
4. Distribute the building load evenly and span loose spots using a reinforced concrete mat or raft foundation – avoid isolated footings

1964 Niigata, Japan Earthquake