ARCH 631. Topic 24 Reading Notes

· Foundations are required to transmit structural loads to the ground

· Common types:
    spread footings (per column)
    continuous spread footings (per load bearing wall)
    raft foundations (multiple columns over one spread footing)
    straight or battered gearing or friction piles
    caissons

· Spread footings spread load over area; stress is assumed uniform; soil mechanics is the study of soil stresses and strains (including settlement) and the behavior is complex because of the variability and soil types

· Piles are long, look a lot like columns, get driven into the ground and usually require a pile cap (or beam); can carry load at base (bearing) or with surface (friction); caissons are larger and are constructed by drilling (rather than driving) and casting concrete into the shaft which is usually belled at the bottom (like a column capital upside down)

· Retaining walls retain earth (typically); soil weight and water within the soil cause a pressure on any surface; lateral pressure means the wall might slide or overturn; the pressure is dependent on the soil type (clay, sandy, etc.) and the water level, etc. and is usually considered to be linearly distributed (for a triangular distribution); lateral force can be characterized by $F_x = (1/2)K_A ph^2$ where p is the unit weight of the soil and h is the height, while K_A is a factor to convert p to a pressure (NOTE: this is not what is presented in the note set which uses γ to represent density, and p_A **to represent the active pressure**)

· Retaining wall are characterized by wall and typically a base, with the overturning location called the toe with the other end of the base called the heel; the soil weight over the base helps resist overturning and sliding

· Concrete walls must be designed to resist the bending and provide tension reinforcement on the soil side of the wall; counterforts or buttresses will support sections of wall (like they were slabs) for flexure in the other direction (out of plane from top view)