

ARCH 331. Study Guide for Quiz 4

This guide is not providing “answers” for the conceptual questions. It is a list of topical concepts and their application you should be familiar with. It is an *aid* to help prepare for the quiz.

Covers material of Lectures 13, 14, 15, 16 & 17

- Allowable Stress Design
- Load and Resistance Factor Design
- Working loads
- Factored loads
- Resistance Factors
- “Design” values vs. “Capacity”
- Factor of Safety
- Density of materials and relation to weight
- Static vs. dynamic loads
- Wind and dynamic response terms & behavior
- Load types (and directions) (*like D, L, S ...*)
- Load combinations for ASD, LRFD
- Load patterns
- Building codes vs. structural design codes vs. material standards
- Minimum Design Loads & Requirements
- Serviceability and limits
- Design vs. analysis
- Actions vs. reactions
- Load tracing & tributary width (vs. area)
- Concentrated loads
- Distributed loads – uniform / non-uniform
- w vs. W
- Equivalent center of load area
- Equivalent Force Systems
- Rafter, joist, girder, decking, pilasters, bearing walls, shear walls
- Shallow foundations: spread, wall, mat
- Deep foundations: piles, pile caps, grade beams
- Horizontal spanning levels and collectors
- Load distribution for slab supports
- Parts of retaining walls & types
- Loads on retaining walls (gravity, friction, equivalent fluid pressure, bearing pressure)
- Factor of safety of sliding and overturning
- Triangular or trapezoid shape of bearing pressure & relation to location of centroid of load
- Wind load tracing and bracing configurations
- Lumber vs. engineered timber characteristics
- Various strengths (directionality, wood type, etc.)
- Timber design methodologies and obtaining allowed stresses (duration, multiple member use....)
- Creep
- Nominal dimensions of timber
- Maximum bending stress (& location along length and in cross section)
- Maximum shear stress (& location along length and in cross section)
- Maximum shear stress by beam shape (proper equations)
- Stress types in beams
- Self-weight

- Deflections & superpositioning (+ *units*)
- Use of Beam Diagrams and Formulas
- Lateral buckling (and bracing)
- Equivalent distributed load based on a maximum moment
- Use of Load Tables
- Decking, joist types, laminated arches, stressed-skin panels, box sections, trusses, lamellas
- Depth with respect to span length and shape
- Timber construction types
- Column stability factor, F_{CE} & l/d
- l/d limit for timber
- Effective length, K & bracing
- Beam-Columns
- Combined bending and compression – *interaction*
- P- Δ effect
- Eccentricity
- Connection stresses
- Design vs. analysis
- Bolt designations
- Effective net area
- Connection types
- Nail load capacity charts
- Bolt capacity charts and relation to wood strengths
- Single vs. double shear
- Stresses in built-up beam sections and the connectors