

ME 314 – Study Guide to Midterm #1

Exam is open class textbook and notes (no other books are allowed)

Note: this study guide is not necessarily inclusive of all the materials you are expected to know.

You are expected to be able to:

1. Find adequate lengths of bolts and cap screws
2. Find bolt and cap screw stiffness
3. Find clamping material stiffness when bolted or with tapped holes
4. Find joint index C
5. Calculate bolt and clamping material forces when external load is applied
6. Size bolts or screws for strength in tension
7. Size bolts or screw for strength for plates under direct shear
8. Size bolts or screws for strength for brackets under torsional loads
9. Size bolts or screws for infinite fatigue life when external (tensile) load fluctuates between zero and a maximum value.

10. Find the torque required to raise or lower a power screw
11. Determine whether a power screw is self-locking
12. Find the efficiency of a power screw

13. Find fillet weld stresses in tension/compression or direct shear loading using welding code method.
14. Find stresses in fillet welds in torsion and bending using welding code method
15. Find the weld bead's factor of safety against static failure
16. Find welded member's factor of safety against static failure
 - a. At the weld bead using welding code method (shear stress is weld material reduced by a factor of 1.4 and compared to $0.4 S_y$ for the materials)
 - b. Material bulk yielding near the weld using conventional method for stresses and recommended strength from welding code.