

53:134 Structural Design II (Steel Structures)
Spring 2006 (Lecture Summary)
Week 14 (4/17 - 4/21/06)

4/17/06

- ◆ Review of design for flexure.
- ◆ Design for combined bending and axial loading: beam-column.
 - ✓ Discussion of HW #16
 - ✓ Two major concepts related to combined bending and axial loading - superposition of stresses; amplification of bending moment
 - ✓ Interaction equations.
 - ✓ LRFD criteria
 - ✓ Moment amplification - basic derivation; braced/unbraced frames
 - ✓ **HW #17**: Beam design problem

4/19/06

- ◆ Design for combined bending and axial loading: beam-column.
 - ✓ Discussion of HW #17: calculation of Z_x and design strength of a section for bending.
 - ✓ Review of previous lecture: interaction equations for combined axial tension/compression loading.
 - ✓ Chapter H of Specifications: Combined loading, bending about two axes; page 38.

- ✓ Chapter C of Specifications: Frames and Other Structures; page 17.
- ✓ Web local buckling in beam-column: Table B5.1 on page 16.1-14: limiting width thickness ratios for compression elements for combined loading depend on the factored axial load.
- ✓ Beam-column design: Part 6 of the Manual.
- ✓ Example of a beam column subjected to varying moment, single curvature bending.
- ◆ **HW #18: Beam-Column Design.**

4/21/06

- ◆ Design for combined bending and axial loading: beam-column.
 - ✓ Review of previous lecture - relevant Manual material.
 - ✓ Example: 6.1 from the Manual, Combined axial tension and bending.
 - ✓ Example 6.2 from the Manual - W-shape subjected to combined axial compression and flexure (braced frame).
- ◆ Interaction equations in terms of b , m , n on Page 6-11 of the Manual. Values of b , m , and n are tabulated in the Manual for sections subjected to combined bending and axial compression.
- ◆ **Read:** Manual Part 6; Examples 1 and 2.