

ENGR 310

Lecture 26

28 April 2008



MONTANA
STATE UNIVERSITY

College of
ENGINEERING

Mountains & Minds

Design Fair

- 12:00 – 6:00 p.m., Thursday, May 1.
- Room opens at 7:00 a.m. for set-up
- Groups needing extra floor space:
 - NE and SE corners
- Groups needing electrical power:
 - South wall and center aisle
 - Bring extension cords, just in case
- Groups NOT needing electrical power:
 - North wall



Design Fair, cont.

- Presentations:
 - Have an “elevator pitch” ready
 - Have a 5-min. informal talk ready
- Team binder is optional



Friday's class

- Poster design awards
- Instructor evaluations



Project Deliverables

- Due by 5:00 p.m., May 5, Roberts 306
 - Team Notebooks
 - Design Journals



Final Exam

- 8:00 a.m., Friday, May 9, Roberts 101
- To receive full credit:
 - Show up on time
 - Give thoughtful responses
- **No studying expected!**

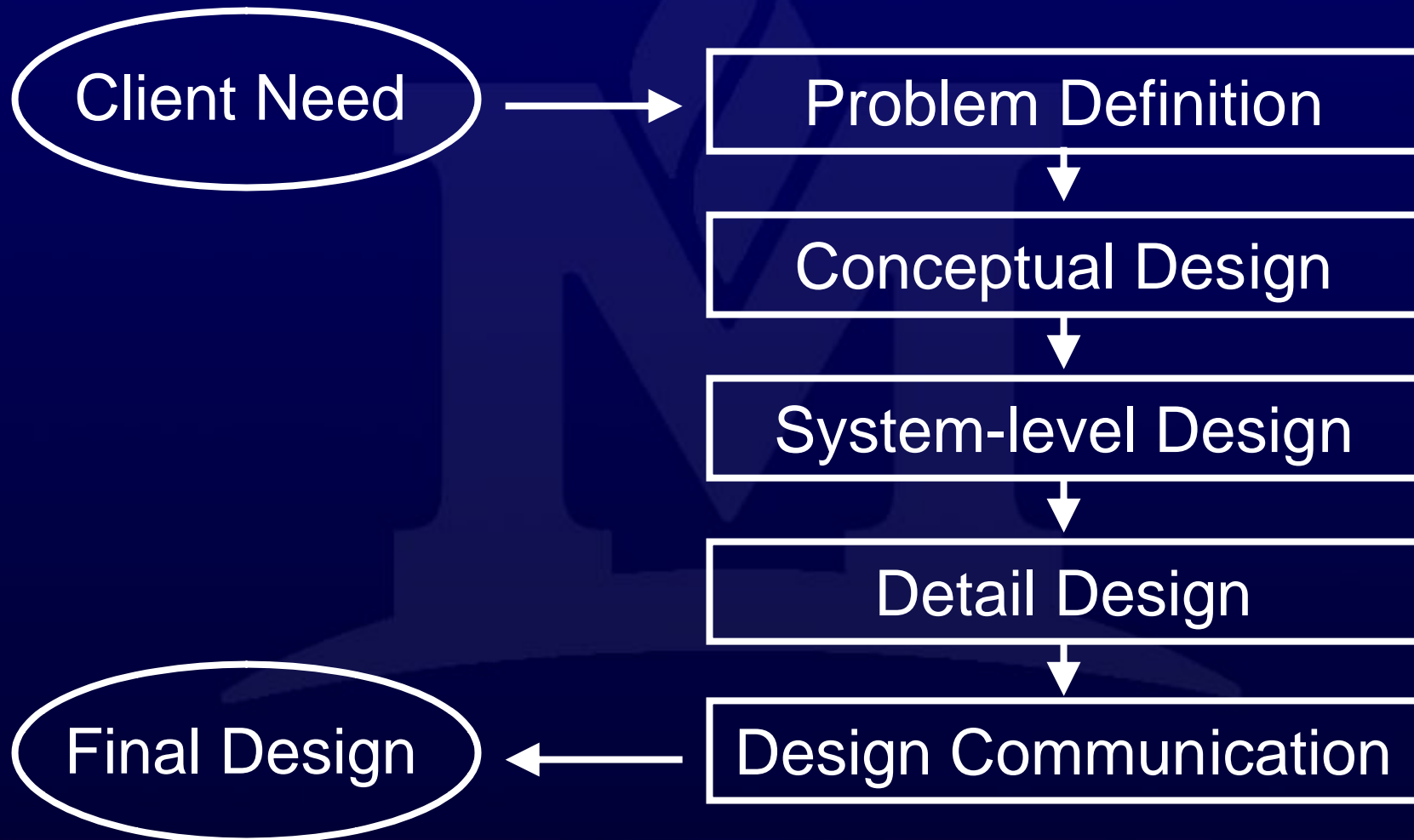


Today's Agenda

- Design Communication
- Design Ethics



An Engineering Design Process



**The project is not complete
until the results are
communicated.**



MONTANA
STATE UNIVERSITY

College of
ENGINEERING

Mountains & Minds

General Tech Comm Guidelines

- Know your purpose.
- Know your audience.
- Choose and organize content around your purpose and audience.



General Tech Comm Guidelines, cont.

- Write / speak clearly, precisely and objectively.
- Think visually.
- Pay attention to aesthetics.
- Be ethical.



Typical Project Report Outline

1. Management Summary
2. Introduction / Overview
3. Problem Analysis (incl. Background)
4. Design Alternatives & Evaluation
5. Design Selection & Rationale
6. Supporting Materials
 - drawings and specifications
 - modeling and analysis results



Design Drawings

- Purpose: Tell someone else how to make the designed artifact.
- Conventions differ by discipline.
- Multiple types required.
 - e.g., in mechanical design: layout drawings, detail drawings, assembly drawings



Engineering Ethics



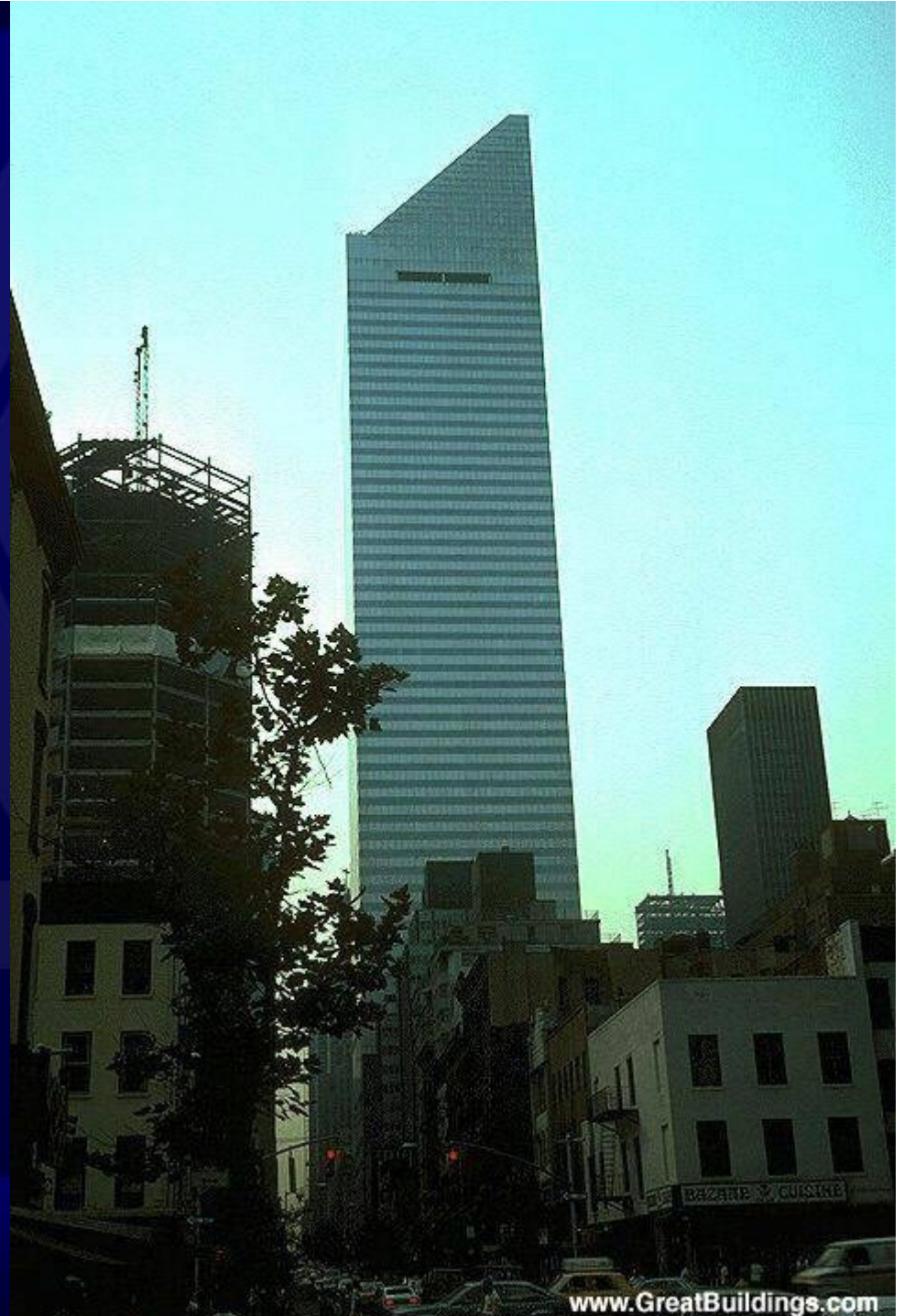
MONTANA
STATE UNIVERSITY

College of
ENGINEERING

Mountains & Minds

Citicorp Center

- 153 E. 53rd Street, New York City, NY.
- Architect Hugh Stubbins Jr.
- Completed in 1977.
- 59 Stories



MONTANA
STATE UNIVERSITY

College of
ENGINEERING



Engineering Challenge

- Structural engineer William LeMessurier
- Building had to be over St. Peter's Lutheran Church site
- Solution: 4 columns centered on the building's sides
- Innovative structure + mass damper

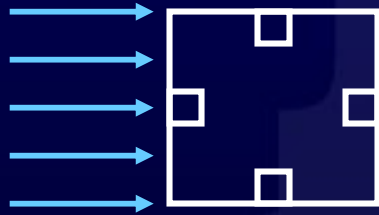
Late discovery....

After the building was occupied,
prompted by a student question after a
presentation about the building,
LeMessurier makes a shocking discovery....

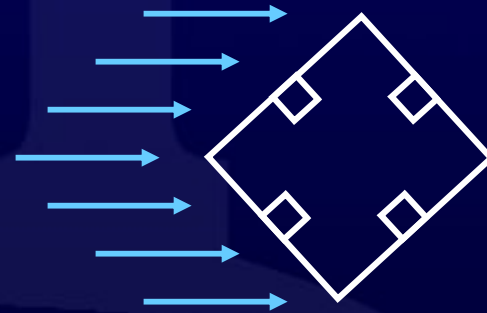


His Error

Quartering winds overlooked in the wind load analysis of a construction change from welded to bolted joints.



100 yr. storm



16 yr. storm



MONTANA
STATE UNIVERSITY

College of
ENGINEERING

Mountains & Minds

What should he do?

- Fix is to weld 2" thick steel plates (weighing 200+ lbs.) over the 200 bolted joints.
- What's at stake?
- Would it make a difference if the insurance co. or building owner had said, "keep it quiet?"



Consequences

- Who should pay for it?
- LeMessurier's reputation?



NSPE Code of Ethics

- Deliberate unethical acts are one thing.
- Need to be especially careful of unintentionally unethical decisions.



Some Common Violations

- Not notifying employer or client of known hazard.
- Approving documents that violate professional standards.
- Disclosure of information without consent of (former) client or employer.
- Failure to include all information in reports



**Design frequently involves
ethical decisions.**

**Know the NSPE Code of
Ethics.**



MONTANA
STATE UNIVERSITY

College of
ENGINEERING

Mountains & Minds