University of Colorado Boulder

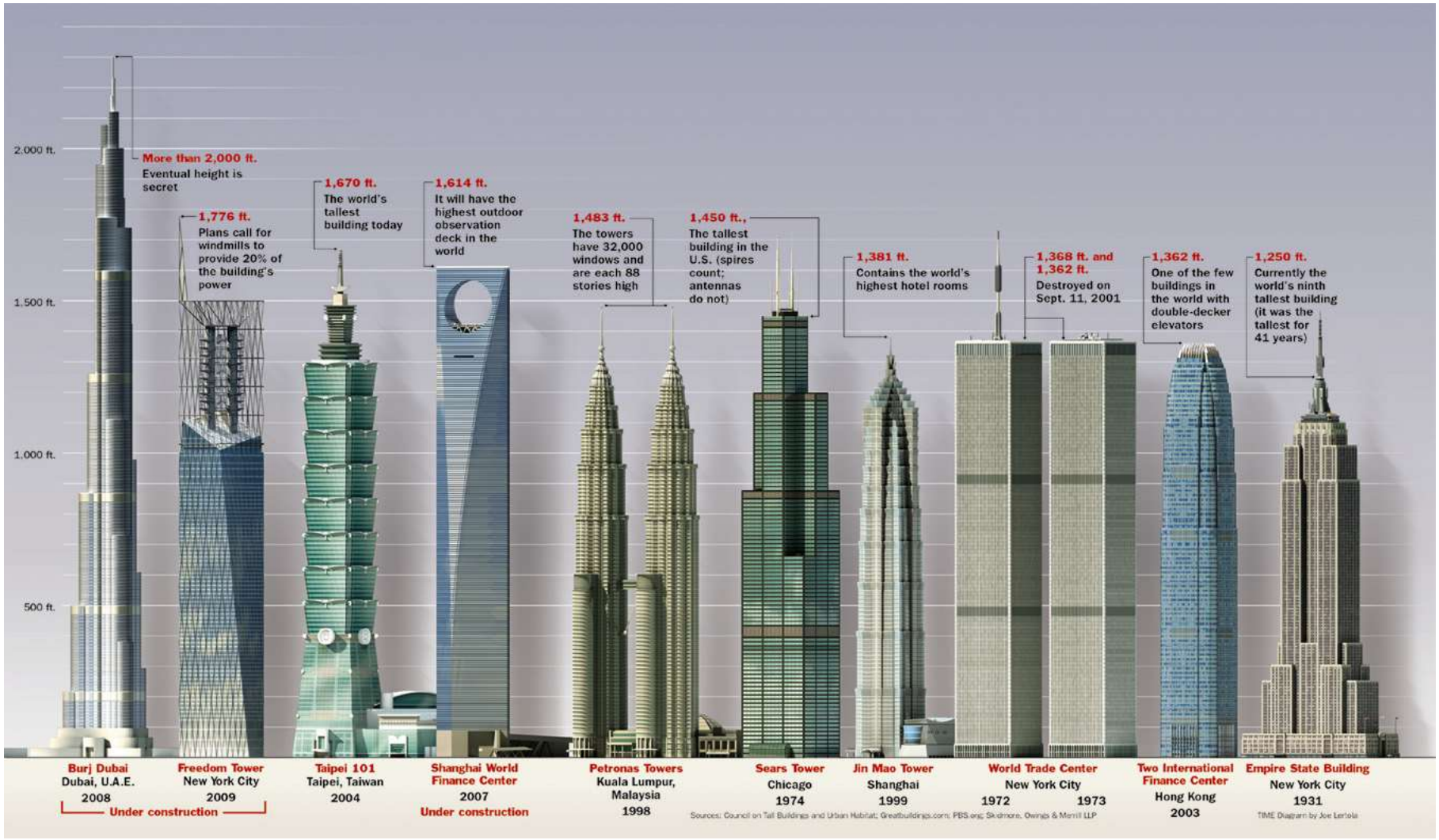
Welcome to Earthquake (and Structural) Engineering

EERI

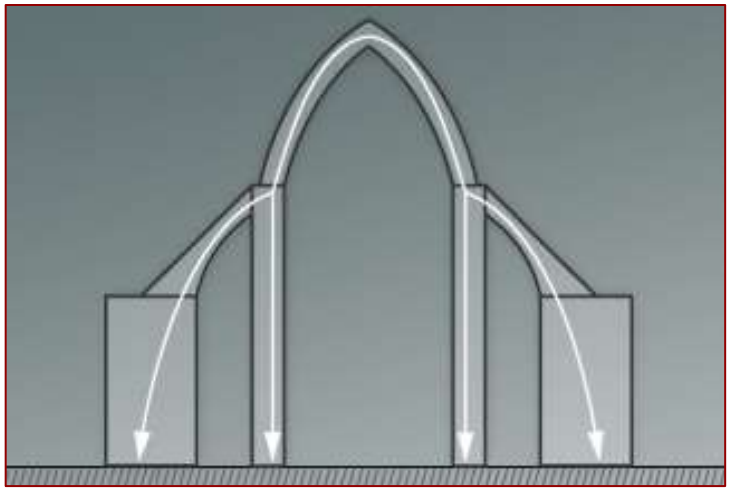
October 11, 2014

Why care about EQ Engineering?

Structural Engineering Examples



Architecture vs. Engineering



What is Structural Engineering?

Building structures…

with respect for forces of nature

What are these forces?

What is Structural Engineering?

Building structures…

with respect for forces of nature

- Water
- Soil
- Wind
- Seismic

What is Structural Engineering?

Building structures…

with respect for forces of nature

- Water
- Soil
- Wind
- Seismic

What is Structural Engineering?

Building structures…

with respect for forces of nature

- Water
- Soil
- Wind
- Seismic

What is Structural Engineering?

Building structures…

with respect for forces of nature

- Water
- Soil
- Wind
- Seismic

What is Structural Engineering?

Building structures…

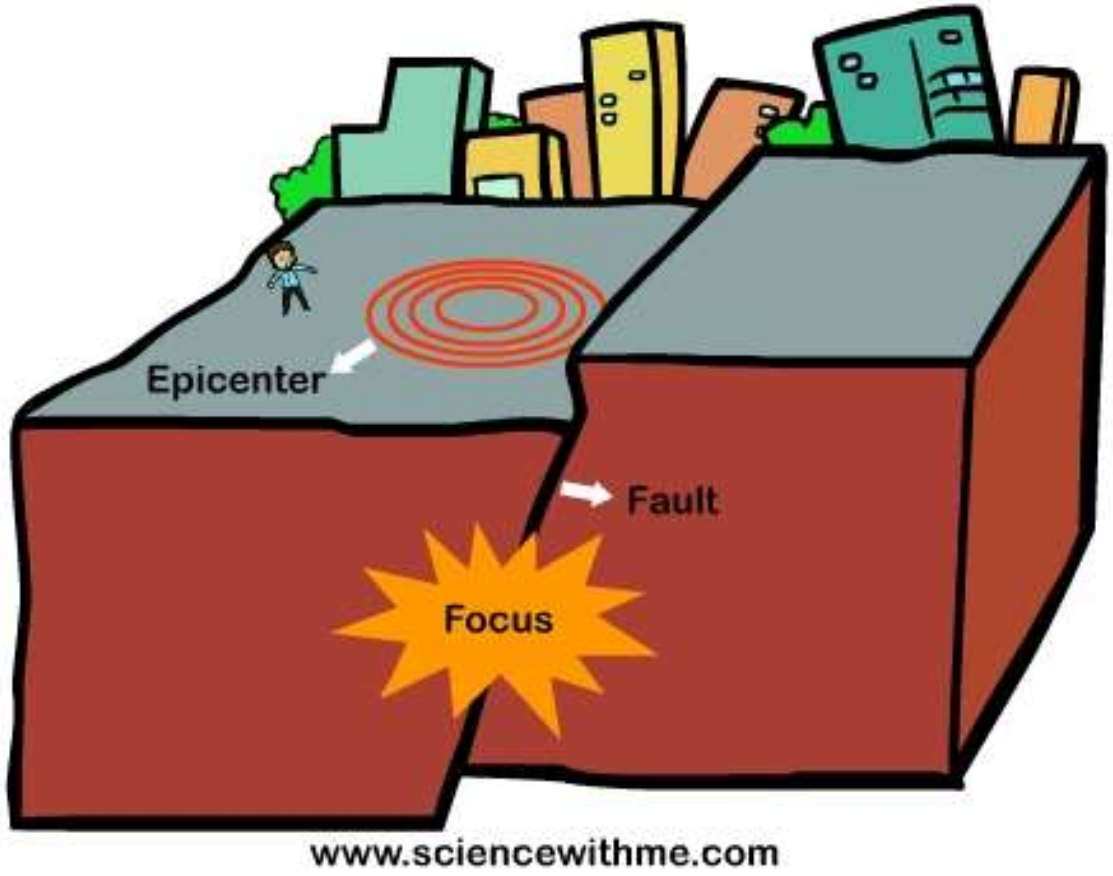
with respect for forces of nature

- Water
- Soil
- Wind
- Seismic

Special Case

•Blasts

What is an Earthquake?



What is an Earthquake?

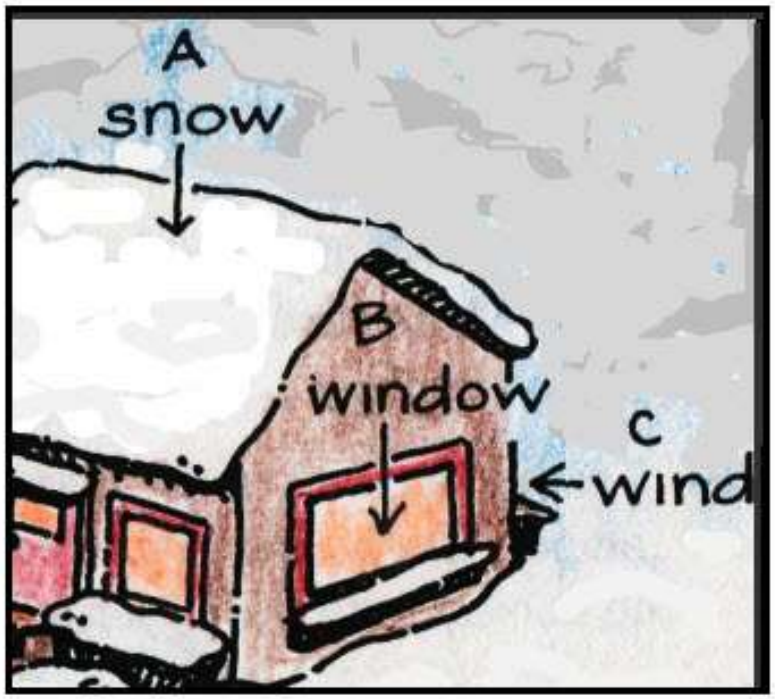
What Do We Need to Know?

STATICS

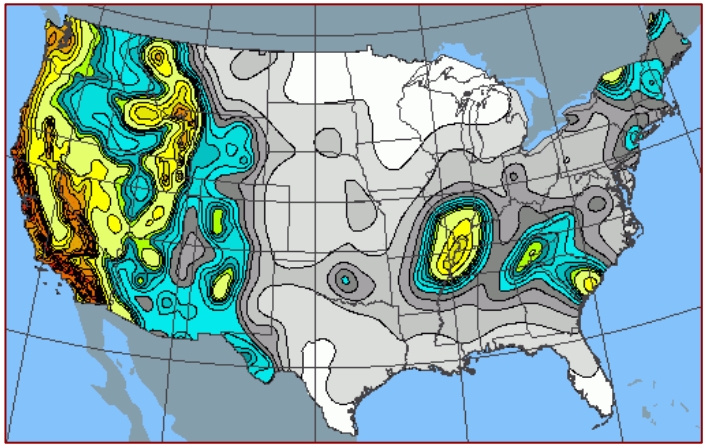
DYNAMICS

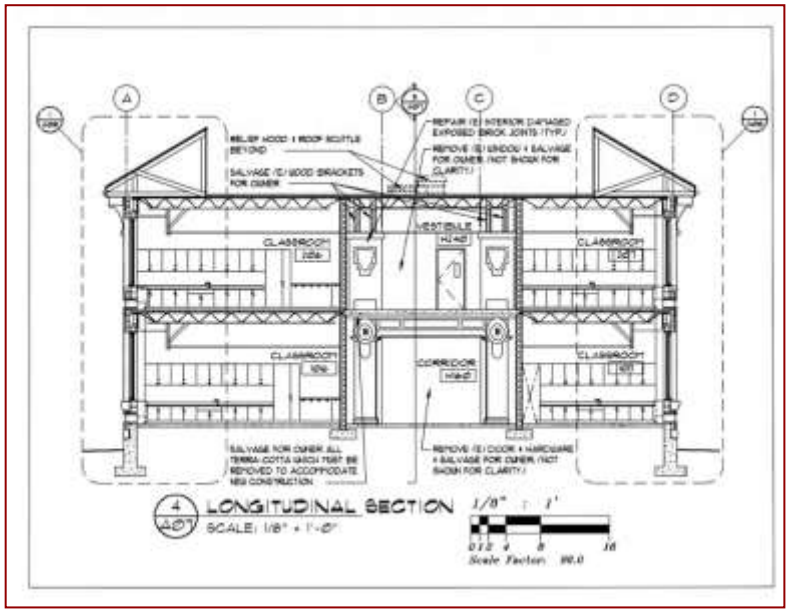
COST

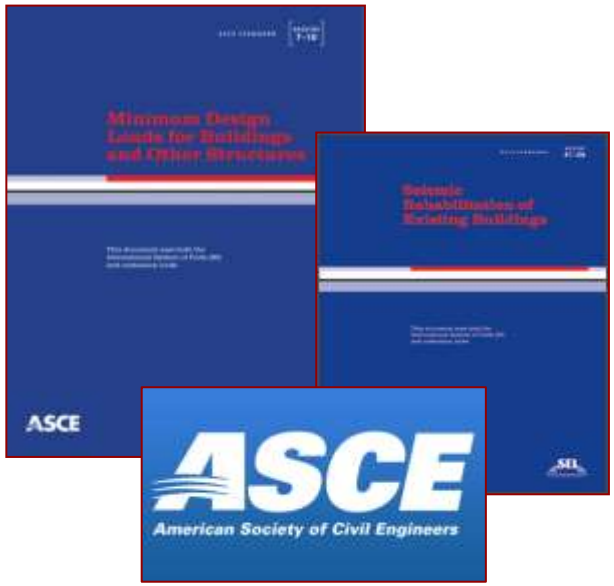
SAFETY



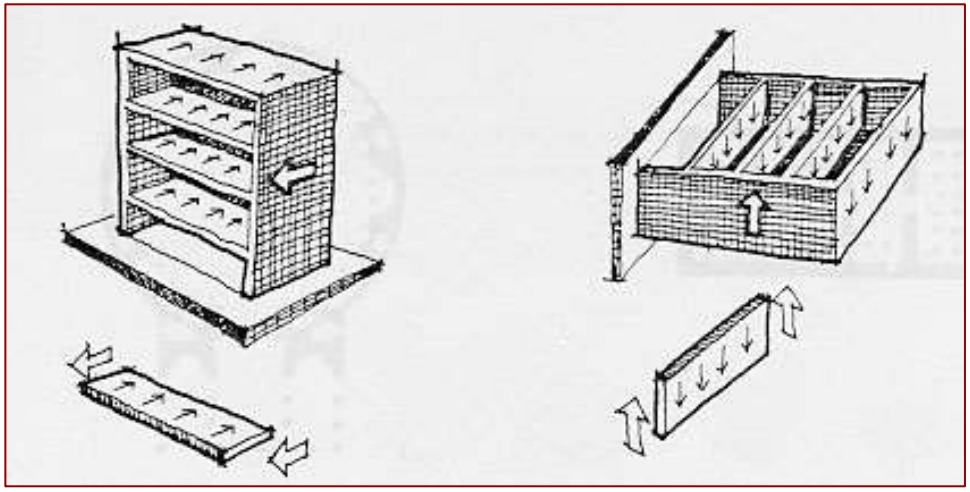
Components of Building Design







Load Path & Lateral Resistance



Stiffness & Stability

Today's Activity

Goal:

Design a gumdrop building to perform well during a jello earthquake

Today's Activity

- Break into small groups
- Develop a group name
- Discuss building ideas together (consider the client needs!)
- Build towers (30-45 min)
- Evaluate buildings
- Lessons learned

Project Criteria

1. Client Needs
   - Minimum height = 12 inches
   - Maximum floor area = 6 in^2
   - Maximum gum drops used
2. Aesthetic Appeal
   - Visually interesting
3. Static Performance
   - Resists gravity load
4. Dynamic Response
   - Resists earthquake load