Rigid Frames

- rigid frames have no pins
- frame is all one body
- joints transfer moments and shear
- typically statically indeterminate
- types
  - portal
  - gable

- moments get redistributed
- deflections are smaller
- effective column lengths are shorter
- very sensitive to settling
Rigid Frames
• resists lateral loadings
• shape depends on stiffness of beams and columns
• 90° maintained

Rigid Frames
• staggered truss
  – rigidity
  – clear stories

Rigid Frames
• connections
  – steel
  – concrete

Braced Frames
• pin connections
• bracing to prevent lateral movements
Braced Frames

- types of bracing
  - knee-bracing
  - diagonal
  - X
  - K or chevron
  - shear walls

Shear Walls

- resist lateral load in plane with wall

Rigid Frame Analysis

- members see
  - shear
  - axial force
  - bending
- V & M diagrams
  - plot on “outside”

Rigid Frame Analysis

- need support reactions
- free body diagram each member
- end reactions are equal and opposite on next member
- “turn” member like beam
- draw V & M
Rigid Frame Analysis

- **FBD & M**
  - opposite end reactions at joints

Rigid Frame Design

- **loads and combinations**
  - usually uniformly distributed gravity loads
  - worst case for largest moments...
  - wind direction can increase moments

Rigid Frame Design

- **frames & floors**
  - rigid frame can have slab floors or slab with connecting beams
- **other**
  - slabs or plates on columns

- **floors – plates & slabs**
  - one-way behavior
    - side ratio > 1.5
    - “strip” beam
  - two-way behavior
    - more complex