Rigid Frames

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

**Rigid Frames**

- 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

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

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**Rigid Frame Analysis**

- members see
  - shear
  - axial force
  - bending

- V & M diagrams
  - plot on “outside”

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**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

**Rigid Frame Design**

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