The Structural Design of Laramie County Community College Student Center

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Objective

To Design a Structural System for a multi-story multi-purpose building through the:

- Schematic Design (SD) Phase
- Design Development (DD) Phase
- Construction Drawings (CD) Phase
Schematic Design Phase

- Determine scope of the project, site requirements, and load information
- Determine the structural system for gravity loads
- Establish major grid lines, columns, and other vertical elements
- Address unique foundation conditions.
Schematic Design Phase

- Four story office and classroom building on the campus of Laramie Country Community College in Cheyenne WY
- Applicable Codes: IBC 2012; ASCE 7
- Gravity Loads:
  - 95 psf floor live load
  - 80 psf floor dead load; 20 psf roof dead load
  - 19 psf flat roof snow load
  - 25 k roof mechanical equipment load
Schematic Design Phase

- Steel Structural gravity system
- Low Soil Bearing pressure
  - Engineered Aggregate Piers
Design Development

The design development builds on the schematic design to reach a level of completeness that demonstrates the project can be built focusing on:

- Primary Structure Member sizes
- Lateral load system
Design Development

- **Floor Beams and Girders**
  - W 21 x 44
  - W 21 x 55

- **Roof Truss and Girders**
  - W 14 x 22

- **Columns**
  - W12 x 53
  - W10 x 33

- **Decking**
  - Floor 2VLI19 with 4” concrete slab
  - Roof 1.5B22
Design Development

- Lateral System
  - Concrete Shear Walls
  - Rigid Floor Diaphragm
Construction Drawings

The construction drawing phase encompasses the preparation of drawings and specifications that contain the detailed requirements for the construction of a building project. For the purposes of this project the CD phased focused on:

- Connections
- Constructability
Construction Drawings

- Bolted Connections
  - Beam to Girder
  - Girder to Column
  - Shear Wall
Construction Drawings

- Constructability
  - Roof
Conclusions

Through to SD, DD, and SD phases of the project, a cohesive structural design was created that:

- Maintains architectural identity
- Resists gravity and lateral loads
- Utilizes the best materials to minimize construction costs and maximize the ease of construction
Questions?
Picture Sources

https://s-media-cache-ak0.pinimg.com/736x/a9/30/10/a93010d5a9a9f473ac9a77ed4c585139.jpg
http://www.tboake.com/SSEF1/CONNECTIONS/BOLTED/framed.jpg
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