Keiller Building
Laboratory Building
University of Texas – Medical Branch
Galveston, Texas

Team “That’s What She Said”
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Background

- History

- Constructed in 1925 as the Laboratory Building for the University of Texas Medical Branch – Galveston, TX
  - Architect –
    - Herbert Miller Greene, Univ. of Texas campus architect, 1922-1932
    - Mediterranean-influenced Beaux-Arts style
  - Expanded in 1932, renovated in 1995, currently undergoing structural alterations.
Construction

- Massing

- Primary system is load bearing masonry consisting of 1’ clay tile masonry units with limestone and brick veneer (non load-bearing)
- No expansion joints
- Renovation/ new construction uses more cast-in-place reinforced concrete, but the overall building system is still primarily load bearing clay masonry.
Construction

- Soil conditions

- Deep Sandy Eolian Sands of Holocene age
- Cohesionless
- Building should be built upon piers or piles in order to create stability.
Construction
- Foundation
Construction

- Foundation

![Diagram of construction foundation](image)
Construction

- Flooring

- Floor slabs are a one-way concrete joist system in most areas. Slabs are 5” thick, joists are 1’ deep and spaced 3’ on center.
- Some of the longer slab areas have tertiary members to reinforce the system. Visually the slabs become a two way system, but the bay proportions exceed the maximum aspect ratio, making them one-way.
Construction

- Roof system
  - Roof trusses are formed of welded steel members.
  - Composed of two steel angels with a gusset plate connections.
  - Rigid joints.
  - Truss welded to plate cast in masonry wall.
All interior columns composed of reinforced concrete.

<table>
<thead>
<tr>
<th>MARK</th>
<th>SIZE</th>
<th>VERT. STEEL</th>
<th>TIES</th>
<th>DOWELS</th>
<th>DETAILS</th>
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<td>8, #7</td>
<td>#3 @ 14</td>
<td>8, #7 x 4'-0&quot;</td>
<td>S818</td>
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NOTE: COLUMNS EXTEND BETWEEN 3RD AND 4TH FLOORS
Construction

- Supports

<table>
<thead>
<tr>
<th>Buckled shape of column shown by dashed line</th>
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</thead>
<tbody>
<tr>
<td>Theoretical K value</td>
</tr>
<tr>
<td>Recommended design values when ideal conditions are approximated</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>(a)</th>
<th>(b)</th>
<th>(c)</th>
<th>(d)</th>
<th>(e)</th>
<th>(f)</th>
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<tbody>
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Can you say plan irregularity??
Construction

- Loads

**THE TWO-MINUTE ENGINEER**

**FORCES**

- Lateral load: Forces applied parallel to level ground surface (wind, seismic, backfill, etc.).
- Uplift: Forces applied perpendicular to level ground surface, in an upward direction (wind uplift and vertical seismic forces).

**REACTION**

- Base shear: The reaction at the base of a wall or structure due to an applied lateral load - “Sidings Force.”
- Overturning: What happens when a lateral force acts on a wall or structure and it can’t slide - “Trip Over Force.”

**Wind Speed (mph)**

![Wind Speed Graph]

- City
- US average

![Graph showing wind speed variations by month.](image-url)
Construction

- Loads
  - Force Diagram
Construction

- Loads
  - Moment Diagram
Construction

- Loads
  - Shear Diagram
Construction

- Loads

  - Load Resisting Factors
    - The building functions as shear walls connected by a rigid diaphragm
    - Resists the overturning moment, resists torsion due to building length
    - Basically, the building functions as a monolithic structure.
Sources

4. http://www.utexas.edu/supportut/news_pub/yg_greeneexhibit.html&hl=en&w=378&sz=20&hl=en&start=4&tbnid=gJ22_sAs5coShM:&tbnh=122&tbnw=85&prev=/images%3Fq%3DGREENE,%2BHERBERT%2BMILLER%26svnum%3D10%26hl%3Den%26rls%3DDKUS,DKUS:2006-29,DKUS:en