QuakeUpLA

Creating an Interactive Seismicity and Building Response Map Tool

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Many older L.A. buildings could collapse in an earthquake

The city has rejected calls to make a list of concrete buildings at risk of collapsing in a major quake, but a Times analysis finds there could be more than 1,000 — many of them homes and offices.
DATA STRUCTURE

**HISTORIC EARTHQUAKE DATA**
includes PGA and MMI

**EARTHQUAKE SCENARIOS**
includes Shakeout2 Scenario

**BUILDING & LAND PARCEL OUTLINES**
includes city boundaries

**BUILDING CONSTRUCTION DETAILS**
includes year built & bldg ht

**OFFLINE PROCESSING**

**TABULAR DATA**
Excel sheets & Access databases

**MAPS & SPATIAL DATA**
layers & geodatabases

**DATABASE**

**APPLICATION**
desktop & mobile devices
**BUILDING INFORMATION**

- **Address**: Santa Monica, CA
- **Year Built**: 1972
- **Stories**: 5

**DESIGN CODES**

- **Design Force vs Modern Code**
  - What was my building designed to withstand?

**Peak Acceleration**

- **Experienced vs Possible**
  - What has my building felt and what could it feel?

**Shaking Intensity**

- **Experienced vs Possible**
  - What is the total shaking experienced by my building and what could it be?

**DESIGN CODES**

- **Design Force vs Modern Design**
  - What was my building designed to withstand?
\[ S_{MS} = F_a S_S \]  
\[ S_{M1} = F_v S_1 \]  
\[ S_{DS} = \frac{2}{3} S_{MS} \]  
\[ S_{DI} = \frac{2}{3} S_{M1} \]  

**FIGURE 11.4-1 Design Response Spectrum**
**What we use**

User Note: Electronic values of mapped acceleration parameters and other seismic design parameters are provided at the USGS website at [http://earthquake.usgs.gov/design-maps](http://earthquake.usgs.gov/design-maps), or through the SEI website at [http://content.seinstitute.org](http://content.seinstitute.org).

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**Table 11.4-1 Site Coefficient, \( F_a \)**

<table>
<thead>
<tr>
<th>Site Class</th>
<th>( S_a \leq 0.25 )</th>
<th>( S_a = 0.5 )</th>
<th>( S_a = 0.75 )</th>
<th>( S_a = 1.0 )</th>
<th>( S_a \geq 1.25 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>0.8</td>
<td>0.8</td>
<td>0.8</td>
<td>0.8</td>
<td>0.8</td>
</tr>
<tr>
<td>B</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>C</td>
<td>1.2</td>
<td>1.2</td>
<td>1.1</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>D</td>
<td>1.6</td>
<td>1.4</td>
<td>1.2</td>
<td>1.1</td>
<td>1.0</td>
</tr>
<tr>
<td>E</td>
<td>2.5</td>
<td>1.7</td>
<td>1.2</td>
<td>0.9</td>
<td>0.9</td>
</tr>
<tr>
<td>F</td>
<td>See Section 11.4.7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Use straight-line interpolation for intermediate values of \( S_a \).

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**Table 11.4-2 Site Coefficient, \( F_v \)**

<table>
<thead>
<tr>
<th>Site Class</th>
<th>( S_v \leq 0.1 )</th>
<th>( S_v = 0.2 )</th>
<th>( S_v = 0.3 )</th>
<th>( S_v = 0.4 )</th>
<th>( S_v \geq 0.5 )</th>
</tr>
</thead>
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<tr>
<td>A</td>
<td>0.8</td>
<td>0.8</td>
<td>0.8</td>
<td>0.8</td>
<td>0.8</td>
</tr>
<tr>
<td>B</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>C</td>
<td>1.7</td>
<td>1.6</td>
<td>1.5</td>
<td>1.4</td>
<td>1.3</td>
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<tr>
<td>D</td>
<td>2.4</td>
<td>2.0</td>
<td>1.8</td>
<td>1.6</td>
<td>1.5</td>
</tr>
<tr>
<td>E</td>
<td>3.5</td>
<td>3.2</td>
<td>2.8</td>
<td>2.4</td>
<td>2.4</td>
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<tr>
<td>F</td>
<td>See Section 11.4.7</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Note: Use straight-line interpolation for intermediate values of \( S_v \).
### Table 20.3-1 Site Classification

<table>
<thead>
<tr>
<th>Site Class</th>
<th>$\bar{v}_s$</th>
<th>$\bar{N}$ or $N_{ch}$</th>
<th>$\bar{s}_u$</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Hard rock</td>
<td>&gt;5,000 ft/s</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>B. Rock</td>
<td>2,500 to 5,000 ft/s</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>C. Very dense soil and soft rock</td>
<td>1,200 to 2,500 ft/s</td>
<td>&gt;50</td>
<td>&gt;2,000 psf</td>
</tr>
<tr>
<td>D. Stiff soil</td>
<td>600 to 1,200 ft/s</td>
<td>15 to 50</td>
<td>1,000 to 2,000 psf</td>
</tr>
<tr>
<td>E. Soft clay soil</td>
<td>&lt;600 ft/s</td>
<td>&lt;15</td>
<td>&lt;1,000 psf</td>
</tr>
</tbody>
</table>

Any profile with more than 10 ft of soil having the following characteristics:
- Plasticity index $PI > 20$.
- Moisture content $w \geq 40\%$.
- Undrained shear strength $s_u < 500$ psf.

F. Soils requiring site response analysis in accordance with Section 21.1

See Section 20.3.1

For SI: 1 ft/s = 0.3048 m/s; 1 lb/ft² = 0.0479 kN/m².
What we would like to see
REQUEST FOR AUDIENCE FEEDBACK

Please contact:

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bmoffett@usc.edu

Anders Carlson, PhD
andersca@usc.edu

PRESENTATION

• Clarity
• Visual Appeal
• User Navigation

INFORMATION

• Information used
• Information you would like to see

COMMUNICATING RISK

• Primary target audience: building owners
• If you lived or worked in the region covered by the map, would you want to look up your building?
Brittany Moffett, bmoffett@usc.edu
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Map contact, @QuakeupLA

Your Seismic Map
@QuakeupLA

What’s happening?

Your Seismic Map @QuakeupLA · 14m
Prototype map to be presented at ATC/USGS Seismic Hazard User-Needs Workshop Monday, September 21.
QuakeUpLA – Brief Survey

We would love your advice and expertise to improve this communication tool intended to increase awareness of the difference between what could happen versus what has happened and to urge building owners to seek seismic inspection and retrofit.

PRESENTATION - What do you think worked well (visually, information provided, clarity, etc) and what should we improve on? After seeing the presentation, was there anything you felt unclear about?

INFORMATION - Is there any additional information you would have liked to see? Was there any information used that we should have excluded? Do you have any recommendations for additional datasets?

COMMUNICATION – Do you have suggestions for making this more clear and comprehensive for building owners? If you lived or worked in the region covered by the map, would you want to look up your building?
Thank you for participating in this survey. Please feel free to tweet us @QuakeupLA or email us with any other thoughts. Do you have any other suggestions for us as we continue to develop this map?

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