Comparative Study of PEER-CEA Woodframe Project Results with Catastrophe Loss Models

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Objectives

- Review PEER-CEA analysis process with cat modelers
- Compare selected results with modelers
- Provide damage functions that can be incorporated into the models
- PEER objective NOT to determine insurance premium discounts
Index buildings – Cat Models

- Cat modelers use “Primary” and “Secondary” modifiers to categorize buildings.
- Typically these modifiers need to be observable by the underwriters’ agents.
- “Hidden” characteristics that are not observable but affect vulnerability are not considered by modelers.
- Cat modelers are protective of their IP.
Index buildings – Model Comparison

- The PEER-CEA team identified a subset of its index buildings that could be matched to the cat models.
- We provided the modelers with four locations we specifically chose to compare results.
- Each modeler ran the index buildings through their models.
- Ground up loss at 250yr RP and Average Annual Loss were provided to PEER.
### 48 Index Building compared to cat modelers

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<thead>
<tr>
<th></th>
<th>1-Story</th>
<th></th>
<th>2-Story</th>
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<tbody>
<tr>
<td></td>
<td>Existing</td>
<td>Retrofit</td>
<td>Existing</td>
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<td><strong>Pre 1945</strong></td>
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<td>Lath + Plaster</td>
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<td><img src="image2.png" alt="Image" /></td>
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<tr>
<td>Wood</td>
<td><img src="image5.png" alt="Image" /></td>
<td><img src="image6.png" alt="Image" /></td>
<td><img src="image7.png" alt="Image" /></td>
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<tr>
<td>Stucco</td>
<td><img src="image9.png" alt="Image" /></td>
<td><img src="image10.png" alt="Image" /></td>
<td><img src="image11.png" alt="Image" /></td>
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<td><strong>1945-55</strong></td>
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<td>Average</td>
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<td>Wood</td>
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<td>Stucco</td>
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<td><strong>1955-70</strong></td>
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<td>Gypsum</td>
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<tr>
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<tr>
<td>Stucco</td>
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Results Presentation

- PEER-CEA – Modeler results were presented to each modeler after initial run of 12 buildings
- Comments, questions and suggested revisions were proposed
- PEER team revised models based on comments and ran remaining 36 buildings
- Comparison of all 48 buildings were presented to modelers
Results: 1 story, wood
Results: 1 story, stucco

San Francisco
@250 yr

San Bernardino
@250 yr
Results: 2 story, wood

San Francisco @250 yr

San Bernardino @250 yr
Results: 2 story, stucco

San Francisco
@250 yr

San Bernardino
@250 yr
Summary

- One relatively clear result appears to be that the PEER-CEA models predict a greater difference in damage between the retrofitted and existing conditions than do the modelers.
Key Findings

- For unretrofitted raised (2-ft) cripple-wall conditions the PEER-CEA Project models consistently and significantly estimated more significant damage than the modelers.

- Both the Modelers and PEER-CEA Project predicted greater damage for the two-story, raised cripple-wall homes versus the one-story homes.

- For unretrofitted stem-wall conditions the Modelers consistently estimated lower damage than the PEER-CEA Project models.

- For retrofitted conditions, the PEER-CEA Project and Modelers’ results compared significantly better than unretrofitted conditions.

- The PEER-CEA Project results showed a consistent improvement in performance with age. The Modelers results showed consistent improvement from the 1945–1955 age range over the pre-1945 age range, but poorer performance from the 1955–1970 age range over the 1945–1955 age range.

- The PEER-CEA Project models show distinctly better performance for stucco over wood siding in the unretrofitted condition, unlike the Modelers.