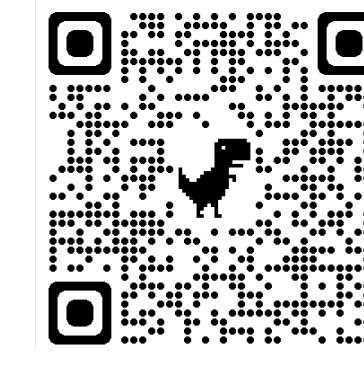


# Effect of Uncertainty in Reinforcing Steel Model Parameters on Seismic Responses of RC Wall Buildings with Force-limiting Connections.



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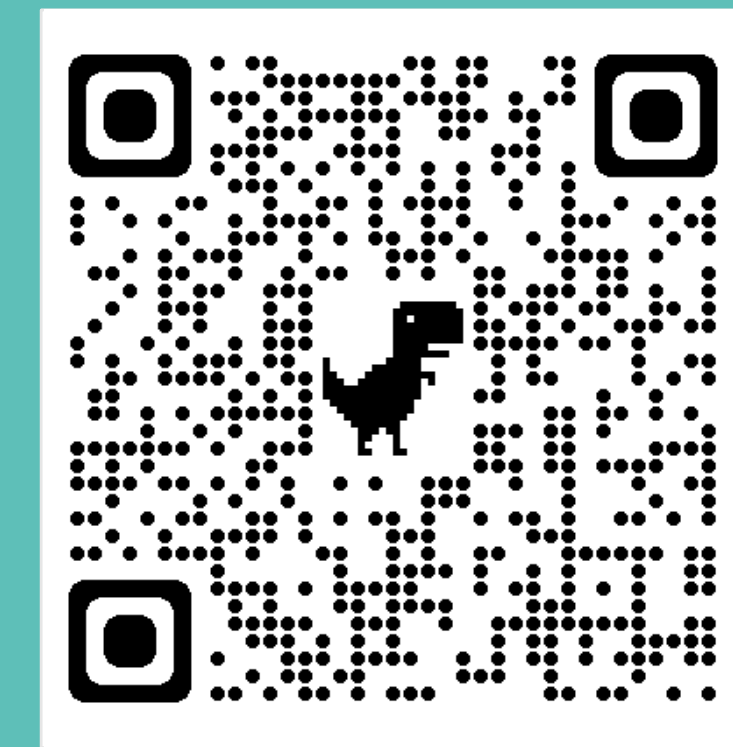
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The reduced effect of the uncertainty in the RC wall model parameters on the seismic responses of the building models with force-limiting connections provides higher confidence in the numerical prediction of the building seismic responses.

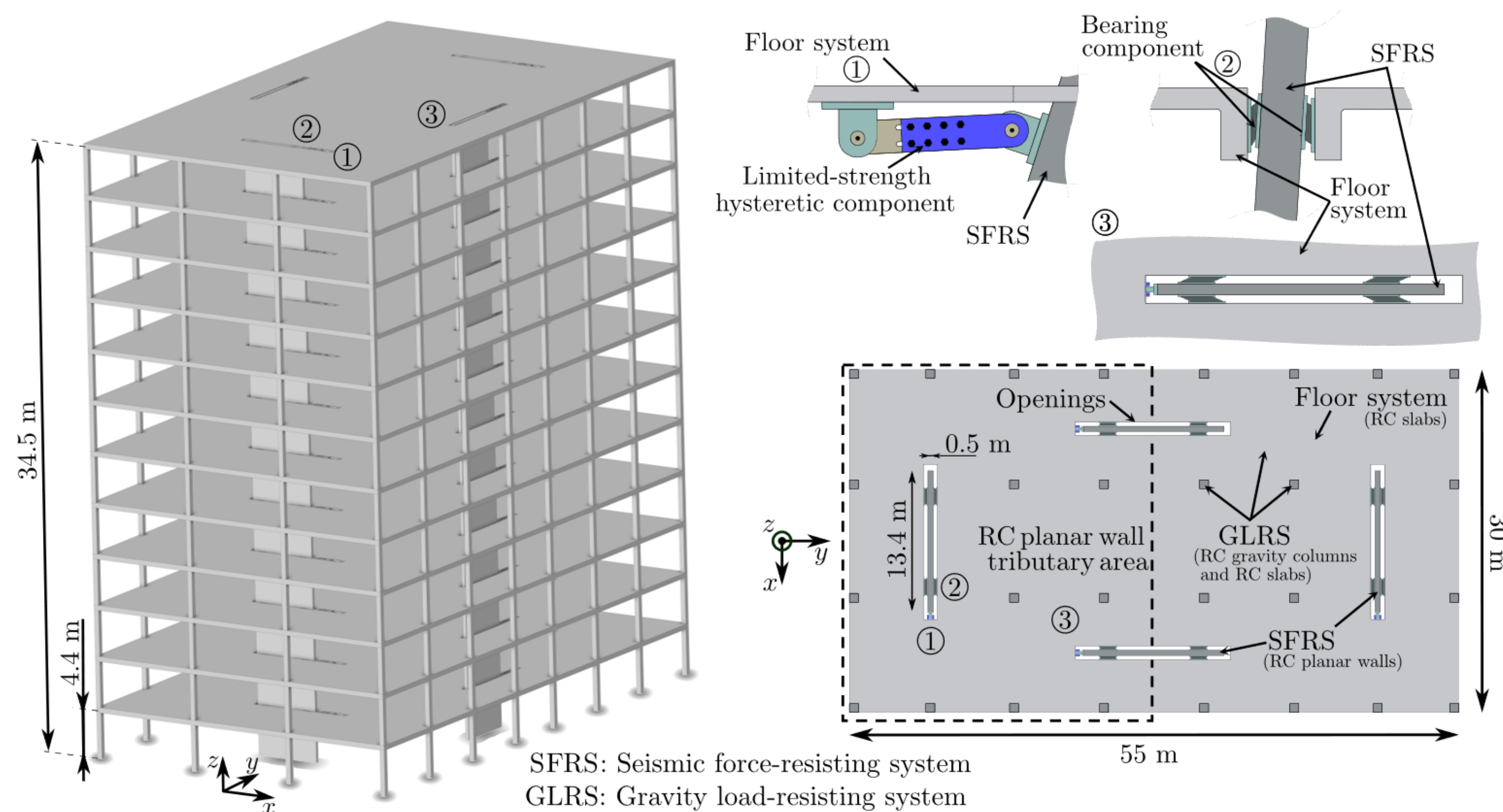


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## Introduction

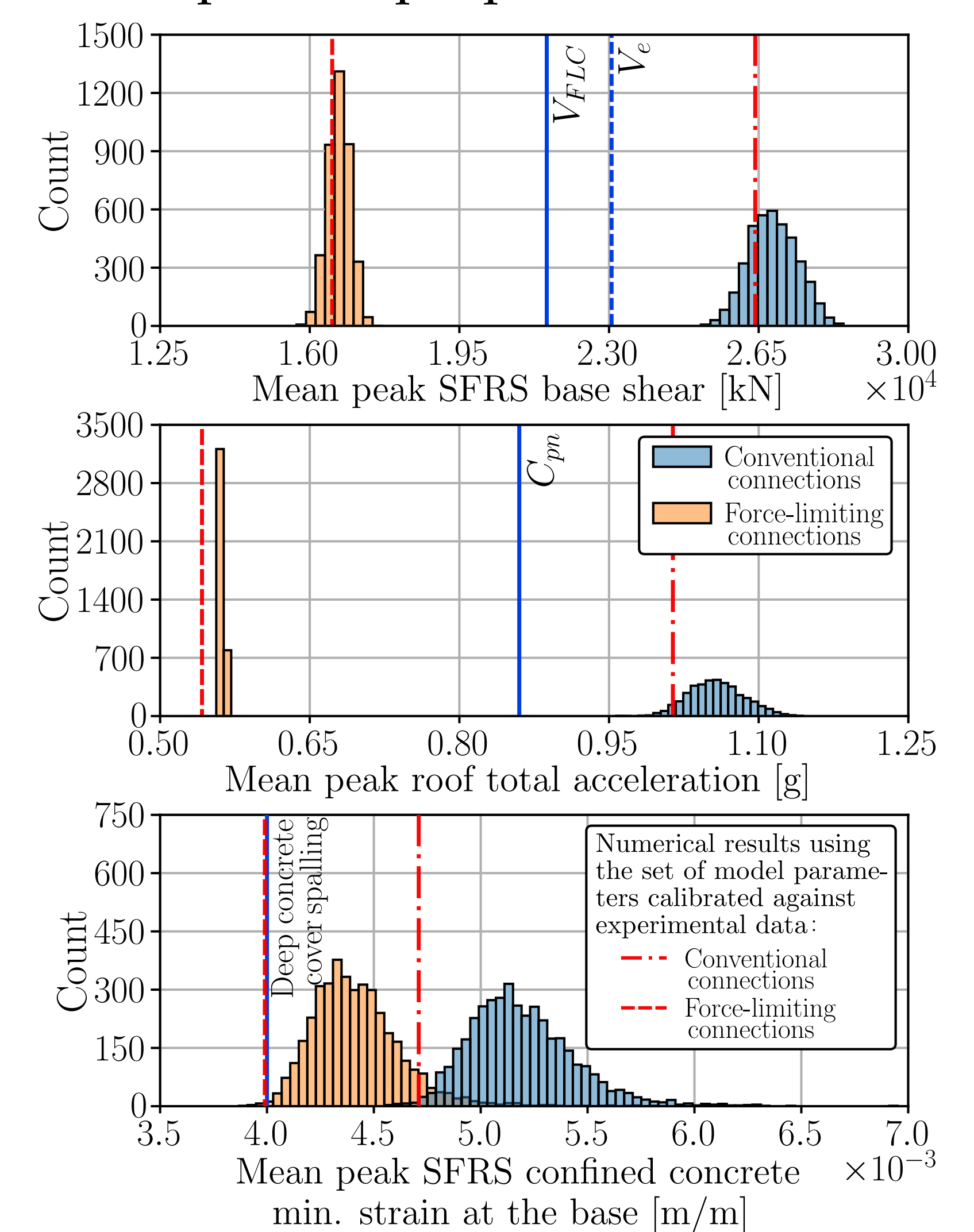
- Seismic analysis and design of buildings are intrinsically linked to multiple sources of uncertainty.
- Quantification of the epistemic uncertainty of the numerical models used to simulate the seismic responses of buildings is crucial to assessing the seismic performance of buildings.
- High-performance earthquake-resistant buildings that include seismic response modification devices strategically located in the seismic load path are expected to result in reduced variability in their seismic responses associated with epistemic uncertainty.

## Buildings with Force-Limiting Deformable Connections (FLCs)

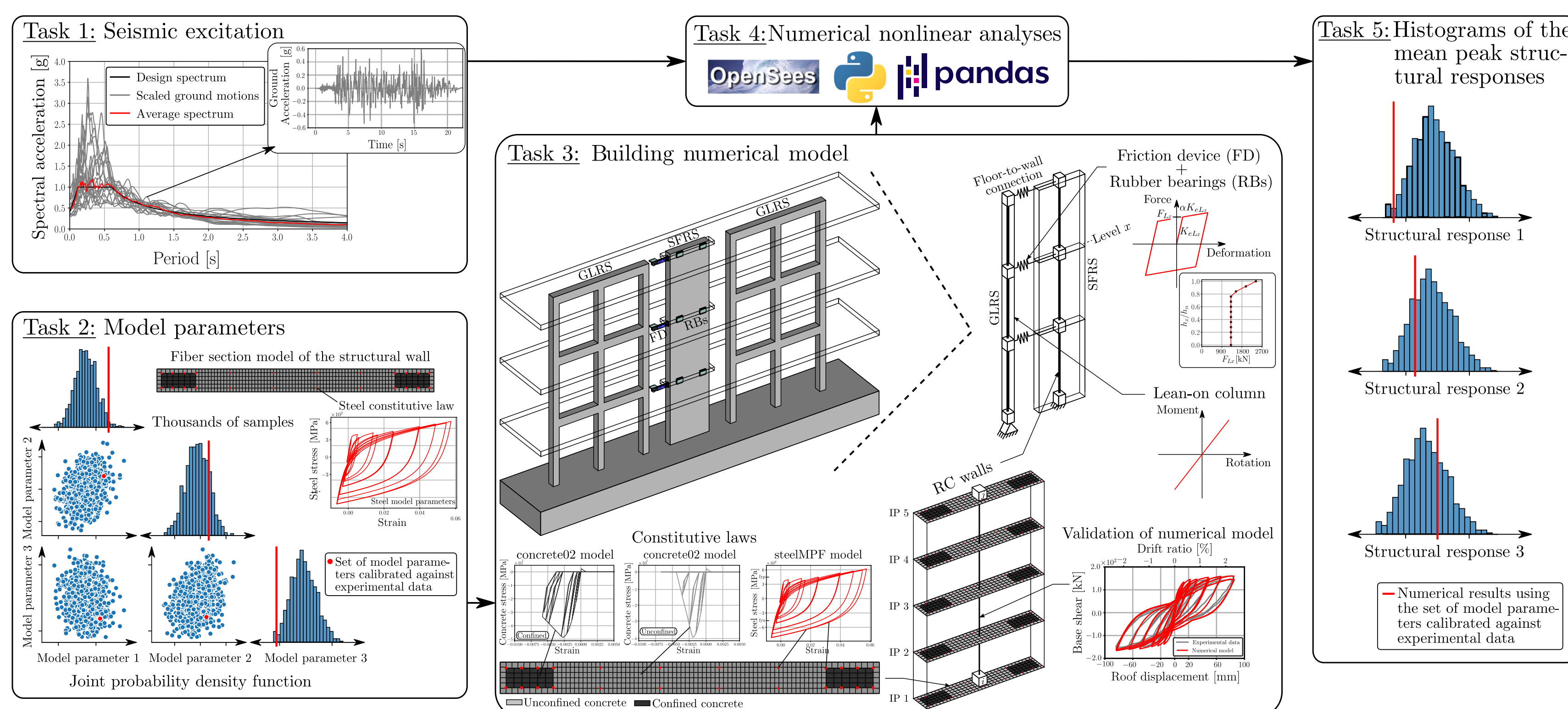


## Results

- Histograms of the mean values (over 18 scaled ground motions) of the peak seismic responses of a 12-story building with FLCs at fiber, element, and structure levels are generated.
- The analysis is repeated for the same building with conventional connections for comparison purposes.



## Uncertainty Propagation Analysis



## Conclusions

- The use of FLCs not only reduces the mean values of the distributions of the mean peak base shear and acceleration responses but also reduces the dispersion of these distributions due to the uncertainty of the model parameters.
- The uncertainty in the modeling parameters has a considerable effect on the mean peak strain responses.

## Selected References

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3. Birrell M., Astroza R., Carreño R., Restrepo J. I., and Araya-Letelier G. (2021). Bayesian parameter and joint probability distribution estimation for a hysteretic constitutive model of reinforcing steel. *Structural Safety*, 90:102062. doi: <https://doi.org/10.1016/j.strusafe.2020.102062>.

