Enhancing Earthquake Engineering Research through DesignSafe

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What is DesignSafe?

• A web-based research platform that provides computational tools to manage, analyze, and understand critical data for natural hazards research

DesignSafe Vision

• A CI that is an integral part of research discovery
  – Support end-to-end research workflows and the full research lifecycle, including data sharing/publishing
  – Cloud-based tools that support the analysis, visualization, and integration of diverse data types
• Amplify and link the capabilities of the NHERI partners and natural hazards researchers around the globe
DesignSafe Research Workbench

• Data Depot Data Repository
  – Private space (My Data)
  – Collaboration space (My Projects) for data sharing
  – Publically accessible space (Published) for curated data
• Discovery Workspace
  – Apps/tools for computational simulation, data analysis, etc.
• Reconnaissance Portal
  – Discover available reconnaissance data
Use of DesignSafe in EQ Engineering Research

- Integration of Computational Simulation, Data Analysis, Publishing
  - M.G. Durante and Scott Brandenberg
- Probabilistic Analysis of Seismic Slope Displacement
  - G. Saygili and E. Rathje
- Seismological ground motion simulations
  - SCEC (Goulet et al.) and M9 (Frankel et al.) projects
- Use of DesignSafe in Reconnaissance Efforts
  - Reconnaissance portal, published datasets
Seismic Earth Pressures on Retaining Walls

Durante et al. (2018) GEESD V, Austin, TX

30,000 analysis parametric study

Output files saved to Data Depot

Post-processed in DesignSafe using matlab script
Seismic Earth Pressures on Retaining Walls

Develop analytical expressions to predict earth pressure from input time history and model properties.
Probabilistic Sliding Displacement of Slopes
Broadband seismological simulations

- Cascadia Subduction Zone M9 Project (Frankel, Wirth, et al. 2018, NCEE)
  - Utilized allocation on Stampede2 for simulations
  - Time series published as dataset in DesignSafe
Broadband seismological simulations

- SCEC Broadband Platform Dataset 17.3
  - Simulations for design levels events in NoCal and SoCal
  - Time series published as a DesignSafe data set
  - Jupyter notebook tool to search and select motions
SCEC BBP Ground Motion Portal
Recon Portal → Data Depot → Workspace
Make **your** data count!

- **Formally publish** data sets in stable data repositories
  - Include data processing scripts, visualizations, etc.
- Data needs a permanent, **digital location (DOI)** not just a URL
  - List curated data sets on your CV
- Formally cite data **in your reference list** of your papers using DOI, citation language as indicated in DesignSafe

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PRJ-1695: PROBABILISTIC SEISMIC HAZARD ANALYSIS FOR THE SLIDING DISPLACEMENT OF RIGID SLIDING MASSES

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Citation

DesignSafe: Open for Business
Available to the Global Natural Hazards Research Community

• Learning Center: Training Webinars, FAQ
• NHERI Community: News, DesignSafe Slack team
• Cite DesignSafe marker paper (Rathje et al. 2017, Natural Hazards Review) if you use DesignSafe in your research

Please share your feedback, ideas, experiences!

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