DESIGNSAFE-CI
A NATURAL HAZARDS ENGINEERING COMMUNITY

Supporting Your Natural Hazards Research

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What is DesignSafe?

- A web-based research platform that enables transformative research to protect human life and reduce damage during natural hazard events

DesignSafe Vision

- A cyberinfrastructure (CI) that is an integral part of research discovery
  - Provide a platform for data sharing/publishing
  - Enable research workflows and access to high performance computing (HPC)
  - Deliver cloud-based tools that support the analysis, visualization, and integration of diverse data types
- Amplify and link the capabilities of natural hazards researchers in the US and abroad

DESIGNSAFE-CI
NHERI: NATURAL HAZARDS ENGINEERING RESEARCH INFRASTRUCTURE

www.designsafe-ci.org

Research Workbench | Learning Center | NHERI Facilities | NHERI Community | About | Help | Search DesignSafe

- Data Depot
- Workspace
- Recon Portal
- SimCenter Research Tools
- User Guides
- Impact of Data Reuse

…sed research
…etwork that
…nal tools needed to
…nderstand critical
data for natural hazards research.

Learn how to
Start Using DesignSafe

Browse the Data Depot's
Published Data Sets

Join the conversation in
DesignSafe's Slack Channel

Learn more about
NHERI, the NCO & DesignSafe

NHERI Five-Year
Science Plan
2nd Edition

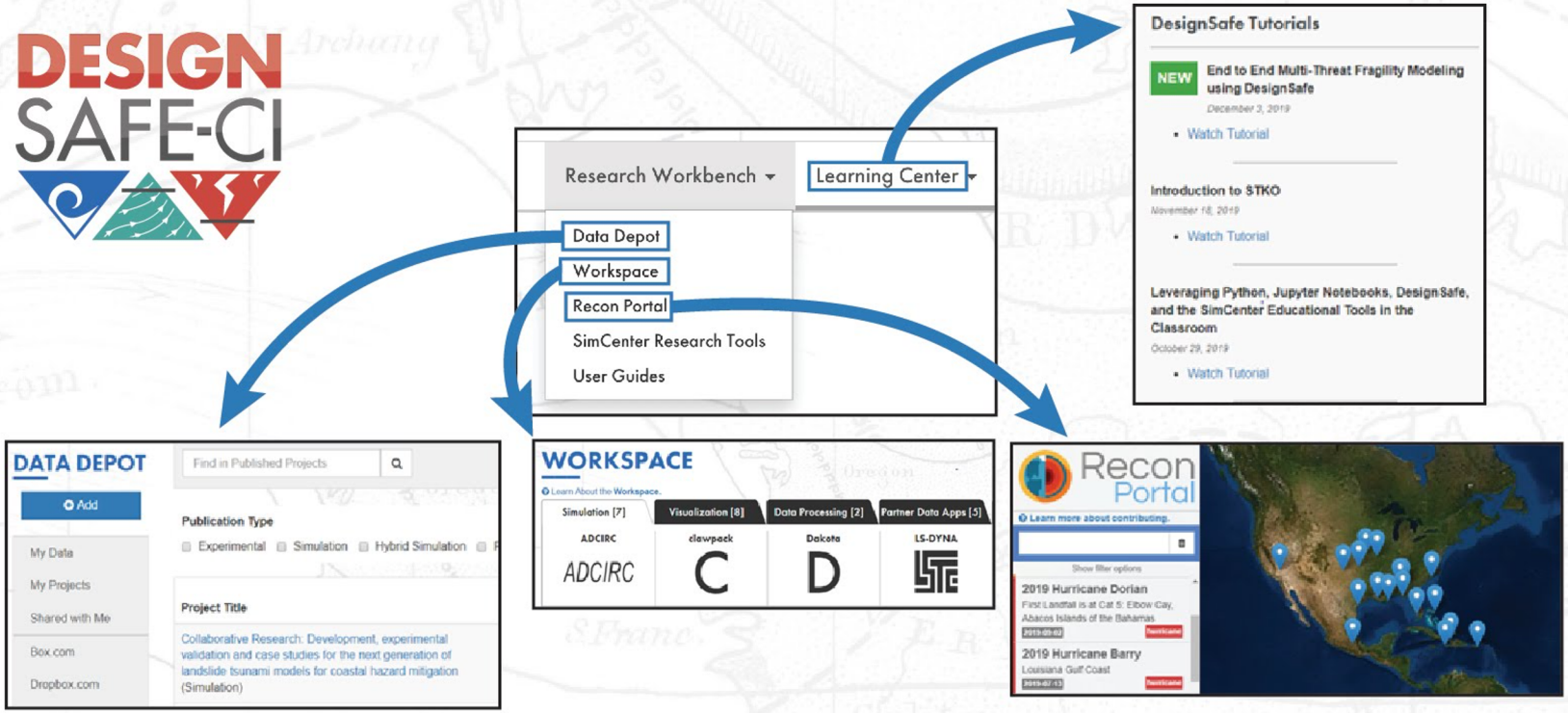
Visible GOES-16 satellite image of Hurricane Marco (left) and Tropical Storm Laura (right) at 12:50 p.m. EDT Sunday, August 23. (Image credit: NOAA/RAMMB, Yale Climate Connections.)

2020 Hurricane Season: NSF-Funded Natural Hazards Experts Available for Comment

For the 2020 hurricane season, experts from the NSF-supported Natural Hazards Engineering Research Infrastructure (NHERI) are available to discuss a variety of hurricane-related topics. NHERI researchers are authorities in infrastructure damage from wind and storm surge, damage mitigation efforts, societal impacts in hurricane-prone regions and post-event data collection.

FIND MORE NEWS IN THE NEWSROOM

DESIGN SAFE-CI



DesignSafe Research Workbench

- Data Depot Data Repository
  - Private space (My Data)
  - Collaboration space (My Projects) for data sharing and ultimate publishing
  - Publicly accessible space (Published) for curated data from My Projects
  - Publicly accessible space (Community Data) for uncurated data
- Workspace
  - Apps/tools for computational simulation, data analysis, visualization, etc. with access to files in Data Depot
  - Access to High Performance Computing at TACC
- Reconnaissance Portal: discover published field data associated with natural hazard events

Data Curation and Workspace Support

- https://www.designsafe-ci.org/rw/user-guides/
- Curation and publication guidelines
- Data transfer methods
  - Web browser/Dropbox/etc (smaller uploads), Globus, Cyberduck

- https://www.designsafe-ci.org/facilities/virtual-office-hours/
- Virtual Curation Office Hours
  - DesignSafe Data Curators: Maria Esteva and Mahyar Sharifi
  - Tuesday and Thursday at 1 pm Central (or by appt)
- Virtual Workspace Office Hours
  - Joe Vantassel and Wenyang Zhang are available Tuesdays 2pm Central

SLIDE BY JOY PAUSCHKE, NSF, DEC 6 PUBLISH YOUR DATA EVENT

Your NSF Project Data Matters: Publish on NHERI DesignSafe!

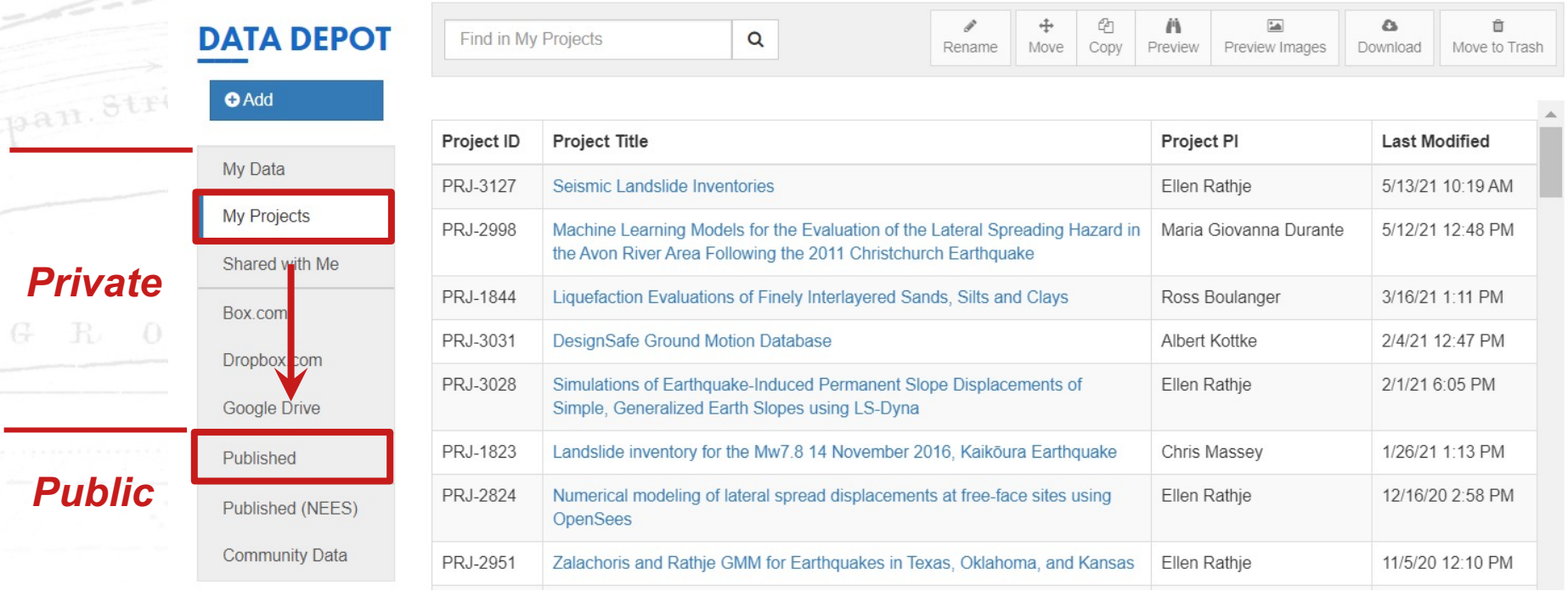
DesignSafe – Your Community's Resource!

- Your project is an investment by NSF to advance knowledge for the natural hazards engineering field
- Your proposal (award) includes a **Data Management Plan** for sharing and archiving your project data (**DesignSafe for natural hazards**)
- NSF award should include costs for processing, curating, and publishing project data
- Benefits of your published data on DesignSafe
  - Discovery of your data for future research by others, e.g., machine learning, design of new experiments or simulations
  - Citation format for others to properly reference your data

Don't Wait to Publish Your Data!

- Start early and often during NSF project
- Use DesignSafe tutorials, office hours,…
- Publish data soon after experiments/simulations completed and students available
- Publish data before NSF Final Report and Project Outcomes Report submitted/due (compliance with Data Management Plan)

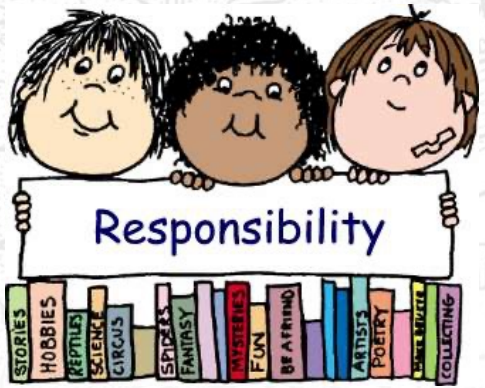
Data Depot


DATA DEPOT
Add
My Data
My Projects
Shared with Me
Box.com
Dropbox.com
Google Drive
Published
Published (NEES)
Community Data
Private
Public
Find in My Projects
Rename
Move
Copy
Preview
Preview Images
Download
Move to Trash
Project ID
Project Title
Project PI
Last Modified
PRJ-3127
Seismic Landslide Inventories
Ellen Rathje
5/13/21 10:19 AM
PRJ-2998
Machine Learning Models for the Evaluation of the Lateral Spreading Hazard in the Avon River Area Following the 2011 Christchurch Earthquake
Maria Giovanna Durante
5/12/21 12:48 PM
PRJ-1844
Liquefaction Evaluations of Finely Interlayered Sands, Silts and Clays
Ross Boulanger
3/16/21 1:11 PM
PRJ-3031
DesignSafe Ground Motion Database
Albert Kottke
2/4/21 12:47 PM
PRJ-3028
Simulations of Earthquake-Induced Permanent Slope Displacements of Simple, Generalized Earth Slopes using LS-Dyna
Ellen Rathje
2/1/21 6:05 PM
PRJ-1823
Landslide inventory for the Mw7.8 14 November 2016, Kaikōura Earthquake
Chris Massey
1/26/21 1:13 PM
PRJ-2824
Numerical modeling of lateral spread displacements at free-face sites using OpenSees
Ellen Rathje
12/16/20 2:58 PM
PRJ-2951
Zalachoris and Rathje GMM for Earthquakes in Texas, Oklahoma, and Kansas
Ellen Rathje
11/5/20 12:10 PM

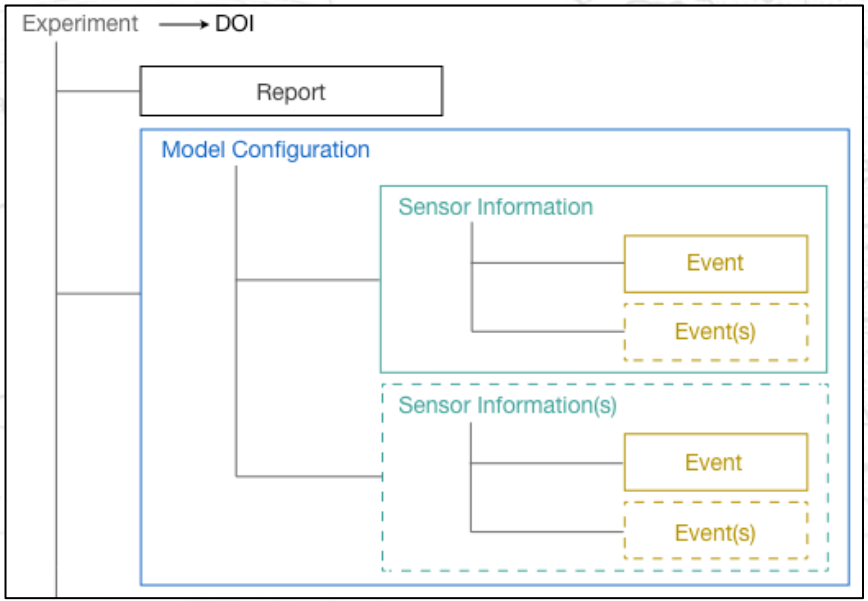
DesignSafe Data Models

Structured, yet ***flexible***, data models for different types of research

- **Experimental Project**
  For physical work, typically done at an experimental facility or in the field.
- **Simulation Project**
  For numerical and/or analytical work, done with software.
- **Hybrid Simulation Project**
  For work using both physical and numerical components.
- **Field Research Project**
  For work done by observation in areas affected by a natural hazard.
- **Other Project**
  For work other than the project types above.



Organizing Data



Experimental Data Model

Model Configuration: Files describing the design and layout of what is being tested (some call this a specimen).

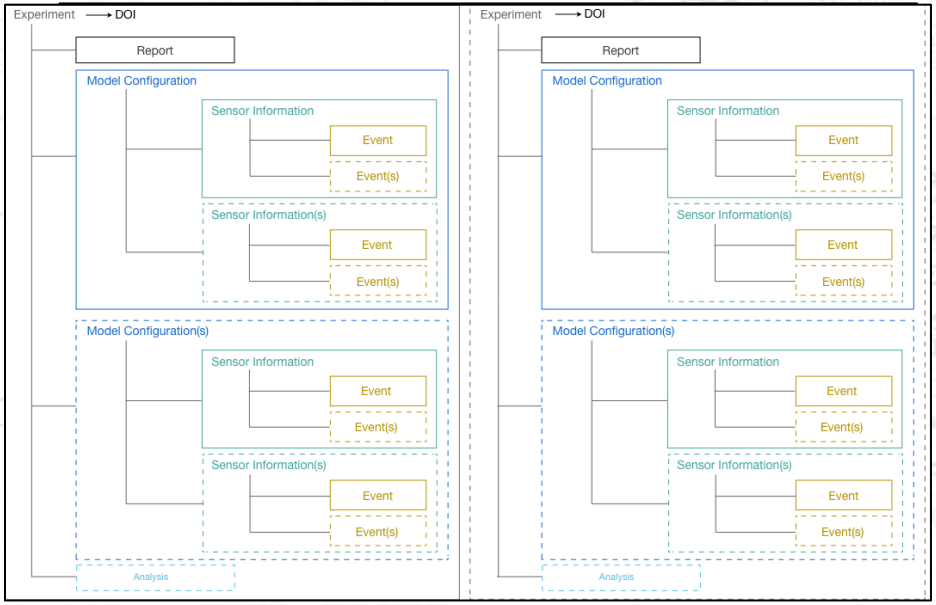
Sensor Information: Files about the sensor instrumentation used in a model configuration to conduct one or more event.

Event: Files from unique occurrences during which data are generated.

Analysis: Tables, graphs, visualizations, Jupyter Notebooks or other representations of the results.

Report: Written accounts made to convey information about the entire project or experiment.

Organizing Data



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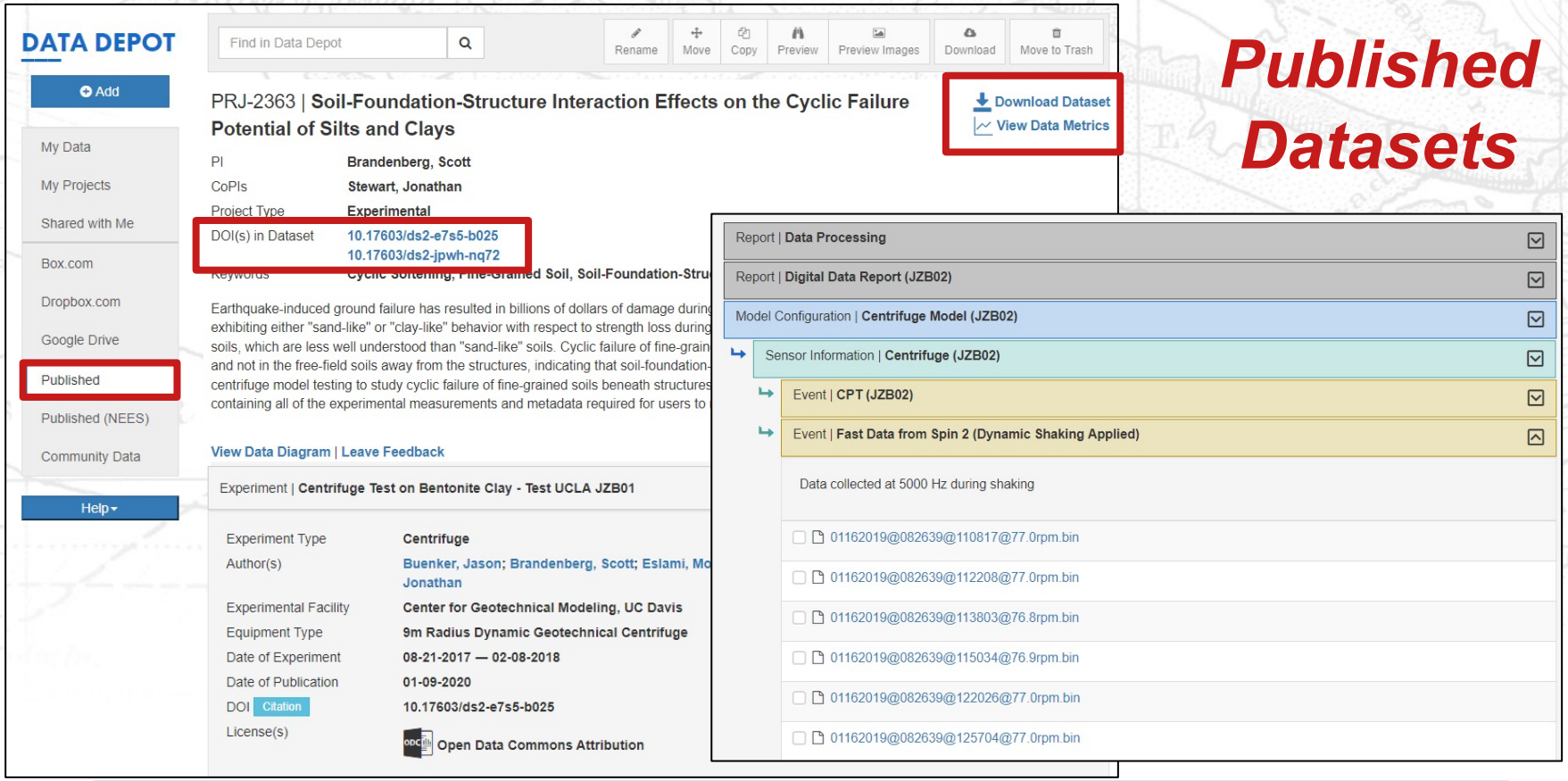
Published Datasets



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Florida Tech

Make **your** data count!

Make your research re-producible and your data re-usable

- ***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, just like papers
- Cite data publication ***in your reference list*** of your paper using DOI, citation language as indicated in DesignSafe

provided here. Additionally, the probabilistic approaches described in this paper are implemented as executable Jupyter notebooks (Saygili 2018a, b). These notebooks can be accessed in the Data

References

Saygili, G., Rathje, E., and Wang, Y. (2018a). "Probabilistic seismic hazard analysis for the sliding displacement of rigid sliding masses [Data set]." Designsafe-CI ⟨https://doi.org/10.17603/ds22d6k⟩

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Make **your** data count!

MAKE DATA COUNT

PRJ-2769 | **Food Access Impact Survey for Southeast and Harris County, Texas after Hurricane Harvey in 2017**

Download Dataset

PI	**Rosenheim, Nathanael**
Project Type	**Field Research**
Event	**Hurricane Harvey | Southeast Texas | 08-25-2017 — 08-31-2017 |** Lat 30.049840 Long -94.077210
Event Type	**Flood, Hurricane**
DOI(s) in Dataset	10.17603/ds2-aq2k-dy92
Related Work	
Keywords	**Field Research Planning, Food Access, Survey Instruments, Sample Frame**

View Data Diagram

Documents | **Food Retail Survey Instrument**

Author(s)	Rosenheim, Nathanael; Peacock, Walter; Perez, Maria; Lane, Gina
Date of Publication	06-18-2020
DOI Citation	10.17603/ds2-aq2k-dy92
License(s)	**Creative Commons Attribution Share Alike**

This collection archives instruments related to the food retail survey conducted by the Hazard Reduction Recovery Center, as part of a National Science Foundation-funded project. The instrument was designed to gather specific types of information on food retailers affected by Hurricane Harvey. The survey instrument was designed to collect information on: (1) Physical and infrastructure damage, (2) Accessibility problems, (3) Impact on employees and customers, (4) Business interruption, (5) Impact on fresh food availability, and (6) Business characteristics. The survey was designed to be answered by an employee with knowledge about store operations and food availability before and after Hurricane Harvey. The survey was designed to be conducted in-person. This archive documents two versions of the survey. The first version was for use in Jefferson and Orange County, Texas. The second version was for use in Harris County, Texas.

Citation

Rosenheim, N. Peacock, W. Perez, M. Lane, G. (2020) "Food Retail Survey Instrument", in *Food Access Impact Survey for Southeast and Harris County, Texas after Hurricane Harvey in 2017*. DesignSafe-CI. https://doi.org/10.17603/ds2-aq2k-dy92.

Download Citation

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PRJ-1811: NHERI UCSD Hybrid Simulation Commissioning

Download Dataset

PI	Mosqueda, Gilberto	View Team Members	**DOI**	doi:10.17603/DS25M42	Citation
Date of Publication	Dec/6/2018		**Award**	NSF 1520904	
Project Type	Hybrid_simulation		**Keywords**	hybrid simulation, shake table substructure, seismic isolation	

Description

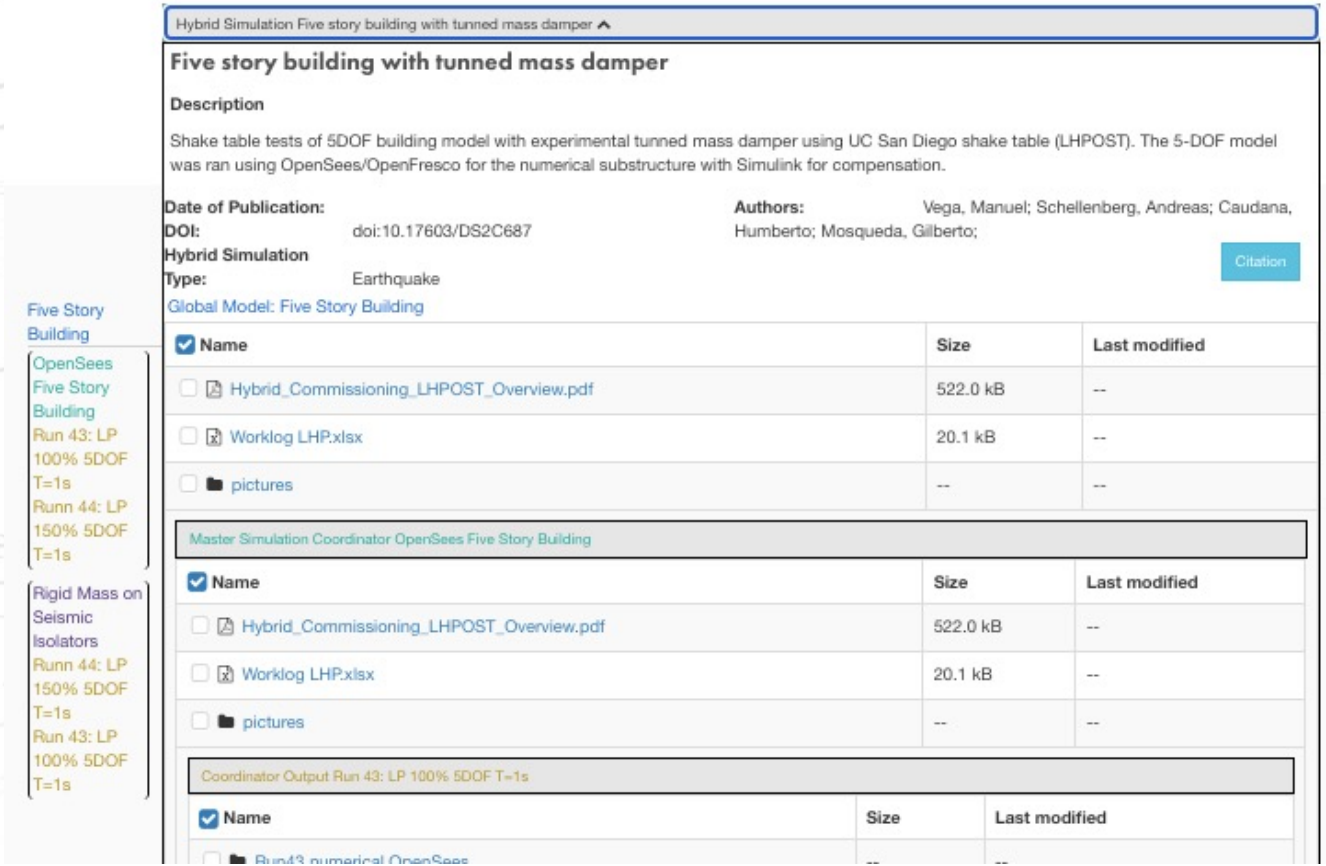
The use of large shake tables can provide extended capabilities to conduct large- and full-scale tests examining the seismic behavior of structural systems that cannot be readily obtained from reduced scale testing, or under pseudo-dynamic conditions. When considering large or complex structural systems, however, additional challenges arise such as high costs of full scale specimens or capacity limitations of currently available shake table. Some of these limitations can be overcome by real-time hybrid shake-table substructure test method that requires only key parts to be evaluated experimentally on the shake table while the remainder of the structure is modeled numerically. As a demonstration of the applicability of this method using a large shake tables, a series of hybrid shake table tests were conducted on the UCSD Large High Performance Outdoor Shake Table (LHPOST) with capabilities to test full scale structural models. A physical specimen was built on the LHPOST, and coupled with a numerical model using hybrid simulation techniques. Comparison of different methods to interface the numerical model with the control systems were evaluated. The physical specimen consisted on a rigid mass resting on four triple friction pendulum bearings that represented the upper story of a shear building model having the effect of a tune mass damper. Numerical models of shear buildings with different periods and multiple degree of freedom were considered to evaluate the performance of the table and stability and accuracy of the simulation results. The teste results demonstrate the effectiveness of tune mass dampers in reducing structural response and the benefit of using a hybrid shake table test method towards expanded system level dynamic testing. The performance of the shake table is evaluated and methods to compensate delay and other sources of error are discussed.

PRJ-1811

Hybrid Simulation Five story building with tunned mass damper

Hybrid Simulation One story building with tuned mass damper - OpenSees

Hybrid Simulation One story building with tuned mass damper - SimulinkRT


Hybrid Simulation Five story building with tunned mass damper
Five story building with tunned mass damper
Description
Shake table tests of 5DOF building model with experimental tunned mass damper using UC San Diego shake table (LHPOST). The 5-DOF model was ran using OpenSees/OpenFresco for the numerical substructure with Simulink for compensation.
Date of Publication:
DOI: doi:10.17603/DS2C687
Hybrid Simulation Type: Earthquake
Authors: Vega, Manuel; Schellenberg, Andreas; Caudana, Humberto; Mosqueda, Gilberto;
Citation
Global Model: Five Story Building
Five Story Building
OpenSees Five Story Building
Run 43: LP 100% 5DOF T=1s
Runn 44: LP 150% 5DOF T=1s
Rigid Mass on Seismic Isolators
Runn 44: LP 150% 5DOF T=1s
Run 43: LP 100% 5DOF T=1s
Name
Size
Last modified
Hybrid_Commissioning_LHPOST_Overview.pdf
522.0 kB
Worklog LHP.xlsx
20.1 kB
pictures
Master Simulation Coordinator OpenSees Five Story Building
Coordinator Output Run 43: LP 100% 5DOF T=1s

Curation Resources

Rathje et al. (2017) Natural Hazards Review, https://doi.org/10.1061/(ASCE)NH.1527-6996.0000246