# IMPROVING EARTHQUAKE RESILIENCY THROUGH THE USE OF POST-EARTHQUAKE CLEARINGHOUSES

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### Overview

- Earthquake Risk and Resilience in the U.S.
  - Where are earthquakes most prevalent?
  - Population trends/built environment and earthquake risk
  - The importance of post-earthquake investigations in informing science and supporting resilience

#### Physical Earthquake Clearinghouses

- Existing plans and/or frameworks for post-earthquake investigation
- Implementing post-earthquake physical technical clearinghouses
  - Plans and Physical requirements
- Use of gathered data/information for response, recovery, mitigation, and preparedness
- Communication & coordination with emergency management officials

### Earthquake Risk and Resilience in the US



https://earthquake.usgs.gov/earthquakes/map/

### Earthquake Risk and Resilience in the US

- US population estimated at 327,167,434<sup>1</sup>
- Over 51,000,000 live on the West Coast
- Among the fastest growing cities are Seattle, Provo, Boise, Bend-Redmond, Los Angeles
- 12.8% have special needs
- As of 2014, approx. half of all people in the U.S. live in earthquake zones<sup>2</sup>
- ICC Building Codes are updated every three years <u>www.iccsafe.org</u>
  - Adoption
  - Grandfathering
  - "Functional Recovery"

#### <sup>1</sup> U.S. Census Bureau:

https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml <sup>2</sup> Earthquake Spectra: https://doi.org/10.1193/111814EQS195M

**Energy Infrastructure** 





### Scenarios Discussions/Exercising Potential Impacts

#### National Level Exercise

#### EXERCISE SCENARIO DOCUMENT



CASCADIA SUBDUCTION ZONE (CSZ) Catastrophic Earthquake and Tsunami

January 2015

Functional Exercise 2016

#### HayWired Scenario (USGS)

#### HayWired



#### Overview Related Science Publications Data and Tools News Partners FAQ

The HayWired scenario examines a hypothetical earthquake (mainshock) with a moment magnitude of 7.0 occurring on April 18, 2018, at 4:18 p.m. on the Hayward Fault in the east bay part of California's San Francisco Bay area. Most economic, cultural, and personal elements of society have grown entwined with the Internet since the last time California experienced a large urban earthquake. What will happen to an Internet-dependent society when a large earthquake occurs? How do tangible lifelines—roads, power, water, communication, etc.—interact in damage and restoration, and how do they interact with the online world of commerce, social media, and news? How will aftershocks affect recovery? To answer these questions, the HayWired earthquake scenario builds on past studies of a Hayward Fault earthquake and previous scenario development procedures to advance risk analysis and inform disaster planning (preparedness, response, and recovery).

Status - Active

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Cascadia Rising: <u>https://www.oregon.gov/oem/Documents/Cascadia\_Rising\_Exercise\_Scenario.pdf</u> HayWired Scenario: <u>https://www.usgs.gov/centers/wgsc/science/haywired</u>

### Importance of Post-Earthquake Investigations

Science Risk Assessment Policy Action/Implementation

- Quantification of the hazard
  - Increase base knowledge
  - "Ground truthing"
- Probable/possible impacts in relation to probability of occurrence
- Development of policies to address event impacts
- Development of policies, prioritization of options, and actions to take

# Existing Frameworks/Resources

- The first post-earthquake clearinghouse was mandated in the California after the 1971 San Fernando Earthquake <u>http://californiaeqclearinghouse.org/</u>
- WSSPC Model Plan (2001)
- Utah Geological Survey Earthquake-Response Plan and Investigation Field Guide (2001) – OFR-384
- "A Plan to Coordinate NEHRP Post-Earthquake Investigations" (2002)
  - CUSEC initiates efforts using this plan as its base in 2002

California Earthquake Clearinghouse: <u>http://californiaeqclearinghouse.org/</u> WSSPC Model Plan (2001): <u>https://www.wsspc.org/wp-content/uploads/2013/10/wsspcclearinghouseplan-1.pdf</u> Utah Geological Survey OFR-384: <u>https://ugspub.nr.utah.gov/publications/open\_file\_reports/OFR-384.pdf</u> NEHRP Post-Earthquake Investigations (2002): <u>https://www.atcouncil.org/pdfs/atc-35postearthquake.pdf</u>

	Co	Ilifornia Earthquake Clearinghouse	
	Navigation		
		ANNOUNCEMENT:	
	Valley Earthquake. For	more information, visit the virtual clearinghouse website for the	
		learningfromearthquakes.org/2019-07-04-searles-valley/.	
POST-EARTHQUAKE TECHNIC	CALCLEARINGHOUSE	rthquake Clearinghouse is a place to coordinate	
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INTROI An earthquake disaster in will attr with the intent to learn lessons and lend assistan seismologists, geologista, and representatives of They have a wide range of koowledge and expe	UTAH GEOLO EARTHQUAKE- AND INVESTIGAT	UTAH GEOLOGICAL SURVEY EARTHQUAKE-RESPONSE PLAN AND INVESTIGATION FIELD GUIDE	
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		APPLIED TECHNOLOGY COUNCIL 555 Twin Dolphin Drive, Suite 350 Robinod City, CA 94065 February 25, 2002	
clearinghouseplan-1.pdf			
rts/0FR-384	.pdf	1	

# **Existing Frameworks/Resources**

- USGS Circular 1242 (2003) https://pubs.usgs.gov/circ/1242
- "Coordinating NEHRP Post-Earthquake Investigations – Exercising the Plan" (2005) -<u>http://www.nehrpscenario.org/wp-</u> <u>content/uploads/2009/01/coordinating\_inves</u> <u>tigations\_exercise2.pdf</u>
- A Framework to Update the Plan to Coordinate NEHRP Post-Earthquake Investigations (2013) -<u>https://tsapps.nist.gov/publication/get\_pdf.cf</u> <u>m?pub\_id=915148</u>
- Idaho Post-Earthquake Clearinghouse Operations Plan (2018) -<u>http://learningfromearthquakes.org/images/L</u> <u>FE\_site/Clearinghouses/Idaho\_Clearinghouse</u> <u>Plan\_v2.pdf</u>



## Implementing Post-Earthquake Physical Technical Clearinghouses - Requirements

#### Physical (Structural)

- Safe structure
- Power
- Water
- Communication

#### Personnel

- Clearinghouse Lead
- Technical Experts (Field)
- Communication
  - Interagency and External Affairs
- Administrative & Logistics Staff

#### Logistics

- Food
- Lodging
- Transportation
- Mutual Aid

#### Administrative

- Documentation
- Accountability Process
- Budget and Finance

# Implementing Post-Earthquake Physical Technical Clearinghouses

### Have a Plan!!

- Under what conditions do you implement the plan?
  - What level of event is required?
  - How soon after the event?
- Who is on the call down list?
- Who opens the door to the clearinghouse?
- Do you have a "Go Kit"?
  - Example <u>http://californiaeqclearinghouse.org/go-kit/</u>

### Clearinghouse Connections to Emergency Management

Information/data gathered and provided by the Clearinghouse are used in all phases of Emergency Management.

#### Response

 Better understanding of current conditions (plus aftershock impacts) helps guide resource allocation and increases the effectiveness, efficiency, and safety of response personnel.

#### Recovery

 Accurate documentation of impacts supports resource allocation, assists in prioritizing needs/repairs, and is a element which can be used to support a Major Disaster request.

## Clearinghouse Connections to Emergency Management

Information/data gathered and provided by the Clearinghouse are used in all phases of Emergency Management.

Mitigation

- Hazard Identification and Risk Analysis
- Supports the development of strategies to reduce impacts from future events

#### Preparedness

- Understanding who was impacted and how leads to the development of targeted outreach
- Improved planning

### Clearinghouse Connections to Emergency Management

Emergency Management Agencies can support the Clearinghouse with:

- Coordination of Mutual Aid
- Logistical support
- Administrative support
- External Affairs support

Direct communication between the Clearinghouse and the state EOC should be **at least** once a day.

This leads to a shared understanding of:

Objectives, Information gathered and/or requested, and Needs

### Thank You

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