Malibu Earthquake Hazards & How to Prepare

Chris Dean
City of Malibu Geologist

Susan Duenas
Public Safety Manager
Overview

- Earthquake hazards effecting Malibu
- Potential impact on Malibu
- What the State is doing to prepare
- What the City is doing to prepare
- What you should do to prepare
Chris Dean

- City of Malibu Consulting Geologist
- Master’s Degree, Geology
  Texas A&M University
- With Malibu Since 1994
What is our earthquake risk?

- San Andreas Fault
- San Jacinto Fault
- Elsinore Fault
- Imperial Fault
Landslides Resulting From an Earthquake

- Both homes and highways are susceptible to land and rock slides during an earthquake
- Malibu has three landslide assessment districts with active landslides
Tsunami Resulting From an Earthquake

MyHazards is a tool for the general public to discover hazards in their area (earthquake, flood, fire, and tsunami) and learn steps to reduce personal risk. Using the MyHazards tool, users may enter an address, city, zip code, or may select a location from a map. The map targets the location, and allows users to zoom and scroll to their desired view. The screen then presents information on the risks identified within the search radius, and recommended actions. MyHazards website performs best when using Internet Explorer. Hazard Data is approximate and data layer visibility are subject to the extent of the Map.
Tsunami Alert Bulletins: During the typical tsunami alert, the Warning Center provides information about the tsunami in “bulletins” to the state and local jurisdictions. There are four levels of “alert” that can be sent by the NTWC (from least to greatest significance):

Tsunami Information Statement - Issued to inform and update emergency managers and the public that an earthquake has occurred, or that a tsunami Watch, Advisory or Warning has been issued elsewhere in the ocean.

Tsunami Watch - Issued to alert emergency managers and the public of an event which may later impact the Watch area. May be upgraded to an Advisory or Warning - or canceled - based on updated information and analysis.

Tsunami Advisory - Issued due to the threat of a tsunami which may produce strong currents or waves dangerous to those in or near the water; typically called when forecasted tsunami amplitudes are between 0.3m and 1m (1ft and 3ft) above existing tidal conditions are expected. Coastal communities are advised that beach and harbor areas could expect rapid, moderate tidal changes and strong currents.

Tsunami Warning - Issued when a tsunami with significant widespread inundation is imminent or expected; typically called when forecasted tsunami amplitudes are equal to or greater than 1m (3ft). Coastal communities are advised to evacuate people from low-lying areas identified as vulnerable to tsunamis.
## Tsunami Source Scenario Model Results for Los Angeles County

Near shore tsunami heights (flow depths) for both local and distant source scenarios, in FEET above Mean Sea Level. **NOTE:** The projections do not include any adjustments for ambient conditions, such as storm surge and tidal fluctuations, and model error (it is very important to note this difference, as those numbers can increase the projected water height during an event).

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<th>Marina Del Rey</th>
<th>Manhattan Beach</th>
<th>Redondo Beach</th>
<th>Palos Verdes Hills</th>
<th>San Pedro-POLA</th>
<th>Long Beach Middle Harbor-POLA</th>
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The Data Flow Behind Tsunami Prediction

Iridium Satellite → DART® Buoy

Offshore Distance Up to ~1,200 km (736 mi)

National Data Buoy Center → National Weather Service

Tsunami Warning Centers → Warnings Issued

NCEI Archives Tsunami Data → Public and Partners

Bottom Pressure Recorder

Drawing Not to Scale

National Centers for Environmental Information
Impact On Malibu

Distant Source Earthquake

- Structures will likely have minor to moderate damage
- Long-term infrastructure disruption
- Emergency resources will be stretched for many days
- Malibu will probably not be a priority

= Less Local Damage + Less Help
Impact On Malibu

Near Source Earthquake

- Structures will likely have moderate to severe damage (from shaking and liquefaction)
- Could result in fires
- Short-term infrastructure disruption
- Emergency resources will be stretched in first days
- Malibu will receive a vast amount of mutual aid

= More Local Damage + More Help
What is the State Doing to Prepare?

- Hazard mitigation $$$
- Public education
- Coordinating with local jurisdictions
- Providing training to state and locals
- Earthquake early warning system
What is the State Doing to Prepare?

Alquist-Priolo Earthquake Fault Zoning Act

- Passed in 1972
- Intent: to mitigate the hazard of surface faulting to structures for human occupancy
- Purpose: Direct result of the 1971 San Fernando Earthquake
  - Extensive surface fault ruptures that damaged numerous homes, commercial buildings, and other structures.
Seismic Hazard and Earthquake Fault Zone Maps
Seismic Hazards Mapping Act

- Passed in 1990
- Intent: Directs the Department of Conservation, California Geological Survey to identify and map areas prone to liquefaction, earthquake-induced landslides and amplified ground shaking.
- Purpose: The SHMA was passed by the legislature following the 1989 Loma Prieta earthquake.
What is the City Doing to Prepare?

- Building codes and standards
- Geotechnical standards (Guidelines)
- Public education
- Training volunteers
- Maintaining emergency supplies
- Training staff to respond
- Earthquake Resiliency Initiative
Geotechnical Guidelines

Search

geotechnical guidelines

1 - 10 of 2348 results (0.19 seconds)

Geology Guidelines Nov2013  -  Sep 10, 2013
https://www.malibucity.org/documentcenter/view/215
Prepared by: Fugro Consultants, Inc., and City of Malibu Environmental Sustainability Department
November 2013 Guidelines for Geotechnical Engineering Reports November 2013 I 1
INTRODUCTION
936 KB
Public Education

- Presentations for community groups
- Public Safety Town Halls
- Community Emergency Response Team (CERT) training
- Community events
City Staff & Supplies

- Emergency Operations Center (EOC) Team training
- City staff training
- Maintain emergency supplies
Earthquake Resiliency Initiative

- Partnering with Southern California Association of Governments and Lucy Jones Center for Science and Society
- Striving to make Malibu more resilient
- Identify vulnerable buildings and identify incentives for strengthening
What should you do to prepare?

- Eliminate non-structural hazards
- Check your insurance policy
- Make a plan
- Obtain supplies for your home and car
- Attend training – CERT
- Sign up for Disaster Notifications
- Talk to your neighbors
Malibu Alert Systems

Alert Center
Alert Center allows you to view all alerts and emergencies in your area. If there are alerts or emergencies, they will be listed below by category. To be instantly notified of alerts and emergencies subscribe to Notify Me or RSS.

▼ Beach Advisories
There are currently no alerts for this category.

▼ Emergencies
There are currently no alerts for this category.

▼ Public Health Advisories
There are currently no alerts for this category.

▼ Traffic Advisories
1 Alert

September 29, 2017 2:00 PM
#Malibu Cyn Pole Replacement, Harbor Vista to Pliuma, nights 9PM-5AM, days 9AM-3PM through March 2018

Construction on the Southern California Edison (SCE) Malibu Canyon Pole Replacement Project resumes October 2, 2017, after a summer hiatus, with project completion expected by the end of March 2018. No construction will take place on holidays or “red flag..."
Malibu Alert Systems
Resources for More Information

- City of Malibu
  Malibucity.org

- California Geological Survey
  conservation.ca.gov/cgs

- Earthquake Country Alliance
  earthquakecountry.org/prepare

- My Hazards
  myhazards.caloes.ca.gov/

- United State Geological Survey (USGS)
  earthquake.usgs.gov/earthquake

- Department of Homeland Security
  Ready.gov