Tsunami Emergency Preparedness

Long Beach Fire Department

March 8, 2005

Tsunami Report

- ✓ Description of tsunamis
- ✓ Port Impact
- ✓ Detection and Notification Processes
- ✓ Evacuation Procedures
- ✓ Public Education
- ✓ City's Emergency Response Plan

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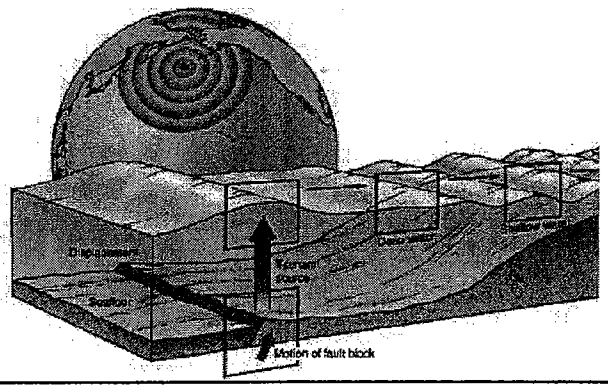
Tsunamis – Description

- ✓ Series of extremely long traveling ocean waves
- ✓ Speeds can exceed 500 miles per hour in deep water
- ✓ Travel slower in shallow coastal areas where wave heights increase



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Indian Ocean Tsunami 12/26/04

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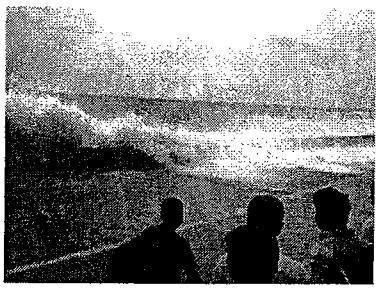
Tsunamis – Description

- ✓ First wave is not necessarily the largest nor most significant
- ✓ First sign of tsunami may actually be the withdrawal of water away from the shore
- ✓ Water level on shore can rise significantly
- ✓ Risks include:
  - Drowning
  - Flooding
  - Contamination of drinking water
  - Fires from ruptured tanks or gas lines
  - Loss of vital infrastructure



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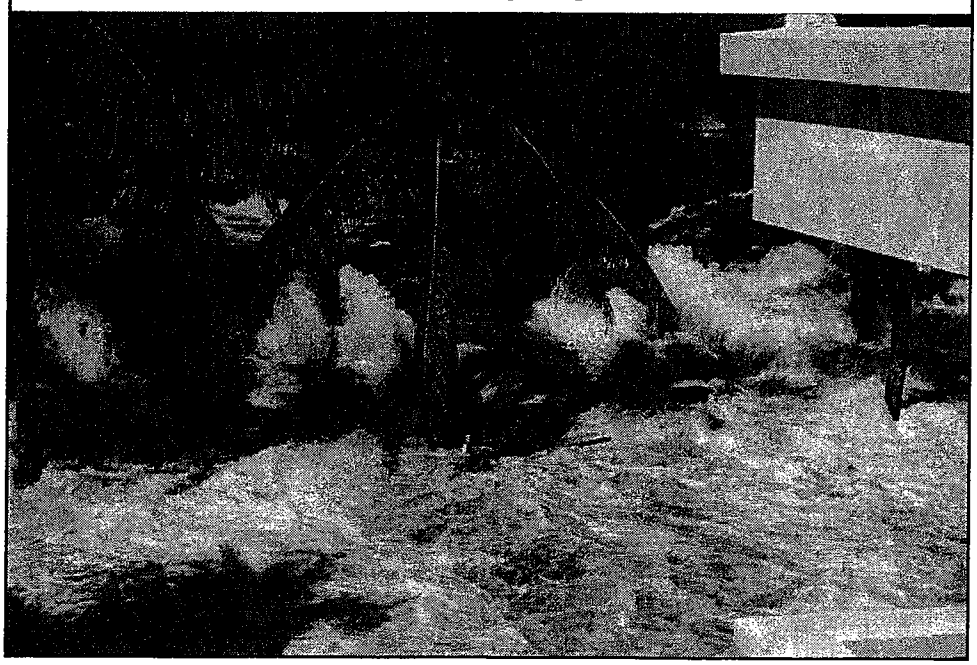
Thailand



Tsunamis – Historical Record

- ✓ Based on historic record, the probability of a devastating tsunami is relatively low
- ✓ 14 tsunamis with waves higher than three feet have impacted the California coast in the last 200 years
  - Six of the 14 caused considerable damage
  - Worst one damaged Crescent City and was caused by the 1964 Alaskan Earthquake

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Tsunamis – Possible Impact

- ✓ Potential impact areas are less than 25 feet above sea level and within one mile of the shoreline
- ✓ Major tsunami in Long Beach area would be rare
- ✓ The Hazard Mitigation Plan identifies these areas as being subject to the most impact:
  - Port and commercial facilities at or near sea level
  - Downtown Marina
  - Naples, the Peninsula, and Belmont Shore areas
  - Coastal bridges and exposed infrastructure

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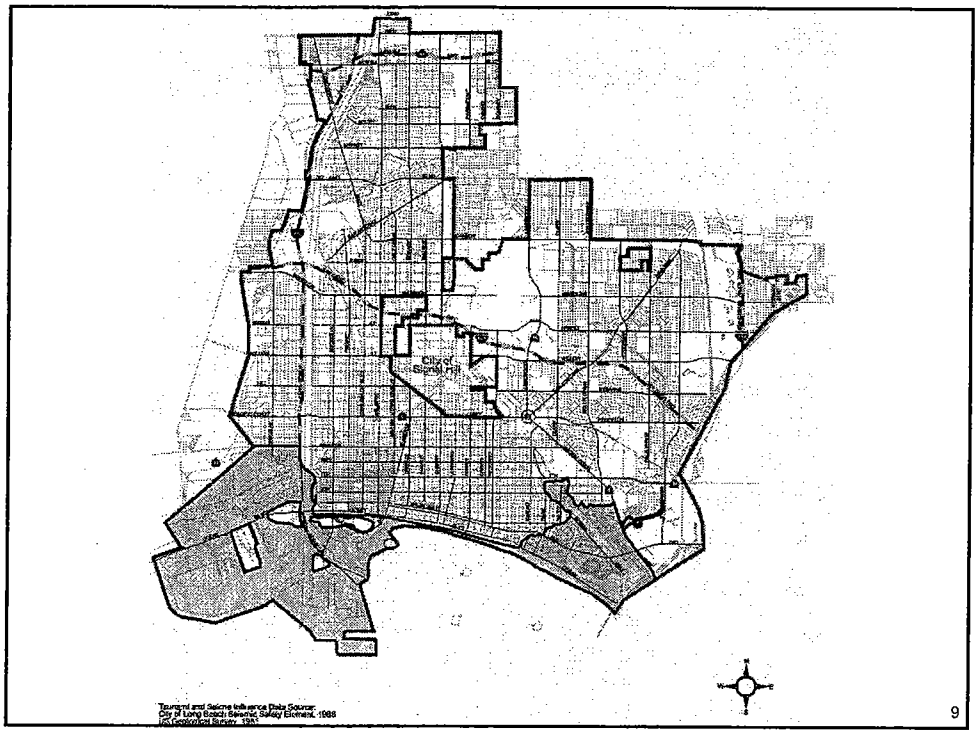

Tsunami and Seiche Inference Data Source:
City of Long Beach Seismic Safety Element, 1988
USC Geological Survey, 1961

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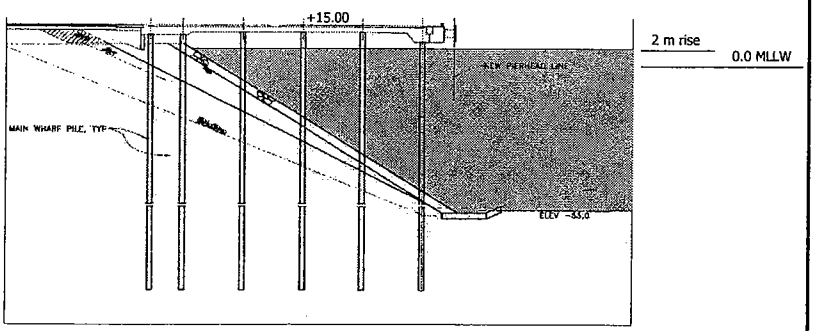
THE PORT OF LONG BEACH

Tsunamis – Port Impact

Typical Wharf Cross-Section

MLLW Tide with 2m Rise



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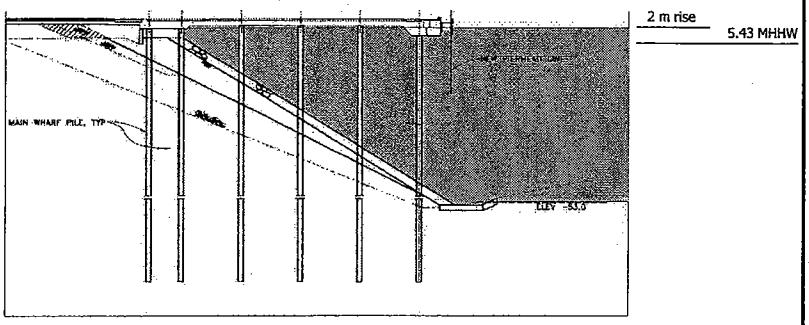
Tsunamis – Port Impact

Typical Wharf Cross-Section

Mean High Water Tide with 2m Rise



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Tsunamis – Port Impact

Facility Design Tools

✓ Long Beach/LA Harbors Model Facility

- The US Army Engineer Research and Development Center constructed a physical model of the Long Beach-Los Angeles (LB/LA) Harbors complex.
- The harbors have a history of surge due to long-period waves.
- Model ensures optimization of facilities to minimize ship motions in the new basins, as well as preventing adverse effects in existing harbors areas.

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Tsunamis – Port Impact

Facility Design Case Study

✓ Modeling and Design

- Prototype wave data have been collected within Long Beach/Los Angeles (LB/LA) Harbors since 1984
- Harbor resonance studies were conducted in the LB/LA physical model to predict the distribution of wave energy
- Wave data are used to document the magnitude of waves occurring in the harbors due to the incident wave climate
- The harbor response to incident wave energy affects ship motion and, therefore design criteria

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Tsunamis – Detection and Notification Processes

✓ Threat of tsunami can be classified into two distinct categories:

- Earthquake along the Pacific Rim
  - ❖ Allows for three to five hours of warning if a tsunami is generated by the event
  - ❖ Such events are currently monitored
- Near-shore event
  - ❖ Allows little or no warning
  - ❖ No local monitoring system currently exists, experts are researching the benefit of such a system
  - ❖ Training and education is important

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Tsunamis – Detection and Notification Processes

- ✓ Current monitoring and other systems
  - Deep water buoys in the Pacific Ocean
  - State of California maintains a Warning Center
  - State Warning Center would make emergency notifications
    - ❖ Emergency Alert System
    - ❖ Emergency News Network
    - ❖ Emergency Data Information Service
    - ❖ California Law Enforcement Telecommunications System

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Tsunamis – Detection and Notification Processes

- ✓ Los Angeles Operational Area utilizes processes to notify local governments
  - Emergency Management Information System
  - Dialogic Phone System
  - Calls to law enforcement agencies by Sheriff's Department

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Tsunamis – Detection and Notification Processes

- ✓ Other systems of communications to the public exist and are available in the City
  - National Weather Service Radio
  - E-Notify
  - Hometown Television (Channel 8)
  - KKJZ (88.1 FM)
  - California Integrated Seismic Network
  - Public address systems in many City vehicles
  - Public Address System in the Marinas

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Tsunamis – Detection and Notification Processes

- ✓ City is researching "pre-emptive telephone dialing systems"
- ✓ Two bills have been introduced in the United States Senate that address tsunamis
  - S.34 - Global Tsunami Detection and Warning System Act of 2005
  - S.50 - Tsunami Preparedness Act

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Tsunamis – Detection and Notification Processes

✓ Other efforts:

- Scientific community is working with federal, state and local governments to identify early warning for locally generated or near shore events
- The USC Tsunami Center will be making recommendations to the Los Angeles Operational Area Task Force
- USGS scientists are developing models for worst case scenario run-ups of water which will assist in the City's planning and response process
- Working with Los Angeles Operational Area to create a regional plan

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Tsunamis – Detection and Notification Processes

Examples of signage

Evacuation Route Sign

Beach Sign

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Tsunamis – Evacuation and Isolation Plans

- ✓ Belmont Shore and Belmont Heights
- ✓ Greater Downtown
- ✓ Port of Long Beach
  - Bridge Closure and Detour
  - Including Westside of Long Beach

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Tsunamis – Evacuation Mission

- ✓ Orderly and efficient evacuation
- ✓ Facilitate the flow of vehicles and pedestrians out of an area
- ✓ Prevent ingress
- ✓ Ensure emergency vehicle access

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Tsunamis – Evacuation Initiation

- ✓ Declare evacuation
  - Law Enforcement can prevent entry
- ✓ People will be directed where to go
  - Parks, Recreation and Marine in conjunction with the Red Cross are tasked with providing emergency sheltering for evacuees
- ✓ Critical intersections
  - Communications Center will advise locations and missions
- ✓ Additional Options

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Tsunamis – Evacuation Procedures

- ✓ Utilities in affected areas will be monitored for isolating and/or shutting off by appropriate personnel
- ✓ A near shore event will provide little or no warning and may require self-evacuations
- ✓ Citizens should monitor their radios and televisions for tsunami warnings
- ✓ Those in low-lying areas may need to move to higher ground
- ✓ Vertical evacuation - moving upstairs in multi-story structures

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Tsunamis – Public Education

- ✓ The Fire Department's Community Emergency Response Team (CERT) Program is a 6-week 22-hour course
- ✓ Since 1992 over 2,000 residents have been trained in CERT
- ✓ The Police Department has an active Neighborhood Watch Program
- ✓ These programs prepare residents to help themselves in emergencies

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Tsunamis – Public Education

- ✓ An informational video is being developed that can be shown at community meetings and on Hometown Television
  - Video will be made by Fire in partnership with the Police and Harbor departments
- ✓ Informational brochures are being developed specific for Long Beach which will incorporate safety rules for residents and businesses

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Tsunamis – Public Education

- ✓ The Long Beach Fire Ambassadors, volunteer citizens assisting the Fire Department, conduct the Fire Safety House Program
- ✓ Program teaches third grade students Fire, Safety, and Earthquake preparedness
- ✓ Tsunami component is being developed

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City's Emergency Response Plan

- ✓ Initial response from on-duty resources – Fire, Police and Public Works departments
  - Fire and Police personnel will survey districts and re-position for response
  - Fire and Rescue Boats will be staged off shore
- ✓ Department Operation Centers will be activated in accordance with the Standardized Emergency Management System

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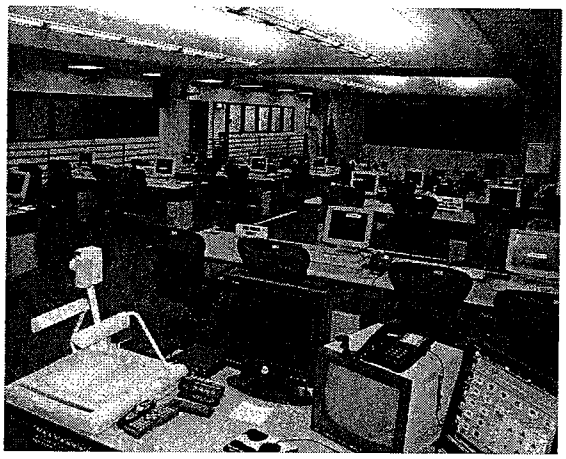
City's Emergency Response Plan

- ✓ City's Emergency Operational Center (EOC) will be activated



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City's Emergency Response Plan

- ✓ Level I - Minor or moderate incident which can be resolved with local resources
- ✓ Level II - Moderate or severe emergency including severe weather conditions
- ✓ Level III - Full activation will occur during major disasters of any nature

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Conclusion

- ✓ Utilize existing Natural Hazards Mitigation Plan as a guiding document
- ✓ Interdepartmental Disaster Committee will coordinate on-going process of reviewing, planning, and development of the Tsunami Emergency Operations Plan
- ✓ Continue active participation in the LA Operational Area Tsunami Task Force

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Conclusion

- ✓ Continue development of operation plan
- ✓ Develop and conduct multiple all hazards disaster exercises
- ✓ To fully protect Long Beach; a well coordinated Federal, State and regional approach is necessary

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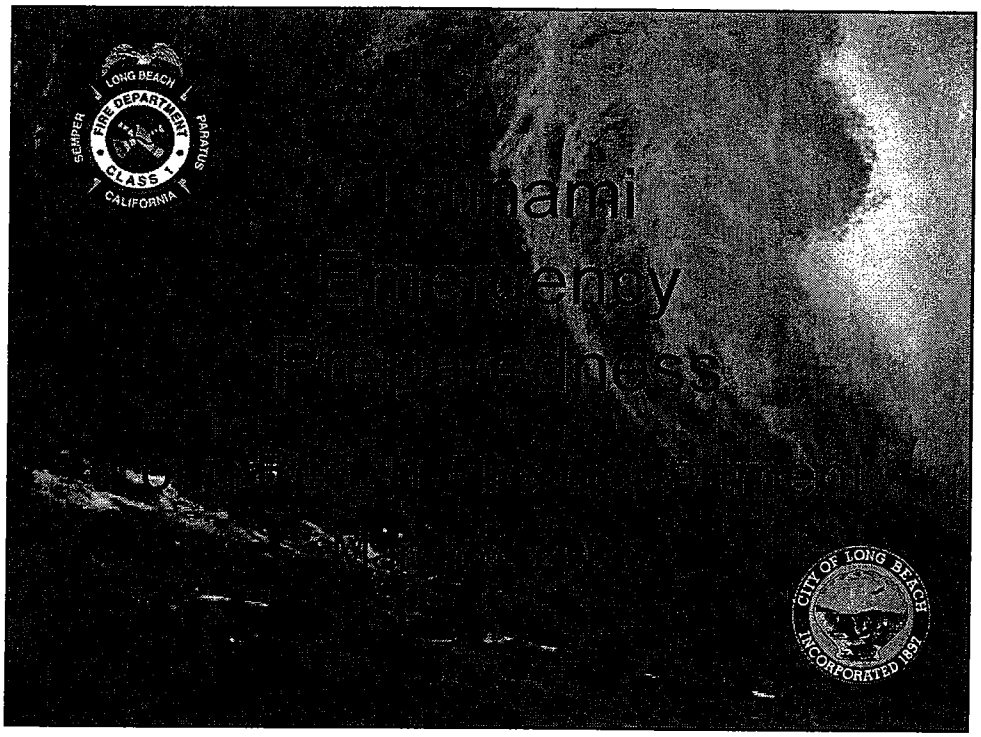
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