

Tsunami Impacts—Field Investigation

Types of Data to Be Collected and Recorded

Tsunamis and coastal effects have been a major source of destruction from recent earthquakes. However, each tsunami is different and, like the earthquakes that generate them, varies in size and other characteristics. While there has been documentation from reconnaissance investigations of devastating Class I events, there has been little analysis of the less destructive Class II events. Most tsunamis are of this latter type.

The state of the art for tsunami warning does not permit prediction of the magnitude (significance) of the event or potential runup. In addition, only the estimated time of arrival (ETA) can be forecast; therefore, it is impossible to plan for the type of response which would be the most appropriate. A primary reason for the lack of accurate prediction capability is the paucity of quantitative data to calibrate and validate existing models. It is hoped that additional insight gained from post-event reconnaissance will contribute to improved prediction capabilities.

Data to be collected consists of three types:

- Tsunami characteristics
- Damage assessment
- Warning and evacuation response plan

CHECKLIST

Tsunami Impacts

Wave Characteristics

1. Indicate location and type of water body—open coast, bay, harbor, estuary.
2. Note direction from which wave came.
3. Note slope of shoreline where wave ran up.
4. Did other natural phenomena, such as landslides, occur at or near the time of the tsunami?
5. What was water condition before tsunami waves arrived? Calm, choppy, ripples, swells, heavy surf, stormy?
6. Note nature of tsunami waves. Fast rising and falling tides? Breaking waves? Other?
7. Did water recede before first tsunami wave arrived?
8. How far inland did water travel from high-tide shoreline?

Damage Inventory

1. Describe types of tree damage observed (if any).
 - a. Small limbs broken.
 - b. Trees less than 29 dia. broken, uprooted or overturned.
 - c. Trees less than 89 dia. broken, uprooted or overturned.
 - d. Trees greater than 89 dia. broken, uprooted or overturned.

- e. Total destruction of vegetation.
2. Did the water move debris inland from the shoreline? If so, note type of debris (sand, driftwood, rocks, boulders, other) and how far inland it was moved.
3. Were buildings or structures damaged by the wave(s)? If so, describe types of structures damaged, including breakwaters, piers, docks, wharfs, lighthouses, and business or residential structures.
 - a. Note construction materials of damaged structures.
 - b. Describe types of damage to exterior walls.
 - c. Describe foundation and any damage.
 - d. How old was structure?
 - e. Note soil type beneath damaged structures.
 - f. Was the ground level? Sloping? Steep?
 - g. How far away from the shoreline were the damaged buildings or structures? In the water? At the shoreline? Inland? If inland, note distance above high-tide shoreline.
4. Describe any ground failure.
5. Was there damage to boats and ships? If so, note number, type, size, and whether or not they sank.
6. Indicate any structural damage to bridges or overpasses. Note type of construction material and extent of damage.
7. What percentage of buildings or structures were damaged by the wave?
8. Did injuries or fatalities occur attributable to the tsunami?

Warning and Response

1. Did the community receive a tsunami alert or warning? If so, was it an alert, warning, or both?
2. If yes, at what time(s) was the alert or warning received? How did you learn of the alert or warning? Siren, radio, TV, government (police, fire department, civil defense), other?
3. What was response to the alert or warning?
4. Was evacuation initiated?
5. Describe the response of the community (responsibilities and duties). Responders (police, fire, other). General public.
6. If a warning was initiated, describe traffic conditions.

Field Investigation Form—Tsunamis

Name of Investigator: _____

Date: _____ Time: _____

Wave Characteristics

Indicate the location and type of water body where wave was observed (open coast, bay, harbor, estuary):

Indicate the direction the wave came from:

Indicate the slope of the shore where the wave was observed:

What was the water condition before the tsunami waves arrived?

Indicate the nature of the wave(s): _____

Did the water recede before the first tsunami wave arrived?

Give times and heights for waves at this location:

	TIMES	HEIGHTS
First wave:	_____	_____
Second wave:	_____	_____
Third wave:	_____	_____
Other waves:	_____	_____

How far inland (in feet) did the water travel from high-tide shoreline? If you do not know, describe the place farthest inland where water was noticed:

Damage Inventory

Describe types of damage observed:

Warning and Response

Were warnings or alerts given? If so, what form did they take?

Describe community response:

Other:

Recommendations for Further Research on Tsunamis