Tsunami: Recovery and Response Aided by Effective Crisis Communication Tools

White Paper

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Introduction

Tsunamis affect coastal communities all over the world. They occur as a result of displacement of water at the bottom of the ocean, usually caused by an earthquake. They are more common in the Pacific Ocean due to geothermal activity in the “Ring of Fire,” a zone of frequent earthquakes and volcanic eruptions that encircles the Pacific basin.

Tsunamis have been recorded since the 1500’s, the most devastating one being the North Sumatra Sea Tsunami of December 2004, which resulted in the loss of 283,100 lives.

They cannot be predicted, but must be anticipated; and must be effectively managed through a thorough disaster recovery plan. This white paper will discuss how automated communication systems serve as critical tools for emergency notification in the event of a tsunami or other major natural disaster.

Wave of destruction

Tsunami waves travel with high speed over long distances without losing much energy, reaching the coast with a destructive and devastating force. For example, where the ocean is 20,000 feet deep, tsunami can travel unnoticed at about 550 miles per hour, the speed of a jet plane. At this speed, they can move from one side of the Pacific to the other in less than a day.

The flooding can extend inward from shore by more than 1000 feet, covering large expanses of land with water and debris. Tsunamis may reach a maximum vertical height onshore above sea level (the run-up height) of 98 ft. Flooding tsunami tend to carry loose objects and people on their retreating waves, sweeping structures out to sea, destroying property and taking lives.

The Devastation of December 2004

The undersea Sumatra-Andaman earthquake occurred around midnight local time on December 26, 2004 and triggered a series of lethal tsunamis that spread throughout the Indian Ocean, killing large numbers of people and devastating coastal communities in Indonesia, Sri Lanka, India, Thailand, and elsewhere. Scientists found evidence that the wave reached a height of 80 ft when coming ashore along large stretches of the coastline.

The US Geologic Survey recorded a magnitude of 9.0 on the Richter scale, the second largest earthquake ever recorded on a seismograph. This earthquake was also reported to be the longest duration of faulting ever observed, lasting 500 - 600 seconds.

The earthquake and resulting tsunami affected many countries in Southeast Asia and beyond, including Indonesia, Sri Lanka, India, Thialand, the Maldives, Somalia, Myanmar, Malaysia, Seychelles and others. Small but measurable tsunamis were felt along the western coast fo North and South America, Manzanillo and Mexico.

At the time of this disaster, there were no systems in place in the Indian Ocean to detect tsunami or to warn the population living on the coasts.

283,100 were recorded dead and 42,883 people listed missing, including 9,000 foreign tourists. Characterized by loss of life, this earthquake ranks among the ten worst in recorded history; the tsunami ranks number one.

Current detection and warning systems

Since science cannot predict earthquakes, it is not possible to determine exactly when a tsunami will be generated. However, through historical records and numerical models, science can get an idea as to where they are most likely to occur.

There are several existing warning centers and systems serving North America. **The West Coast/ Alaska Tsunami Warning Center (WCATWC)** is located in Palmer, Alaska. The WCATWC's mission is to provide accurate and timely tsunami bulletins to coastal populations along the U.S. west, and east coasts, Gulf of Mexico, Alaska and Canadian coasts.

Established in 1949, the **Richard H. Hagemeyer Pacific Tsunami Warning Center (PTWC)** provides warnings for tsunamis to most countries in the Pacific Basin as well as to Hawaii and all other US interests in the Pacific outside of Alaska and the US West Coast.

TsunamiReady is A **National Weather Service (NWS)** initiative that promotes tsunami hazard preparedness as an active collaboration among Federal, state and local emergency management agencies, the public, and the NWS tsunami warning system.

The **National Oceanic and Atmospheric Administration/ Pacific Marine Environmental Laboratory (NOAA/ PMEL)** conducts tsunami research focused on development of methodologies and operational tools to advance tsunami hazard reduction and protection of life and property.

Deep-Ocean Assessment and Reporting of Tsunamis (DART) was developed by NOAA scientists at the Pacific Marine Environmental Laboratory (PMEL) in Seattle, Washington. DART is a buoy system that takes direct measurement of tsunamis in the open ocean and follows with real-time reports to warning centers, with a goal of improving the lead time for the tsunami hazard for communities 600 miles or more from the earthquake epicenter. The information is relayed to local governments, which, through their emergency managers, are responsible for citizen warning and evacuation.

A typical warning process

A tsunami early warning system is based on several key components including high-tech installation featuring quake and tidal sensors, speedy communications, alarm networks and disaster preparedness training in vulnerable regions, giving people time to flee to higher ground before the giant waves strike.

1) A tsunami is detected by a deep-water device.
2) The alert is relayed to local authorities.
3) Communication is sent from local government to warn citizens.
4) Authorities launch evacuation or response plan.

All the high-tech tsunami detection and analysis equipment in the world is not worth its weight in steel without a reliable, effective communications system with which to alert the public and mobilize response. Manual phone trees are inherently flawed, having too many potential points of failure and are being replaced by automated systems.

Response and recovery depend on two things: a solid plan in place well in advance, and an effective **crisis communication system** to inform the community.

A safer tomorrow

What is necessary to protect our communities against future tsunami disasters?

Tsunami Risk Assessment: Advance modeling of coastal communities to determine areas of risk and hazard probability. Target susceptible areas for mitigation and warning.

Detection Devices: Observations and monitoring of sea-floor seismic activity and indication if a tsunami has been generated.

Warning System: A warning message is issued by the monitoring agencies and received by national and local officials within minutes. The warning is quickly communicated to the local at-risk population via sirens, mass media, specialized radio systems, and emergency notification technologies.

Disaster Response Plan: A local response plan exists and is activated. This response plan must be developed well in advance and communicated to the public.

A Prepared Public: Public responds appropriately, having been prepared and educated in advance.

Crisis Monitoring: The hazard situation is monitored until the "all-clear" is given.

Shelter and Supplies: Protective shelters, and reliable supply routes for emergency response, food, water and dry ice, and medical evacuation.

Communication is the key.
An emergency notification solution to meet the alert and response demands of a tsunami must be able to communicate mass notification to the public; deliver warnings and alerts to local public safety authorities; send targeted notification to critical staff, team leaders and first responders; and to provide information to the media. An effective emergency notification technology must document all contacts in a database, save groups and messages in advance, and record and report call data after the event. Messages relative to any kind of emergency need to be created in advance and deployed in an instant. Messages may need to be modified or updated as the situation unfolds. Multiple alert scenarios should be able to run concurrently, so information may be disseminated to specific individuals and/or targeted groups.

A Twenty First Century Solution

The **Universal Communications System** offered by Twenty First Century Communications is a fully hosted Application Service Provider (ASP) solution that can be used to quickly reach any number of individuals or groups. The key applications of the system are mass public alert and mobilization of critical staff such as managers, first responders, and emergency personnel. It can also be used for routine, non-emergency communication.

The system provides targeted messaging with an unlimited number of possible scenarios, messages, recipients, and groups. Also, Geocoded Mapping can be used to designate notification areas on a web-based map. The system will identify the residents and businesses in that area, generate phone numbers, and deliver notifications or instructions. Messages can be pre-recorded for later use, created on the fly, and/or changed as the situation unfolds.

Twenty First Century offers simultaneous outdial and toll-free inbound calling capability. In fact, TFCC accesses the largest telecommunications platform in North America, with 25,000 outdial and 30,000 inbound ports. Using both inbound and outbound programs, the system can perform a simple broadcast, or it can poll contacts to collect information. It also includes a real-time customizable reporting function which tracks call results in whatever terms are appropriate for the situation.

The **Dynamic Locator Program (DLP)** can provide the public with locations and directions to critical resources, medications, shelter or supplies. Using the DLP, callers provide their zip code, then the program performs a search through its mapping function. The DLP will search and report locations within a set radius, increasing that radius until an available location is found. Addresses are uploaded into the program ahead of time and directions are spoken to callers at the time of the crisis in a calm female voice.

Twenty First Century's systems are accessed through the internet, with 24/7/365 toll-free live technical support. TFCC's automated solutions assist organizations in conserving resources, as these hosted services do not require the purchase of any additional equipment, software, licenses, or phone lines. There is no maintenance on the part of the client nor are there fees for upgrades. Twenty First Century Communications is a certified vendor of the General Services Administration (GSA) authorized under federal law to provide its services to any governmental agency through recently approved Cooperative Purchasing legislation.

Whatever the likelihood or frequency of natural disasters, the absolute truth is that they will occur. They will be unannounced and may be undetected. The critical key to response and recovery, from best to worst case scenario, is communication: getting the right info to the right people.

For more information about Twenty First Century Communications and its Emergency Response tools, please visit: www.tfcci.com.