Mega-Tsunami Survival Guide

by James A. Marusek

Threat

Most deaths associated with massive earthquakes that generate mega-tsunamis are associated with drowning.

A 9.0 magnitude earthquake struck off the Pacific coast of Tōhoku, Japan on 11 March 2011, producing a mega-tsunami. Of the 13,135 fatalities, 12,143 or 92.5% died by drowning. The tsunami inundated approximately 217 square miles of land in Japan.

The 2004 Indian Ocean (magnitude 9.1-9.3) earthquake occurred on 26 December 2004 releasing the energy underground equivalent to 550 million Hiroshima-type atomic bombs. The mega-tsunami produced 80-foot high waves along large stretches of the coast of Indonesia. There were in excess of 229,898 casualties. One-third of the dead appeared to be children because in part children were the least able to resist being overcome by the surging waters.

It is projected that an 8.7 to 9.2 magnitude earthquake will strike the Pacific Northwest coast of the U.S. and produce around 13,000 casualties. [A FEMA official said their operating assumption is that everything west of Interstate 5 will be toast.] The last earthquake from this fault line is believed to have occurred on 26 January 1700, when the area was relatively uninhabited.

In a tsunami, the waves come up gradually and receded gradually over several minutes. They sweep away everything and anything in their path. They do not look like ocean waves that have short wavelengths but rather more similar to quickly rising raging water seen in flash floods. If you live in a vulnerable low-lying area, you could be affected and it could cause you to become extinct. The water level will rise and flood the lower cities and sweep people away, unless they flee and reach higher ground immediately.

Warning

A massive earthquake can produce a mega-tsunami close to the epicenter and a less powerful tsunami thousands of miles distant. In general, when a massive earthquake occurs, scientists measure the size and predict possible tsunami events. Depending on the distance, the arrival of this tsunami on distant shores will take several hours. But the mega-tsunami, close to the site of the earthquake, strikes with very little warning, and the reaction time is measured in minutes.

There are two types of warnings for those living in low-lying coastal areas for an imminent mega-tsunami.

1. In general, the duration of a major earthquake provides an instant estimate of its size. A minute-long quake is in the high sevens on the Richter scale, a two-minute quake has entered the eights, and a three-minute quake is in the high eights. By four minutes, an earthquake has hit magnitude 9.0. So in general, if one accurately measures the duration of the quake and it is 3 minutes or longer, a mega-tsunami may arrive within 15 minutes in nearby coastal regions.

2. There is also a visual warning, if you are near the ocean. If an earthquake is felt and the ocean begins to recede, seek high ground immediately.

Preparedness Planning

For those that live or work in low lying coastal areas near a major undersea fault line, it is important to have a preparedness kit for this type of disaster. This would also include those that live on volcanic island chains (such as Hawaii) where an undersea landslide could trigger a massive earthquake and a mega-tsunami.

Since this is a rare type of event and one could easily go overboard in preparation for this type of threat; I decided to apply the KISS (Keep It Simple Stupid) approach and identify only 3 essential items in any tsunami disaster preparedness kit. These items are high floatation life jackets, lightweight kayaking helmet and a seatbelt cutter/window breaker emergency escape tools.

The primary item in the kit is a life jacket. But not all life jackets are alike. One needs a High Flotation Life Jacket. This pictured jacket is rated at 22 pounds floatation. In order to survive a tsunami, you want something that will keep you as high above the water as possible. Should you become submerged, you want something that will pull you to the surface with some force (buoyancy). You also want the life jacket to keep your head above water should you become unconscious. You want it constructed of a strong material that will withstand harsh stresses including strong currents and debris hazards. It should be equipped with strong belts and harnesses to preclude separation from the body. The pocket of this life jacket contained an emergency whistle for signaling for help. When I was young, I went down the Grand Canyon on a

two-week raft trip. We traveled down the river using small 5-man rubber rafts. We traversed a rapid about every hour. We used this type of life jackets. They were great for keeping you afloat. With this type of life jacket you were almost unsinkable. Towards the end of my journey I decided to swim the rapids. Whenever we came upon a rapid, I would stand up and dive into the water. I felt very safe and secure in crossing these raging rapids with this added buoyancy.

The next item is a lightweight kayaking helmet. The helmet should be composed of a high impact shell and a layered impact absorption system to effectively dissipate impacts. The helmet is required to minimize head injuries if you are caught up and tossed around by the tsunami wave. The helmet should have reflective tape in order to make the helmet (and wearer) highly visible in the water at night.

The last essential item is a Seatbelt Cutter/Window Breaker Emergency Escape Tool. There should be one in the glove compartment of every car that you own. A tsunami is similar to a flash flood. If you are inside an automobile fleeing a tsunami when it strikes, the water pressure will prevent you from opening the door of the car. Your electrical system can be short-circuited by the water and you may find yourself unable to open the electrically operated windows. Therefore you will need one of these tools to break out the windows and exit the vehicle before it sinks or the car is swept out to sea. Obviously, if you don't own a car, this second item is not required.

The High Flotation Life Jackets would best be stored in the trunk of a car. The trunk is a good location because it travels with you. One must also keep in mind that there is a simultaneous major earthquake threat. Buildings crumble and immediately after a major quake, individuals naturally flee buildings. Cars are designed for roadway shock and unless something falls on top them they survive fairly well in a massive quake.

Disaster Plan – Part 1 – Up Close and Personal

The following plan applies to a massive quake near a coastal region with a major offshore fault line. This would also include those that live on volcanic island chains (such as Hawaii) where an undersea landslide could trigger a massive earthquake and a mega-tsunami.

Let's assume that you do not have a watch on when the quake strikes, or that you are in the dark, or you are too rattled to understand instantly what is happening. When you come to your senses, start counting at 1,010. [1,010, 1,011, 1,012, etc.]

Count at a moderately quick pace and count out loud. When the quake vibration ends, stop counting. I have factored in 10 seconds of reaction time at the beginning. Take the final number and subtract 1,000. That is the approximate duration time of the earthquake in seconds. If the number exceeds 160, and the quake was offshore, then assume a tsunami. If you live in a low lying coastal area, make sure you have the car keys and exit the building, remove the life jackets and helmets from the trunk of the car and put them on immediately. [Put on the children's life jacket first.] Then flee to high ground. [A strong multi-story concrete and steel building may provide a safe haven for a mega-tsunami. In Japan many of these buildings are classified as public tsunami shelters.]

If you flee by automobile, make sure that all the windows are rolled down and the radio is turned off. As you drive monitor for signs of a tsunami wave. These are a visual sighting of the wave, the roar of a tsunami wave, or at night the lights along the shoreline suddenly being extinguished. If any of these signs appear, exit the vehicle immediately and flee the rest of the way by foot. If you live in a city, there is a good chance the traffic will gridlock because most of the stoplights will no longer be operational. So you may have to flee on foot. If your vehicle is trapped by floodwaters and you are unable to fit through the passenger windows, you may need to break the front windshield in order to exit the vehicle. If you are swept up in the waves, don't panic. Your lifejacket will do most of the work. Avoid hazardous obstacles in the water. The surge wave will carry you inland for several minutes, and then the water will begin to rapidly recede and try to carry you back out to sea. It is important to detect the change in wave direction. While you are moving inland, try and float with the wave instead of fighting it. At the transition try and anchor yourself to an unmovable object such as a tree. Then when the water level drops to the point that you can walk again, continue to move inland towards higher ground. [Climbing a tree, climbing to the top of a strong multistory building or another immoveable object can suffice.] Be aware of the next wave that is on its way. A mega-tsunami consists of a series of waves, generally between 2 and 10. These are spaced between 10 and 30 minutes apart. Normally the first wave is not the biggest. The waves produce a loud roaring sound similar to a train or jet. This will give you a little bit of warning as they approach.

Practical Considerations:

> Plan your evacuation route in advance. The route should minimize the distance to higher ground. Avoid potential choke points such as bridges and overpasses that might be destroyed by a massive quake. You may need one evacuation route for home and another for work.
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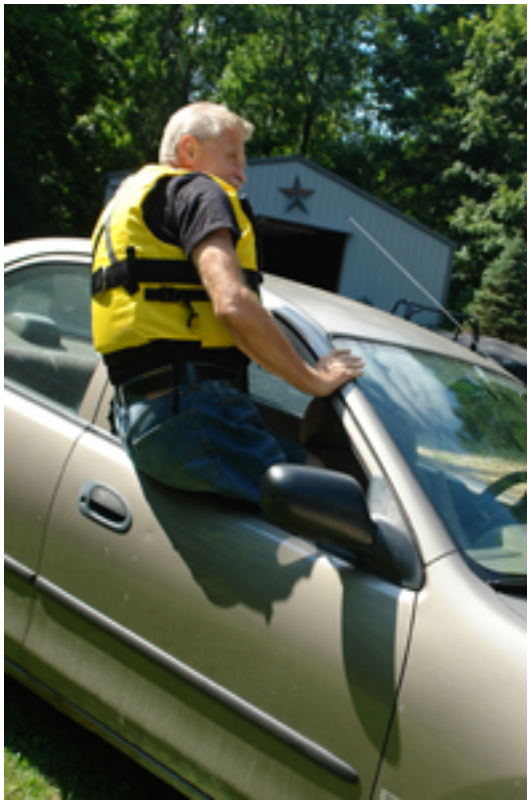
> Practice putting on the life jackets and helmets. It should take no longer than 60 seconds for the entire party to put on and adjust their equipment.



With the life jacket on, I was able to freely walk, run and climb hills. I was able to get inside and drive a car. I was able to exit the vehicle through an open passenger door window without much difficulty. But I weigh 115 pounds less than I did a couple years ago and I am far healthier. Two trends in recent years may compound the difficulty of exiting a vehicle in the floodwaters of a tsunami. These are (1) the cars are getting smaller and (2) the waistline of individuals are getting bigger. When I weighed 260 pounds, exiting a vehicle may have been more of a challenge. The front window of the vehicle is substantially larger than the door windows. For some this window will be the only exit if trapped by floodwaters in a vehicle. That is why a Seatbelt Cutter/Window Breaker Emergency Escape Tool in the glove compartment is essential.

All young children should have an identification tag with their name and address and also an out-of-area emergency contact (with a phone number).

Disaster Plan – Part 2 – On Distant Shores

The following plan applies to a tsunami threat on distant shores. If a massive quake strikes the Pacific Northwest coast of the United States, it will most likely also produce a tsunami on the northeast coast of Japan several hours later. Because of the vast distance involved (5,000 miles), the strength of the tsunami will be significantly reduced. But it will still cause devastation. But the main difference will be that Japan will have significant warning time, a tsunami warning will be issued, areas will be evacuated, and lives will be saved.

It is theorized that a massive landslide caused by an eruption of the Cumbre Vieja Volcano in the Canary Islands off the coast of Africa could potentially produce a massive tsunami that could strike the east coast of the United States. Around 9 hours after the event, a wide swath of Manhattan, Brooklyn, Long Island, New Jersey, and Staten Island could be buried as 60-foot waves wash ashore.

The plan here is quite simple. If a tsunami warning is posted, take it seriously and evacuate the area immediately. Don't dilly-dally and wait until the last minute. Just relocate to a safe region. [Even if a warning has not been issued, a magnitude 9

earthquake could pose a tsunami hazard to far distant coastlines that ring the earthquake/underwater landslide epicenter.]

In coastal regions, there are two options. These are either move to higher ground or head out to sea. Higher ground can be land several hundred feet in elevation above sea level. If a boat is available, relocating beyond the continental shelf should provide a safe region.

Not all tsunami warnings will result in a tsunami. It is better to be a little cautious and take action than to become extinct.

[When I was a young whippersnapper back in 1974, a tsunami warning was issued for Southern California because of a massive earthquake in Chili. We lived a half a block from the ocean at that time. My first reaction was to contact my insurance agent and check to see if tsunami damage was covered under my insurance policy. He said it would be treated as flood damage and not covered. My next thought was this is a once in a lifetime opportunity of seeing a tsunami up close and personal and that would be exciting to watch the ocean recede and a massive wave come ashore. That was then and now is now. When you are young you feel invincible. As you age, you begin to recognize the folly of tempting death. The mountains were just a few miles distant from our home. It would have been far safer to get in the car, head to the hills and make a fun day trip of exploring that region.]

Final Words of Wisdom

It would be wise if every school in the immediate danger zone of a mega-tsunami was equipped with high floatation life jackets and kayaking helmets for their staff and students and that they periodically practiced tsunami drills (similar to tornado drills in the Midwest) where the students learned about the threat, the warning signs, putting on the gear, and evacuating to higher ground.

There is a movie called “The Impossible”. I thought it visually portrayed fairly well the effects of a mega-tsunami and the aftermath that followed. The movie is about the 2004 Indian Ocean mega-tsunami and is based on the lives of real people who lived through this disaster.

Although this preparedness plan is focused on the threat of tsunamis. This threat is also linked to massive earthquakes. They go hand in hand. So when implementing this guide also incorporate guidelines for earthquake preparedness. One of the critical items in high demand after a major earthquake is drinking water. So make sure you store an adequate supply.

Remember should you ever encounter a mega-tsunami to stay calm and try not to become extinct.