

V.I.'s last big shock was in 1867

Earthquake and tsunami killed 600 people here

By JAMIE BATE
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ST. THOMAS — The last powerful earthquake to shake the Virgin Islands was more than 130 years ago. Since then, thousands of smaller tremors have rocked and rolled, posing the question seismologists are trying to answer: How big will the next "big one" be?

According to a 1997 geological study of the territory done by Earth Scientific Consultants, it's just a matter of time before a quake similar to the 7.2 event and tsunami that killed 600 people in 1867 happens again. In the meantime, experts say, the islands will continue to shake.

The average earthquake activity for the Virgin Islands and Puerto Rico is one to three events daily, said Rafael Abreu Paris, a data analyst at the Puerto Rico Seismic Network.

Of those tremors, the average of "felt" events recorded by the PRSN in the last 10 years comes to one per month, Paris said.

All this seismicity adds up to over five hundred events yearly, he said. "For example, a total of 816 events were located in 1994. Although these numbers may seem high, once again, this is considered normal activity for this area. Most of the seismicity for this area falls in the range of 2.5-4.0 in the magnitude scale."

Despite the wealth of knowledge about the Eastern Caribbean's earthquake activity, predicting when the "big one" is going to hit isn't easy.

"Prediction is still a feat that modern seismology has not been

able to accomplish," Paris said. "The closest we've gotten to that goal is seismic hazard research. This is basically a statistical analysis based on the historic and recent seismicity of a specific area."

In their effort to figure out future quakes, seismologists take into account such local geological features as fault lines. The result is an estimate for the probability of a large event for an area.

"The last estimate for the Puerto Rico area showed an average of 40 percent probability of a large earthquake for a 50-year period," Paris said. "Roughly speaking, as time passes by, this probability also increases."

Since the last big quake was more than 100 years ago, that means the area is overdue for a big tremor. With that in mind, one question arises: are residents prepared?

Paris said people's awareness of natural hazards depends a lot on their occurrence.

"People tend to be a whole lot more aware of not just the pos-

sibility, but also of the sheer magnitude of a natural hazard if it happens seasonally, like hurricanes," he said. "We should give the possibility of an earthquake at least the same attention that we do hurricanes every summer."

"The only difference is that people should be ready for an earthquake not as something that'll happen in a few months but as an event that could be as imminent as tonight."

Because of that, buildings need to be designed to ride out a tremor. And even though the territory's building code has been strengthened following Hurricanes Hugo and Marilyn, building for windstorms and earthquakes isn't necessarily the same.

"Since the hurricanes, some people have built with concrete roofs," said Bill Taylor, an architect on St. Croix. "That isn't the most sensible thing in an earthquake."

"No, the solutions aren't the same, so it makes it more complicated."

Taylor said that while most people in the design and construction fields are aware of the seismic activity in the region, more need to plan for earthquakes.

To assist with that, the Uniform Building Code, under which the territory operates, mandates that construction meet "Zone 4" standards. Earthquake-prone California is a Zone 4 area. It wasn't until after Hurricane Hugo in 1989 that all public buildings were required to be Zone 4 compliant. And it wasn't until after Hurricane Marilyn in 1995 that private homes were required to beef up from Zone 2 requirements to Zone 4.

"The UBC requires us to address high seismic activity," Taylor said. "Earthquake resistance is part of the code."

How to protect yourself

Earthquakes can't be prevented any more than a hurricane can. That doesn't mean people can't protect themselves before, during and after a tremor.

People should be ready for aftershocks, some of which can be as strong as the main shock and can occur any time from minutes to hours after the initial earthquake.

Aftershocks can last for days and, in some cases, months.

According to the Puerto Rico Seismic Network, most structures, after resisting the first earthquake, become vulnerable to partial or total collapse due to aftershocks. People living in low coastal areas should pay attention to the potential for tidal waves, often called tsunamis. With a large earthquake, it is safe to assume that a tsunami will follow within minutes.

Residents living in low areas should move to high ground, at least 30 feet high and higher. Residents of mountainous zones should be ready for landslides.

Here's what to do

Before

Be prepared all year. Stock up as if a hurricane was approaching. Canned food and sufficient water should be stored to last several days. Flashlights, radios and batteries should be in working order. Keep a first-aid kit prepared.

During

- Don't panic
- If indoors, go under a desk or heavy table or stand in a doorway. Stay away from windows, mirrors, bookcases and china cabinets.
- In a multi-story building, stay away from outside walls and windows and don't use elevators.

- Outdoors, stay away from power lines, buildings — especially brick or stone structures — and trees.

- If driving, slowly stop in an open

area and stay away from bridges, buildings, power lines and trees.

After

- Beware of aftershocks.

- Check gas, water and electric lines for damage. If there is a gas odor, turn off tanks and leave it off until the gas company checks them out. Do not light matches or use open flames.

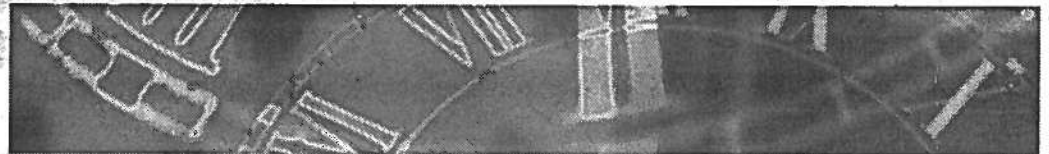
- Clean up any spilled flammables or toxic liquids.

- Check for building damage and other hazards.

- Check sewage lines before using toilet. Plug drains to prevent sewage backup.

- Listen to radio for instructions from disaster officials.

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