

Let History Be Our Lesson, Prepare and Plan for Earthquakes

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History has recorded several major tremors in this part of the country over the past two centuries. With the earthquake and tidal wave which followed in Asia this week maybe we should consider the earthquake risk here in Ohio and plan for its threat to us.

History speaks of an earthquake on October 31, 1895, that happened near Charleston, Missouri and was felt across the eastern half of the U.S. Later research indicates it probably would have measured about 6.2 magnitude if there had been seismic instruments to gauge it. The Charleston earthquake took place in the New Madrid Seismic Zone, considered to be the most serious earthquake-producing zone east of the Rocky Mountains.

According to the Geological Survey, enough seismic strain has built up in the New Madrid Seismic Zone to produce an earthquake as strong as 7.8 on the Richter scale. While a tremor of that size is possible, it is not considered as likely as one registering 6 to 6.5. Scientists believe there is about a 50% probability of a 6.5-magnitude earthquake during the next decade in the Central U.S. Over the next fifty years, that probability rises to well over 90%.

An earthquake of that size has the potential to cause damage over a wide area and disrupt transportation, communications, electricity and natural gas service. People affected by the tremor may find themselves without emergency services such as medical help for hours or days. And because aftershocks are very common, further damage after the initial tremor is also a possibility.

When was the last damaging earthquake in the Midwest? While many may think the legendary quakes of 1811-12 were the last ones to happen in this region, a strong tremor from the New Madrid Seismic Zone near Charleston, Missouri, occurred a century ago--on October 31, 1895. There were no seismic instruments to measure the earthquake, but research at St. Louis University derived an estimate of 6.2 magnitude.

A study of the event by Dr. Ron Street and others at the University of Kentucky was published in 1986. It quoted the *Hickman (Ky.) Courier* as reporting people "rushed into the streets panic stricken..." and "chimney tops of many residences in the city were knocked off" during the 5:15 a.m. event. The *Paducah Daily News* reported "plaster walls cracked.... a number of chimneys and flues had gone by the board." The *Lexington (Ky.) Daily Leader* described people in Frankfort, Ky., as being "...badly scared..," adding that "...small cracks were discovered in the walls..." and that plaster fell from walls and ceilings in some houses.

The research found reports that the earthquake was felt in Washington, D.C., Green Bay, Wisconsin and in Iowa. The area which sustained damage, primarily in the lower Ohio and Wabash River valleys, was probably about 14,000 square kilometers.

When will a damaging earthquake happen again in the New Madrid Seismic Zone or other active areas in the Midwest? Earthquakes cannot be predicted, but geologic scientists believe the chance of a tremor the size of the Charleston quake is about 50/50 during the next decade and up to 97% during the next fifty years, as seismic strain builds in the region.

Much more "infrastructure" of buildings, bridges, roadways, utilities and services has been built in the region since the Charleston earthquake, creating the potential for much more damage to human-made structures as well as injuries and deaths. Ground shaking can cause many of these effects, but earthquakes can also cause soil liquefaction and flooding. Earthquakes elsewhere in recent years have resulted in fires and hazardous materials spills, compounding the job of emergency response agencies.

A damaging earthquake will happen again sometime in the central part of the U.S., and Ohio is likely to be affected by it. Strong tremors happened in the Central U.S. in 1811, 1812 and 1895. Geologists and seismologists believe there is a high probability of a damaging tremor from the New Madrid Seismic Zone in the next half century.

As earthquakes occur elsewhere such as the one Christmas day on the coast of Northern Sumatra, and in years past in California, Japan, Ecuador and Mexico, the belief that "It can't happen here" may begin to set in. Thus the question "When **has** it happened here, anyway". The answer is, "Plenty of times." And not necessarily so long ago or far away.

Just about everyone has heard about the legendary New Madrid earthquakes of 1811-12. This series of three or four major tremors was felt across the eastern half of the U.S. and into Canada. It created the body of water now called Reelfoot Lake and reportedly caused the Mississippi River to appear to flow backward for a time. Had the Richter Scale existed then, the 'quakes might have registered up to 8.7 magnitude, placing them among the strongest quakes ever to have struck in North America.

But another earthquake struck in the New Madrid Zone (running from the vicinity of Marked Tree, Arkansas to southern Illinois) one hundred years ago. The October 31, 1895 tremor, which would have registered 6.2 on the scale, was also widely felt and caused damage to buildings and other structures in the lower Ohio and Wabash River valleys.

Hundreds of 'quakes occur in the vicinity of the zone every year--most of them too small for people to detect. But occasionally, a larger one reminds us the zone is an active one and holds the potential to cause damage. One such tremor happened February 5, 1994 in southern Illinois. It registered 4.2 and was felt in the vicinity of the epicenter and into Western Kentucky.

The New Madrid Zone doesn't hold a monopoly on earthquakes in the region. Shelby County and surrounding counties in western Ohio have experienced more earthquakes

than any other area of our state. At least 40 earthquakes have occurred in this area since 1875. Although most of these events have caused little or no damage, earthquakes in 1875, 1930, 1931, and 1937 caused minor to moderate damage. Two earthquakes in 1937, on March 2 and March 9, caused significant damage in the Shelby County community of Anna. The damage included toppled chimneys, cracked plaster, broken windows, and structural damage to buildings. The community school, of brick construction, was razed because of structural damage.

Northeastern Ohio has experienced at least 20 felt earthquakes since 1836. These also were small and caused little or no damage. But on January 31, 1986, an earthquake strongly shook Ohio and was felt in 10 other states and southern Canada. This event had a Richter magnitude of 5.0 and caused minor to moderate damage, including broken windows and cracked plaster, in the epicentral area of Lake and Geauga Counties.

Southeastern Ohio has been the site of at least 10 felt earthquakes with epicenters in the state since 1776. The 1776 event, recorded by a Moravian missionary, has a very uncertain location. Earthquakes in 1901 near Portsmouth (Scioto County), in 1926 near Pomeroy (Meigs County), and in 1952 near Crooksville (Perry County) caused minor to moderate damage.

Significant earthquakes east of the Rocky Mountains aren't as numerous as California tremors, but they can damage areas twenty times the size of California earthquakes. That's because the changing geology of the West Coast, where two tectonic plates are grinding together, tends to prevent earthquake waves from traveling very far from the epicenter. In the Central U.S., waves from the same-size earthquake will travel much further, damaging a larger area.

While damaging earthquakes are not as common in our region as other emergencies such as floods and tornadoes, the potential for widespread damage from an earthquake should motivate people to prepare. Steps should be taken in homes, at school and in the workplace to prepare for the effects of a damaging earthquake. No one can prevent earthquakes, but everyone can take steps to prevent some of the damages and injuries which may happen.

Take these steps at home, in schools and in workplaces. Know what to do when an earthquake happens. There will be no warning. Don't try to run away; get under a heavy desk or table and hold onto the legs to keep the table or desk from moving away from you until the shaking stops. If there is nothing to get under, sit against an interior wall and cover your head and neck with your hands. If you're outside, move away from utility lines or other structures which might fall, crouch down and wait out the shaking. If you are in a car, pull to the side and stop until the shaking is over. Watch for breaks in the pavement or utility poles and other things which may have fallen on the road when you drive on.

Always check for potential electrical problems after a 'quake and shut off the electricity if

you think there could be a "short" or fire hazard. Natural gas should be cut off only if you smell gas inside a building, and you should leave the building immediately.

Be prepared for aftershocks as well; earthquakes rarely happen without later tremors, some of them possibly as strong as or even stronger than the first one.

Prepare a survival kit for any emergency. It should include water, non-perishable food, a flashlight, first aid kit, extra medications such as prescriptions, blankets and other needs. The kit should be stored in a safe place where it can quickly be reached.

Prepare a home, school and workplace plan for evacuating a damaged house or building after the earthquake. The plan should also include how family members will get back in touch with each other or with other relatives or how schools and businesses will check for damages and injuries in their buildings. Schools are required by state law to conduct two earthquake drills each year and write earthquake plans.

Services we take for granted, such as emergency medicine, electricity, water and telephones, could be interrupted for hours, days or weeks. That's why planning to be "on your own" for several days is essential.

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