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Earthquakes - Seismic Risks in Indiana

THE DANGER OF A MAJOR EARTHQUAKE

The U.S. Geological Survey has created maps that show areas of probable earthquakes for the entire United States (2002 National Seismic Hazard Maps).

While a large earthquake that will seriously affect southwestern Indiana is inevitable, it is currently impossible to predict when the next "big one" will occur, or even whether it will happen during our lifetimes. While fearing the inevitable is pointless, it would be prudent for government officials and citizens to begin taking basic steps to prepare for a major quake.

A recent press release of the U.S. Geological Survey stated that there is a 25 to 40 percent chance of a magnitude 6.0 or greater earthquake in the next 50 years for the central United States. There is a 7 to 10 percent chance of a repeat of events similar to the 1811-12 earthquake.

GEOLOGIC FAULTS AND EARTHQUAKES

Unlike the famous San Andreas Fault, nearly all of Indiana's faults are buried and cannot be seen at the surface. Nevertheless, researchers have been able to map some faults using information from oil and gas wells and by employing geophysical methods. Most of the mapped faults are in the southwestern corner of the state. These faults extend into southeastern Illinois and western Kentucky and are collectively known as the Wabash Valley Fault System.

Most of the mapped faults are within one kilometer of the earth's surface and are unlikely to be the cause of earthquakes. The earthquakes that have occurred during the last 200 years are the result of movement along faults at much greater depths (10 or more kilometers). Because such earthquake-generating faults are so deep, geoscientists have difficulty mapping them. More research is needed before we will know the full extent of faulting at great depth and the potential for movement along those faults.

GEOLOGY AND EARTHQUAKE PREPAREDNESS

While earthquakes cannot be prevented, their effects can be reduced by assessing risks and preparing appropriately. Risk assessment requires (1) determining the probability that a major quake will occur and (2) studying the susceptibility of soils to severe shaking. Once such information is obtained, existing structures can be reinforced, if necessary, and building codes for new structures can be revised.

Because long periods of time pass between damaging earthquakes in this region, it is easy for us to become complacent. Studying the stresses, strains, and movements of masses of rock kilometers below the surface of the Earth presents problems of immense complexity for scientists, but until those problems are solved we cannot know when a major earthquake will occur.

PREPARING BUILDINGS FOR A MAJOR EARTHQUAKE

Preparing for an earthquake includes constructing critical structures such as schools, hospitals, dams, and bridges so that they are able to survive the maximum level of shaking likely to occur at the site; developing a plan for coordinating activities among emergency response agencies; developing plans of action for schools, businesses, and homes; and educating everyone about earthquakes and what can be done to lessen their potentially disastrous effects.

The Indiana Geological Survey has worked with the city of Evansville to gather data about the shaking potential of parts of the city, and therefore, where best to locate critical facilities. Evansville is currently requiring structure designs that will withstand a magnitude 7 earthquake. People living in other communities throughout southwestern Indiana would do well to follow at least the basic steps dictated by the earthquake hazard.

Local and regional officials should take the lead to lessen the risk to citizens and their property. Building inspectors can be trained to notice structural problems and conduct structural evaluations. A variety of publications is available from the Applied Technology Council, a nonprofit organization that disseminates the results of engineering research to withstand earthquakes.

The earthquake preparedness efforts of several states, including Indiana, are coordinated by the Central United States

Earthquake Consortium (CUSEC).

Indiana Geological Survey
611 N. Walnut Grove Ave., Bloomington, IN 47405-2208 | phone: 812-855-7636 email: igsinfo@indiana.edu | sitemap