

## How safe are the bridges of Portland?

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An animation of a Portland bridge in 2012 (KOIN 6 News)

*Editor's note: This report originally aired on KOIN 6 News in 2012.*

PORTLAND, Ore. (KOIN) — More than a half-million cars cross Portland's downtown bridges every day, but geologists say most of them are at risk from an earthquake.

Geologists say a major earthquake will happen at some point in Portland.

"We have a major issue with seismic vulnerability," said Bruce Johnson.

Engineers say bridges like the **Hawthorne and the Steel could fall into the Willamette River.**

"It is possible that the deck surface that you drive on could slide off of the pier, so it would actually collapse," Johnson said.

- **Photos: I-5 Skagit Bridge collapse** (<http://interactives.koin.com/photomojo/gallery/7513/1/i-5-bridge-collapses-in-washington/>)

Every downtown bridge was built before anything was known about the earthquake threat off the coast of Washington and Oregon.

PSU research professor and geophysicist Rob McCaffrey said it will unleash a magnitude 8 or 9 earthquake with “shaking (that) could last four to five minutes.”

ODOT's bridge engineer said there will be no way to cross the river for days, possibly weeks.

“There’s going to be widespread interruption to the transportation system,” he said.

Each bridge has different issues and vulnerabilities when it comes to earthquakes. Multnomah County’s Mike Pullen said, “The one that’s on life support is the **Sellwood Bridge**.”

A historic landslide is pushing the bridge east, and has already caused the columns to crack and twist. Engineers said an earthquake would likely take out the whole west end of the existing Sellwood Bridge.

Just north, the **Ross Island Bridge** faces problems of its own.

Bruce Johnson’s main concern is the sandy soil surrounding the bridge supports would almost liquefy.

“There’s a potential for some banks moving around and sliding into the river and not providing adequate support,” he said.

A PSU simulation of a 9.0 earthquake predicts “moderate damage” to the Ross Island Bridge. The simulation ranked four downtown bridges on a damage scale of “none” to “complete collapse.”

The **safest bridge is the Marquam**, with only minor damage predicted. It was retrofitted so the bridge deck won’t come off the columns.

But that’s not the case with the Hawthorne Bridge.

“In a worst case scenario, it could, you know, dance off the columns,” Pullen said. There’s also concern the 880,000 pound counterweights could crash onto the bridge deck.

There are similar concerns with the **Morrison Bridge**, except the counterweights are below the bridge. It has not been retrofitted.

The **Burnside Bridge** is more prepared for an earthquake. It’s been deemed a “lifeline emergency route,” so it was upgraded in 2002. County officials said that work will ensure the bridge deck will stay connected with the columns.

“We’ve put our limited resources into making sure the Burnside is going to do well,” Pullen said.

The **Steel Bridge** — the only link between east and west for MAX riders — is very vulnerable. PSU’s simulation predicts complete collapse. There’s concern about shaking and the bridge deck. The massive counterweights “don’t behave well during a seismic event,” Johnson said.

The **Broadway Bridge** may not have counterweights above it, but it's vulnerable. It was built in 1913 and has not been retrofitted.

Neither has the Fremont Bridge, where the main span isn't the state engineer's biggest worry — it's the double-deck approaches.

"It's hard to say whether it would collapse or not, but there would definitely be some movement and some damage and the bridge would not be useful after quake," Johnson said.

Both the county and the state say more needs to be done to prepare Portland's bridges. State and federal funding for bridges has been cut by almost \$35 million since 2009 and almost all the money is being used for bridge maintenance.

"People should realize," Johnson said, "we do know how to retrofit bridges and if there were funding available we could preclude some of the damage."

Two brand new bridges will be complete in 2015. Both the new Sellwood Bridge and the new lightrail bridge, just north of the Hawthorne, are being built to withstand a 500-year quake.

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