

QUAKE SCENARIOS: TYPE DETERMINES EXTENT OF DAMAGE

Last year's Nisqually Quake was a deep earthquake that caused some damage but is the least destructive of the three types of quakes possible in the Northwest. The two other types — shallow and subduction — are potentially much more destructive. The scenarios below illustrate why magnitude estimates alone do not fully represent the threat an earthquake may pose or type of shaking it can generate.

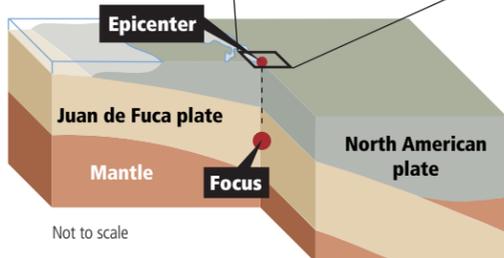
DEEP QUAKES

Fracturing occurs within the Juan de Fuca plate 30 to 40 miles underground. The Juan de Fuca plate dives under, subducts, North America. The intensity of a deep quake often dissipates before hitting the surface.

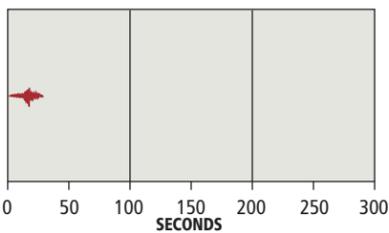
Possible shaking scenario
If a 7.1M (magnitude) quake hit Seattle



Largest recorded in Washington: 7.1M in 1949, Olympia
Frequency: Every 30 or 40 years

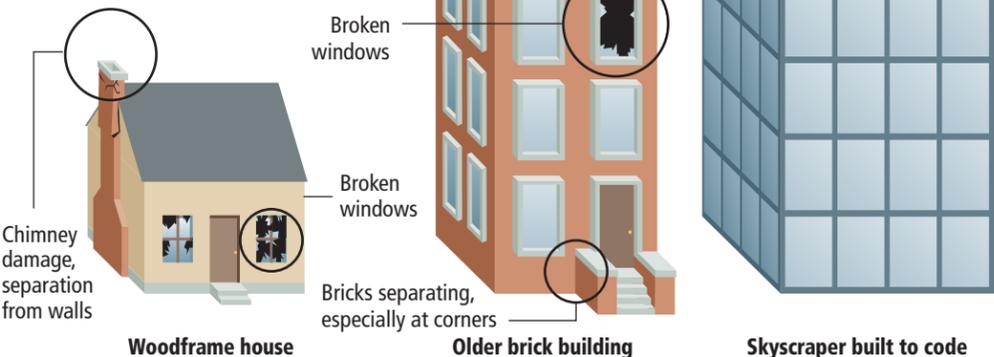


DURATION, INTENSITY AND STRUCTURAL DAMAGE



Duration: Roughly 15 to 30 seconds
Intensity: Moderate ground shaking
Damage: Most likely only the weakest parts of structures, such as unreinforced masonry and windows, will be damaged. Foundations will endure in most situations.

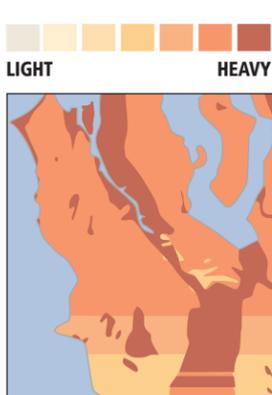
How damage varies by building type:



SHALLOW QUAKES

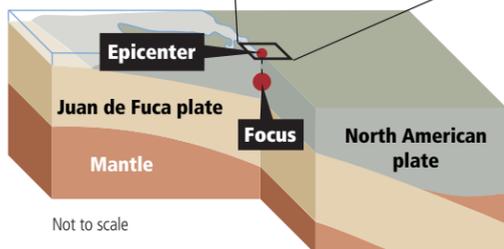
Crustal stress causes fracturing within the North American plate less than 15 miles below the surface.

Possible shaking scenario
If a 7M quake hit Seattle

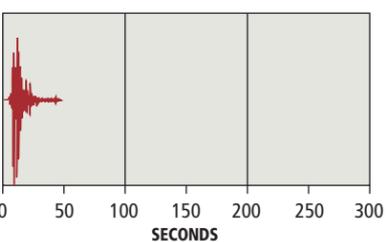


Largest known in Washington: 7.4M in 1872, North Cascades
Frequency: Unknown

The Seattle Fault Zone is a shallow fault. Scientists suspect there are similar faults in Tacoma, Olympia and Portland.

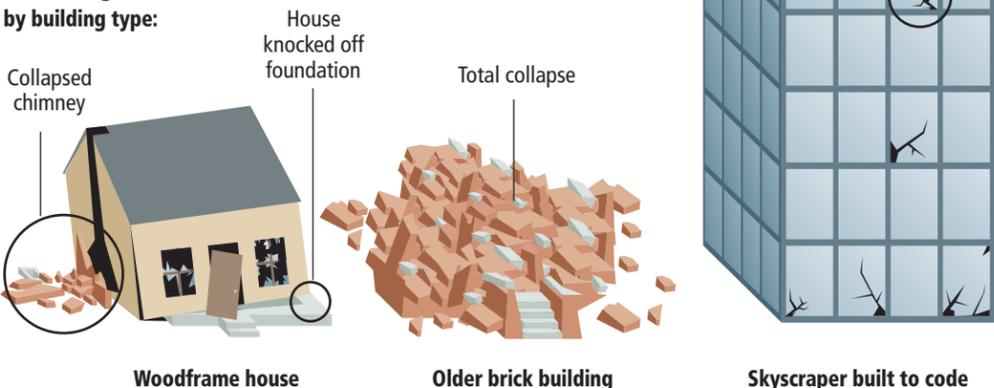


DURATION, INTENSITY AND STRUCTURAL DAMAGE



Duration: Roughly 20 to 60 seconds
Intensity: Violent ground shaking
Damage: Taller, newer structures built to flex would likely handle the shaking best. Brick or other unreinforced masonry buildings would do poorly, as would woodframe structures.

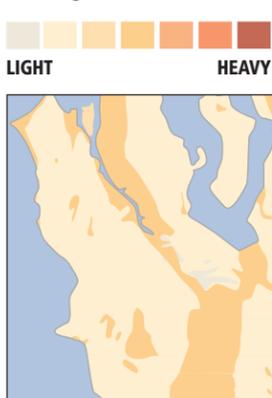
How damage varies by building type:



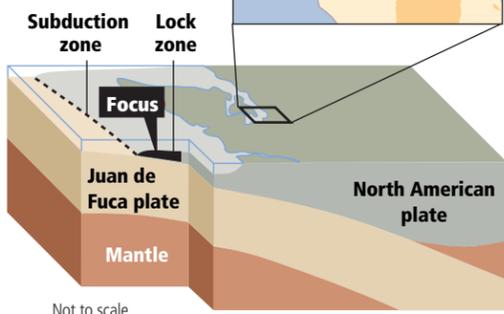
SUBDUCTION QUAKES

Over time, the North American plate builds stress as it locks up against the Juan de Fuca plate. When the subduction boundary slips, releasing the stress, scientists say it will produce one of the world's largest earthquakes.

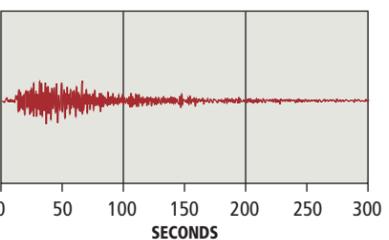
Possible shaking scenario
If a 9M quake hit Western Washington



Largest known in Washington: 9M in 1700
Frequency: About every 400-600 years



DURATION, INTENSITY AND STRUCTURAL DAMAGE



Duration: Roughly 1 to 5 minutes
Intensity: Moderate ground shaking
Damage: This is the scenario scientists know least about. Some say the long duration of shaking could start modern skyscrapers and bridges swaying back and forth until they collapse because many structures have only been engineered to withstand shaking for seconds rather than minutes. Others think the damage might not be as severe because the shaking is not as violent as a shallow quake.

How damage varies by building type:

