



Anchorage Earthquake 12.01.18 Bulletin

Risk Services Division

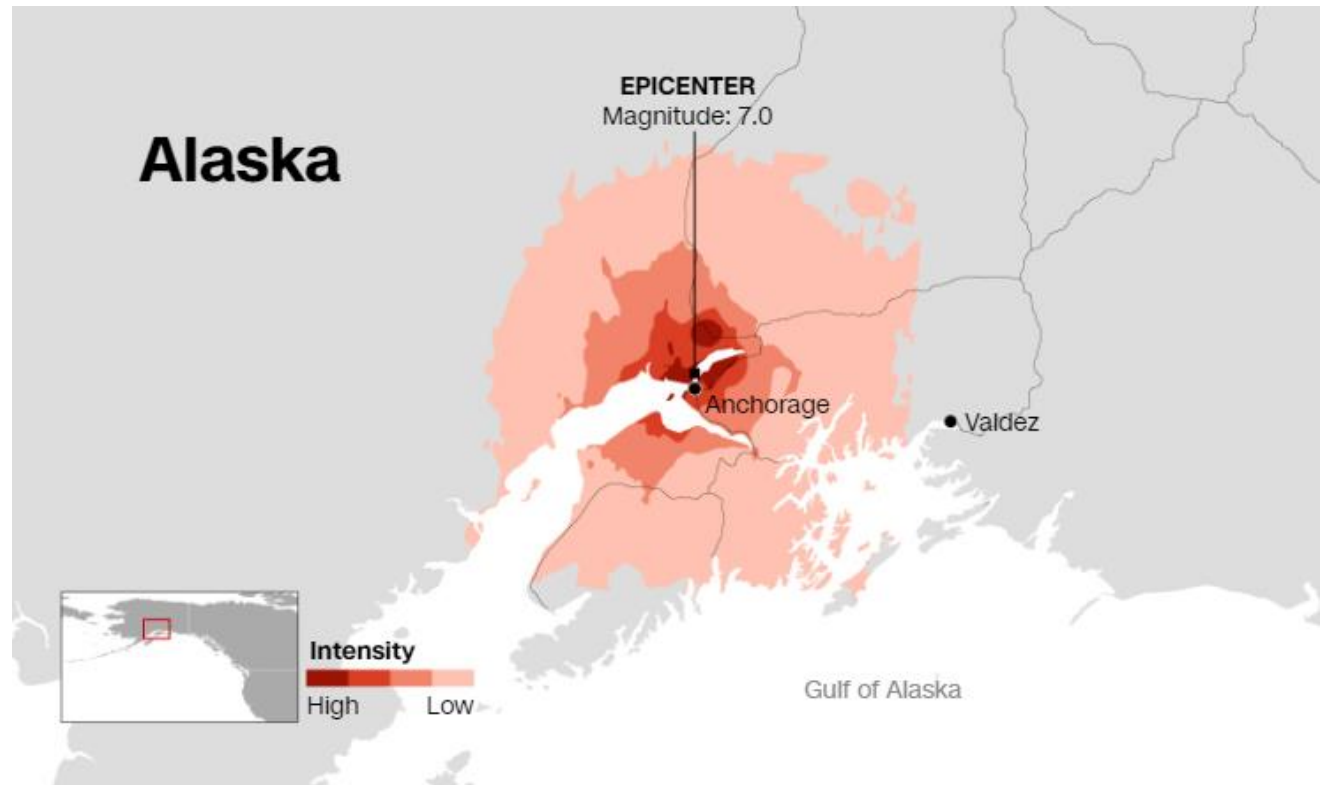
01 December 2018

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Anchorage Earthquake Status at 11:00 AM PST 01 December, 2018

- **Magnitude:** 7.0
- **Depth:** 25.4 mi. (40.9km)
- **Location:** 61.340°N; 149.937°W; 35 miles (56km) SW of Palmer, Alaska
- **Origin Time:** 11/30/2018, 9:29:28 AM
- **Felt intensity:** VIII (Severe)
- **Multiple aftershocks occurring in the range of 5.7Mw to 4.0Mw**
- **No Tsunami Warning, Advisory, Watch, or Threat**
- **No fatalities or serious injury reported**
- **Significant infrastructure damage reported**
- **Governor Walker issues disaster declaration**



Source: U.S. Geological Survey
Graphic: Will Houp, CNN

Summary

On 30 November, 2018, at 9:29:28, a Mw 7.0 earthquake occurred at a depth of 25.4 miles (40.9 km). The earthquake occurred along a known subduction fault and was centered at 61.340°N; 149.937°W; 8 miles (13 km) N of Anchorage Alaska and 35 miles (56 km) SW of Palmer, Alaska. The felt intensity of the earthquake was as high as eight on the modified Mercalli intensity scale. Significant aftershocks ranging up to 5.7 Mw have occurred and are continuing.

Between 7,000 and 10,000 customers are reported to have lost power. Significant infrastructure damage is reported.

Aftershock Forecast

The USGS warns the public to be prepared for more earthquakes.

- More earthquakes than usual (called aftershocks) will continue to occur near the main shock.
- When there are more earthquakes, the chance of a large earthquake is greater which means that the chance of damage is greater.
- The USGS advises everyone to be aware of the possibility of aftershocks, especially when in or around vulnerable structures such as unreinforced masonry buildings.
- This earthquake could be part of a sequence. An earthquake sequence may have larger and potentially damaging earthquakes in the future, so remember to: Drop, Cover, and Hold on.

The USGS estimates the chance of more aftershocks as follows: Within the next 1 Week until 2018-12-08 02:00:37 (UTC):

- The chance of an earthquake of magnitude 3 or higher is > 99 %, and it is most likely that as few as 84 or as many as 610 such earthquakes may occur in the case that the sequence is re-invigorated by a larger aftershock.
- The chance of an earthquake of magnitude 5 or higher is 88 %, and it is most likely that as few as 0 or as many as 8 such earthquakes may occur.
- The chance of an earthquake of magnitude 6 or higher is 24 %, and it is most likely that as few as 0 or as many as 2 such earthquakes may occur.
- The chance of an earthquake of magnitude 7 or higher is 3 %, such an earthquake is possible but with a low probability.

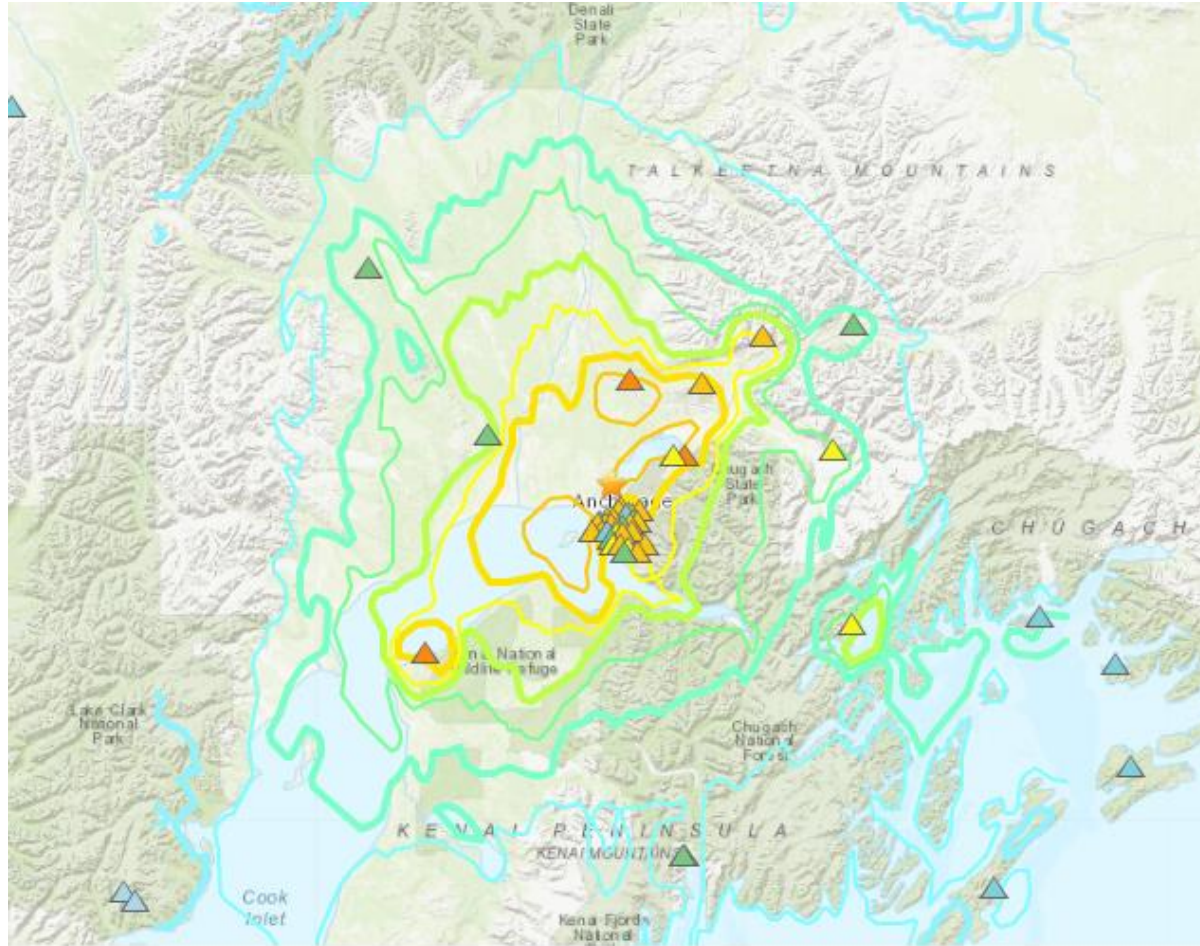
Emergency Declaration

The Department of Homeland Security, Federal Emergency Management Agency (FEMA), is authorized to provide appropriate assistance for required emergency measures, authorized under Title V of the Stafford Act, to save lives and to protect property and public health and safety, or to lessen or avert the threat of a catastrophe in the designated areas. Specifically, FEMA is authorized to provide emergency protective measures (Category B), limited to direct federal assistance, under the Public Assistance program at 75 percent federal funding.

This assistance is for Anchorage Municipality, Kenai Peninsula Borough, and Matanuska Susitna Borough.

Additional designations may be made at a later date if requested by the state and warranted by the results of further evaluation.

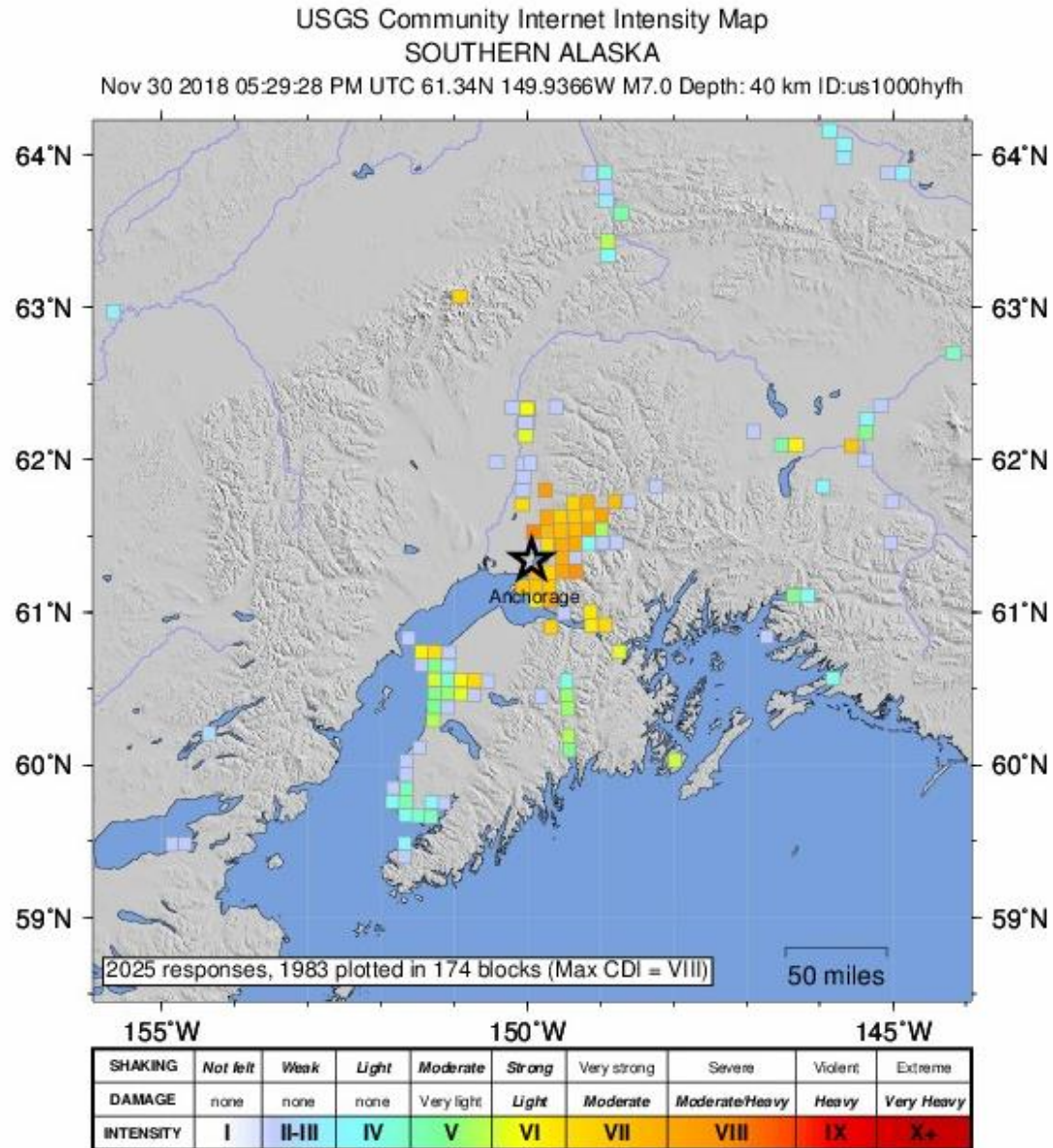
Shake Intensity



PERCEIVED SHAKING	Not felt	Weak	Light	Moderate	Strong	Very strong	Severe	Violent	Extreme
POTENTIAL DAMAGE	none	none	none	Very light	Light	Moderate	Mod./Heavy	Heavy	Very Heavy
PEAK ACC. (%g)	<0.05	0.3	2.8	6.2	12	22	40	75	>139
PEAK VEL. (cm/s)	<0.02	0.1	1.4	4.7	9.6	20	41	86	>178
INSTRUMENTAL INTENSITY	I	II-III	IV	V	VI	VII	VIII	IX	X+

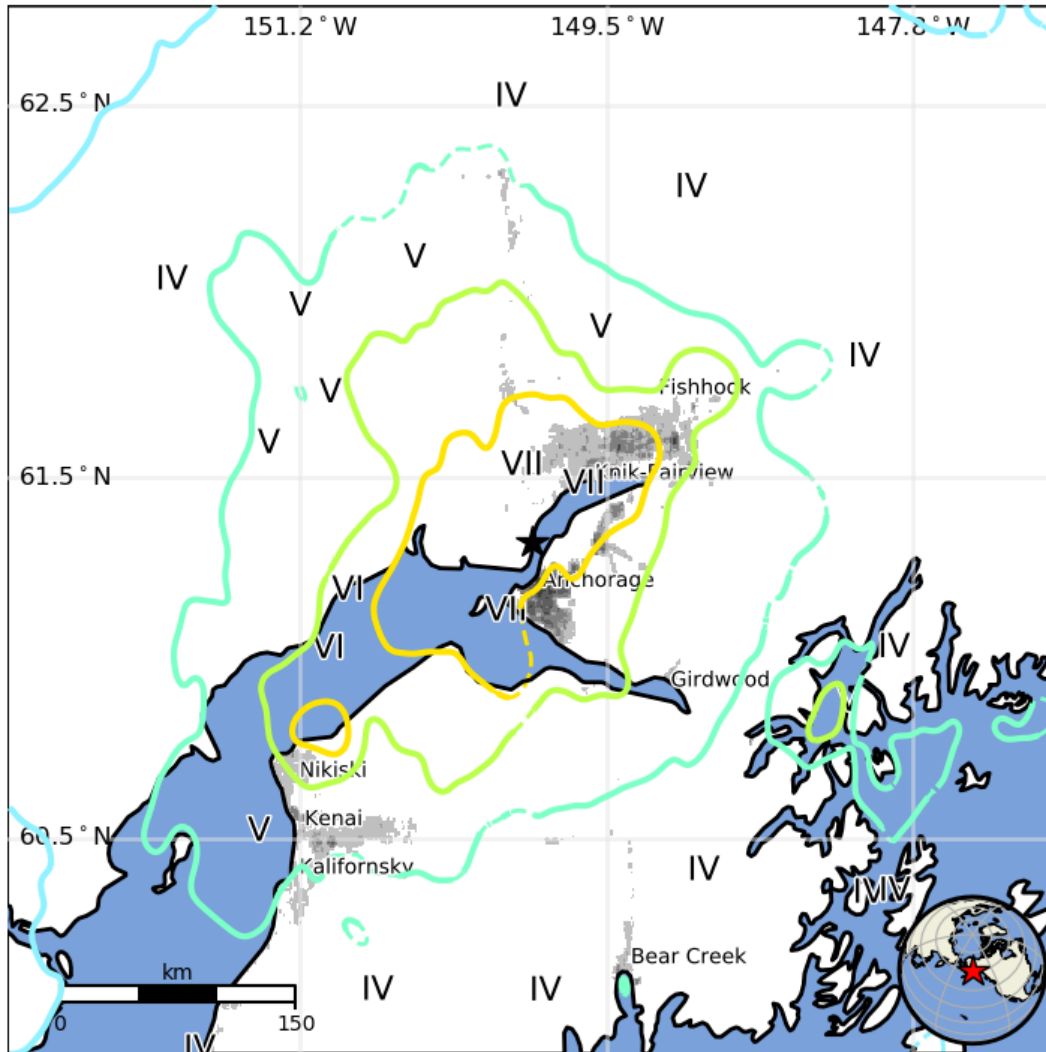
Scale based upon Worden et al. (2012)

Felt Intensity



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Estimated Population Exposure to Earthquake Shaking



Population per ~1 sq. km. from LandScan

MMI	Shaking	Population
I	Not Felt	0 k*
II-III	Weak	0 k*
IV	Light	12 k*
V	Moderate	39 k
VI	Strong	252 k
VII	Very Strong	145 k
VIII	Severe	0 k
IX	Violent	0 k
X	Extreme	0 k

*Estimated exposure only includes population within map area (k = x1,000)

Alaska Department of Transportation and Public Facilities

General Information:

- All DOT&PF Bridge inspectors are now in Southcentral Alaska and are conducting technical bridge inspections this morning.
- DOT&PF Maintenance and Construction crews are now actively working the eight major damage sites. Aftershocks are continuing to contribute to settling and additional cracking.
- DOT&PF has documented over 40 damage sites on transportation infrastructure.
- DOT&PF 24 hour operations center will continue to issue situation reports throughout the day.

Glenn Highway

- Glenn Highway North Bound Eagle River Bridge: Highway is closed, but detour is available through Eagle River. Plan on additional time when traveling in this area. Construction crews are actively working on restoring the approaches.
- Mirror Lake/Thunderbird Falls: Slope failure on both sides of the highway. AFTERSHOCKS AND SETTLING ARE EXPANDING THE DAMAGE TO DRIVING LANES. Detours are slow; please plan for additional time when traveling the area. Construction crews are actively repairing slope failures.
- Parks/Glenn Interchange: Off-ramp toward Palmer is closed. Use Trunk Road detour via the Parks Highway to access Palmer. Construction crews are actively working to restore the approach/abutment.

Seward Highway

- Seward Highway MP 104-114: Rock fall continues in this area with continuing aftershocks and settling. DOT&PF recommends avoiding the area unless travel is absolutely necessary. DOT&PF Maintenance is actively monitoring and removing rock fall.

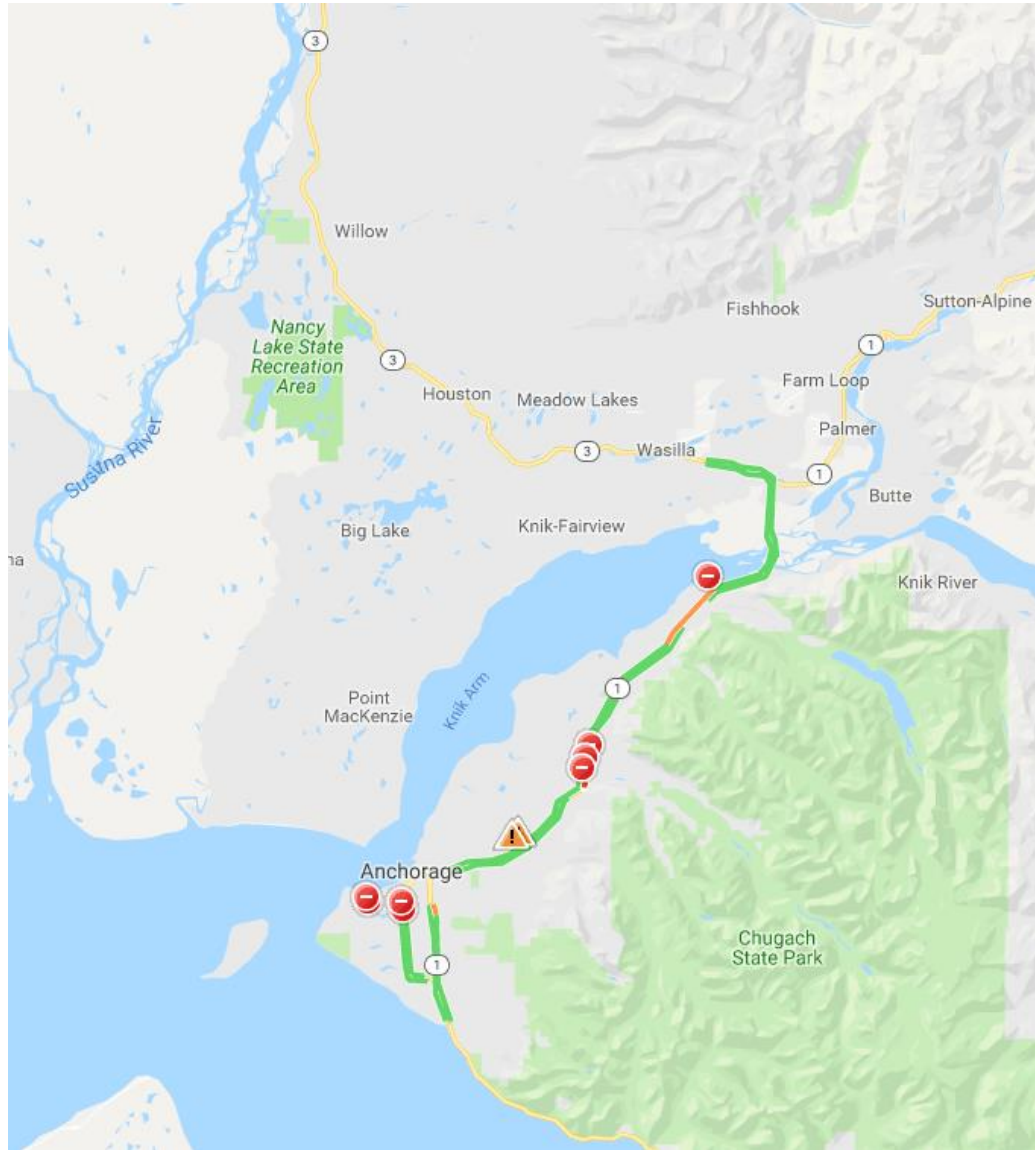
Parks Highway

- Parks / Glenn interchange has major damage. Off-ramp toward Palmer is closed. Use Trunk Road detour via the Parks Highway to access Palmer.
- Bridges and roadways clear from Talkeetna north.
- All of Parks Highway is passable.

Kenai Spur Highway

- Damage at 35.1 and 35.7. Crack in road 150' by 8" wide. Road is passable. Damage at MP19.7. 500' long by 4" wide, still passable. Maintenance crews are actively repairing these sites.

Current Road Closures



Current Traffic Speeds

Fast Slow

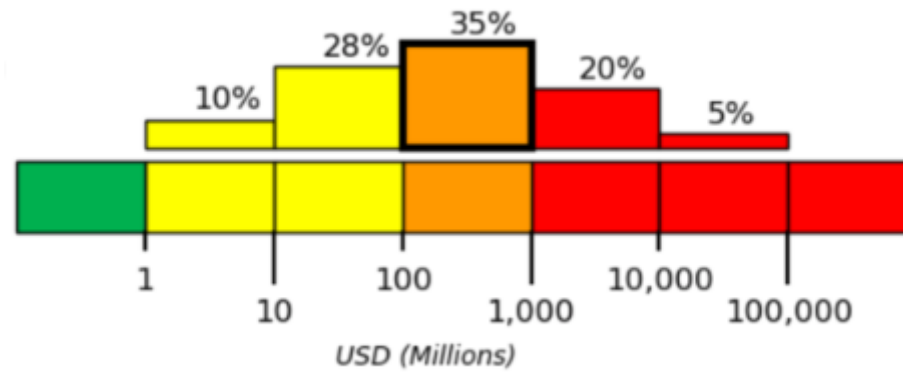
Traffic alerts from waze.com users

- Road Closed
- Hazard reports
- Accidents
- Construction

Estimated Economic Losses

USGS estimates a 35% chance of USD 100 million to USD one billion in economic losses.

There is a 25% chance that economic losses will be over USD one billion dollars.



Safety Before an Earthquake

Go through your home or workplace, imagining what could happen to each part of it, if shaken by a violent earthquake.

Check off the items that you have completed in this list.

- Teach everybody in the family (if they are old enough) how to turn off the water and electricity.
- Clearly label the on-off positions for the water, electricity and gas. If your home is equipped with natural gas: tie or tape the appropriate wrench on or near the pipe, to turn off the gas, if necessary.
- Repair loose roof shingles.
- Tie the water heater to studs along with other heavy appliances (stove, washer, dryer), especially those that could break gas or water lines if they shift or topple.
- Secure top-heavy furniture and shelving units to prevent tipping. Keep heavy items on lower shelves.
- Affix mirrors, paintings and other hanging objects securely, so they won't fall off hooks.
- Locate beds and chairs away from chimneys and windows. Don't hang heavy pictures and other items over beds. Closed curtains and blinds will help stop broken window glass from falling on beds.
- Put anti-skid pads under TVs, computers and other small appliances, or secure them with Velcro or other such product.
- Use child-proof or safety latches on cupboards to stop contents from spilling out.
- Keep flammable items and household chemicals away from heat and where they are less likely to spill.
- Consult a professional to find out additional ways you can protect your home, such as bolting the house to its foundation and other structural mitigation techniques.
- If you live in an **apartment** block or a multi-story building, work with your building manager or condominium board to decide how best to "quake-safe" your unit. Seek advice from professionals (building engineers, emergency preparedness authorities) if you are unsure about what to do.
- If you live in a **mobile home**, you can leave the wheels on the mobile home to limit its fall. Or, you can install a structural bracing system to reduce the chance of your unit falling off its supports. Ensure the awning on your home is securely supported and fastened to the unit. For information on the best way to brace your unit, contact your local mobile home dealer or a mobile home owner's association.
- Don't shut off the gas unless there is a leak or a fire. If the gas is turned off, it must be turned on again by a qualified tradesperson.
- Discuss earthquake insurance with your insurance broker. Check your coverage - it could affect your financial ability to recover losses after an earthquake.

Safety During an Earthquake

Wherever you are when an earthquake starts, take cover immediately.

Move a few steps to a nearby safe place if need be.

Stay there until the shaking stops.

Drop, Cover, and Hold On is the recommended safety action in the United States, and many other developed countries.



DROP where you are, onto your hands and knees. This position protects you from being knocked down and also allows you to stay low and crawl to shelter if nearby.



COVER your head and neck with one arm and hand

- If a sturdy table or desk is nearby, crawl underneath it for shelter
- If no shelter is nearby, crawl next to an interior wall (away from windows)
- Stay on your knees; bend over to protect vital organs



HOLD ON until shaking stops

- Under shelter: hold on to it with one hand; be ready to move with your shelter if it shifts
- No shelter: hold on to your head and neck with both arms and hands

If you are indoors: "DROP, COVER, HOLD ON"

- Stay inside.
- **Drop** under heavy furniture such as a table, desk, bed or any solid furniture.
- **Cover** your head and torso to prevent being hit by falling objects.
- **Hold** onto the object that you are under so that you remain covered.
- If you can't get under something strong, or if you are in a hallway, flatten yourself or crouch against an interior wall.
- If you are in a shopping mall, go into the nearest store.
- Stay away from windows, and shelves with heavy objects.
- If you are at school, get under a desk or table and hold on. Face away from windows.
- If you are in a wheelchair, lock the wheels and protect the back of your head and neck.

If you are outdoors

- Stay outside.
- Go to an open area away from buildings.
- If you are in a crowded public place, take cover where you won't be trampled.

If you are in a vehicle

- Pull over to a safe place where you are not blocking the road. Keep roads clear for rescue and emergency vehicles.
- Avoid bridges, overpasses, underpasses, buildings or anything that could collapse.
- Stop the car and stay inside.
- Listen to your car radio for instructions from emergency officials.
- Do not attempt to get out of your car if downed power lines are across it. Wait to be rescued.
- Place a HELP sign in your window if you need assistance.
- If you are on a bus, stay in your seat until the bus stops. Take cover in a protected place. If you can't take cover, sit in a crouched position and protect your head from falling debris.

AVOID the following in an earthquake

- Doorways. Doors may slam shut and cause injuries.
- Windows, bookcases, tall furniture and light fixtures. You could be hurt by shattered glass or heavy objects.
- Elevators. If you are in an elevator during an earthquake, hit the button for every floor and get out as soon as you can.
- Downed power lines - stay at least 10 meters away to avoid injury.

- Coastline. Earthquakes can trigger large ocean waves called tsunamis.

Safety Following an Earthquake

Stay calm. Help others if you are able.

- Be prepared for aftershocks.
- Listen to the radio or television for information from authorities. Follow their instructions. Place telephone receivers back in their cradles; only make calls if requiring emergency services.
- Put on sturdy shoes and protective clothing to help prevent injury from debris, especially broken glass.
- Check your home for structural damage and other hazards. If you suspect your home is unsafe, do not re-enter.
- If you have to leave your home, take your emergency kit and other essential items with you. Post a message in clear view, indicating where you can be found. Do not waste food or water as supplies may be interrupted.
- Do not light matches or turn on light switches until you are sure there are no gas leaks or flammable liquids spilled. Use a flashlight to check utilities and do not shut them off unless damaged. Leaking gas will smell.
- If tap water is still available immediately after the earthquake, fill a bathtub and other containers in case the supply gets cut off. If there is no running water, remember that you may have water available in a hot water tank (make sure water is not hot before touching it) and toilet reservoir (not the bowl).
- Do not flush toilets if you suspect sewer lines are broken.
- Carefully clean up any spilled hazardous materials. Wear proper hand and eye protection.
- Check on your neighbors after looking after members of your own household. Organize rescue measures if people are trapped or call for emergency assistance if you cannot safely help them.
- If you have pets, try to find and comfort them. If you have to evacuate, take them to a pre-identified pet-friendly shelter.
- Place a HELP sign in your window if you need assistance.
- Beware of secondary effects. Although ground shaking is the major source of earthquake damage, secondary effects can also be very destructive. These include landslides, saturated sandy soils becoming soft and unstable, flooding of low-lying areas and tsunamis washing over coastlines.

Modified Mercalli Intensity Scale

Intensity	Shaking	Description/Damage
I	Not felt	Not felt except by a very few under especially favorable conditions.
II	Weak	Felt only by a few persons at rest, especially on upper floors of buildings.
III	Weak	Felt quite noticeably by persons indoors, especially on upper floors of buildings. Many people do not recognize it as an earthquake. Standing motor cars may rock slightly. Vibrations similar to the passing of a truck. Duration estimated.
IV	Light	Felt indoors by many, outdoors by few during the day. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motor cars rocked noticeably.
V	Moderate	Felt by nearly everyone; many awakened. Some dishes, windows broken. Unstable objects overturned. Pendulum clocks may stop.
VI	Strong	Felt by all, many frightened. Some heavy furniture moved; a few instances of fallen plaster. Damage slight.
VII	Very strong	Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable damage in poorly built or badly designed structures; some chimneys broken.
VIII	Severe	Damage slight in specially designed structures; considerable damage in ordinary substantial buildings with partial collapse. Damage great in poorly built structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned.
IX	Violent	Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb. Damage great in substantial buildings, with partial collapse. Buildings shifted off foundations.
X	Extreme	Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations. Rails bent.

For Additional Information

US Geological Survey	https://www.usgs.gov/
USGS National Earthquake Information Center	https://earthquake.usgs.gov/contactus/golden/neic.php
USGS Prompt Assessment (PAGER)	https://earthquake.usgs.gov/earthquakes/eventpage/ak20419010/pager
US Federal Emergency Management Agency	https://www.fema.gov/
Ready.gov	https://www.ready.gov/earthquakes
Alaska Earthquake Center	https://earthquake.alaska.edu/
National Tsunami Warning Center	http://tsunami.gov
Pacific Tsunami Warning Center	http://ptwc.weather.gov/
Alaska Department of Transportation and Public Facilities	http://www.dot.state.ak.us/
NOAA National Weather Service (Alaska)	https://alerts.weather.gov/cap/ak.php?x=2
Alaska Office of the Governor	https://gov.alaska.gov/
Natural Resources Canada	http://www.earthquakescanada.nrcan.gc.ca//index-en.php
American Red Cross of Alaska	https://www.redcross.org/local/alaska.html
Smart Traveler Enrollment Program	https://step.state.gov/