

The Earthquake Exchange

Special points of interest:

- **Please Note: *The Earthquake Exchange* is now distributed quarterly instead of monthly.**
- [Set one preparation goal per month and then actually do it!](#) Get the family involved. Start with the basics in home & personal safety.
- **To watch short National Geographic videos on earthquakes, including a fascinating look at the fault beneath Seattle that represents a situation similar to Utah— please click here:**
http://www.nationalgeographic.com/interactive/07_18/0718earthquake_coffee.html

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Earthquake in Japan, Warning to Utah

In one of the most earthquake prone countries in the world, a magnitude 6.6 earthquake shook Japan's northwest coast Monday morning, July 16, at 10:13 Japanese local time. The epicenter was about 40 miles southwest of Niigata.

According to the New York Times, skyscrapers in Tokyo, about 130 miles southeast of Niigata swayed for almost a minute.

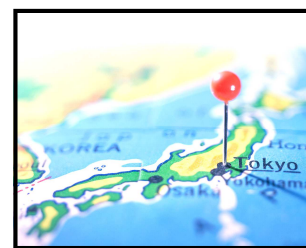
Also according to the New York Times, the earthquake killed 9, injured 900, flattened hundreds of buildings, left thousands homeless, buckled roads and bridges, toppled a local train, interrupted the supply of water and power to tens of thousands of homes, and caused a small fire at the largest nuclear plant in the world which later leaked a small amount of water containing radioactive materials into the Sea of Japan.

Aftershocks continued through much of the day.

The New York Times relayed that on Monday, the Japanese media reported that more than 10,000 people left their homes for evacuation centers after the earthquake. Authorities struggled to deliver provisions to evacuees, most of whom had access only to hardtack and water by late evening.

In an interview with National Geographic Society, Dr. Allan Lindh, a scientist from the U.S. Geological Survey, said, "My guess is that earthquakes are really so scary because you don't have any warning. It's the only thing besides a nuclear war that can really... one second you're living in a big beautiful city, and ten seconds later it's flat."

The recent Japan earthquake should act as a wake-up call to residents in Utah, who have literally built their lives



Skyscrapers in Tokyo, about 150 miles from the epicenter, swayed for almost a minute.

next to and on top of the active Wasatch Fault. Preparing in advance of a relatively unpredictable disaster will help mitigate damage, loss of life, and a local ability to provide for those affected.

Individually, we should learn what to do in an earthquake and invest in a proper 72-hour emergency kit; make an emergency plan and practice it with our household. As a community, we should act to bring our schools up to seismic code, and demand businesses train employees. Luck, after all, favors the prepared.

What are Seismic waves? Explanation of Types

by Jamie Robinson

Seismic waves are waves of energy caused by the sudden breaking of rock within the earth. They can be caused by an earthquake or a large explosion. Their energy travels through the earth and is recorded on seismographs.

Types of Seismic Waves

There are several different kinds of seismic waves, and they all move in different ways. The main seismic waves can be divided into two broad categories, **body waves** and **surface waves**. **Body waves** propagate through the interior of the earth, and can be sub-categorized into two catego-

ries, **P** and **S waves**. **Surface waves** propagate on the surface of the earth. They are the slowest of seismic waves, and cause the majority of ground shaking and damage. They can be categorized into two categories, **Rayleigh** and **Love waves**.

—Con't pg. 3

Helping the Community: Training Children for Earthquakes

From potty training to sex education, parents question themselves about when and how to teach life's critical lessons.

Training children for earthquakes lies in the realm of critical lessons—but how old should your children be? And how should you teach them?

The adage *you know your child best* applies here as in every circumstance. But keep in mind that in young years, your children probably take everything they learn at face value. The emotional response you have to

the word *earthquake*, is unlikely to affect your children the same way. As such, you should start training them to respond appropriately to the shaking of the earth as young as reasonable.

Here are some suggestions:

- Explain to her the science of earthquakes, at a simple level.
- Try having him “experience” an earthquake by gently shaking a chair or bed he is sitting on. DO NOT try to scare your child, just demonstrate what the shaking could feel like.
- Point out appropriate places to Duck, Cover, and Hold On.

You can make it a game by moving from room to room and having children race to a safe spot when you say, “Earthquake!”

—Employ the Red Cross Emergency coloring book for children: www.UtahEarthquake.org. Click on Kids, upper right corner.

—Show her what to do if she is outside when an earthquake occurs. Talk to her about what to do at school or in a store.

—Let your children play age-appropriate parts in your emergency plan/drills.



When trained properly, children may be more calm in an emergency than you are.

Did You Know?

You Can Listen to Earthquakes...

Thanks to the United States Geological Survey and the work of Andy Michael (USGS) and Daniel Ross (12 year-old USGS volunteer), you can now listen to earthquakes right on your computer.

You can download the sound files here:

www.earthquake.usgs.gov/learning/listen/download.php

The sounds are available as .wav files. If your computer doesn't play .wav files, you can install a free plugin on the USGS Listening to Earthquakes introductory page, here:

www.earthquake.usgs.gov/learning/listen/index.php

Check out the USGS site for all kinds of other fascinating information including geology, history of earthquakes, on-line lessons, research & monitoring, photos, preparedness, earthquakes for kids, and regional data, including the Wasatch Fault.

<http://quake.usgs.gov/>

“In a band both trumpets and tubas can play at the same ... magnitude, but the smaller trumpet will play higher notes. For the same magnitude, a short fault will produce more high frequencies than a longer fault.”

(USGS Web Site)

Quarterly Preparation Tip: Make a Binder of Information

This Summer, fires have sparked and raged throughout Utah and elsewhere. Chances are you've witnessed at least one of these wildfires from your kitchen or bedroom window or perhaps on your daily commute.

At times like these, you may wonder whether any homes had to be evacuated or whether you'd be prepared to evacuate your own home in an emergency.

So you've got a 72-hour kit—way to go! You do emergency drills with your family members every 6 months—

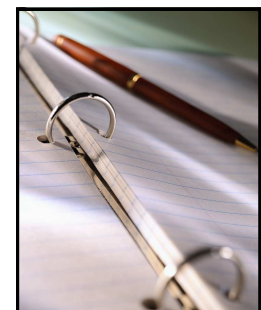
fantastic! You've even taken a 1st Aid/CPR class for any unexpected injuries.

But when you see a fire on the mountainside and think, “What if?” do you begin to consider what you might have forgotten? Do you start to prioritize what you would run back inside and retrieve, if there were only time?

The upside is that a little effort can go a long way to preserve those items most precious to you. When asked, most people respond that they will most miss their family photographs, heirlooms, scrap-

books, and unique memorabilia. Others worry about financial and insurance documentation and the info stored on their computers.

To help, prepare a binder for your 72-hour kit where you can store emergency contact numbers, important documentation, copies of your favorite photos, photos of your favorite heirlooms, and DVD back-ups of computer files. Add to this copies of birth, marriage and other certificates, special awards, letters, abridged personal histories, etc. Make it specific to your needs and desires.



Put a binder of “second-thought” items into your 72-hour emergency kit, in case there's no time for a second trip inside...

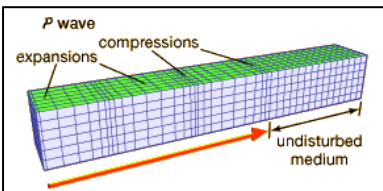
**Educate
Prepare
Communicate
Share**

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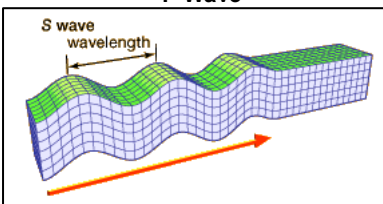
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We're on the Web!

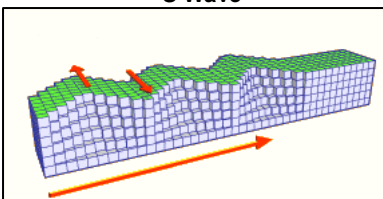
Past newsletters are now posted on our web site. Go to www.UtahEarthquake.org and click Free Newsletter.



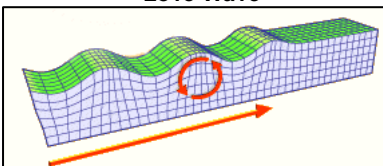
P Wave



S Wave



Love Wave



Rayleigh Wave

UtahEarthquake.org is a not-for-profit educational tool. Originally created with help from three junior-high students, it was conceived during a UNICEF lecture about natural disasters. The website's mission is to fill a community need for concise earthquake preparation information. The website and newsletter serve to provide easy access about everything from the physical laws of plate-tectonics to home retrofits, emergency instruction, food & water storage, community action, public events, and disaster & supply planning.

Although every reasonable effort is made to ensure information is accurate, information, data, suggestions, links, instructions and guidelines are provided for informational purposes only. UtahEarthquake.org makes no guarantees of any kind. This newsletter, and the information posted herein, may contain personal opinions.

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Body Waves

The first kind of **body wave** is the **P-wave** or **primary wave**. P-waves are alternating wave pulses of compression and expansion energy in the direction of wave movement. These compressional waves move through material much like a wave pulses through a slinky. This is the fastest kind of seismic wave, with a velocity of 6 km/s through the uppermost part of the crust, and therefore is usually felt first. The P wave can move through solid rock and fluids, like water or the liquid layers of the earth. Very little motion of this type of wave is felt, and very little, if any damage is caused.

The second type of body wave to arrive on an earthquake seismogram is the **S-wave**, or **secondary wave**. S-waves move as a shear or transverse wave. S-waves are slower than P-waves, traveling only at about 3.5

km/s. The fact that S-waves are slow traveling, transverse waves (earth motion is perpendicular to the direction of wave travel), means they are much more destructive than P-Waves. These waves move through the earth much like a wave moves through a taut rope. Unlike the P-wave, the S-wave cannot travel through the molten outer core of the Earth, and this causes a shadow zone for S-waves opposite of where they originate.

Surface Waves

A **Love wave** moves similarly to the S-wave, but moves side to side, rather than up and down. Because these waves are on the surface of the earth, they have low frequency, long

duration, and large amplitude, causing them to be the most destructive type of seismic wave.

A **Rayleigh wave** rolls through the earth's surface much like a water wave rolls through the ocean, with an up and down, side to side motion. The greatest ground motion felt from an earthquake is related to the Rayleigh Wave.

<http://www.darylscience.com/Demos/PSWaves.html>
http://www.wiley.com/college/ford_test/case1/imagestour_1/1_18.html
<http://www.geo.mtu.edu/UPSeis/waves.html>

Pictures

1. www.physics.uiowa.edu
- 2-5. www.concise.britannica.com

