# Evaluation Form 1

**Lecture 1: Concept of Seismology and earth structure**

**Course Title:** Earthquake Engineering and Urban Disaster Management

**Course Code:** DRE 421

*Submitted To*

Dr. Raman Kumar Biswas
Associate Professor
Department of Disaster Resilience and Engineering,
Faculty of Disaster Management
Patuakhali Science and Technology University.

*Submitted By*

ID. No.: 1606014
Reg. No.: 06851
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Faculty of Environmental Science and Disaster Management

**Patuakhali Science and Technology University**
**Dumki, Patuakhali-8602**

# Patuakhali Science and Technology University

## Faculty of Environmental Science and Disaster Management

**Level 4 Semester 2 Session: 2016-2017**

**Course Title: Earthquake Engineering and Urban Disaster Management**

**Course Code: DRE 421, Credit Hour: 2, Marks: 100**

***Evaluation form 1/ Lecture_1: Concept of Seismology and earth structure***

## Question 1: What is your most interesting topics of today's lesson?

## Answer to the question number 1

Today's class was a lot of fun. In today's lecture, we were given a brief overview of the above-mentioned topic. The list is as follows:

- Basic concept on Earth interior
- Basic knowledge on projected earth movement and plate tectonics
- Types of plate tectonics
- Plate tectonic and plate boundaries
- Reason of happening earth quake: plate tectonics movement and fault line
- Seismic wave types: S waves, P waves, Surface waves, Love waves, Rayleigh waves
- Seismograph and seismogram
- And other basic terminology of earthquake.

In today's session, all of the topics were quite Fascinating. We are familiar with most of the topics since we've already covered the basic knowledge in the 'Basic of Earth Science' course except seismogram and seismograph. But, thanks to today's lesson, we have acquired a better understanding of all of these topics through your excellent presentation.

Returning to my earlier comment, seismogram and seismograph are quite new to us. It piqued my attention even more. I'm particularly interested in calculating the magnitude of an earthquake analytically utilizing the time difference between P and S waves and their amplitude.

## Question 2: Why S-wave doesn't pass through the liquid medium?

## Answer to the Question No 2

**S waves:**

S waves (also known as secondary waves or shear waves) are a type of elastic wave that moves through the body of an object, unlike surface waves, and are one of the two primary types of elastic body waves in seismology.

In other words, An S wave, or shear wave, is a seismic body wave that shakes the ground back and forth perpendicular to the direction the wave is moving.

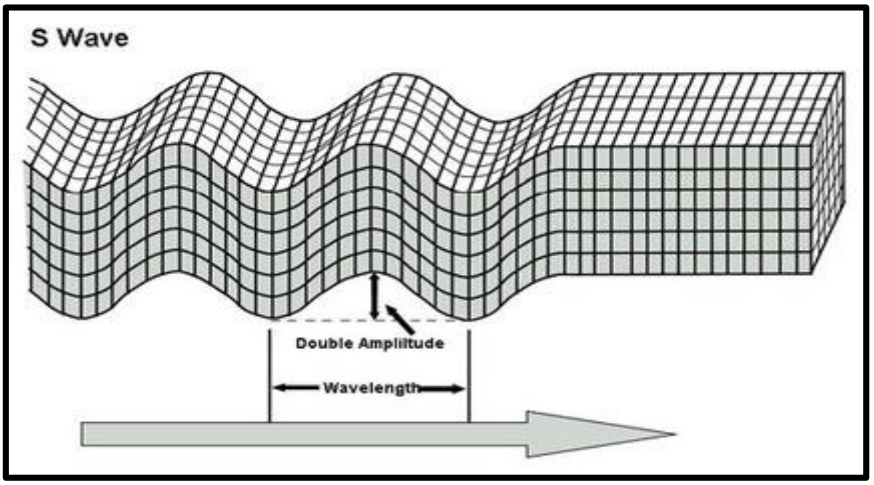


Figure 1: S Waves (Secondary or Shear Waves)

**Reason:**

We know, S-waves are shear waves that transport particles in the opposite direction of their propagation. As solid rocks have sufficient shear strength, they can spread through them. Shear strength is one of the forces that keeps the rock together and prevents it from decaying. S waves produce an up-and-down or side-to-side motion at right angles to the direction of wave propagation. As liquids can-not spring back when subjected to this type of motion (called sideways shear), S waves cannot pass through liquids medium. So, S waves require a hard medium in order to spread.

**Explanation:**

If we consider two materials, solid and liquid as shown in figure 2. Imagine A and B are infinitesimal thin layers.

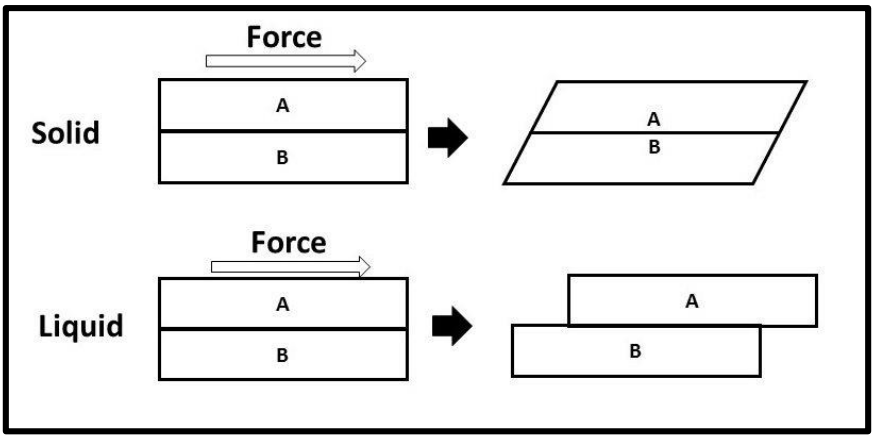


Figure 2: Understanding Shear Strength in Solid and Liquid Medium

Case-1 Solid: When force applied parallel to the layer A of solid (shear force), the atomic and molecular bonds across the two layers A and B resist the force and try to stay together. Within the elastic limit when the force is removed the solid will take its original shape.

Case-2 Liquid: When force applied parallel to the layer A of liquid, the atomic and molecular bonds across the two layers A and B are too weak to resist the force and cannot stay together. When the external force is removed, liquid won't retain its original shape. Liquids can't hold shear strain.

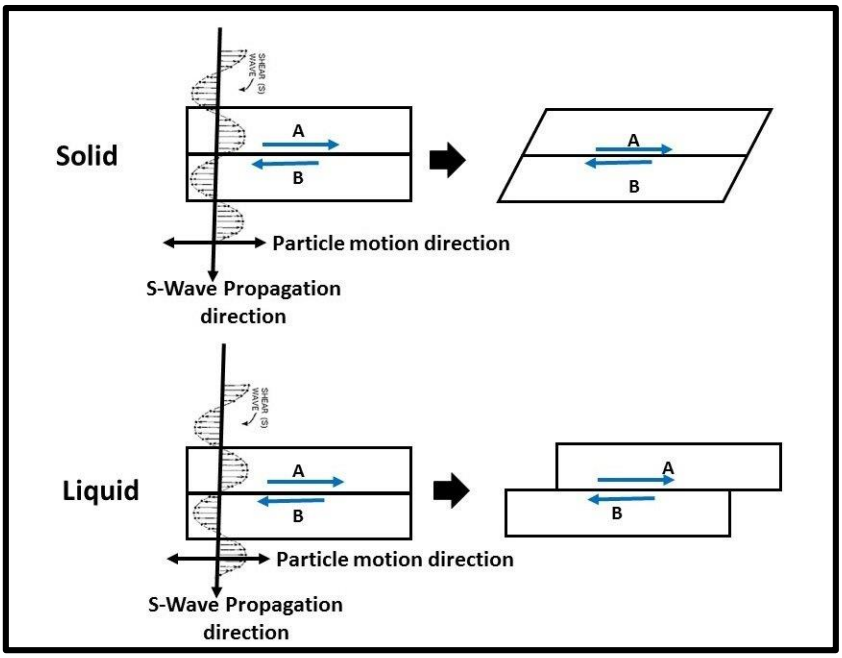


Figure 3: S Waves Propagation on Solid and Liquid form

The particle motion is perpendicular to the direction of wave propagation of Shear waves. When shear waves propagate in medium they produce shear stress and shear strain. The main restoring force comes from the shearing effects of the medium. Since liquids can’t hold shear strain, they can’t produce restoring force and hence shear wave can’t propagate.

**Example**

If a glass of water is withdrawn abruptly, the water will lose its shape. In actuality, it's simply an issue of rigidity. S-waves require a hard medium in order to spread.

In a short summary we can say, As Shear strength is lack in liquids, that’s why S waves cannot pass through liquids medium.

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