

Dynamics and Statics

Slinky Seismometer

Background

Robert Mallet, (1810 – 1881), Irish geophysicist, civil engineer, and inventor is sometimes called the father of seismology. A seismometer is an instrument that measures motion of the ground, caused by, for example, an earthquake.

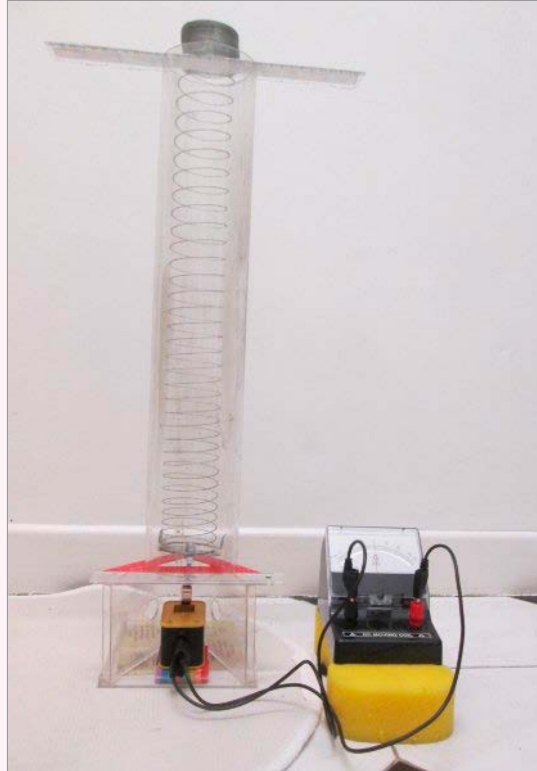
In this demonstration the physical shaking of a building is detected by a small induced electrical current in a coil which then deflects the needle of a galvanometer.

You will need...

- ✓ A slinky,
- ✓ strong neodymium magnet,
- ✓ a coil of wire (400 turns),
- ✓ a galvanometer,
- ✓ 2 wires and
- ✓ a tall plastic cylinder (or similar support structure).

Follow these steps

1. Attach the galvanometer to the coil.
2. Place a sponge under the galvanometer to absorb any unwanted vibration.
3. Place the coil in “the basement” of a tall building.
4. Suspend the slinky from



the top of the building so that it hovers just above the coil.

5. Test that the galvanometer deflects if there is relative motion between the magnet and coil.

So what happened?

The table was shaken slightly to simulate an earthquake. The “building” shook and a weak “shock wave” trav-

elled through the slinky. The resulting slight motion of the magnet induced an electric current in the coil which deflected the galvanometer (and so the earthquake was detected)

What next?

Explore if the scale of the galvanometer could be calibrated to indicate the severity of the earthquake.