

## LANDSLIDES AND STRESS

### *Purpose*

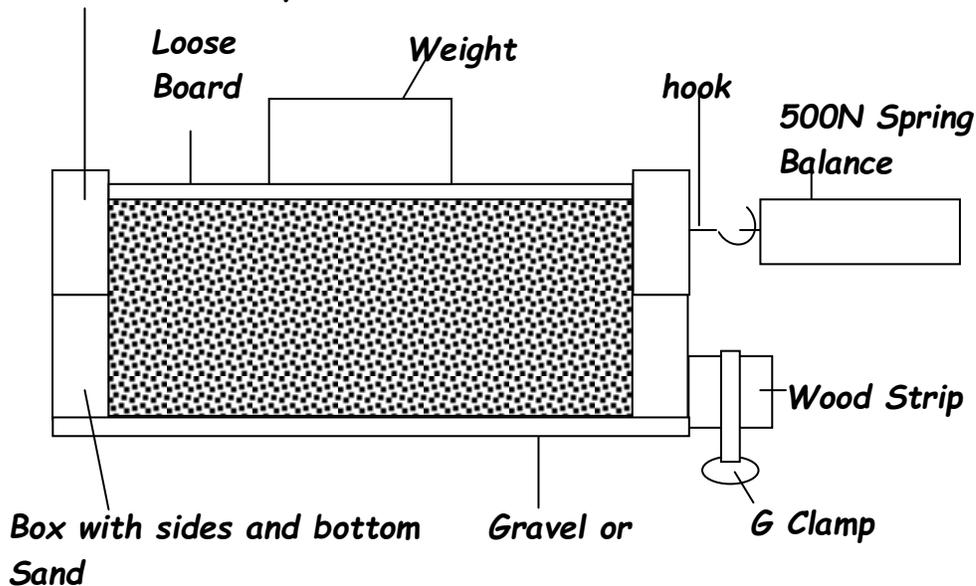
*To determine the relationship between the force necessary to initiate movement and the weight of the overlying strata and the grain size of the sediment.*

### *Background*

*The principal force involved in landslides is gravity. The force of gravity can be resolved into two forces: one acting down the slope trying to initiate the landslide and the other acting at right angles to the slope and increasing the friction between the layers.*

### *Side view of apparatus*

#### *Box with sides only*



### *Activity 1 To determine the effect of the weight of the overlying rock*

- 1. Use the clamp to attach the strip of wood to the bench and place the lower box beside it*
- 2. Place the open box on top of the box with the bottom and fill with sand until the top of the sand is level with the line inside the box.*
- 3. Place the loose board on top of the sand and 1 kg weight on the board.*
- 4. Attach the force meter to the hook.*

5. Pull on the force meter slowly and carefully and note the reading when the upper box moves

6. Repeat using different weights.

*Activity 2 To show the effect of bed roughness and grain size*

1. Place the two boxes together as before and fill with fine sand.

2. Place the loose board on top of the sand and 1 kg weight on the board.

3. Attach the force meter to the hook.

4. Pull on the force meter slowly and carefully and note the reading when the upper box moves

5. Repeat using different grades of sand.

## **Teacher's Section**

### **Requirements**

1m of wood 20mm by 25mm to make boxes (see below)

Piece of hardboard for bottom 14cm by 14cm

Piece of wood 15cm by 2.5cm by 2cm

G clamp

500 N spring balance

Loose piece of hardboard to fit in top box.

Sand of various grain sizes, say 0.5mm, 1mm, 2mm, 4mm

### **Making the boxes (30 minutes)**

Make a box with internal measurements of 10cm by 10cm by 2.5cm with bottom but no top as in diagram. Sides of a box of the same size with no top or bottom but with a strong hook screwed into centre of one side.

### **Results**

The force needed to initiate movement increases with the weight added and with the increase in grain size.

### **Time**

1 hour