

GAPS CAUSED BY NORMAL FAULTING

Purpose

Firstly to determine what parameters control the size of the gap that develops when a normal fault cuts two different rock types.

Secondly to determine the effect of varying these parameters.

Background

The angle a fault makes with the bedding is determined by the physical properties of the rock; it is lower in incompetent strata and higher in competent strata. This means that movement along the fault causes a gap to open up if the fault cuts different strata. This gap will fill up with minerals, usually quartz or calcite but sometimes minerals of economic importance. Predicting the size of the gap is therefore important for mining companies.

Activity

1. Look at the model and try to work out what parameters are going to affect the size of the gap.
2. Choose one of the parameters and draw at least three diagrams similar to the model but varying the chosen parameter. Use a full sheet of A4 paper for each diagram.
3. Calculate the area of the gap. The area of a parallelogram is base x perpendicular.

Teacher's Section

Requirements

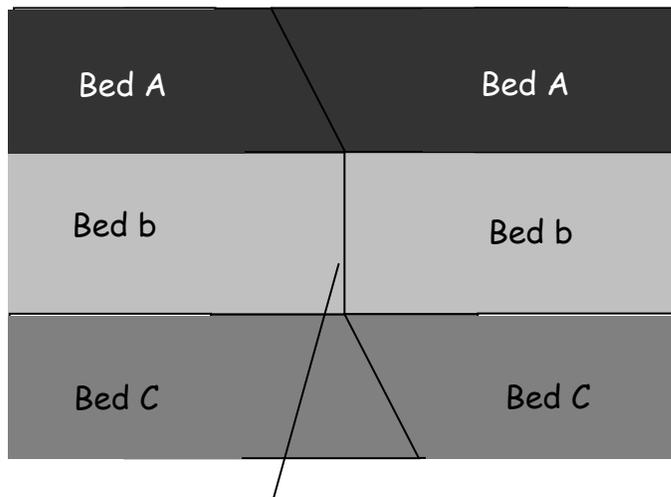
A model of a normal fault like the first diagram cut out of card or hardboard (15 minutes to make).

Each student requires a ruler (one designed for drawing parallel lines is best), plain paper, scissors and a protractor.

Notes

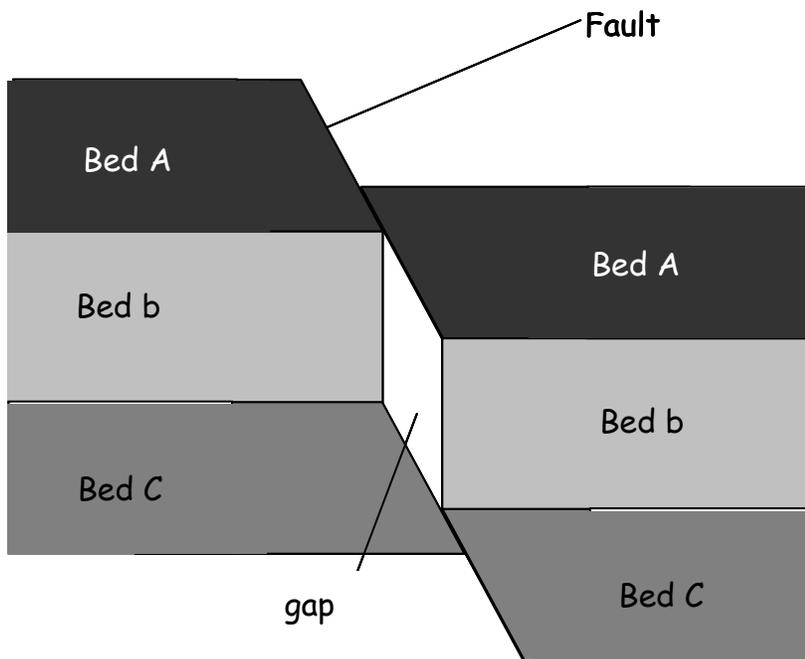
I now use pieces of hardboard cut to show the different variations and students no longer draw the faults they just have to measure the gaps. They fill in the attached table.

Strata before faulting



Fracture plane. The angle varies with the rock type

Gaps caused by normal faulting



Results

Parameters

Bed thickness Bed A and Bed B

Displacement

Throw

Angle in strata A

Angle in strata B

Increasing thickness of beds and/or, increasing the difference in angle, increase area of gap and therefore volume of mineralisation. So does increasing the displacement, but only up to the thickness of the bed then it decreases.

Time

15 minutes for each parameter.