

Joints in a Cornstarch Analog

Type of activity: in-class exercise

Brief description: Desiccated cornstarch-water mixture provides an interactive introduction to joints and joint sets. Students interpret relative ages, examine intersection angles, use surface textures to determine propagation direction, and evaluate the role of flaws in joint initiation.

Context

Type and level of course in which I use this activity: undergraduate required course in structural geology.
Typical enrollment: 20 students.

Skills and concepts that students must have mastered before beginning the activity: This exercise follows a brief introduction to joints, abutting relationships, and joint-surface textures.

How the activity is situated in my course: one of more than a dozen in-class and laboratory exercises

Goals of the Activity or Assignment

Content/concepts goals for this activity: Describing and interpreting joints: abutting relationships (relative age), intersection angles, surface textures, propagation direction, and initiation from flaws

Higher order thinking skills goals for this activity: Interpreting sequence of events

Other skills goals for this activity: Sketching and labeling accurate representations of structures

Documentation:

Student handout attached; instructor's notes available

See also: Müller, G., 2001, Experimental simulation of joint morphology, *Journal of Structural Geology*, v. 23, p. 45-49.

JOINT PATTERNS AND SURFACE TEXTURES

Objectives: to determine the relative ages of joints and to identify the origin of a joint from surface textures; to produce annotated sketches of geologic structures

Materials you will need:

pencil, eraser
un-lined paper
hand lens (optional)

Materials provided:

desiccated cornstarch-water mixture

Read through entire lab before acting!

- A. Observe the map-pattern of the large joints.
 1. Make a drawing of the sample showing the large joints. Include a scale.
 2. What is the angle of intersection between most joints?
 3. On your drawing, show how the joints curve to intersect each other and accurately show the angle.
 4. Annotate your drawing to indicate the relative ages of the joints

- B. Observe the role of a flaw in the material
 5. Indicate the location of the flaw on your illustration in A.
 6. What is the relationship of the flaw to the large joints?

- C. Carefully dissect the sample so that you can see the surface of one of the large joints.
 7. Sketch the fine structures visible on the surface of the joint. Include a scale.
 8. From your sketch, determine the direction of joint propagation and, if possible, the origin of the joint. Note these on your drawing.
 9. Can you relate the direction of propagation to the flaw or joint intersections? Explain this relationship in words.

Turn in:

- your sketches for A and C.
- your answers to questions 2, 6 and 9 typed or neatly written on a separate sheet