Drapery Repair
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Gather the broken fragments of drapery and piece them together like a jigsaw puzzle before beginning the actual reattachment with adhesives. A flat, dry surface aids in the matching process. It may be practical to transport the drapery pieces outside of the cave.

For pieces that go together with that satisfying snap-fit feel, make a pencil tick mark across the fracture for alignment, apply Hot Stuff® Super T along one edge, spray NCF Mild Accelerator on the matching edge, then quickly match the ticks and click-fit the edges. Along weight-bearing joints, larger pieces may also need a thin layer of archival epoxy. (See cave-safe adhesives and epoxies, pages 445–447.)

Fabricating Missing Pieces
Missing pieces can be fabricated from rock dust and epoxy. After mating and adhering the available pieces of the drapery, fill in the missing sections with a thick mixture of approved epoxy and crushed or powdered rocks. (Cave rocks or irreparably damaged pieces of speleothem might be pulverized for the mixture.)

Place masking tape or clear packing tape on one side of the gap. Spoon the epoxy fill into place. Add texture as the epoxy thickens and cures. Create surface texture and diminish the epoxy shine with a Dremel® tool after the epoxy is completely dry. Epoxy mixtures change color during the curing process—speleothem color is best matched by fabricating pieces in daylight conditions.

To reattach the completed drapery to the ceiling, install stainless steel stabilization pins or stainless wire supports and epoxy the parts into position. Permanent wire supports provide added security for rehanging drapery formations. It is important to use stainless steel wire in long-term applications. (See stainless pins, rods, and wires, pages 448–449.) Drill small holes for the wire through the portions of speleothem still attached to the ceiling and through matching positions on the pieced-together drapery.

Use a Dremel tool to grind small grooves between the holes for hiding the permanent stainless support wires. Make grooves on the front and back of the drapery break joint.
Drapery Repair—Fit, Epoxy, Wire to Rehang, and Texture

Figure 2. During a week-long drapery repair project at Cave Without a Name in Texas, we pieced together over 300 fragments of broken drapery. We used both Hot Stuff Super T cyanoacrylate adhesive and Epon 828 epoxy with Versamid 40 hardener to adhere fragments of various sizes.

Figure 3. To fabricate the sections that were never found, we filled in gaps on the reconstructed drapery with a color-matched epoxy and rock dust mixture. To make a form for the epoxy, clear packaging tape was attached on one side and up along the edge.

Figure 4. After allowing the epoxy to set up for several hours, we used a plastic spoon to create a base texture in the thickened epoxy mixture.

Figure 5. This drapery was too thin for internal support pins. We drilled small holes to accept permanent stainless wire that reinforced the epoxy reattachment joint. Jim Werker used a Dremel tool to grind grooves for the wires. Holes and grooves were filled with a color-matched rock dust and epoxy mixture. The Dremel was also used to create final texturing.

Apply a thin coat of epoxy to one surface of the joint, fit to the tick marks, and tightly secure all support wires to hold the speleothem in place. Then push wires into the grooves below the speleothem surface and fill the slots with an epoxy and drill dust mixture. (See filling cracks and holes, pages 457–458.)

After the epoxy cures, smooth and texture the filled grooves with a Dremel tool and files. Though drapery repair is time consuming and each painstaking step must be scheduled separately, the completed repair is rewarding.

Figure 6. The repaired drapery again hangs in Cave Without a Name. Time and new mineral deposition will improve the color match.