AIO

Online Technical Resource

Glues

by Ross King

Types of glues we use: For porous materials- wood, leather, etc, there is hide glue (hot, which comes in dry form, and liquid, which is already prepared) and PVA glue (in white and yellow varieties). For metal and non porous materials there are two part epoxies and cyanocrylate glues ("Superglue").

Suggestions for using glues: 1. Spread the glue evenly before closing the joint. 2. Do not expect the pressure on the joint to spread the glue. Spread the glue before clamping. 3. Too much glue applied to cork, felt, and leather make them hard. Think about the function of the glue; perhaps it doesn't have to do anything more than hold the gasket in place until screws are installed. 4. If maximum strength is needed in a wood joint, apply enough glue to cause some squeeze-out at the joint. Use a chisel to cut off the squeeze out when it dries to the consistency of chewing gum. Don't wait until it hardens fully. 5. Do not use a damp rag to wipe off excess glue, as the rag will spread a thin coat of glue on the surface which will prevent the absorbtion of stain and lacquer later.

PVA glues (polyvinyl acetate): PVA glue comes in two forms, yellow (Titebond) and white (Elmers). Both are strong, have short open time, and can be thinned and cleaned with water. Yellow dries crisper than white, will creep less, and is easier to scrape and sand. Allow one hour for a full strength bond with yellow glue. Heat speeds up the bonding process, so let it dry longer on cold days.

Hide glue: Hide glue is made from animal hides. It comes in two forms, granules and liquid. The granular form is dissolved in hot water to form hot glue. Both forms are strong, can be easily removed with water, dry very hard, can be scraped and sanded, and develop their full strength after 24 hours. Hot glue is particularly useful for leather because it is tacky initially, yet it does not dry firm for several minutes. This interval permits repositioning of the leather if necessary. Liquid hide glue is not as tacky, but it has a long setup or open time- which is useful when making complicated wood joints which require a lot of positioning. Liquid hide glue has a short shelf life and should be used before it's a year old. It is wise to do a test joint to be sure a bottle of liquid hide glue is still good.

Mixing and applying hot glue:
*Mix equal parts by volume of granules and water.
*Let it sit overnight.
*Heat in glue pot to 140 degrees F.
*Keep the glue pot covered with aluminum foil to prevent drying and skinning over.
*Use a 1/2 inch nylon bristle brush. Don't use natural bristles, they absorb water and swell.
*Cut bristles short in order to make them stiff.
*Use a stiff wire bail in the glue pot.

*Keep the brush in the glue pot so that it will stay hot, wipe it dry on the bail, then dip only the
tip into the glue immediately before applying.

Cautions to observe with hot glue:
*Glue may be reheated, but it loses some strength each time.
*Use fresh glue for difficult jobs, such as gluing rubber cloth to wood.
*Hot glue cures in two ways, by cooling and drying. First comes cooling, which produces an
immediate but weak bond. Next comes drying, producing a delayed but strong adhesion.
*It is essential to prevent the hot glue from cooling too quickly, so work in a warm room,
avoid drafts on the work, apply glue to no more than six inches at a time, and close the joint
immediately.
*If the joint must be open longer than a fee seconds after the glue is applied, consider heating
the materials with radiant heat lamps.
*The coating of glue must be thin. If the glue cools before the joint is closed, the layer of glue
will be thick and weak.
*If you aren't using an automatic glue pot, check the temperature with a candy thermometer.

Using hot glue with rubber cloth...Hot hide glue is good for a rubber cloth to wood joint, but it will not bond rubber cloth to rubber cloth, as the layer of rubber inside the cloth prevents moisture from leaving the joint. If rubber cloth must overlap itself when applying rubber cloth to wood, use a PVA glue at the overlap.

Using Superglue (cyanocrylate):
*Cyanocrylates cure through chemical reaction with surface moisture. They cure very rapidly.
If curing is slow because the surface is acidic or if there isn't enough moisture, use an
accelerator which is available in spray cans from the glue supplier.
*Beware of short shelf life.
*Good brands to look for are Duro Quick Gel (the best), Satellite City, Pacer, Sig, PIC, 3M.
*Drugstore cyanocrylates are often of poor quality.

Application of Superglues (for tight fitting, non-porous parts):
*Use thin glue.
*Assemble the parts dry.
*Apply adhesive around the edges of the seam. Glue will wick deeply into the joint by
capillary action and will cure in seconds.

Superglues for loose fitting parts:
*Use medium or thick viscosity glue.
*Mist a light coat of accelerator on one of the surfaces.
*Apply glue to the other part.
*Assemble the parts.

Cautions in using Superglues:
*The better the fit before gluing, the better the bond.
*Do not use too much glue.
*Prevent premature curing by laying down a bead and then assembling the parts, letting
pressure squeeze the bead out into a thin film.
*Avoid premature stressing. Initial cure is only about 20 percent of full strength. Full
strength is reached after eight to 24 hours.
*Have a clean surface. Remove waxes, oils, and excess moisture.
*Watch for short shelf life. Store unopened bottles in the freezer. Frozen adhesive should last
at least two years. Shelf life after opening is about six months. Do not refrigerate opened
bottles, and don't apply when the glue is cold.

Safety: Though cyanocrylates do not constitute a health hazard, ventilate the work area to eliminate odors. Superglue will bond skin in seconds- bonded skin should be soaked in warm, soapy water for several minutes then gently worked loose through a rubbing action. Do NOT attempt to cut the bonded skin apart; this is dangerous and is not necessary. Adhesive which has cured on the skin can be removed using a soap containing pumice. Some people recommend using acetone (lacquer thinner or nail polish remover) to dissolve glue from flesh, but this is dangerous, especially near the eyes. If cyanocrylate adhesive comes in contact with the eye it will cure instantly. The eye should be flushed with water or a boric acid solution as soon as possible and medical aid should be sought. If corneal surfaces and the eyelid are bonded together, do not force them apart. Treat with a suitable anti-irritant ointment and allow the eye to remain closed. Bond separation, and cornea regeneration, will occur naturally within a few days with no permanent impairment. If the adhesive is spilled in any quantity, flood the spill with water and ventilate the area. Water will cause the adhesive to harden and then the material can be scraped up. Do NOT attempt to soak up the liquid adhesive with towels as this could cause an exothermic reaction...namely, heat, and possible fire.

Chris Nagorka adds: I don't know anything about the health affects of Superglues, but I remember building models in high school all too clearly- the fumes from cyanocrylate glues when they're bonding sting the eyes fiercely.