

TECHNICAL NOTE

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GLUES FOR WOOD IN ARCHERY OREGON STATE
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Uses

Glues are used (1) to splice billets for bow-staves, (2) to splice "footings" to arrow shafts, (3) to attach feathers to shafts, (4) to attach backings to bows, (5) to lay bindings on arrows, and (6) to lay cord bindings, leather, or cloth on bow grips or handles. Glue is sometimes used to attach horn tips to bows, to splice horn nocks in arrows, to attach arrow heads, and to lay bowstrings. Laying bowstrings is not covered in this note.

Properties of glues¹

The following incomplete summary of the characteristics of glues may give some guidance to amateur archers who do not wish to make a special study of gluing literature:

(a) None of the glues used in woodworking are "waterproof." Glue joints vary in water resistance according to the kind of glue, the kind of wood, the manner of gluing, and the efficiency of protective coatings.

(b) Animal glues are characterized by high strength, low water resistance, and quick jellying. The high grades jellyify the quickest and are the most water resistant.

¹The characteristics of various glues are described in detail in Technical Note No. 207

There is a paraformaldehyde animal glue which approaches casein glue in water resistance, but it is not recommended for amateurs.

Animal glue should be used as soon as possible after melting. Boiling, or prolonged heating at temperatures below 212° F. reduces its quality.

- (c) There are many kinds and grades of casein glue. For wood used in archery a water-resistant and a "joint" grade casein glue should be specified. The strength of casein glue in wood joints approaches that of animal glues.

Casein glues are used cold.

- (d) No glue will produce joints of maximum strength unless the joint fits closely and unless the glue is prepared and used according to proper directions.

Use requirements

(1 and 2) For fishtail splices in staves and for footing joints in arrows high strength is required and water resistance is important. Either animal or casein glue has sufficient strength. A good fit and a large bearing surface affect strength more than the kind of glue. In staves the bearing surface may be enlarged by keeping plenty of thickness under the handle. In shafts a sufficient bearing surface is assured if the length of the splice is at least fifteen times the diameter.

(3) Any good glue or cement is strong enough for attaching feathers. The choice depends on the degree of water resistance desired, and more especially on the speed of jelling suitable to the mechanical method used for feather attachment. If steamed feathers are

to be attached without clamps, a quick-jellying adhesive, such as animal glue, is usually preferred. If dry feathers are to be attached with thread binding a slow-jellying adhesive, such as casein glue, is usually preferred.

Moisture readily enters feather joints by reason of the absorbency of the feather itself. Under long exposure to moisture the feathers will come off even if laid in the best casein glue. Under short exposure any good glue will hold.

(4) Glue for attaching bow backings requires not only strength and water resistance but also the capacity to bend with the bow without cracking the glue film.

Separate films of animal glue bend farther without breaking than films of casein glue. The extent to which the bending properties of separate glue films indicate their bending properties in actual joints is not known. The interaction between the properties of the glue and the properties of the backing are not known.

Backings can be satisfactorily laid with either casein or animal glue. To lay a backing with animal glue a warm room and warm wood are essential.

To avoid glue bubbles under rawhide backings it is necessary to use thin glue and with a wet finger to wipe off excess glue from both the backing and the bow before laying them together.

(5) Arrow bindings require no particular strength or other special properties except ease of application. Bindings laid in casein glue lie smooth and do not gum the fingers.

(6) Handle cord is best laid in casein glue, or in one of the commercial liquid glues or cements. Animal glue jellifies too quickly and the jelly gathers as unsightly lumps between the wrappings.

Leathers may be laid in either animal or casein glue except on woods, such as osage orange, which are high in colored extractives. In such woods the alkali in the casein glue forms dark stains which may discolor the bow.

In gluing horn tips and nocks it should be remembered that horn, like wood, shrinks in drying. Non-aqueous cements liquified by heating such as the De-Khotinsky cement are therefore preferable.

Gluing properties of archery woods

All of the native woods commonly used in archery glue readily except osage orange, hickory, and the oily cedars (Port Orford and Alaska cedars). Strong glued joints of these species are hard to make unless the surfaces to be glued are sponged with caustic soda, wiped, and dried before gluing. The caustic dissolves the extractives on the surface of the wood and thus improves the anchorage for the glue.