

The following small boat assembly process was developed out of the need for an easy, lightweight, cost effective and health friendly method of providing a structurally sound and sealed small hull assembly. Let it be said up front that it is not the solution to everyones needs. In fact, to do it right, the boat should be designed with this process in mind.

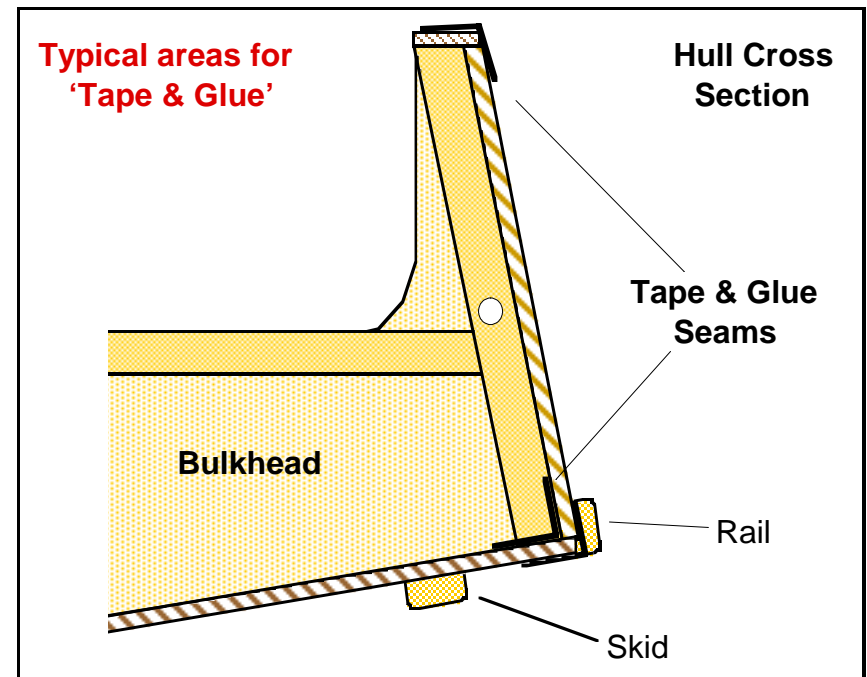
Basically, 'Tape & Glue' is a method for sealing and strengthening all seams of a small boat to the elements. It is not unlike Stitch & Glue, except it is not used to actually construct the boat. 'T&G' (as it will be referred to) is applied after the boat is fully assembled, minus a few appendages, such as skids and rubrails. For this reason alone, it is best if the boat is designed to utilize the 'T&G' process. It should also be stated that the outer seams are naturally subject to damage from rocks and beaching the boat, so protective skids or rails at or near the joint are strongly recommended. The 'Tape & Glue' process has been used on boats such as an eleven foot Canoe, a nine foot pram, an eight foot rowboat and a 10 foot sailboat. Each of these applications used the same materials and process, and all have performed safely.

To best take advantage of 'T & G', the hull design should be capable of being constructed by gluing and screwing the various parts together, to make a self-supporting structure. Additionally, the base panels, and any decking, should always overlap the side panels and end bulkheads. This means the various hull elements should fit together in such a way that heavy structural elements (stringers, gussets and forms) will be minimized, reducing hull weight while maintaining hull strength and integrity.

Then, Taping and Gluing the various inside and outside hull seams with *glue impregnated fiberglass cloth tape* will add the necessary structural bond and joint sealing that will complete the build cycle. This is a relatively easy process. It does not use toxic materials, and cleans up with water prior to curing.

If you have question regarding this process, email me and I will respond promptly to your input :

kensimpsonaz@yahoo.com



T & G CONSTRUCTION SUPPLIES:

* Fiberglass Cloth, 3.25 oz., 50 inch wide, cut into 2-1/2" to 3" x 50 inch strips for seam sealing.

Available at: Duckworks Boat Builders Supply

* TiteBond III Waterproof Wood Glue - 16 oz (\$8)
(available in larger 1 Gal. container (\$30))

Options:

Epoxy Resin : Duckworks BBS

Glass Cloth Tape, 4" , Roll : Duckworks BBS

Note: About 200 ft. of 2-1/2 inch cloth tape is required for average small boat assembly.

* Not recommended for bonding:

Polyester Resin (poor bond to wood), OK for molding fiberglass boats and other things.

FINISHING:

The choice of finishing is that of the builder. However, it is not just a matter of sanding and sealing all the wood surfaces, and applying a coat of durable paint, it is also about personalizing the boat. Color or natural finish? Fancy trim or camouflage? The important elements are the needs of the builder; you built it, you enjoy it, you earned it !

Insure that all surfaces are protected, that skids are applied as needed, and that hull weight is always kept in check.

Recommend a minimum of 2 Layers of Tape per joint.

Optional Glue Mixing & "Tape & Glue" Instructions

TiteBond-III, which is easy to work with, does not require any thickening agent, unless used in a very hot environment, like here in Arizona. You should mix only enough woodflour to prevent excessive vertical running.

If necessary, Wood Flour can be purchase from *Duckworks Boat Builders Supply* in pound containers . It acts as a thickening agent that produces a more viscous glue that will not run easily. Mix only enough by volume (container of choice) of glue to wood flour to minimize running.

Mix thoroughly.

Tape & Glue Process:

Apply Glue in thick beads, first in the corner of a joint, and then about 3/4 inch away from each side of the corner.

Smooth glue evenly over the panel surface in the area the Glass Tape is to be applied, and let dry for a few (2 to 3) minutes. Cut strips of Glass Tape (2-1/2" - 3" wide) the length of the joint, and centrally place in the corner of the joint. Smooth out over the length of the Tape. Apply Glue over the Tape, wetting Tape completely. Again smooth evenly over the entire Tape surface. Remove any bubbles. Insure edges are wet and that the Tape is completely saturated with TB3 Glue. You should still see the weave. Repeat the process for ALL exposed outside & inside corners and joints. Lightly sand between layers.

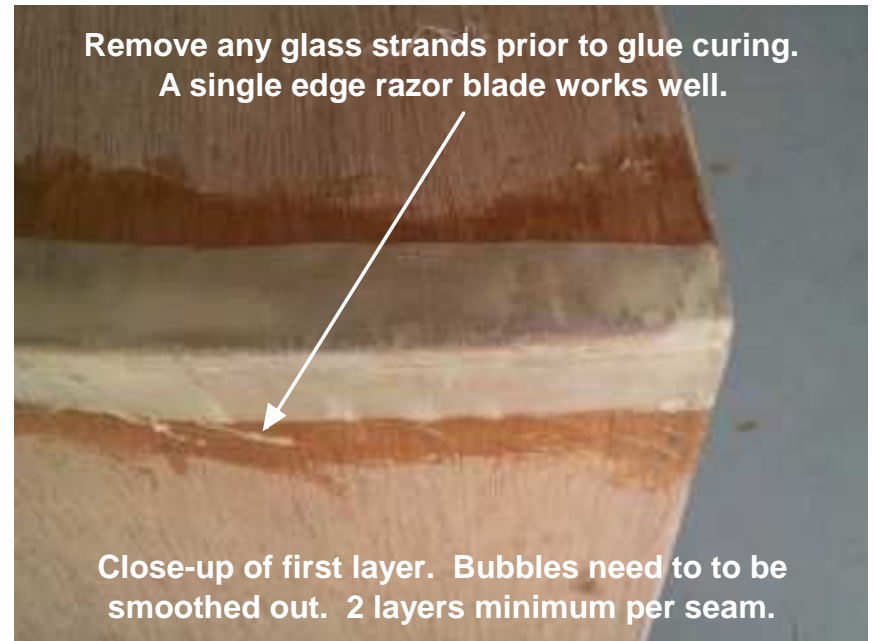
Allow to cure 4 hours minimum at room temp. Repeat the process for any additional layers that may be required.

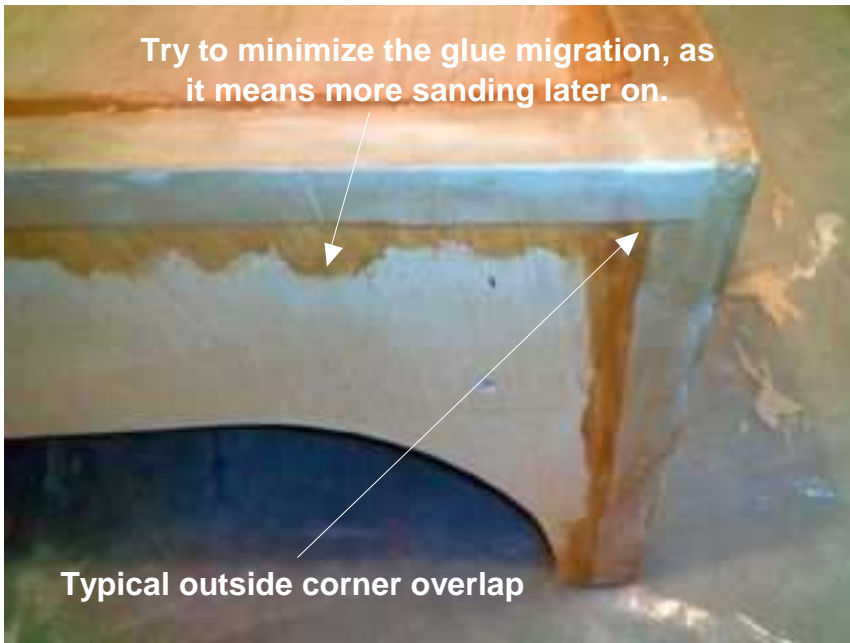
Note: Temperature and humidity may affect mixing ratios and glue cure time. Do not rush the process.

Always wear Latex Gloves during the gluing process.

START

TAPE and GLUE Process Pictures





Application Notes

Finishing of the surfaces can be a time consuming process, but the end result it well worth it.

Sanding the taped areas requires some technique. If you sand too aggressively the TB3 glue may heat up, soften and clog the sandpaper. In this regard it is not like epoxy, which hardens and never softens.

Nevertheless, with some practice, and the right sandpaper (good quality), smooth surfaces can be developed and the taped edges flared.

I usually start with 100 grit black (silicon carbide) drywall sandpaper, and work my way up to 180 grit.

Be very careful not to sand through the fiberglass corners, but if you do, repair the area with TB3, and possibly a fiberglass patch, immediately.

FINISH

November 10, 2010

'TAPE & GLUE PROCESS' Update

Note:

Since this article was first introduced in 2008, many boats have been constructed, and sailed, using the T&G process.

Pundits have suggested, however, that the process is not approved by a Marine Agency, and therefore it is not safe to use. I mention this because I want you, the builder, to know that properly applied and protected, the process produces a solid and robust assembly. That is not to say it is impervious to all outside forces, nothing is. The Stitch & Glue process that this usually replaces is subject to the same possible builder processing errors, and subsequent failures. The only difference is, it uses Epoxy, a thermosetting toxic material which will not weaken when moderate heat is applied. The Titebond III Glue that I recommend dries hard, and penetrates the wood surface for a good watertight bond, but can be weakened with the application of excessive heat, around 150 degrees F (where does this exist in boating?). As a result of tests that I have conducted (not documented), and in cooperation with a Technical Specialist at Titebond, I can honestly recommend the use of Titebond III in the 'T&G Process' for the boats that I design, because they have proven to be safe and water worthy. Other applications are always naturally suspect.

It is my opinion that when applied properly, per the instructions, including a water seal and surface treatment (paint), the 'T&G Process' will provide many years of acceptable service. If, however, the boat is mis-used or abused, and the taped seams are subjected to repeated overload or punctured, the seams will fail and the boat will become unsafe to use. If water is allowed to enter the plywood at a taped joint, and not quickly dried and repaired, the joint will fail over time. Also, it is not safe for anyone to jump up and down inside any of these boats.

For the above reasons, it is best if the boats built using this process remain small in design, preferably under 12 feet long. And they should never be allowed to remain in the water when not in use, as moisture could seep into the wood and destroy the seals. This limits the load (number of occupants) and the end use of the intended boats, and none are recommended for rough water use or for extended use in the ocean for that matter. And, none are suggested for competitive purposes.

Thank you for your attention to this information. Always follow the plans, and make safety your number one priority !

Sincerely,

Ken Simpson

However : This is an experimental design drawn up by an untrained amateur. The Designer accepts no liability for any loss or damage sustained during construction or use. Builders may use these plans to construct small numbers of boats freely for their own use. Commercial manufacturers must ask the designer to negotiate permission.