



Wooden Boat Building



Presented by Walter Hansen

Topics

- Why wooden boats?
- Wood applications
- Lofting
- Types of construction
- Model boat building
- Building the Puffin
- Getting Involved

Why Wooden Boats?

“The creation of beauty is more satisfying and joyous than mere possession. For the person who loves boats, and has time on his hands, what better way to spend some of it than to build himself a boat that will please him every time he looks at it or uses it. It will take some pains, both in the figurative and the literal sense, for the creative process at levels of excellence is never easy, and often its demands are rigorous and its discipline severe.”

(John Gardner, *Building Classic Small Craft*, p. 6.)

Why Wooden Boats?

“Any man who wants to can produce a good boat. It takes some study, some practice, and, of course, experience. The experience starts coming the minute you begin, and not one jot before.”

“As one of my builder friends says, “Its only a boat; go ahead and build it.” If the first effort is a bit lumpy, so what? There will be another much less lumpy later on.”

(Pete Culler, *Wooden Boats*, p.11.)

But What Kind of Wood?

Application	Qualities	Wood
Stem, keel, frames	Strong, durable, able to hold fasteners	White Oak
Planking	Stable, not too heavy, smooth finish, long length	Mahogany
Clamps, bilge stringers	Strong, light weight, straight grain	Fir
Decking	Stable, durable, able to be left bare	Teak
Tiller, oars	Strong, limber	Ash
Ceiling	Light, durable	Cedar
Spars (mast, boom, etc.)	Light, strong, long length, straight grain	Spruce
Cabin sole	Stable, durable, slip resistant	Teak with Holly

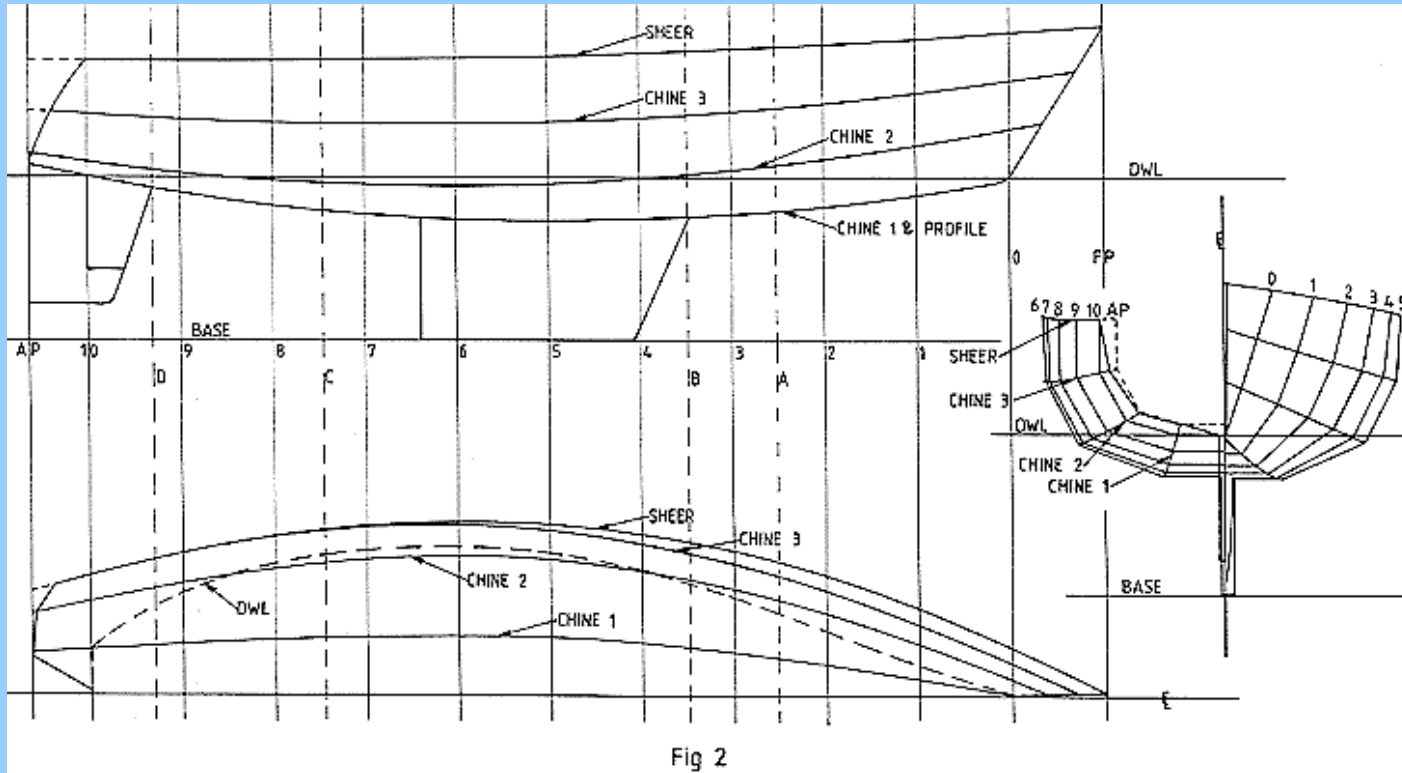
Boat Building Challenges



- Compound angles
- Nothing is square
- Visualize in 3 dimensions
- Bright finish requires perfect joinery (well, really good anyway)

Lifeboat from the Elissa, Galveston, TX

Lofting



“The process of drawing the lines of a boat and some of its parts full size to get the shapes and patterns needed to build it.” (Allan H. Vaitses, *Lofting*, p.3.)

Table of Offsets

	— OFFSETS. —													READ '2-7-3' AS 2'-7 $\frac{3}{8}$ '.
STA.	0	1	2	3	4	5	6	7	8	9	10	11	T	
SHEER	3-4-6	3-2-1	2-11-5	2-9-2	2-7-0	2-5-1	2-3-4	2-2-1	2-1-2	2-0-5	2-0-5	2-0-7	2-1-4	HEIGHTS ABOVE & BELOW W. L. 1.
CHINE		1-1-6	0-9-3	0-5-6	0-2-6	0-0-3	-0-1-2	-0-2-2	-0-3-0	-0-3-5	-0-4-0	-0-4-2	-0-4-3	
B-1		1-9-4	0-0-4	0-5-6	0-8-0	0-9-0	0-9-1	0-8-7	0-8-4	0-7-7	0-7-3	0-6-7	0-6-4	
B-2			1-8-0	0-2-4	0-2-6	0-4-7	0-5-7	0-6-2	0-6-3	0-6-2	0-5-7	0-5-6	0-5-5	
C.L.		0-0-7	0-8-4	0-10-4	0-11-3	0-11-6	0-11-4	0-10-7	0-10-1	0-9-3	0-8-3	0-7-7	0-7-3	
SHEER	0-0-3	1-6-7	2-5-7	3-0-2	3-4-1	3-6-3	3-7-2	3-7-1	3-6-3	3-5-0	3-3-0	3-0-0	2-8-5	HALF BREATHS.
CHINE		0-8-3	1-7-3	2-3-5	2-9-3	3-0-7	3-2-5	3-3-1	3-2-7	3-2-2	3-1-1	3-0-1	2-11-3	
W.L. 1		0-0-7	0-11-3	1-8-7	2-6-1	2-11-7	3-2-7	3-3-3	3-3-2	3-2-5	3-1-3	3-0-4	2-11-2	
W.L. 2		0-6-0	1-7-0	2-5-0	2-11-0	3-2-5	3-4-2	3-4-5	3-4-2	3-3-4	3-2-0	3-0-5	2-10-7	
W.L. 3		0-10-3	1-11-1	2-8-0	3-1-1	3-4-2	3-5-6	3-6-0	3-5-4	3-4-3	3-2-5	3-0-4	2-9-7	
W.L. 4		1-2-3	2-2-5	2-10-5	3-3-2	3-5-7								

“An expression of the hull’s shape using measurements taken from the hull lines at certain points where they intersect lines of reference.”

(Allan H. Vaitses, *Lofting*, p. 13.)

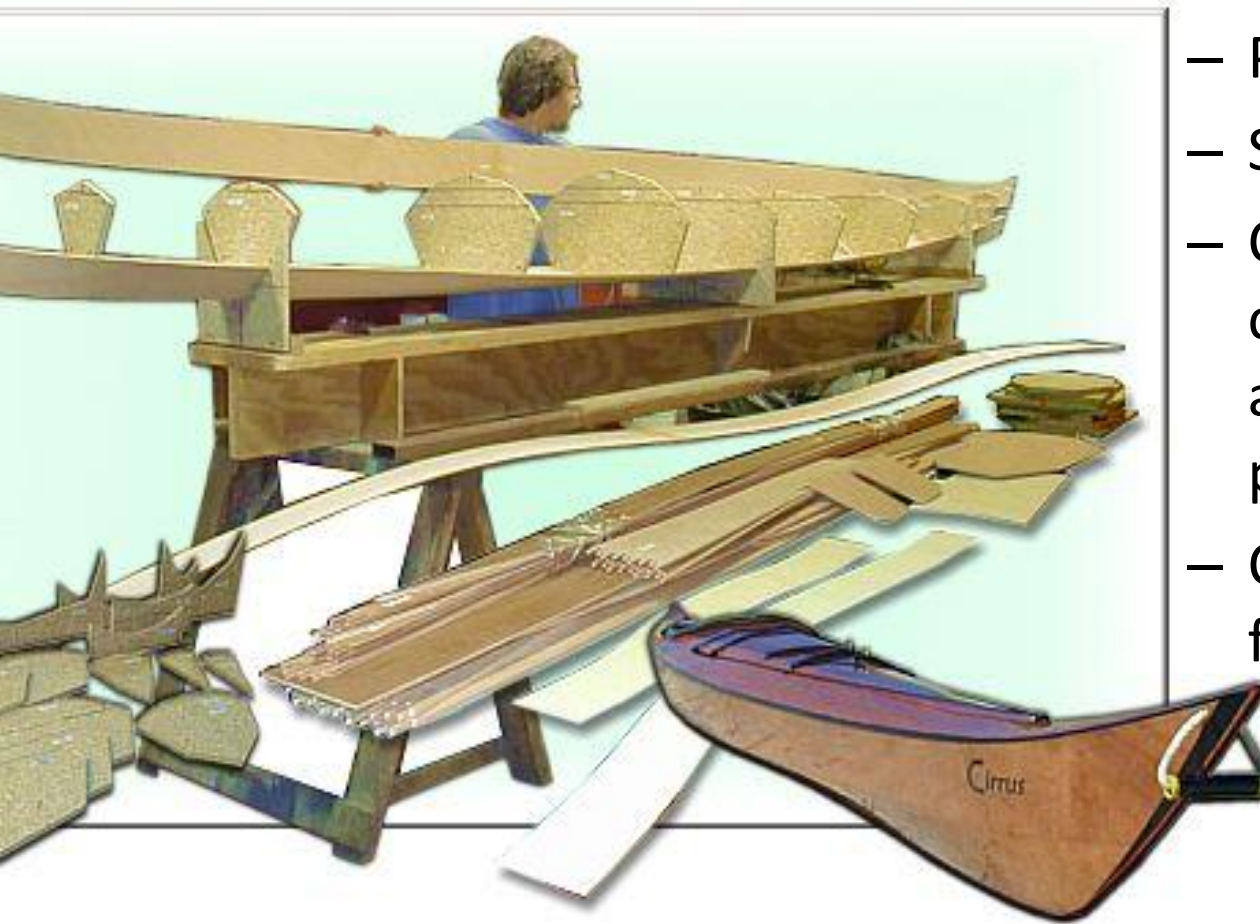
Types of Construction



- Traditional Plank on Frame
 - Row boats, prams, as well as larger boats.
 - Simple, fast technique
 - Construct skeleton of stem and frames
 - Cover frame with planks or plywood.
 - Install thwarts (seats) for lateral strength

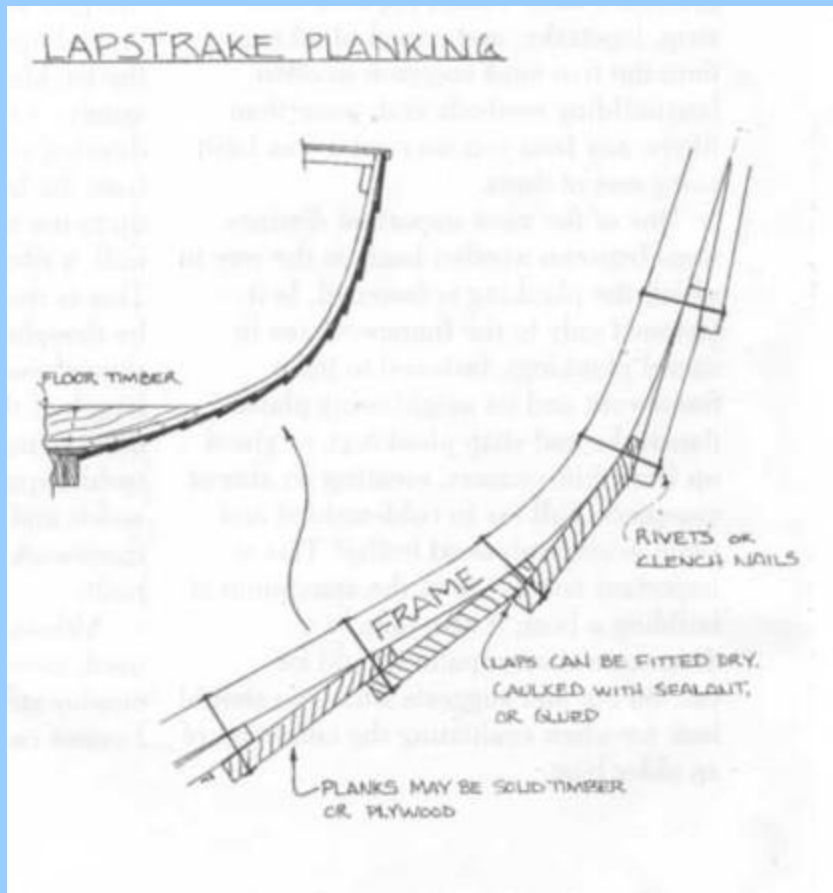
Types of Construction

- Modern Stitch and Glue



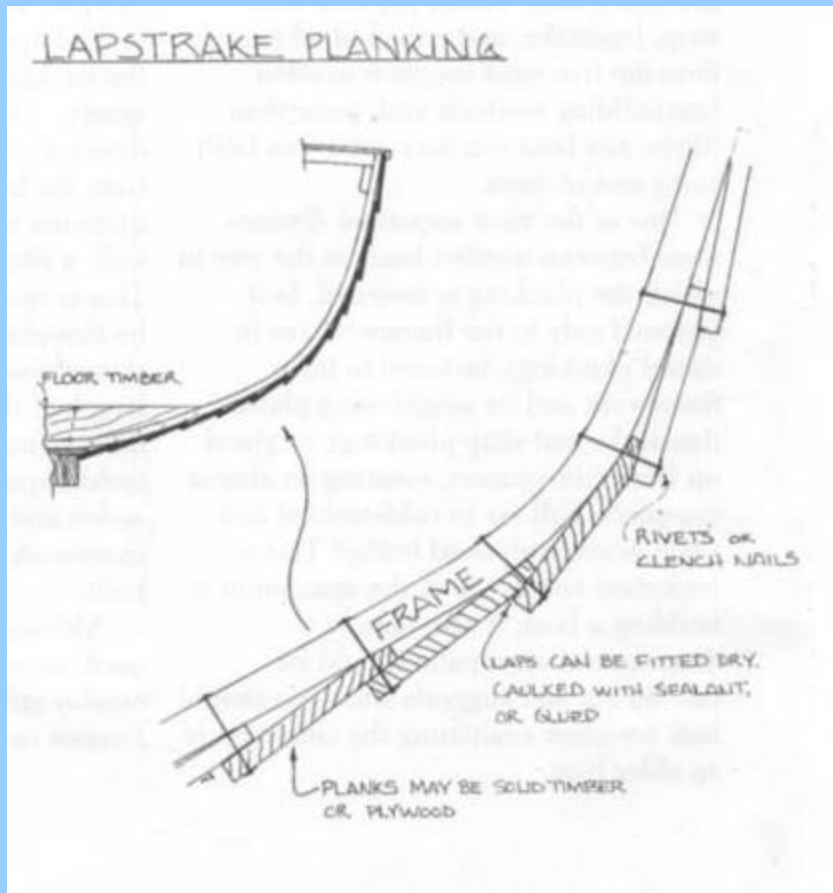
- Prams, kayaks
- Simple, fast technique
- Cut out plywood hull components, drill holes along edges and wire pieces together
- Cover hull with fiberglass.

Types of Construction



- Traditional Clinker Built Lapstrake
 - Very strong, used in sail boats, dinghies
 - Hull formed of ribs and frames attached to stem
 - Overlapping planks (strakes) attached to ribs copper nails or rivets

Types of Construction



- Modern Glued Lapstrake
 - Stronger than clinker built
 - Hull formed on molds – no need for frames or ribs
 - Overlapping strakes glued to each other, stem and transom
 - Water tight construction does not leak!

Types of Construction



- Strip Planking
 - Commonly seen in canoe and kayak construction
 - Glue thin strips together over molds
 - Cover with fiberglass cloth
 - Notice no ribs or framing

Strip built Lawley Tender – Cedar and Mahogany

Types of Construction

- Traditional Carvel Planking

- Molds are attached to keel or stem.
- Ribbands are attached to the molds.
- Planks are attached to ribs and ribbands.
- Then molds are removed.
- Planks butt against each other and must be caulked to prevent leaks.



Types of Construction



Hot Molded “Yellow Jacket” runabout built in Denison, Texas using monocoque airplane construction methods

- Hot Molding
 - Layers of veneer are laid up in a mold using hot glues.
 - Extremely strong!
 - Factory process developed for monocoque aircraft fuselages – please don’t try this at home!

Types of Construction



- Modern Cold Molding
 - Layers of plywood or veneer are glued up on molds using epoxy resin.
 - Even stronger!
 - The do-it-yourself version of hot molding.

Restoration of a Riva runabout (above) and new construction of traditional Chris Craft style Barrelback runabout They have great lines!

Model Boat Building



- Scale models
 - Develop construction details, sail plans
 - Practice precision joinery
 - Retain the beauty of classic designs in miniature

(Classic Skipjack model.)

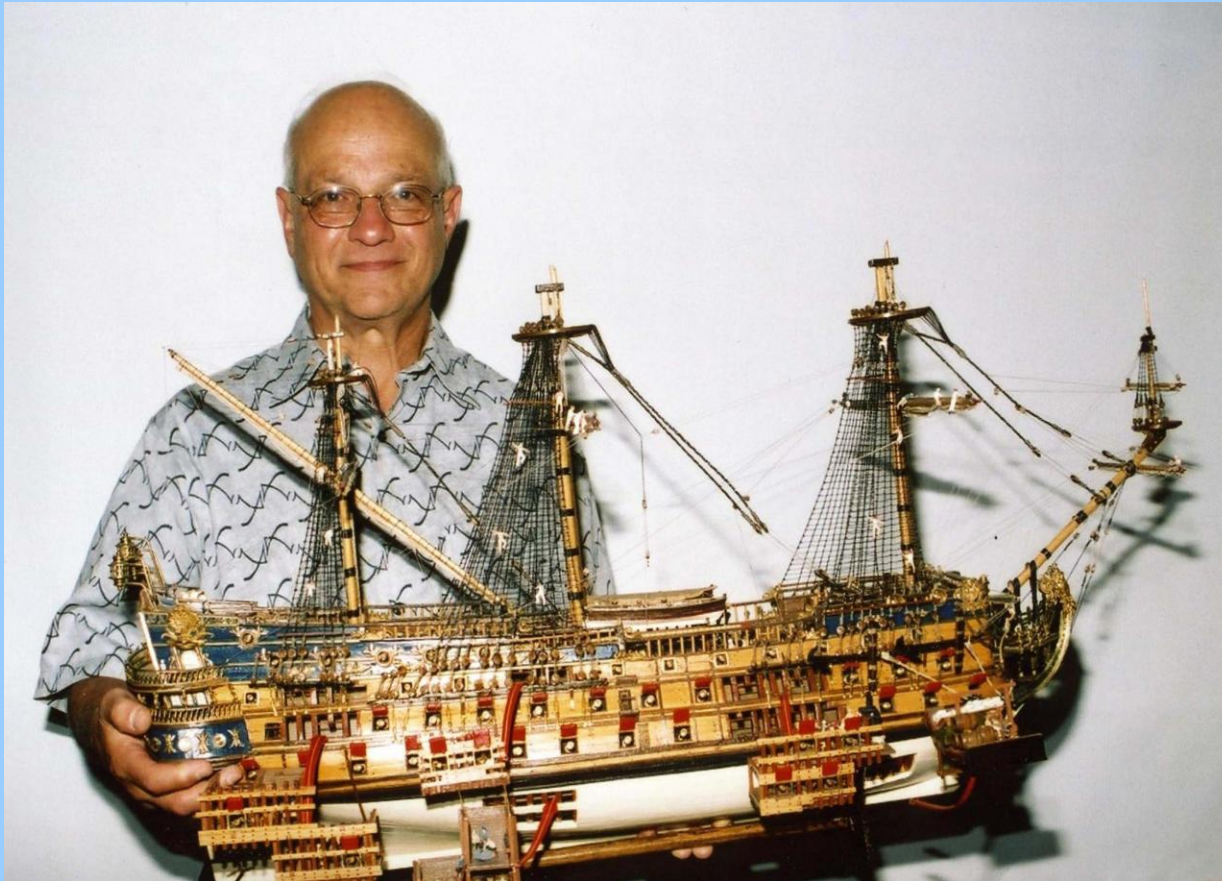
Model Boat Building



- Half hull models
 - Used to visualize hull design
 - May be built up with layers at design waterlines and used to loft full size hull plans

Hall of Boats at the Herreshoff Museum in Rhode Island

Model Ship Building



You don't have to go to Rhode Island to see magnificent models. This is Master Modeler Burt Reckles with his model, the "San Felipe" at the Houston Maritime Museum (www.houstonmaritimemuseum.org)

The Puffin



- Glued lapstrake hull
- White oak stem and keel
- Western red cedar keelson (hog)
- Okoume plywood hull (strakes)
- African mahogany and Alder brightwork



First Celebration: Stem and transom are laid up. (White Oak stem and Western Red Cedar keelson are laid up on the plywood molds.)



The keelson is fitted to the African Mahogany transom.



Strakes installed using shop-built C-clamps and wedges



The sealed hull showing African Mahogany transom.

About Mistakes

- “The real challenge in building a boat is finding ways to fix the mistakes you make.”
(Walter Hansen)
- “A life spent making mistakes is not only more honorable but more useful than a life spent doing nothing.” (George Bernard Shaw)



The sealed hull showing White Oak stem, Okoume plywood strakes and Mahogany rub rail.



Second Celebration: The boat is turned over. Here, breasthook, Alder spacers, half frames, floors, and sternsheet beam have been installed.



Alder floors are glued to the hull using homemade clamps sprung to the gunwale .



Alder half frames are installed in the bow. Alder spacers are ready for the Mahogany inwale to be installed.



Mahogany inwale is installed. Mahogany stern sheets and center thwart are laid up for final fit.



The first coat of varnish goes on the bright work.



**Varnish shows contrast between light (Alder) and dark (Mahogany) woods.
Note the centerboard well in the... well, it's in the center.**



Another coat of varnish is applied. Only eight more to go.



The breast hook is fitted with Alder edging to start the line of spacers.



The finished product – rowing configuration

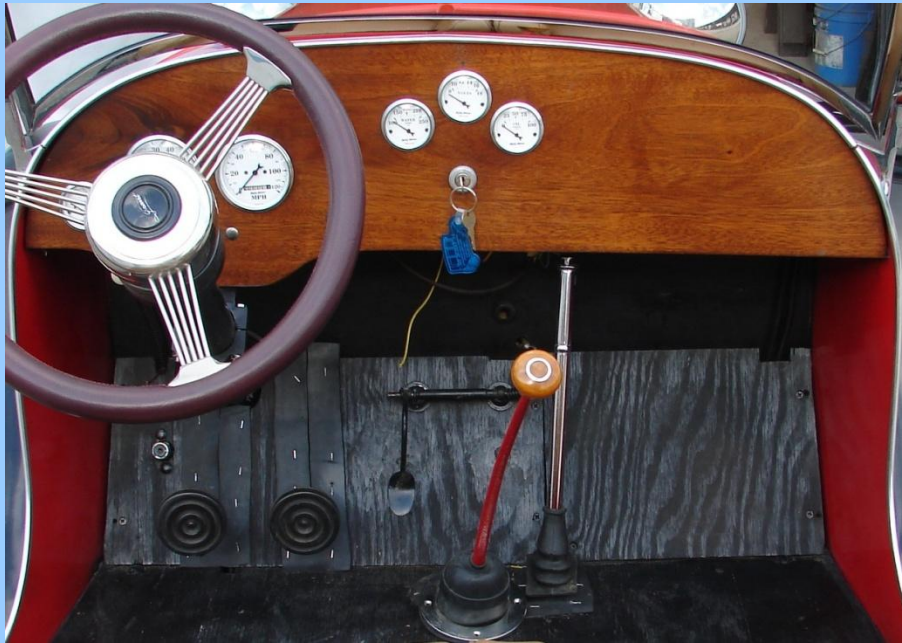


The finished product – sailing configuration



Winner of a Corinthian Trophy for new construction at 2011 Keels and Wheels! (Note the Pete Culler oars.)

Spinoff Projects



New African Mahogany dashboard and floor in Ford Model A Speedster

Spinoff Projects



1931 Model A Ford Woody Wagon Restoration

Spinoff Projects



1931 Model A Ford Express Delivery Van

Spinoff Projects



1931 Model A Ford Express Delivery Van

Spinoff Projects



Redwood Strip-built Canoe Restoration (before)

Spinoff Projects



Redwood Strip-built Canoe Restoration (after)

Spinoff Projects



Redwood Strip-built Canoe Restoration (after)

Spinoff Projects



Holocaust Museum of Houston Danish rescue fishing boat restoration.



Danish fishermen in boats like this one rescued over 7,200 Jews from the Nazis by taking them to Sweden in 1943.



The boat is deteriorating and is in need of documentation, restoration, routine repairs and maintenance in the long run.

Get Involved

- Join me in volunteering to research, document, restore, and maintain this wonderful artifact.
- Donate money or in-kind services to the project.
- Buy a ticket for a drawing to own my sailing tender – proceeds go to the fishing boat restoration.

Questions?