

Materials List

Item	Qty.	Part	Material	Grade or Type	Length	Width or Gauge	Thic k.	Remarks
M1	1	plywood	baltic birch	9 Plies	60"	17"	1/2"	
M2	1/4 l	varnish	polyurethane (PU)	exterior grade, clear				
M3	4	angle bar	aluminium		4'	1"	1/8"	
M4	1	angle bar	aluminium		4'	1"	1/16"	
M5	1	flat bar	aluminium		4'	2"	1/8"	
M6	88	bolts	stainless steel	flathead (10-32)		~3/16" (10) 5mm (M5)		
M6a	60				5/8" 15mm			Alu-Wood
M6b	4				6/8" 18mm			Alu-Wood-Snap
M6c	4				1" 24mm			Wood-Wood
M6d	16				9/8" 27mm			Alu-Wood-Wood
M6e	2				36mm (3/2")			Wood-Wood-Wood
M7	2	long bolts	stainless steel	Pan head (10-32)	3" 70 mm	~3/16" (10) 5mm (M5)		5xWood + Washer + Nut
M8		nuts	stainless steel	with locking ring		~3/16" (10) 5mm (M5)		
M9		washers	stainless steel			1/4" 6.25mm	0.5m m	
M10		short rivets	aluminium	pop rivets	1/4" 6mm	1/8" 3mm		length refers to grip range
M11		long rivets	aluminium	pop rivets				
M12	48	snaps	?	heavy duty		1/2"		
M13		cable	stainless steel					
M14		spring hooks	aluminium			2"-3"		
M15	2	buckles	plastics		1 1/2"	1"		
M16	2	zippers	???	water tight	22"	1"		

				(???)				
M17	1	straps	Nylon	as for rucksacks	9'	1"		
M18	1	pack cloth	Nylon, polyester or Cordura	PU-coated	12 1/2'	60"	1000 D	D=Denier=Thickness of thread
M19	1	pack cloth	Nylon, polyester or Cordura	PU-coated	12 1/2'	60"	400-600 D	
M20	1	thread	polyester	strong grade	100m		0.5 mm	
M21	1	foam mat	polyurethane (PU)	closed-cell	2 y	5'	1/4"	closed-cell = crossed linked
M22	1/4 l	glue	rubber cement	bonding on contact				
M23	1/2 l	water seal	?	Thompson's				
M24	1	shock cords	elastic cord		> 140"	1/8"		
M25	2	pinch knobs	plastics			1/8"		
M26	1	paddle	aluminium / plastics	double blades, telescopic	2'			length as disassembled
M27	2	fanny packs	plastics	1/2 liter				
M28	2	rings	aluminium	D-Rings		1"		width refers to the flat side
M29	1	Thwart	Dowel	Buche/Esche	10"	<1/2"		Has to fit into M29
M30	1	Thwart	Tube	PVC	10"	1/2"		

Tools List

The bold tools are compulsory.

Item	Qty.	Tool	Type	Size	Remark	Price \$
T1	1	drill press		17"	straight holes well in place	100
T2	1	drill	wood hole drill	3/16"	centered holes in wood	1
T3	1	drill	wood hole drill	3/8"	countersinking nuts (flat bottom)	2
T4	1	drill	HSS for aluminium	3/8"	countersinking bolts (conus bottom)	2
T5	1	drill	HSS for aluminium	3/16"	bolt holes in aluminium	1
T6	1	drill	HSS for aluminium	1/18"	rivet holes in aluminium	1
T7	1	file	for aluminium (rough grain)		round notches for hinges	7
T8	1	shaper			rounding wood strips	100
T9	1	rounder bit	concave	1/4"	here radius is meant.	6
T10	1	rounder bit	cylindrical		to round the strips ends (coners)	6
T11	1	emery paper	60, 120 and 240		to finish rounded edges	4
T12	1	cork	rectangular		to use emery paper with	2
T13	1	saw	circular table saw, for wood with guide	220 mm	to saw stripes of plywood	100
T14	1	saw	cut-off saw		cutting strips into shorter pieces	100
T15	1	saw	handsaw, for metal		to saw angle and flat bar aluminium	20
T16	1	screwdriver			depending on screws used	5
T17	1	hammer	hard plastic		to tap nuts into their holes	20
T18	1	brush	medium	1"	to varnish the wooden parts	2
T19	1	sewing machine	normal houshold machine			300-400
T20	1	needles	as used for sewing jeans	100-120	sewing the skin (packcloth).	6
T21	1	scissors			cutting the packcloth	4
T22	1	spatula	hard, as used in kitchen for creams	3"-4"	to spread the glue over the packcloth	2
T23	1	grinder	belt grinder		to round edges	
		Total				800 - 900

Wooden Parts

Cutting pieces & Drilling holes








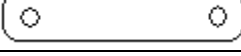
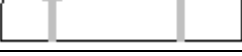

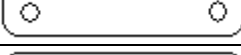
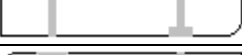

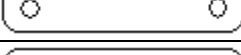
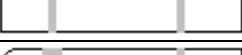

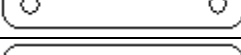
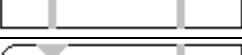

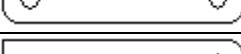
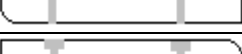

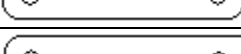
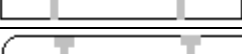

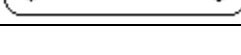
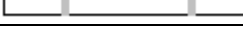
From material M1 cut the following 56 pieces of wood and drill the holes indicated.




























Note: Basically hole one and two are 1/2" from ends. But for the sake of precision all measures in the following table refer to one end! Thus you don't mess up with wrong stripe length or holes in between.

Item	Qty.	Part	Location (alongship)	Length	Width	Thick-ness	First hole	Third hole	Second hole	Bore
A	18	stringers	mid & center	24"	1"	1/2"	1/2"		23-1/2"	3/16"
B	12	stringers	end	25"	1"	1/2"	1/2"		24-1/2"	3/16"
C	4	braces		7"	1"	1/2"	1/2"	4-1/2"	6-1/2"	3/16"
D	4	braces		4 1/2"	1"	1/2"	1/2"		4"	3/16"
E	4	braces		7 3/4"	1"	1/2"	1/2"	4"	7-1/4"	3/16"
F	4	braces		5"	1"	1/2"	1/2"		4-1/2"	3/16"
G	4	braces		9"	1"	1/2"	1/2"	4-1/2"	8-1/2"	3/16"
H	2	braces	center brace	11"	2"	1/2"	*1/2"		10-1/2"	3/16"
I	2	braces	side brace	4"	2"	1/2"	1/2"		3-1/2"	3/16"

*Part H: **Two holes** have to be drilled one beside the other 1" apart 1/2" from end.

Rounding, Countersinking and Slotting; Peculiarities

Item	Qty.	Location	Section	Large side	Narrow side
A1	2	mid: top center			
A2	8	mid: side & bottom			
A3	8	center: side & bottom			
B1	4	end: bottom			
B2	2	end: top center left			
B3	2	end: top center right			
B4	4	end: side			
D1	2	end: bottom left			
D2	2	end: bottom right			

F1	2	mid: bottom left			
F2	2	mid: bottom right			
C	4	mid: middle			
G1	2	mid: top left			
G2	2	mid: top right			
E1	2	end: top right			
E2	2	end: top right			
H	2	center: center brace			
I	2	center: side			

Notes:

General

Watch orientation of parts D1/D2, F1/F2, E1/E2 and G1/G2. One half is mirrored!

Rounding occurs on the long edges (section view) of the strip, on every edge. The strip's ends (large side view) are also rounded but on some ends only and on some side only (narrow side view). The rounding radii are the following:

- long edge (section): 1/4"
- end (large side): 1/2"
- end side (narrow side): done by eye (get a smooth 'round edge' with the belt grinder (Tool T23))

Countersinking is needed for flathead bolts or nuts. Which holes to countersink what way is shown in the section view. The following measures apply (may vary according to bolts and nuts used):

- bolts: 1/16" deep, 3/8" wide
- nuts: 1/8" deep, 3/8" wide

Slotting allows the later insertion of metal strips (1/8"). The following parts require it.

- Part A1: one slot in the middle, 1" deep (to accommodate the hook attaching to the gunwale)
- Part I: two slots 1" apart, 2" deep (to accommodate the catches (prongs) for the buckle of the center brace)

Peculiarities

Part H (the center brace) has

- a pair of holes 1/2" from lower end 1" between each other (watch out: across length!)
- an additional hole, 3/8" diameter, 3/4" from the smaller ones (center/center)
- a rectangular hole 8.5" from its center to the lower pair of holes, 1/2" high, 1" large.
- the upper end with (without) holes need being trimmed at an angle of approx. 18°. long side: 1 1/8"; short side 3/8"

Tools needed

T1, T2, T3, T4, T8, T9, T10, T11, T13, T23

General notes:

- Don't even start if no shaper (T8) is available. A drill press has not the rpms needed to turn a router bit (>20'000 rpm). There are special bits with more cutting edges, but it will take you 3 or 4 times longer to do the same job. It's tedious...
- If you're not used to handle a shaper – rounding long edges is rather difficult toward the end of the stripe - rather buy a longer plywood board (Material M1). So you can waste spoiled ends. Plus 3" - 4" should do.
- A circular table saw is really recommended!
- Rounding narrow edges works best with a belt grinder. Of course you can do it by hand...

Production

From plywood plate (Material M1) produce the before mentioned parts as follows:

1. Cut 15 (+3 reserve) stripes of 1" (Why? see general notes under Tools needed)
2. Cut 1 stripe of 2" (see also remark under Tools needed).
3. Round long edges (Tool T8 – T10)
4. Cut pieces as described in Section 2 / Plywood Cuts of the PakYak Plans

As shown in the table above

5. Plot holes
6. Countersink for nuts (Tool T3). See depth above!
7. Bore holes through (Tool T2). Wood drill T3 leaves center mark to use now.
8. Countersink for bolts (T4). See depth above!
9. Round edges of large side (Tool T9)*
10. Round edges of narrow side (Tool T10)*
11. Saw slots (Tool T14)
12. Smoothen all edges with sandpaper (Tool T11)

* Mind orientation of parts D1/D2, F1/F2, E1/E2 and G1/G2. One half is mirrored mirrored!

Aluminium Parts

Cutting pieces & Drilling holes

From material M3, M4 and M5 cut the following xx pieces of aluminium and drill the holes indicated.

Notes: The spacing given is either the larger of 2 distances between 3 holes or applies to all holes (more than 3 holes).

Take anyway care to measure all from one end (adding correctly) -> precision!

Offset means the measure is to be taken from the inner side of the angle (not from outside). It, this applies to side 2 of an angle only!

Item	Qty.	Part	from	Length	Width	Thick-ness	Side 1			Side 2				bore
							Qty. of holes	from ends	spacing	Qty. of holes	from ends	spacing	offset	
*GS	4	Gunwale Side Rail	M3	2' 600mm	1"	1/8"	7	3" 75mm	3" 75mm	-	-	-	-	1/8" 3mm
GE	2	Gunwale End Rail	M4	22" 55cm	1"	1/16"	4	3" 75mm	3" 75mm	2	6"	3"	-	1/8" 3mm
HA	2	Hinge angle	M3	1-3/4" 44mm	1"	1/8"		3/8" 95mm	1" 25mm	2	3/8"	1"	1/2"	3/16" 5mm
HF	2	Hinge flat piece	M5	2" 5cm	1"	1/8"	2	1/2" 12.5mm	1" 12.5mm	-	-	-	-	3/16" 5mm
*H	2	Hook	M5	1-1/2" 37.5mm	1"	1/8"	2	1/2" 12.5mm	1/2" 12.5mm	-	-	-	-	3/16" 5mm
P	2	Catches (Prongs)	M5	2" 50mm	1/2"	1/8"	2	1/4" 6.25mm	1/2" 12.5mm	-	-	-	-	1/12" 2.5mm
AA	4	End Side Braces	M3	5" 125mm	1"	1/8"	2	1/2" 12.5mm	3" 75mm	1	1/2"	-	1/2"	3/16" 5mm
BB	4	Mid Side Braces	M3	10" 250mm	1"	1/8"	3	1/2" 12.5mm	5" 125mm	1	1/2"	-	1/2"	3/16" 5mm
CC	8	Pivot Pieces	M3	2" 50mm	1"	1/8"	1	1/2" 12.5mm	-	1	1/2"	-	1/2"	3/16" 5mm
*DD	2	End Brace	M5	5-1/2" 137.5mm	2"	1/8"	2	1/2" 12.5mm	3" 75mm	-	-	-	-	-
*EE	4	Mid Brace	M5	9" 225mm	2"	1/8"	2	1/2" 12.5mm	8" 100mm	-	-	-	-	-
FF	4	Mid Outer Brace	M5	4" 100mm	1"	1/8"	2	1/2" 12.5mm	3" 75mm	-	-	-	-	-


*Exceptions:

- Part GS: Additionally one hinge or brace hole, 1/2" from end, diameter 3/16".
- Part H: The second hole is not 1/2" from end but less! It's diameter is merely 1/8".
- Part DD: The holes indicated are to be made twice 1" apart, so that you end up with 4 holes
- Part EE: Same as DD

Rounding, Countersinking, Plying and Notching; Peculiarities

Watch out: Half of parts are always mirrored!

- GS
- GE
- HA
- HF
- P
- AA
- BB
- CC

Item	Qty.	
A1	2	
*GS		
GE		
HA		
HF		
*H		
P		
AA		
BB		
CC		
*DD		
*EE		
FF		