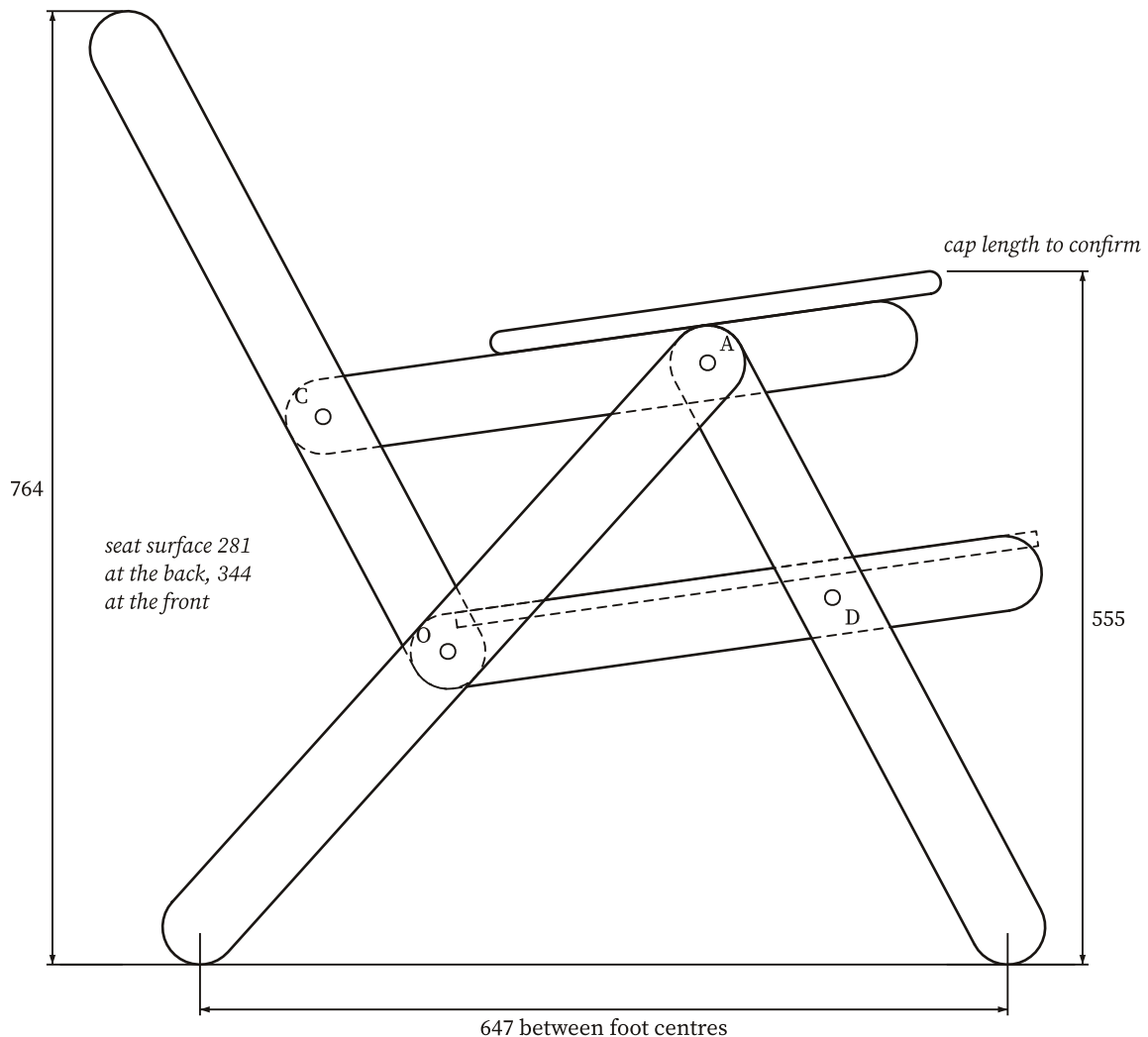


Keel Truss Lounge Chair

The same two triangles with the apex moved from the seat to the arm: ten sticks, pinned, no notches and no glue.



Side elevation at 1:6. The keel is the outside layer, the back and front leg the middle, the arm and seat inside; hidden edges are dashed, and the recessed seat panel lies behind the seat stick. O, A, C and D are the four pins.

Plan of 2 October 2026, in millimeters, printed for A4 paper. Every drawing is placed at its stated scale; check one dimension with a rule before cutting from a printout.

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A record of the third build (4 September 2026) more than a settled pattern. The arm cap length is a placeholder, and whether the keel goes from 18 to 25 mm is an open upgrade.

The chair

This is the second chair built to the Keel pattern, and the one that kept a promise the project made at the start and had stopped keeping: that the chair could come out of the scrap pile. The Keel Panel wants a 400 mm panel. The widest piece in this one is 143.

The topology is the Keel Panel's. Two congruent triangles share a keel, and the keel is the only member that belongs to both. What moved is the apex: in the Keel Panel it is where the seat meets the back, and here it is where the arm meets the back. That relocation turns four panels into ten sticks and every notch into a pin. Set the seat-to-back angle to 90 degrees plus half the apex and the keel's pin spacing equals the arm and seat spacing, which is why ten sticks need only four cut lengths and two drill settings.

Cut list

Part	Name	Qty	Length	Pin to pin	Note
K	keel	2	668	311 pins at A and O; foot at the far end	
XB	back	2	607	213 pins at O and C	
Y	seat and arm	4	510	311 seat: O and D; arm: C and A; alternate C at 20	
XF	front leg	2	572	213 pins at A and D; foot at the far end	
	arm cap	2	to confirm	60 wide, 18 thick, R30	
	seat strip	3	450	143 wide, 12 ply	
	back panel	1	486	300 wide, 12 ply	
	back panel	1	486	143 wide, 12 ply	

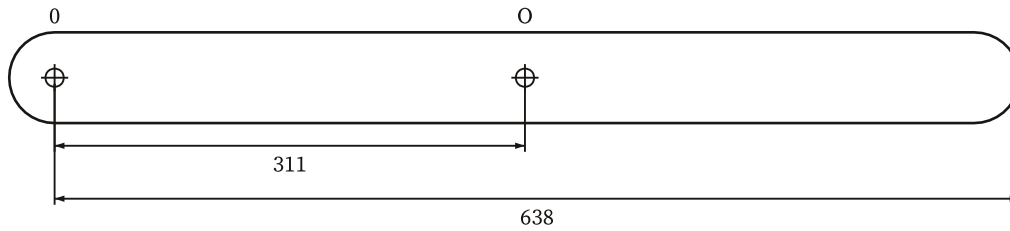
About 6 m of 60 mm strip in 18 mm plywood for the sticks, plus 12 mm plywood for the panels and a few hardwood cleats. Mixed colours and species are the point.

Hardware. Eight barrel bolts (sex bolts): four long for the three-layer stacks, four short for the two-layer stacks. Small screws for the panels and cleats. Size the holes to the bolt and drill them square.

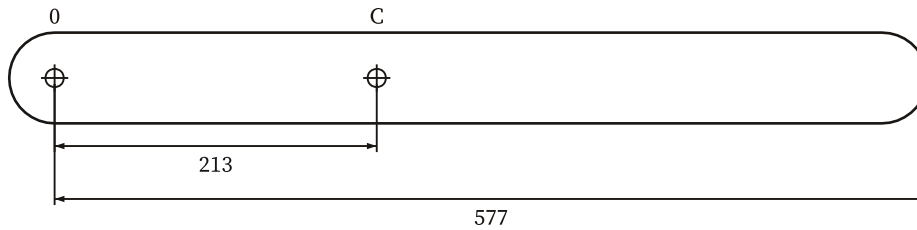
Drawings

The side view is on the first page.

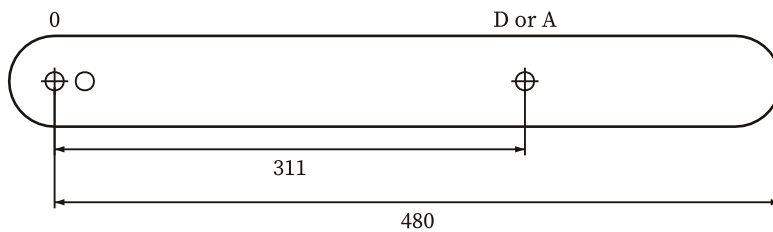
K keel ×2 668 long



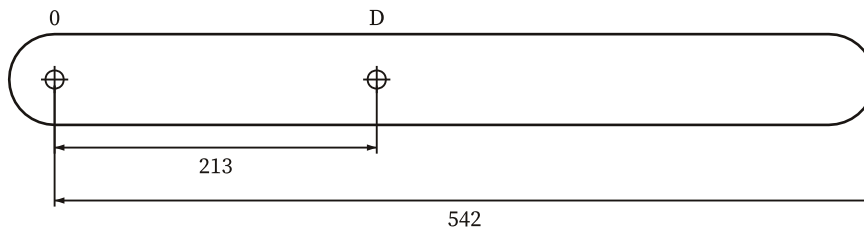
XB back ×2 607 long



Y seat and arm ×4 510 long



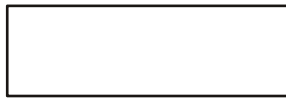
XF front leg ×2 572 long



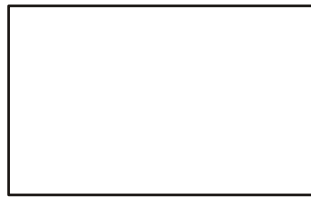
Every stick 60 wide, ends full radius 30 centred on the end pin;
every dimension struck from the pin marked 0; 18 plywood throughout.
The small ring on Y is the alternate C, 20 along: seat to back 110° becomes 104.4°.

The ten sticks at 1:5, each dimensioned from the pin at one end. Four cut lengths, two drill settings.

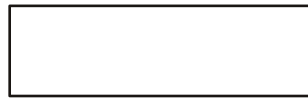
panels, 12 plywood, recessed between the sticks on cleats (1:12)



seat strip ×3
450 × 143



back ×1
486 × 300



back ×1
486 × 143

arm cap ×2, 18 thick (1:5)



60 wide, R30; overhangs the arm end 25
length to confirm

The panels at 1:12, recessed between the sticks on cleats, and the arm cap at 1:5, whose length is still to be confirmed.

Building it

1. Cut ten sticks from 18 plywood strips 60 wide: two keels, two backs, four seat-and-arm sticks and two front legs. This is what the scrap bin is for; the widest piece in the chair is a 143 panel strip.
2. Round every end to a full 30 radius centred on its pin. A printed router guide with a small hold-down hole at the radius centre does this in one pass per end and puts the pin centre where it belongs.
3. Drill the pins. Every stick is dimensioned from the pin at one end, marked 0 on the parts sheet. Two settings do the whole chair: 311 on the keels and all four seat-and-arm sticks, 213 on the backs and front legs. A third, 20, is the optional alternate C on the four Y sticks. Make a drill template; holes laid out by hand let the joints wobble.
4. Lay up each side in three layers: the keel outside, the back and front leg in the middle, the arm and seat inside. Pin O takes keel, back and seat; pin A takes keel, front leg and arm; pin C takes back and arm; pin D takes seat and front leg. The two triangles share the keel and nothing else.
5. Use barrel bolts, eight in all: four long through the three-layer stacks at O and A, four short through the two-layer stacks at C and D. The first build used plain M6 bolts in 6 mm holes.
6. Screw hardwood cleats to the inside faces of the seat and back sticks. Drop the panels between the sticks, flush with their top faces: three seat strips 143 × 450, and back panels 486 × 300 and 486 × 143. Screw down through each panel into its cleat, one screw size, one inset, evenly spaced.
7. Pin on the arms last. They do not fold with the rest of the frame, so they ship loose. Each carries a cap 60 wide and 18 thick, overhanging the arm end by 25.
8. To fold the chair, pull the keel pin at the apex: the remaining parallelogram lies down flat.

Open and estimated

- The arm cap length is not settled; the drawing marks it.
- Panels on top of the sticks rather than recessed between them would raise the seat 12 mm; the frame, sticks and pins are identical either way.
- A 25 mm keel is a stiffness upgrade over 18 (flex roughly halves), and only the long bolt changes.
- The pin joints in plywood have a little play when the holes are drilled by hand; bushings or a drill template are the cures under consideration.

Credits and license

Designed by Karl T. Ulrich. The drawings are generated from tools/make_k3_popsicle_v3.py, the same geometry the sticks were cut from.

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