De Havilland DH.82

Tiger Moth

1/2.8 (35.7%) scale RC

PHOTO BUILDING MANUAL

PAOLO SEVERIN

DE HAVILLAND DH.82 - TIGER MOTH
1/2.8 (35.7%) SCALE RC

Wingspan: 3.19 m (10.47 ft)
Length: 2.59 m (8.5 ft)
Wing area: 2.79 sq m (27.87 sq ft) approx.
Wing loading: 80 gr/sq dm approx.
Weight: 20 kg (44 lb)
Engine: Valach Motors VM 120 I2-4T
Kolm Engines IL-100/135/155 2 cyl. or IL-150 3 cyl. in-line 4 stroke or similar

Designed and engineered by Paolo Severin in consultation with Gerhard Reinsch from November 2014 to September 2015.
Flight tested with two prototypes from March to August 2015 by Gerhard Reinsch.

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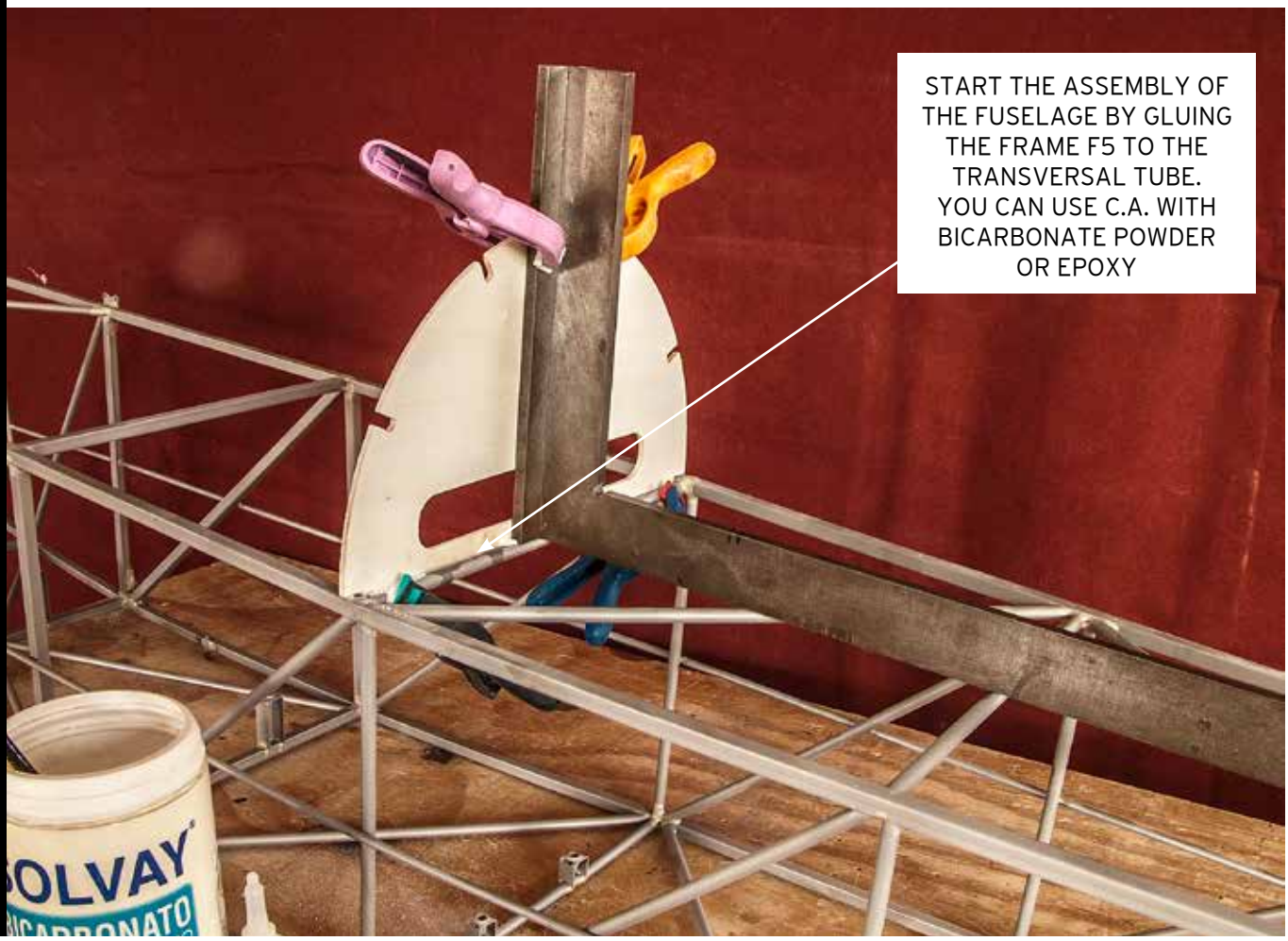
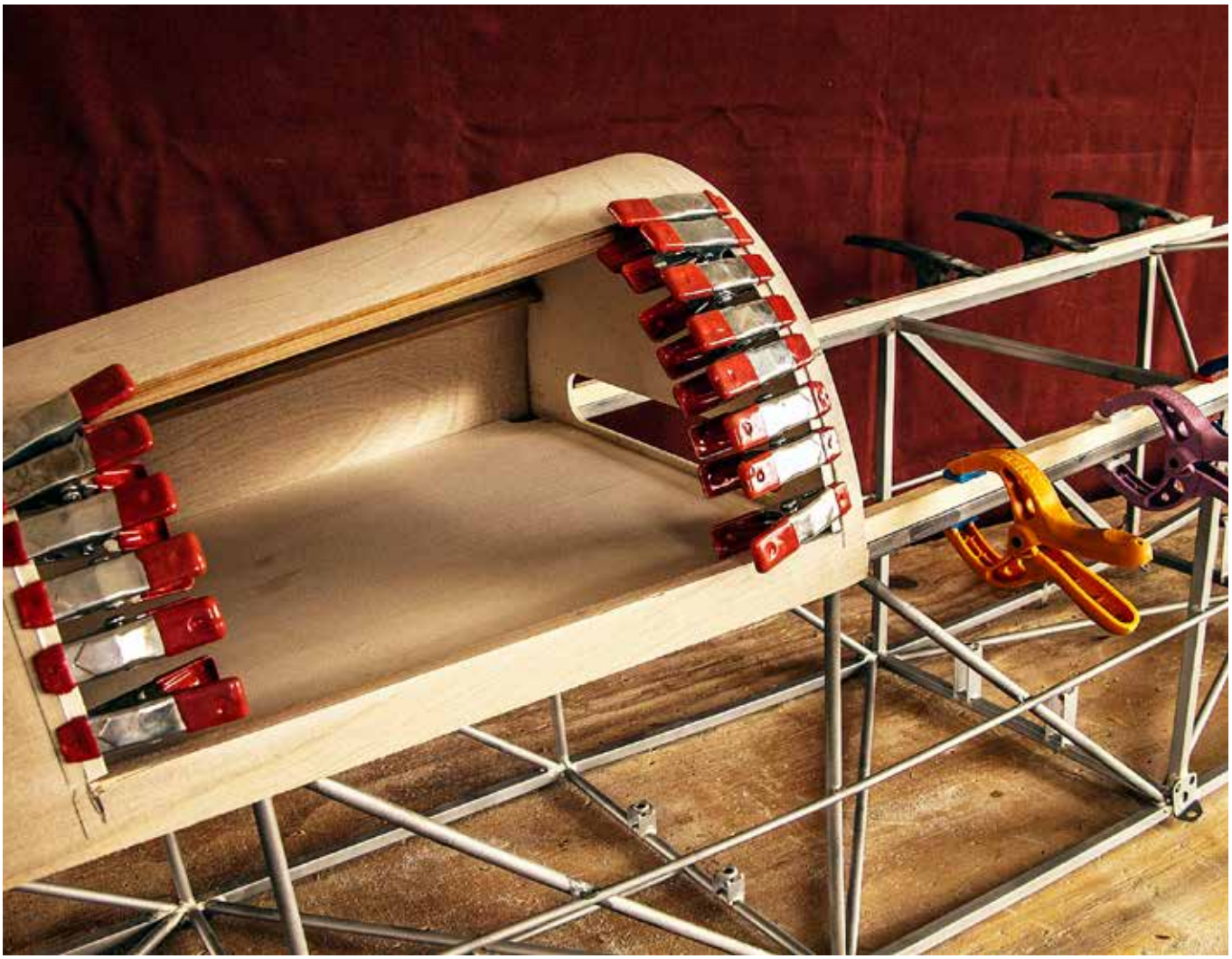
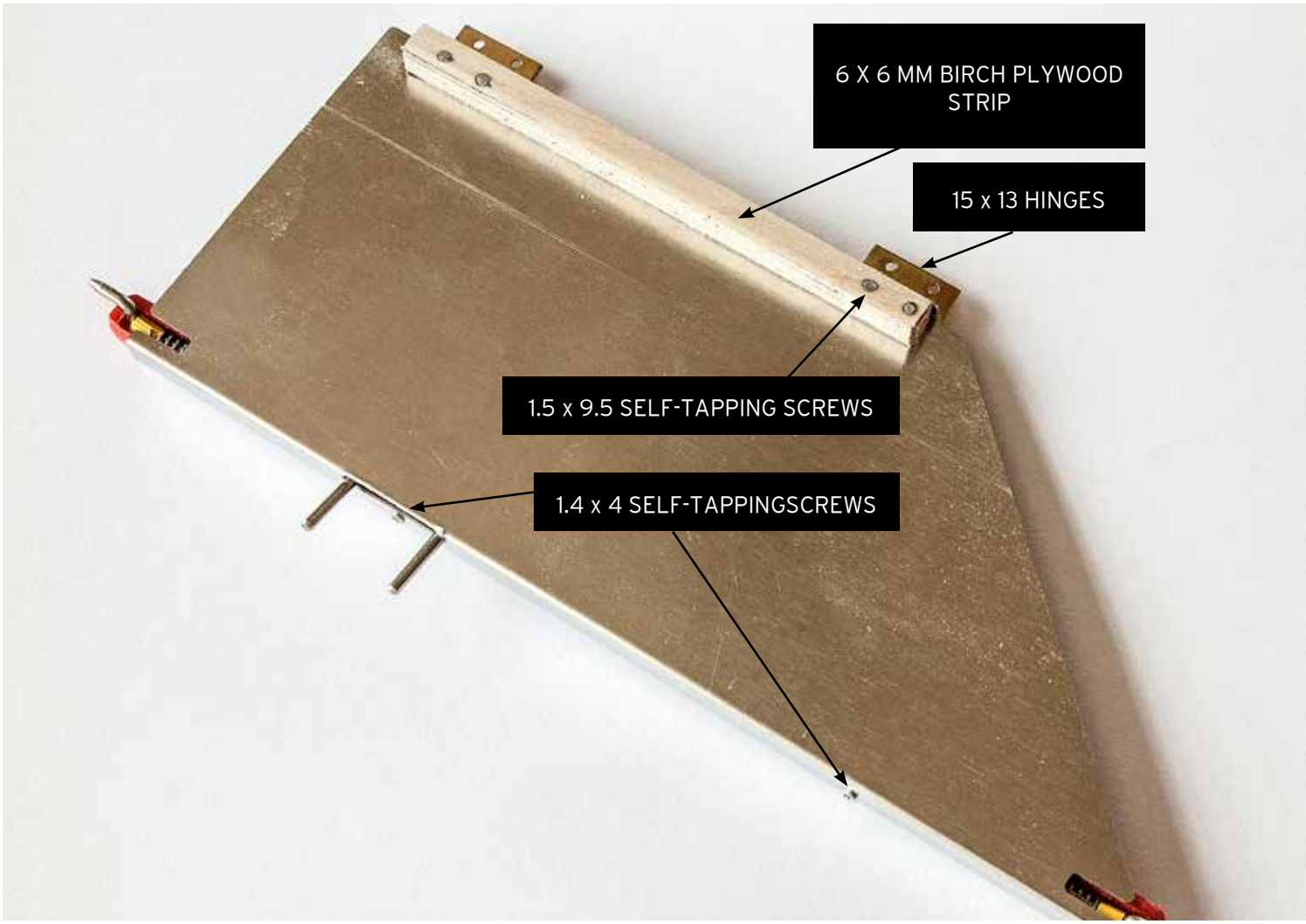
START THE ASSEMBLY OF THE FUSELAGE BY GLUING THE FRAME F5 TO THE TRANSVERSAL TUBE. YOU CAN USE C.A. WITH BICARBONATE POWDER OR EPOXY




6 MM BIRCH PLYWOOD
GUSSETS

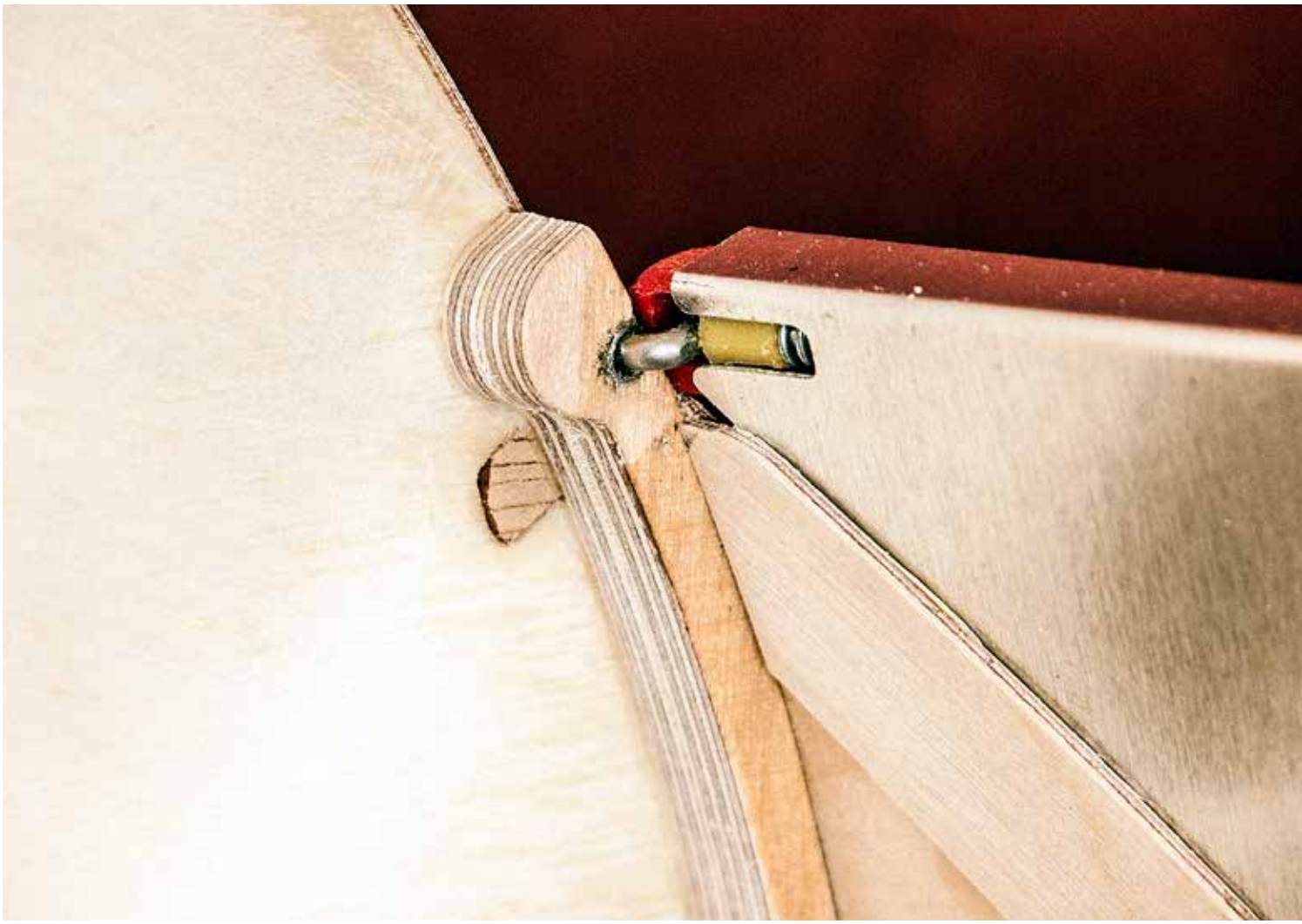


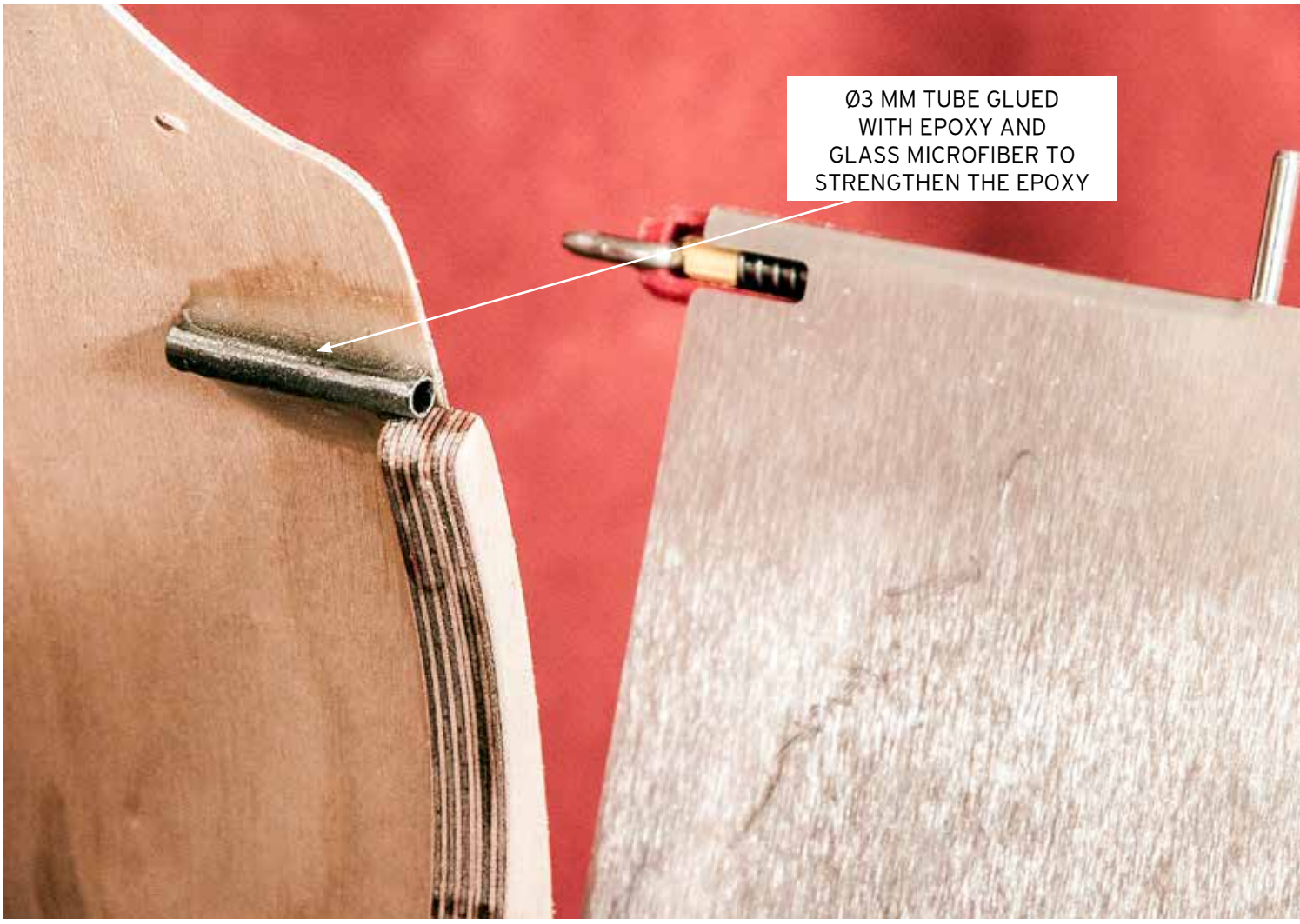

6 X 6 MM BIRCH PLYWOOD STRIP
15 x 13 HINGES
1.5 x 9.5 SELF-TAPPING SCREWS
1.4 x 4 SELF-TAPPINGSCREWS

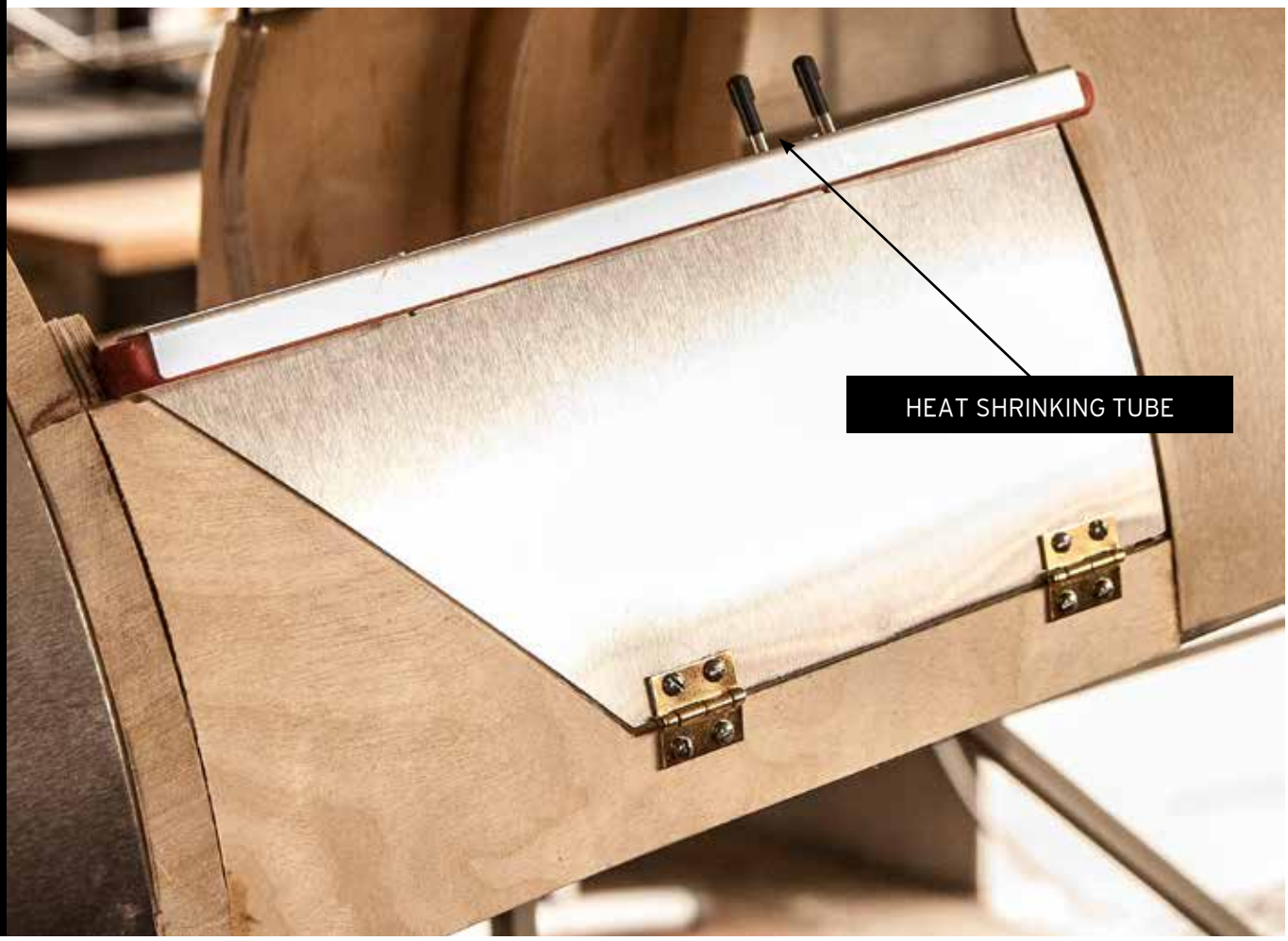

MOUNT THE DOOR AND MARK
THE HOLE FOR THE LATCH


DRILL Ø 3 MM, GLUE THE TUBE WITH
EPOXY...

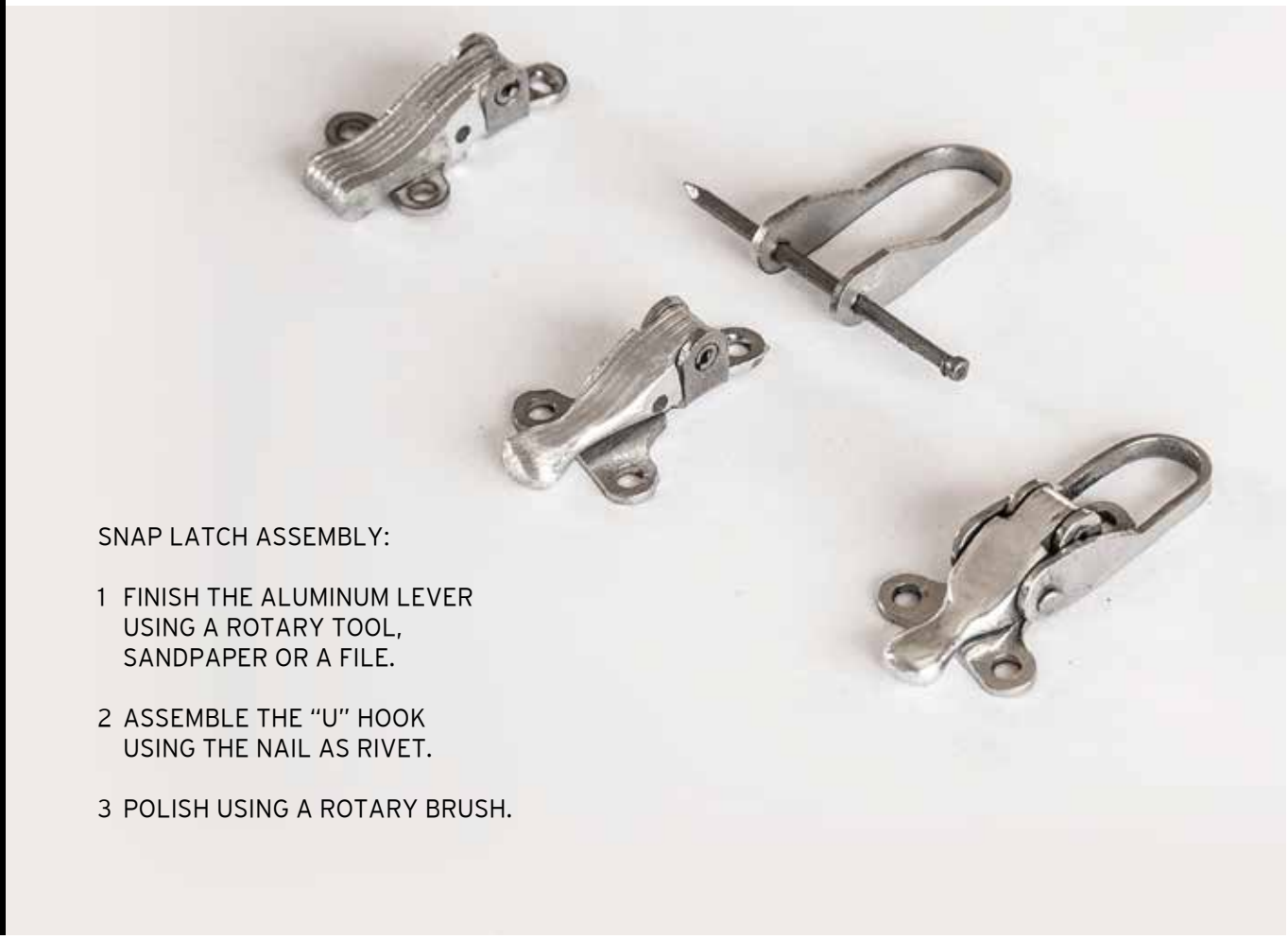
...AND CUT AFTER THE EPOXY HAS HARDENED




Ø3 MM TUBE GLUED
WITH EPOXY AND
GLASS MICROFIBER TO
STRENGTHEN THE EPOXY


HEAT SHRINKING TUBE

TO ATTACH THE PIANO HINGE TO THE LUGGAGE DOOR, USE 1.5 X 5 MM ALUMINUM RIVETS. WHEN HAMMERING, PLACE THE HEAD OF THE RIVET ON A BLOCK OF HARDWOOD TO AVOID DAMAGE TO THE RIVET HEAD.

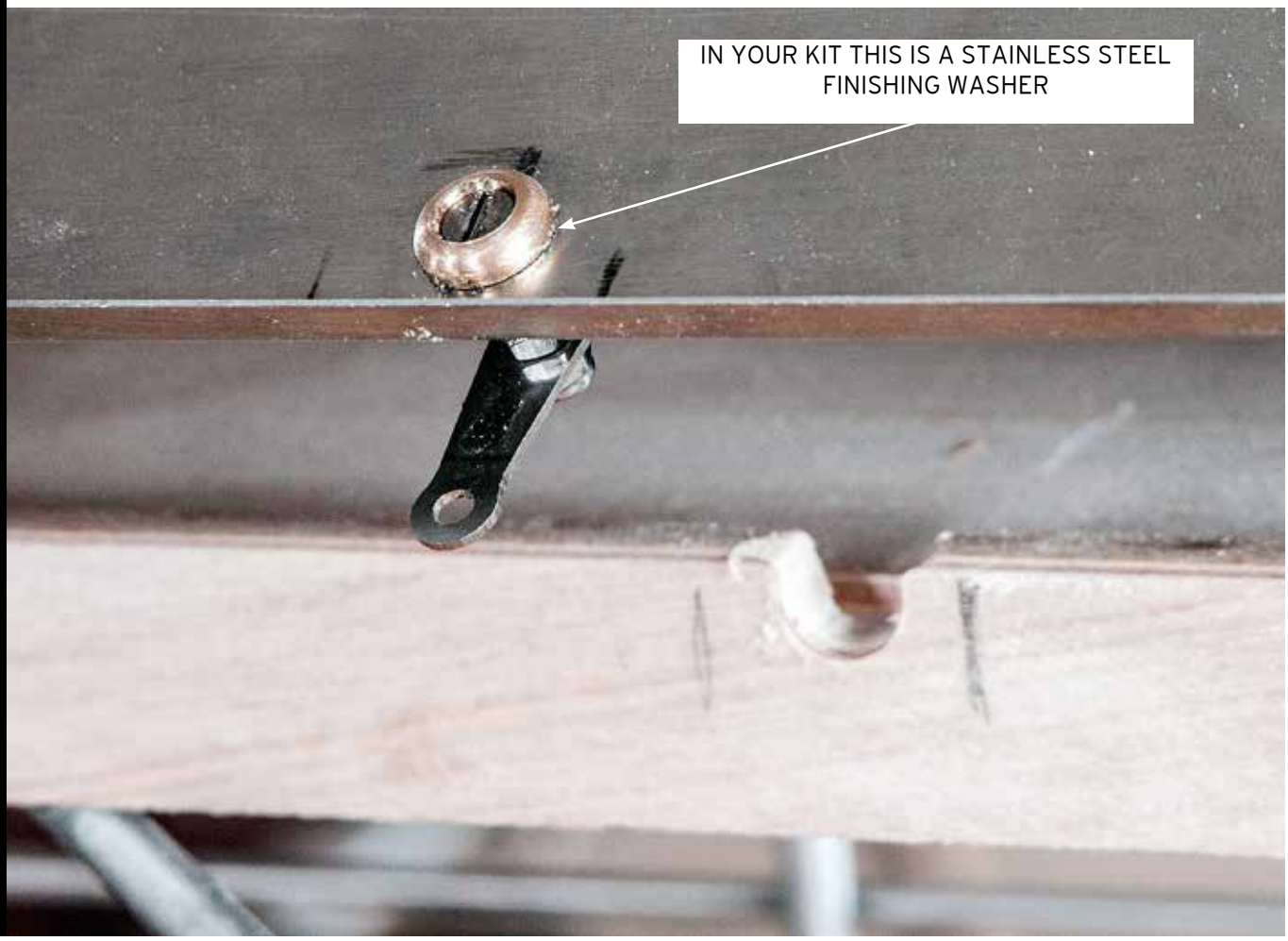


SNAP LATCH ASSEMBLY:

1 FINISH THE ALUMINUM LEVER USING A ROTARY TOOL, SANDPAPER OR A FILE.

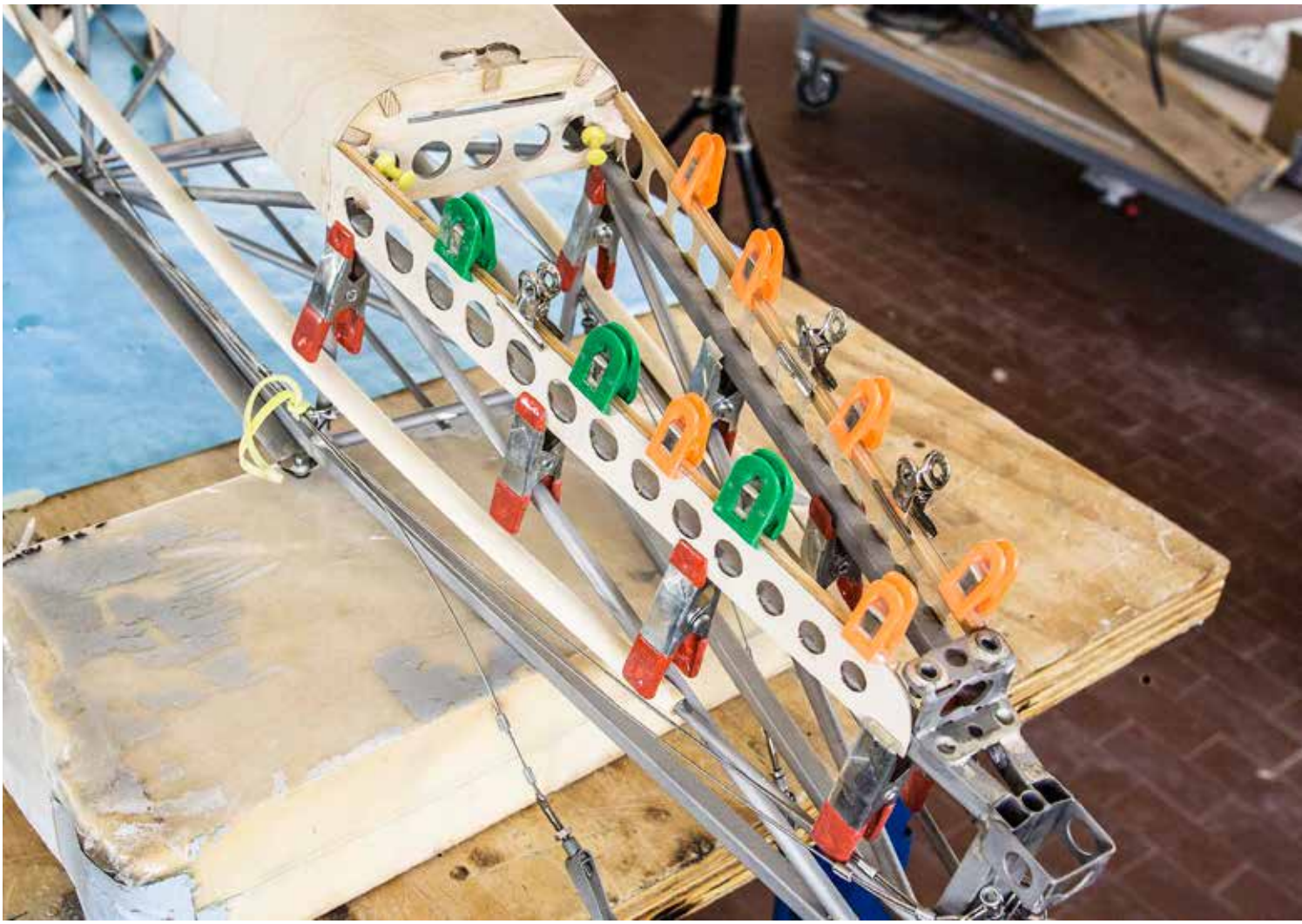
2 ASSEMBLE THE "U" HOOK USING THE NAIL AS RIVET.

3 POLISH USING A ROTARY BRUSH.

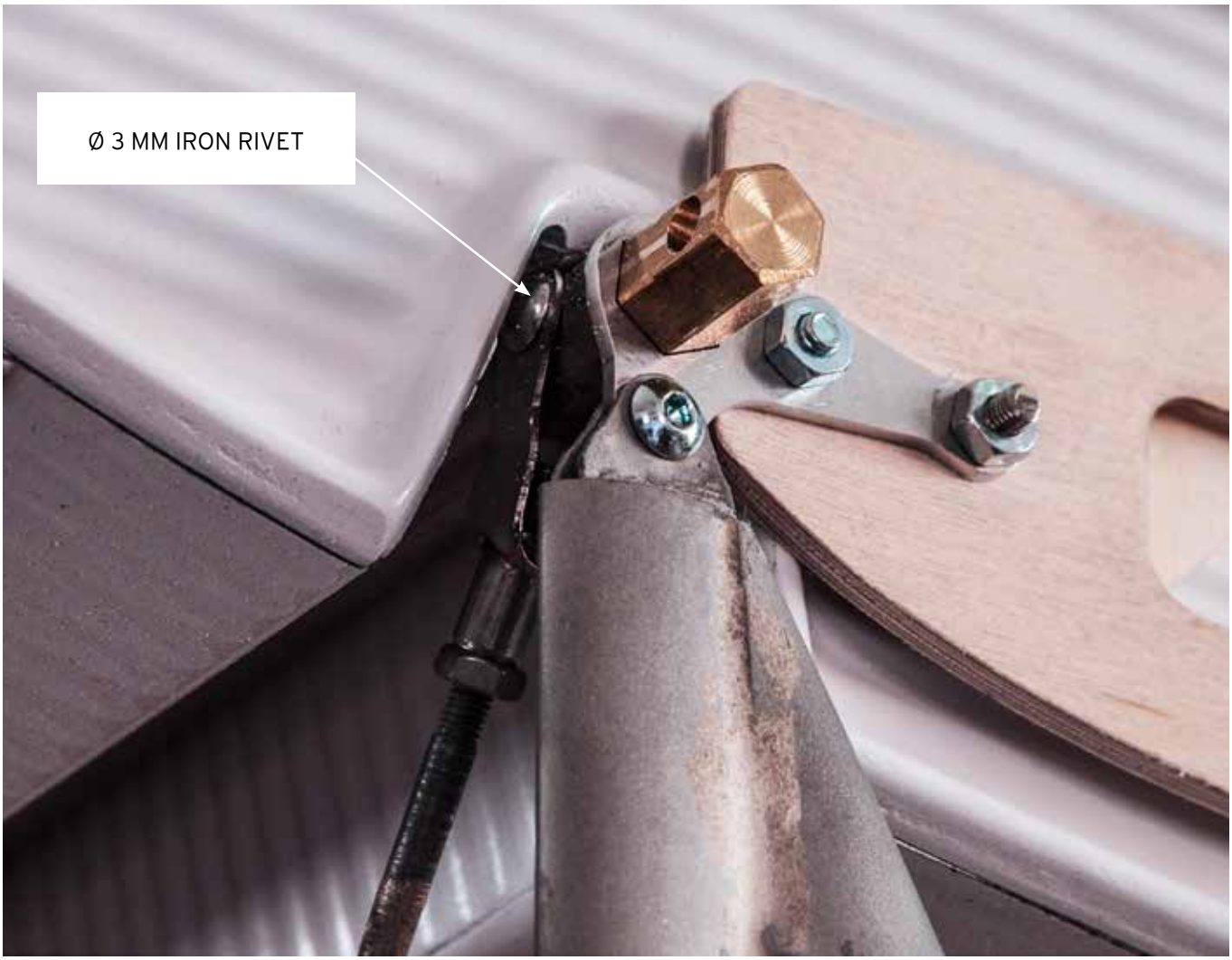

IN YOUR KIT THIS IS A STAINLESS STEEL FINISHING WASHER


USE A SCREWDRIVER AS A KEY

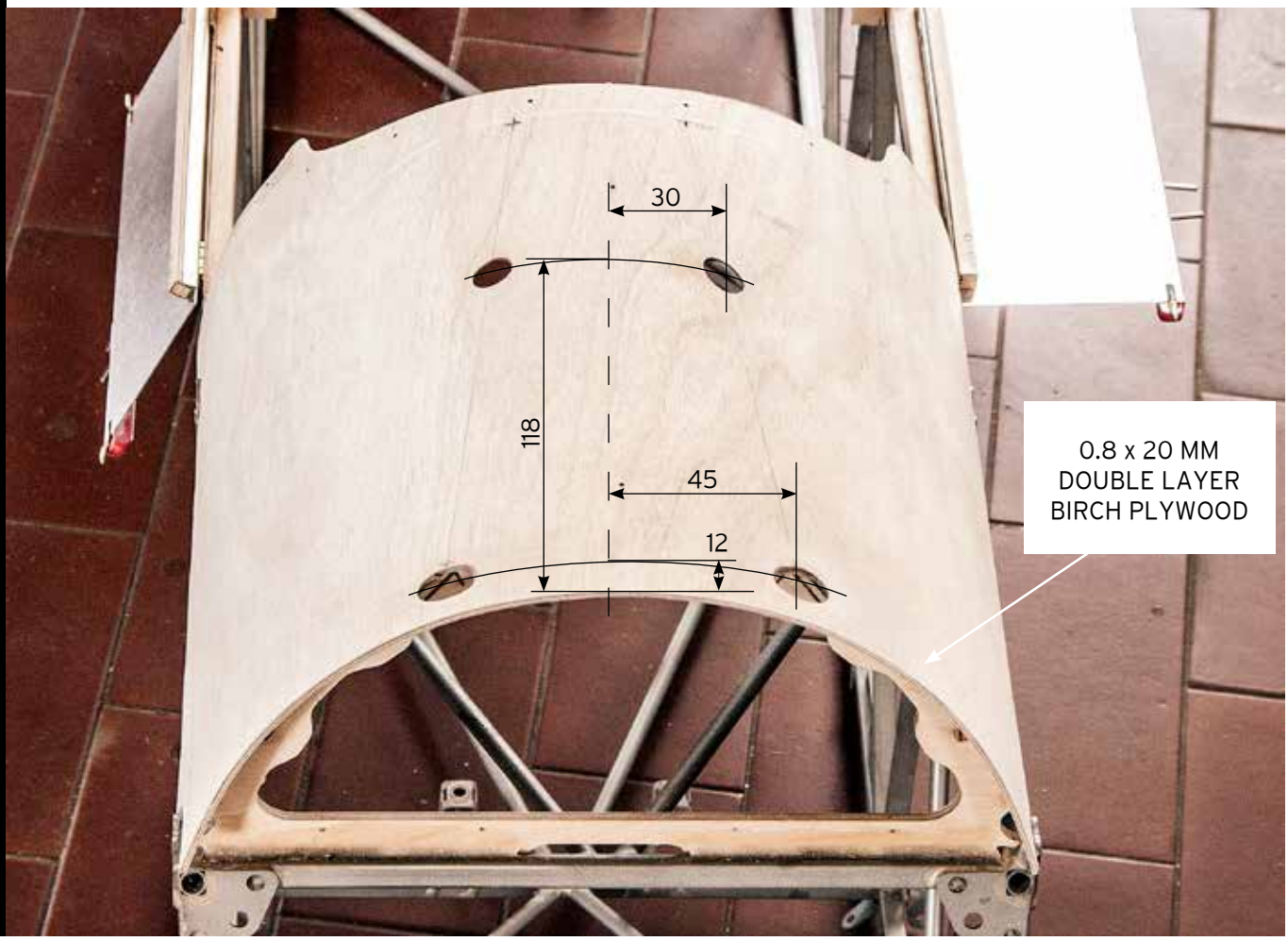

WHEN GLUING, USE A STRAIGHT BAR TO
OBTAIN A STRAIGHT STRINGER

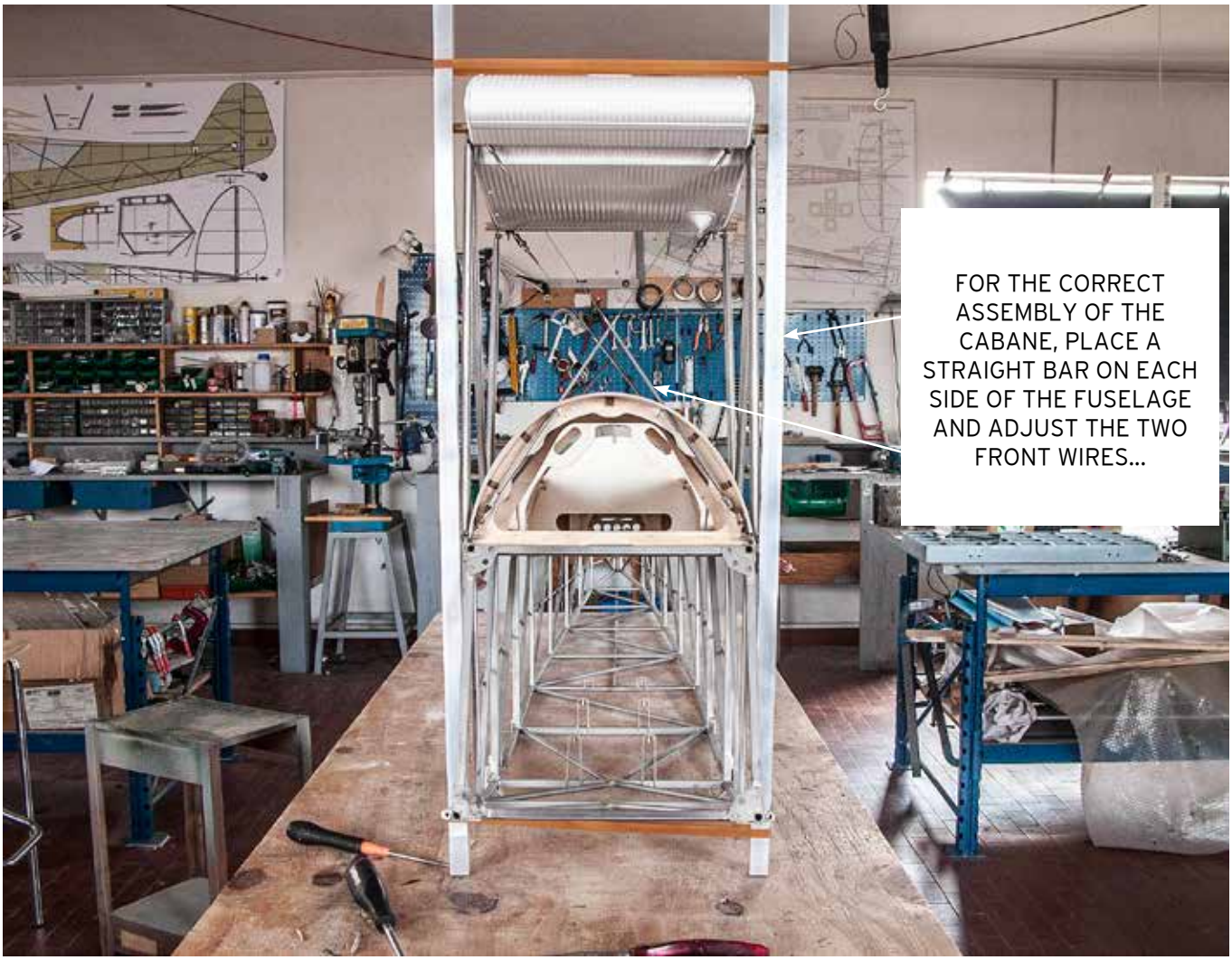


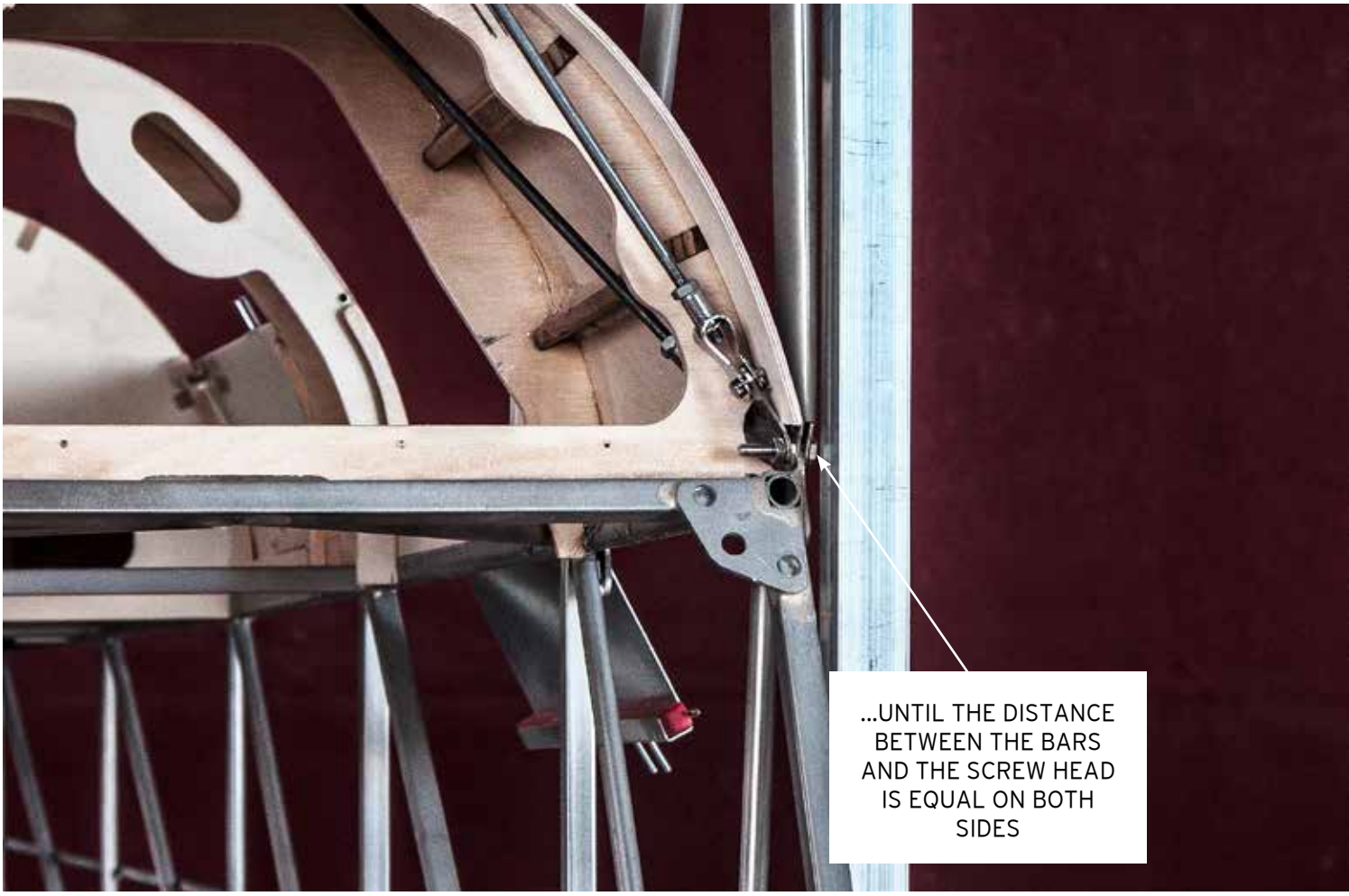

SCREW TO THE TANK WITH 3 COUNTERSUNK SELF-TAPPING SCREWS AND GLUE WITH EPOXY


Ø 3 MM IRON RIVET


Ø 3 MM IRON RIVET


30
118
45
12
0.8 x 20 MM
DOUBLE LAYER
BIRCH PLYWOOD


FOR THE CORRECT ASSEMBLY OF THE CABANE, PLACE A STRAIGHT BAR ON EACH SIDE OF THE FUSELAGE AND ADJUST THE TWO FRONT WIRES...


...UNTIL THE DISTANCE BETWEEN THE BARS AND THE SCREW HEAD IS EQUAL ON BOTH SIDES

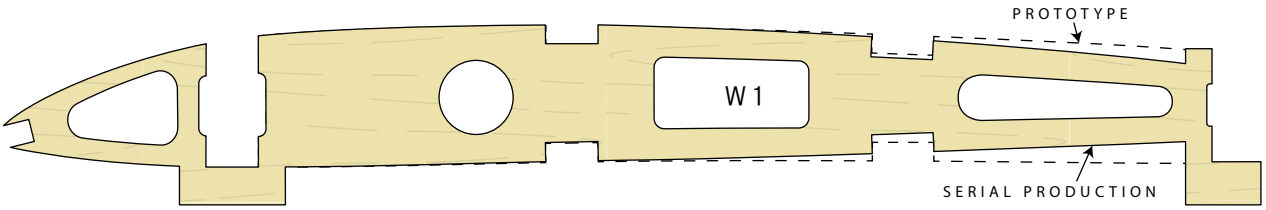

USE THESE SCREWS TO ADJUST...

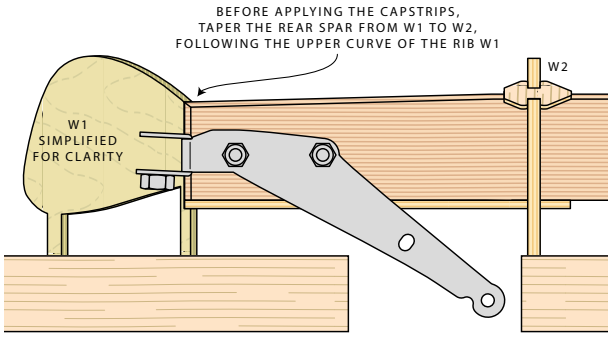

...THE TRANSVERSAL INCLINATION OF THE CABANE.
BE SURE THAT THIS DISTANCE IS EQUAL ON BOTH SIDES

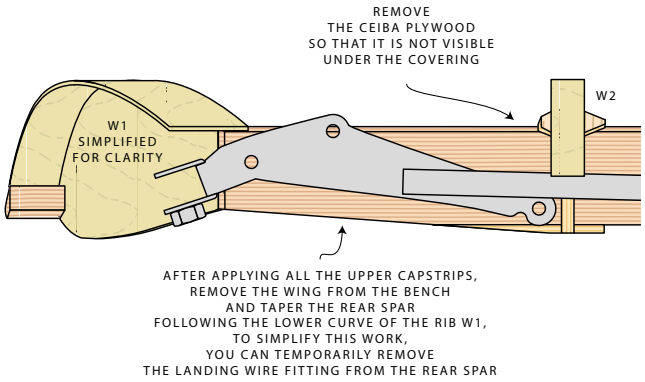

PLACE A STRAIGHT BAR ON EACH SIDE OF THE FUSELAGE AND ADJUST THE TWO REAR WIRES, SAME AS YOU ALREADY DID WITH THE FRONT WIRES.

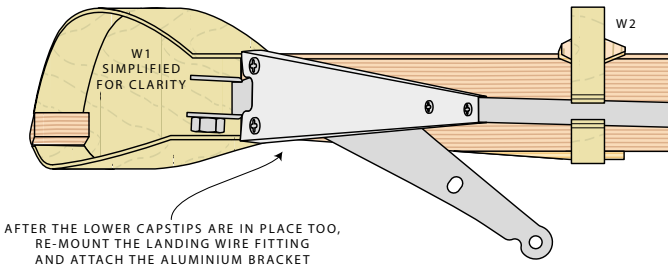
ATTENTION:
The pictures in this manual have been made on the second prototype that I built.
Later, I had the opportunity to inspect a real Tiger Moth under restoration and,
for better scale fidelity,
I made a change to the center ribs on all wing panels.
Paolo Severin

TOP WING
Only rib W1 is modified.



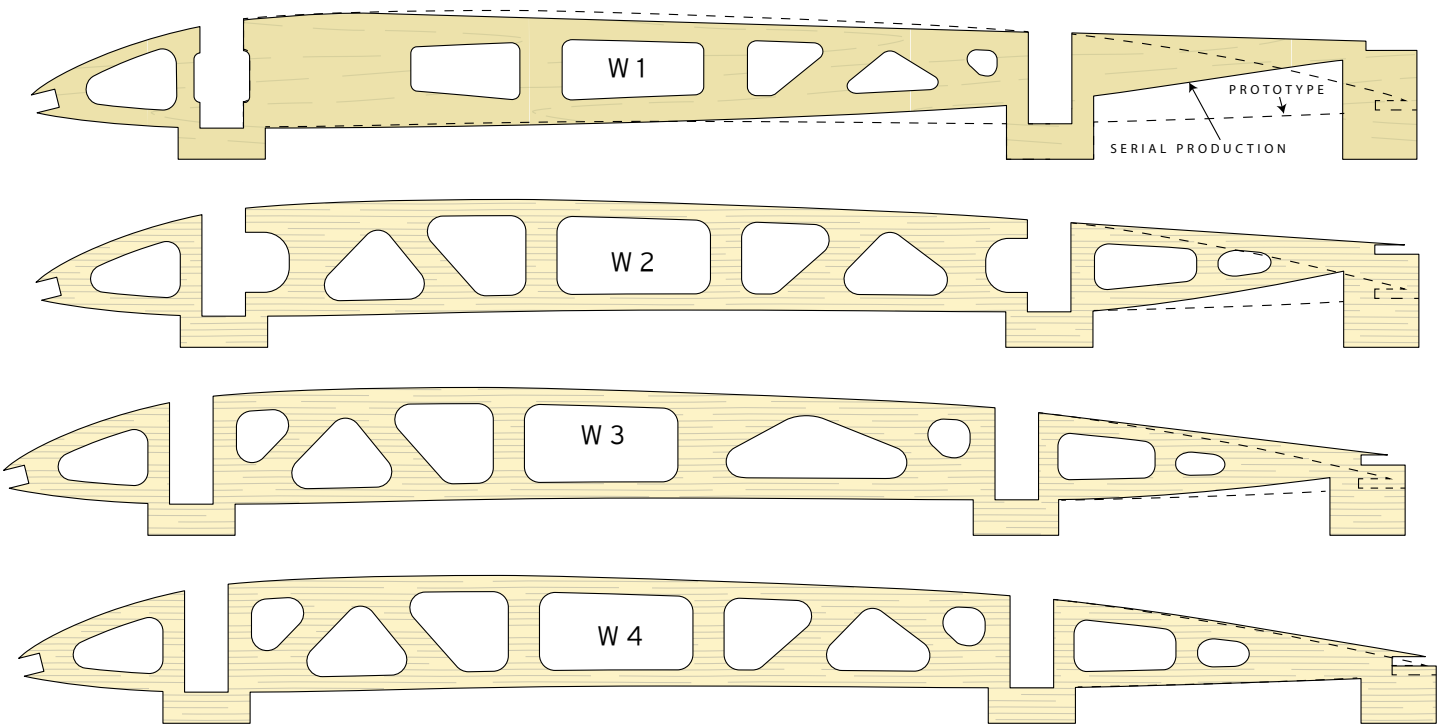


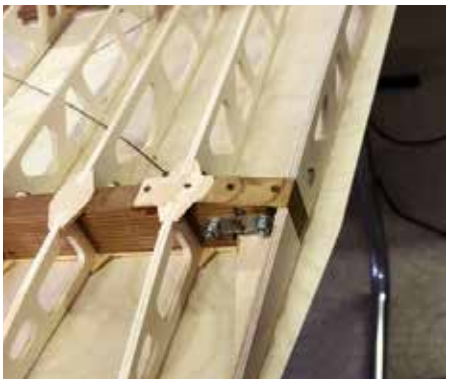




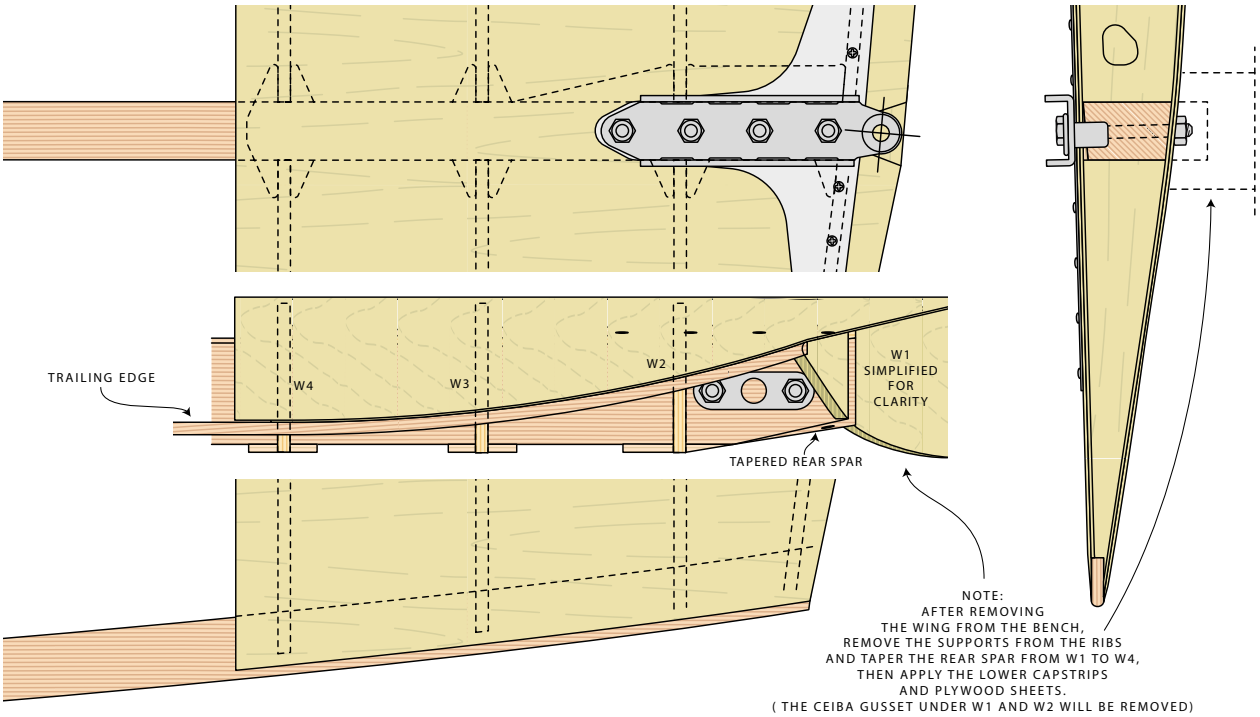
Bottom wing
of a real Tiger Moth
under restoration,
the upper plywood sheeting
is modified now
to represent the original.

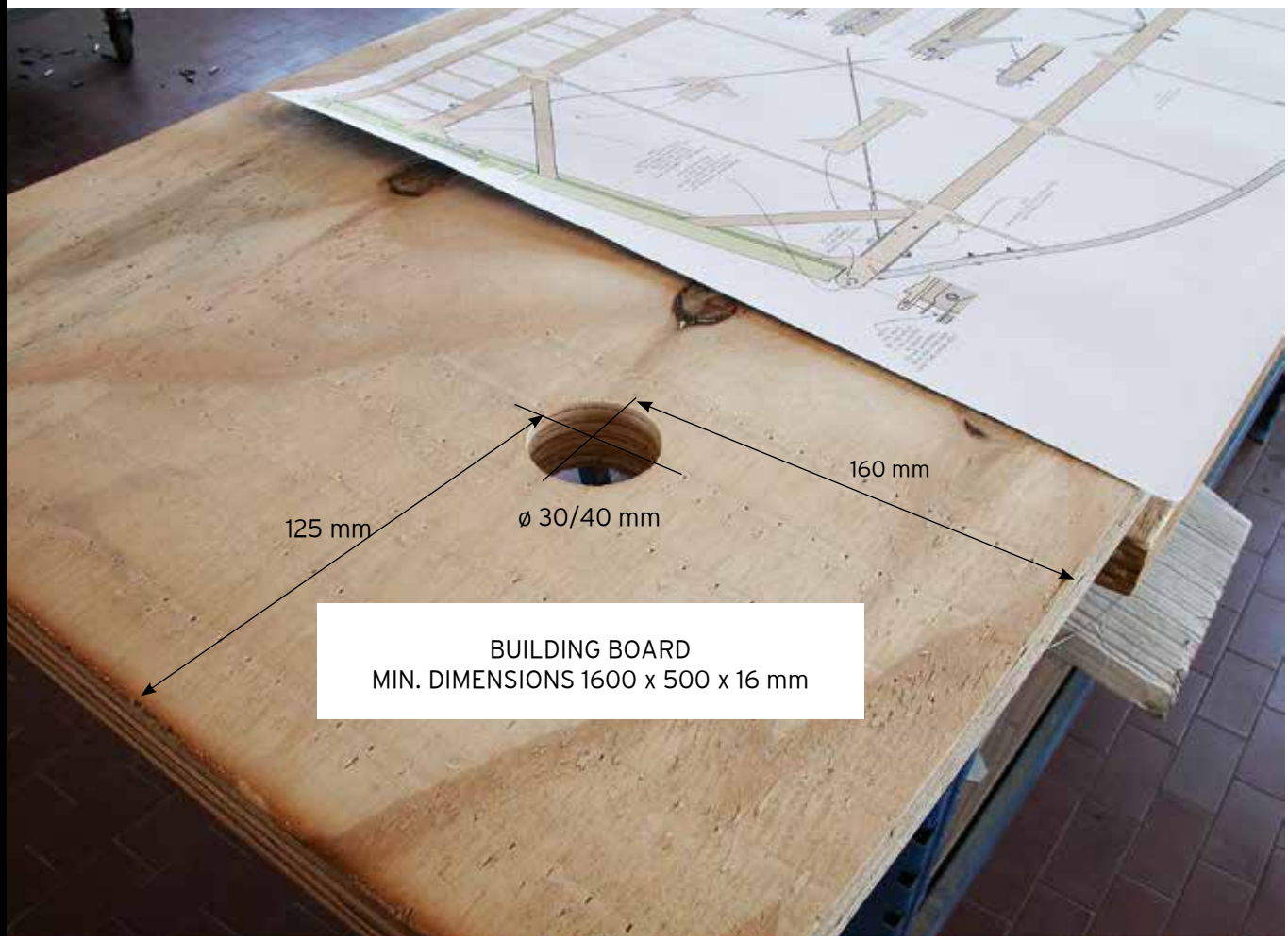
BOTTOM WING
Rib W1, W2, W3 and W4 modified.

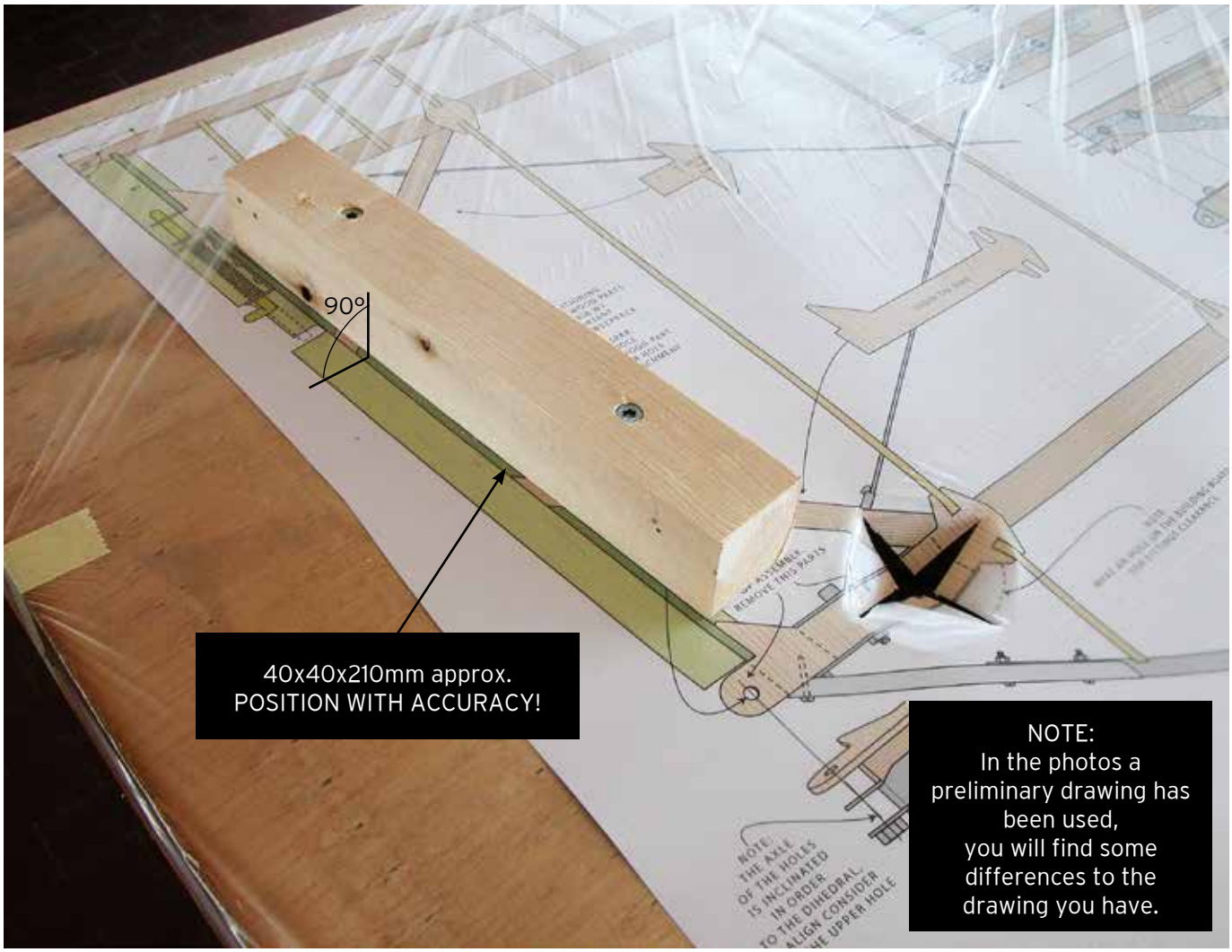


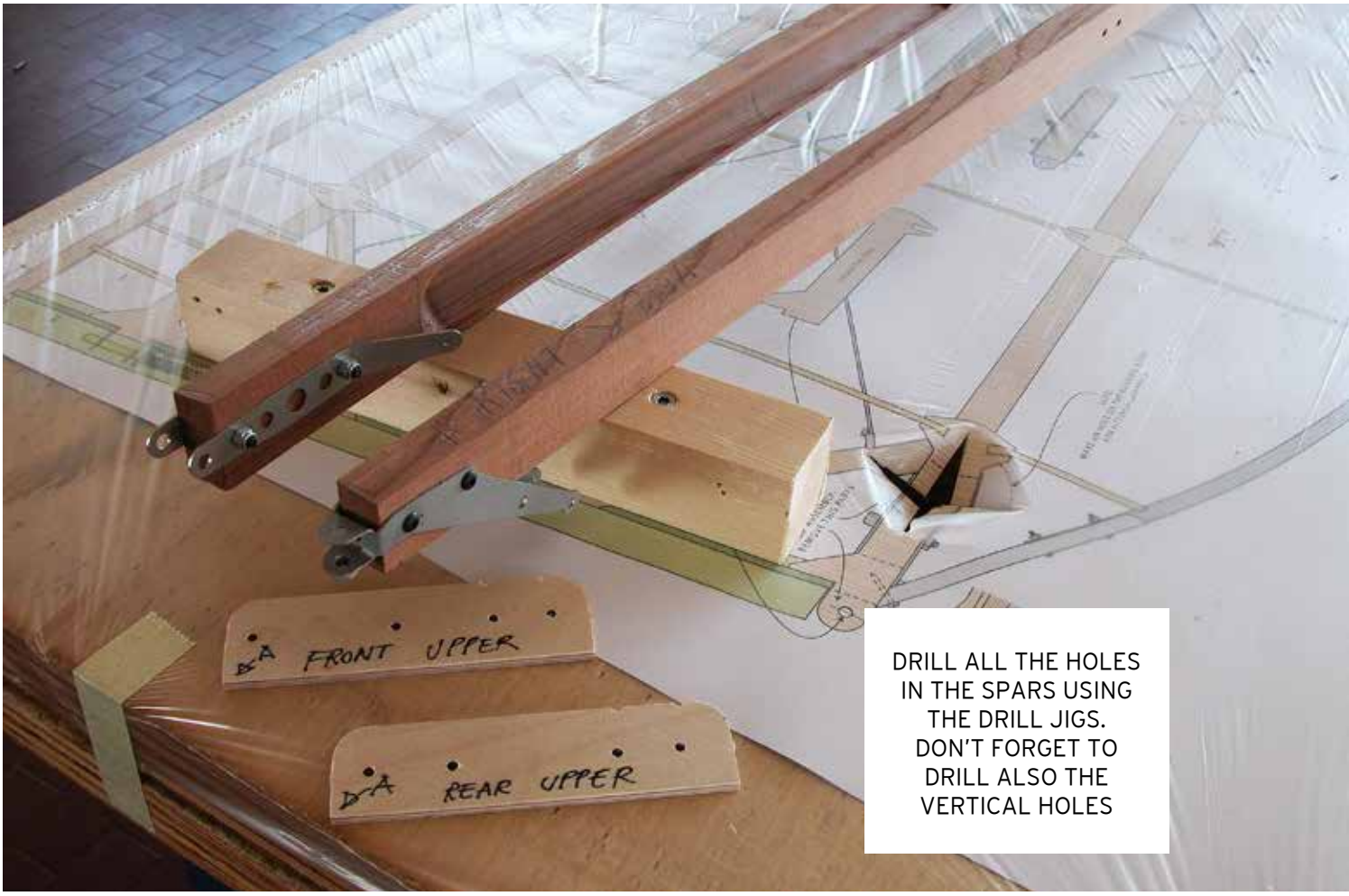


In the above photos, you see the first Tiger Moth built from my kit under construction in the workshop of my friend Gianni Vetrini.
Note the first four ribs on the bottom wing.

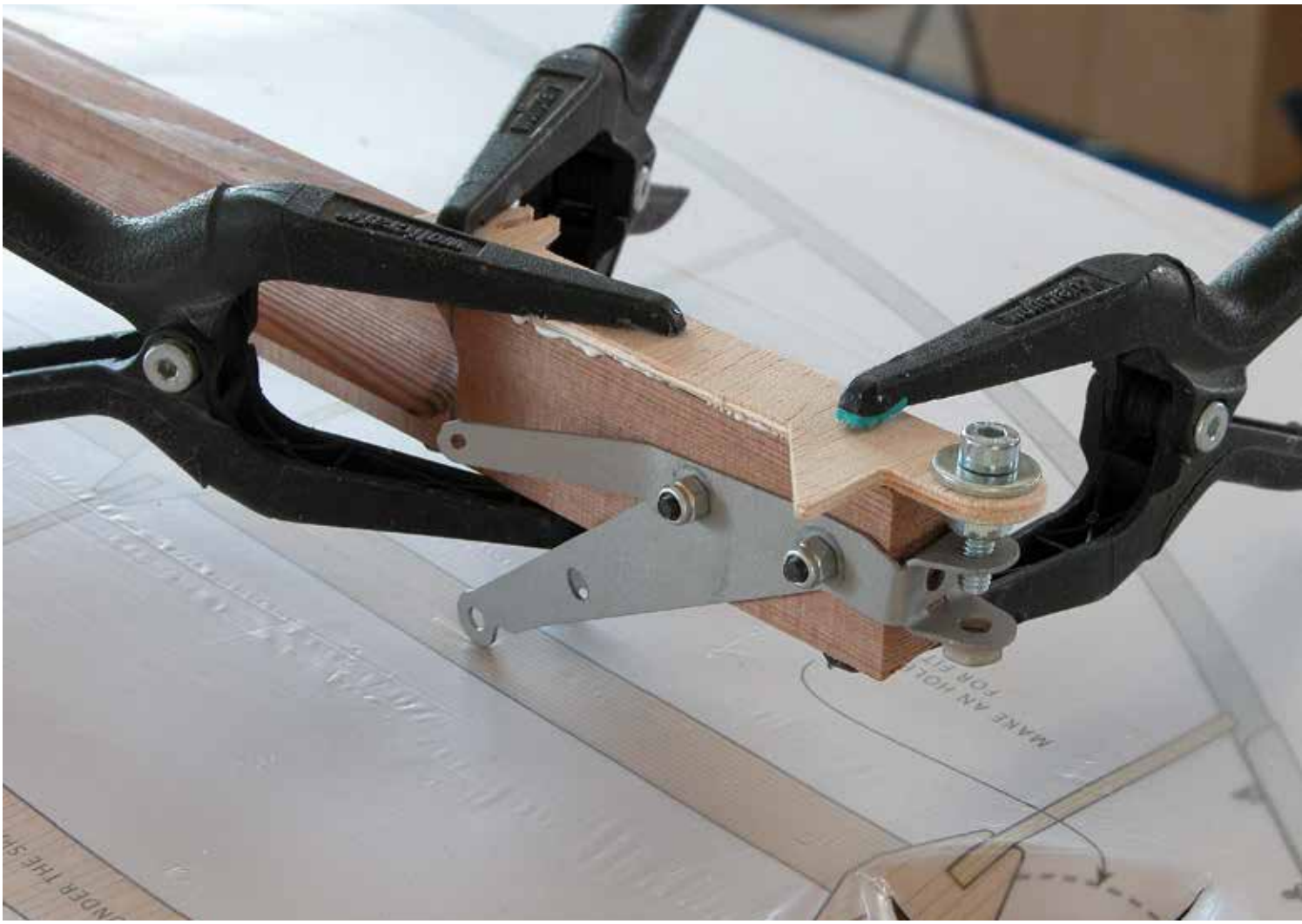


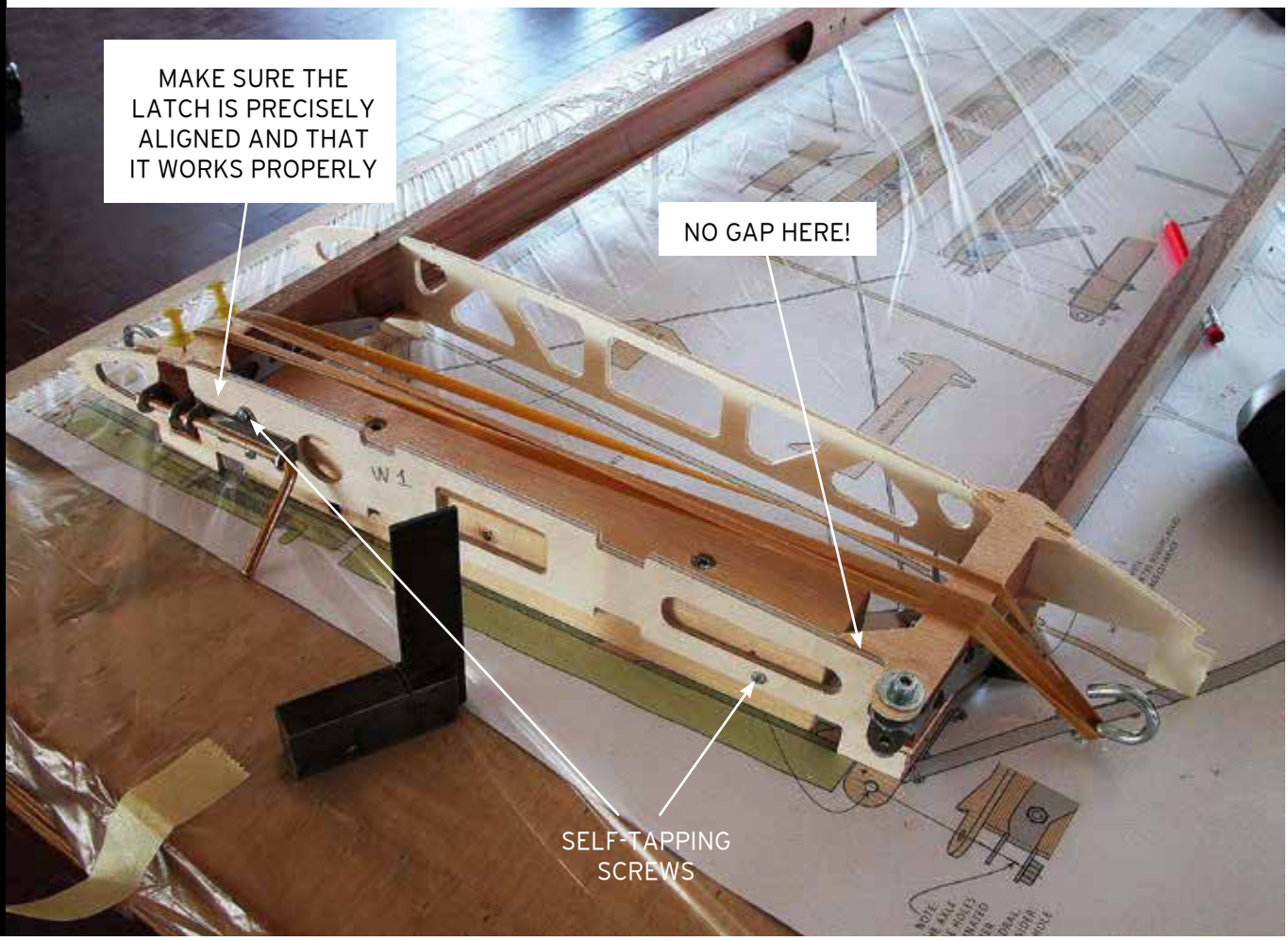

125 mm
ø 30/40 mm
160 mm
BUILDING BOARD
MIN. DIMENSIONS 1600 x 500 x 16 mm

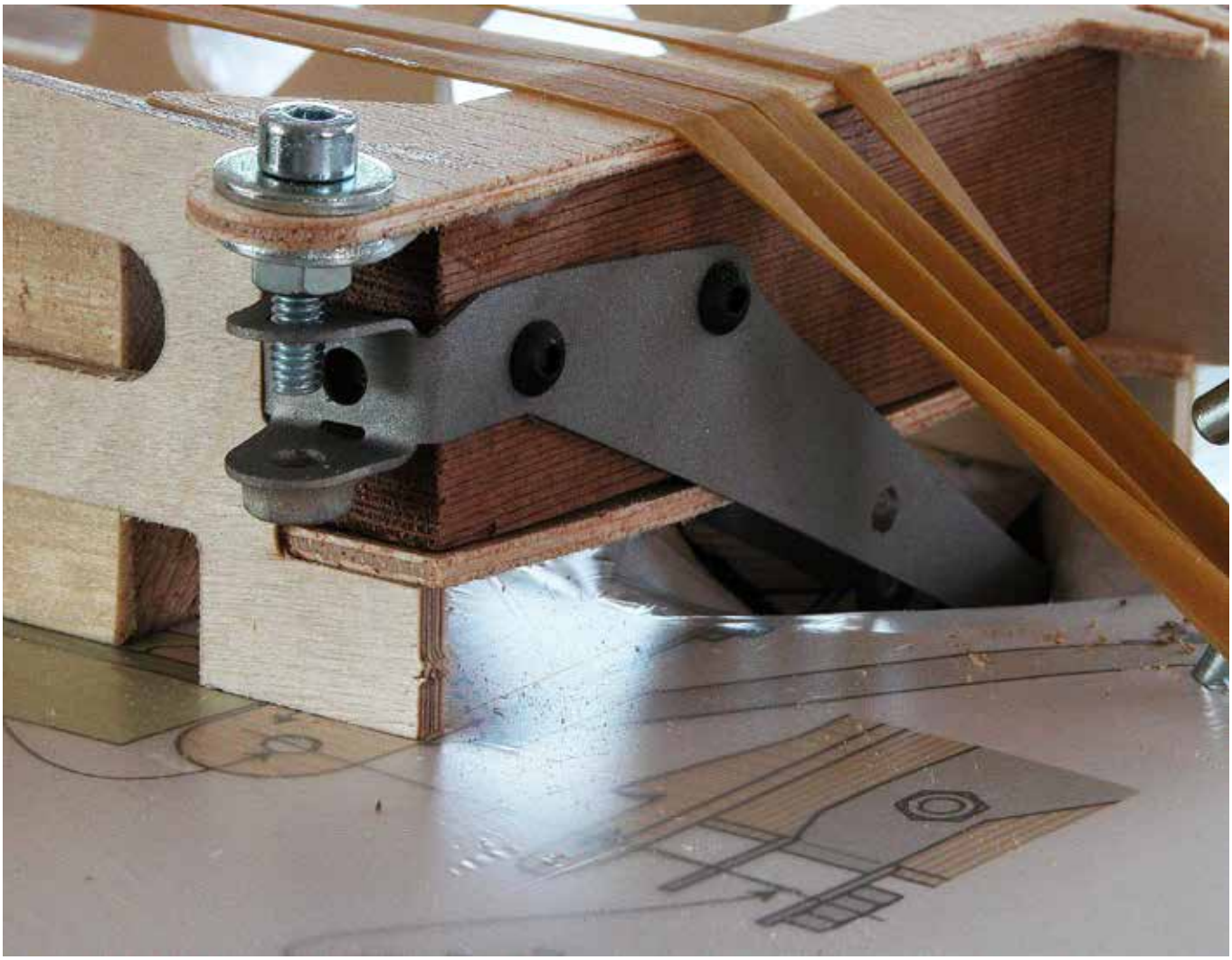

90°
40x40x210mm approx.
POSITION WITH ACCURACY!
NOTE:
In the photos a preliminary drawing has been used,
you will find some differences to the drawing you have.



DRILL ALL THE HOLES IN THE SPARS USING THE DRILL JIGS. DON'T FORGET TO DRILL ALSO THE VERTICAL HOLES

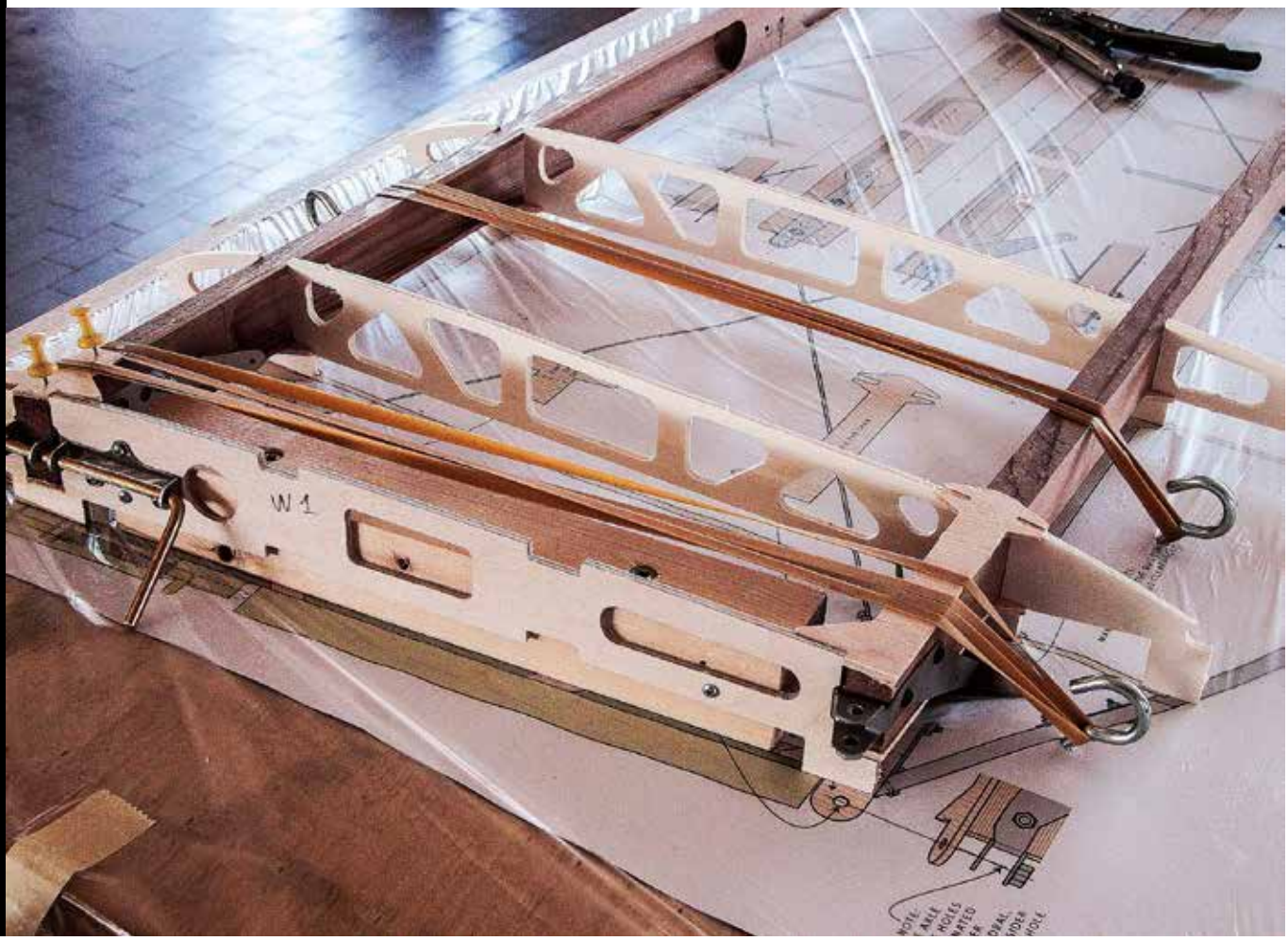



MAKE SURE THE LATCH IS PRECISELY ALIGNED AND THAT IT WORKS PROPERLY
NO GAP HERE!
SELF-TAPPING SCREWS

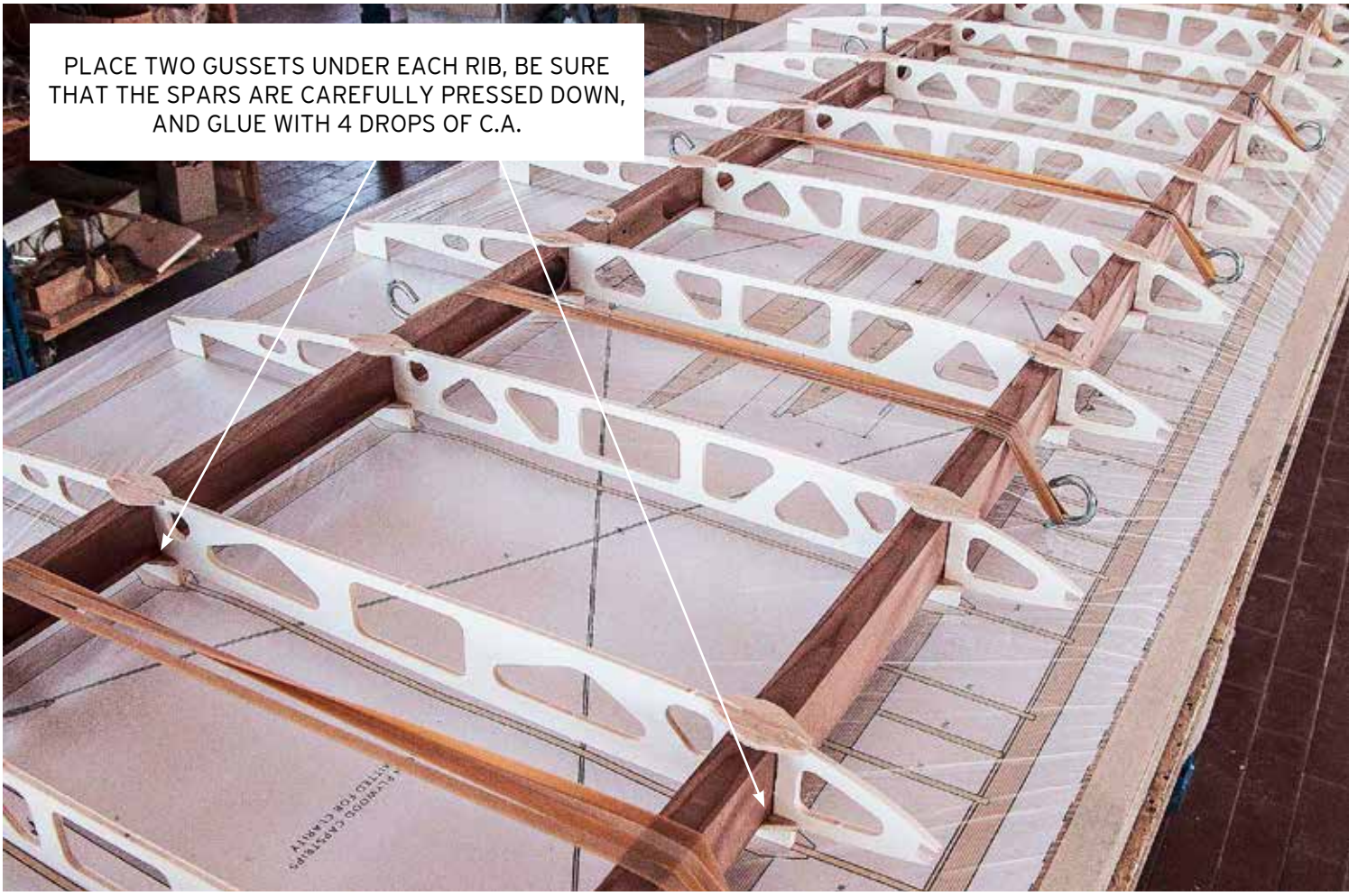



W1


A BIT MORE HEIGHT (UP TO 1 MM) IS CORRECT

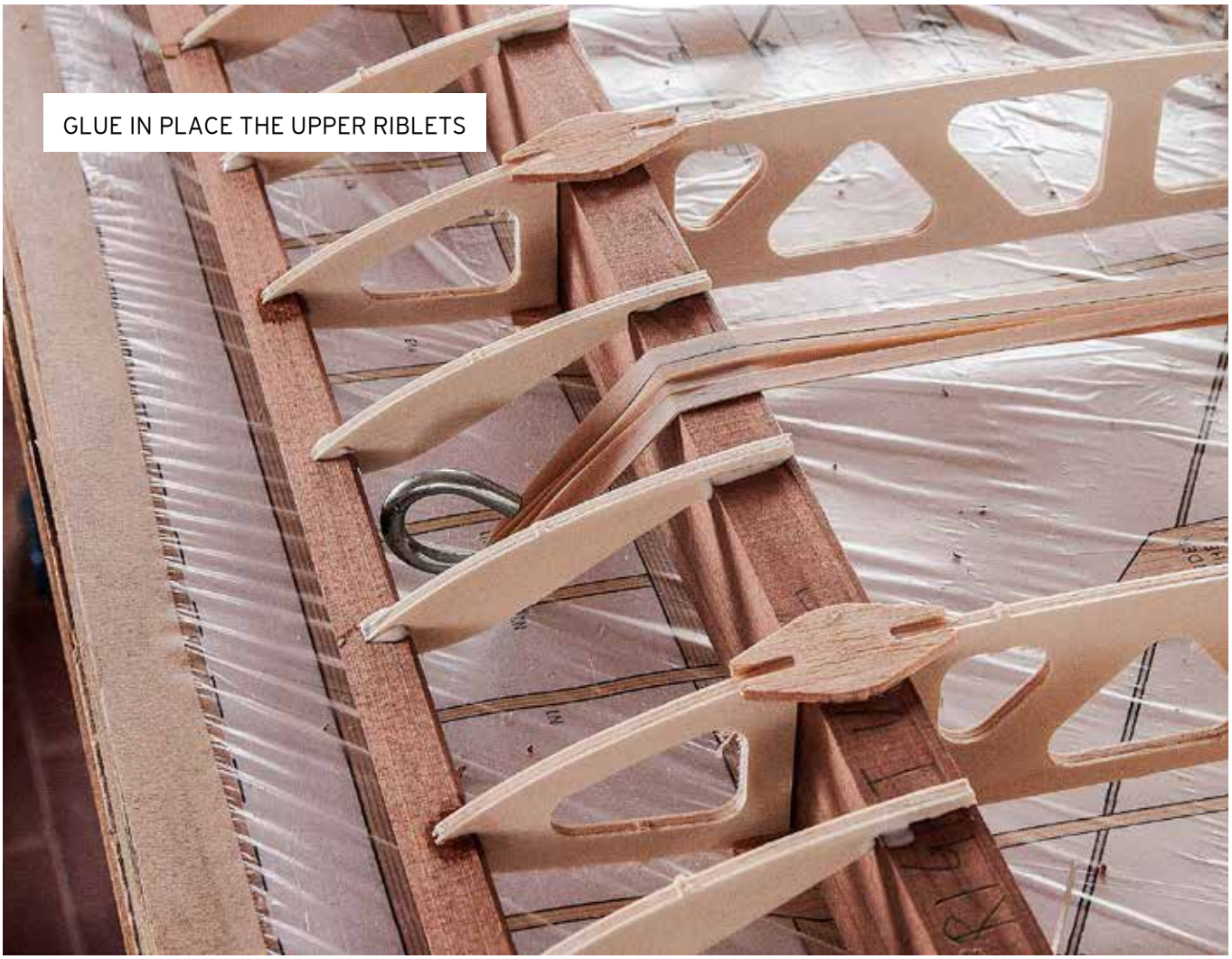

W1


GLUE THE UPPER GUSSETS IN PLACE WITH PVA GLUE
A BIT MORE HEIGHT (UP TO 1 MM) IS CORRECT


PLACE TWO GUSSETS UNDER EACH RIB, BE SURE THAT THE SPARS ARE CAREFULLY PRESSED DOWN, AND GLUE WITH 4 DROPS OF C.A.

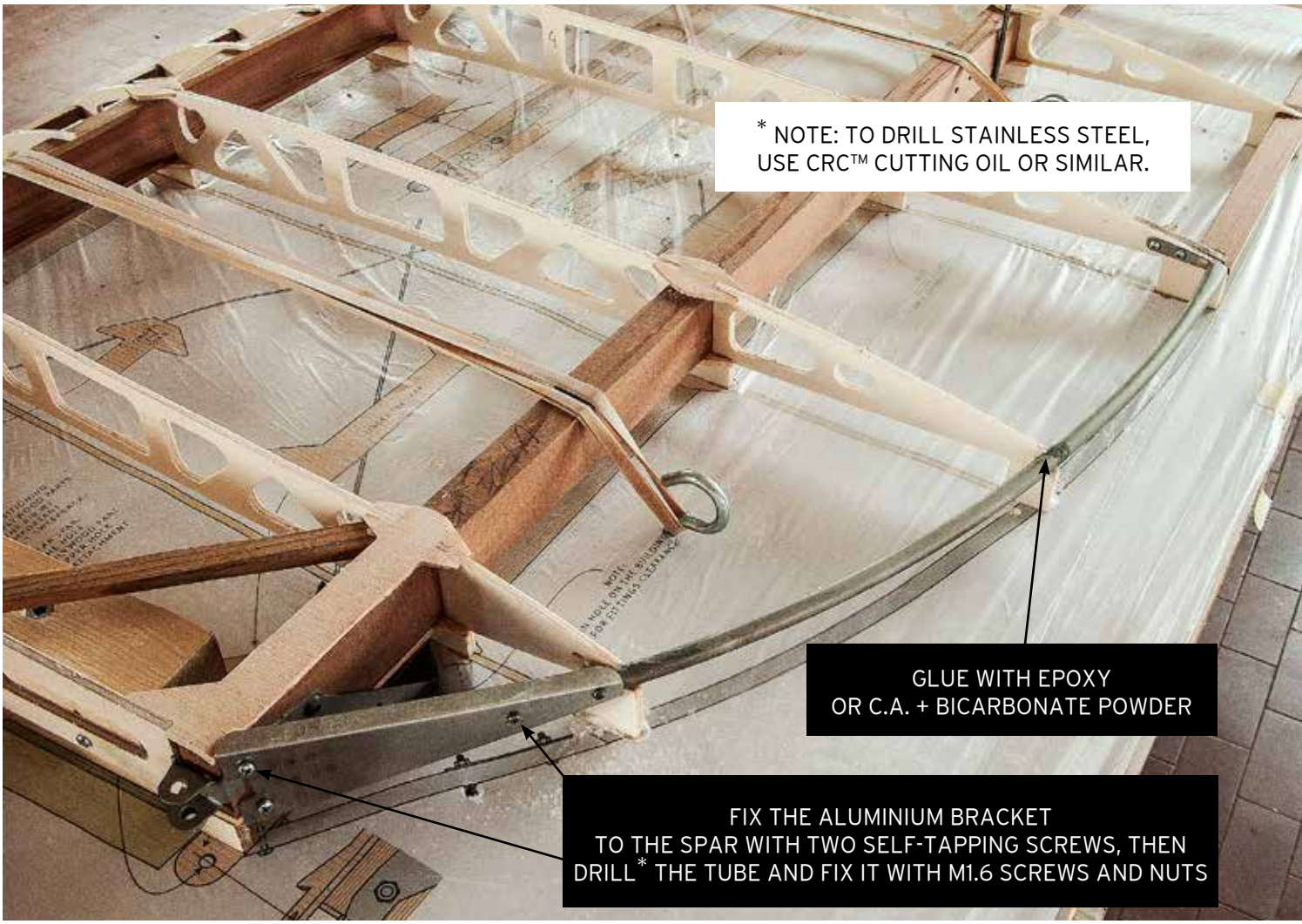

GLUE THE LEADING EDGE TO THE RIBS

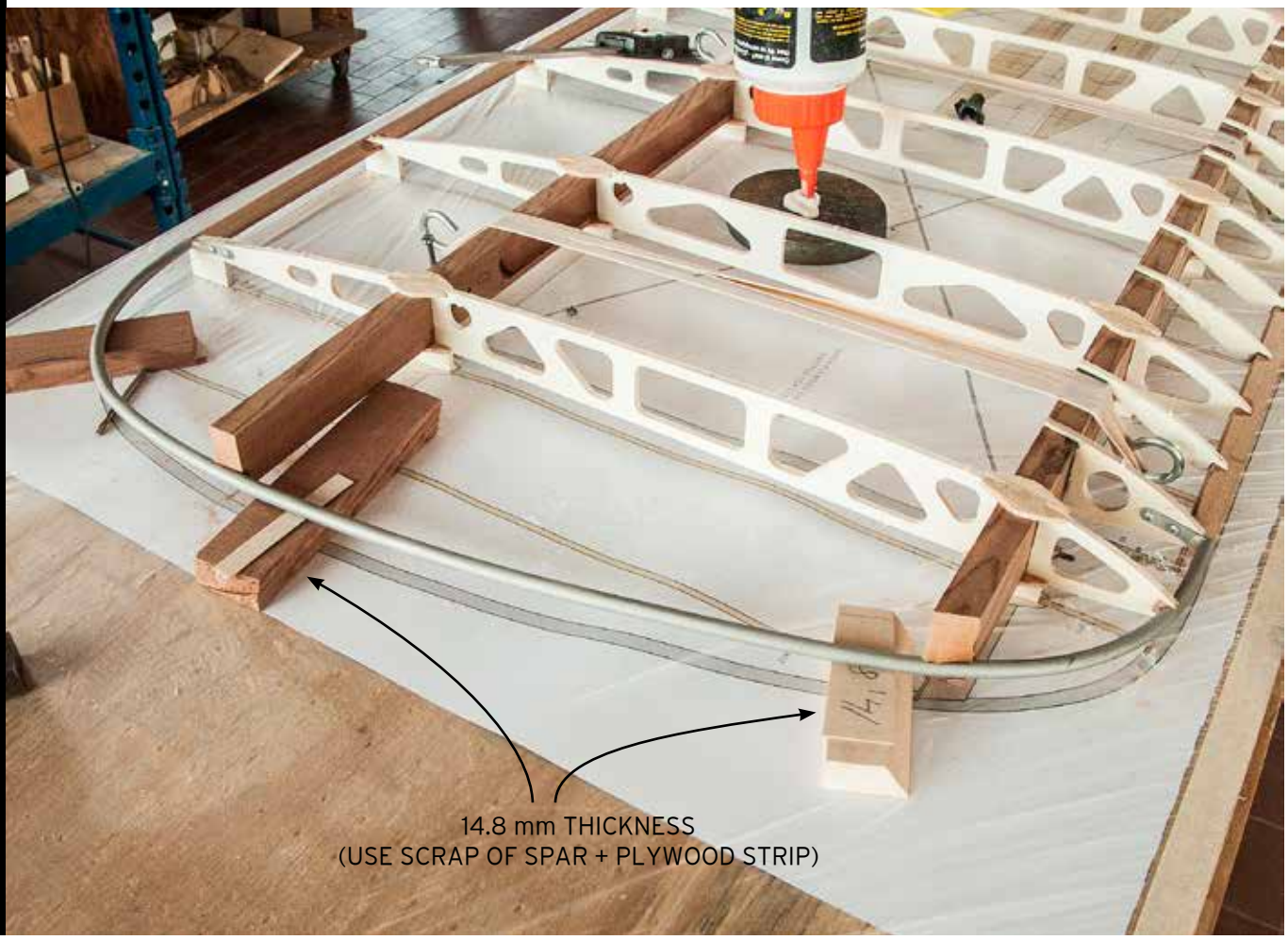
GLUE THE TRAILING EDGE TO THE RIBS

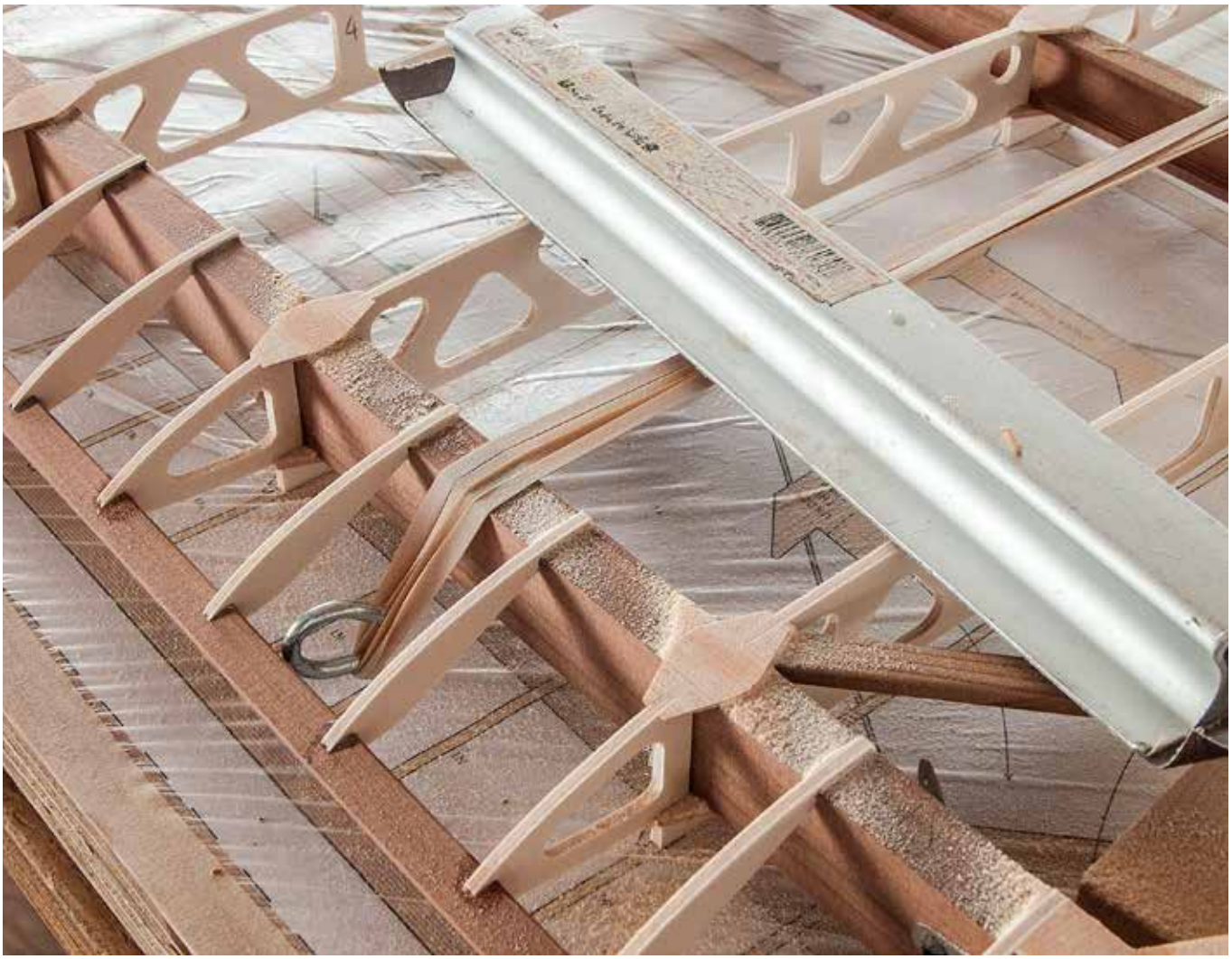


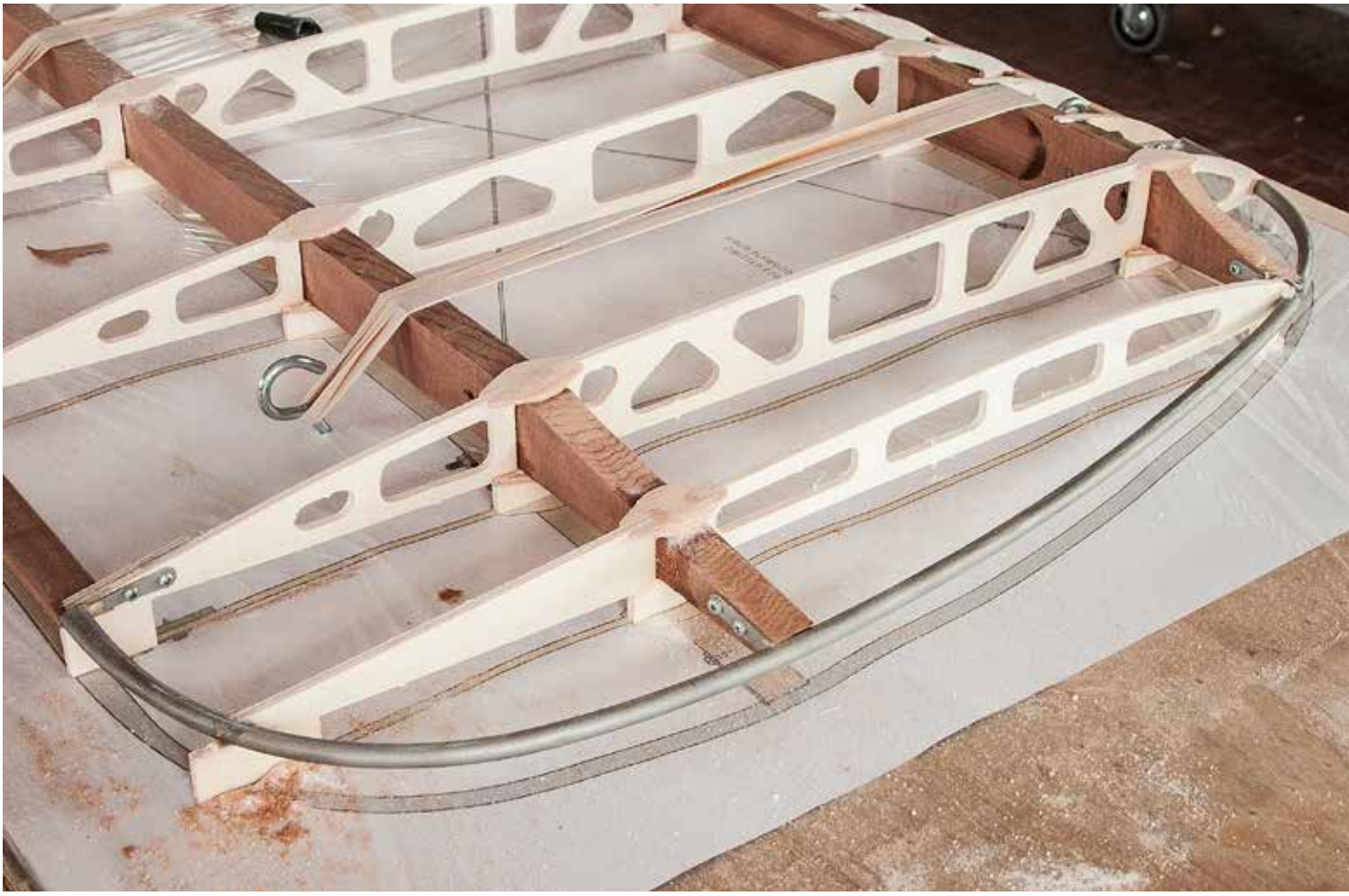
GLUE IN PLACE THE UPPER RIBLETS


GLUE IN-PLACE
THE UPPER DIAGONAL BRACES

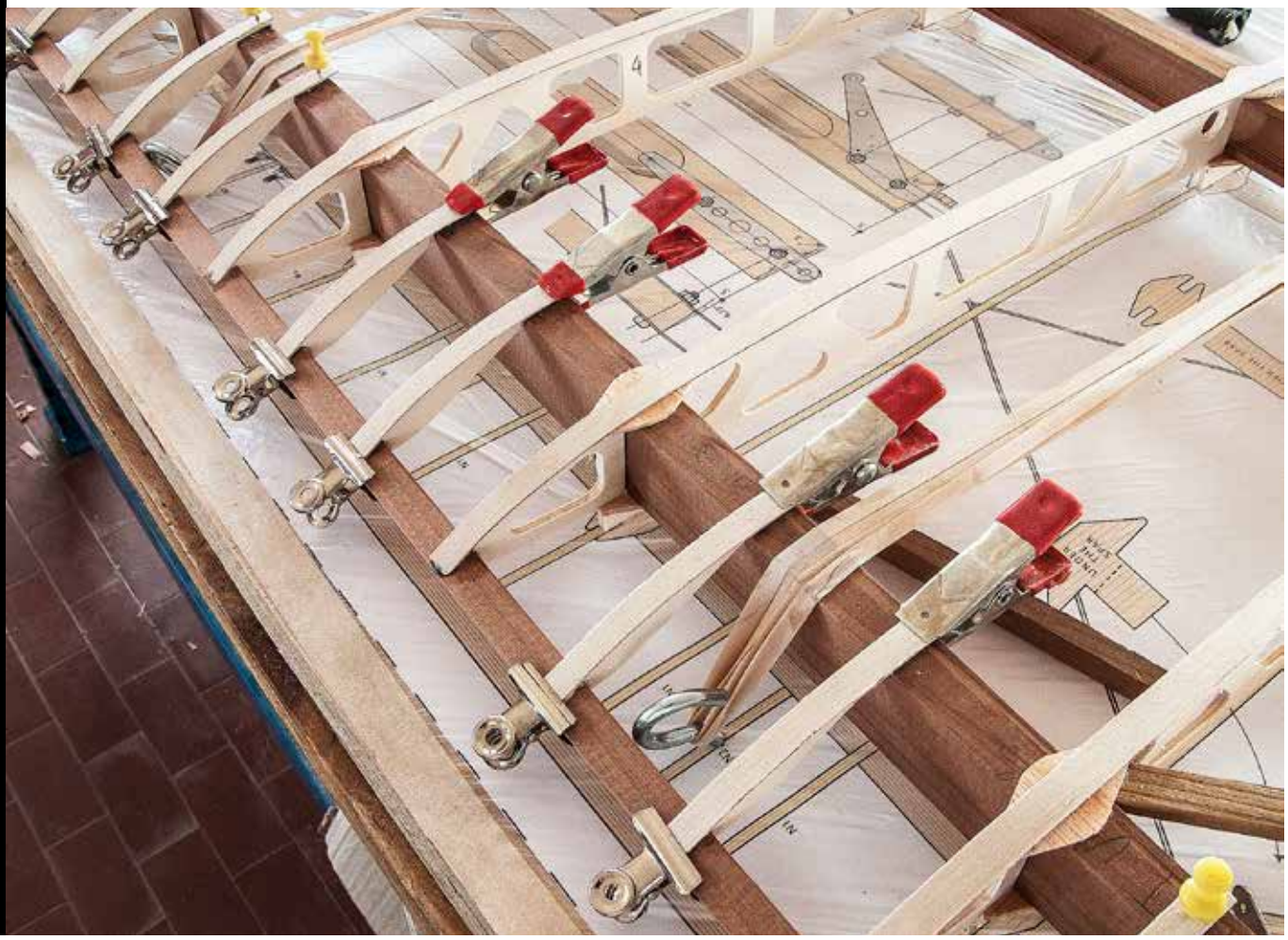

* NOTE: TO DRILL STAINLESS STEEL,
USE CRC™ CUTTING OIL OR SIMILAR.
GLUE WITH EPOXY
OR C.A. + BICARBONATE POWDER
FIX THE ALUMINIUM BRACKET
TO THE SPAR WITH TWO SELF-TAPPING SCREWS, THEN
DRILL* THE TUBE AND FIX IT WITH M1.6 SCREWS AND NUTS

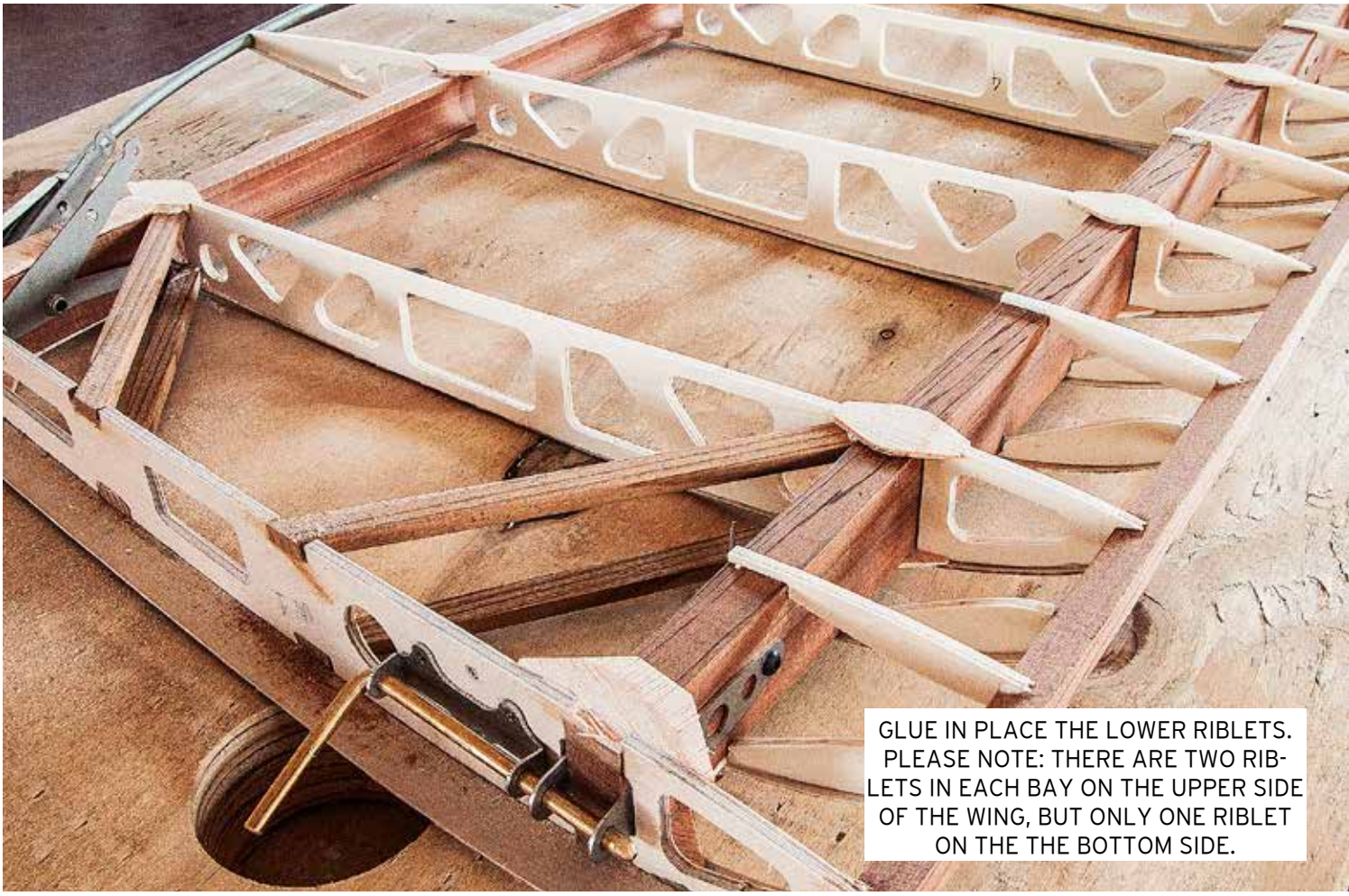

14.8 mm THICKNESS
(USE SCRAP OF SPAR + PLYWOOD STRIP)



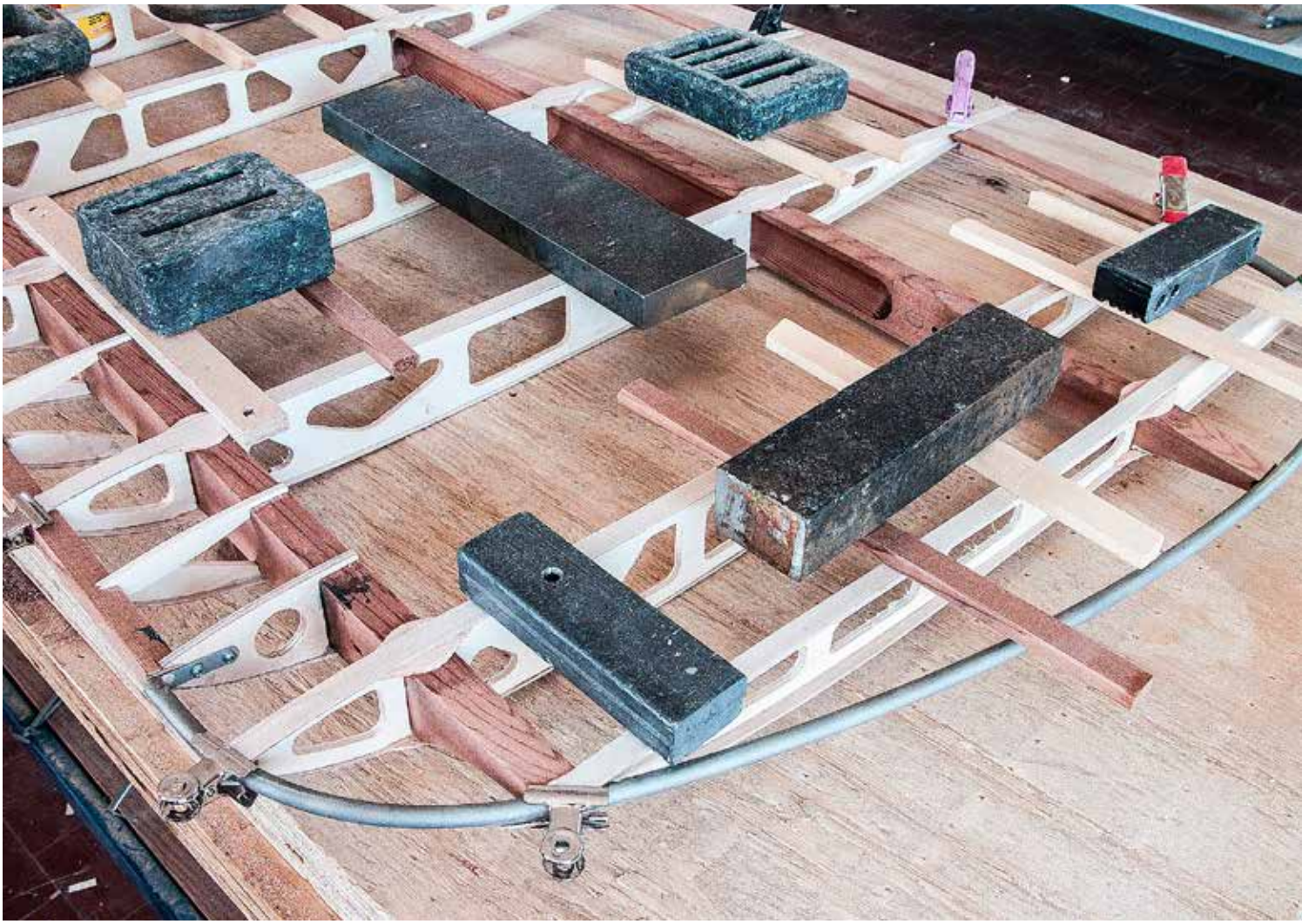


GLUE THE CAPSTRIPS WITH CARE,
LIGHTLY SANDPAPER EACH CAPSTRIP BEFORE GLUING,
BECAUSE THERE COULD BE SOME WAX
ON THE SURFACE OF BIRCH PLYWOOD.



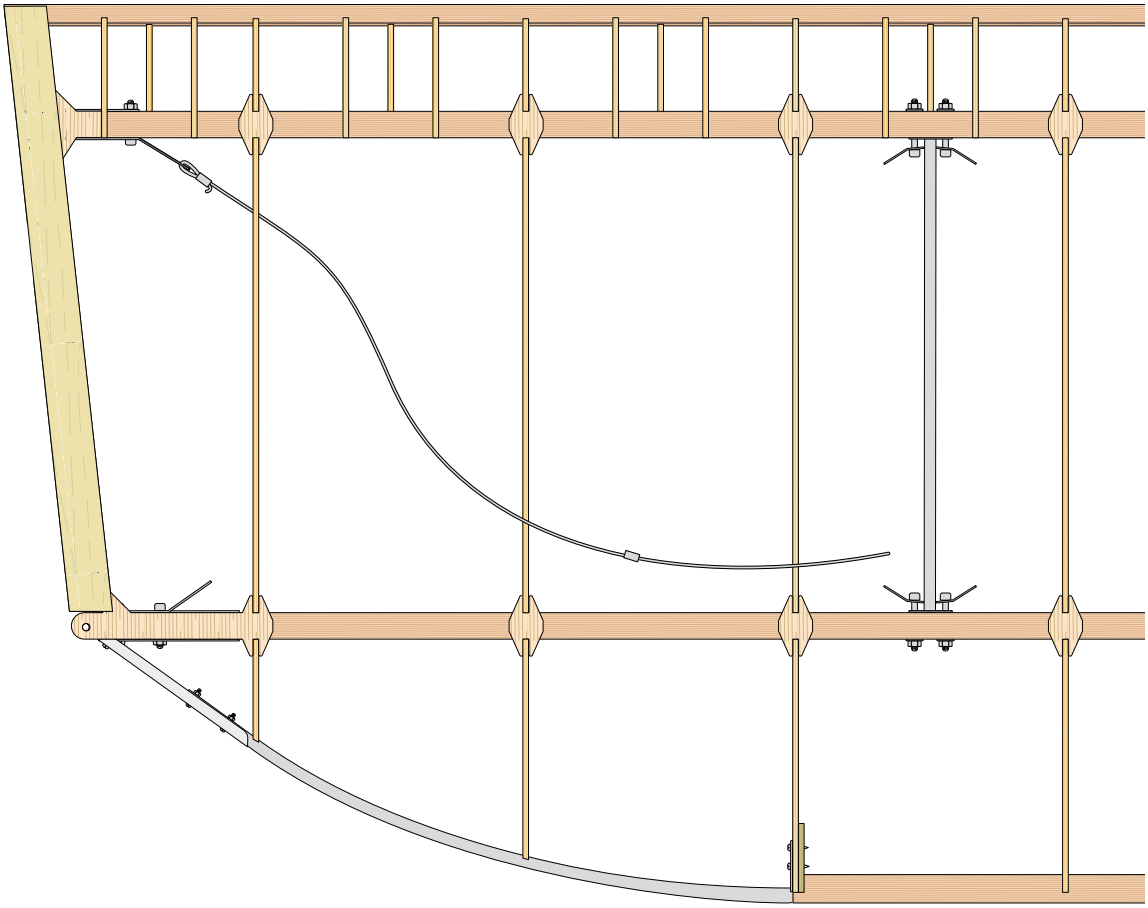


GLUE IN PLACE THE LOWER RIBLETS. PLEASE NOTE: THERE ARE TWO RIBLETS IN EACH BAY ON THE UPPER SIDE OF THE WING, BUT ONLY ONE RIBLET ON THE THE BOTTOM SIDE.

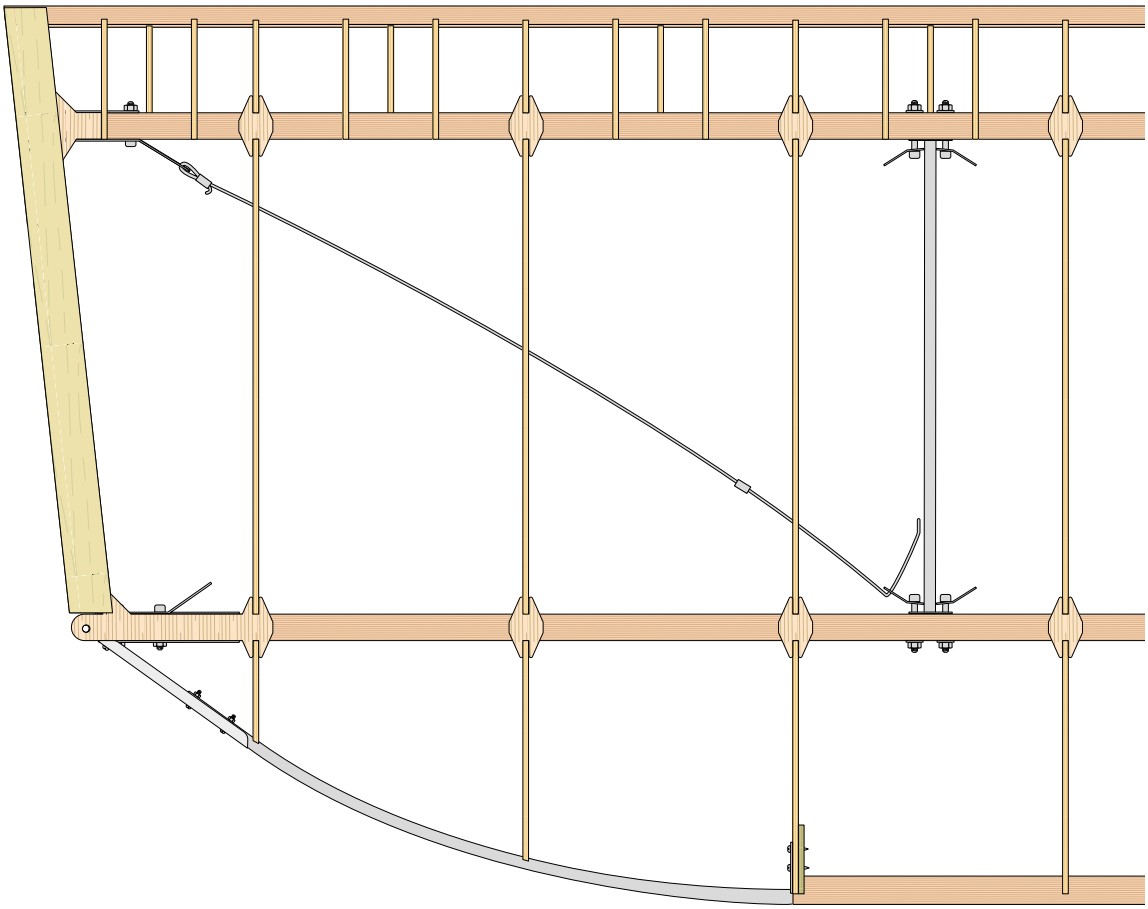


GLUE IN PLACE THE 2ND LAYER OF PLYWOOD

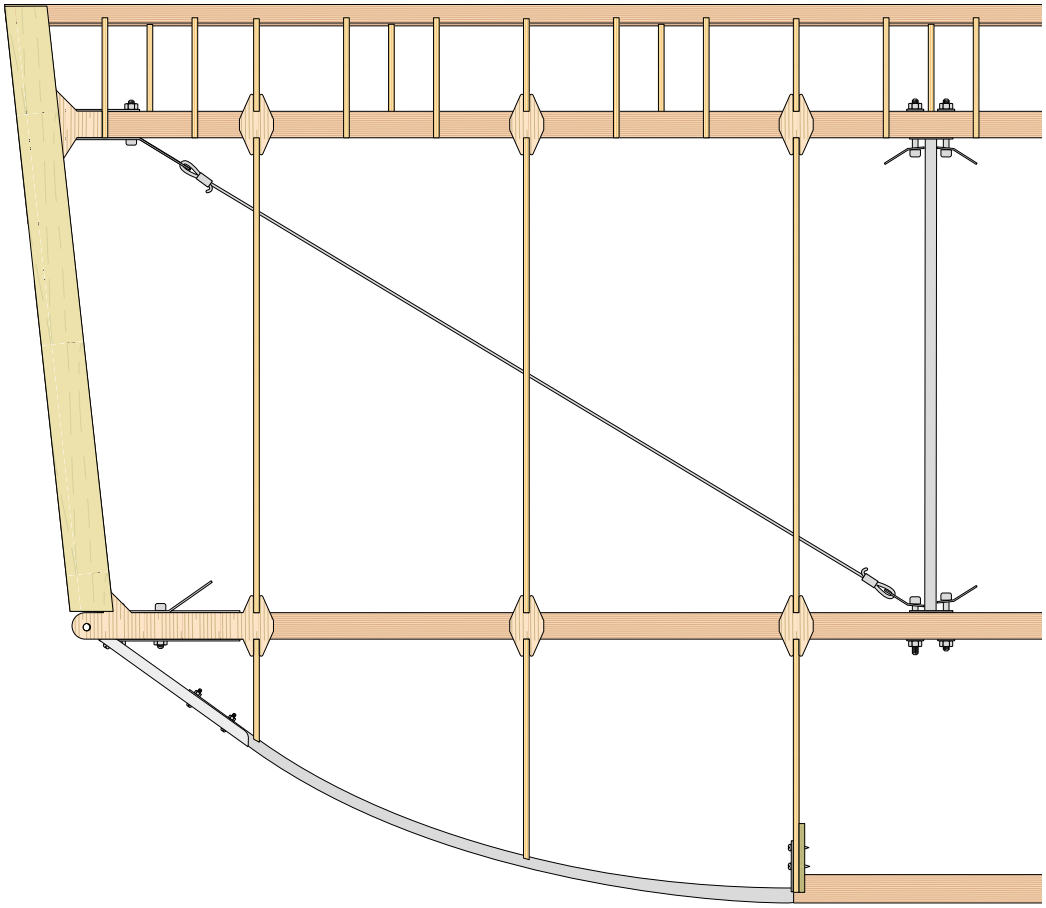
1) Attach one end of the wire as shown in the drawing. Don't forget to insert a second ferrule to attach the other end.

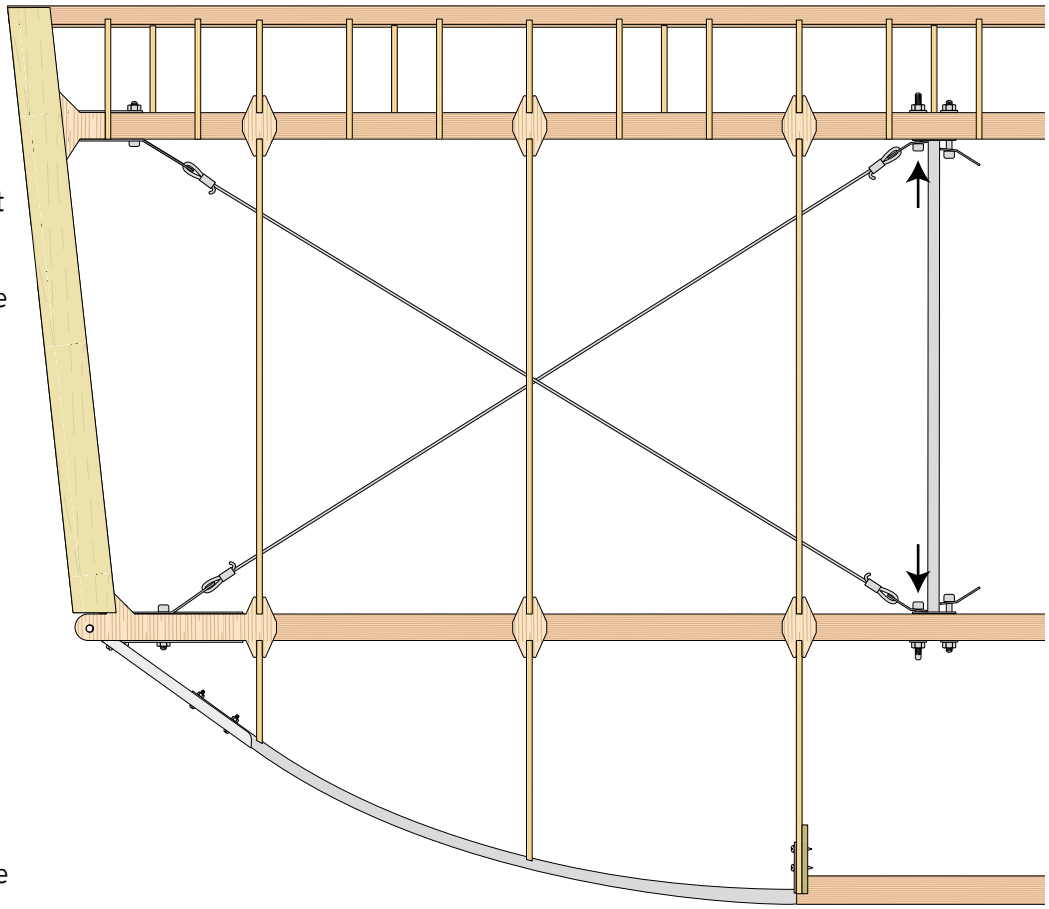


2) To achieve the correct tension, make a 90° bend in the other end of the wire and insert in the lug as in the drawing.



3) Insert the wire completely and fully bend the ends to 180° and lock with the ferrules.

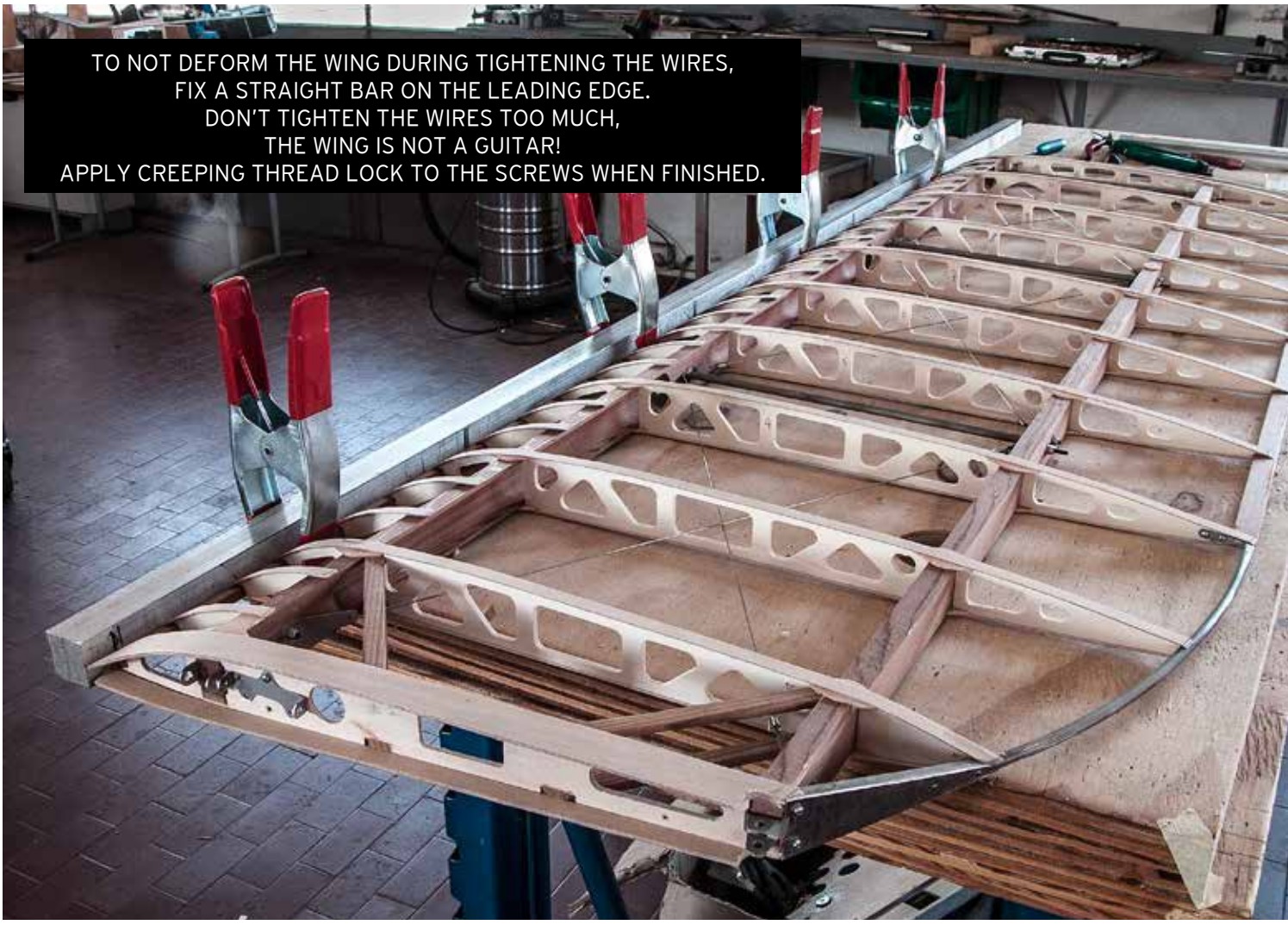




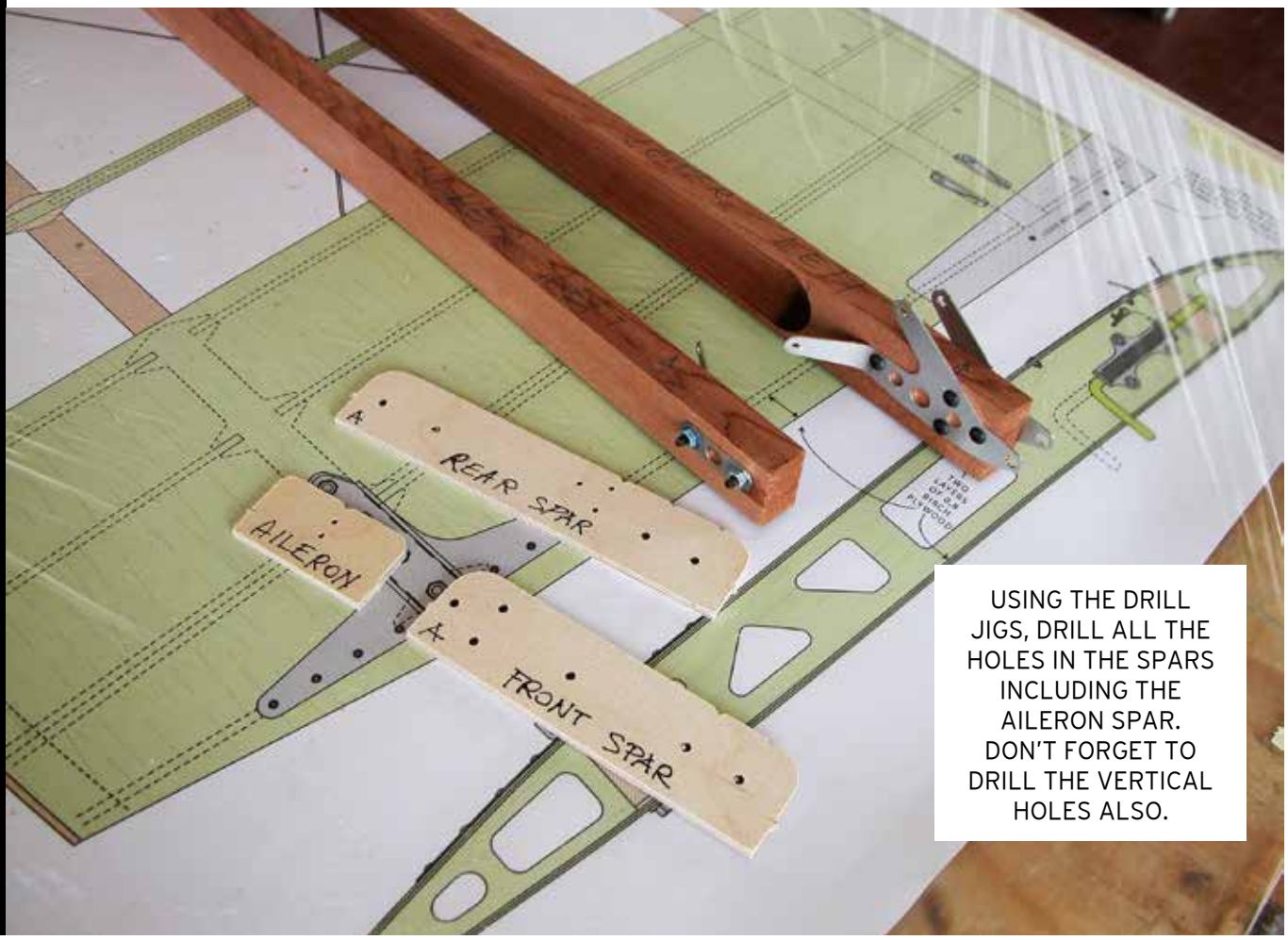
4) Mount the other wire and tighten with the screws. Check that the tension is not excessive. You can bend the stainless steel wire many times without compromising its integrity. In any case, there is ample wire supplied.

Do not press the ferrules; it is not needed for strength. If you don't press them, you can always reuse the ferrules in case you do not succeed on the first try and you have to replace a wire.

If it makes you feel more secure, press the ferrules just before covering the wings.

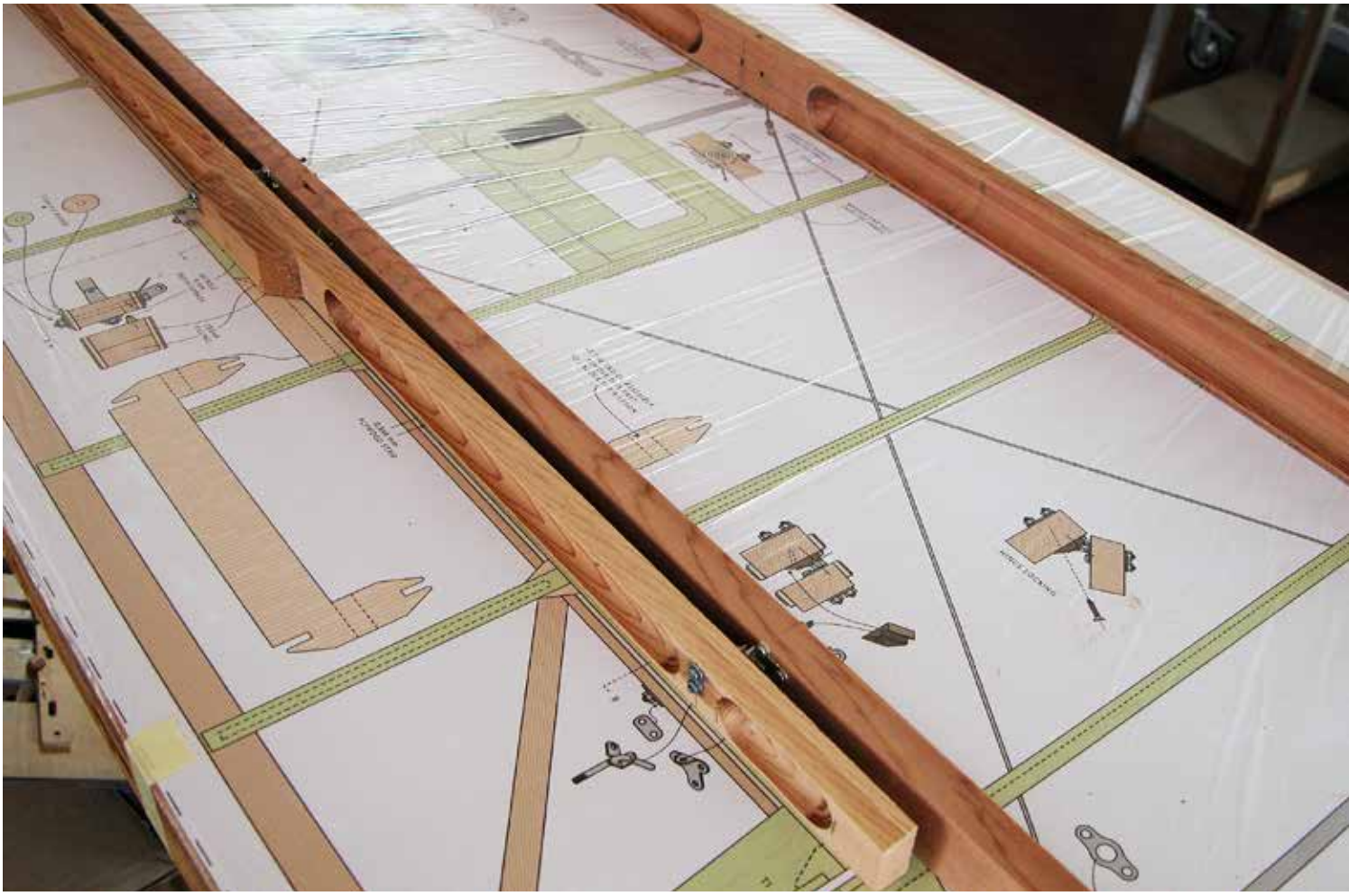


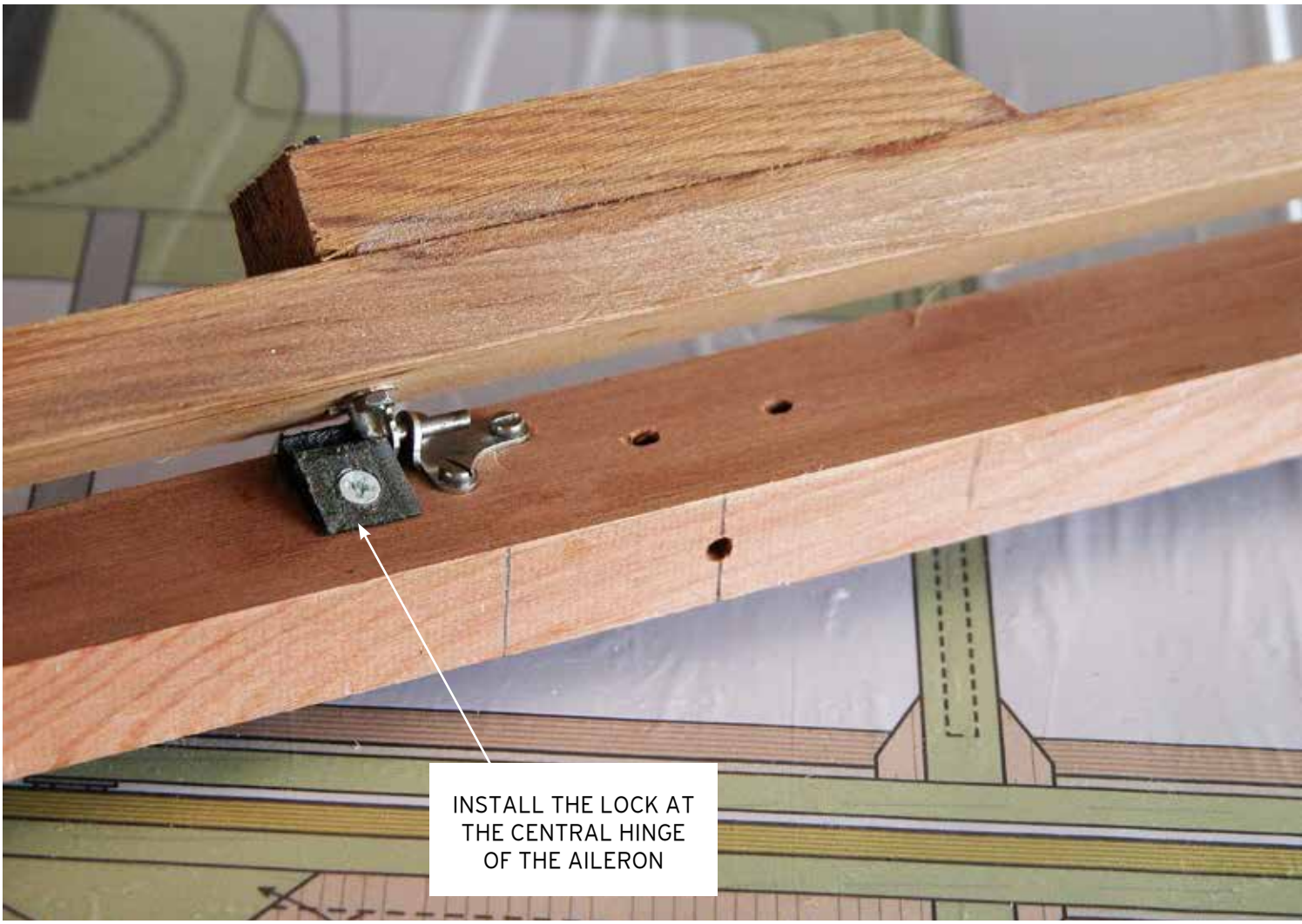
TO NOT DEFORM THE WING DURING TIGHTENING THE WIRES,
FIX A STRAIGHT BAR ON THE LEADING EDGE.
DON'T TIGHTEN THE WIRES TOO MUCH,
THE WING IS NOT A GUITAR!
APPLY CREEPING THREAD LOCK TO THE SCREWS WHEN FINISHED.

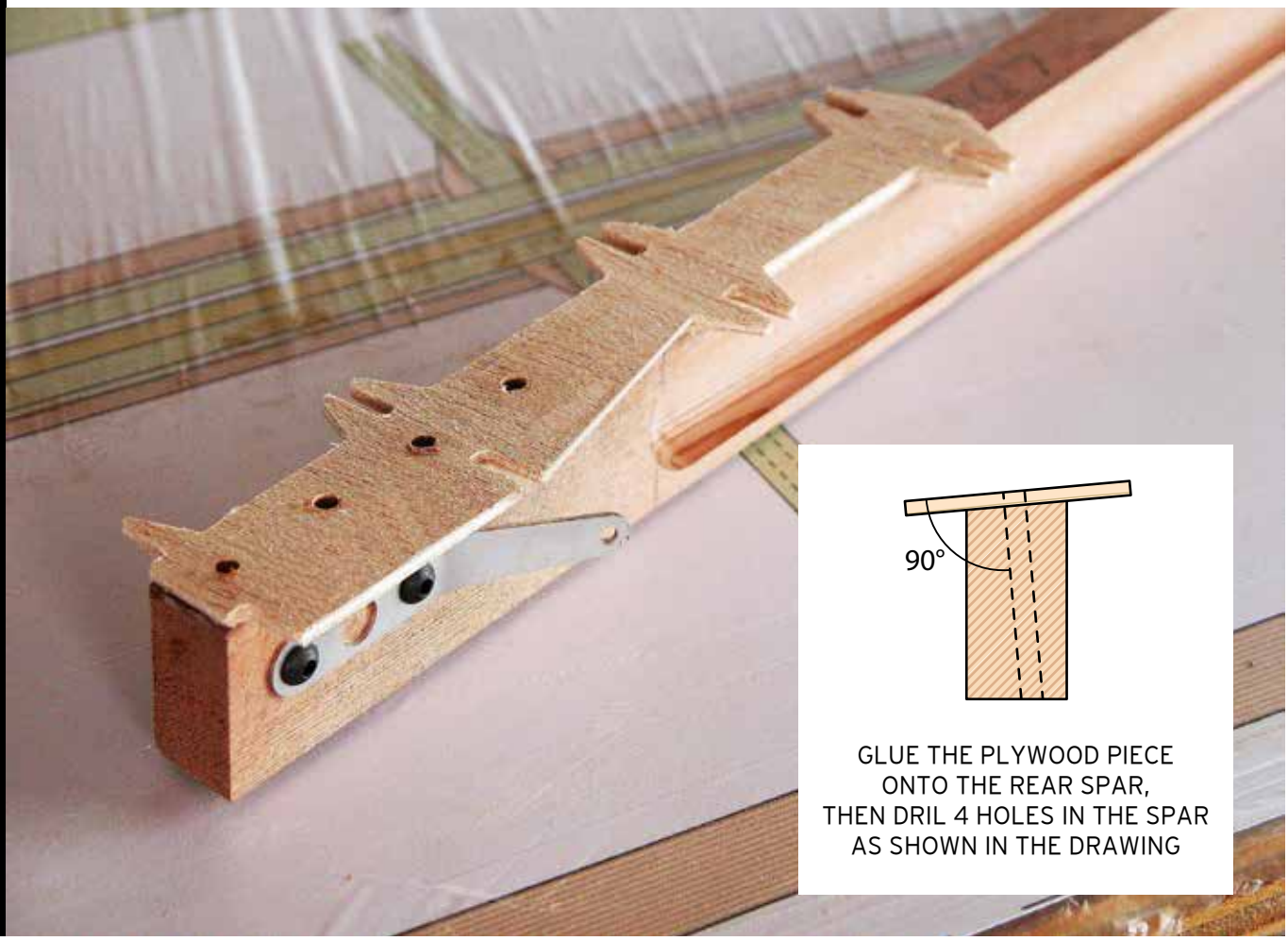


USING THE DRILL JIGS, DRILL ALL THE HOLES IN THE SPARS INCLUDING THE AILERON SPAR. DON'T FORGET TO DRILL THE VERTICAL HOLES ALSO.

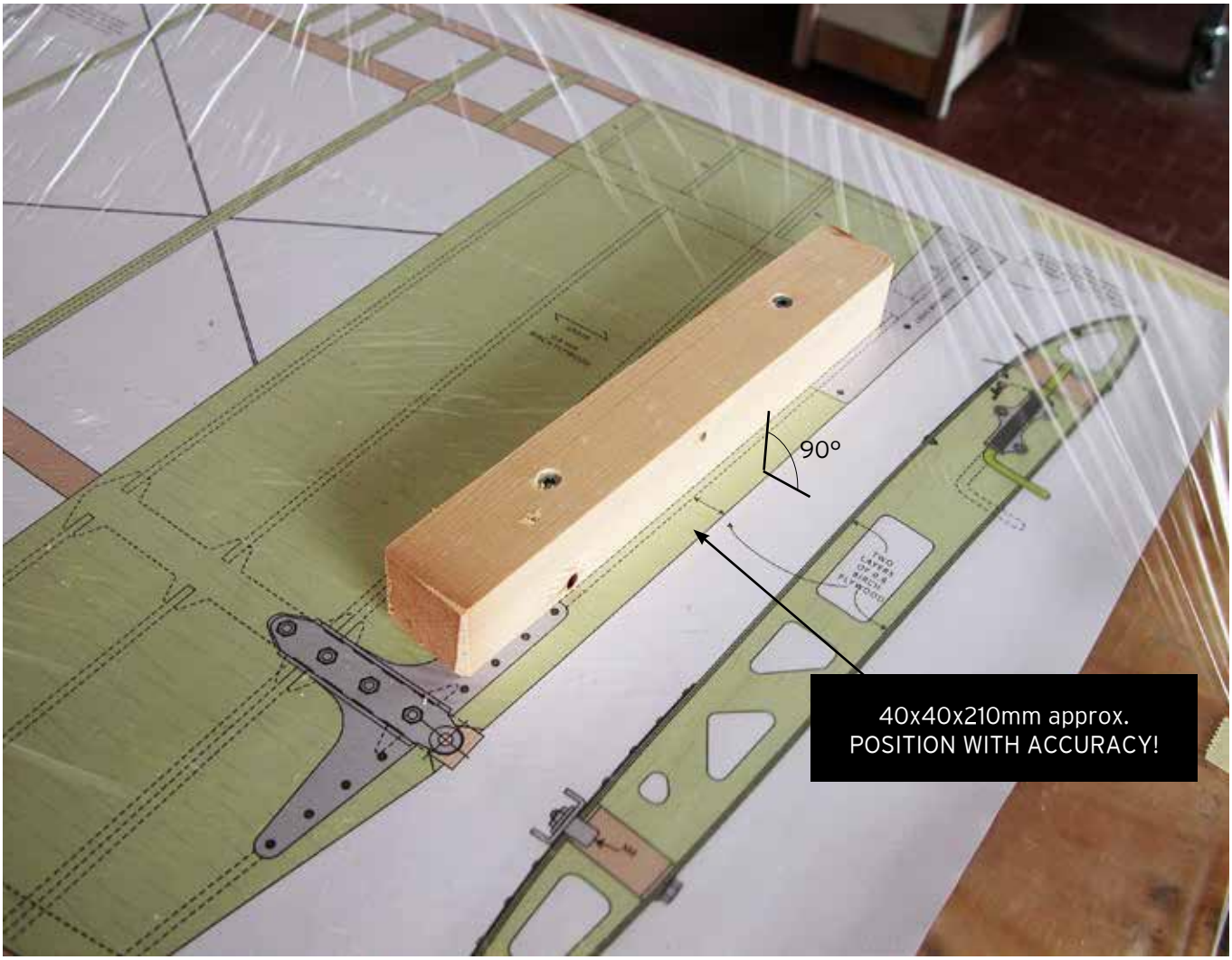
ASSEMBLE THE AILERON SPAR WITH THE REAR WING SPAR

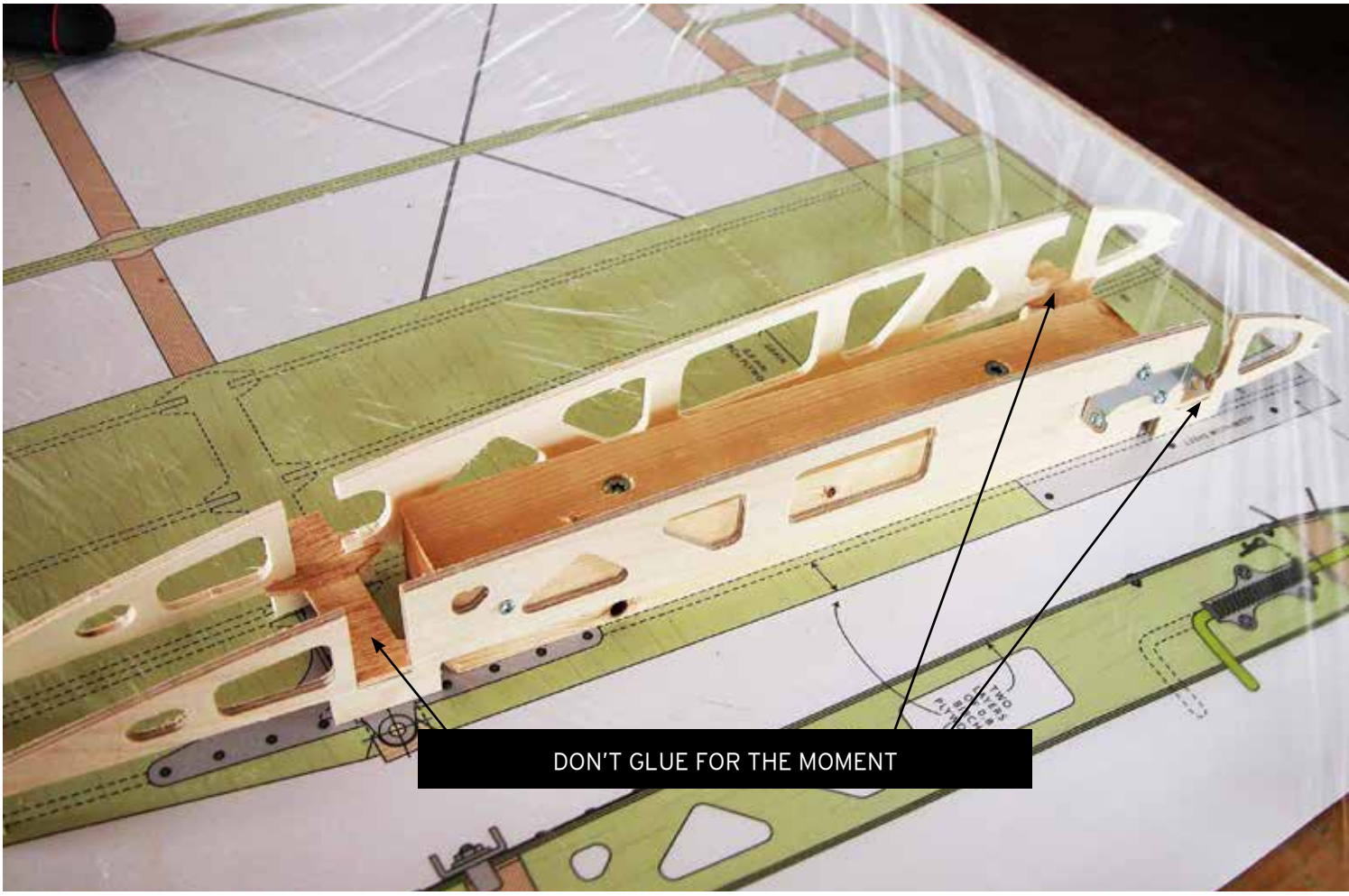


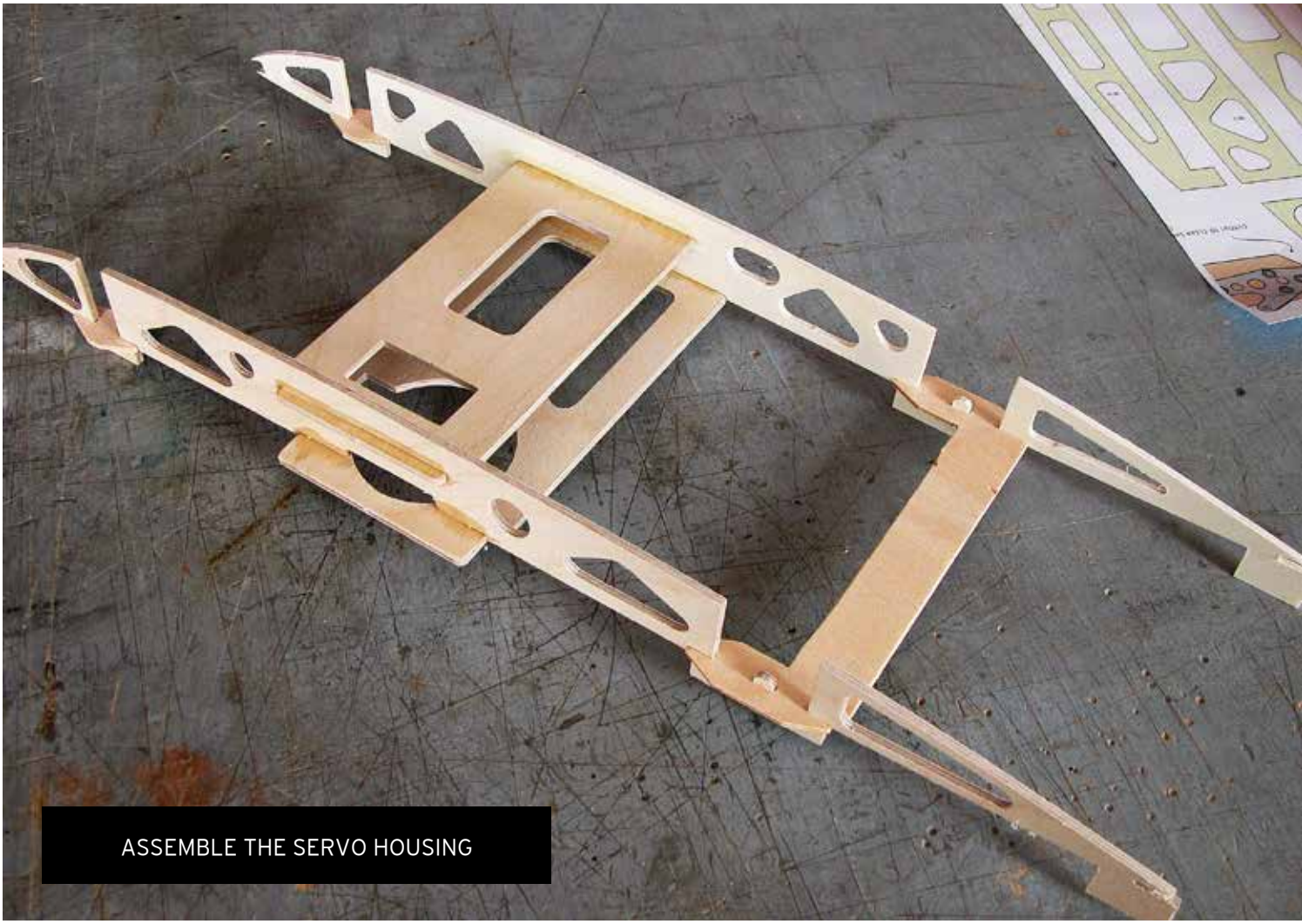

INSTALL THE LOCK AT
THE CENTRAL HINGE
OF THE AILERON

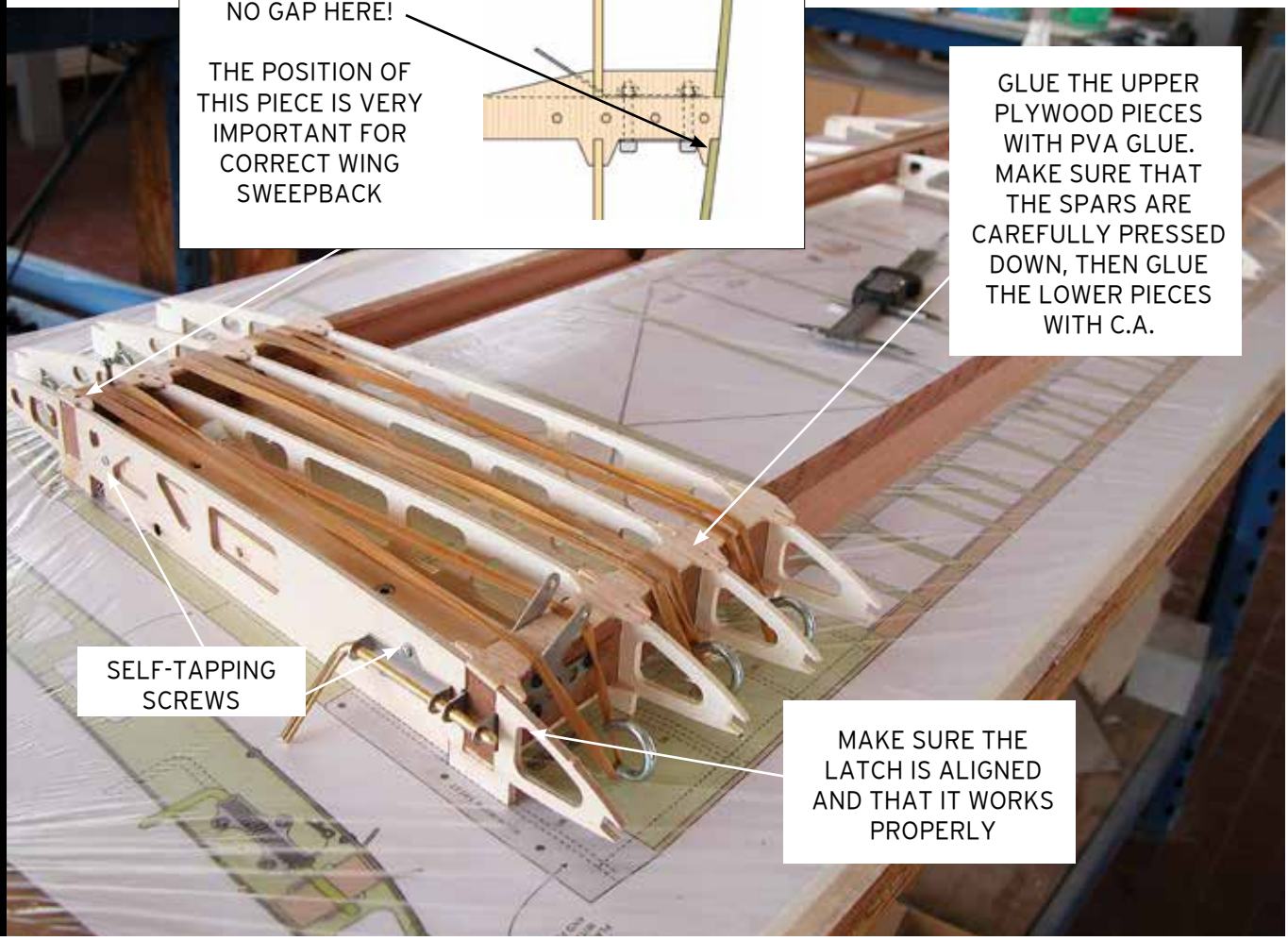


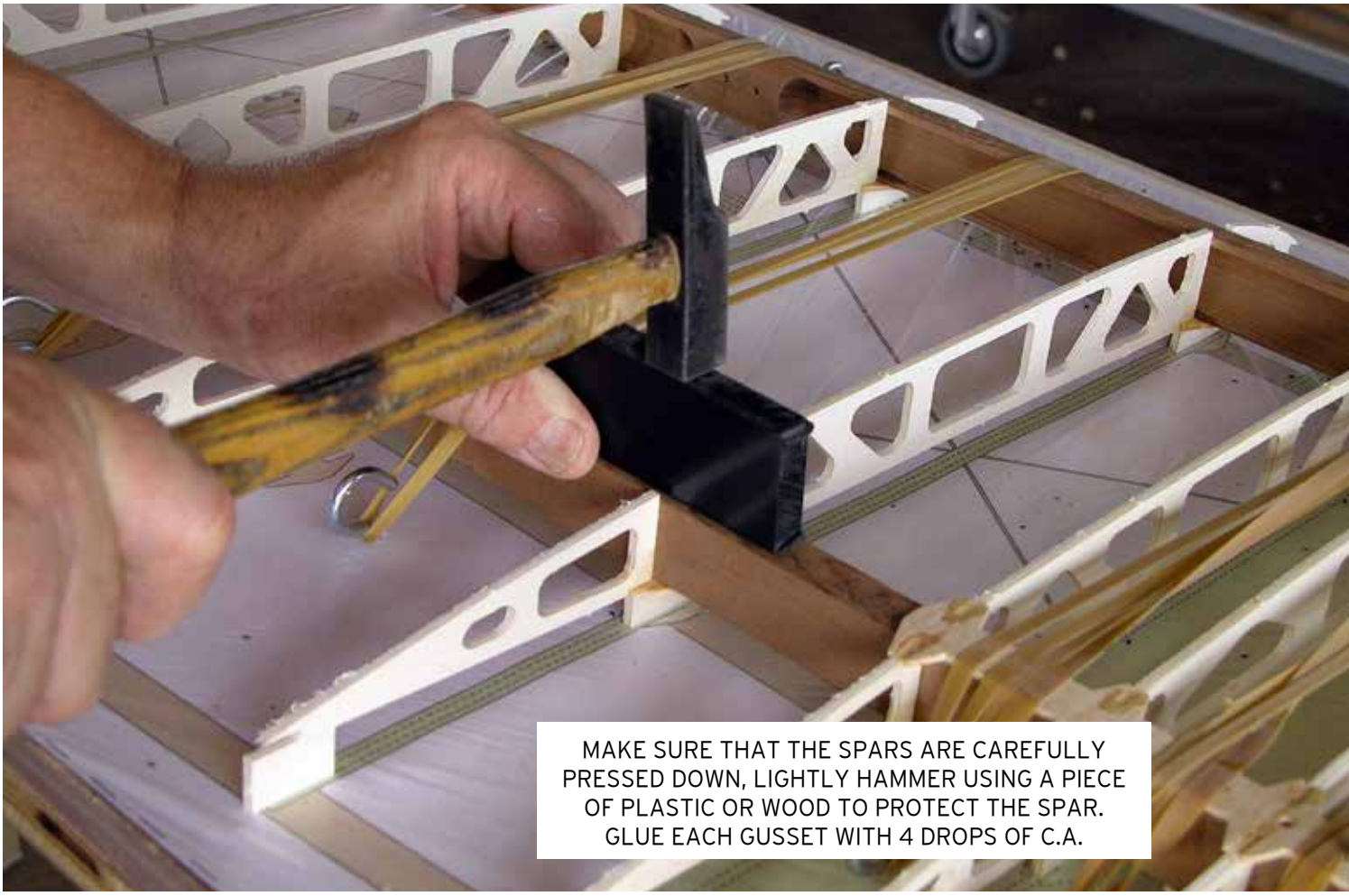
GLUE THE PLYWOOD PIECE
ONTO THE REAR SPAR,
THEN DRIL 4 HOLES IN THE SPAR
AS SHOWN IN THE DRAWING




DON'T GLUE FOR THE MOMENT

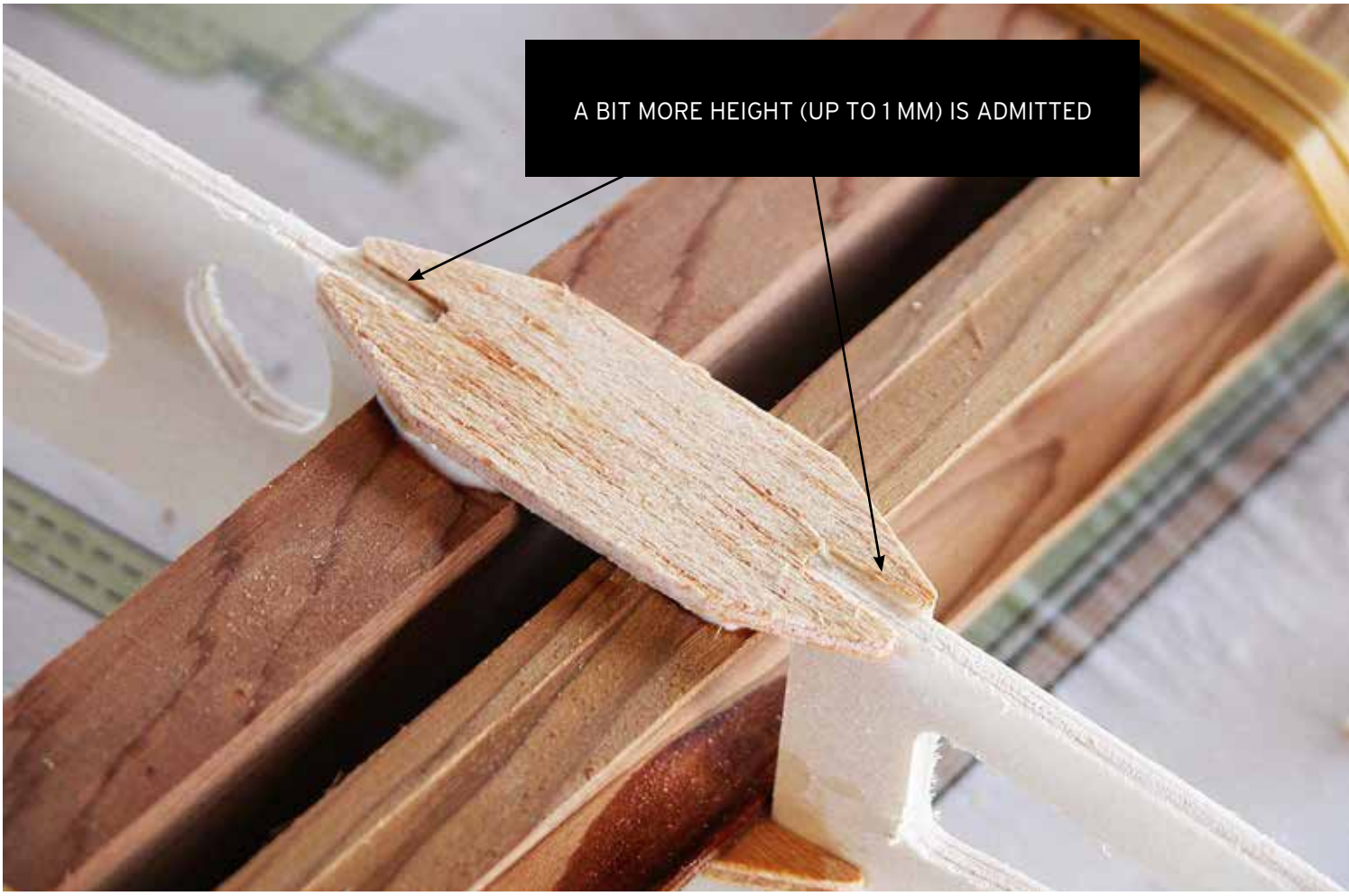

ASSEMBLE THE SERVO HOUSING

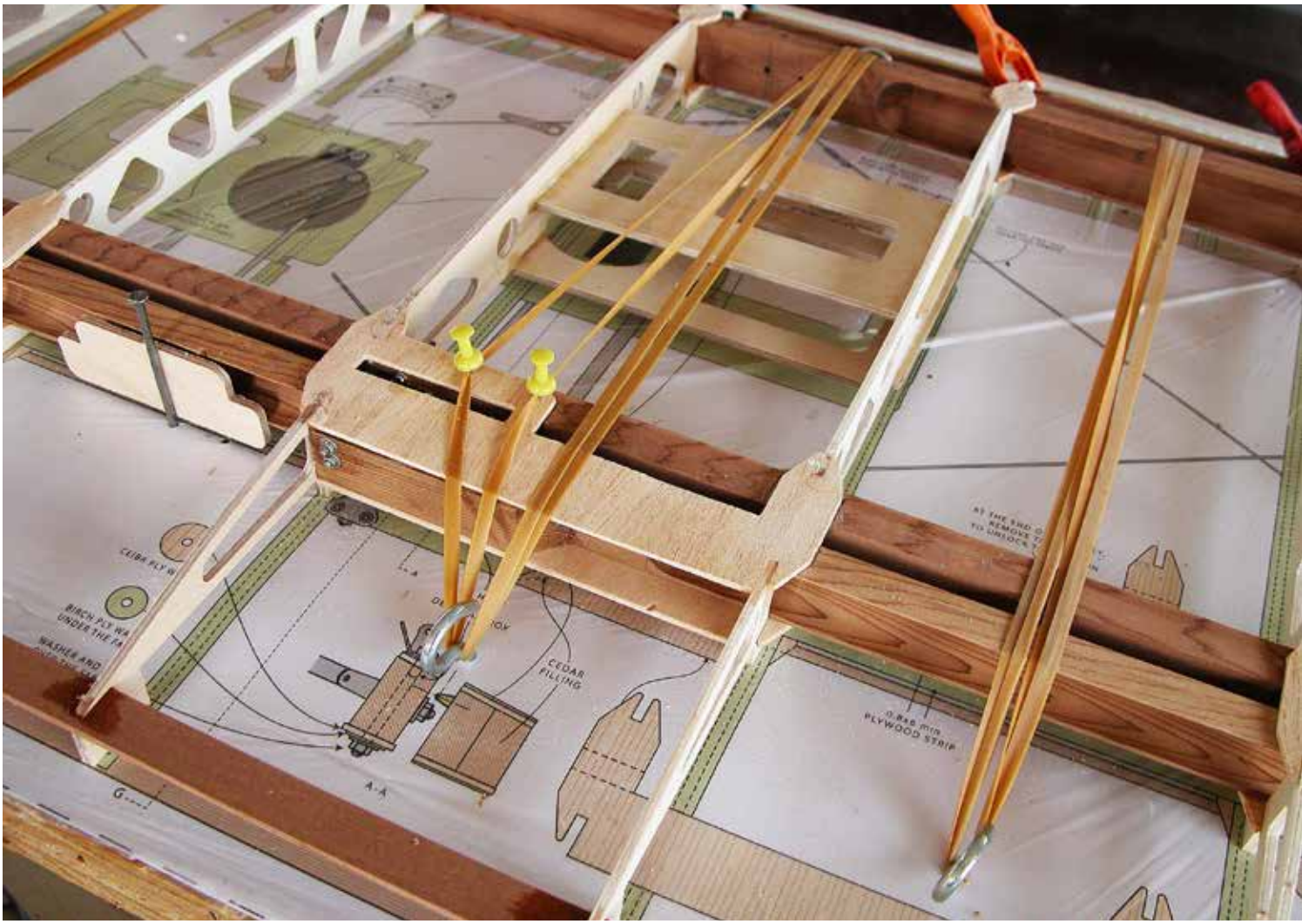

NO GAP HERE!
THE POSITION OF THIS PIECE IS VERY IMPORTANT FOR CORRECT WING SWEEPBACK
GLUE THE UPPER PLYWOOD PIECES WITH PVA GLUE. MAKE SURE THAT THE SPARS ARE CAREFULLY PRESSED DOWN, THEN GLUE THE LOWER PIECES WITH C.A.
SELF-TAPPING SCREWS
MAKE SURE THE LATCH IS ALIGNED AND THAT IT WORKS PROPERLY

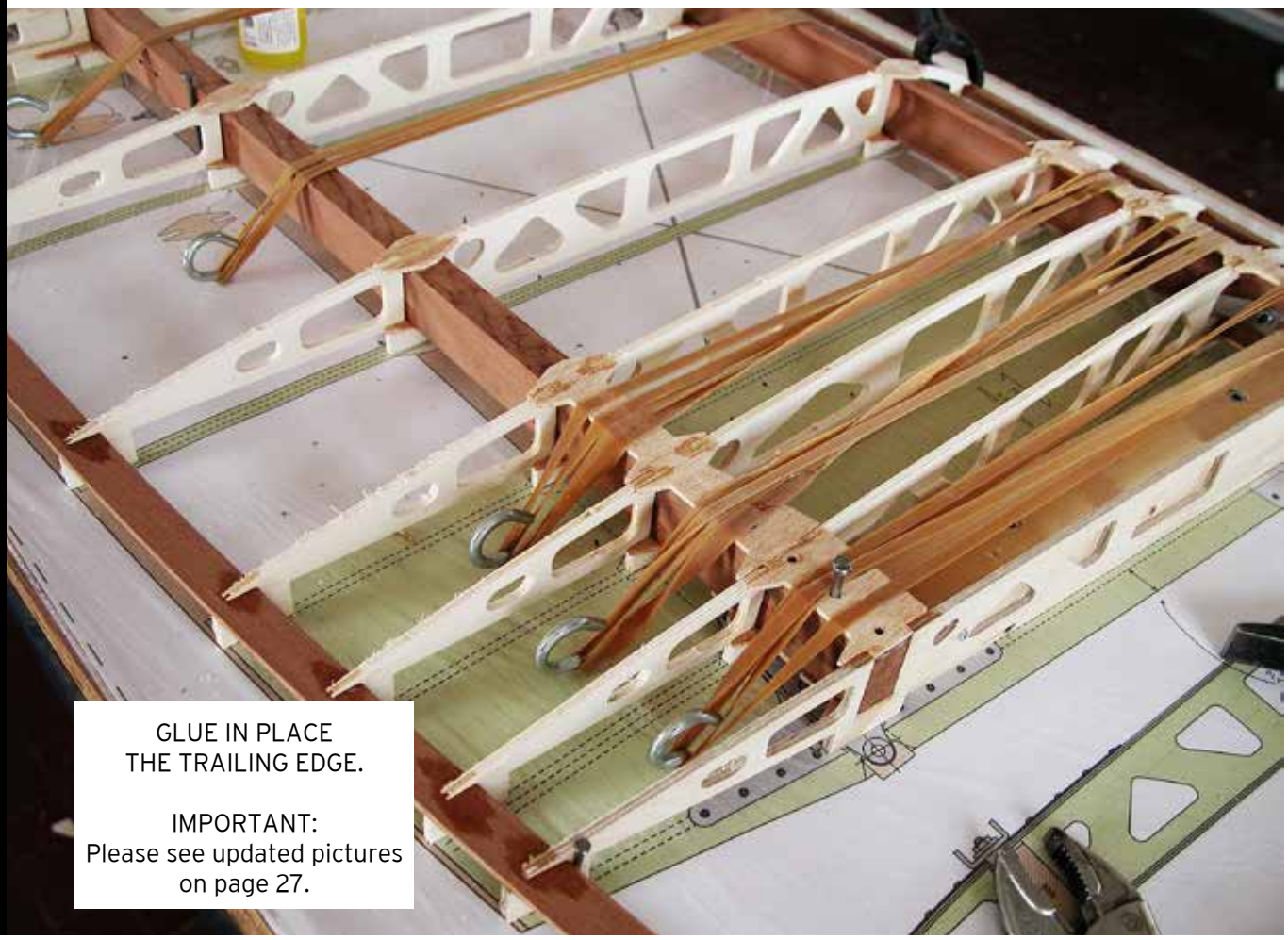


MAKE SURE THAT THE SPARS ARE CAREFULLY PRESSED DOWN, LIGHTLY HAMMER USING A PIECE OF PLASTIC OR WOOD TO PROTECT THE SPAR. GLUE EACH GUSSET WITH 4 DROPS OF C.A.

GLUE THE UPPER GUSSETS WITH PVA GLUE


A BIT MORE HEIGHT (UP TO 1 MM) IS ADMITTED

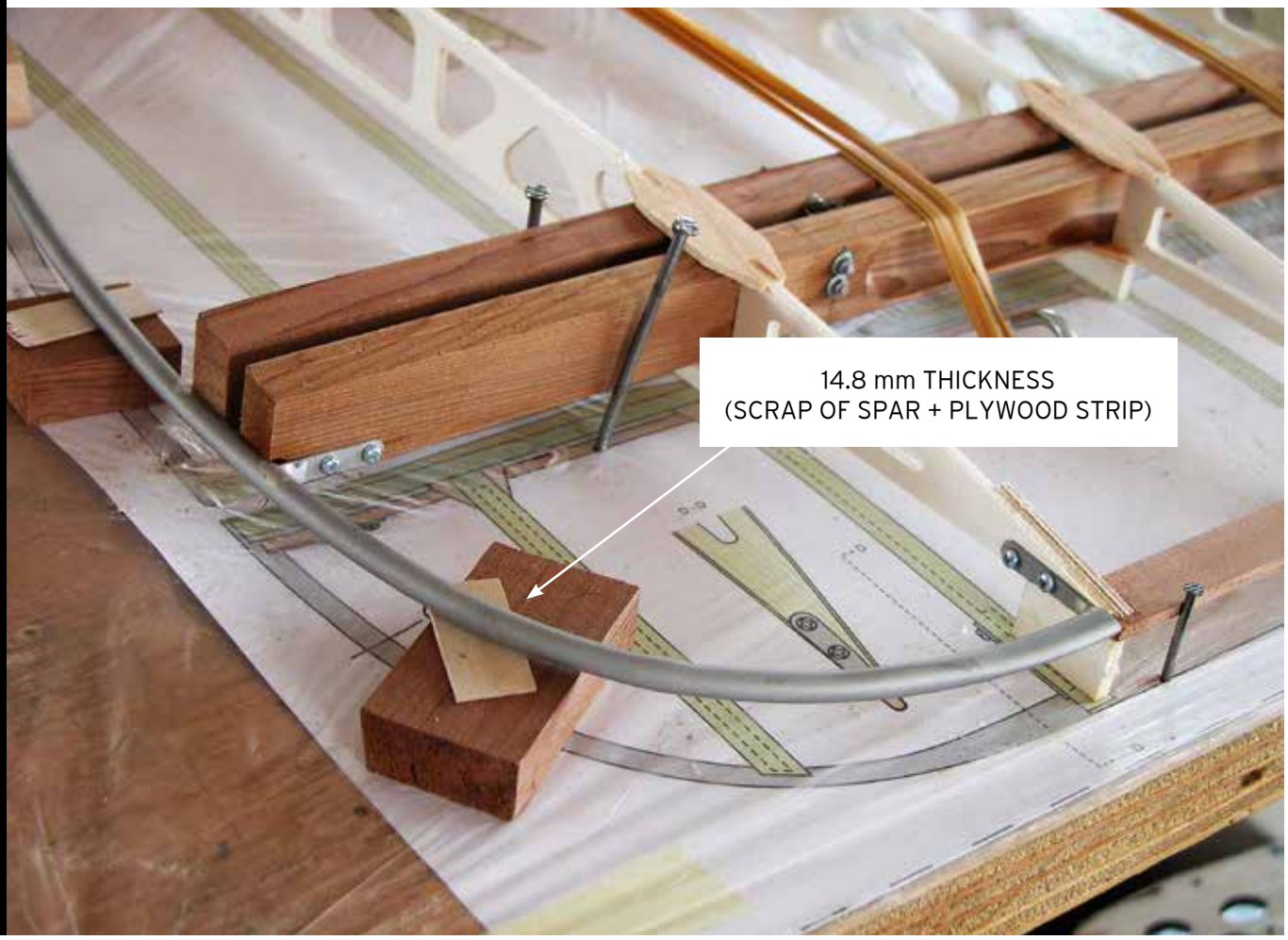

CEDAR FILLING
A-A

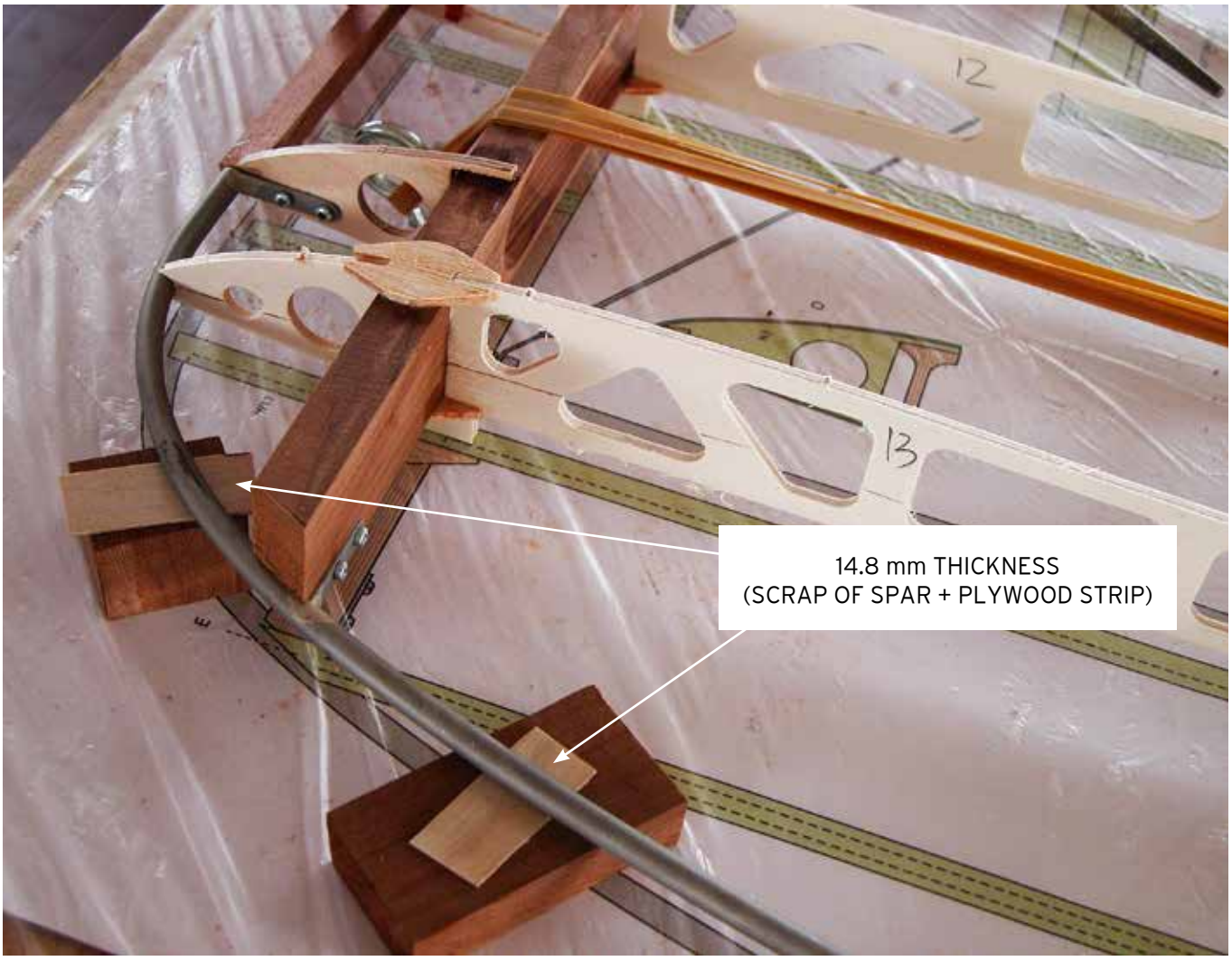


GLUE IN PLACE
THE TRAILING EDGE.

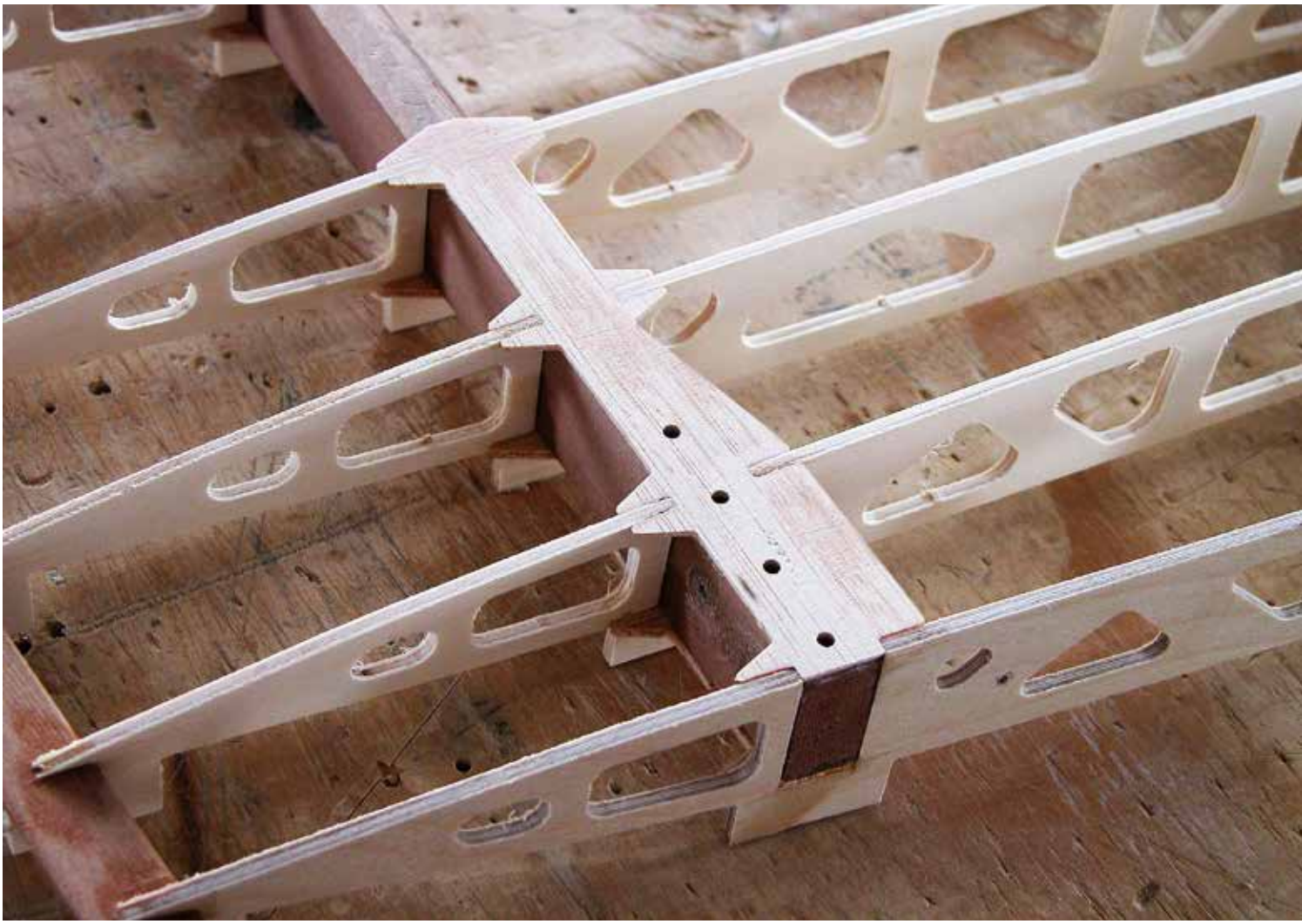
IMPORTANT:
Please see updated pictures
on page 27.

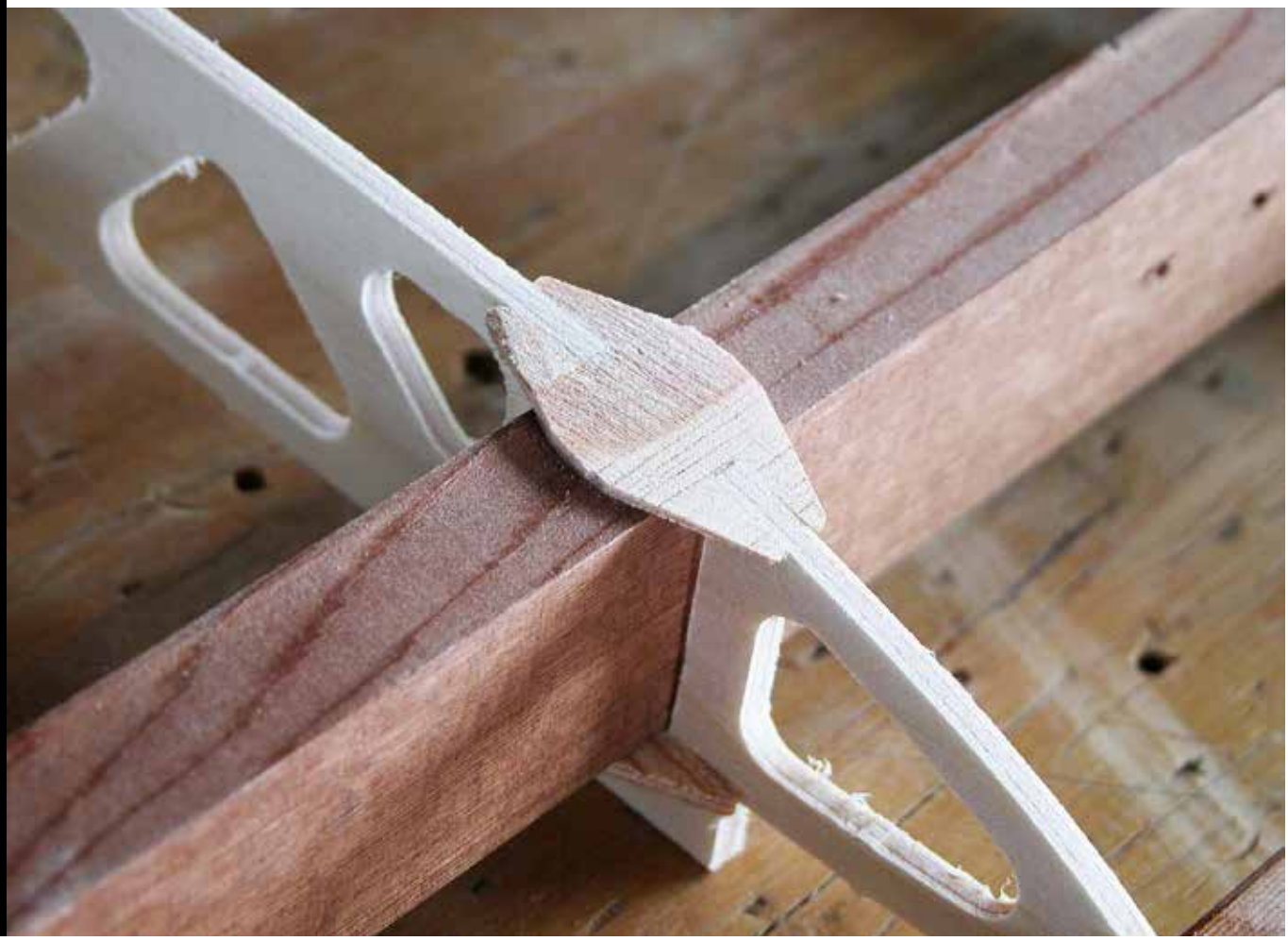
GLUE IN PLACE
THE LEADING EDGE


14.8 mm THICKNESS
(SCRAP OF SPAR + PLYWOOD STRIP)


12
13
14.8 mm THICKNESS
(SCRAP OF SPAR + PLYWOOD STRIP)

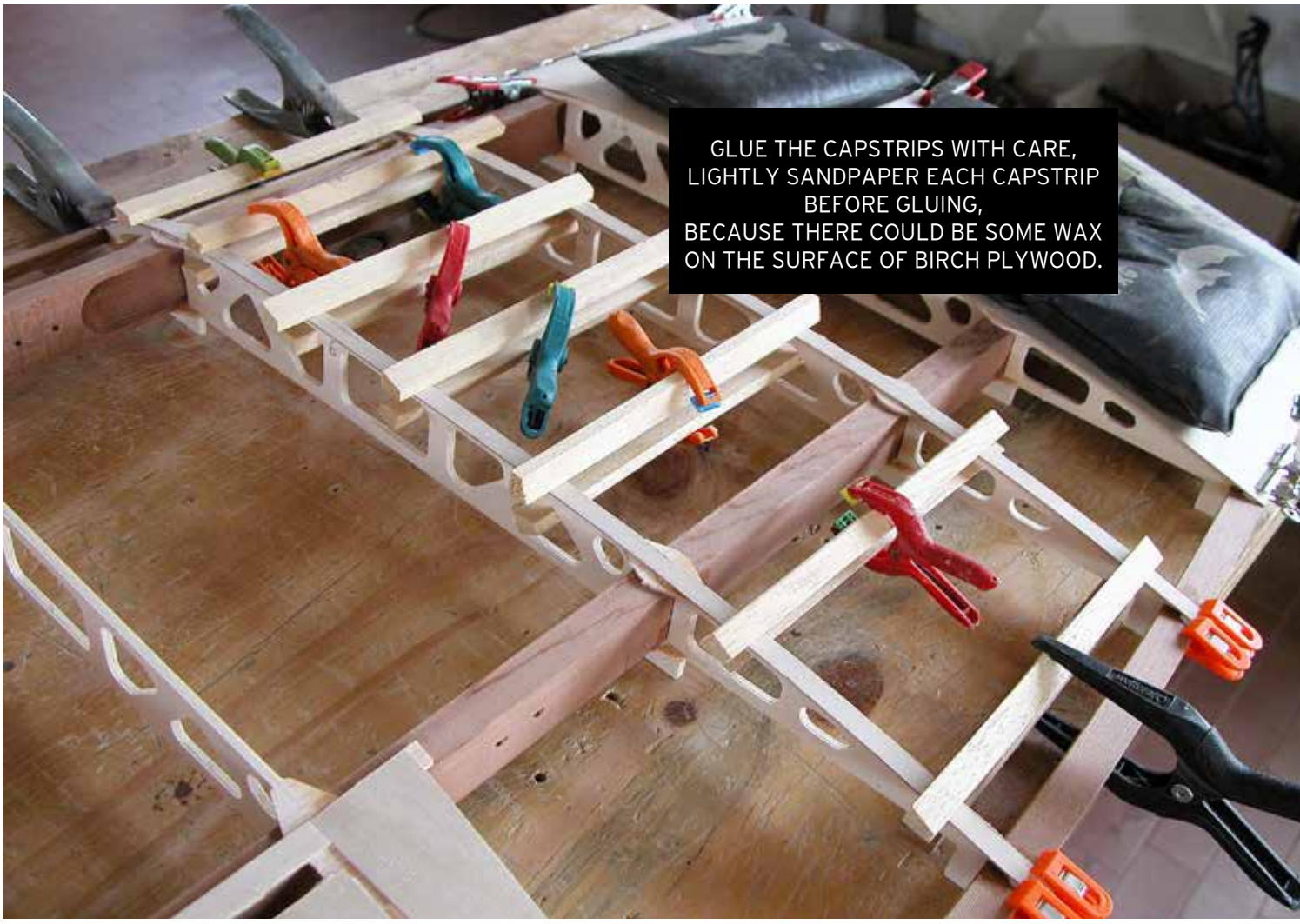

GLUE WITH EPOXY
OR C.A. + BICARBONATE POWDER



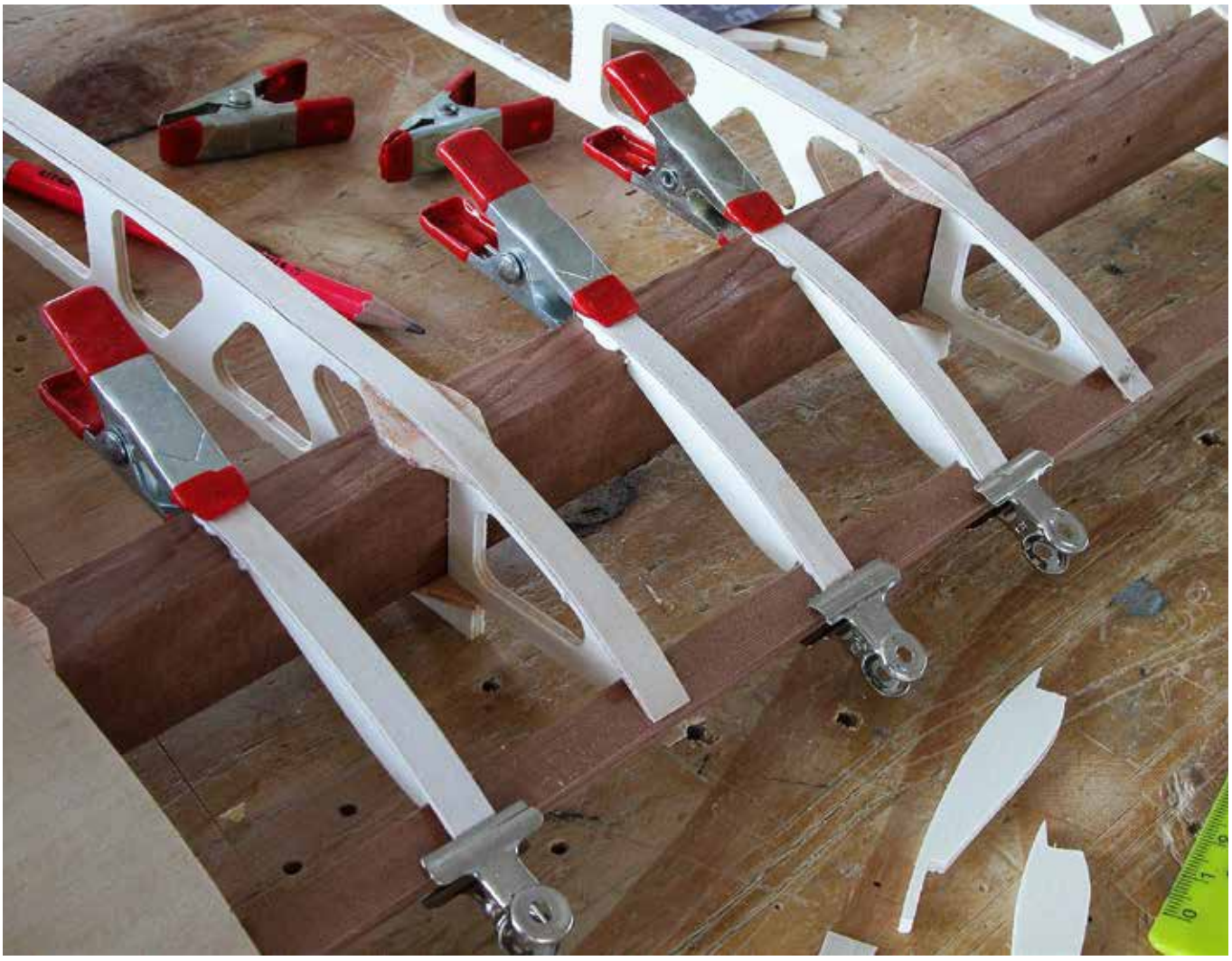


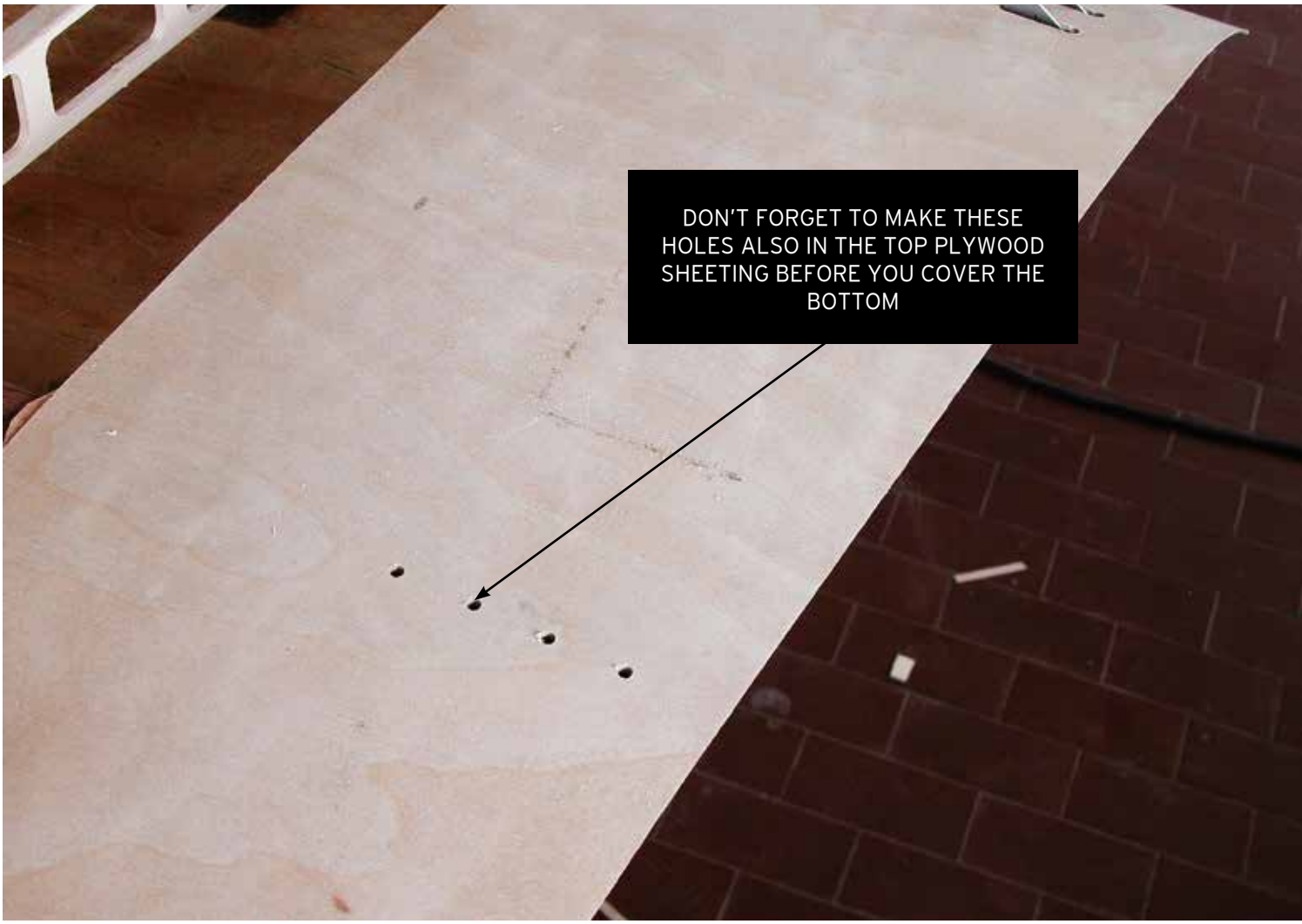

GLUE 2x8 MM BALSA STRIP
BETWEEN THE GUSSETS, THEN
SANDPAPER AND GLUE A 0.8x8 MM
BIRCH PLYWOOD STRIP

GLUE IN PLACE THE TOP PLYWOOD COVERING



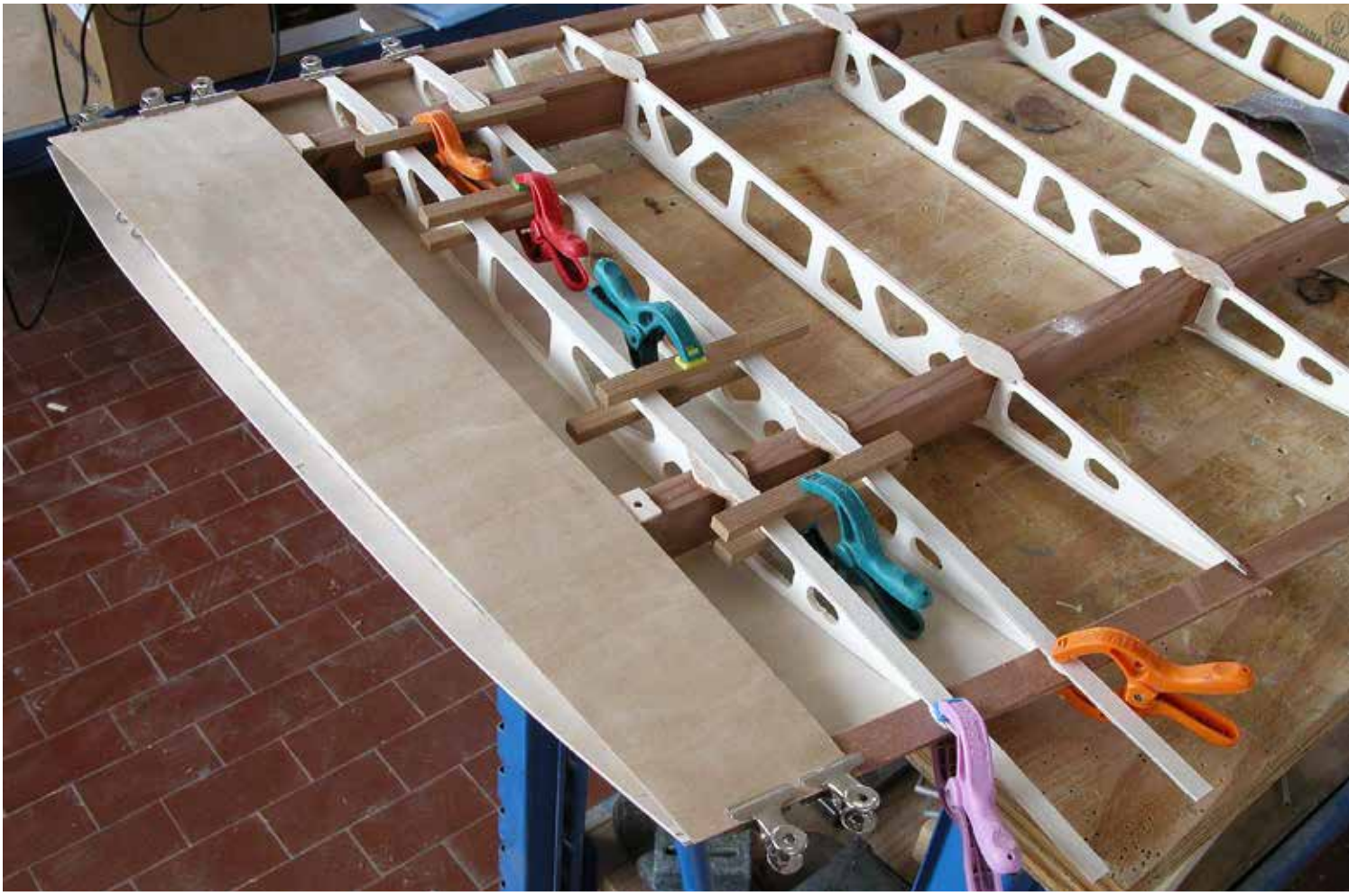
GLUE THE CAPSTRIPS WITH CARE,
LIGHTLY SANDPAPER EACH CAPSTRIP
BEFORE GLUING,
BECAUSE THERE COULD BE SOME WAX
ON THE SURFACE OF BIRCH PLYWOOD.

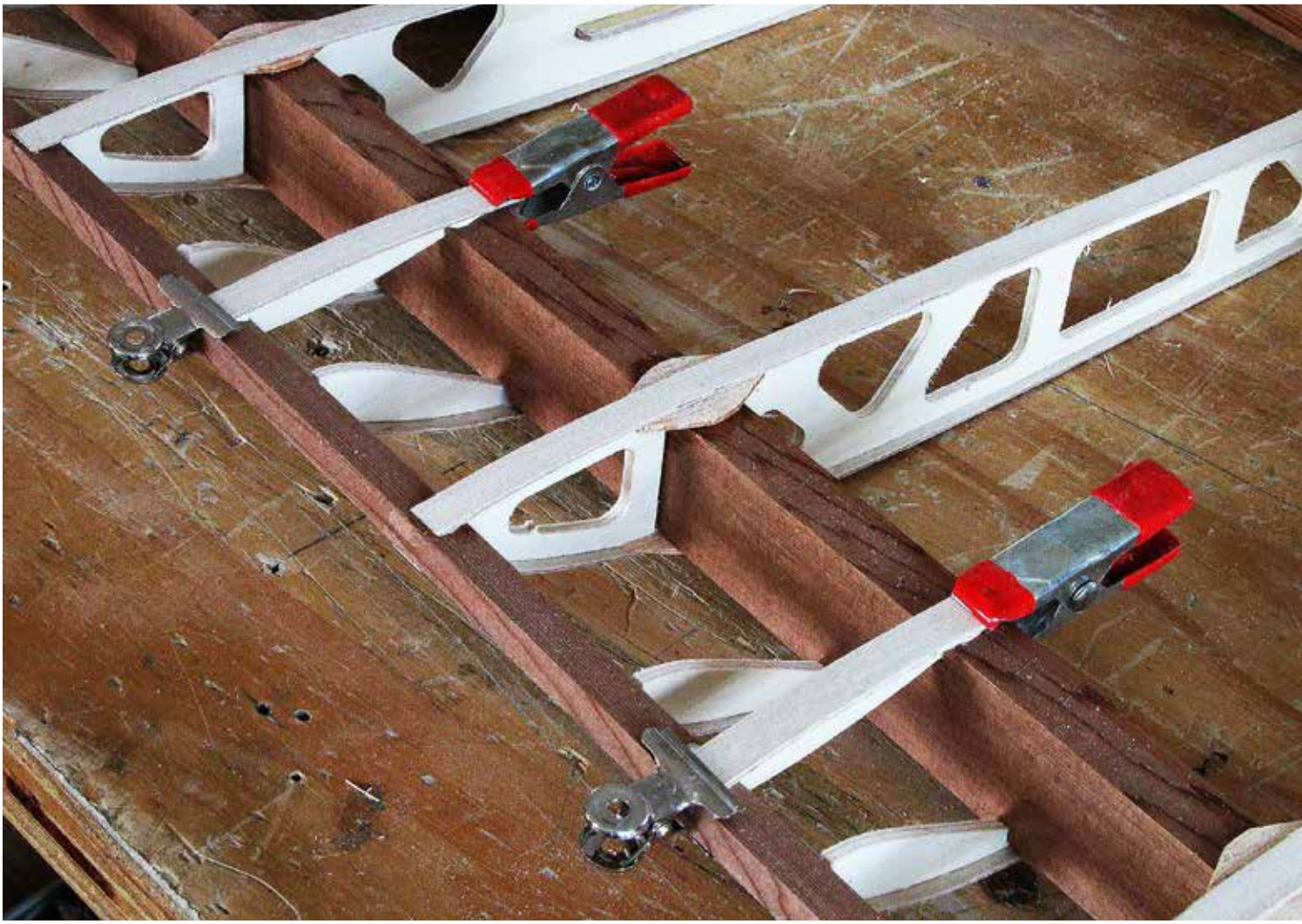


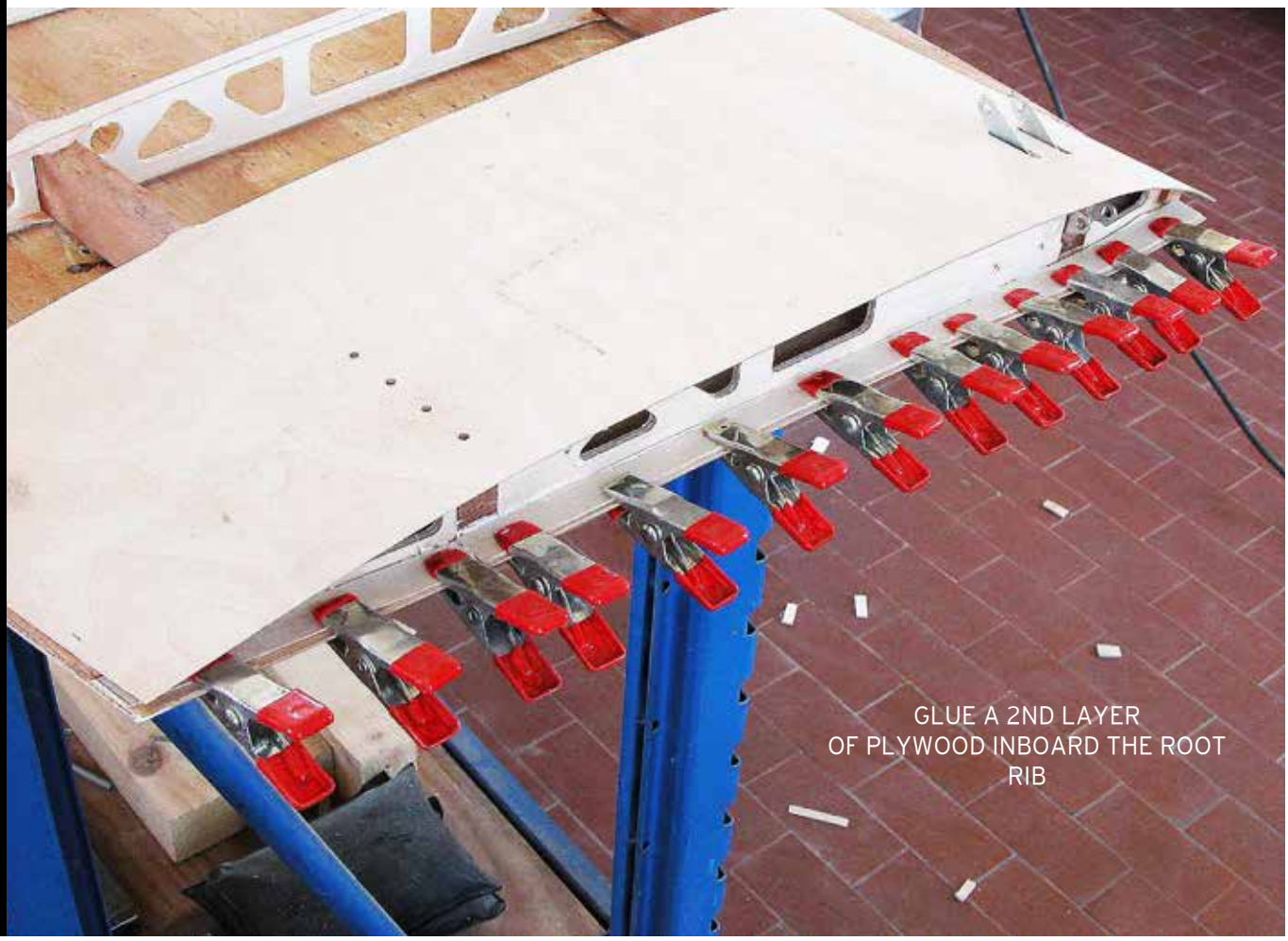

DON'T FORGET TO MAKE THESE HOLES ALSO IN THE TOP PLYWOOD SHEETING BEFORE YOU COVER THE BOTTOM

GLUE IN PLACE THE LOWER PLYWOOD SHEETING (ONLY OVER TWO RIBS)

GLUE 2x8 MM BALSA STRIPWOOD BETWEEN THE GUSSETS, THEN SANDPAPER AND GLUE A 0.8x8 MM BIRCH PLYWOOD STRIP ON TOP







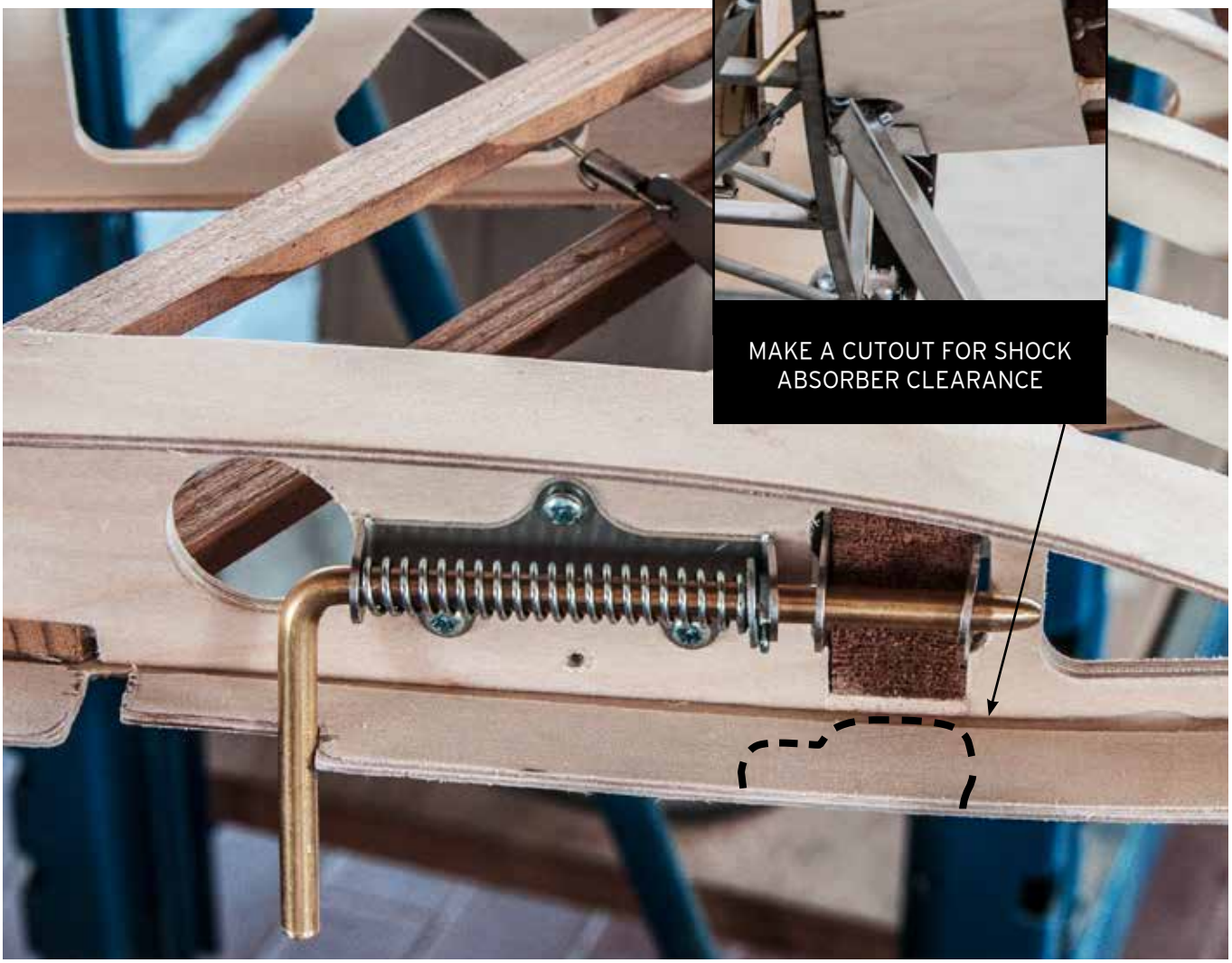
GLUE A 2ND LAYER
OF PLYWOOD INBOARD THE ROOT
RIB

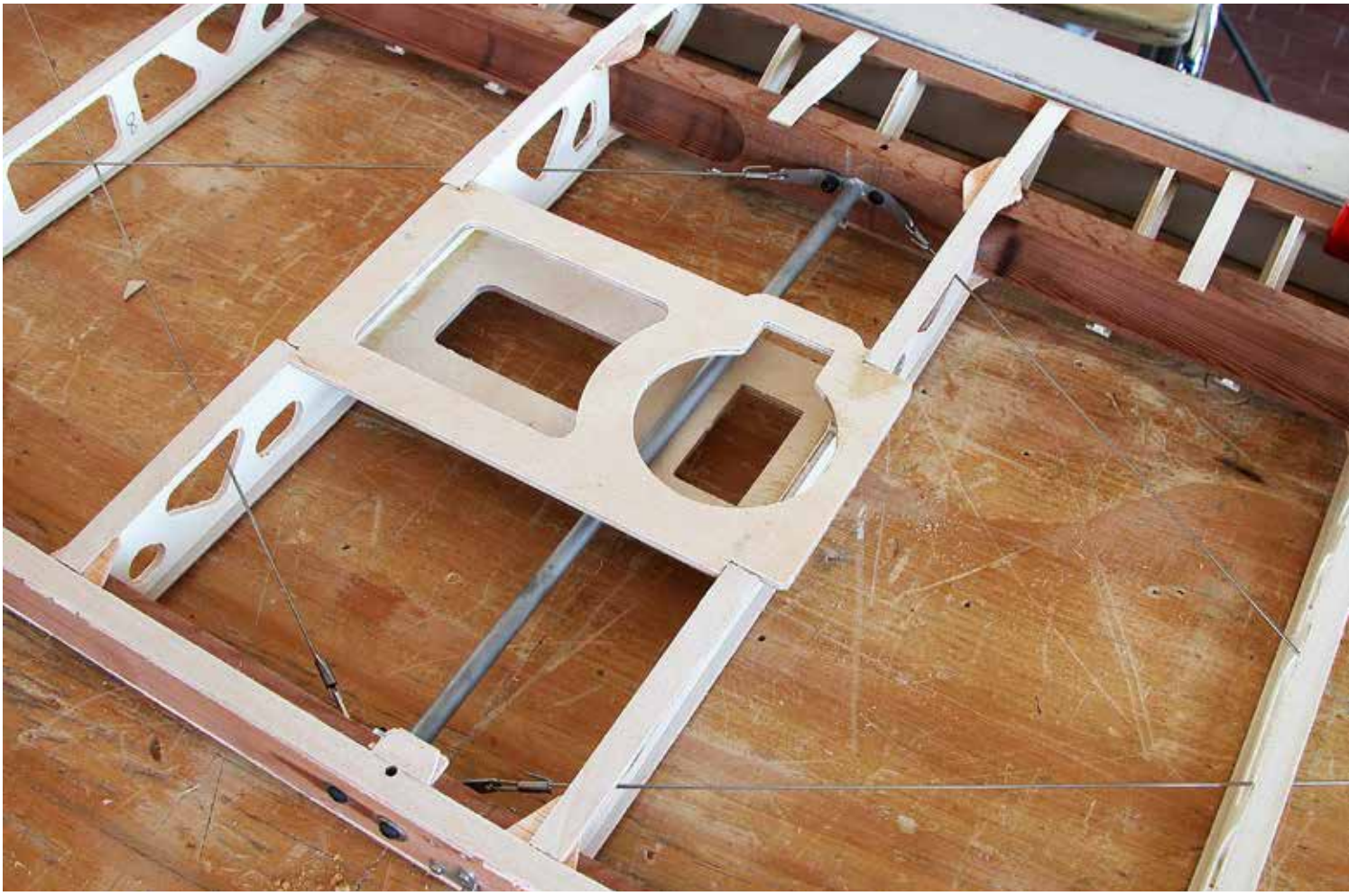
CUT THE WINGTIP SO THE AILERON IS FINALLY FREE!

TO AVOID DEFORMING THE WING DURING TIGHTENING OF THE WIRES, FIX A STRAIGHT BAR ON THE LEADING EDGE.

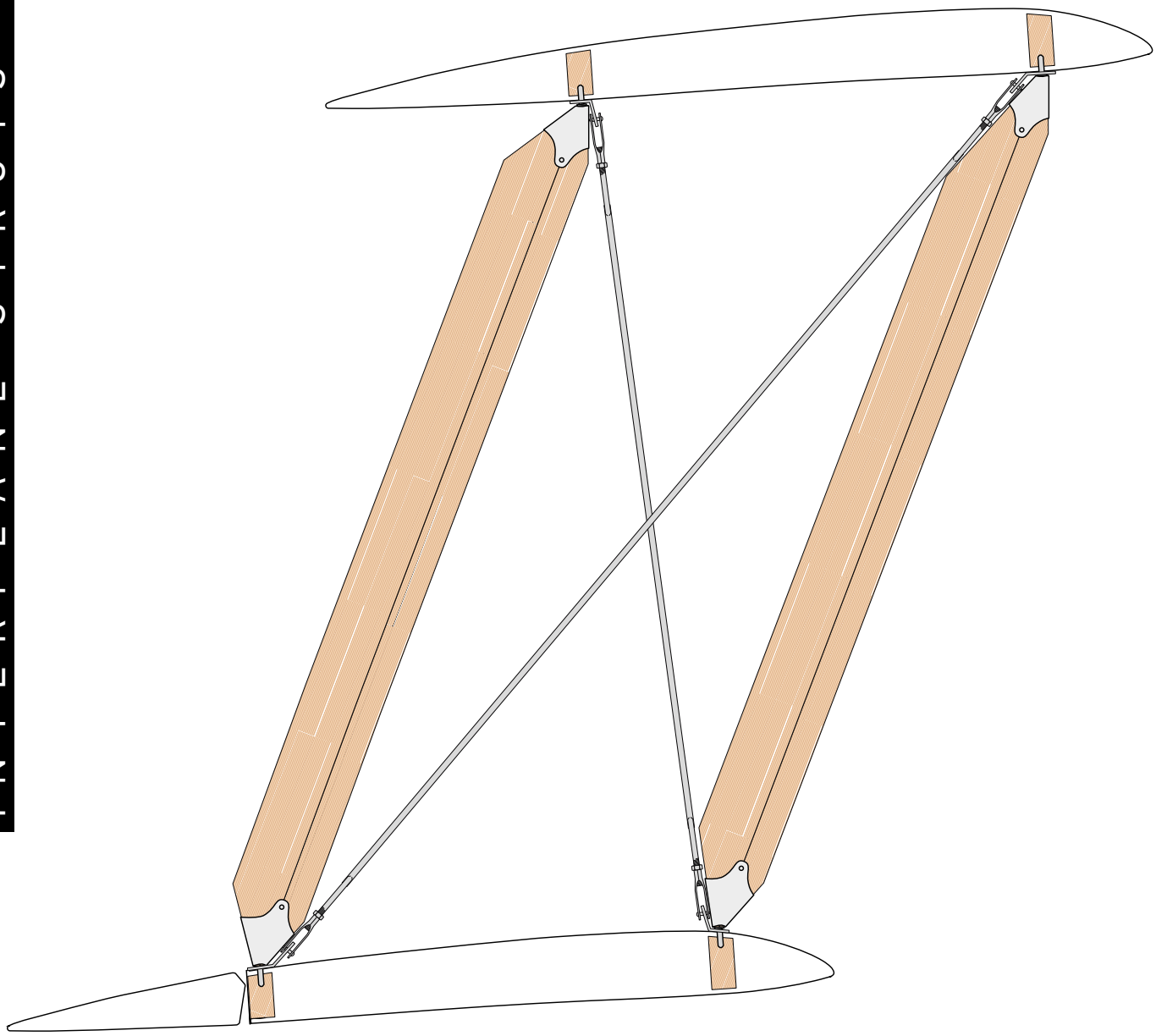
DON'T OVERDO WHEN TIGHTENING THE WIRES.

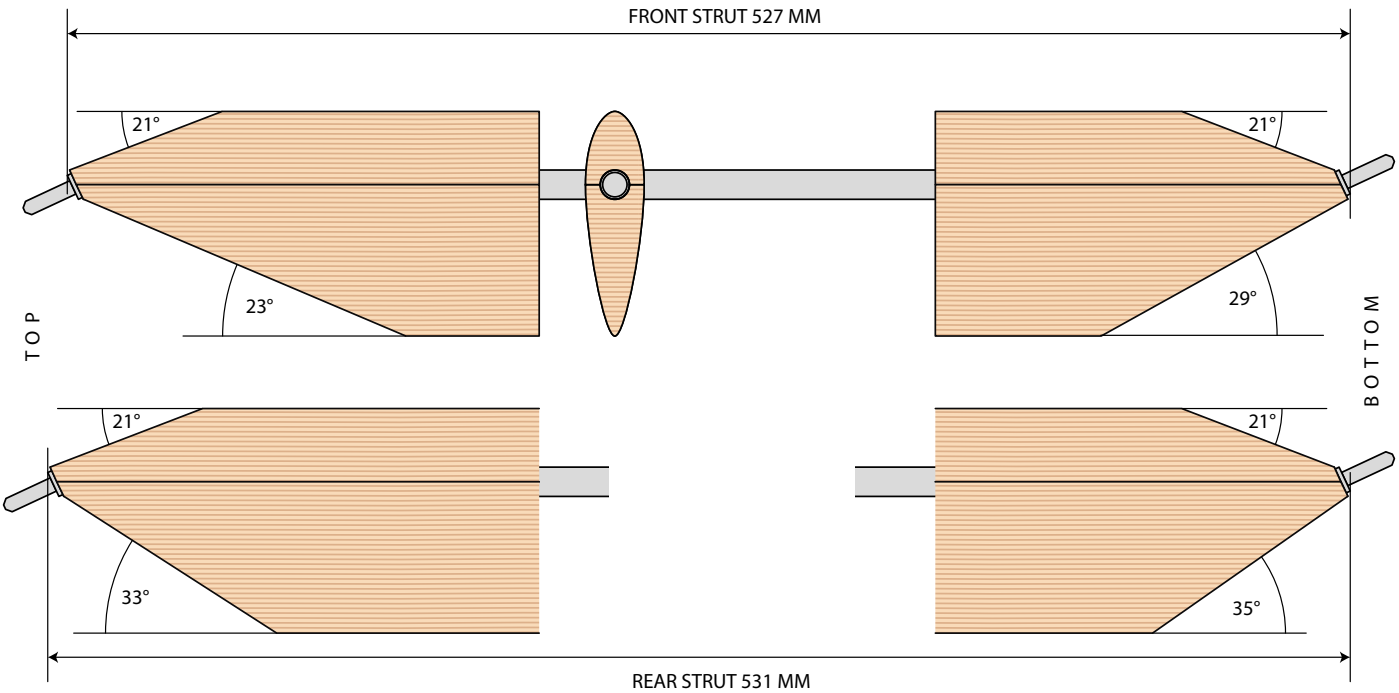

MAKE A SLOT TO
ARM THE LATCH


MAKE A CUTOUT FOR SHOCK
ABSORBER CLEARANCE

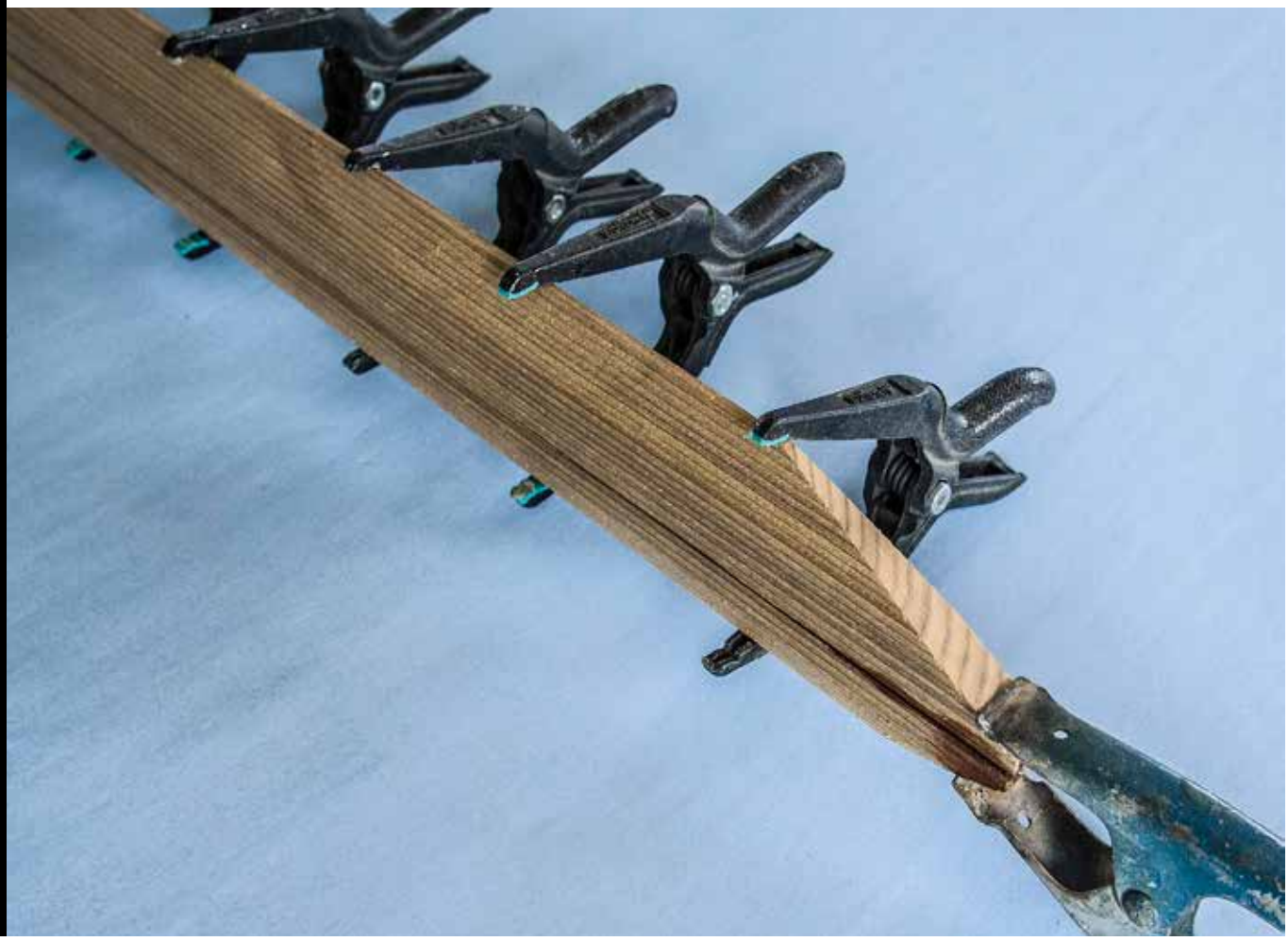


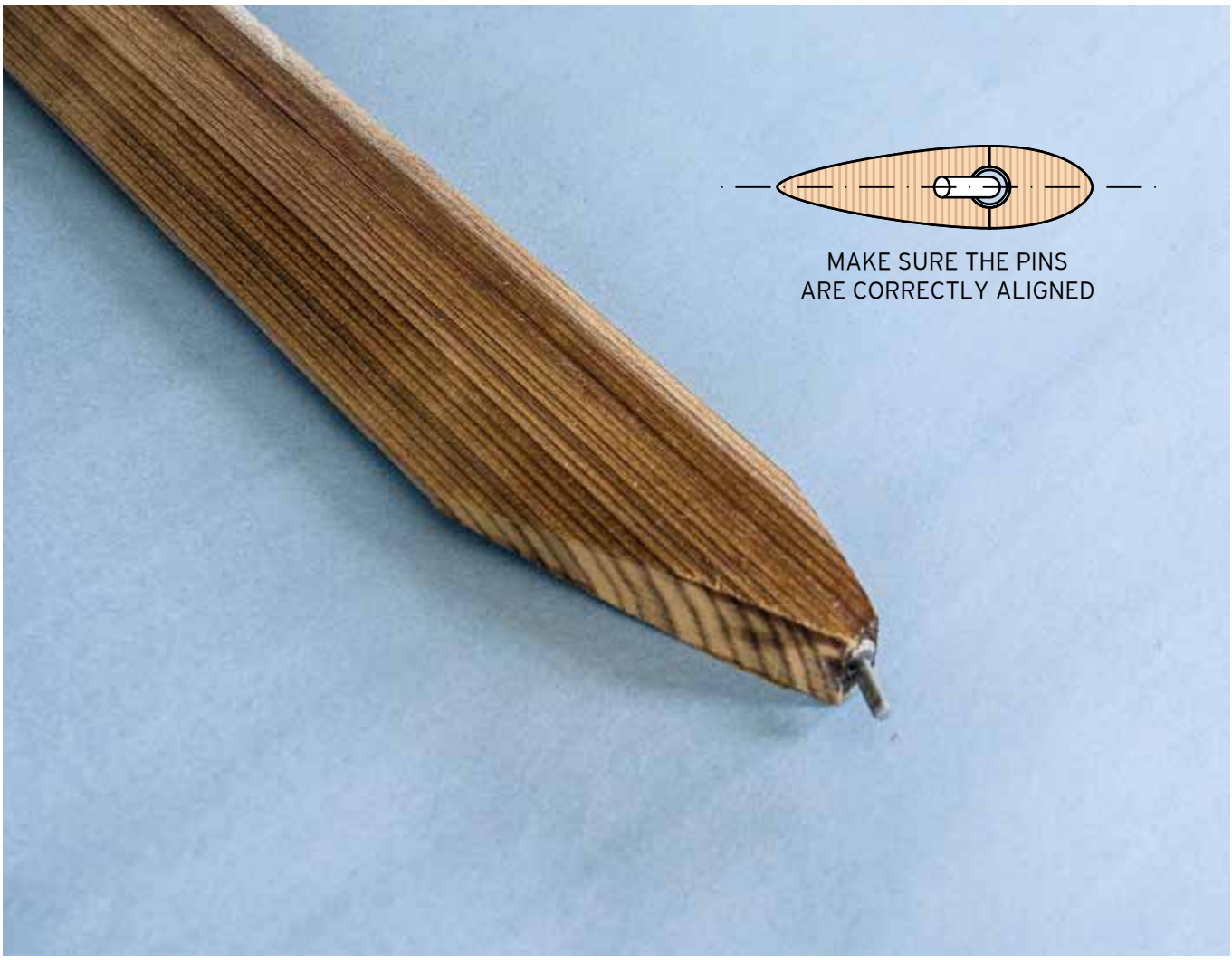
INTERPLANE STRUTS





USE EPOXY GLUE.





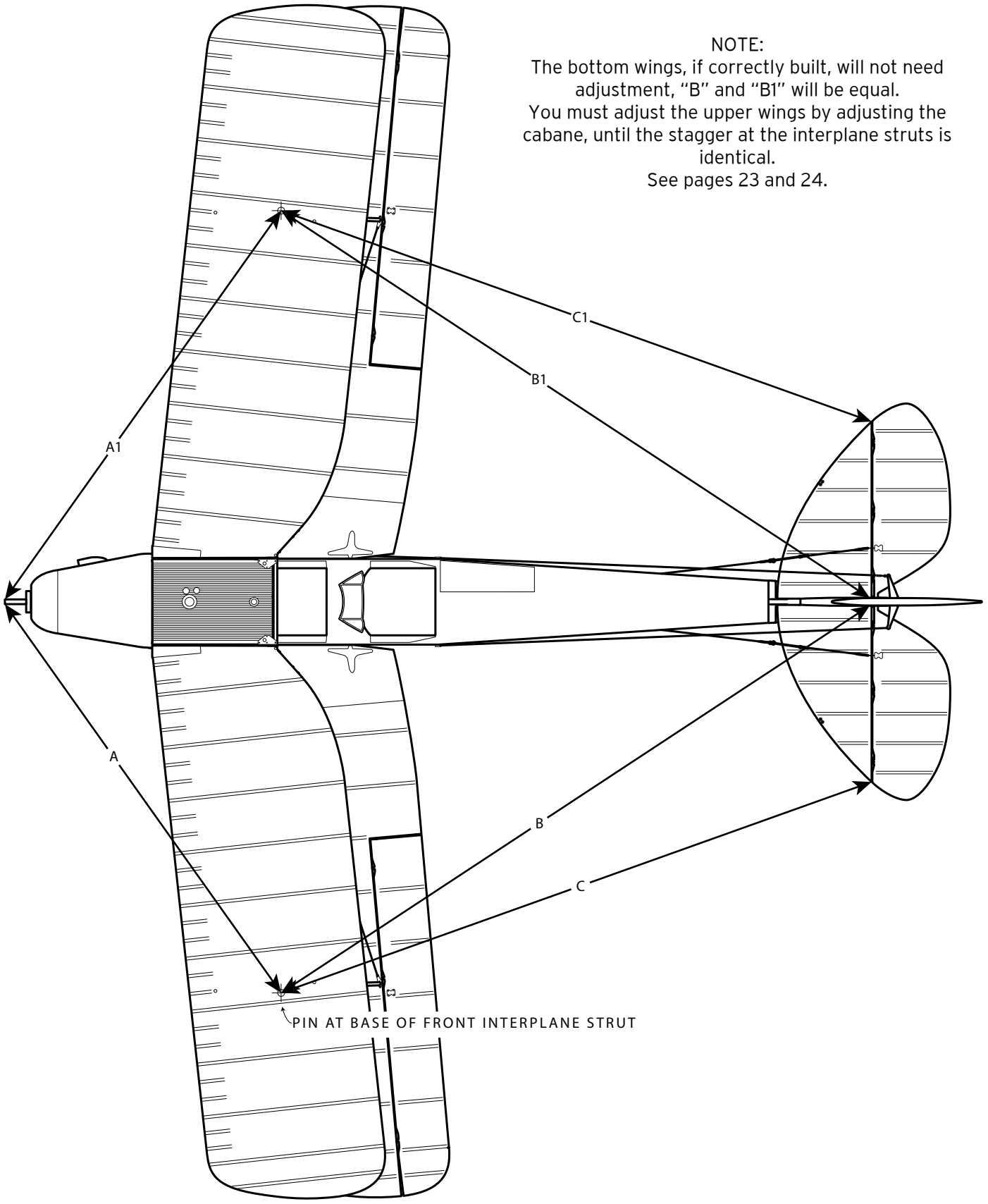
MAKE SURE THE PINS
ARE CORRECTLY ALIGNED


USE EPOXY GLUE,
KEEP IN PLACE WITH ELECTRICAL TAPE

PITOT ON FRONT STARBOARD INTERPLANE STRUT

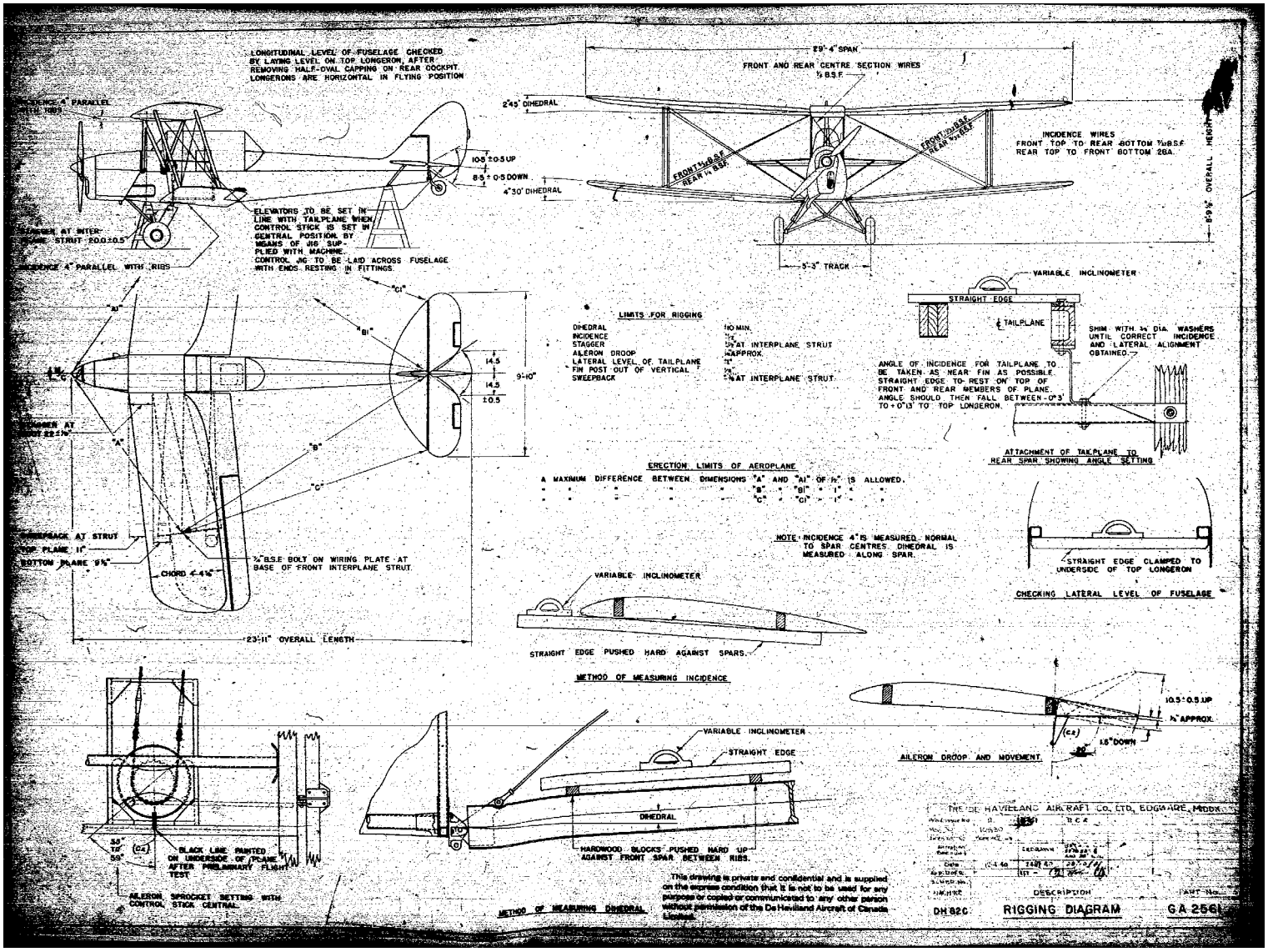
AIR PRESSURE A.S.I. ON FRONT PORT INTERPLANE STRUT

NOTE:
The bottom wings, if correctly built, will not need adjustment, "B" and "B1" will be equal.
You must adjust the upper wings by adjusting the cabane, until the stagger at the interplane struts is identical.
See pages 23 and 24.

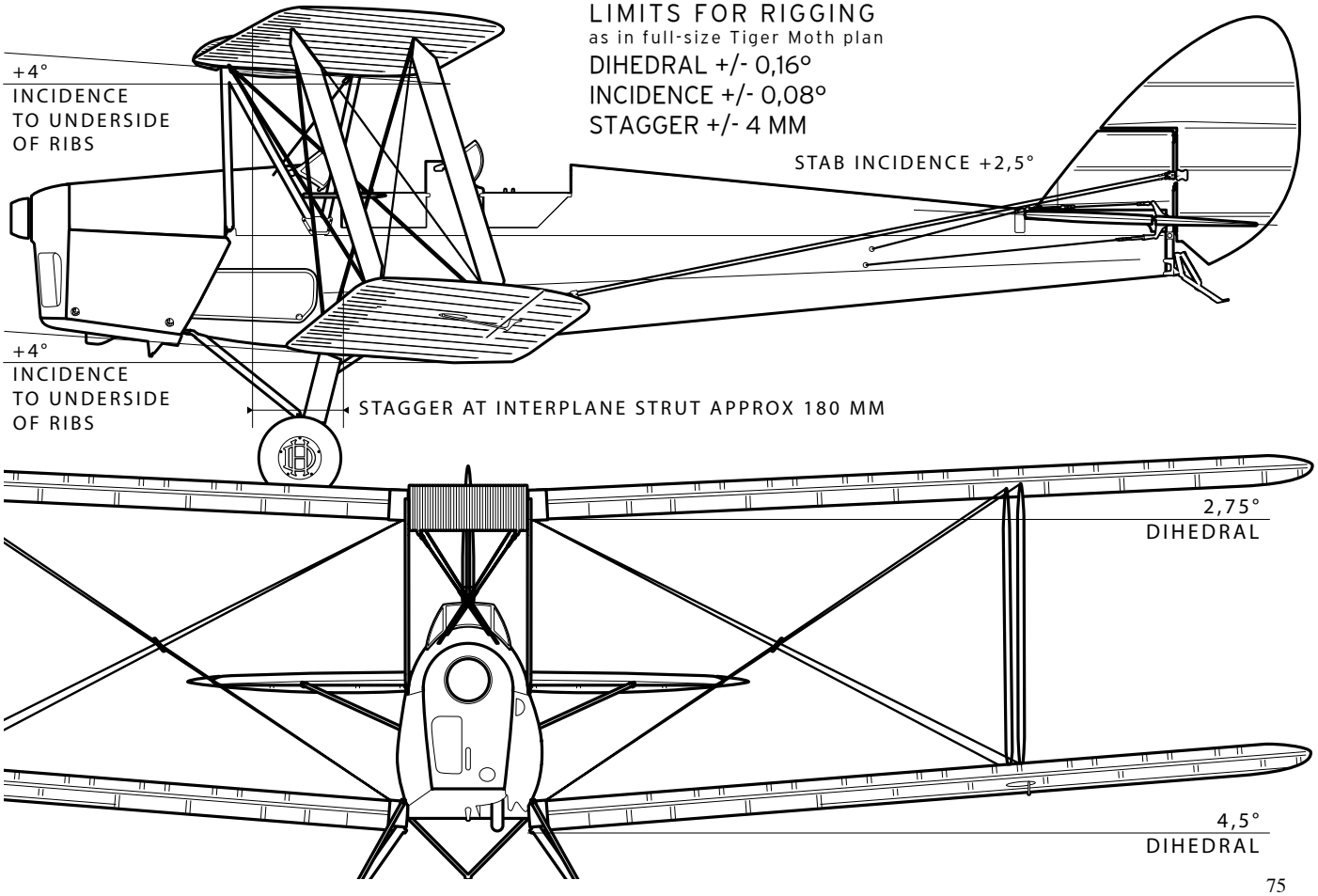


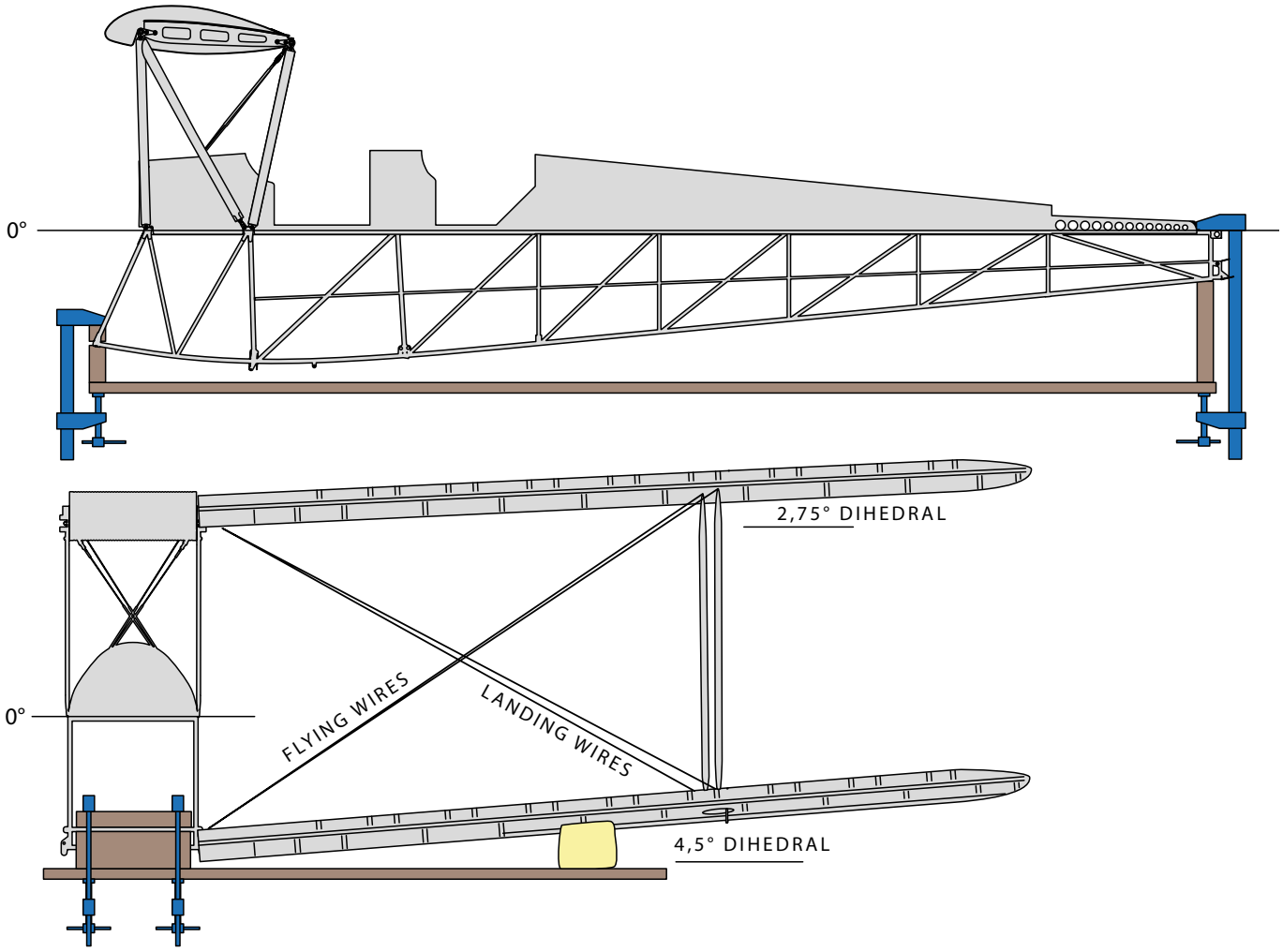
ERRECTION LIMITS OF AEROPLANE (scaled down from full-size Tiger Moth plan)

A	MAXIMUM	DIFFERENCE	BETWEEN	DIMENSIONS	"A"	AND	"A1"	OF	4 MM	IS ALLOWED
"	"	"	"	"	"B"	"	"B1"	"	9 MM	"
"	"	"	"	"	"C"	"	"C1"	"	9 MM	"



The original rigging diagram (From full-size plan set of the Canadian version)





1. Before covering, lock the fuselage in horizontal position.

2. Fix the bottom wing to the fuselage with the M4 screw and the latch (put a cushion sponge under the wing)

3. Fix the upper wing to the cabane with the M4 screw and the latch, then insert the struts. Make sure that the strut pins are completely inserted in the wing holes

4. Mount the two landing wires. For the moment, insert the metal clevis 2 or 3 turns onto the threads, don't forget to insert the locking nuts. See locking system in the drawing A, don't close the lever for the moment.

5. Mount the two flying wires. For the moment, insert the metal clevis 2 or 3 turns onto the threads, don't forget to insert the locking nuts.

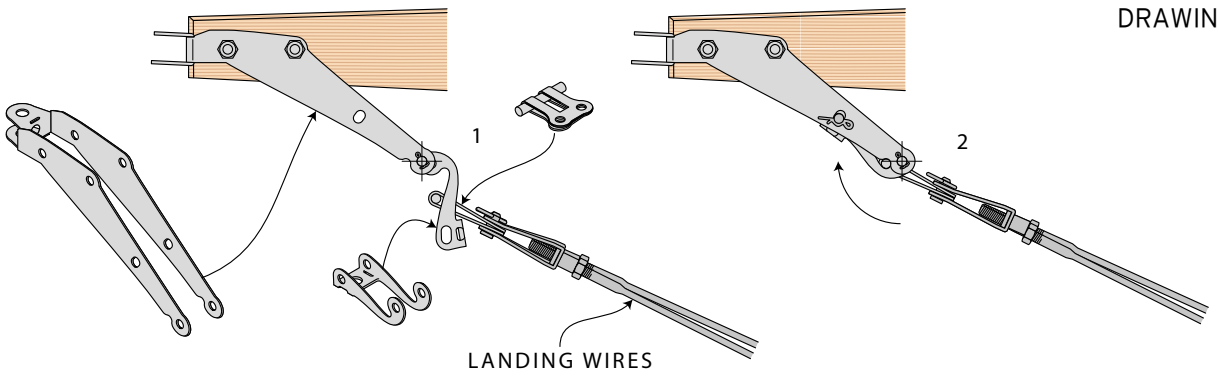
6. Adjust the two front wires until the dihedral of the lower wing at the front spar is approx 4,5 degrees. The dihedral of the upper wing is automatically determined by the length of the struts.

7. Apply the rear flying wires and adjust the two rear wires until the dihedral of the rear spar of the bottom wing is approx 4,5 degrees. This way the wing incidence will be identical over the full length of the wing.

7. Mount the other wing, adjust the dihedral of both wings definitively, then lock all the metal clevis with the nuts.

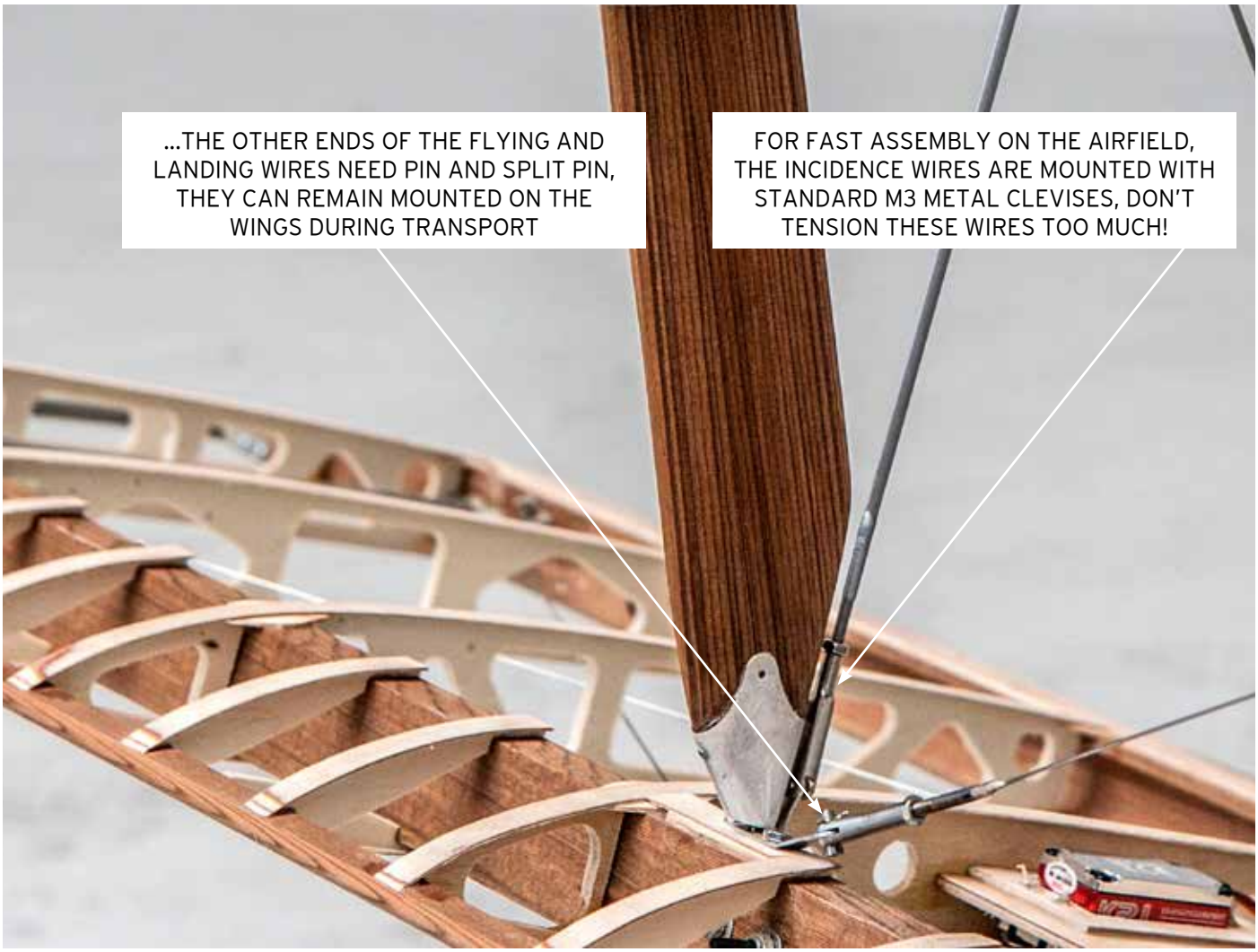
Note: do not tension the wires too much with the wings mounted on only one side and without the firewall, (the firewall, like on the full-size Tiger Moth, contributes to the strength of the fuselage).

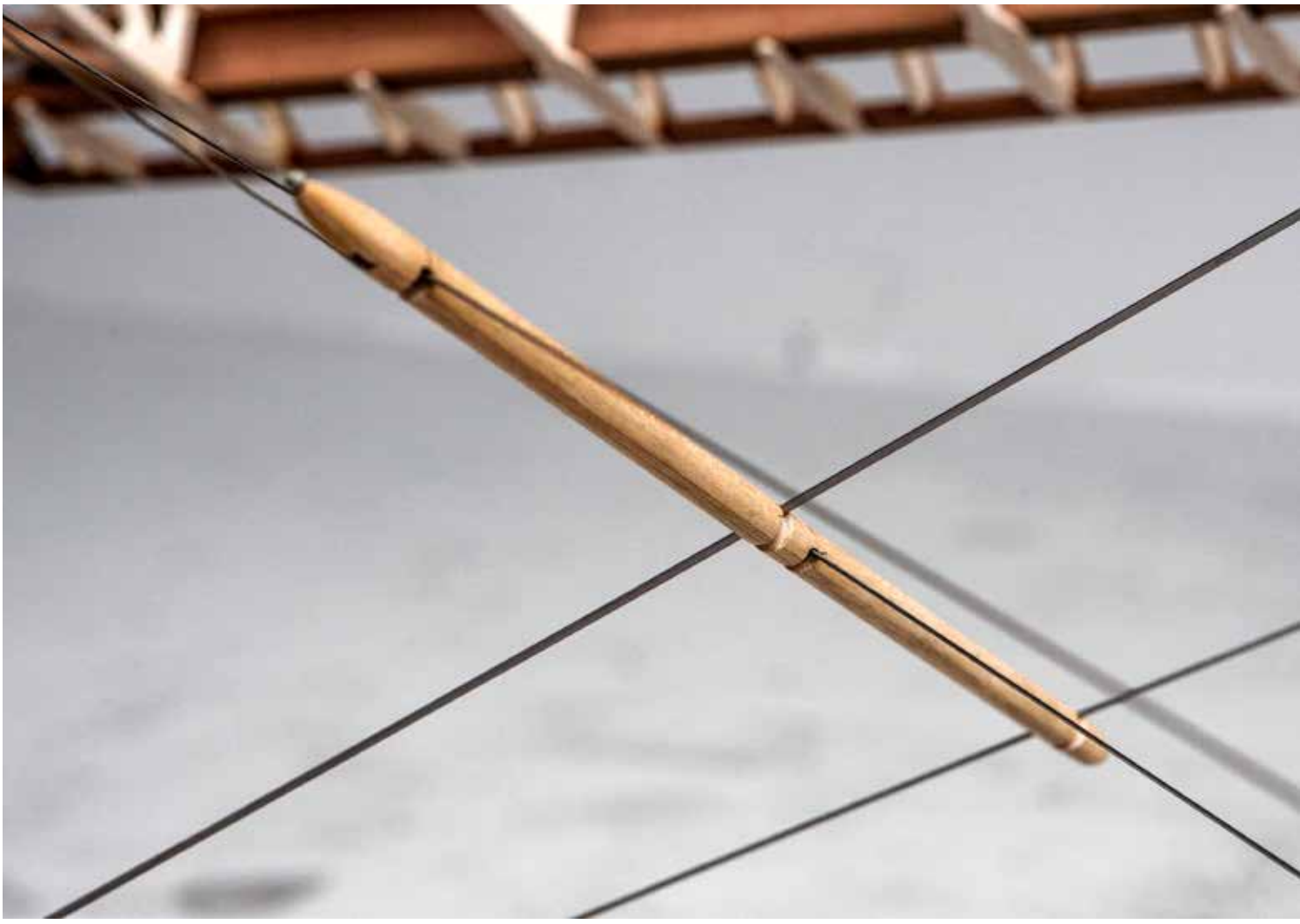
DRAWING A

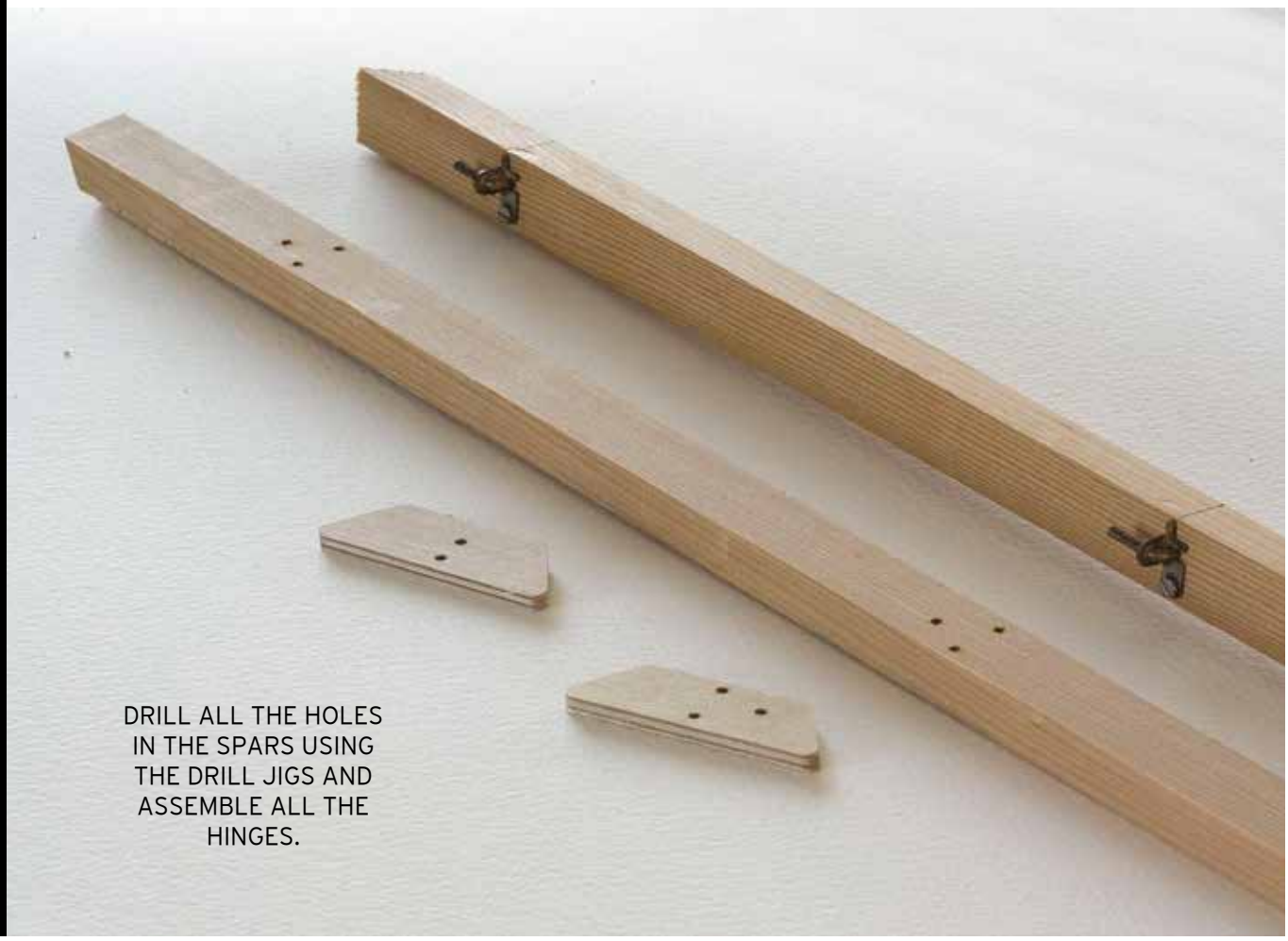



PIN AND "R" CLIP


THE ONLY TWO WIRES THAT NEED A PIN AND "R" CLIP ARE THE FLYING WIRES AT THE LOWER ENDS...


...THE OTHER ENDS OF THE FLYING AND LANDING WIRES NEED PIN AND SPLIT PIN, THEY CAN REMAIN MOUNTED ON THE WINGS DURING TRANSPORT
FOR FAST ASSEMBLY ON THE AIRFIELD, THE INCIDENCE WIRES ARE MOUNTED WITH STANDARD M3 METAL CLEVISES, DON'T TENSION THESE WIRES TOO MUCH!



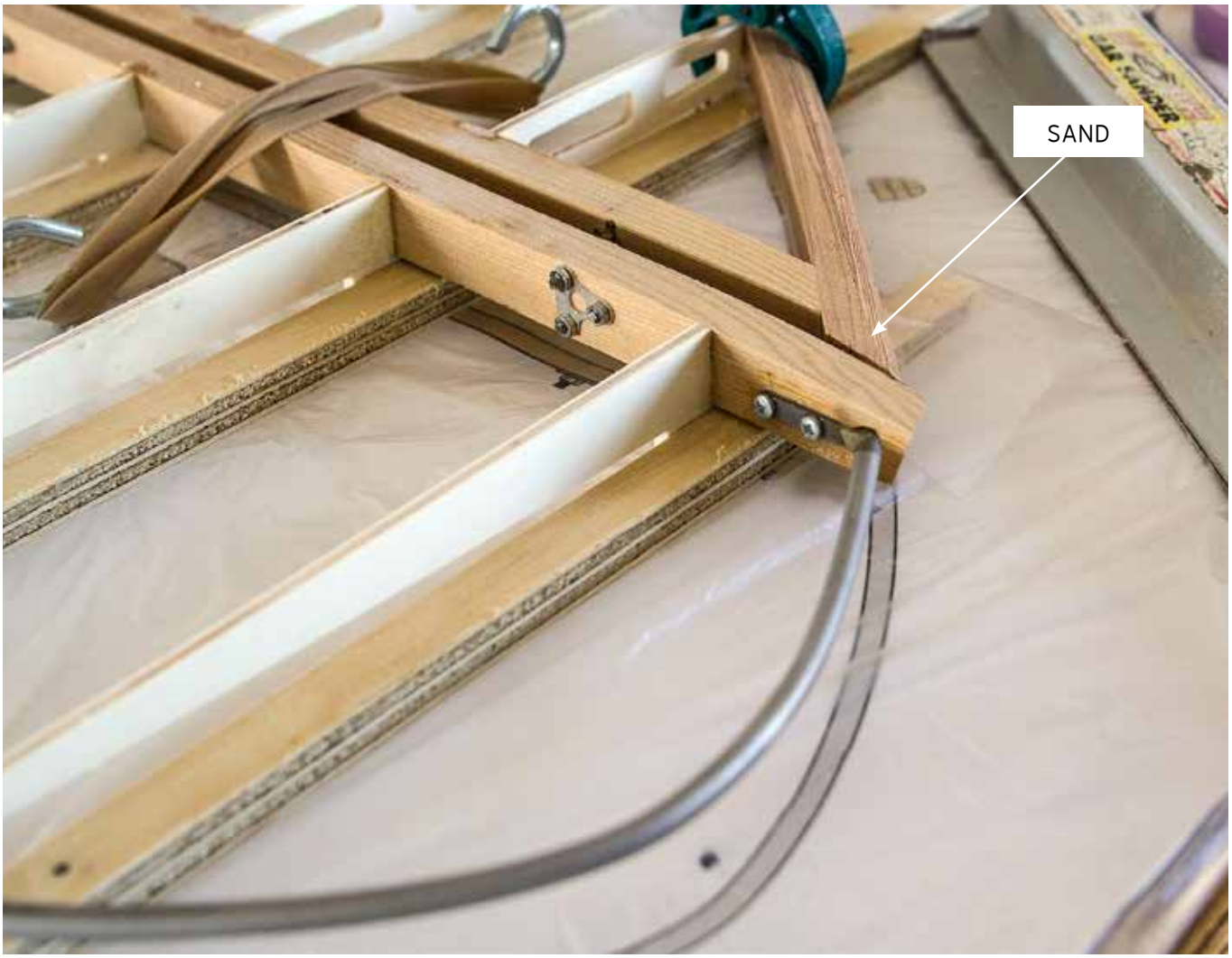


DRILL ALL THE HOLES IN THE SPARS USING THE DRILL JIGS AND ASSEMBLE ALL THE HINGES.

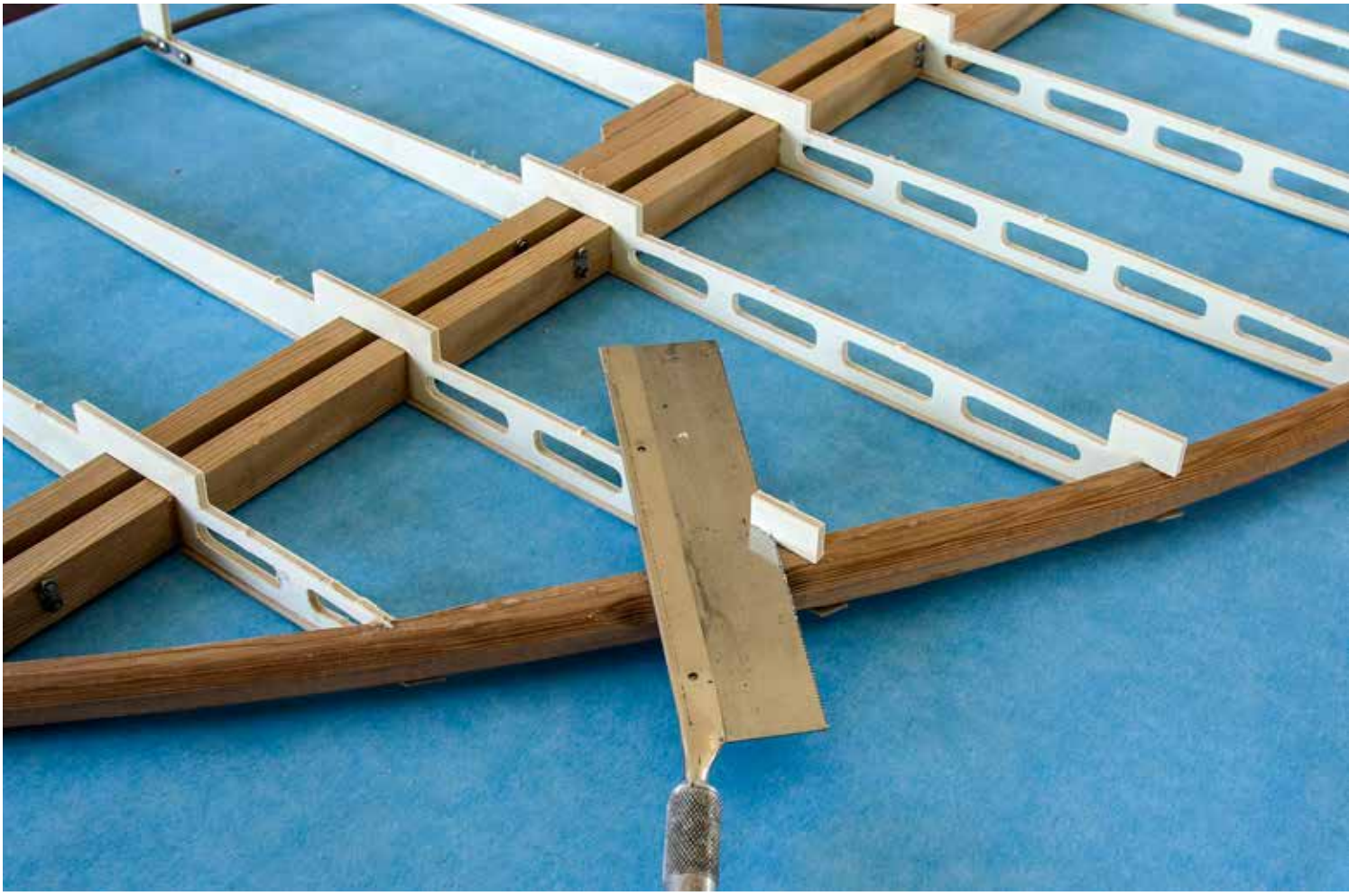
NAIL A STRIP UP TO 10 MM THICK NEXT TO EACH RIB, COVER EACH STRIP WITH SELLOTAPE TO PREVENT GLUING.

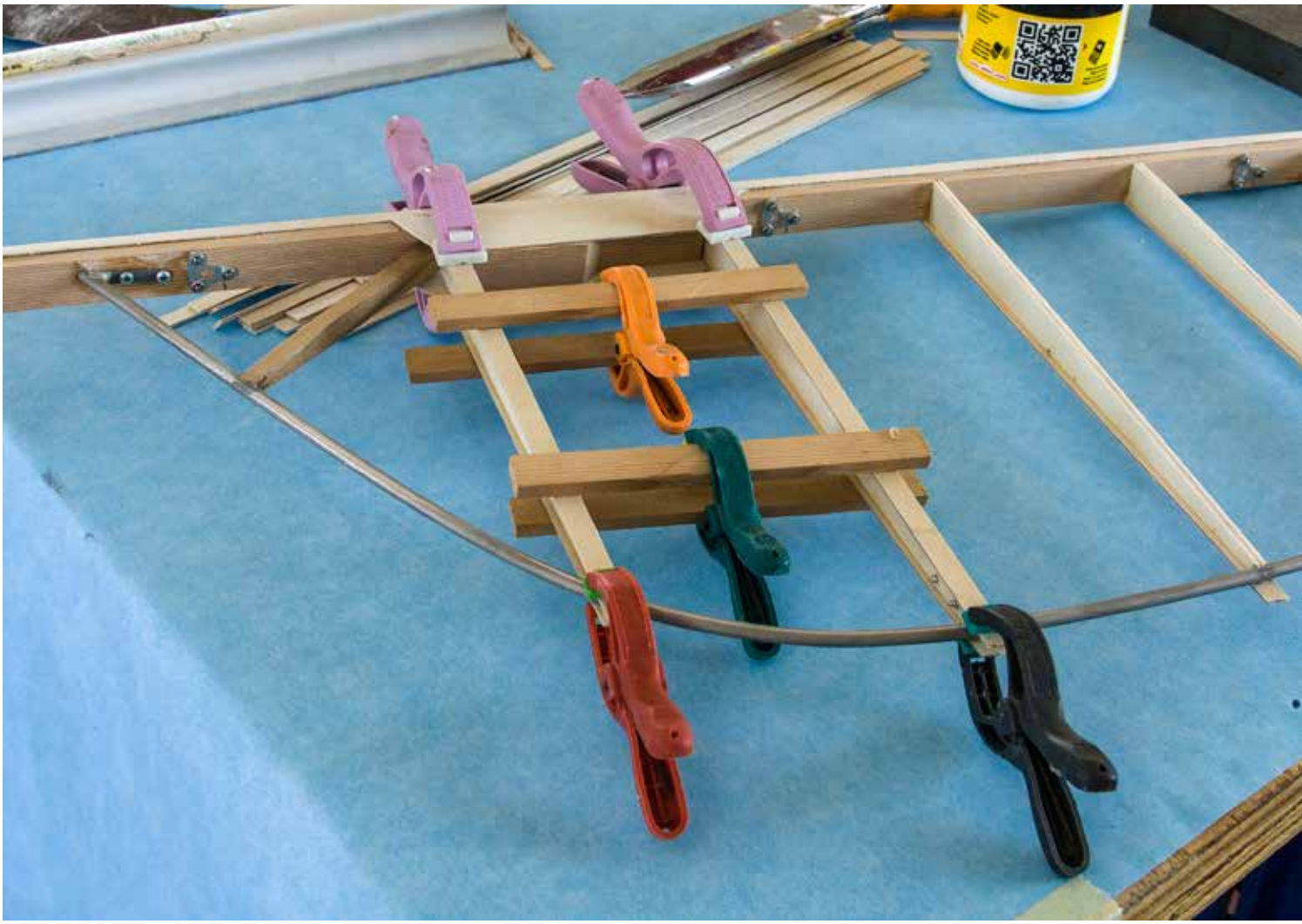

ADD REINFORCING STRIPS
AS SHOWN IN DRAWING

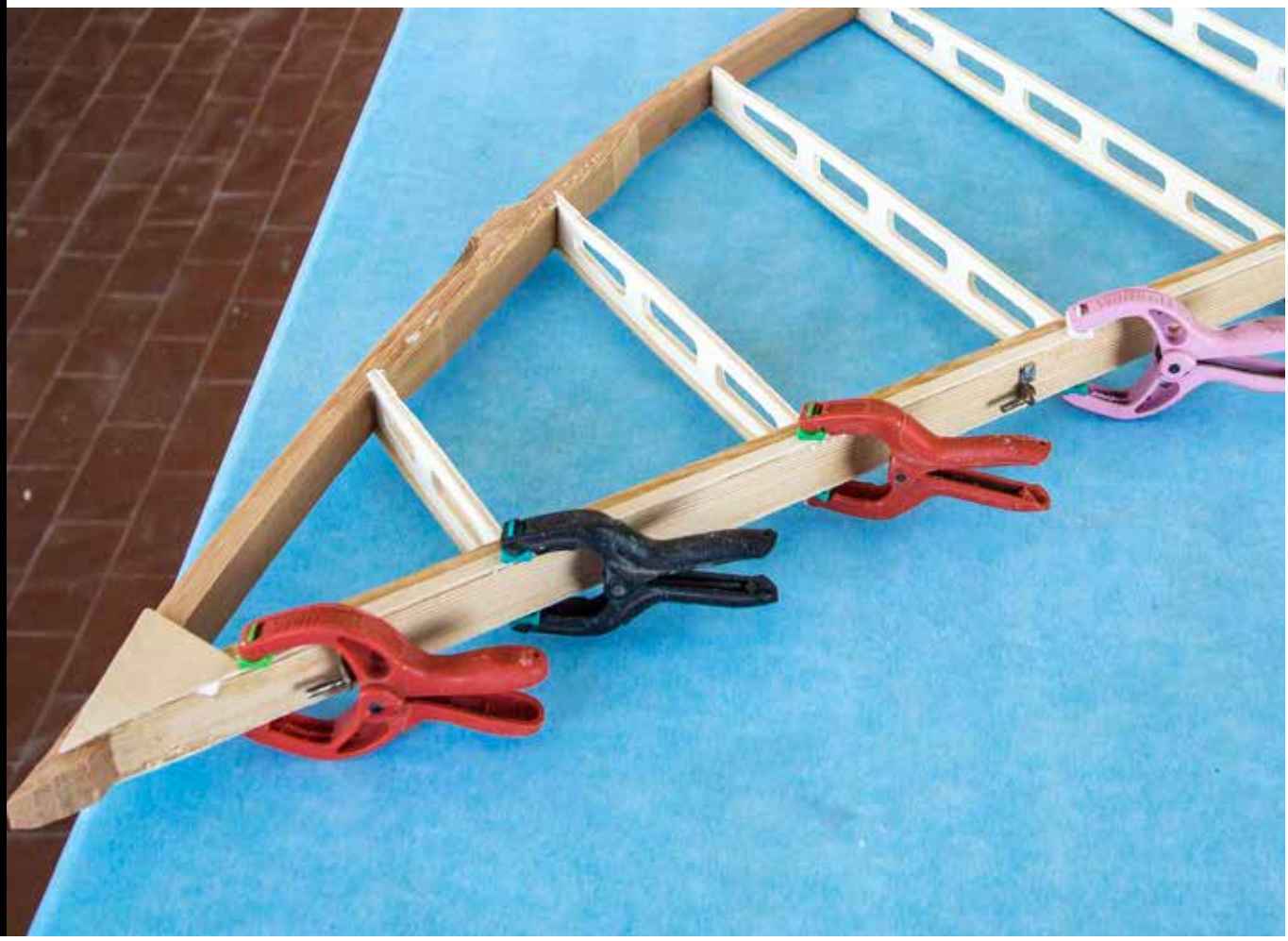

ADD A FEW DROPS OF C.A.

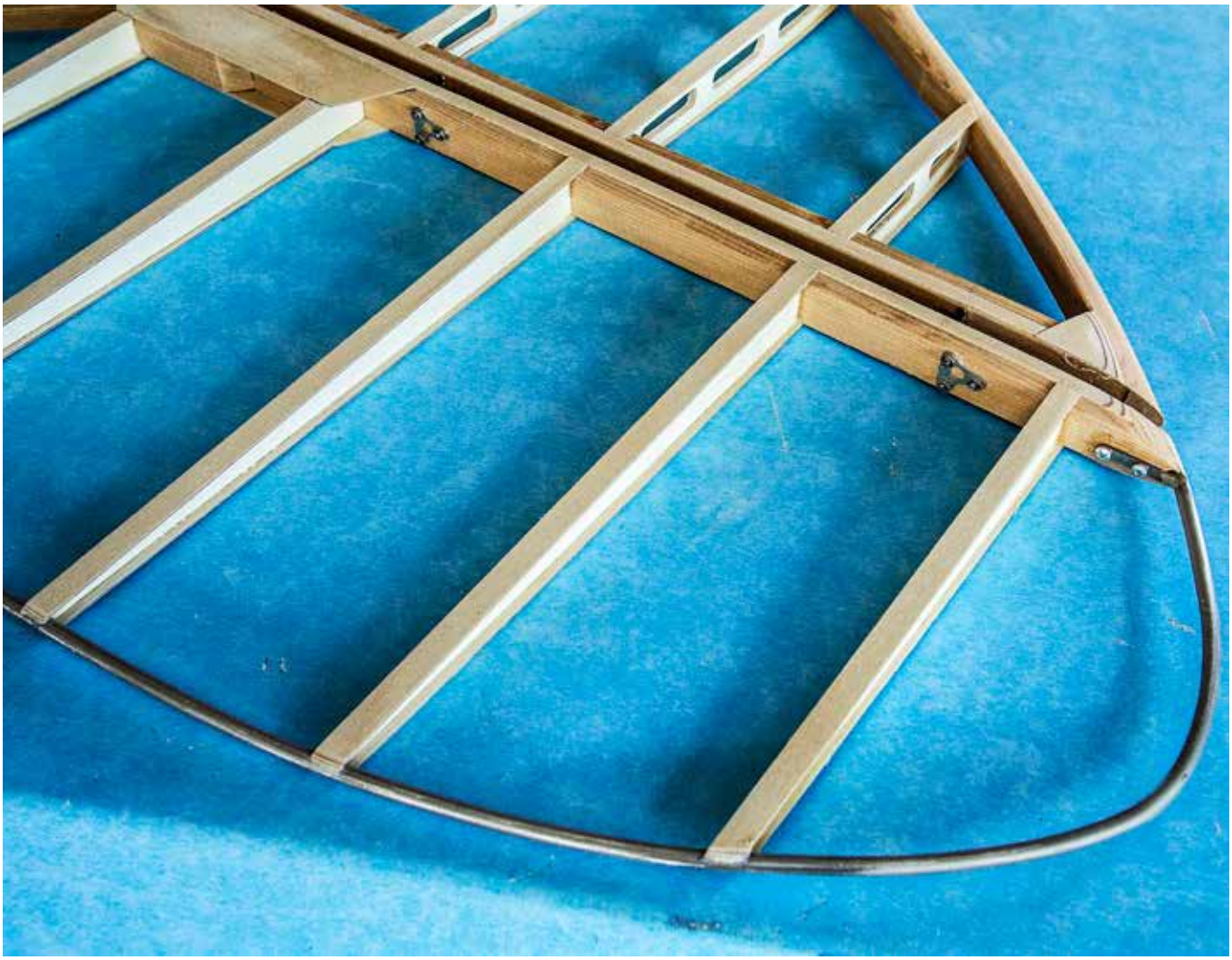

SAND

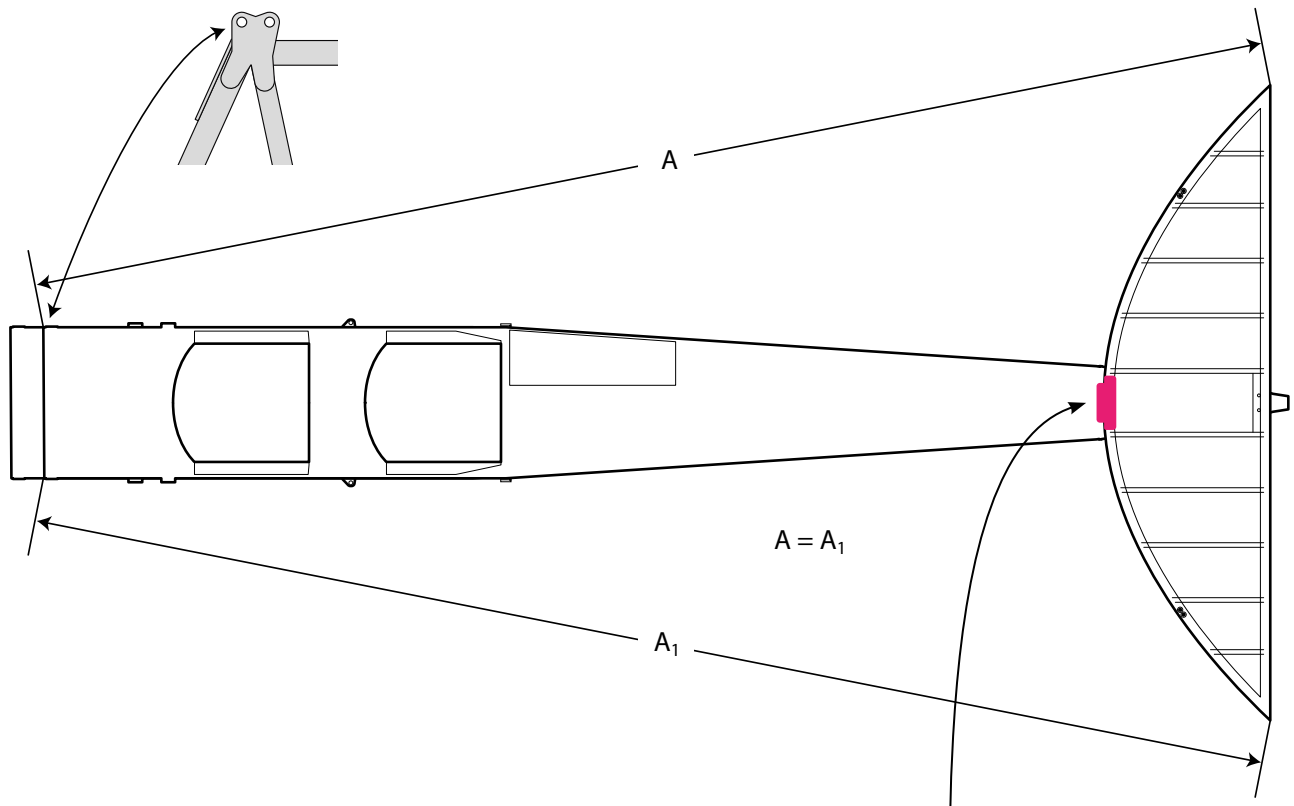

SLOT FOR THE CAPSTRIP,
FILED TO THE SAME
LEVEL OF THE RIB



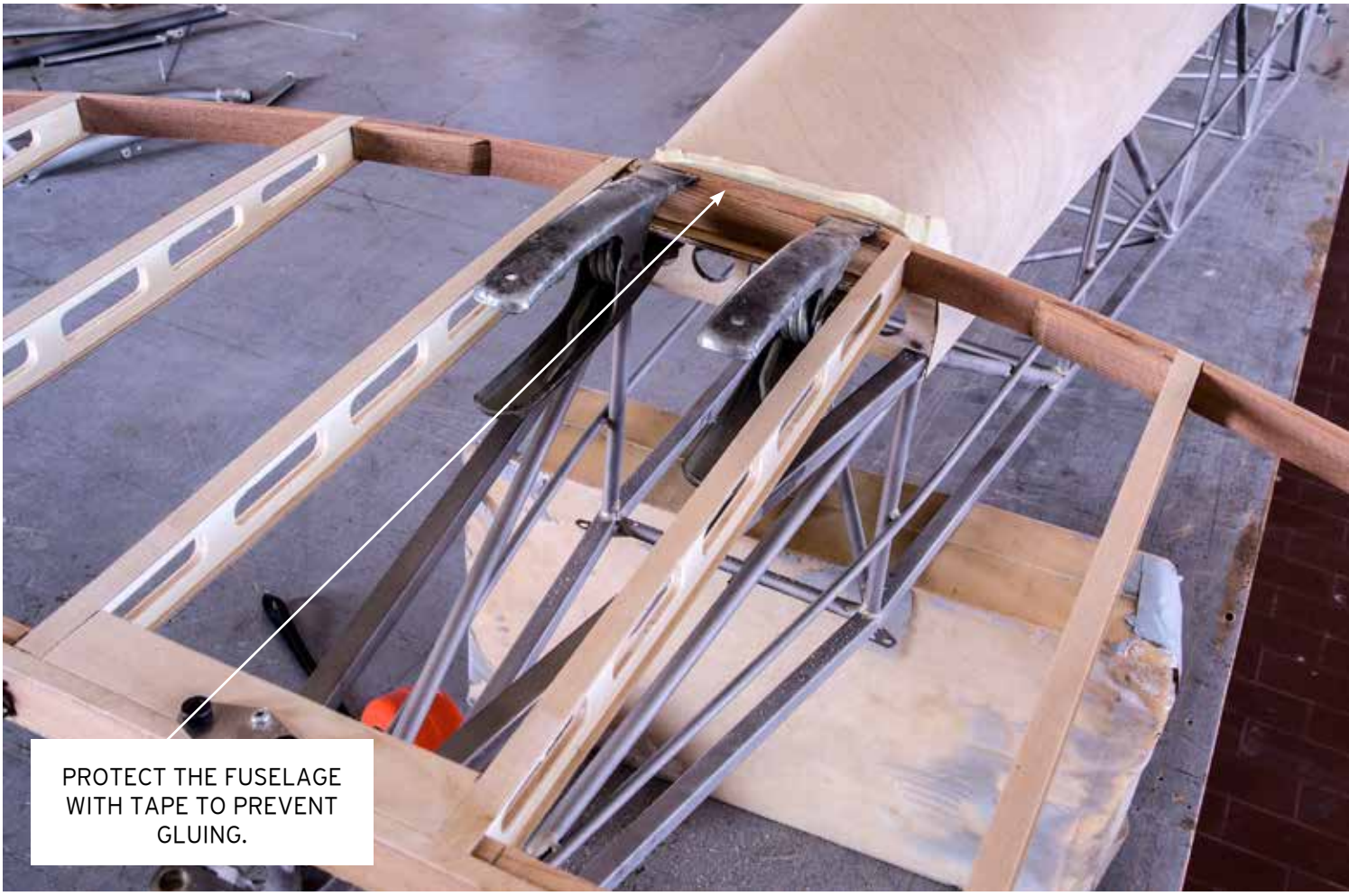




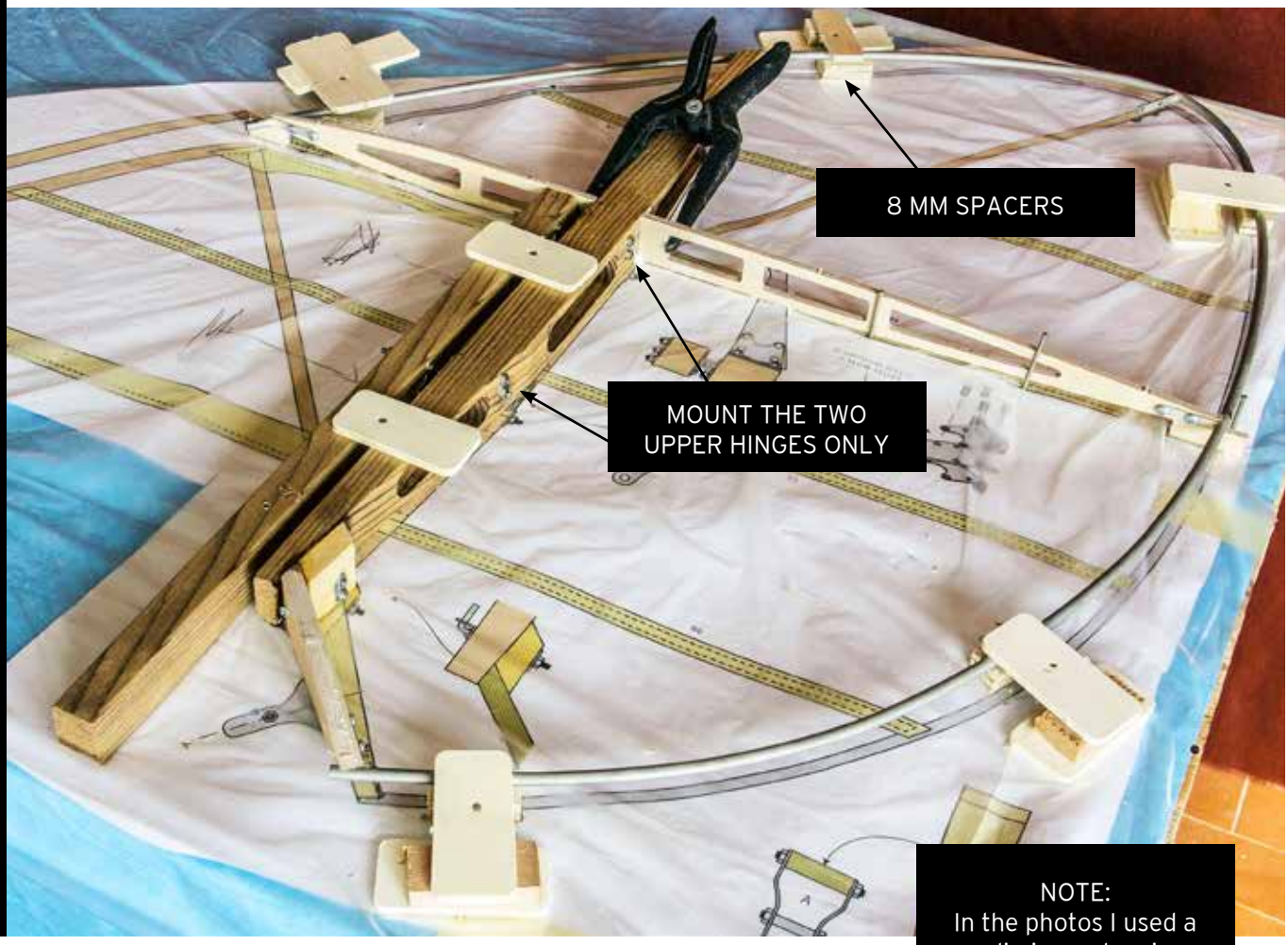



A
A = A1
A1

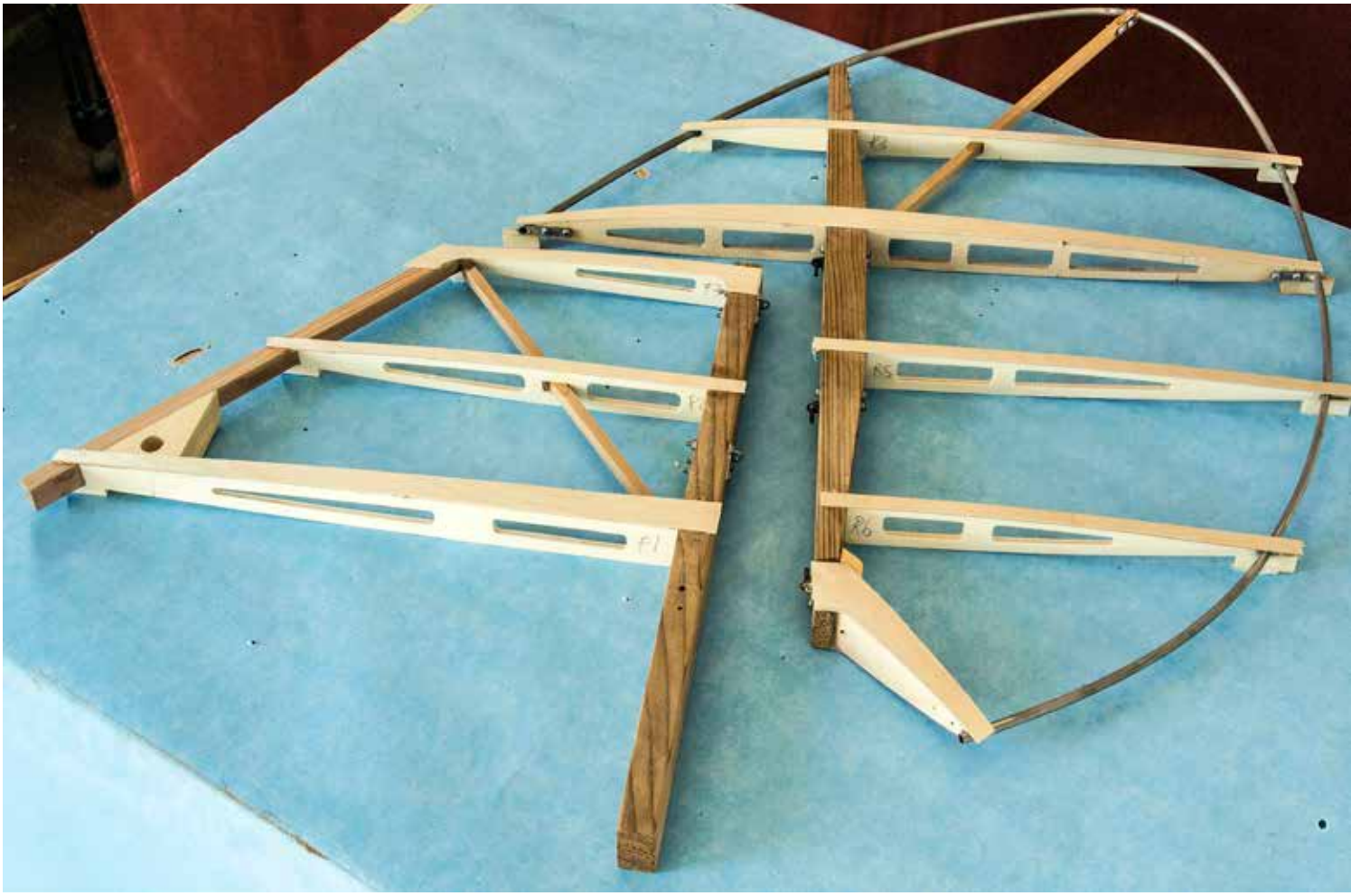

3MM BIRCH PLYWOOD
EPOXY GLUE
TO STABILIZER

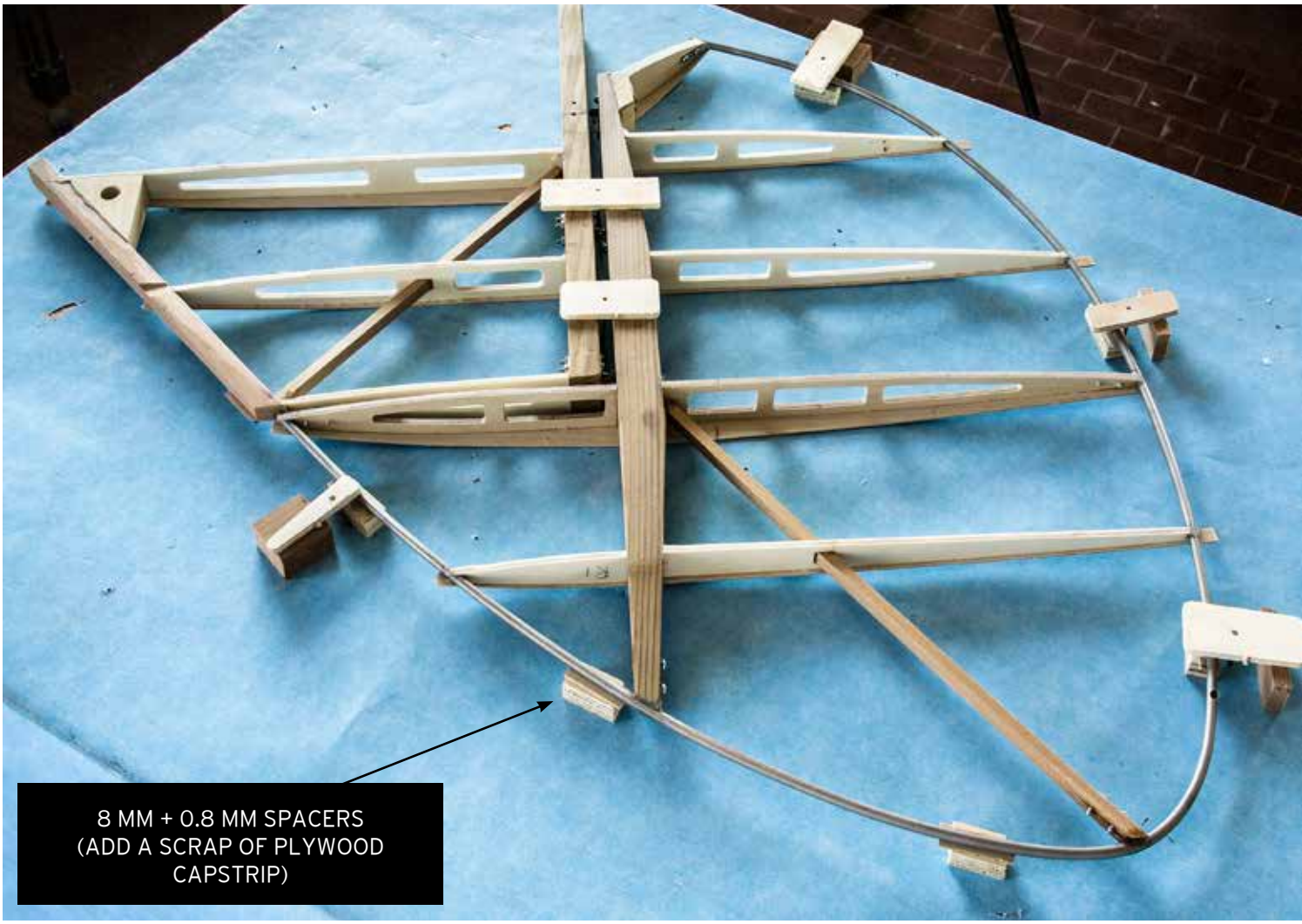

PROTECT THE FUSELAGE WITH TAPE TO PREVENT GLUING.

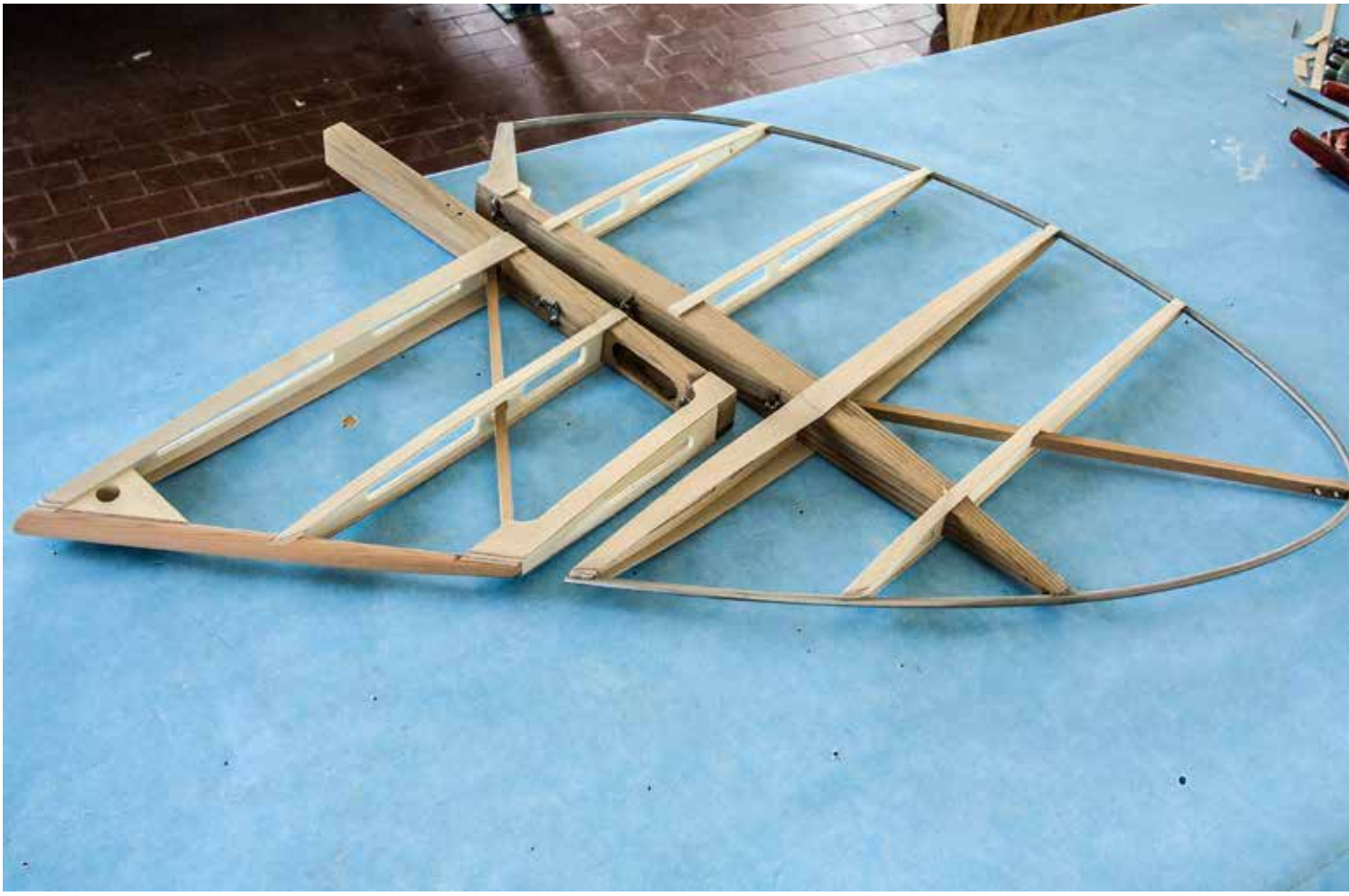

MAKE SURE THAT THE STAB IS HORIZONTAL BEFORE DRILLING

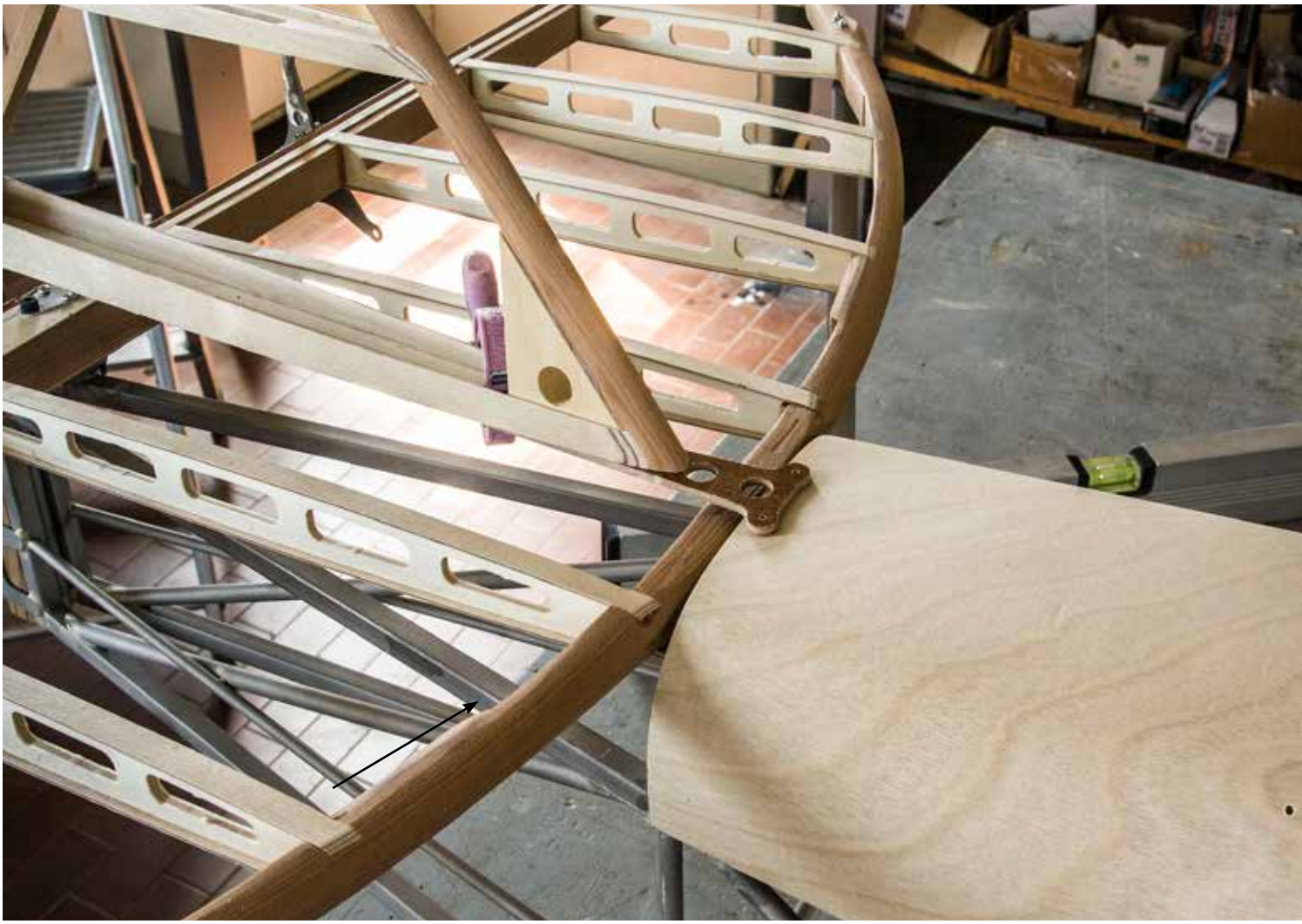


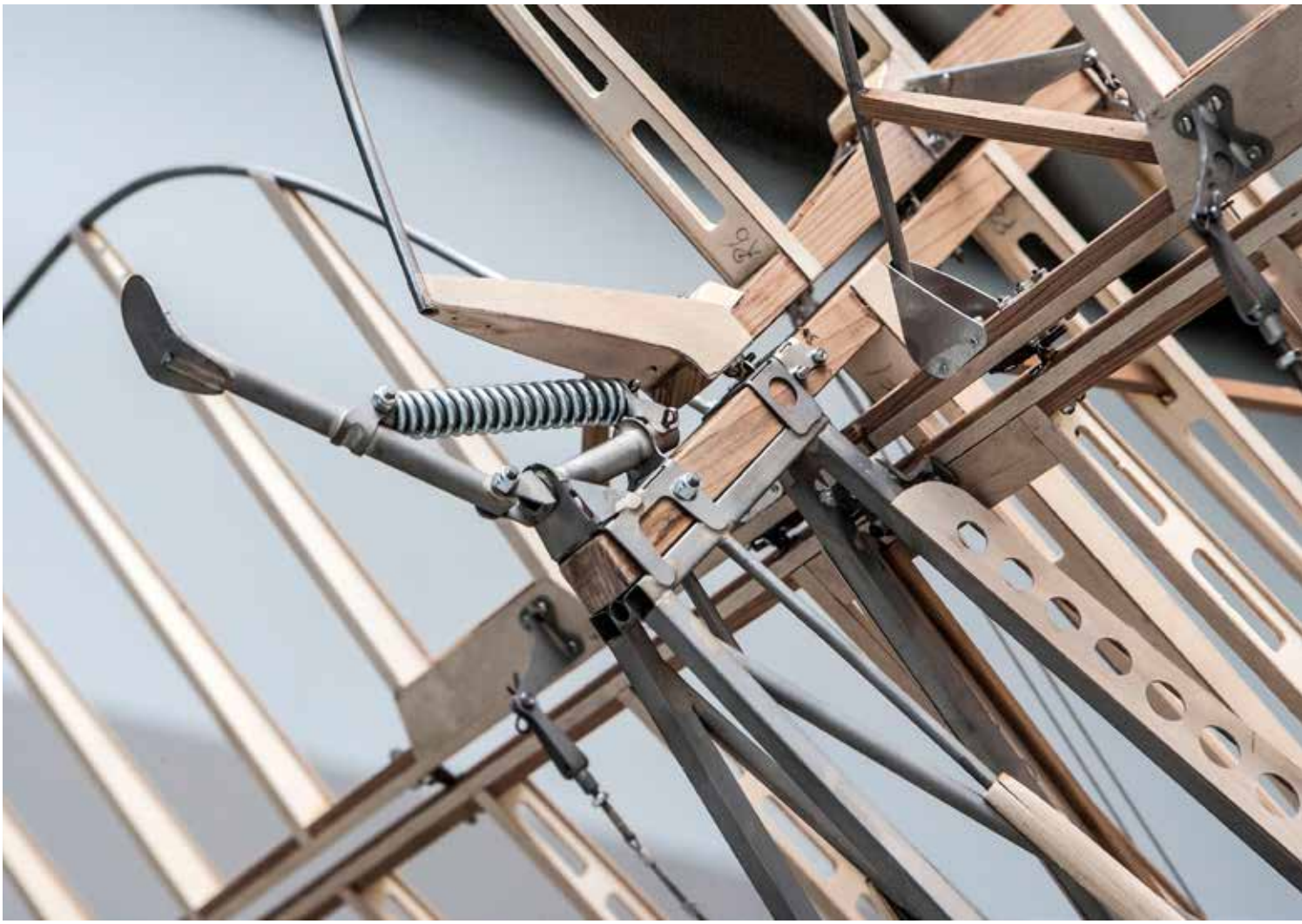
NOTE:
In the photos I used a preliminary drawing, you will find some differences to the drawing you have.



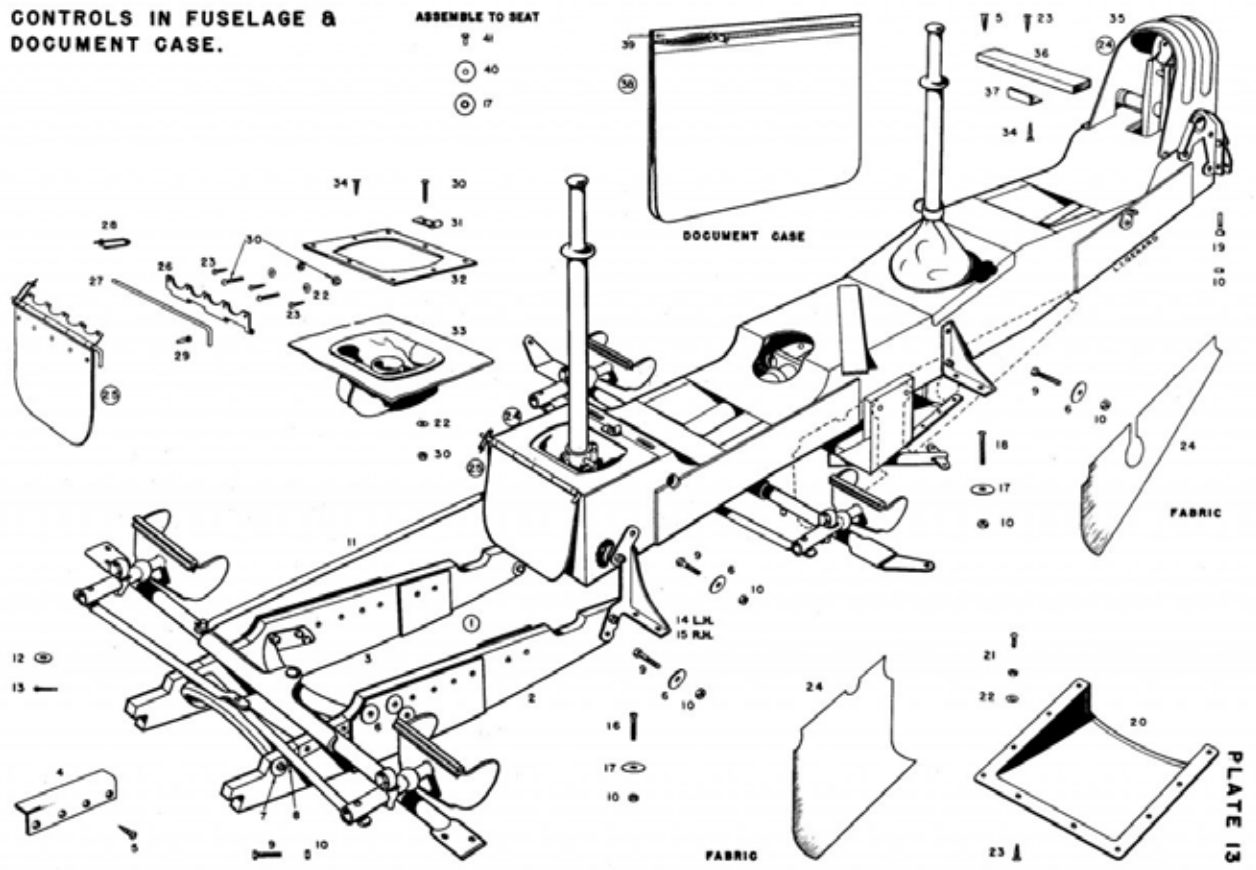

8 MM + 0.8 MM SPACERS
(ADD A SCRAP OF PLYWOOD
CAPSTRIP)

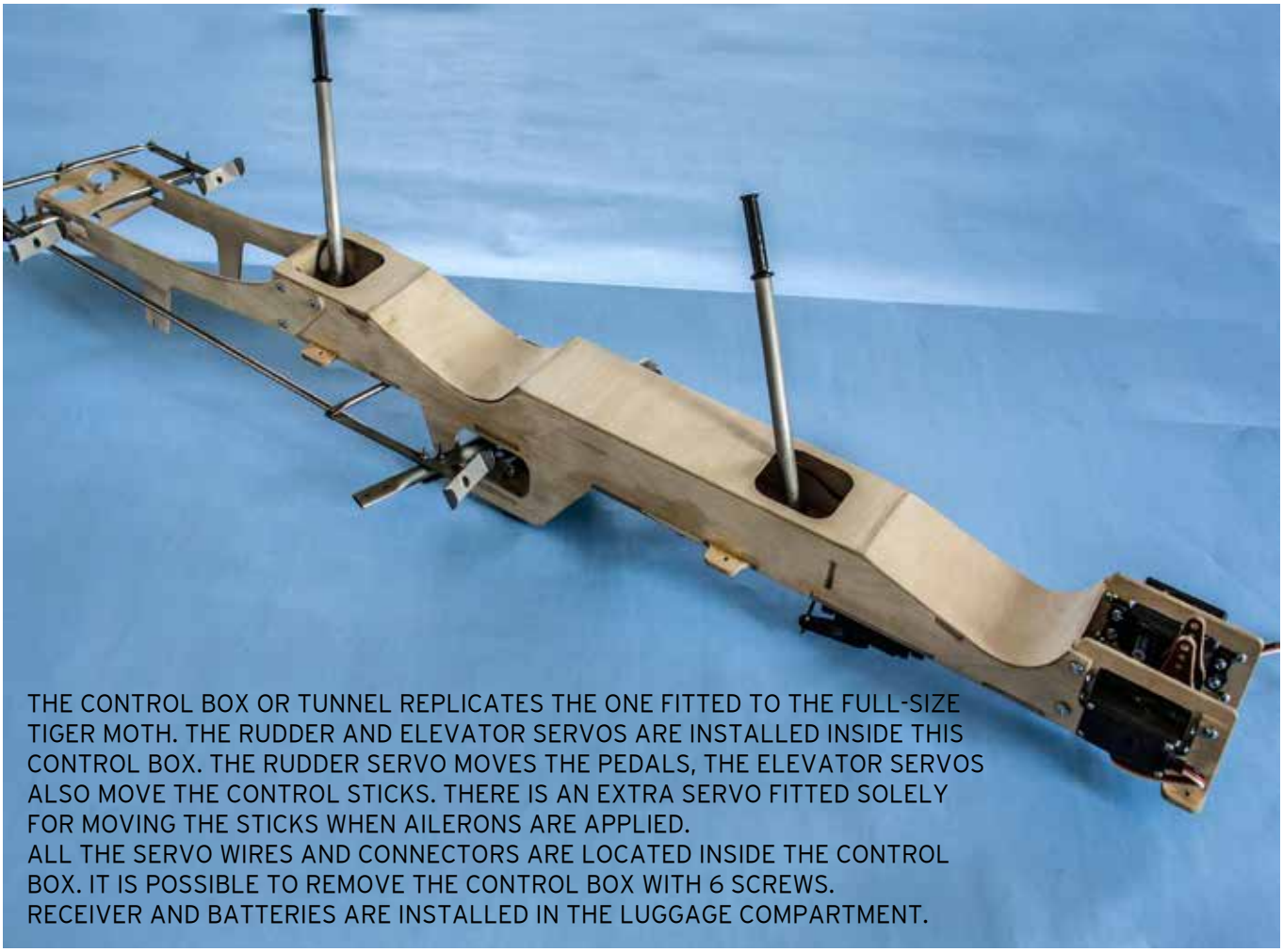




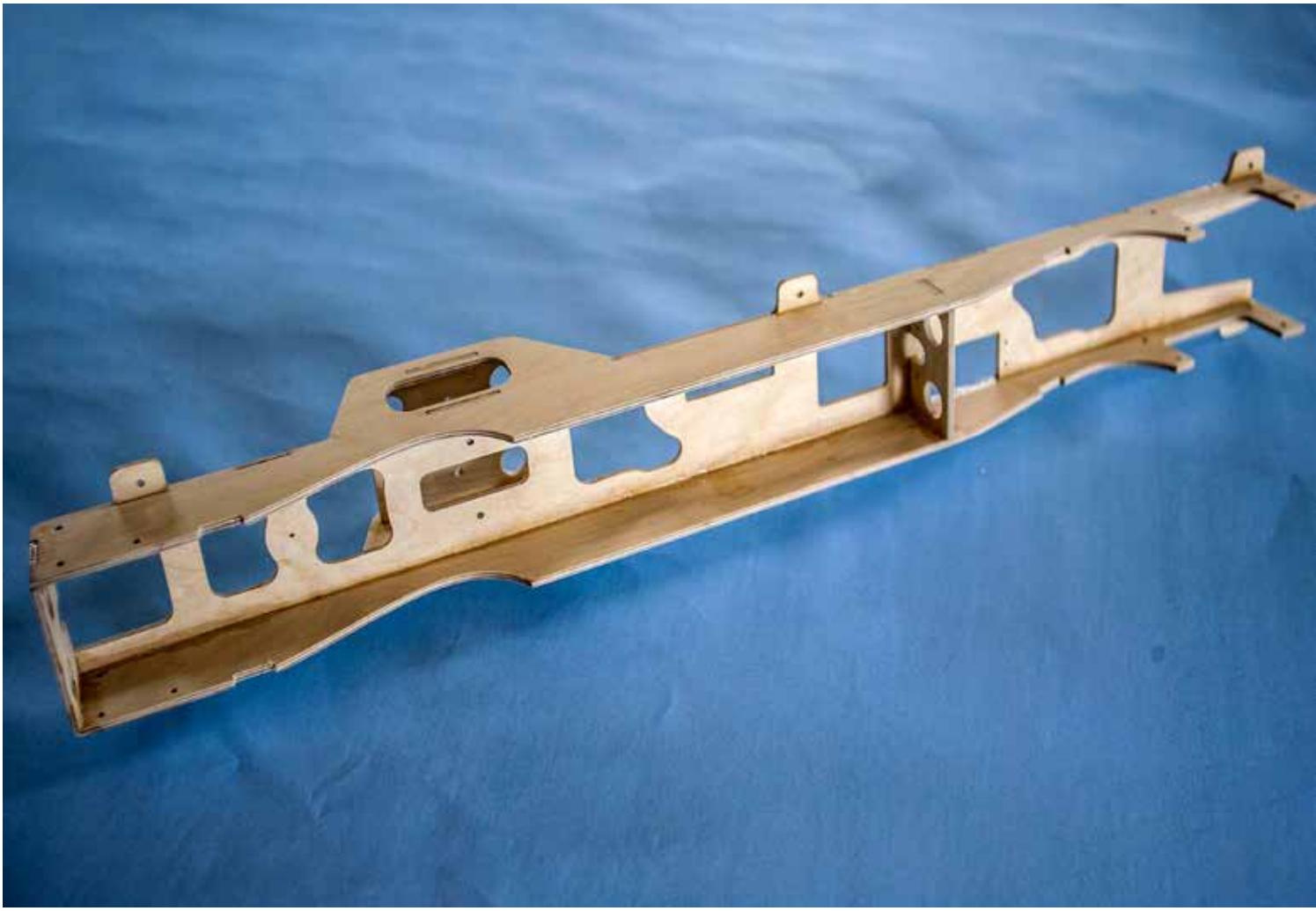


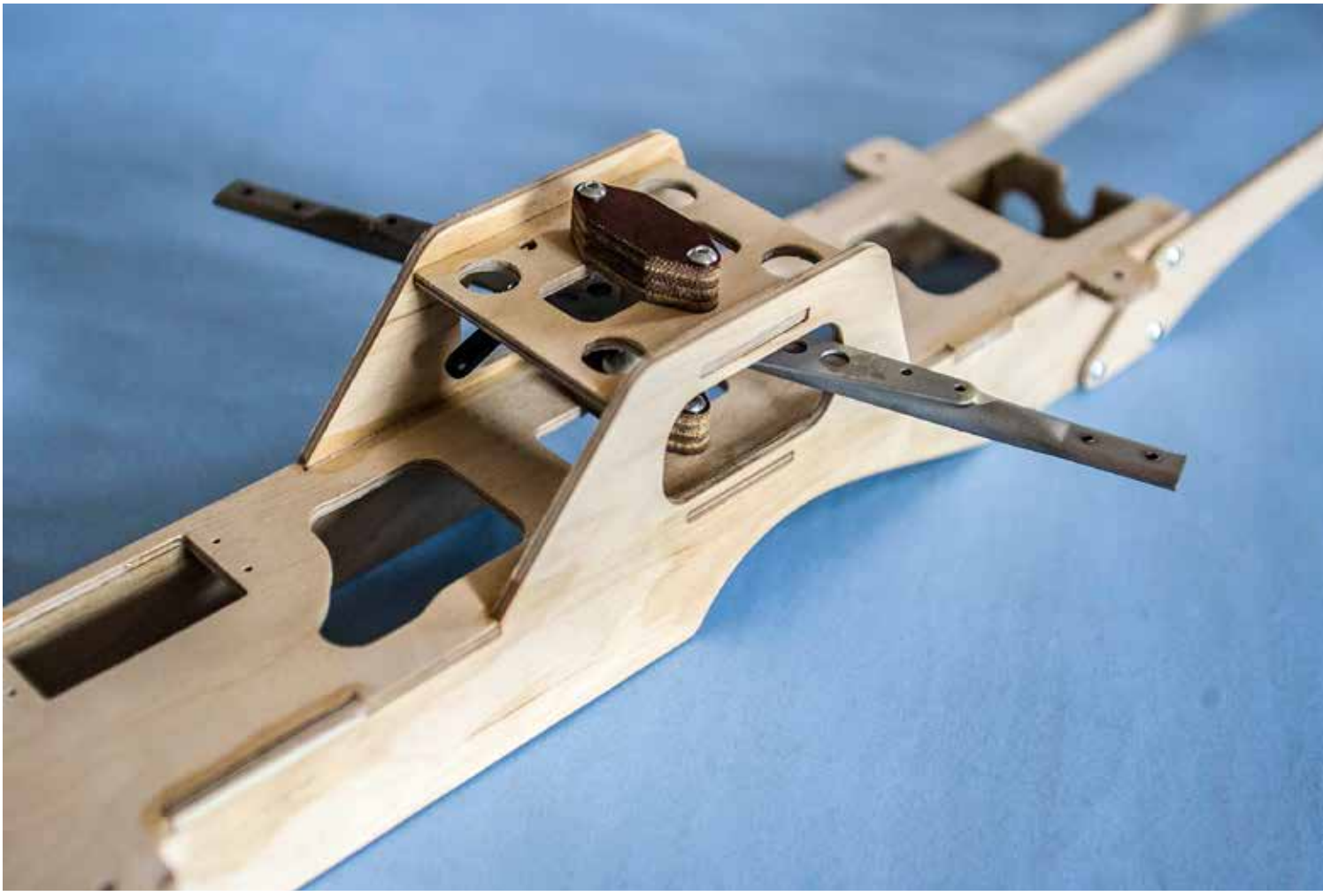
THE FULL-SIZE TIGER MOTH CONTROL BOX

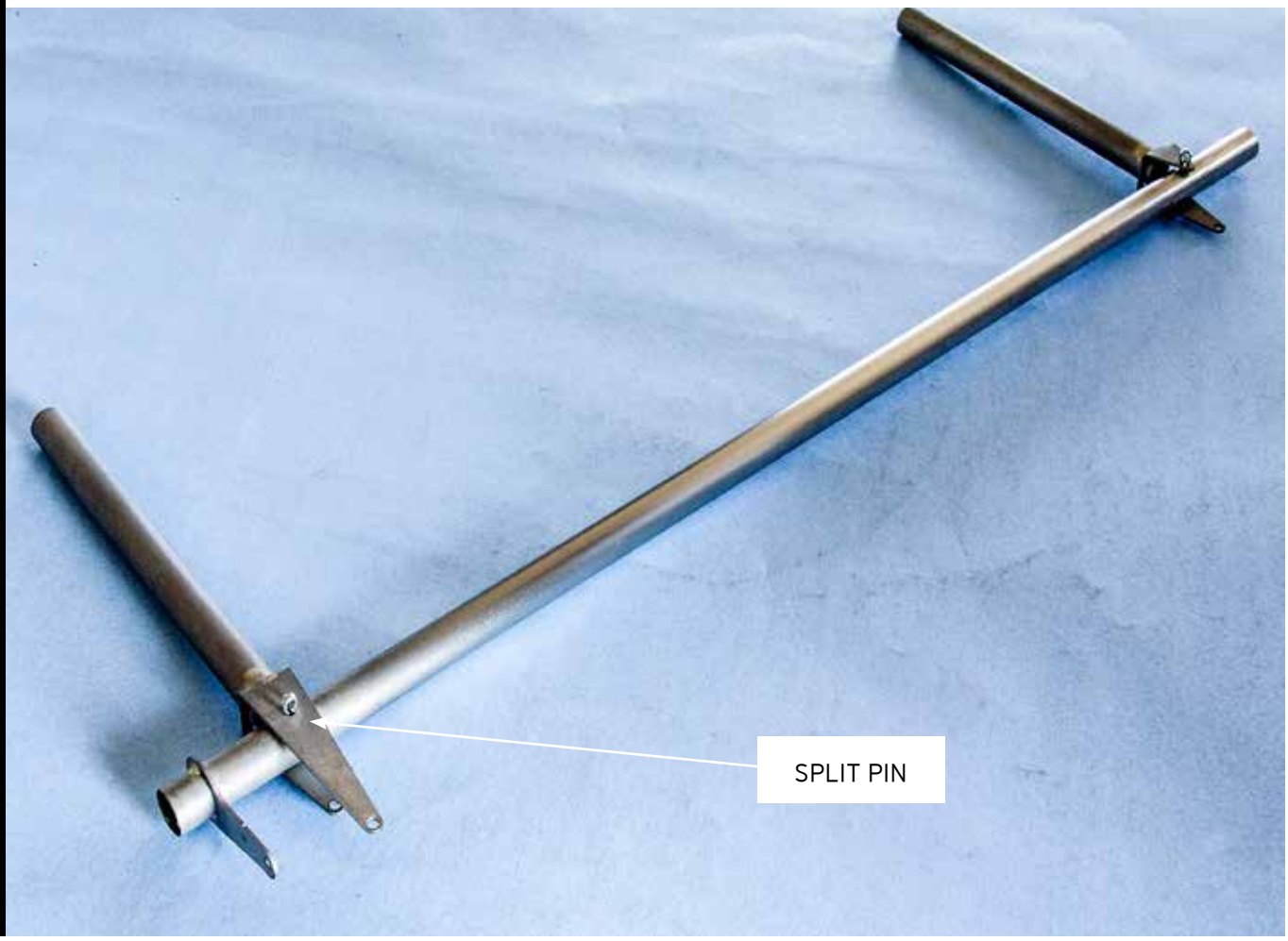


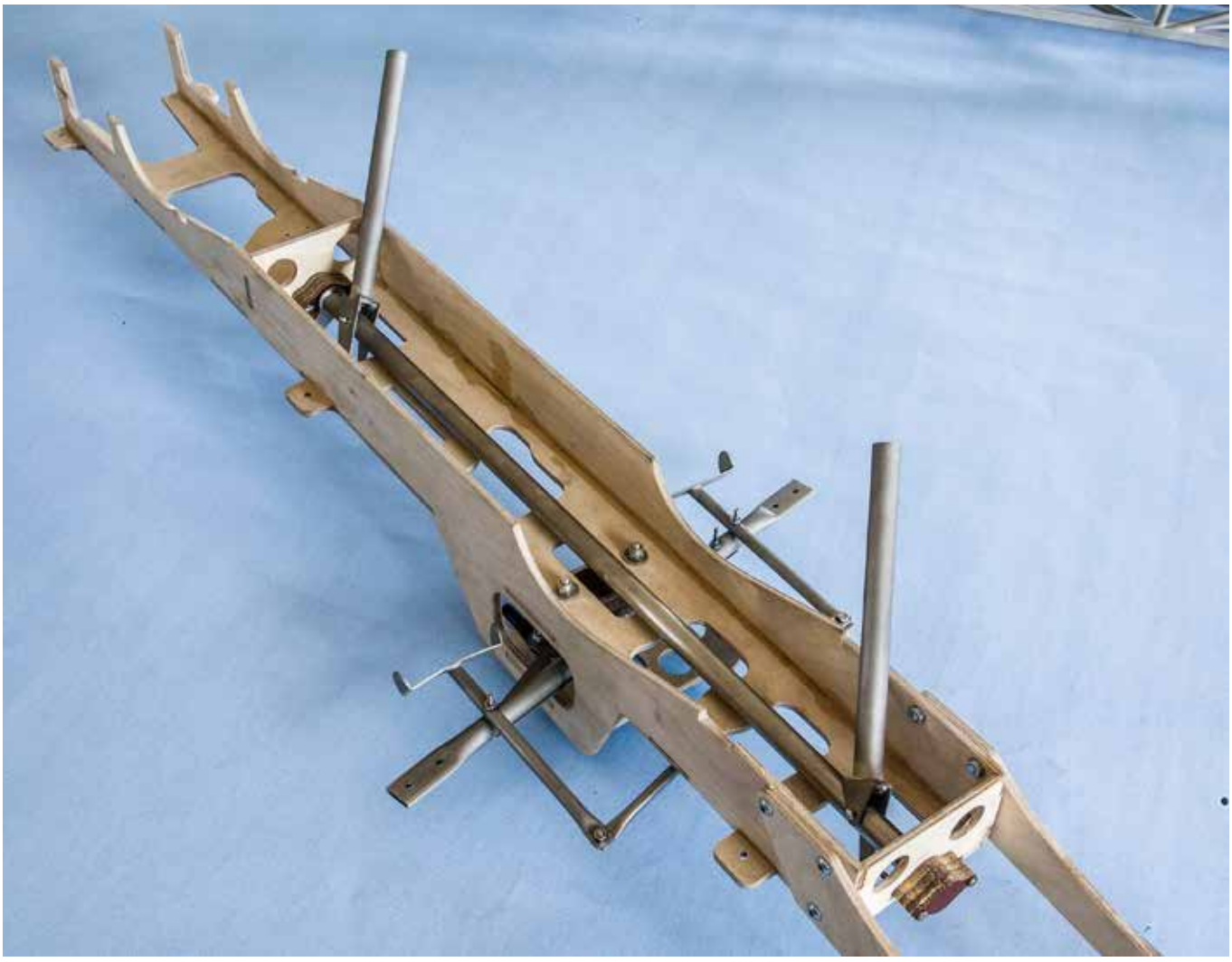


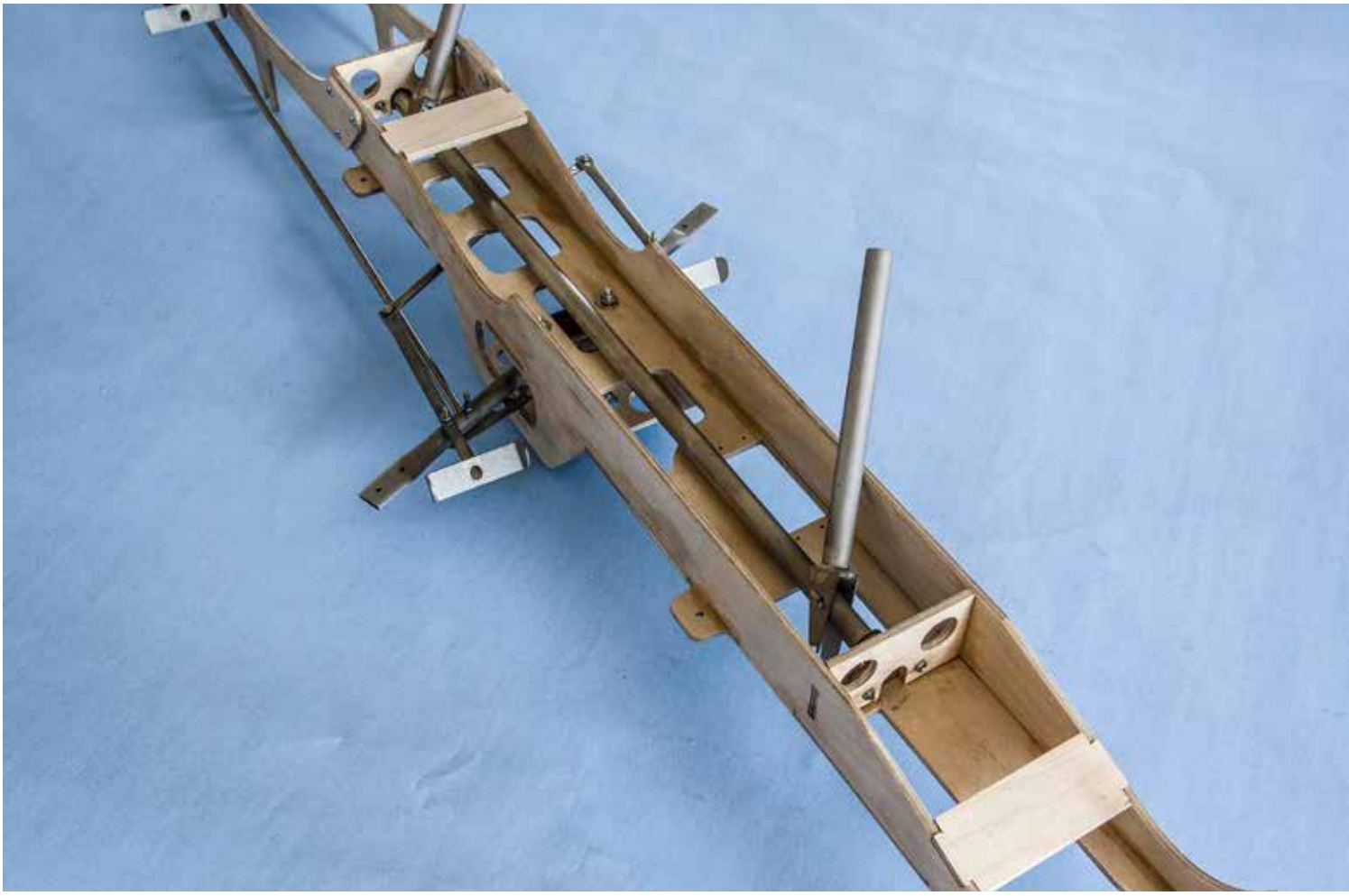
THE CONTROL BOX OR TUNNEL REPLICATES THE ONE FITTED TO THE FULL-SIZE TIGER MOTH. THE RUDDER AND ELEVATOR SERVOS ARE INSTALLED INSIDE THIS CONTROL BOX. THE RUDDER SERVO MOVES THE PEDALS, THE ELEVATOR SERVOS ALSO MOVE THE CONTROL STICKS. THERE IS AN EXTRA SERVO FITTED SOLELY FOR MOVING THE STICKS WHEN AILERONS ARE APPLIED.
ALL THE SERVO WIRES AND CONNECTORS ARE LOCATED INSIDE THE CONTROL BOX. IT IS POSSIBLE TO REMOVE THE CONTROL BOX WITH 6 SCREWS.
RECEIVER AND BATTERIES ARE INSTALLED IN THE LUGGAGE COMPARTMENT.

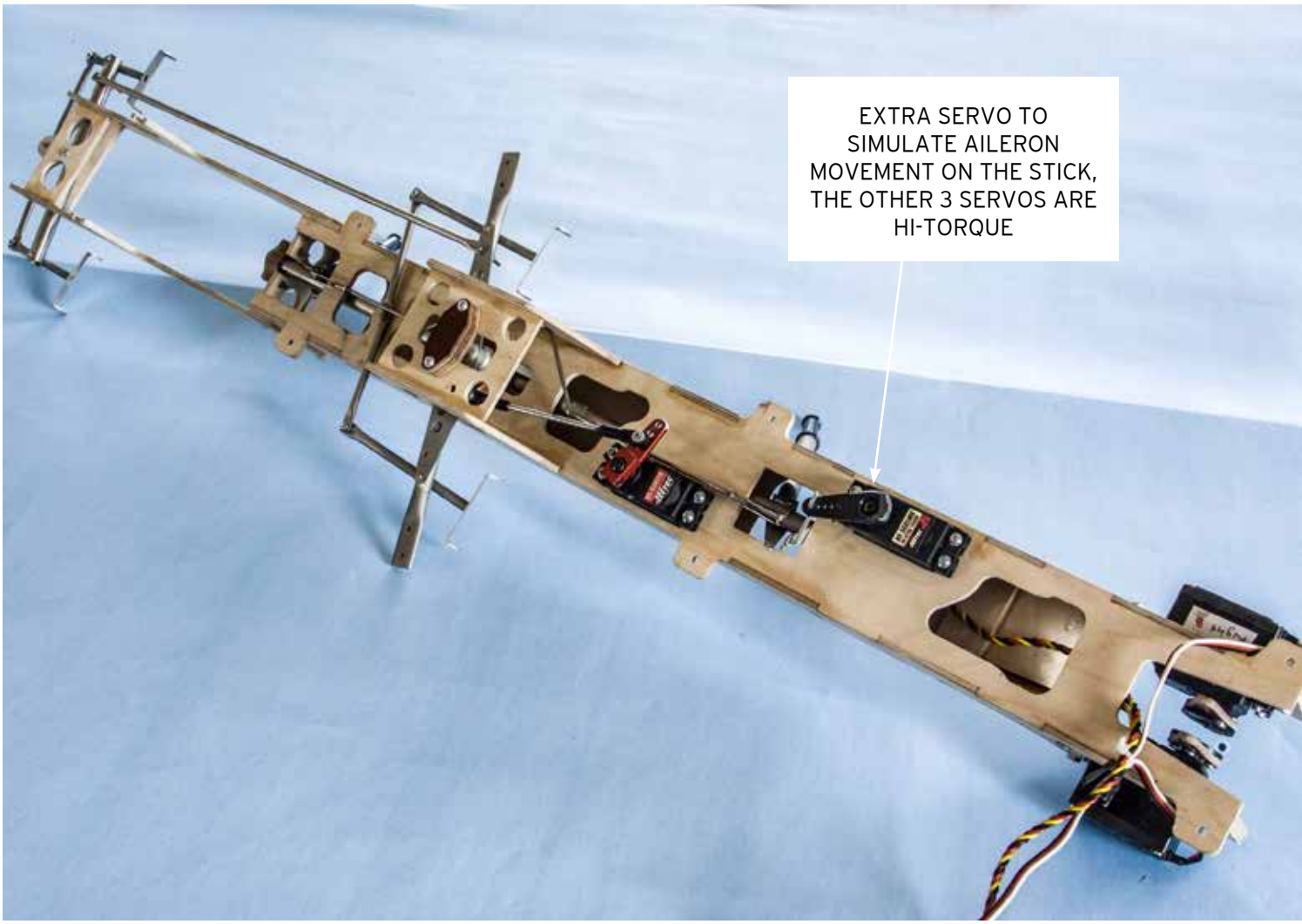


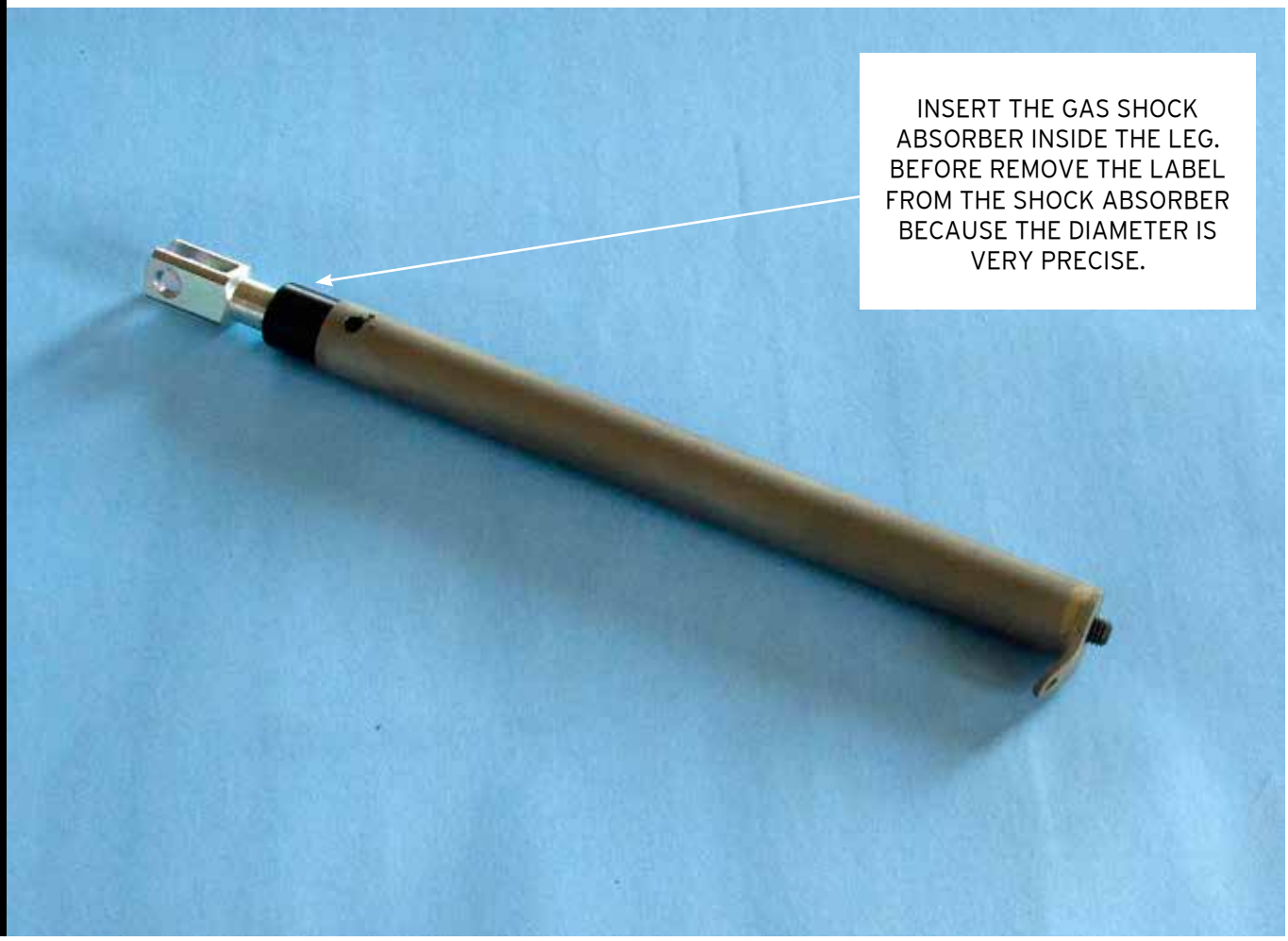


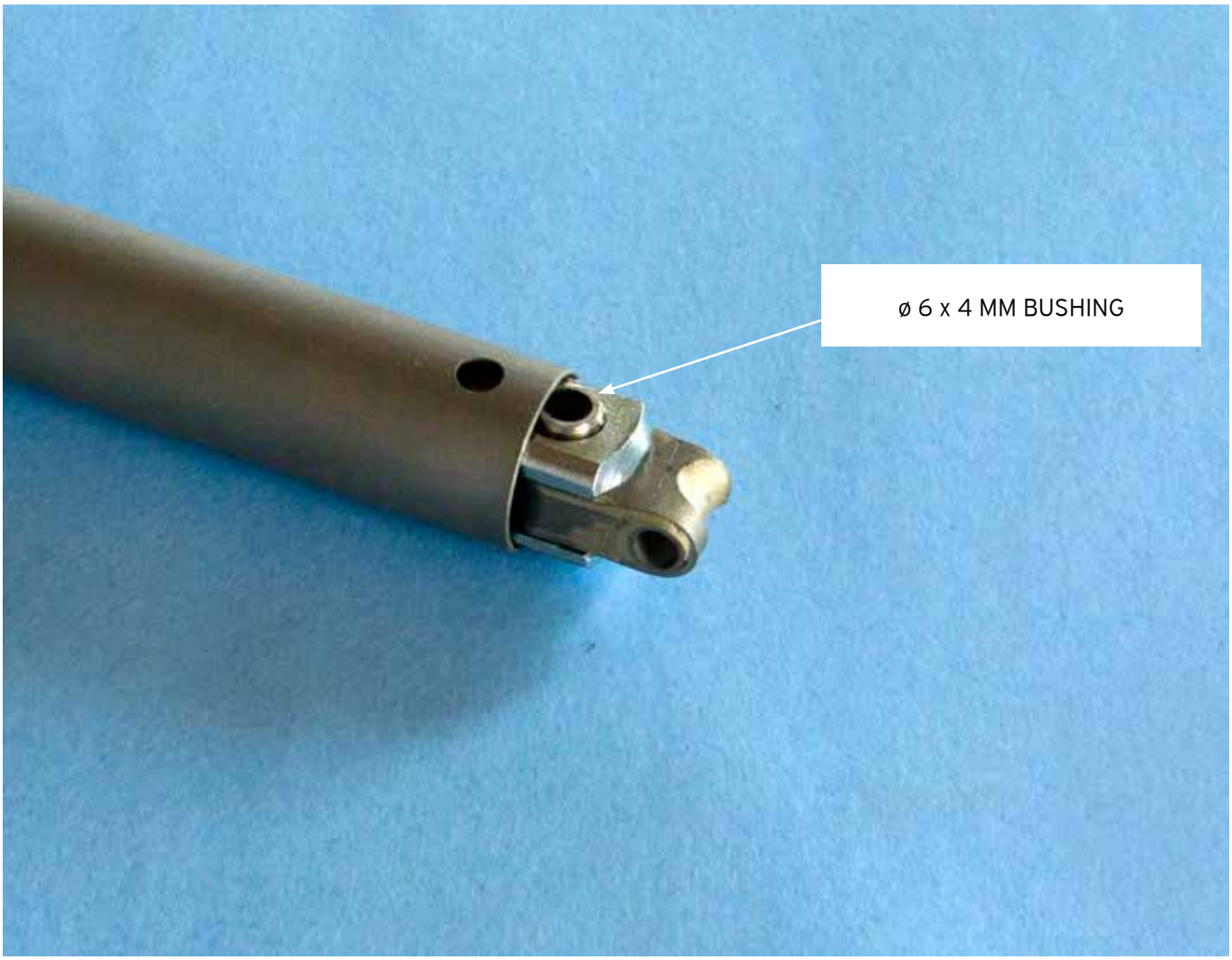

SPLIT PIN

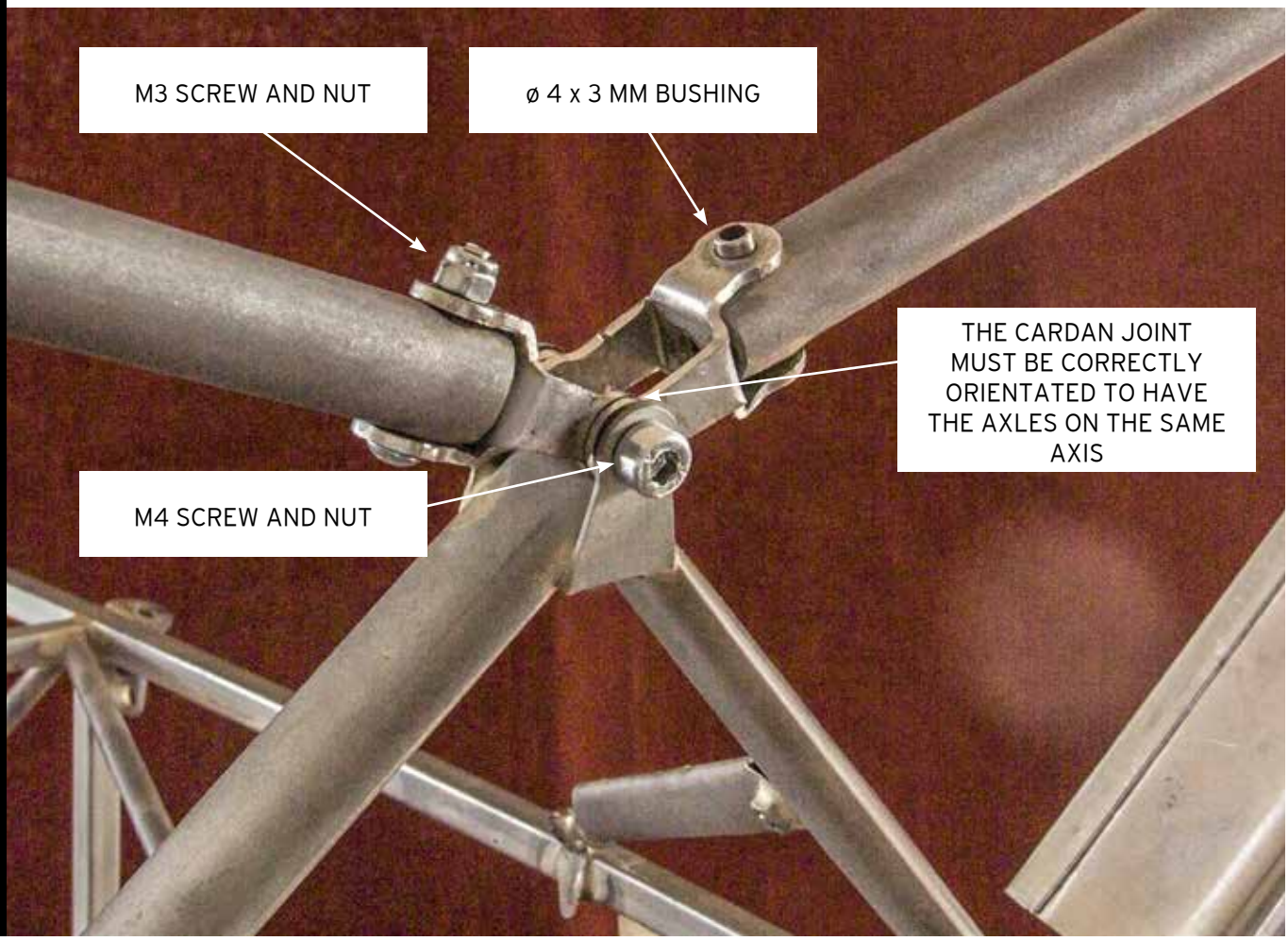





EXTRA SERVO TO SIMULATE AILERON MOVEMENT ON THE STICK, THE OTHER 3 SERVOS ARE HI-TORQUE

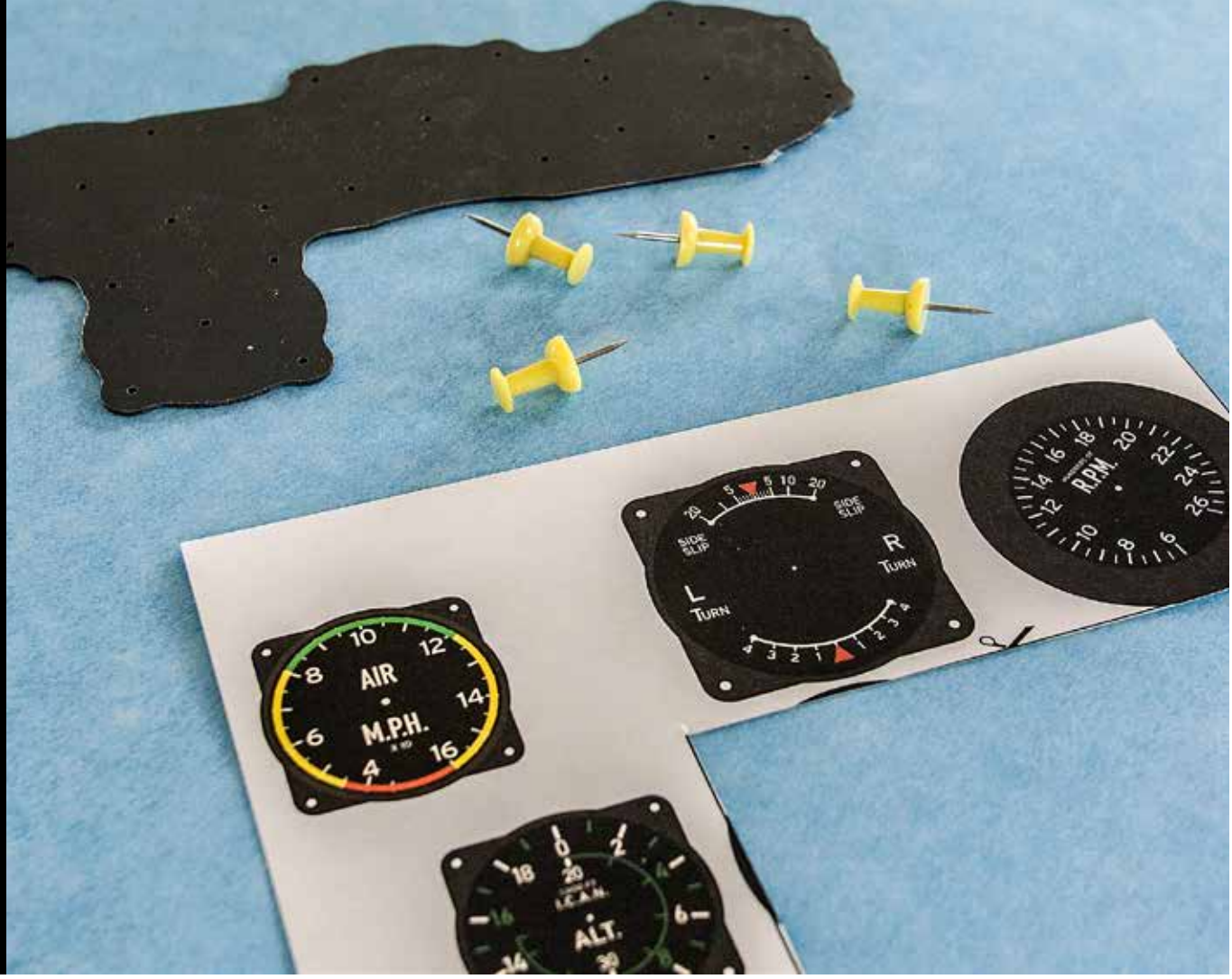

INSERT THE GAS SHOCK ABSORBER INSIDE THE LEG. BEFORE REMOVE THE LABEL FROM THE SHOCK ABSORBER BECAUSE THE DIAMETER IS VERY PRECISE.

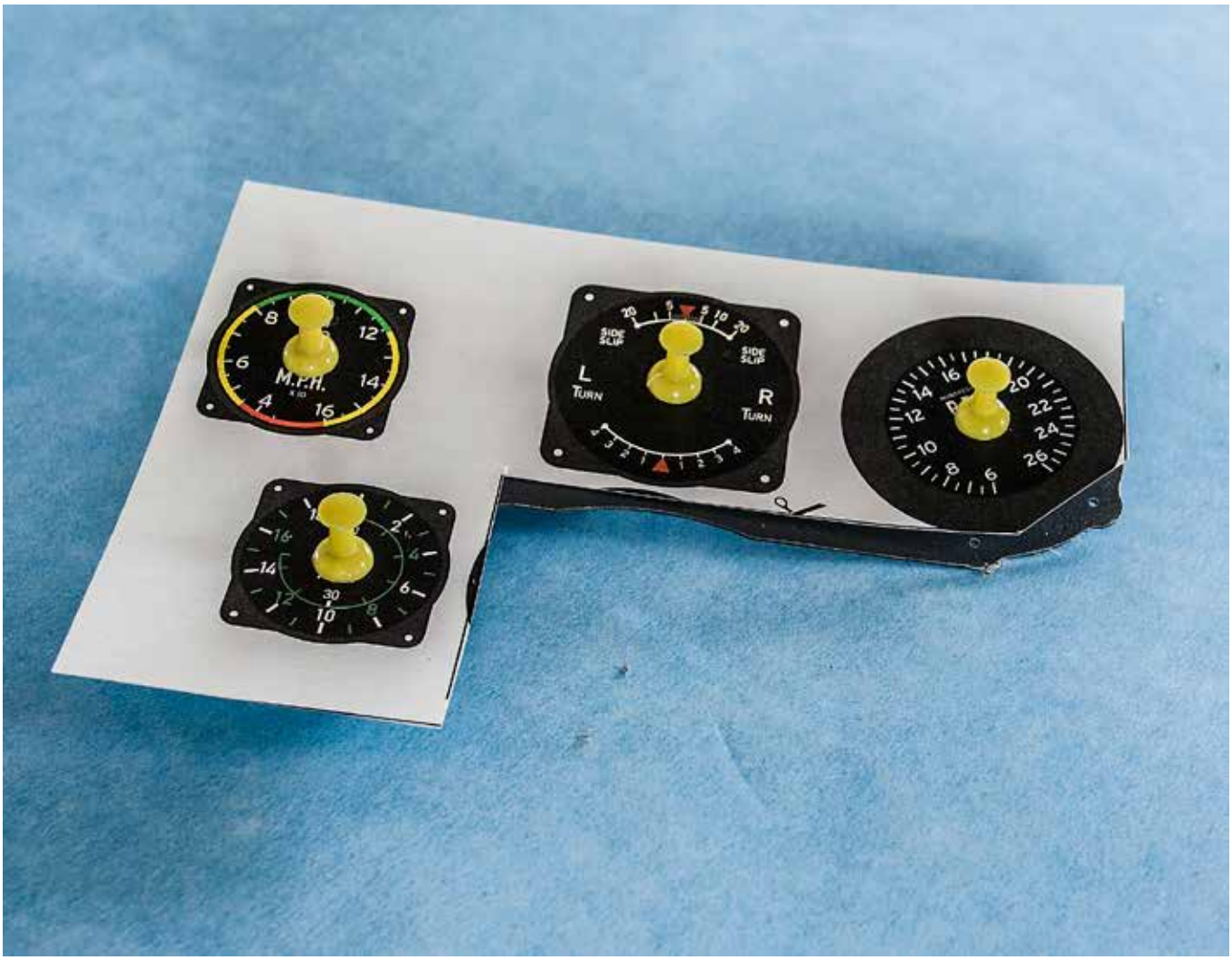

ø 6 x 4 MM BUSHING

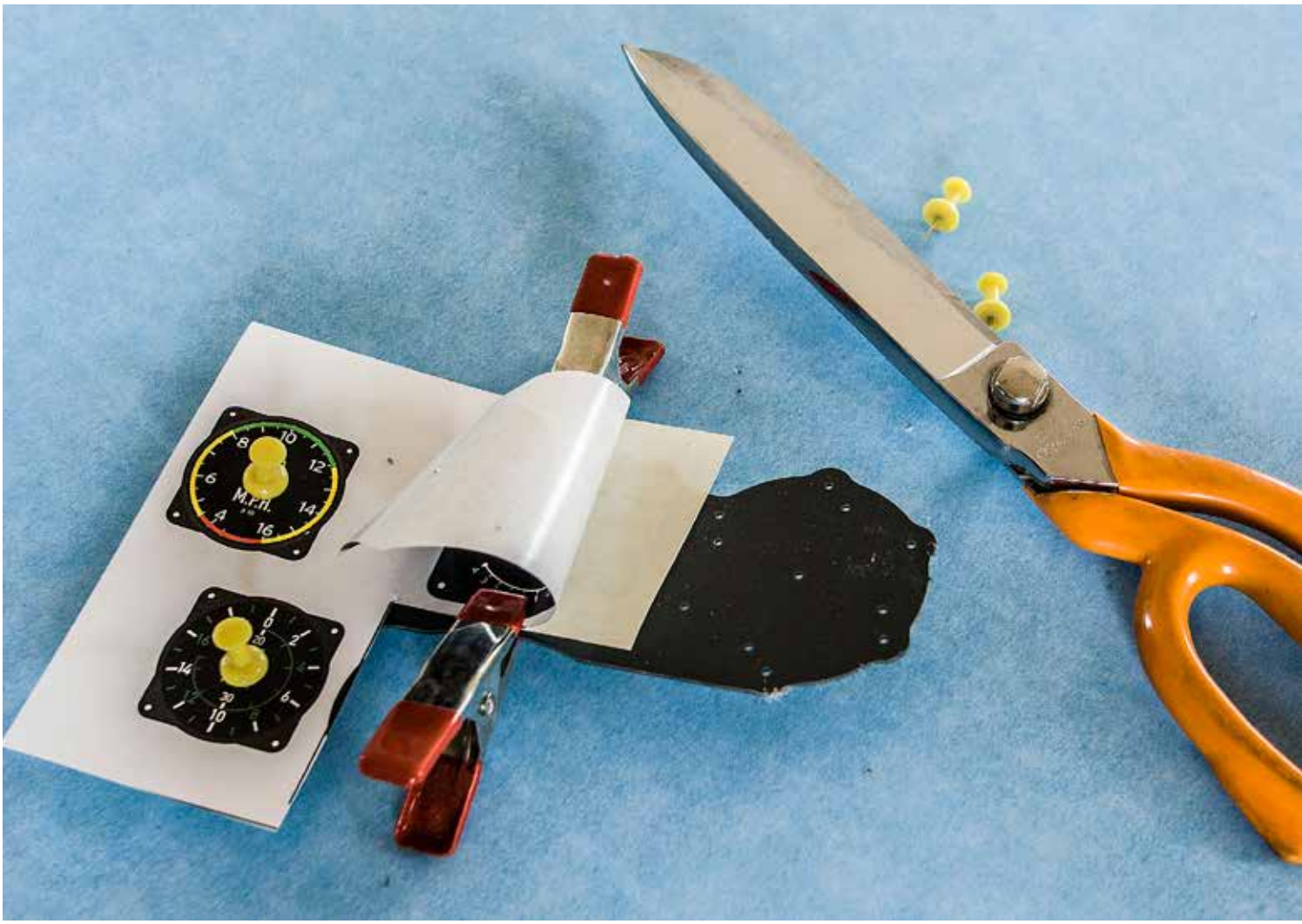

M3 SCREW AND NUT
ø 4 x 3 MM BUSHING
THE CARDAN JOINT MUST BE CORRECTLY ORIENTATED TO HAVE THE AXLES ON THE SAME AXIS
M4 SCREW AND NUT


HEAT SHRINKABLE TUBE


WOOD TRAILING EDGE
GLUED WITH EPOXY AND
WRAPPED WITH FABRIC

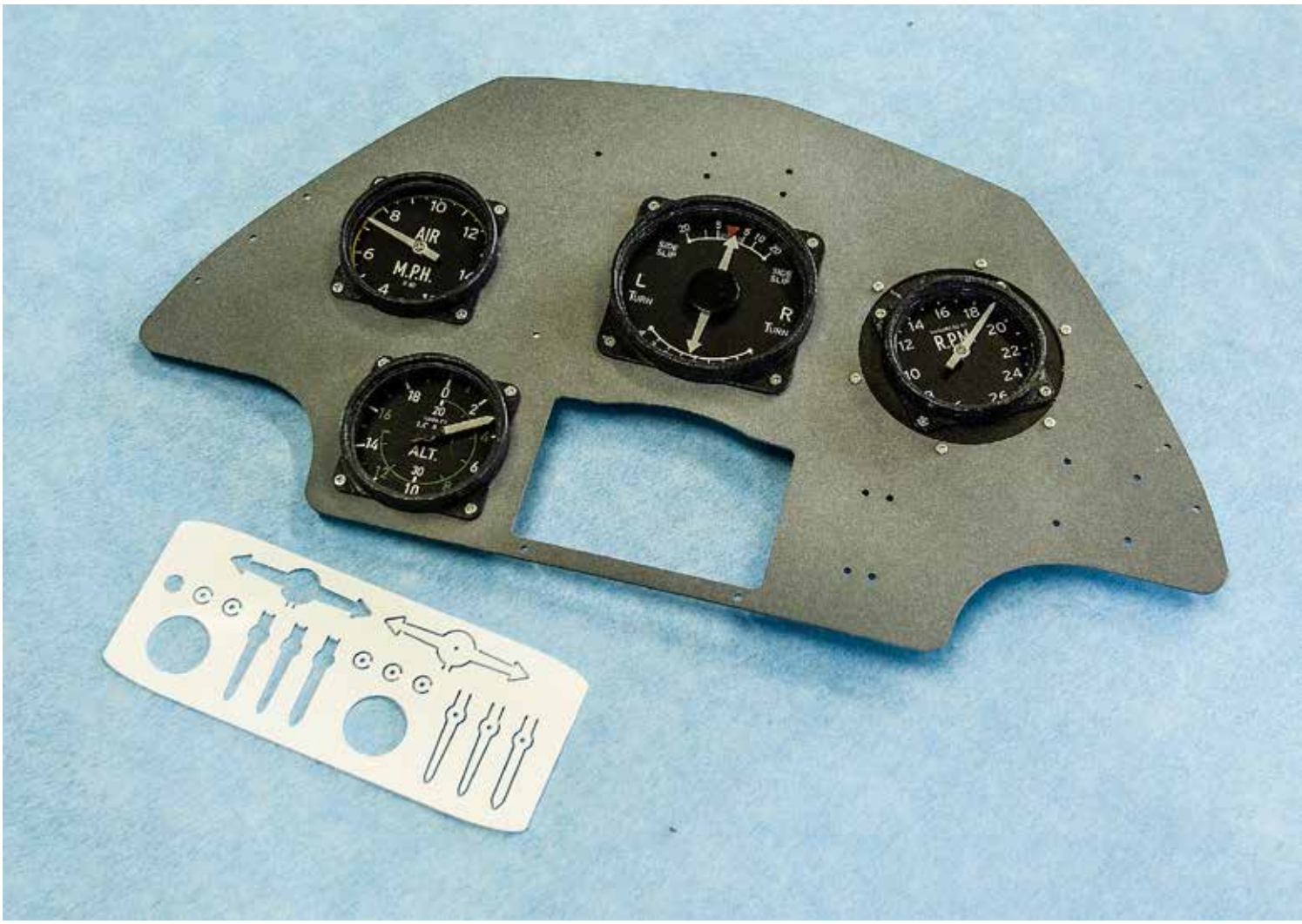

AIR
M.P.H.
SIDE SLIP
L TURN
R TURN
R.P.M.
ALT.


M.P.H.
SIDE SLIP
L TURN
R TURN




AIR
M.P.H.
ALT.
R.P.M.
SIDE SLIP
L TURN
R TURN


AIR
M.P.H.
ALT.
R.P.M.
R
TURN


AIR
M.P.H.
ALT.
L
TURN
R
TURN
R.P.M.


AIR
M.P.H.
ALT.
SIDE SLIP
L
TURN


SMOKING PROHIBITED
AIR
M.P.H.
ALT.
R.P.M.
SIDE SLIP
L
TURN
R
TURN


NE
E
SE
S
SW
W
NW
N
10 20 30
60 70 80
100 110 120
150
210
240 270 300
330 340 350


NW
N
280 290 300
330 340 350
10 20 30
SW
E


SMOKING PROHIBITED
AIR M.P.H.
SIDE SLIP
L TURN
R TURN
R.P.M.
ALT.
"TIGER MOTH" GIPSY MAJOR


R.P.M.

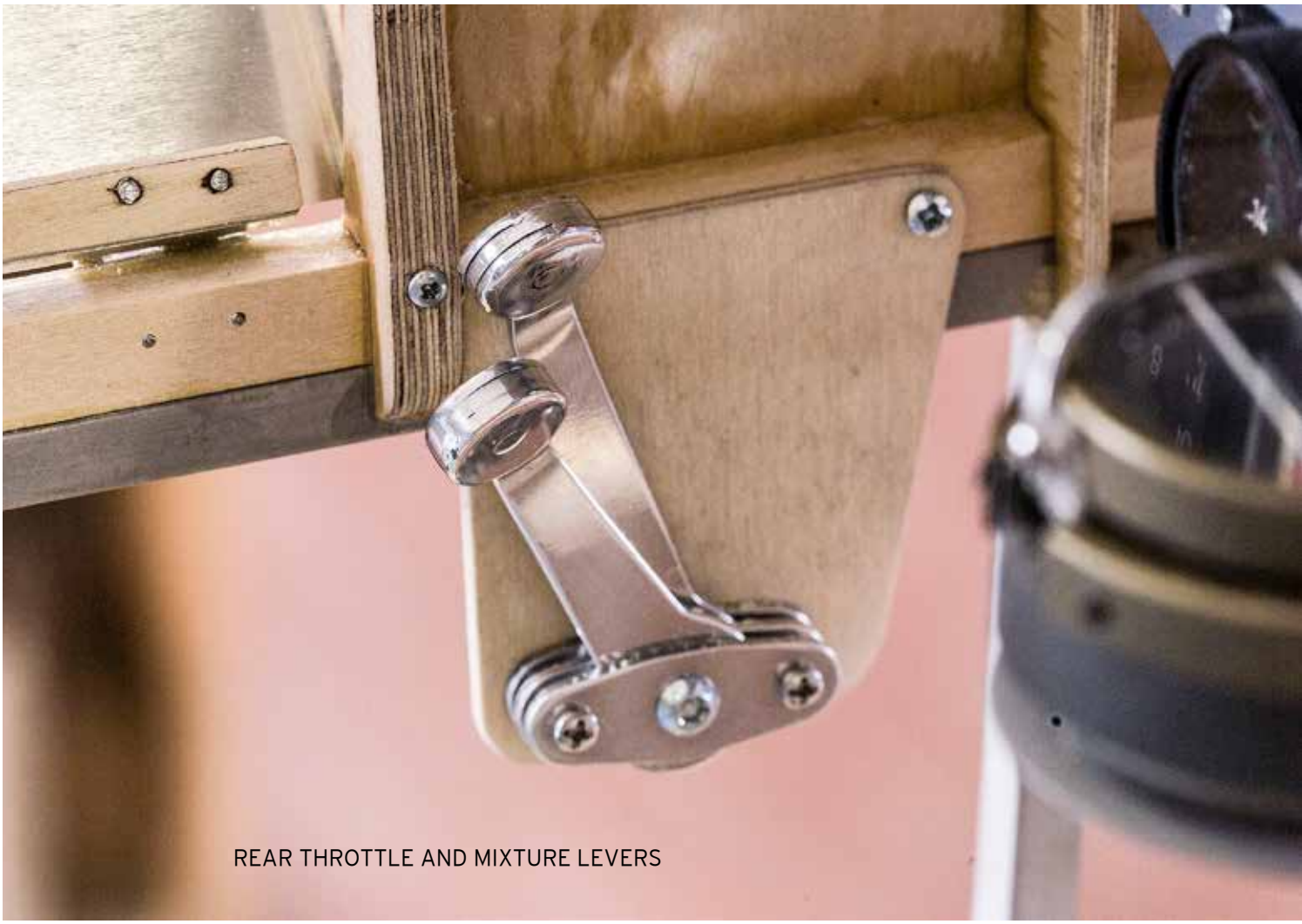
GLUE THE ENDS WITH A BIT OF C.A.
BE CAREFUL NOT TO PUT CYANOACRYLATE ON
THE FRONT SIDE OF THE ECO LEATHER,
IT IS VERY DELICATE

GLUE WITH A BIT OF C.A.
BE CAREFUL NOT TO PUT CYANOACRYLATE ON
THE FRONT SIDE OF THE ECO LEATHER,
IT IS VERY DELICATE

POLISH USING A ROTARY BRUSH

TAIL TRIM LEVER

FRONT THROTTLE AND
MIXTURE LEVERS

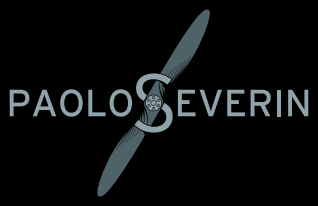


REAR THROTTLE AND MIXTURE LEVERS


USE A SCRAP OF BOTTOM COWL TO
REINFORCE WHERE SCREWED

COOLING BAFFLE

INDEX


PAOLO SEVERIN