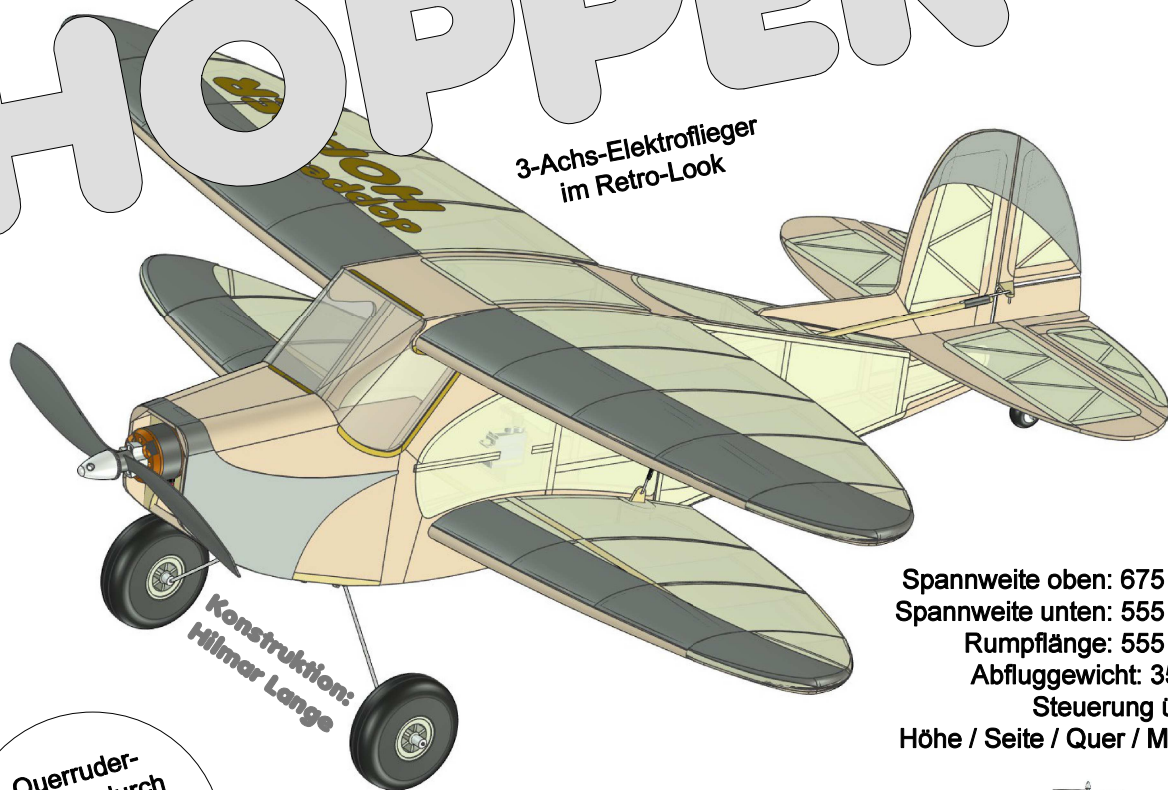


doppel- HOPPER

3-Achs-Elektroflieger
im Retro-Look

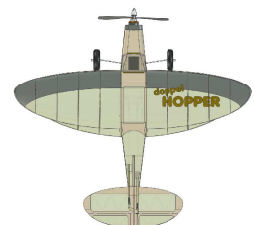


Konstruktion:
Hilmar Lange

Spannweite oben: 675 mm
Spannweite unten: 555 mm
Rumpflänge: 555 mm
Abfluggewicht: 350 g
Steuerung über
Höhe / Seite / Quer / Motor



Querruder-
funktion durch
Flügelverwindung!
Aileron function by
twisting the lower
wing!



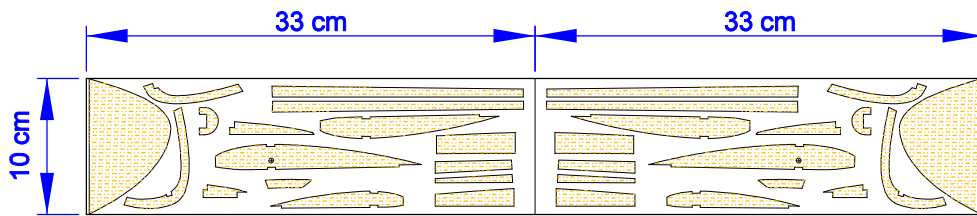
benötigte Materialien:

Ø 0,8 mm Stahldraht (ca. 30 cm)
 Ø 1,5 mm Stahldraht (ca. 35 cm)
 Ø 1,5 mm Messingdraht (ca. 6 cm)
 Ø 2 mm ABS-Rohr (innen-Ø 1 mm) (ca. 10 cm)
 Ø 4 mm Messingrohr (innen-Ø 3,1 mm) (ca. 40 cm)
 Ø 3 mm CFK-Stab (ca. 40 cm)
 Schrumpfschlauch Ø 4,8 mm (ca. 10-20 cm)
 8 Neodym-Stabmagnete Ø 6 mm x 10 mm
 6 weiche Vlies-Scharniere
 4x4 mm Balsa-Vierkanteleiste (ca. 4 m)
 Ø 3 mm Holzrundstab (ca. 60 cm)
 4 Blechschrauben, ca. 9 x 2,6 mm
 1 Blatt Klarsichtfolie
 ORACOVER Bügelfolie (Grundfarbe, cream, ca. 100 cm x 100 cm)
 ORACOVER Bügelfolie (Zusatzfarbe, seafire sea grey, ca. 100 cm x 25 cm)
 ORACAL 751C Klebefolie (Zusatzfarbe, 811 saharabeige, ca. 21 cm x 10 cm)
 sowie Holz gemäß Auflistung auf Seite 2

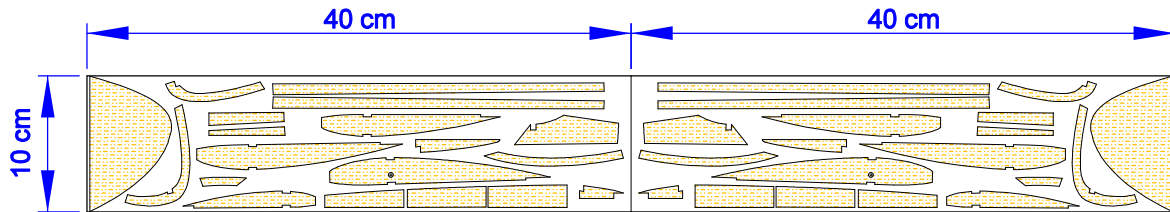
RC-Komponenten / Bauteile:

4 Servos à 4,8 g, z.B. Hitec HS-40
 BL Dymond AL 28-13 / 41 g / 1380 kv
 Regler 20 Ampere
 Propeller 8x6" APC Slowfly
 6-Kanal-Empfänger
 3S LiPo 450 mAh
 Haupträder Ø 60 mm: Aero-Naut #735333
 1 Heckrad, Ø ca. 15-17 mm

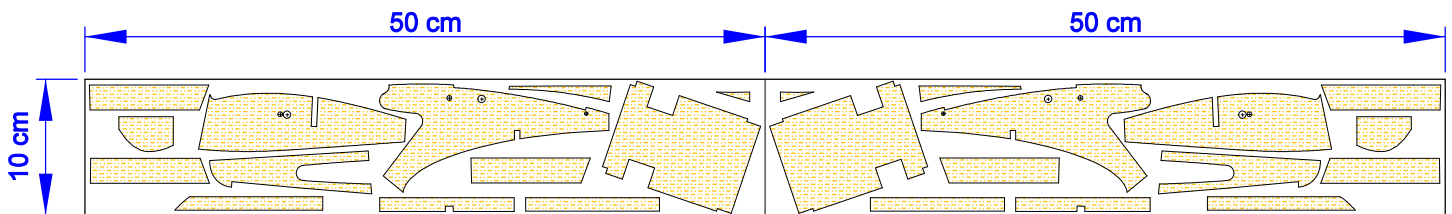




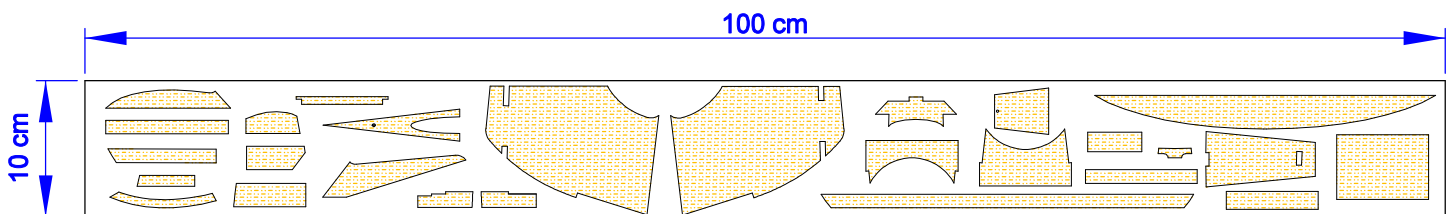
1 Brettchen 2 mm Balsa (mittelhart / ca. 20 g pro 1-m-Brettchen)
 Tipp: die Bauteile sind zur Hälfte spiegelbildlich angeordnet.
 1 board 2 mm balsa (medium hard / approx. 20 g per 1 m board)
 Tip: half of the components are arranged in a mirror image.



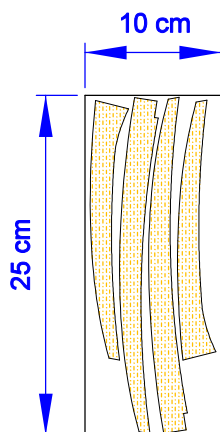
1 Brettchen 2 mm Balsa (mittelhart / ca. 20 g pro 1-m-Brettchen)
 Tipp: die Bauteile sind zur Hälfte spiegelbildlich angeordnet.
 1 board 2 mm balsa (medium hard / approx. 20 g per 1 m board)
 Tip: half of the components are arranged in a mirror image.



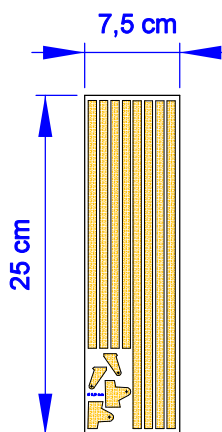
1 Brettchen 2 mm Balsa (mittelhart / ca. 20 g pro 1-m-Brettchen)
 Tipp: die Bauteile sind zur Hälfte spiegelbildlich angeordnet.
 1 board 2 mm balsa (medium hard / approx. 20 g per 1 m board)
 Tip: half of the components are arranged in a mirror image.



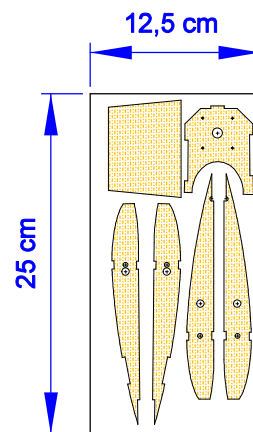
1 Brettchen 2 mm Balsa (mittelhart / ca. 20 g pro 1-m-Brettchen)
 1 board 2 mm balsa (medium hard / approx. 20 g per 1 m board)



1,5 mm Balsa
 (hart / ca. 40 g
 pro 1-m-Brettchen)

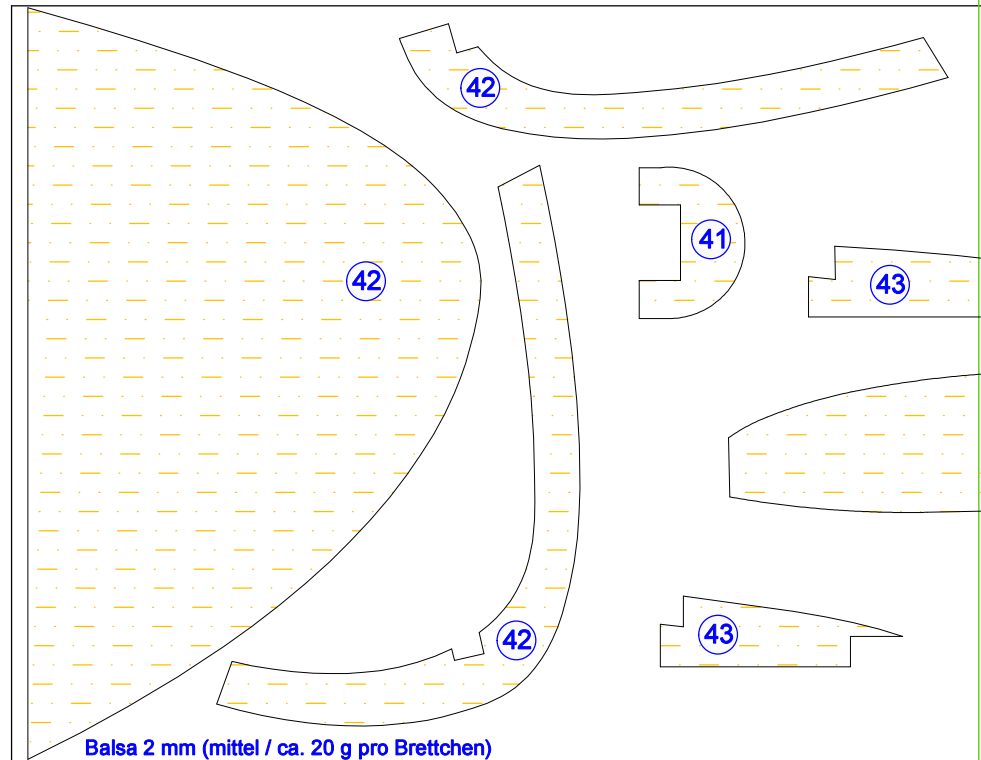


1,5 mm Flug-
 zeugsperrholz
 1,5 mm aircraft plywood



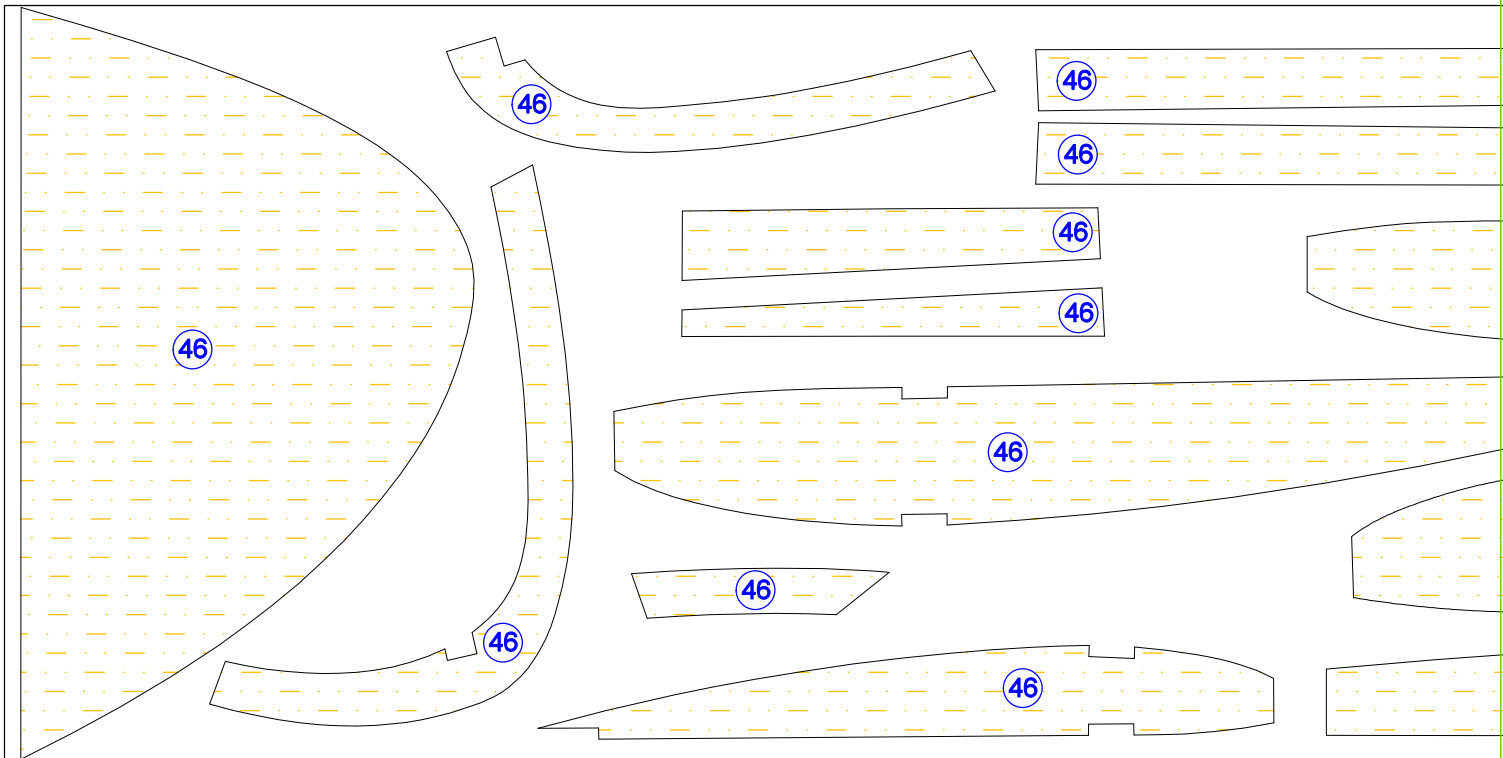
4 mm Pappel-
 sperrholz
 4 mm poplar plywood

Kleben Sie die nächsten 4 Seiten (3-6) exakt an den grünen Linien zusammen. Schneiden Sie dann die 80 cm und 66 cm langen Streifen aus und heften Sie sie mit etwas Sprühkleber aufs Holz. Die Einzelteile werden dann mit einer frischen Klinge oder einer Bandsäge möglichst präzise ausgeschnitten. Lassen Sie das Papier zwecks Identifikation des jeweiligen Teils bis zum späteren Einbau auf dem Holz.

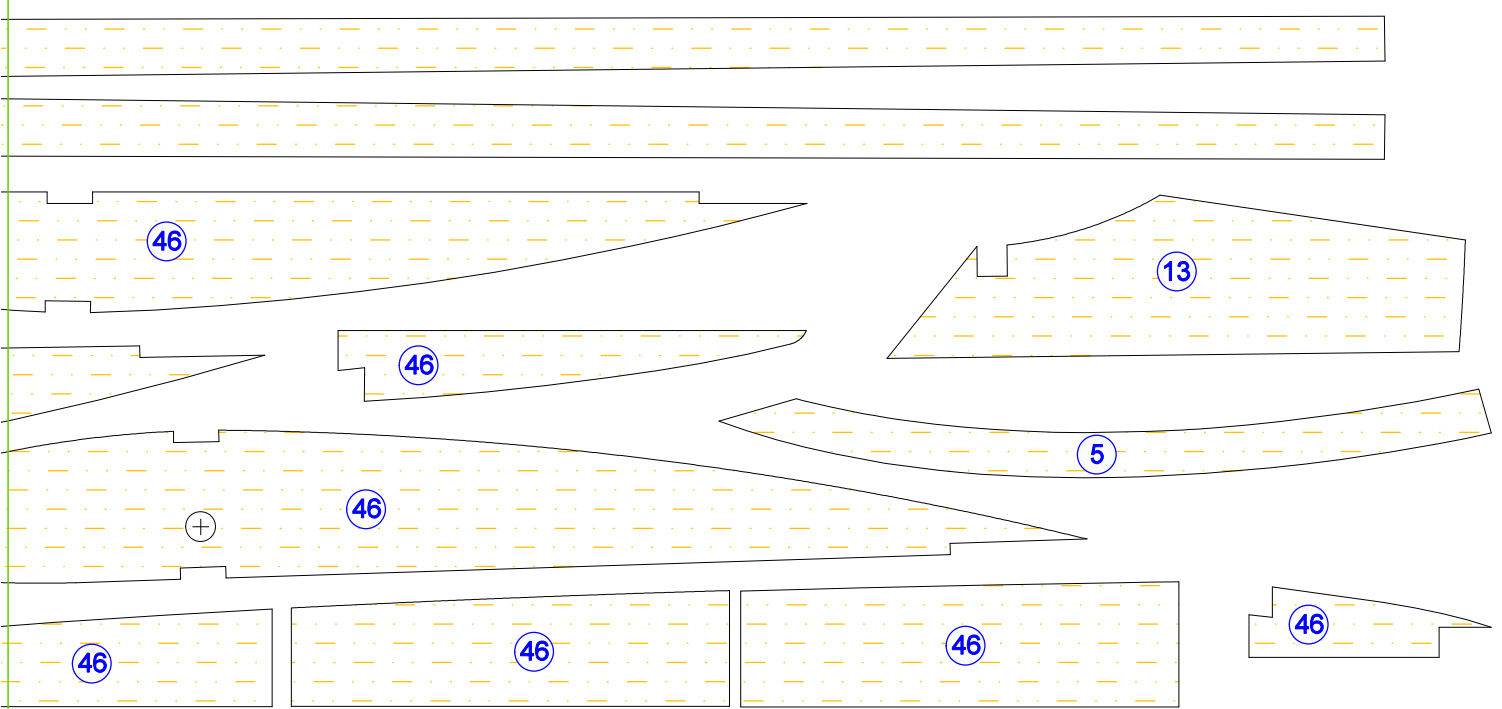
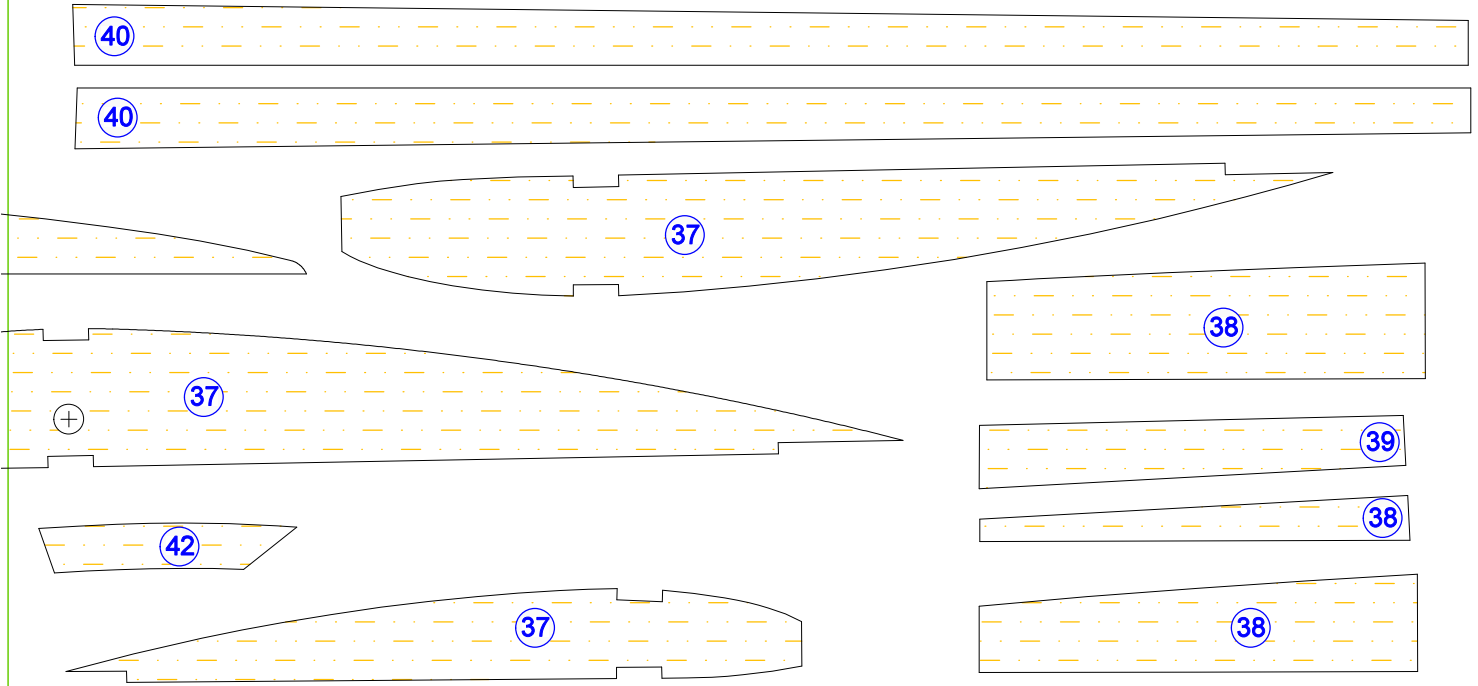


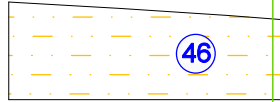
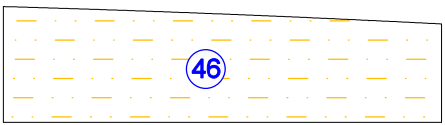
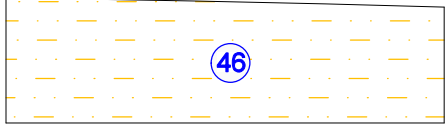
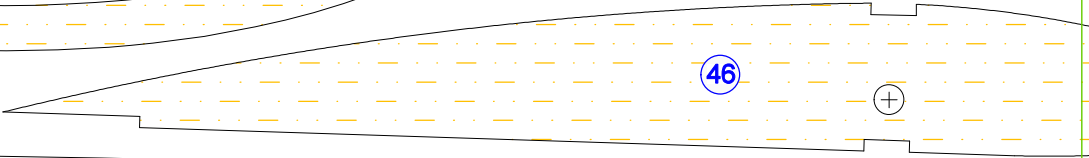
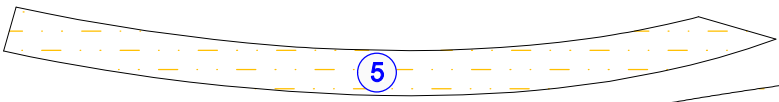
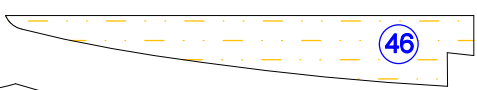
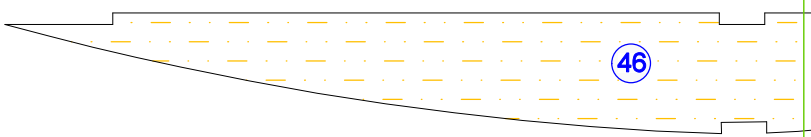
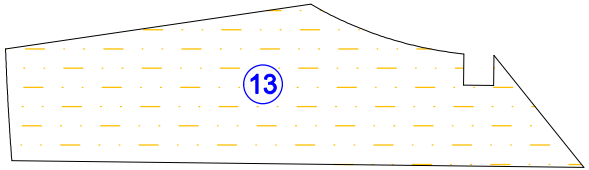
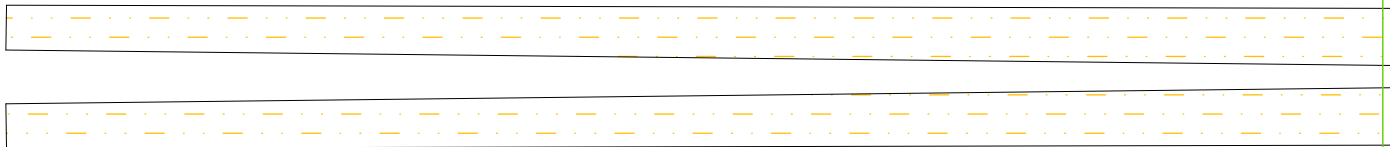
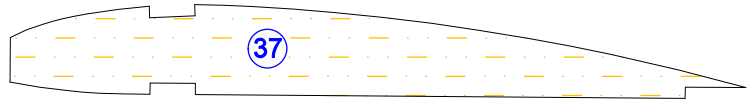
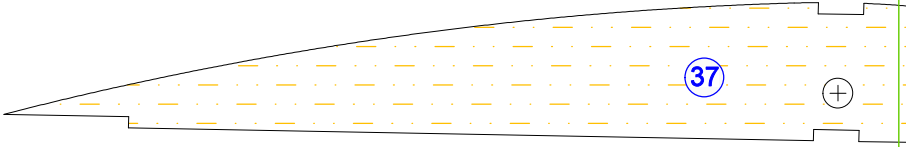
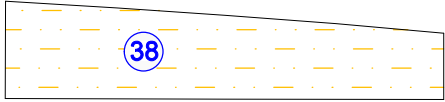
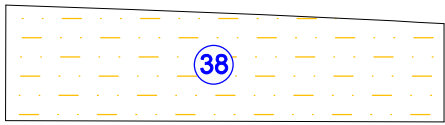
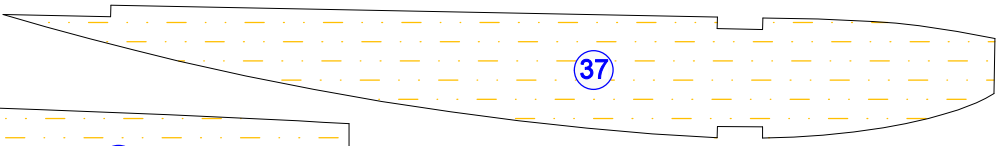
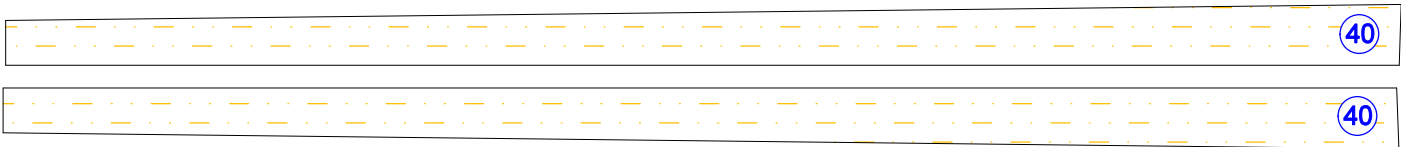
Jedes Bauteil besitzt eine Nummer, die dem dazugehörigen Baustufenfoto entspricht. Am Besten sortieren Sie die Teile nach dem Aussägen zu ihrer passenden Bauplanseite.

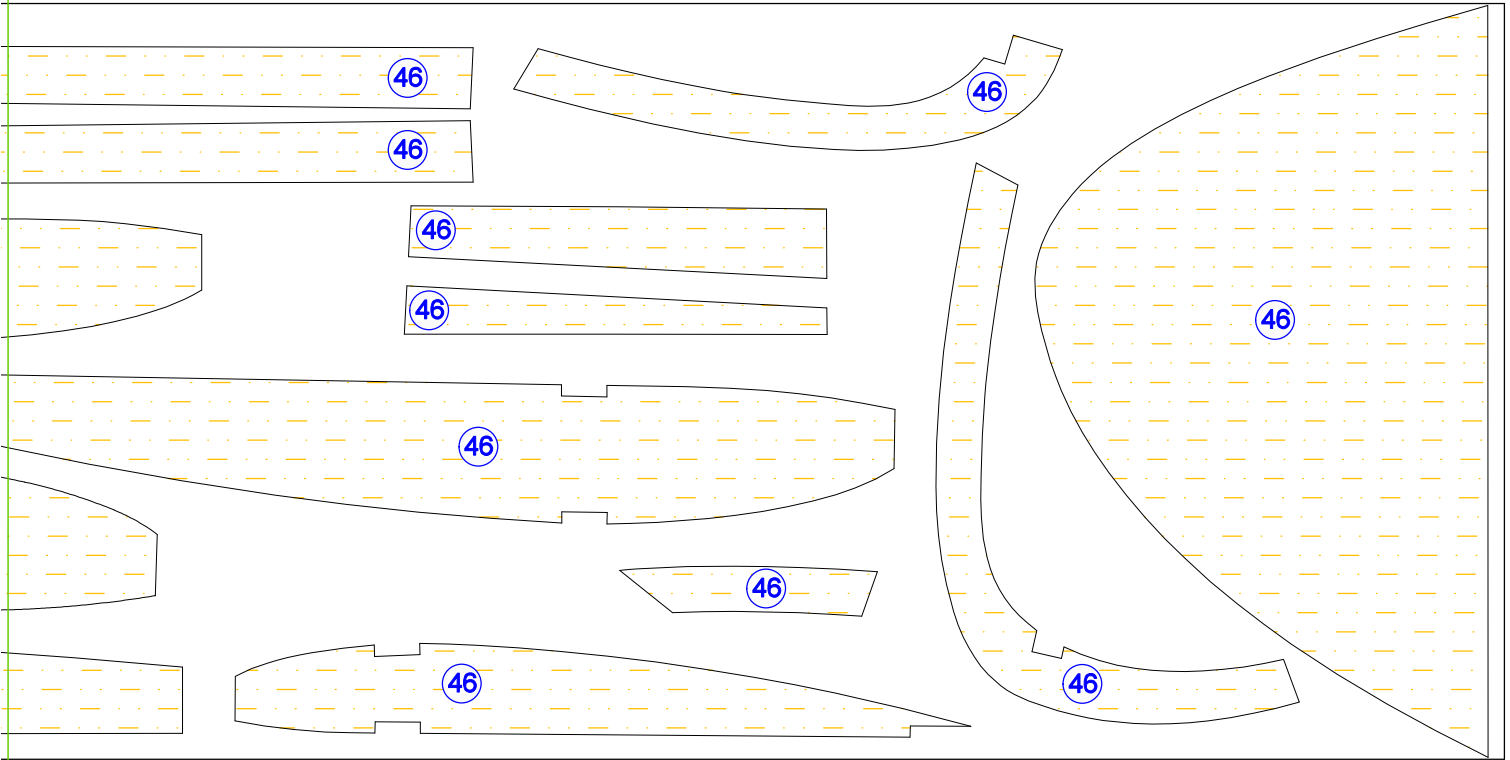
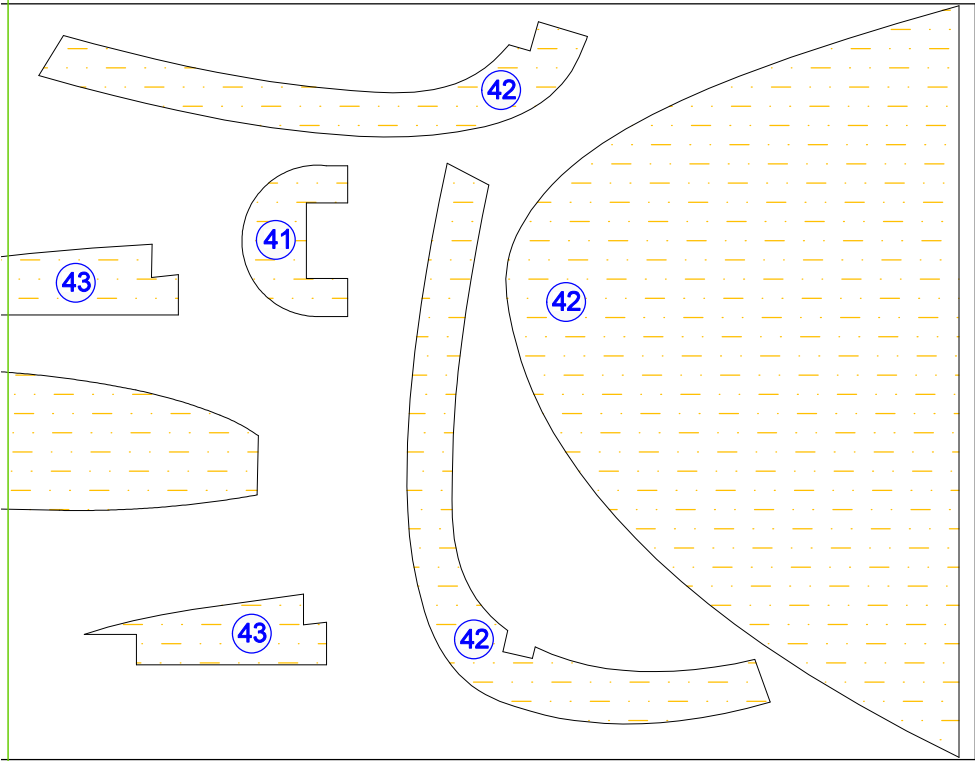
Each part has a number that corresponds to its construction stage picture. It is best to sort the parts after sawing them out to their matching page of the plan.



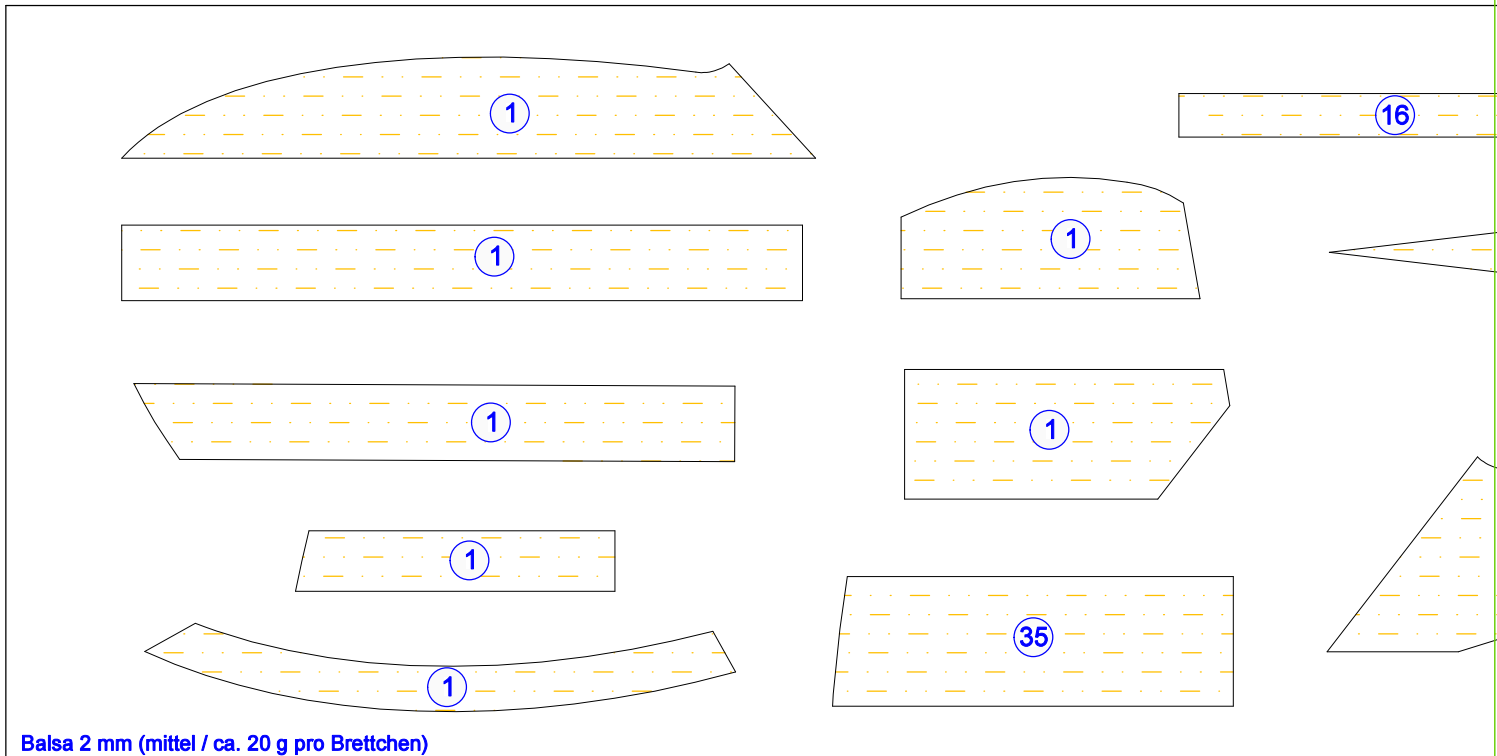
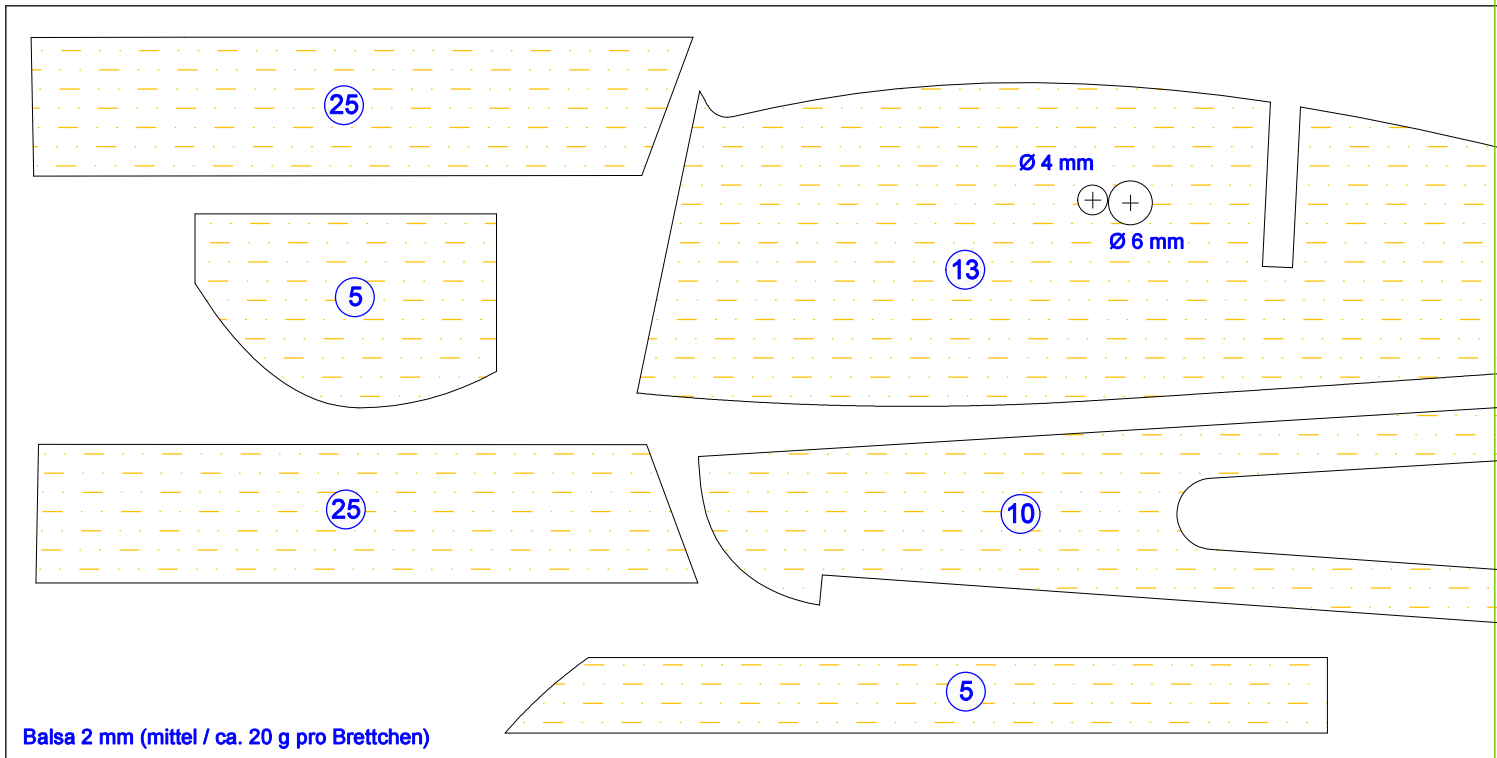
Tape these 4 pages (3-6) together exactly along the green lines. Then cut out the 80 cm and 66 cm long strips and attach them to the wood with very little spray glue. The individual parts are then cut out as precisely as possible with a fresh blade or a band saw. Leave the paper on the wood for the purpose of identifying the respective part until later installation.



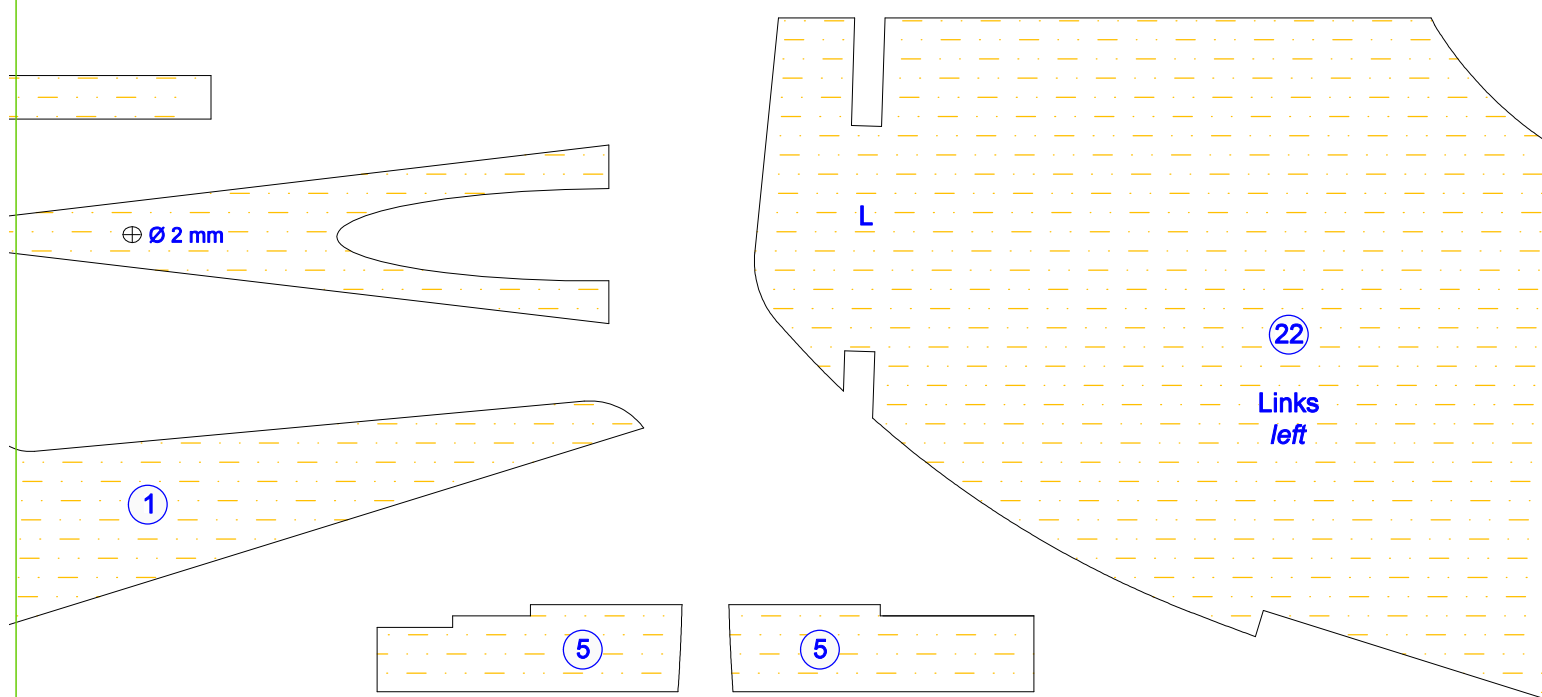
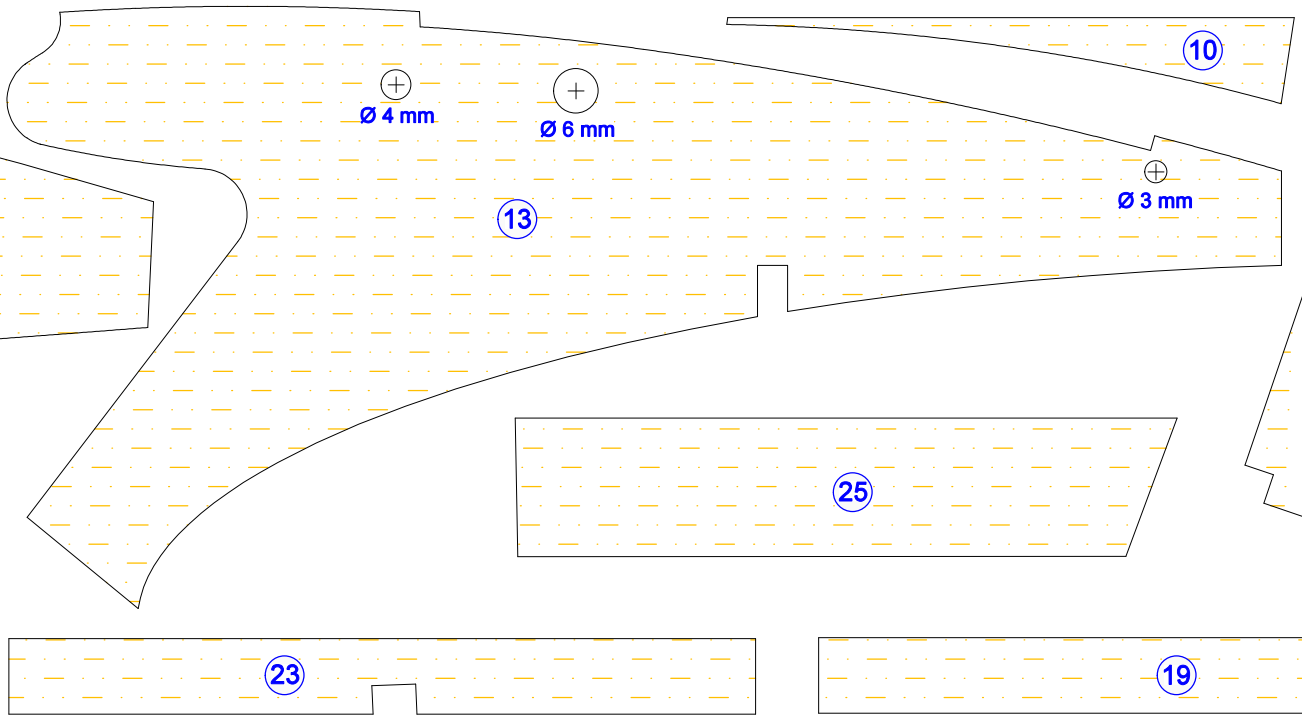


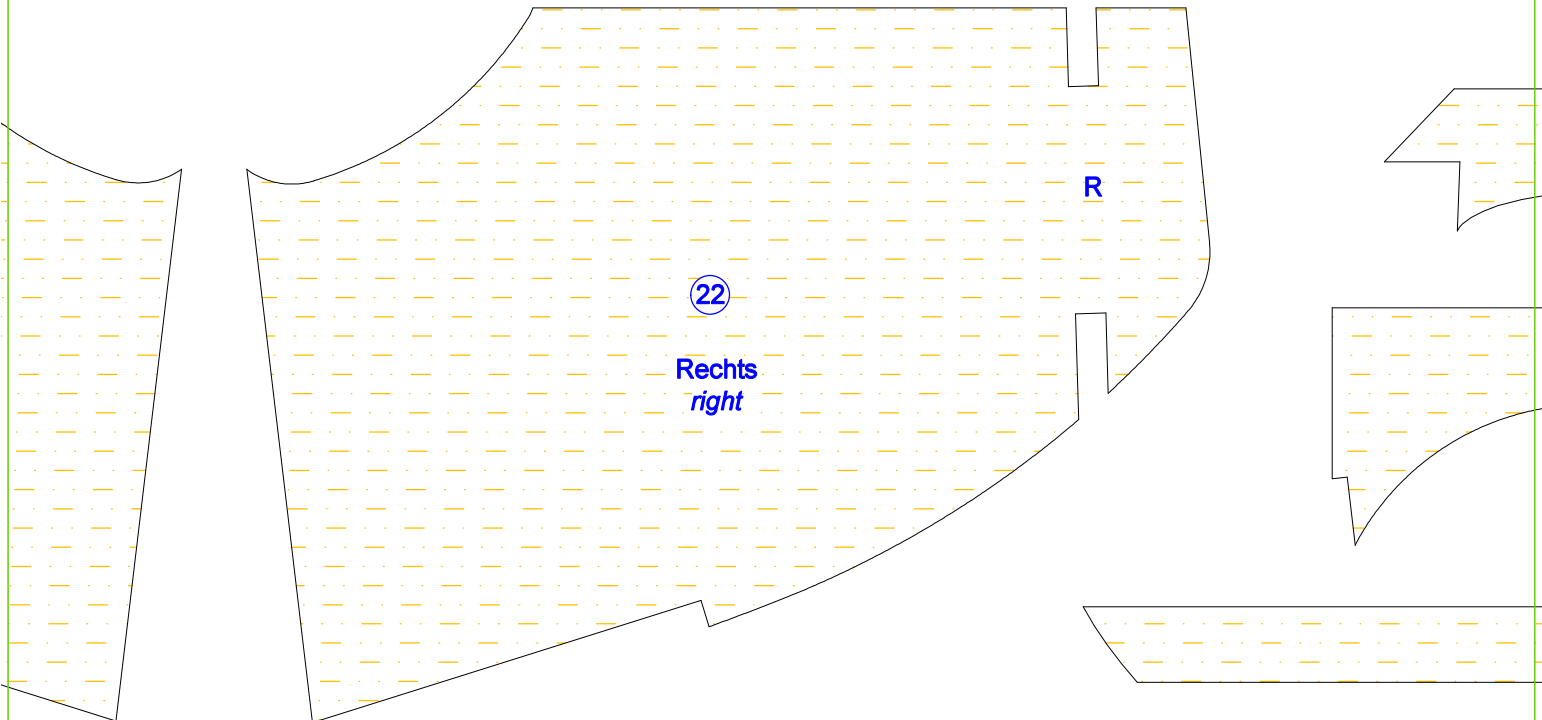
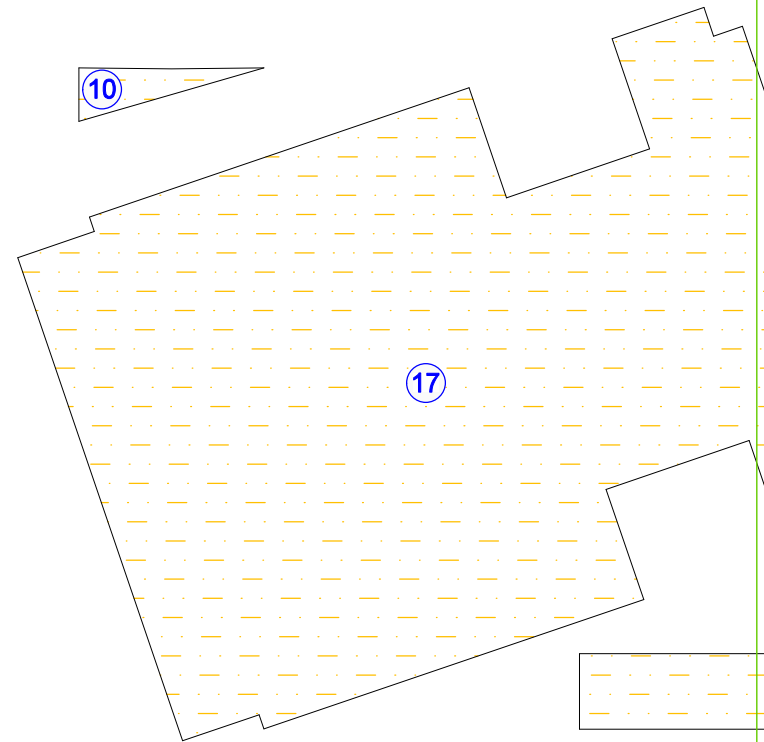
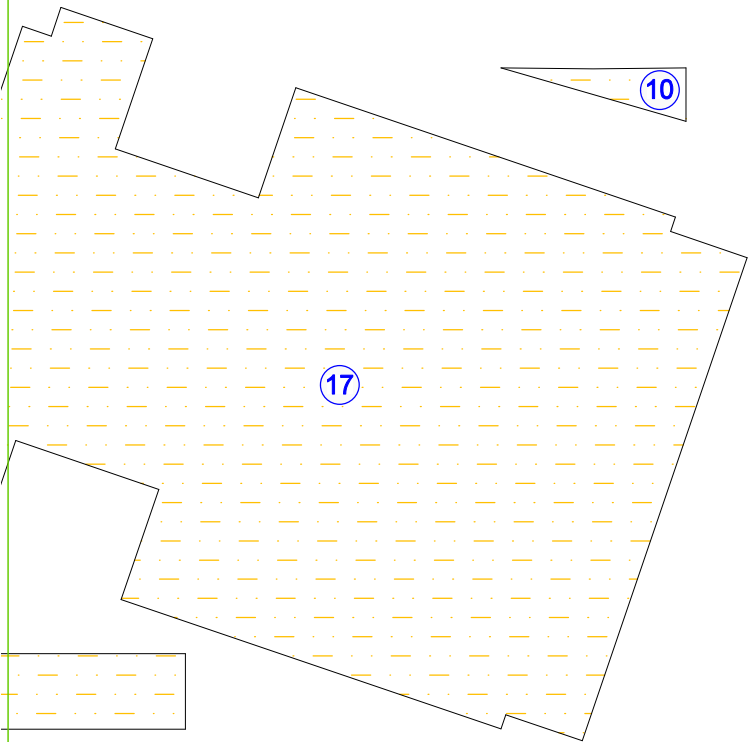


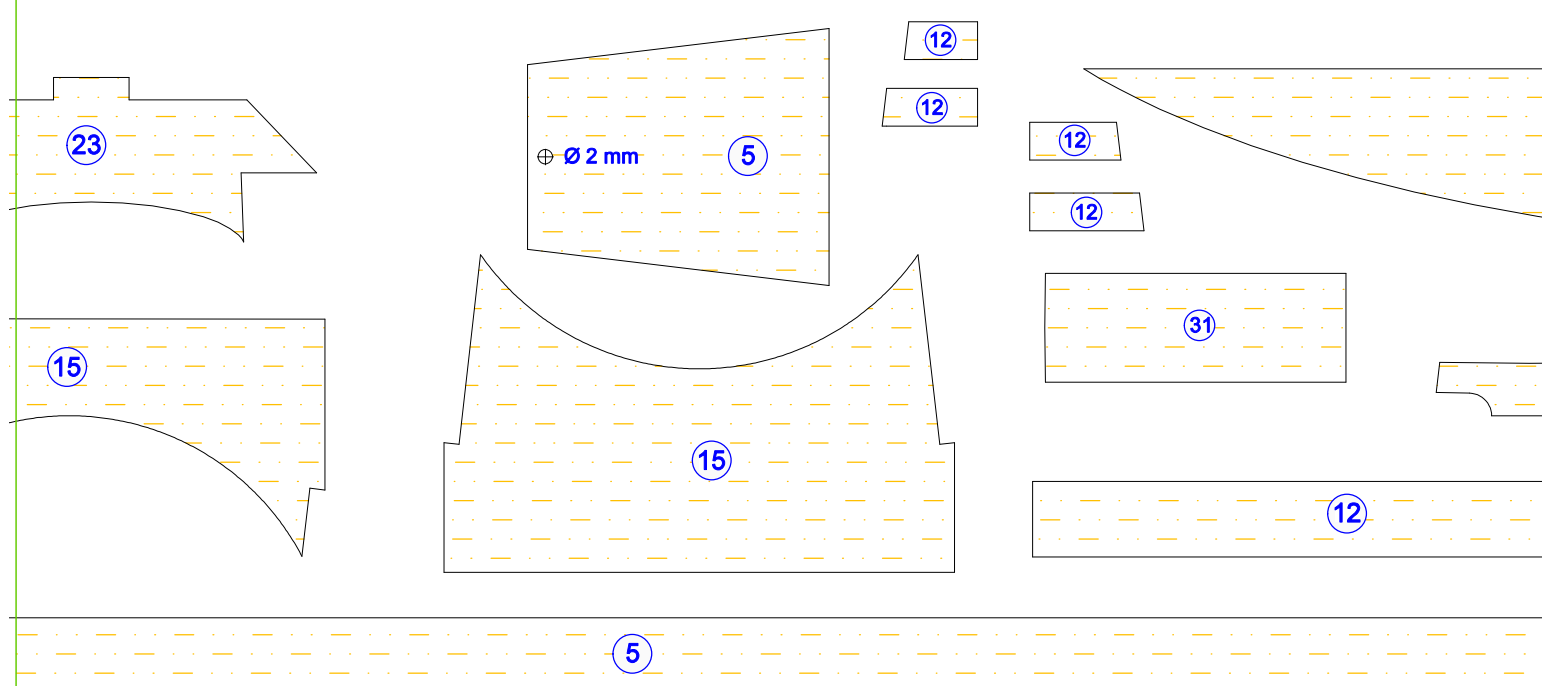
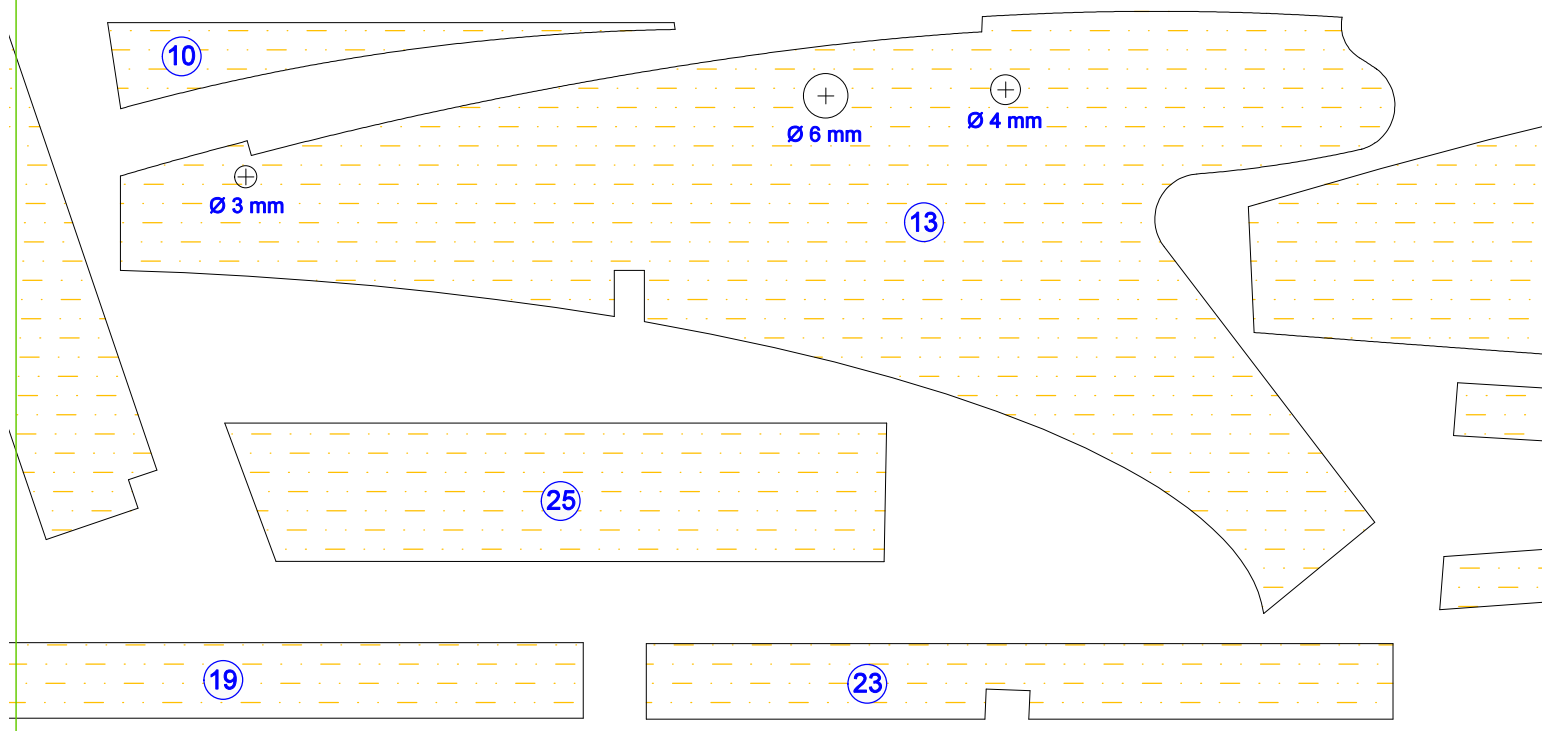
Kleben Sie die nächsten 5 Seiten (7-11) exakt an den grünen Linien zusammen. Schneiden Sie dann die 1 m langen Streifen aus und heften Sie sie mit etwas Sprühkleber aufs Holz. Die Einzelteile werden dann mit einer frischen Klinge oder einer Bandsäge möglichst präzise ausgeschnitten. Lassen Sie das Papier zwecks Identifikation des jeweiligen Teils bis zum späteren Einbau auf dem Holz.

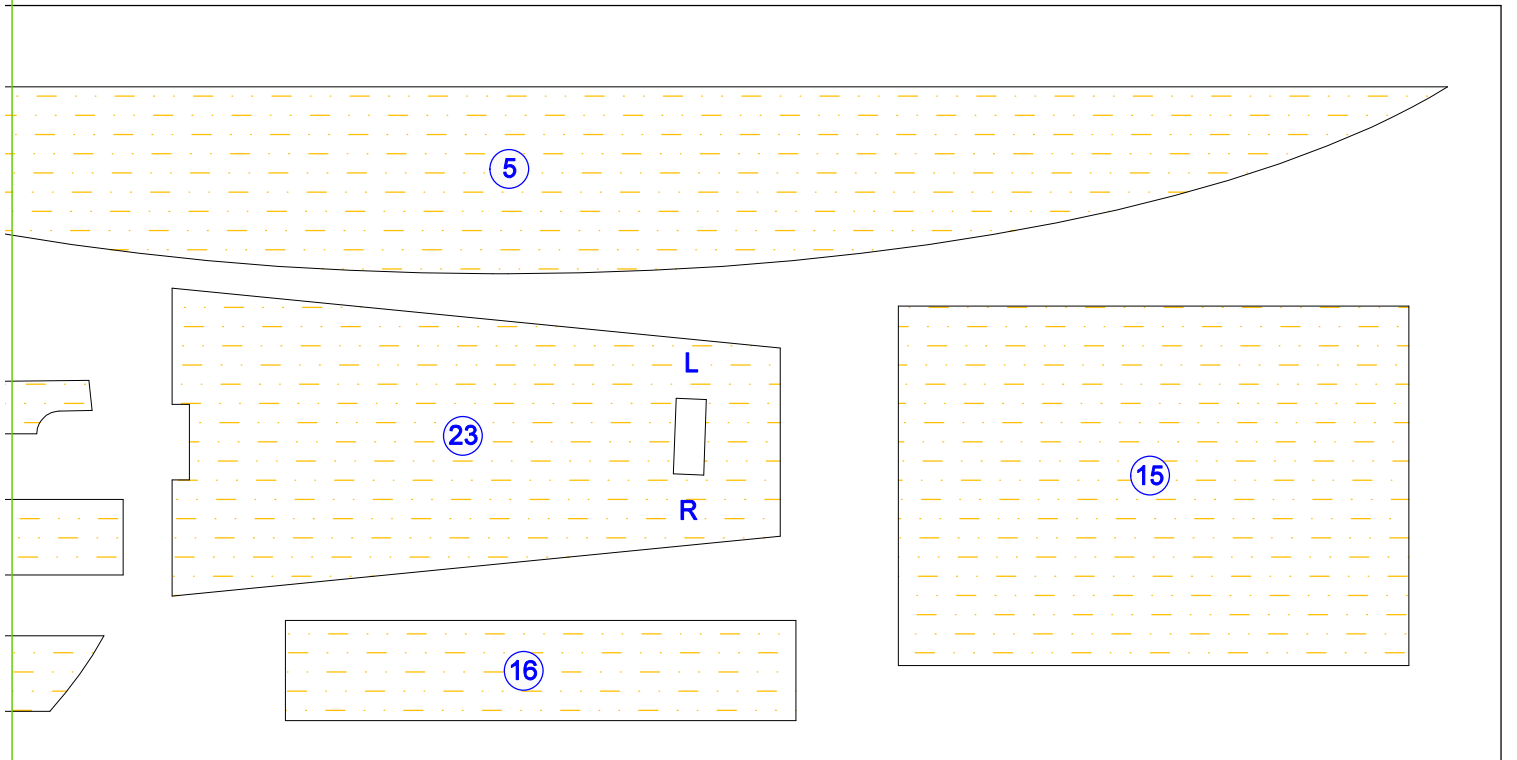
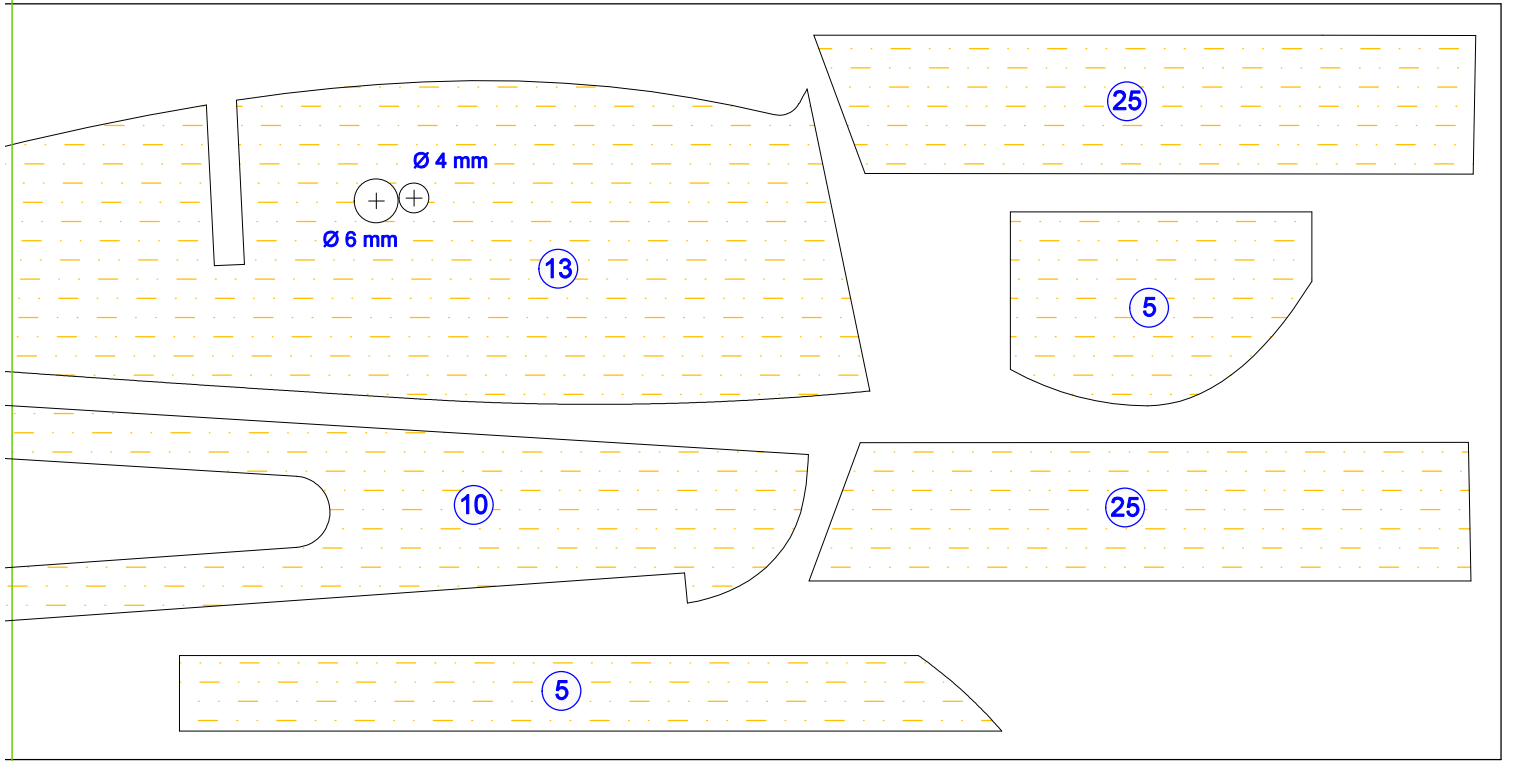


Tape these 5 pages (7-11) together exactly along the green lines. Then cut out the 1 m long strips and attach them to the wood with very little spray glue. The individual parts are then cut out as precisely as possible with a fresh blade or a band saw. Leave the paper on the wood for the purpose of identifying the respective part until later installation.

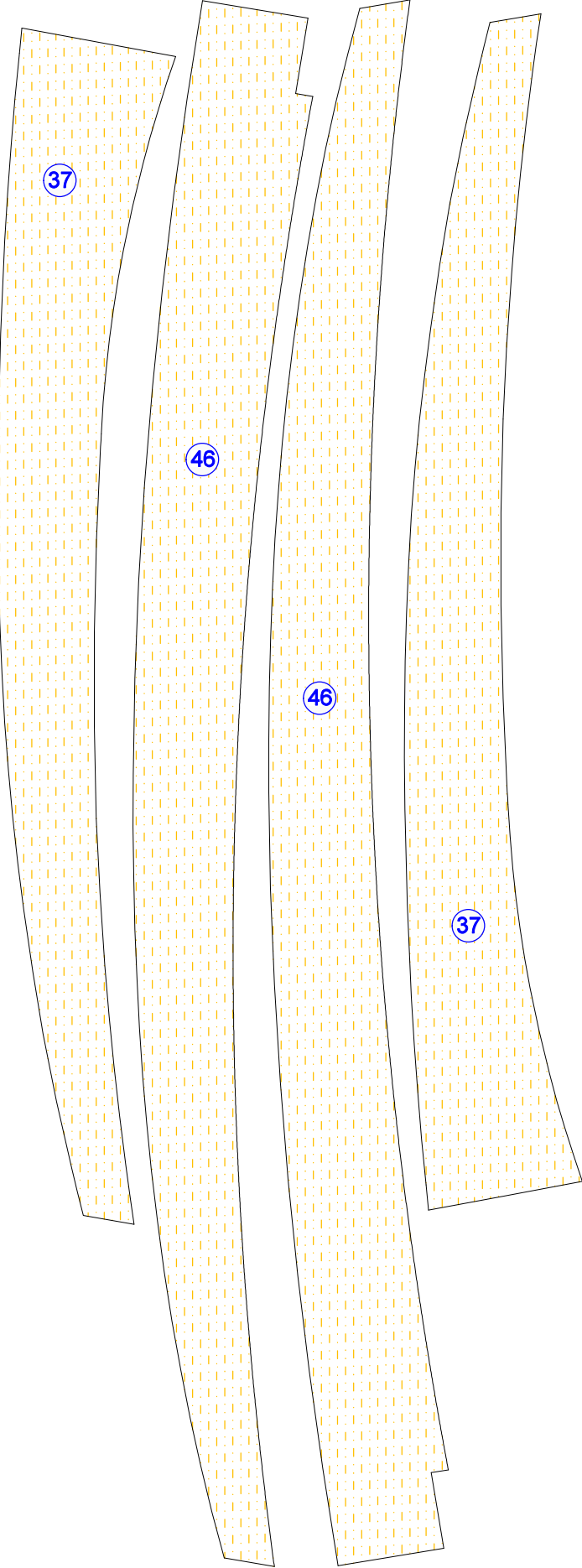




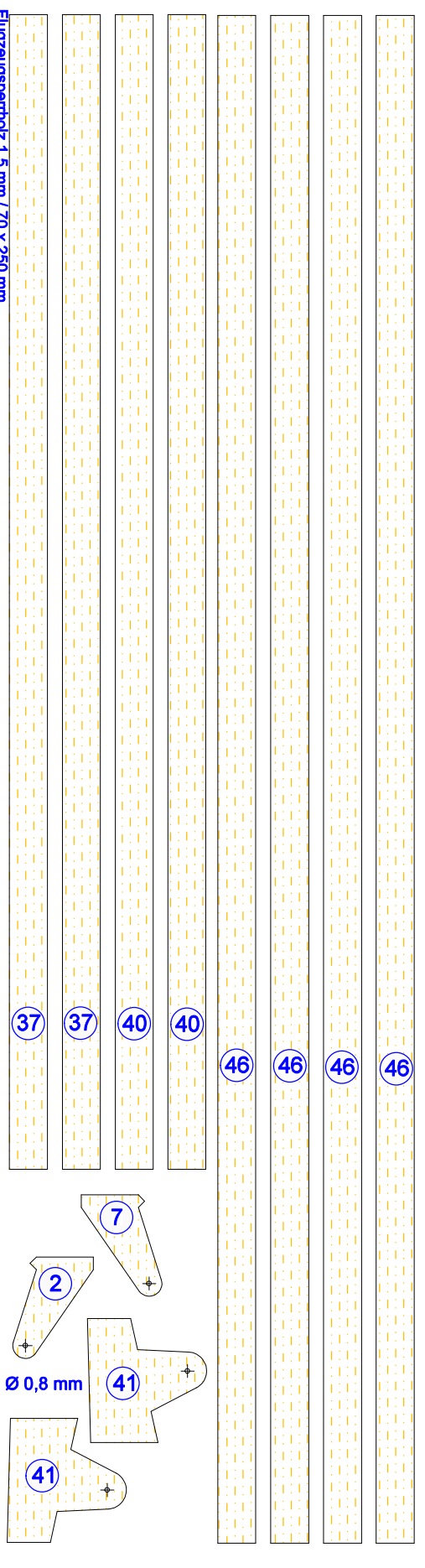




Balsa 1,5 mm (hart) / 100 x 250 mm



Flugzeugsperrholz 1,5 mm / 70 x 250 mm

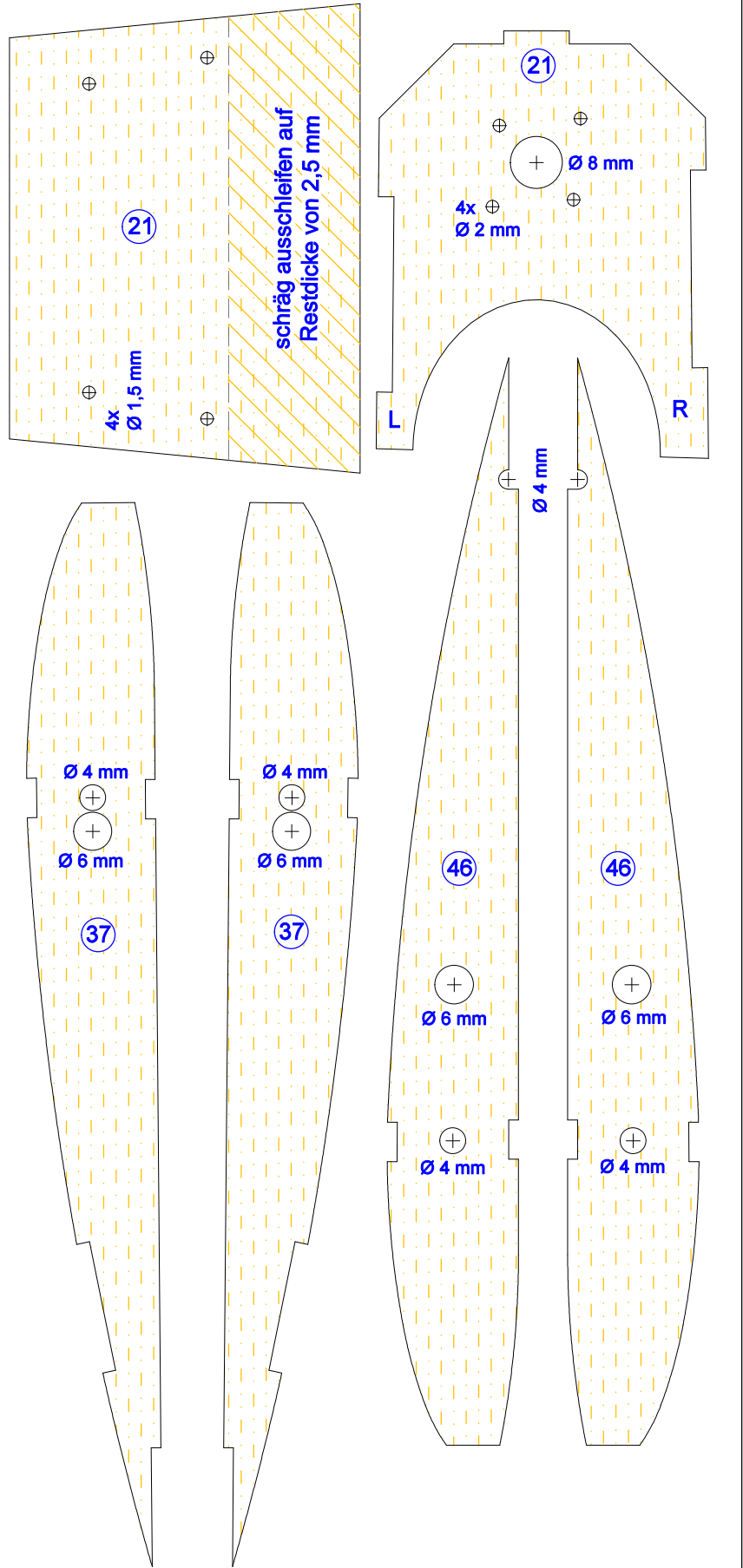


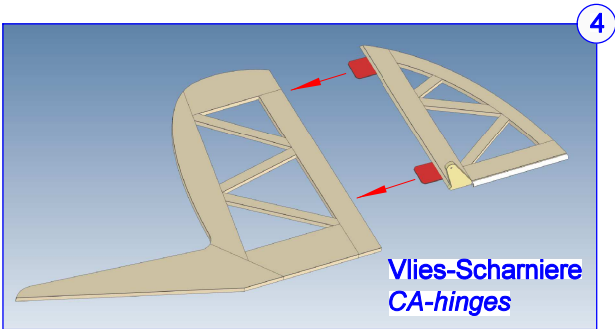
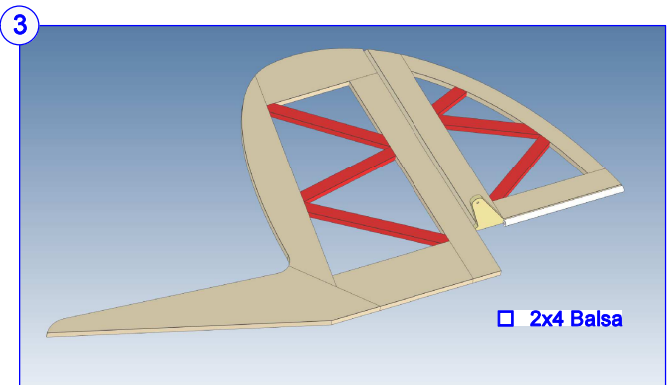
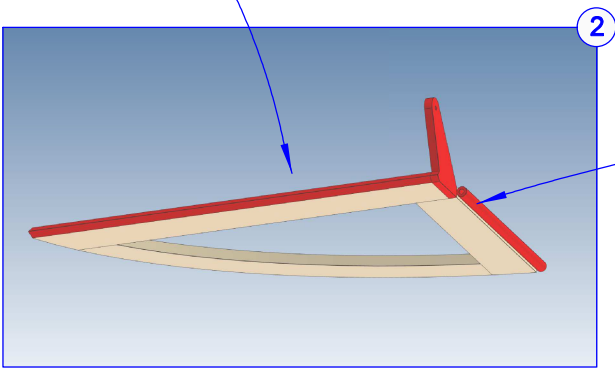
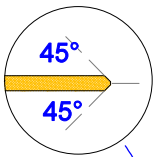
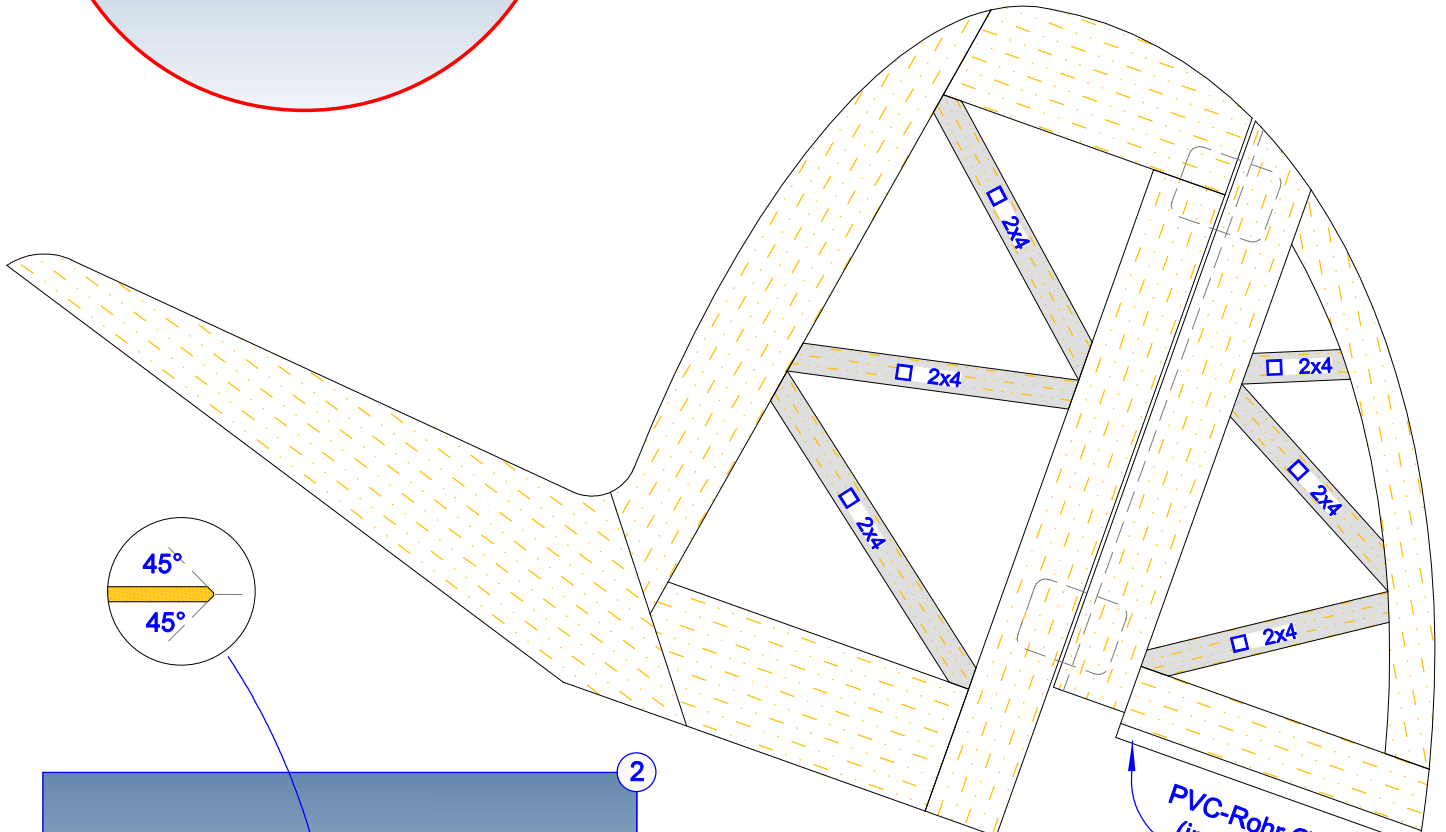
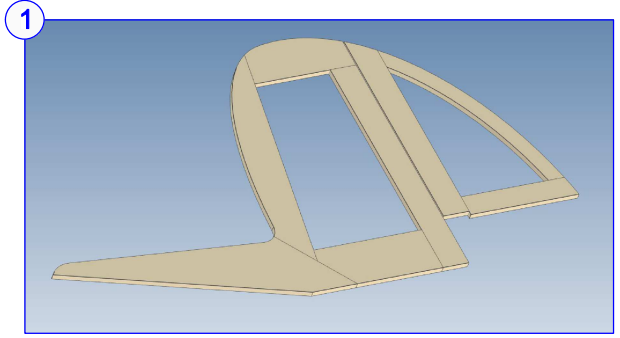
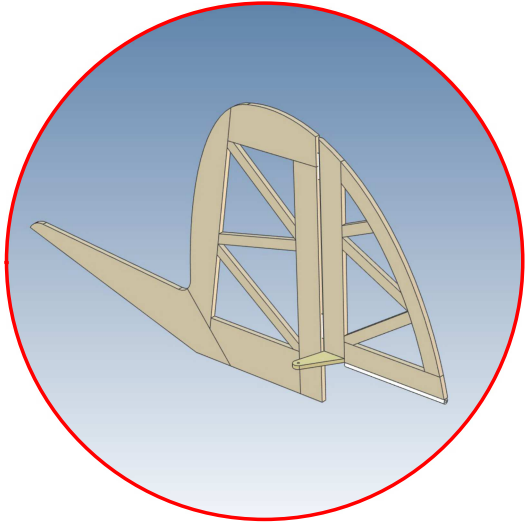


Setzen Sie die vier Bohrungen in der Fahrwerksaufnahme (21) erst **nach** dem Biegen des Fahrwerksdrahtes (S. 35), damit Sie sie genau in die Eckpunkte des Drahtes bohren können.

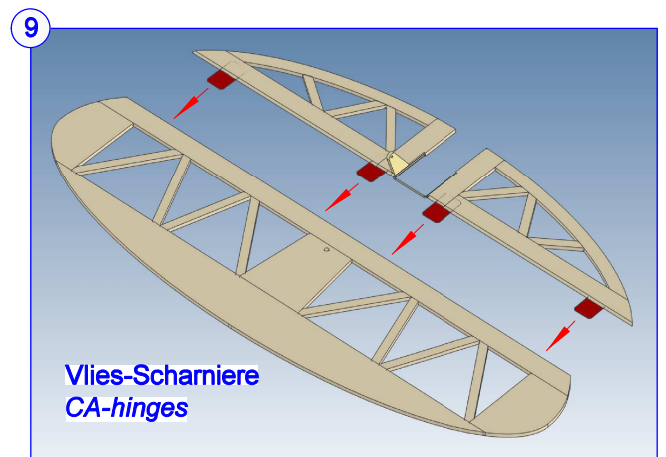
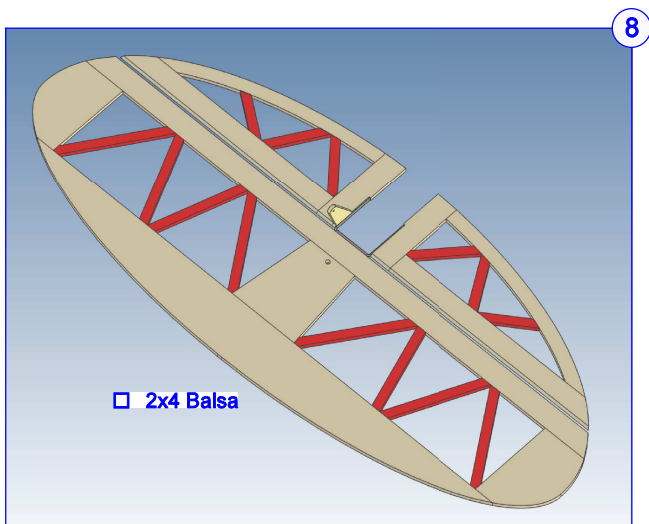
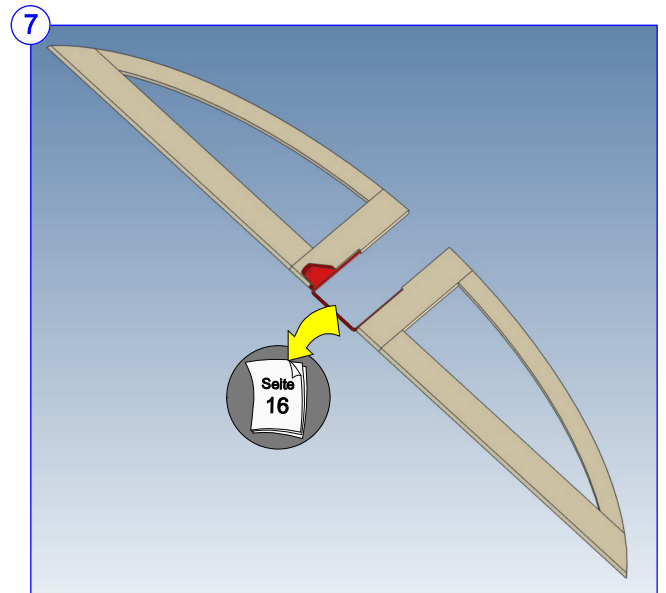
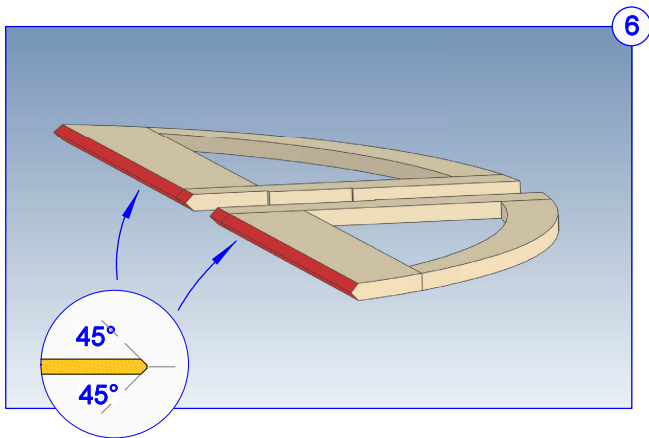
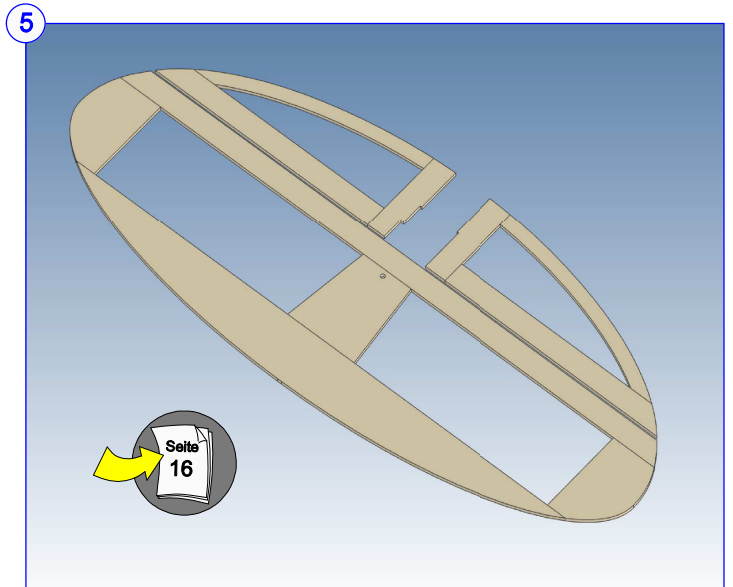
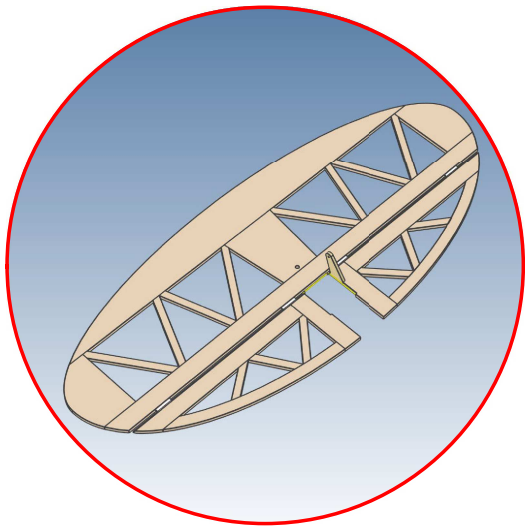
*Place the four holes in the gear mounting plate (21) **after** you have bent the gear wire (page 35) so that you can drill them exactly into the corner points of the wire.*

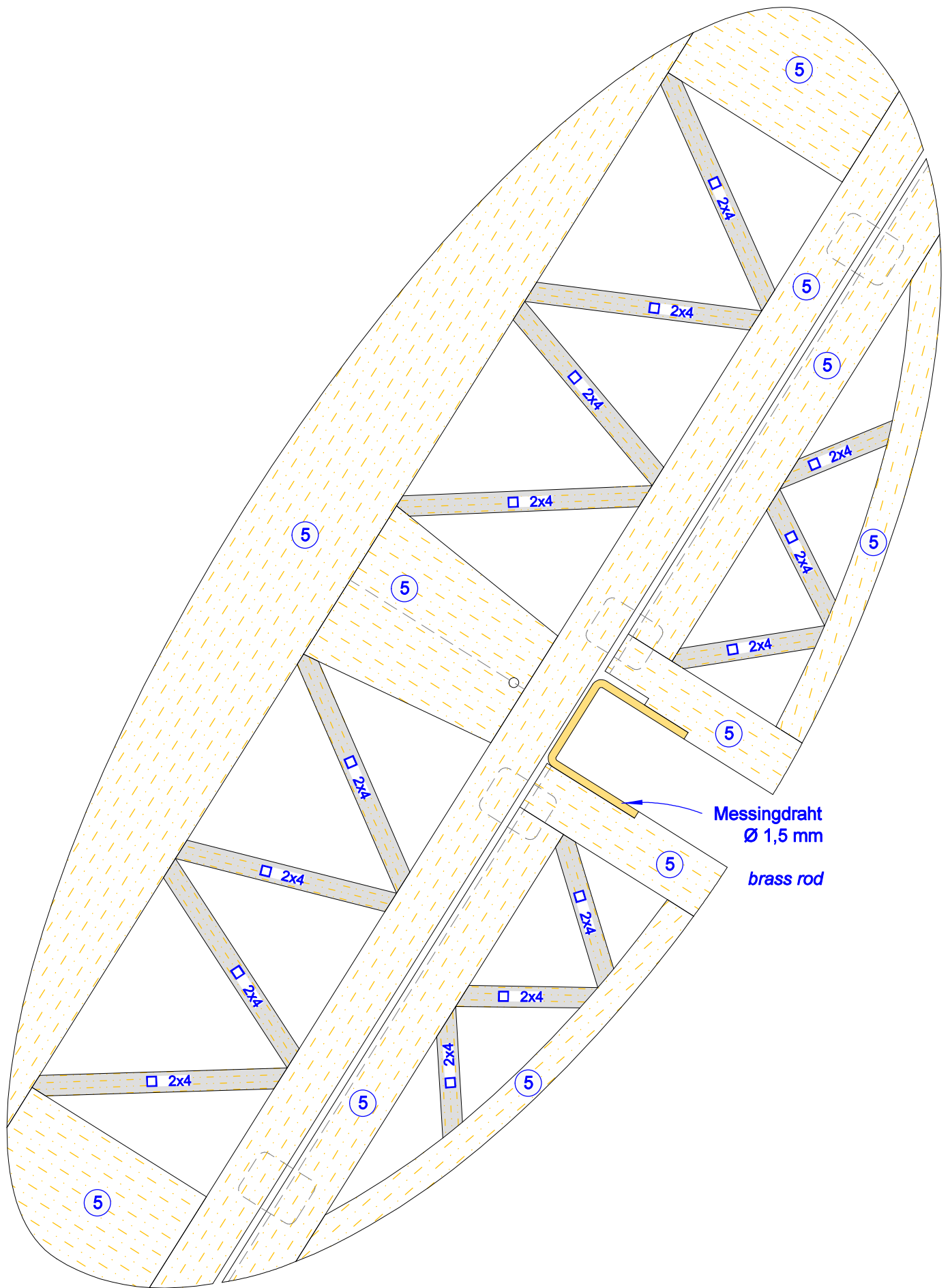
Pappeispertholz 4 mm / 125 x 250 mm

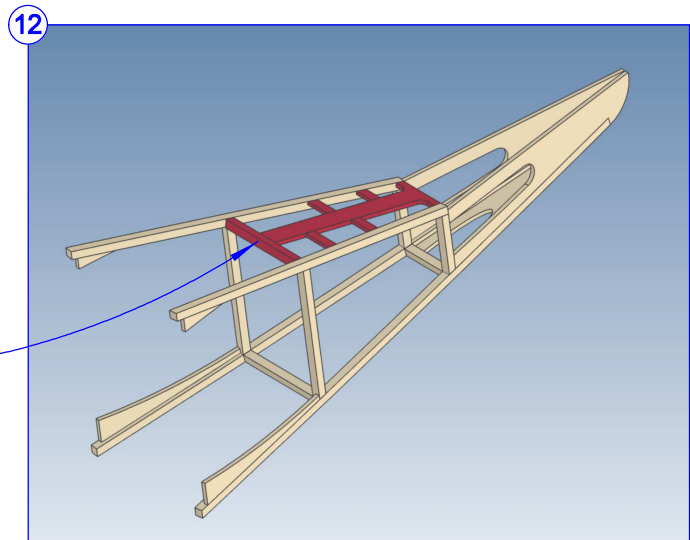
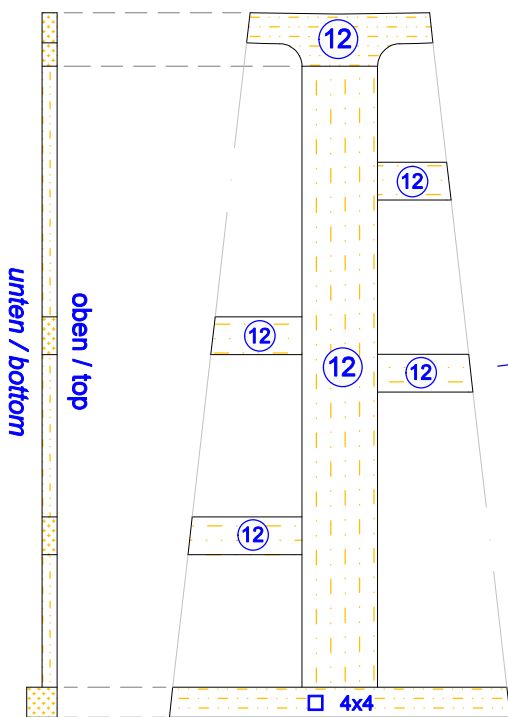
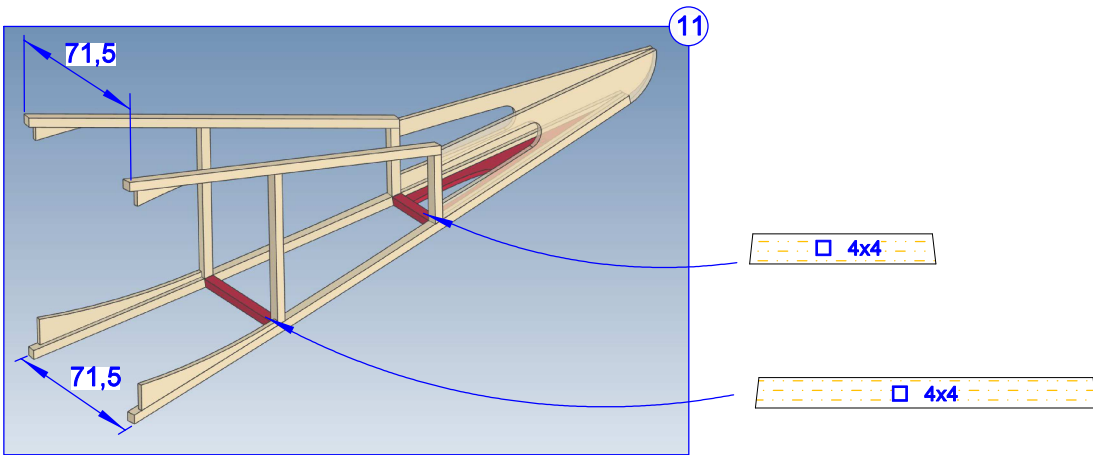
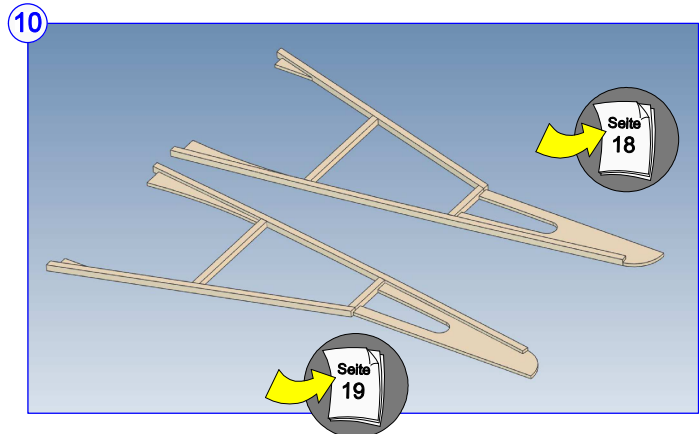
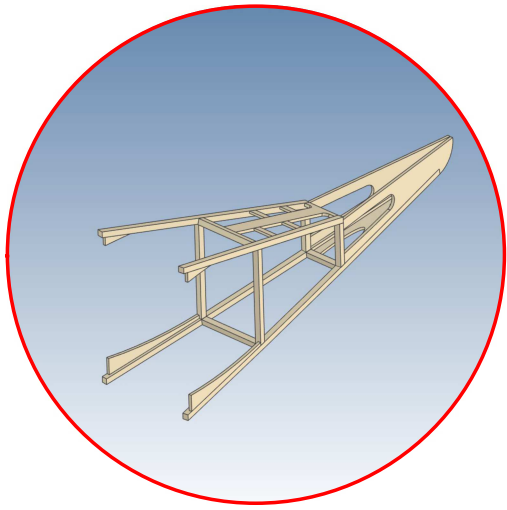




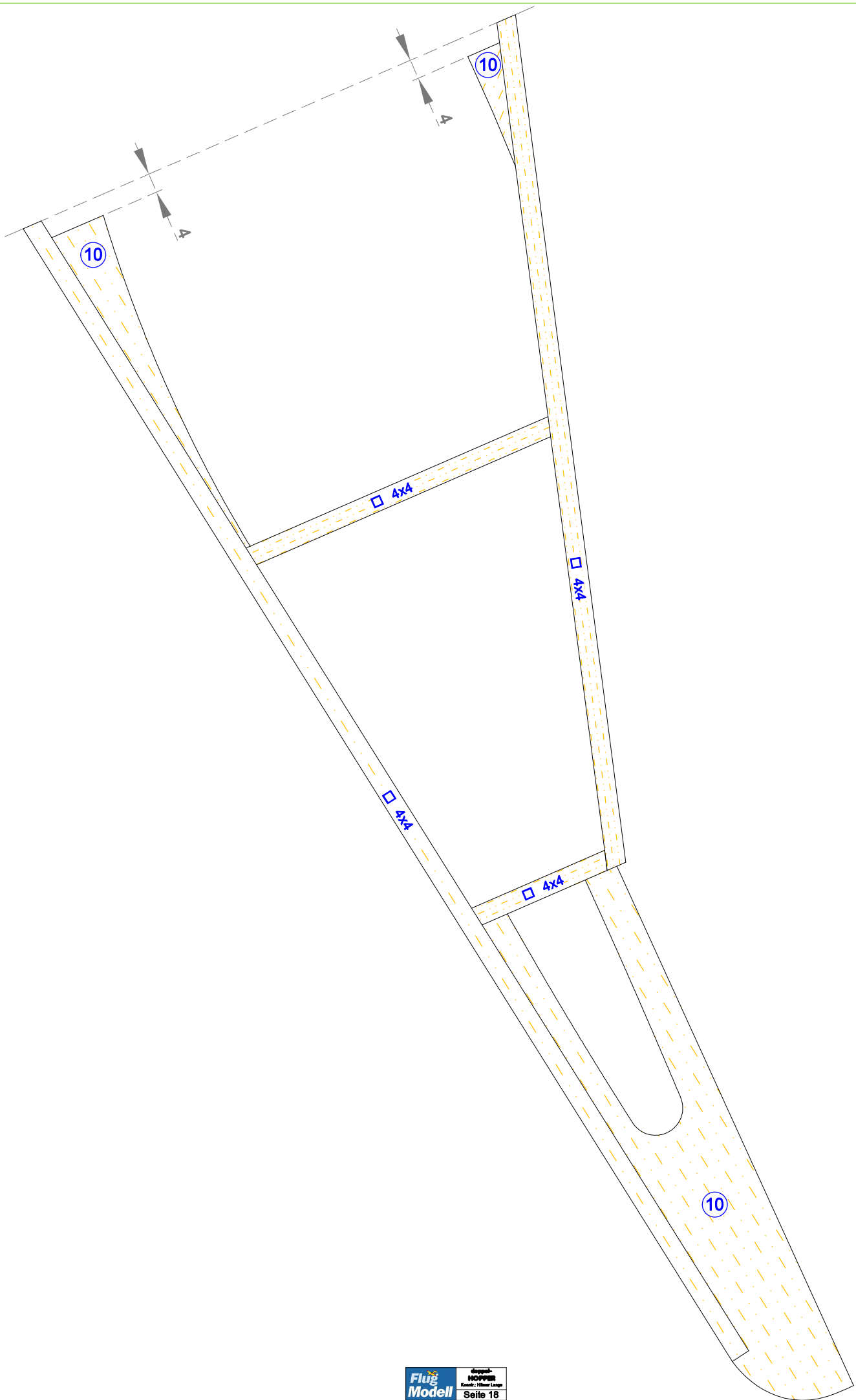
Vlies-Scharniere
CA-hinges

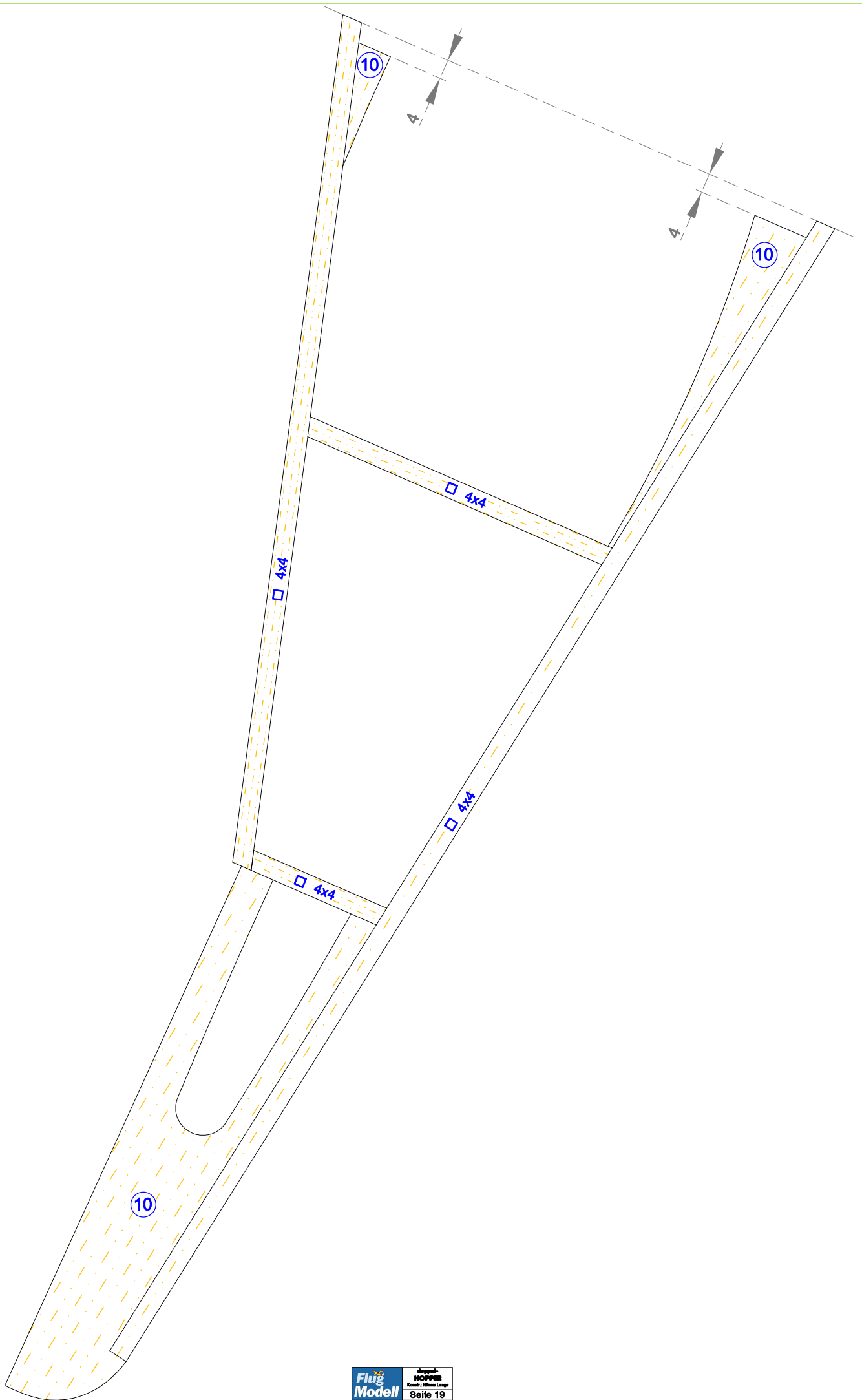


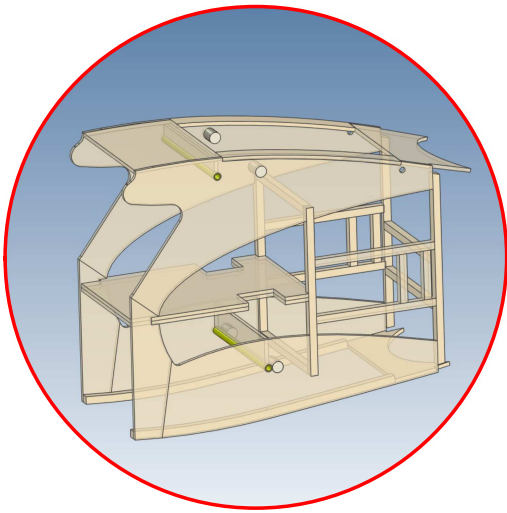




Druntersicht
bottom view



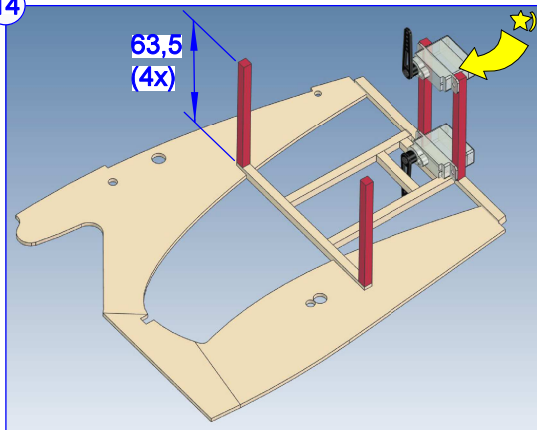




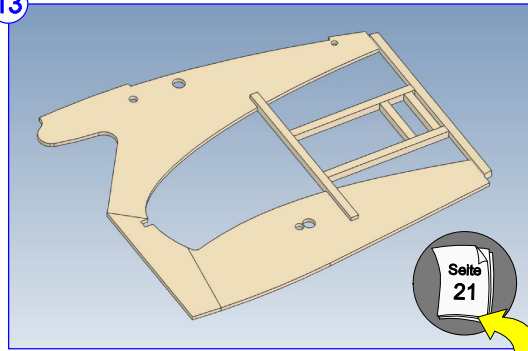
Zwischen die hinteren beiden Stäbe müssen die Servos passen können. Der Bauplan ist exakt passend für Hitec HS-40.

The servos must be able to fit between the two rear rods. The plan is exactly suitable for Hitec HS-40.

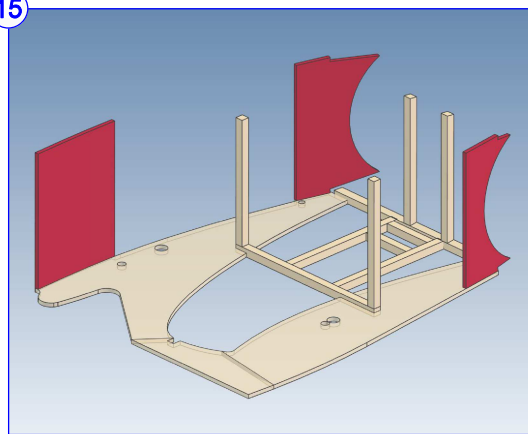
14



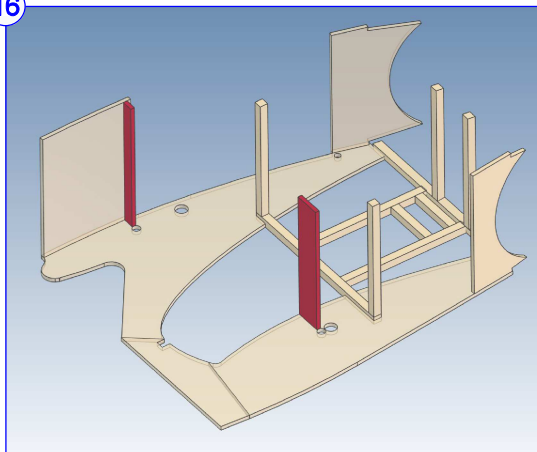
13



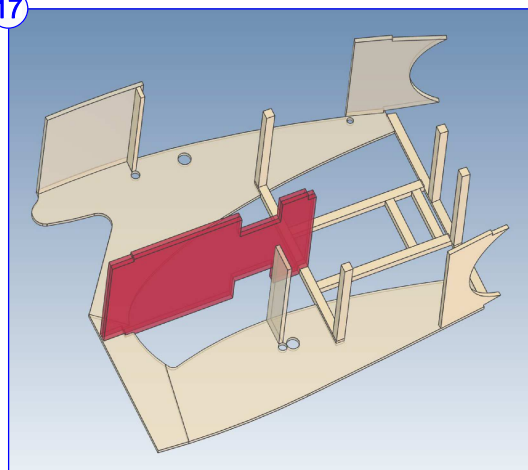
15



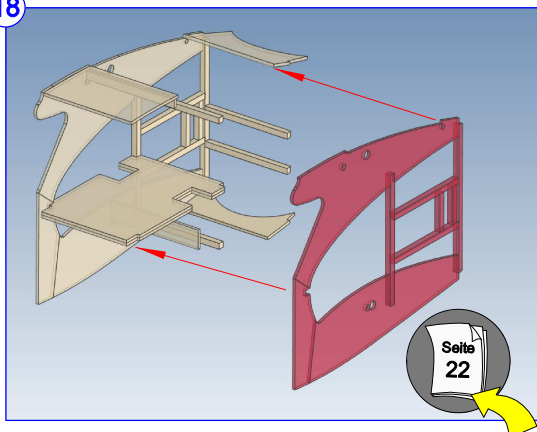
16

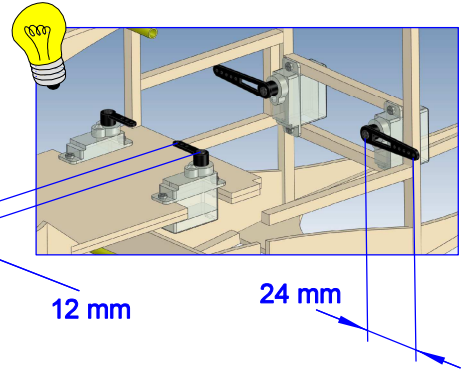
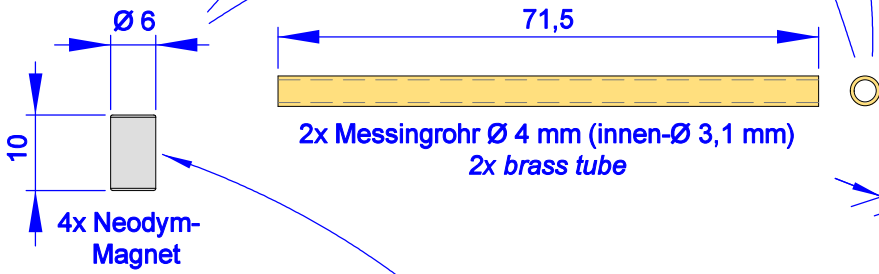
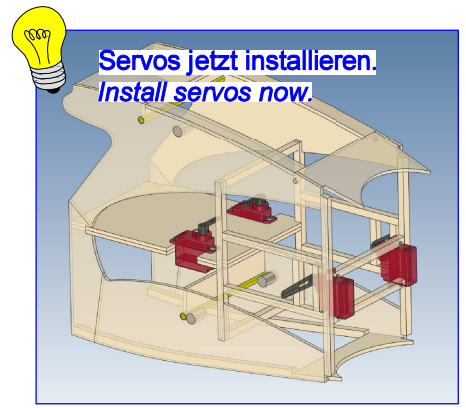
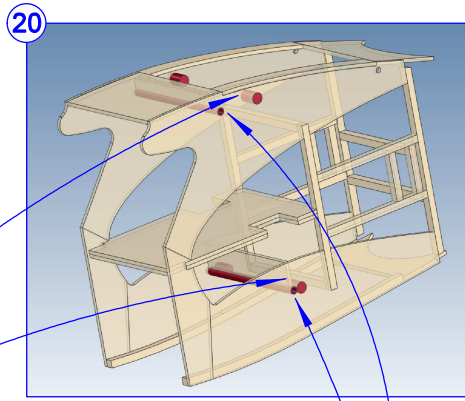
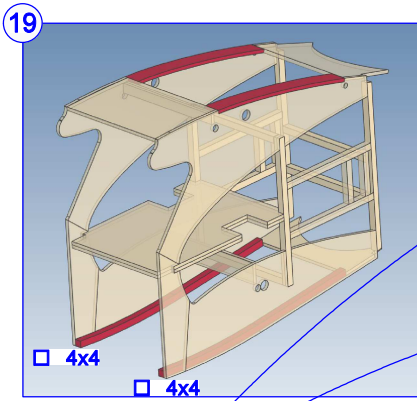


17



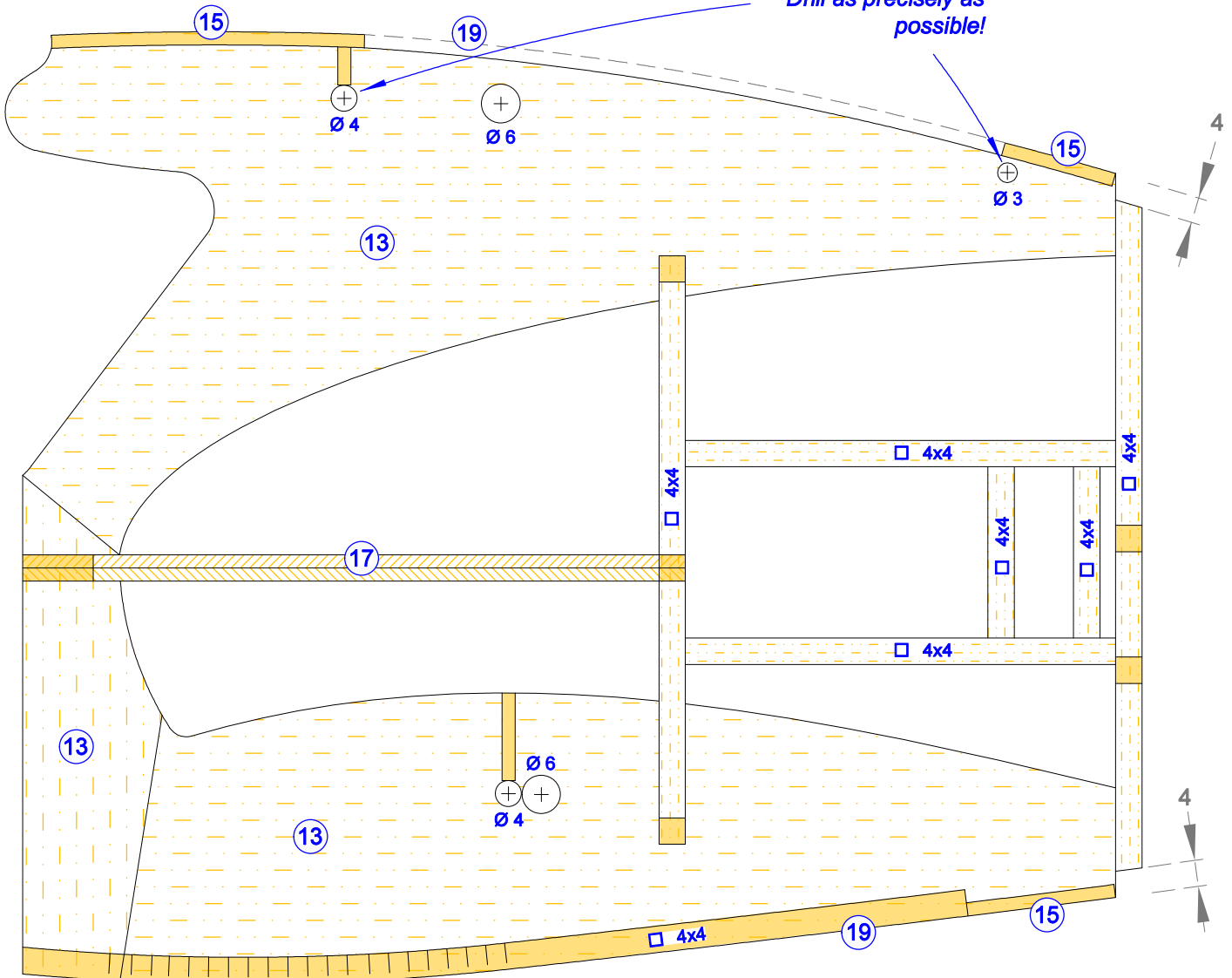
18



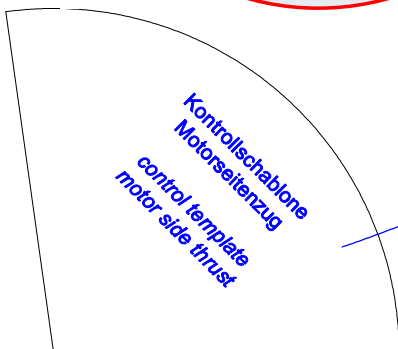
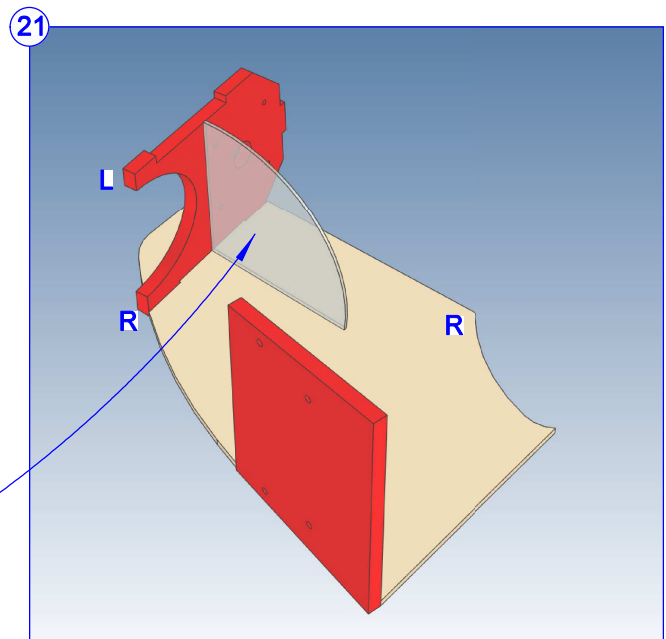
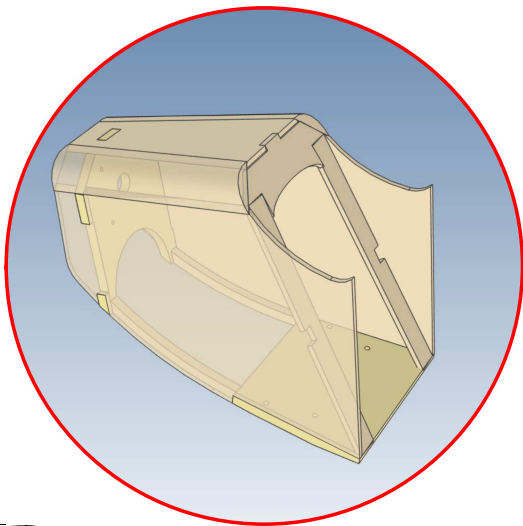
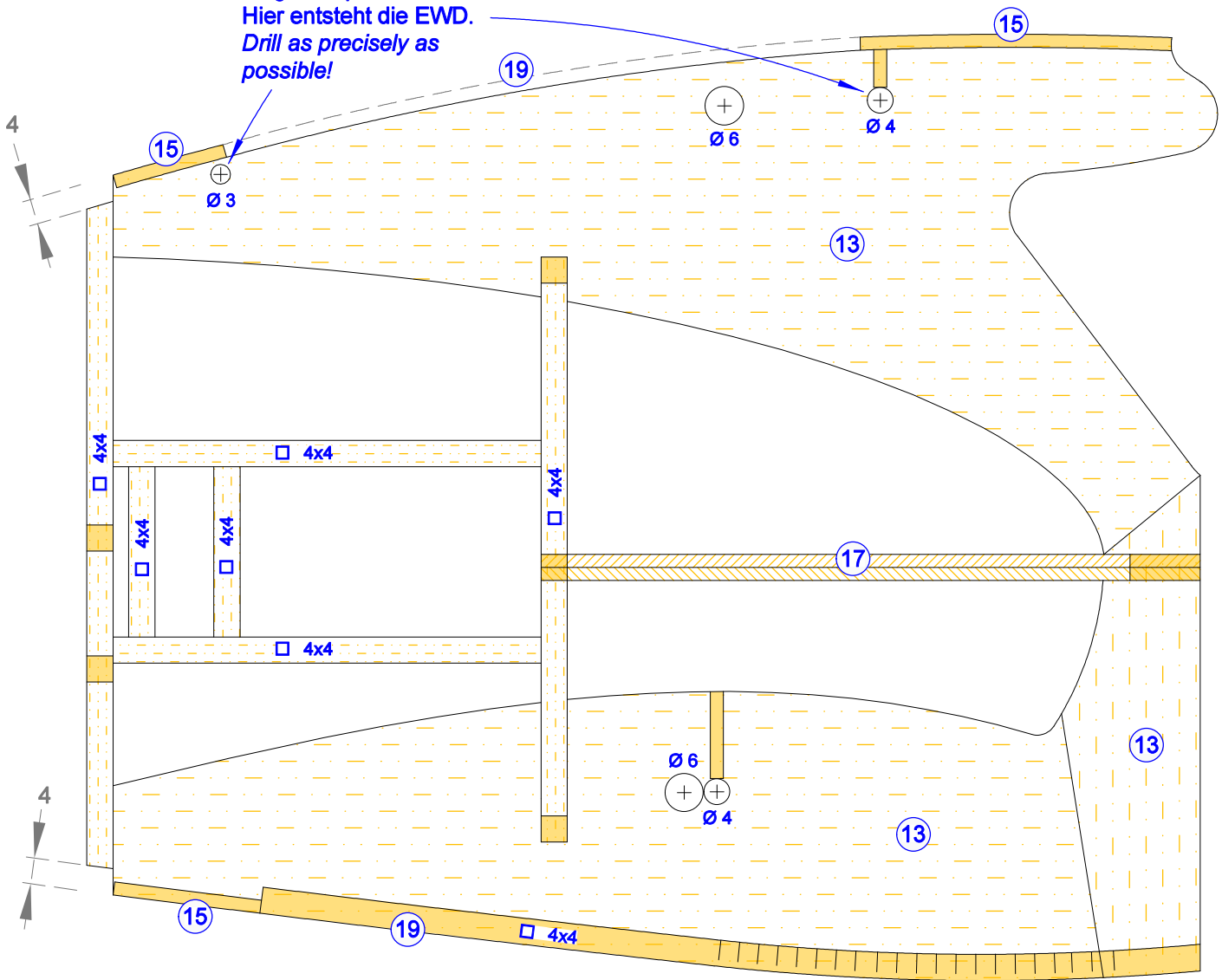


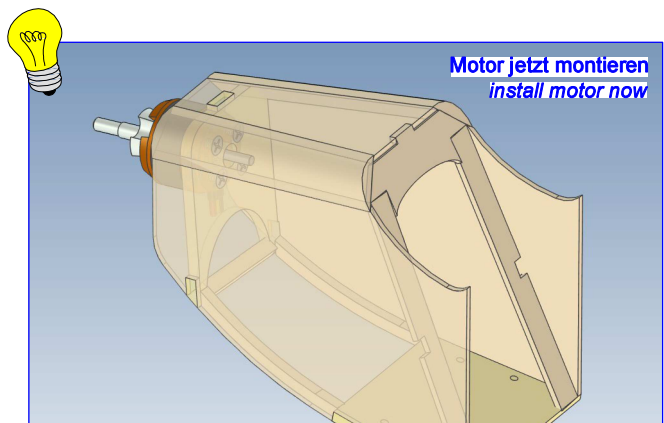
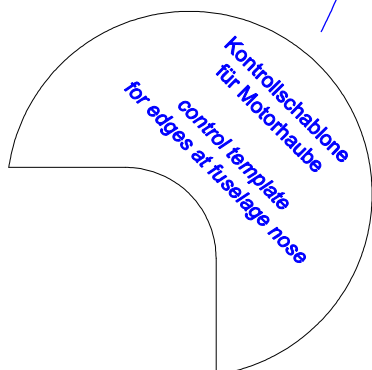
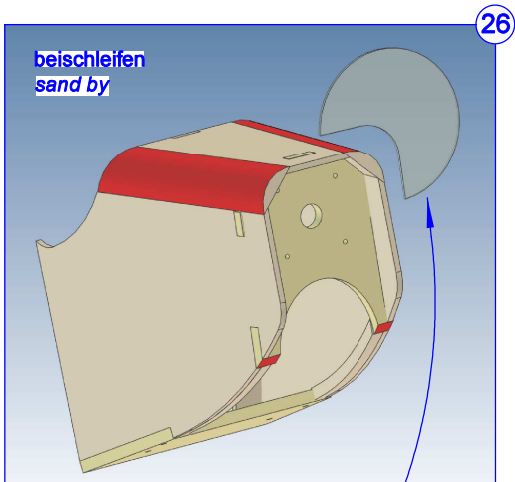
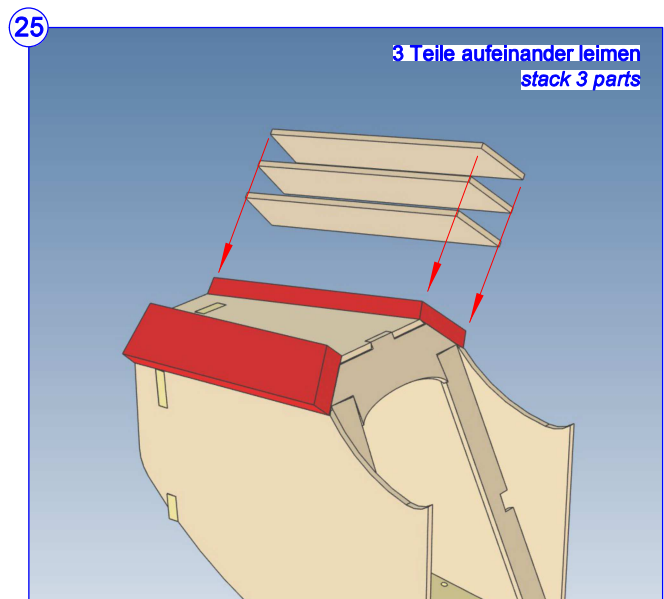
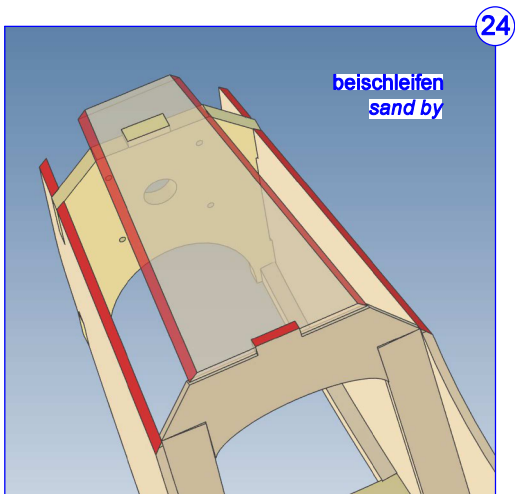
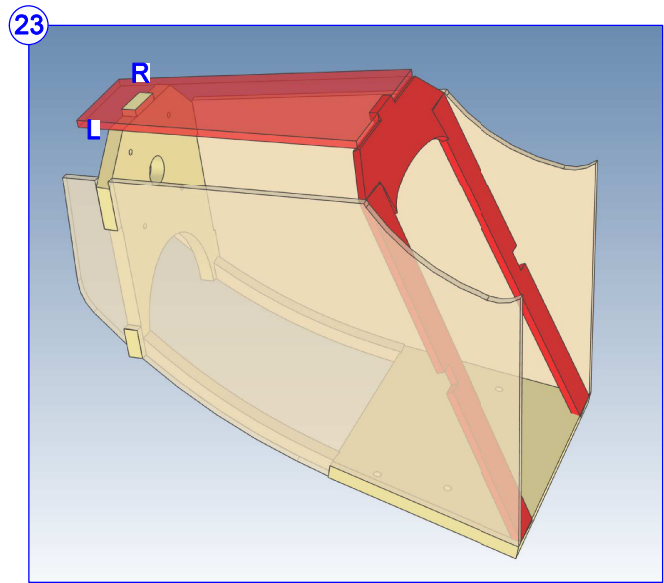
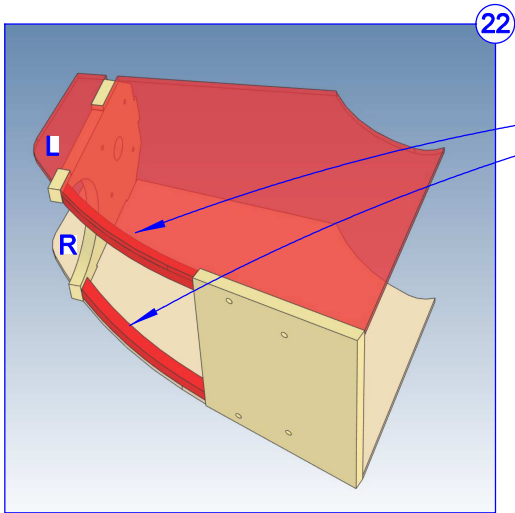
Das untere Magnetenpaar muss ca. 0,2 mm heraus stehen, damit sich der Flügel später darauf drehen kann.
The lower pair of magnets must protrude approx. 0.2 mm so that the wing can turn on it later.

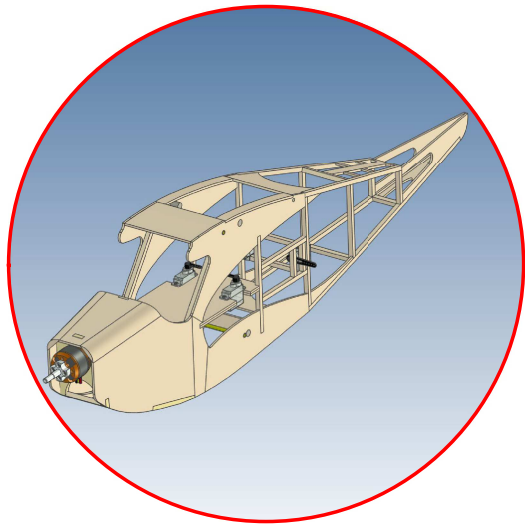
möglichst präzise bohren!
Hier entsteht die EWD.
Drill as precisely as possible!



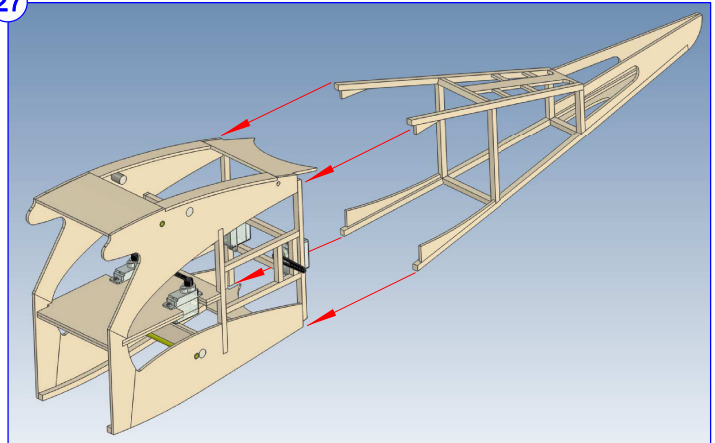
möglichst präzise bohren!
 Hier entsteht die EWD.
 Drill as precisely as possible!
 Here the EWD is formed.



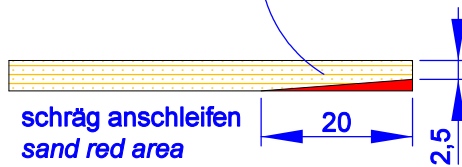
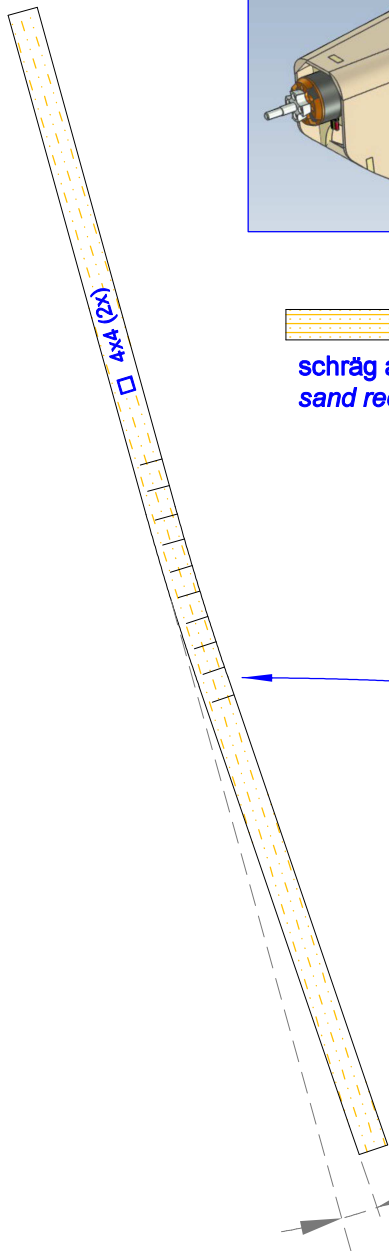
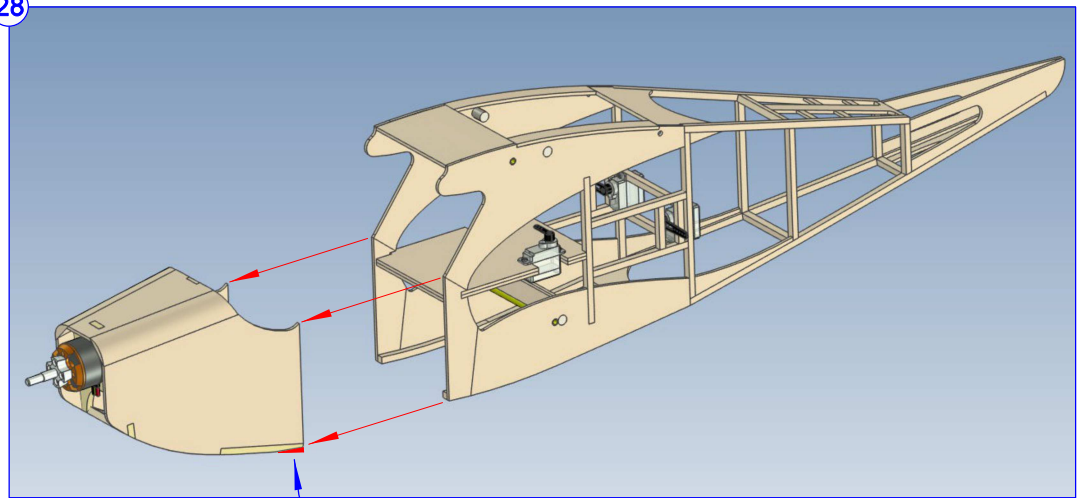




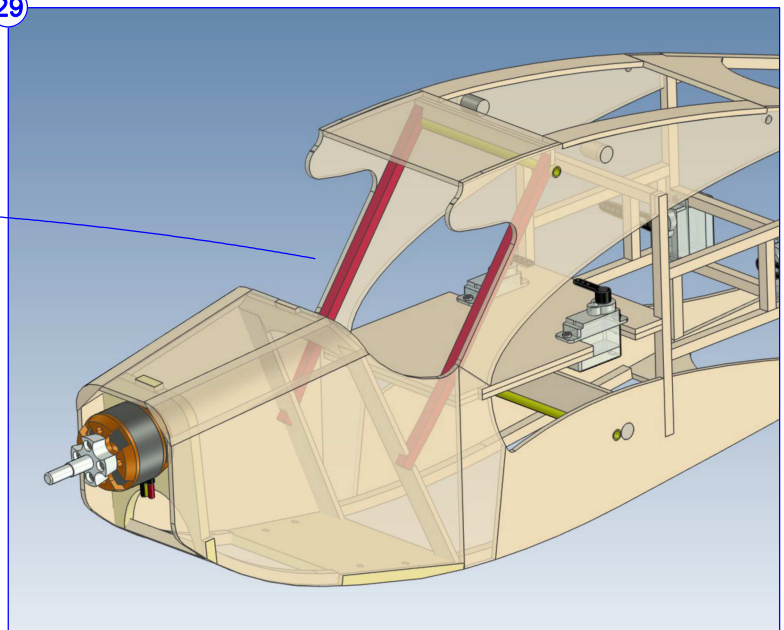
27

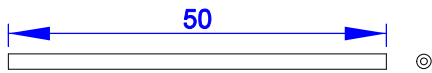
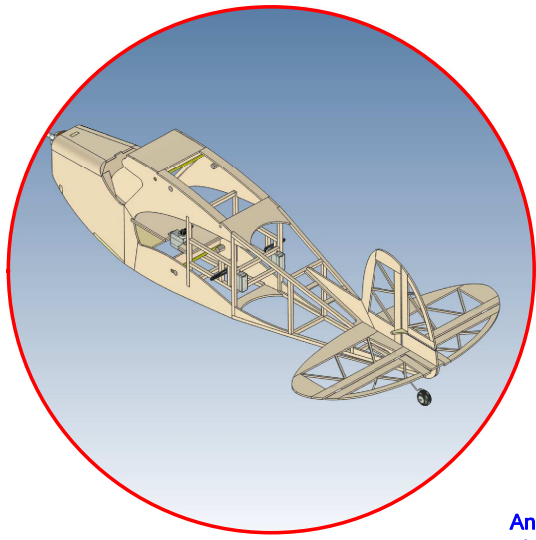


28

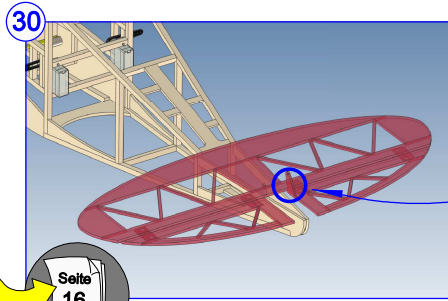


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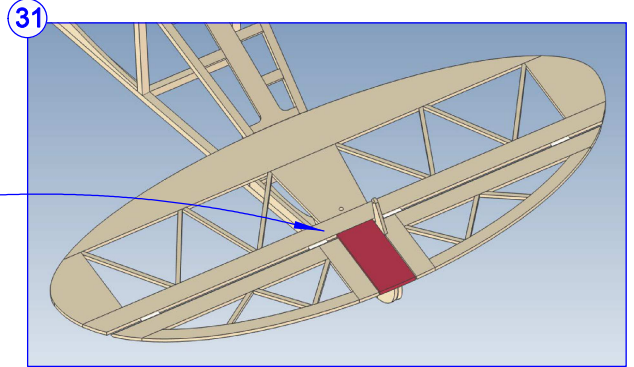
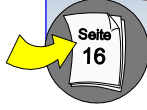




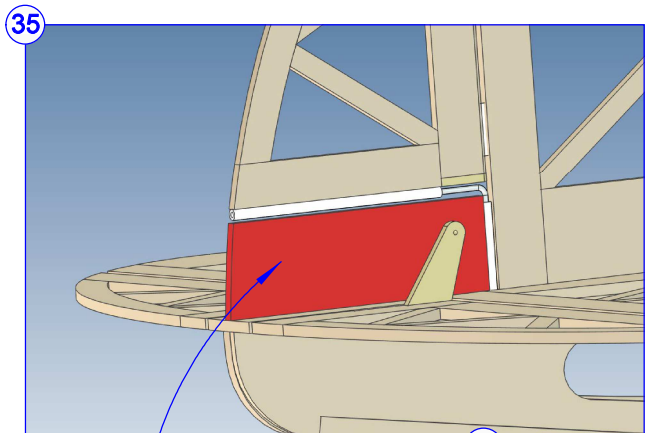
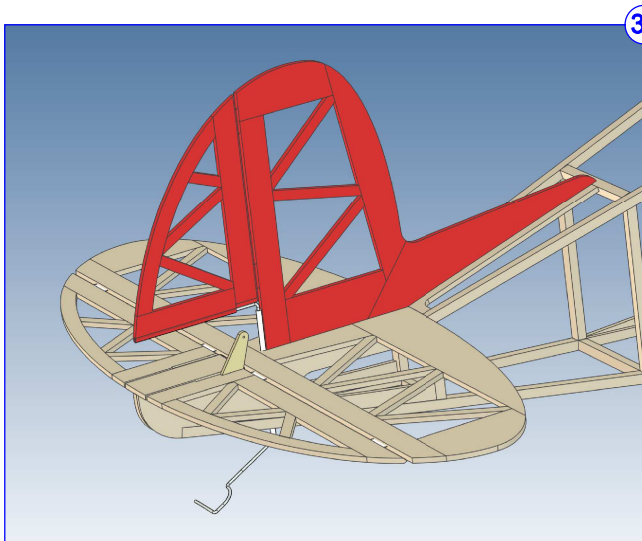
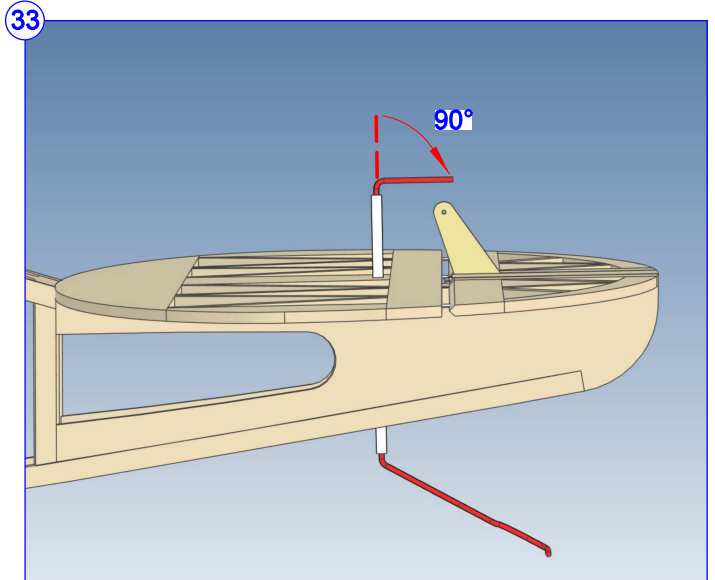
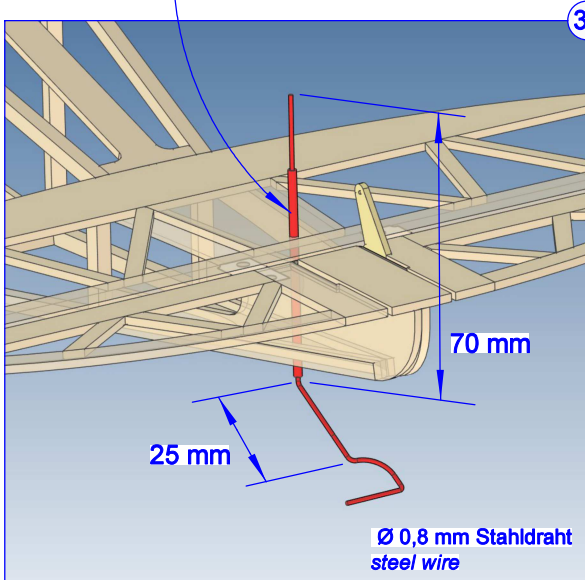
ABS-Rohr Ø 2 mm
ABS-tube



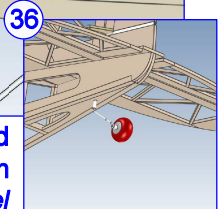
nach oben zeigend
pointing upward



An Rumpfheck aufkleben
glue onto fuselage back end



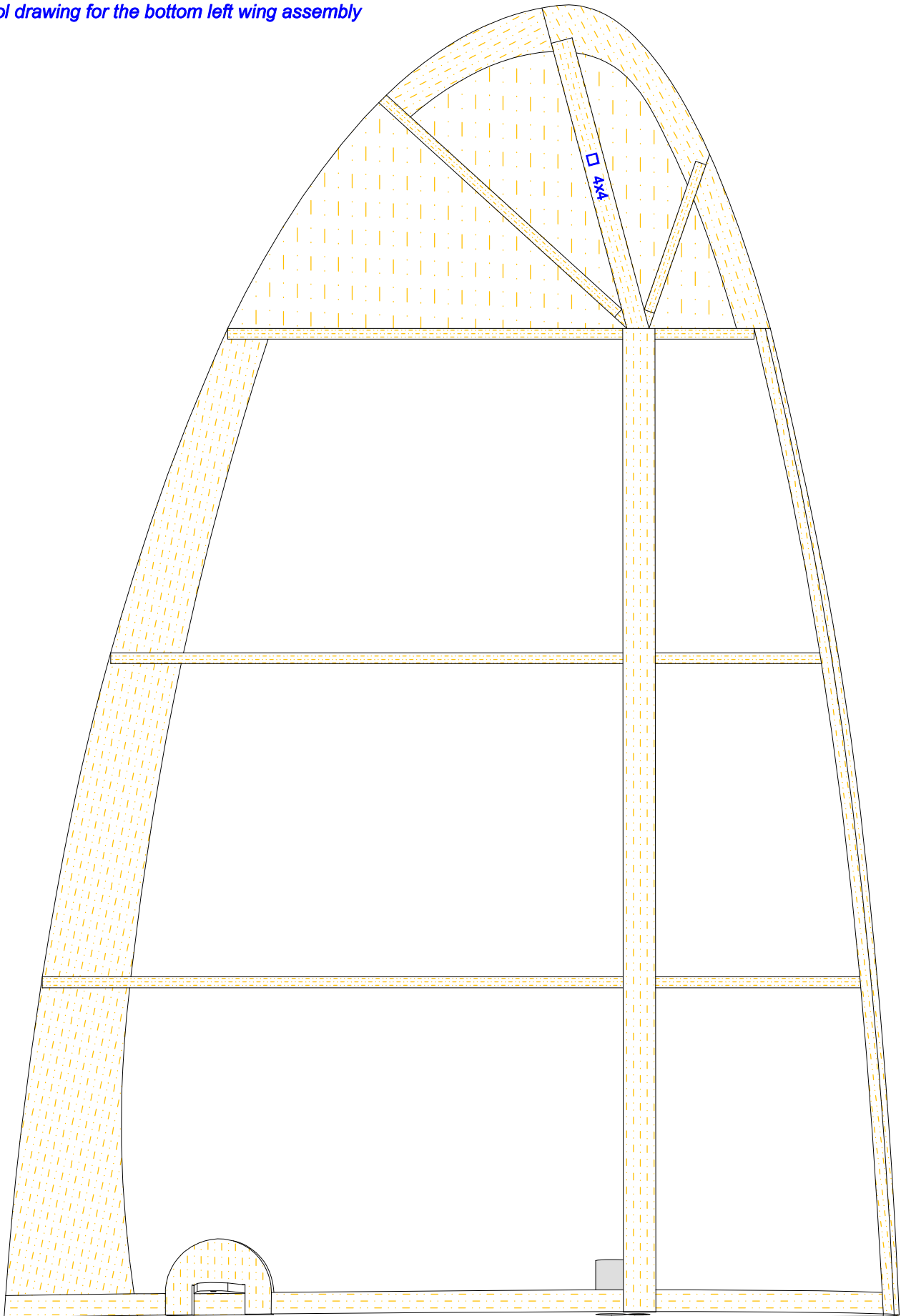
mit Rumpf verkleben
glue to the fuselage

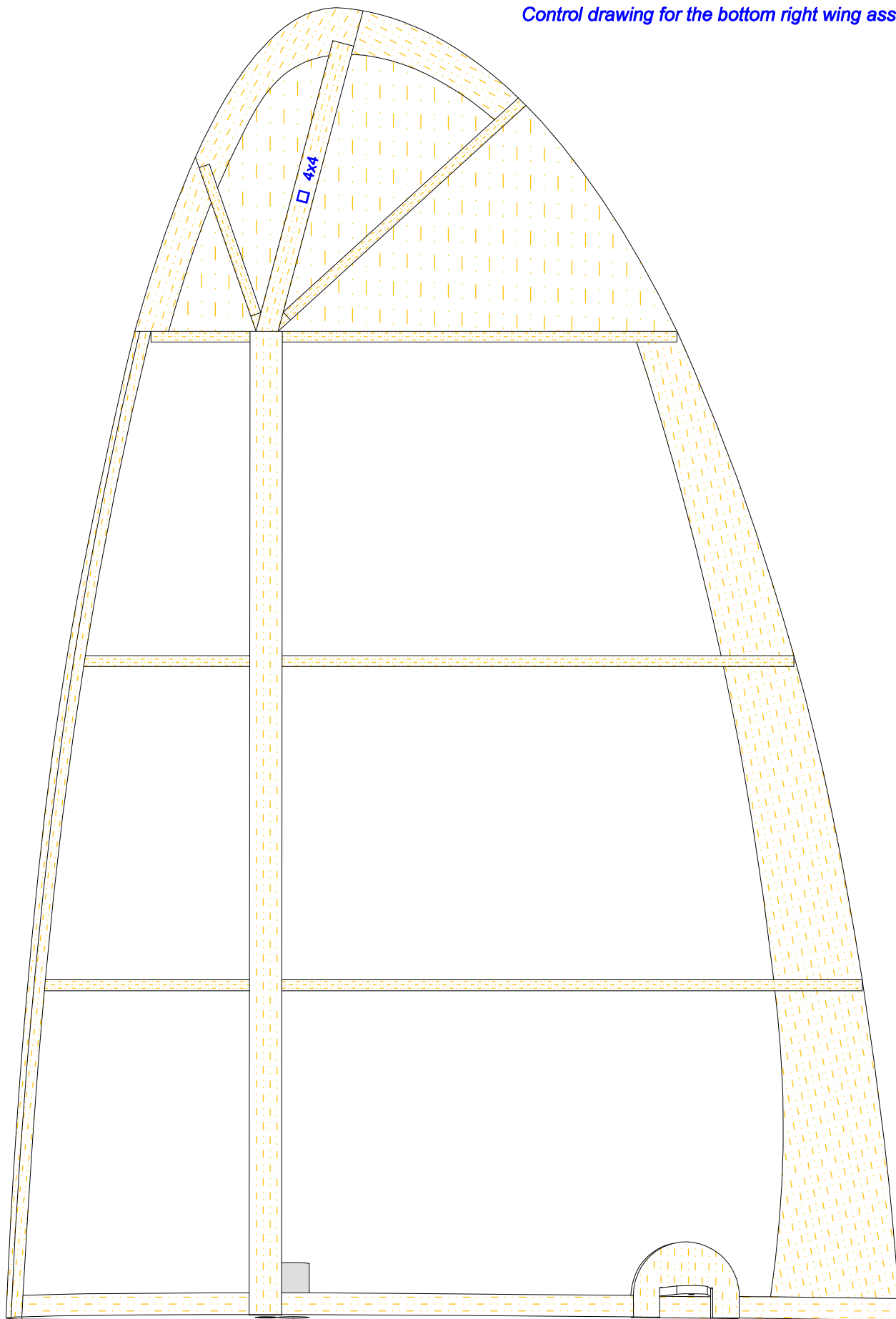


Heckrad
Ø 15-17 mm
rear wheel

Hilfsdarstellung für den Bau der unteren linken Flügelhälfte

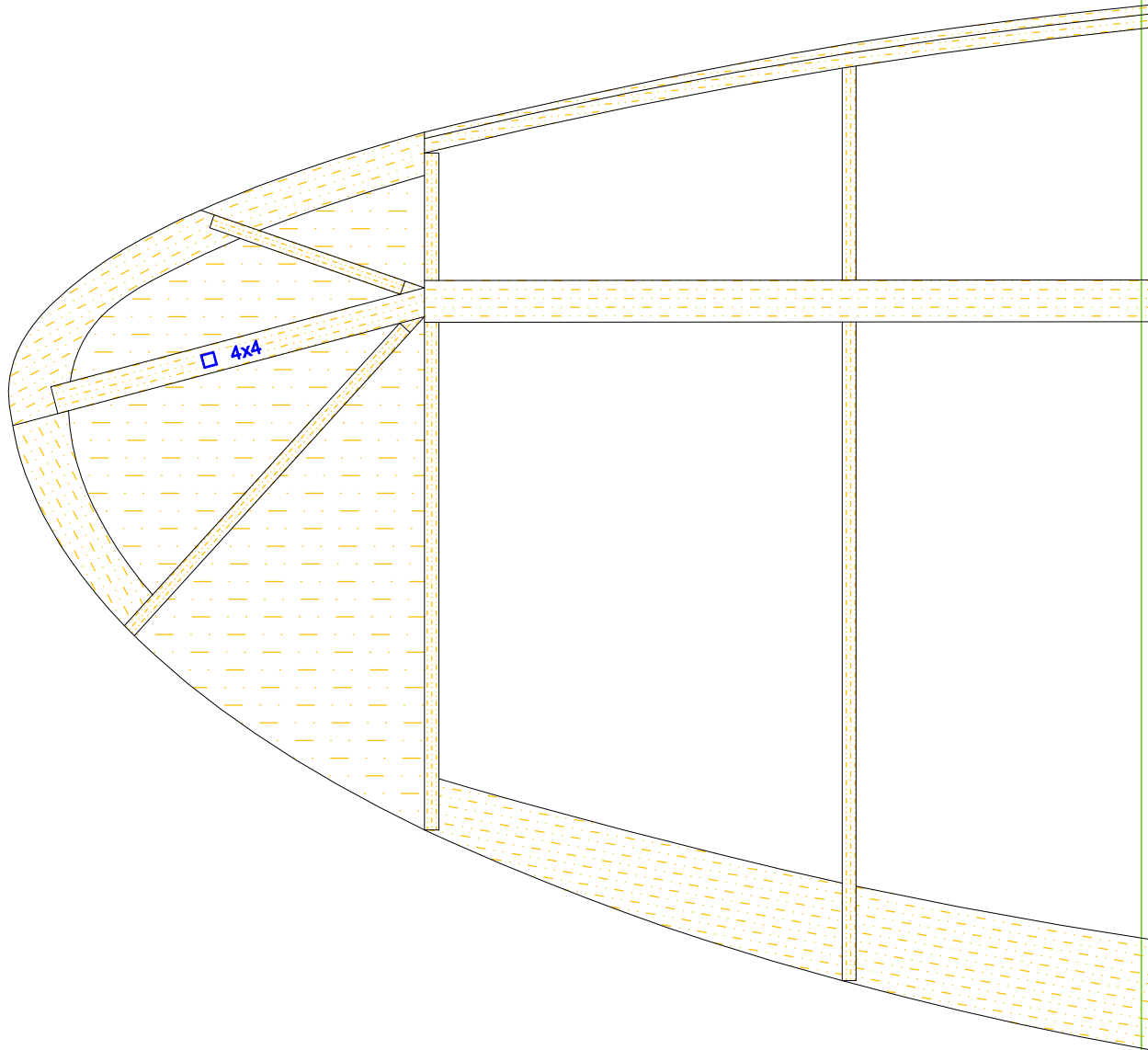
Control drawing for the bottom left wing assembly

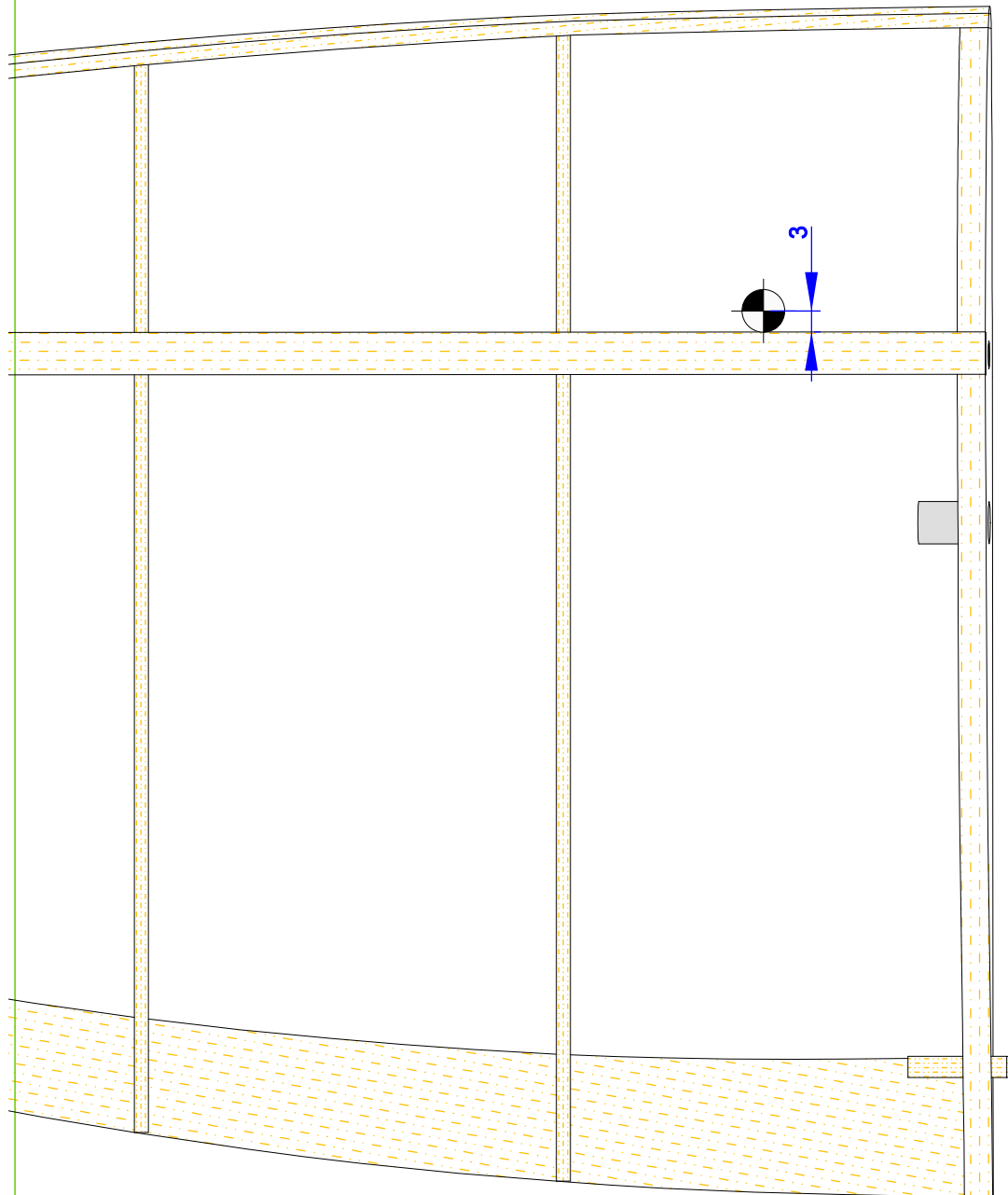


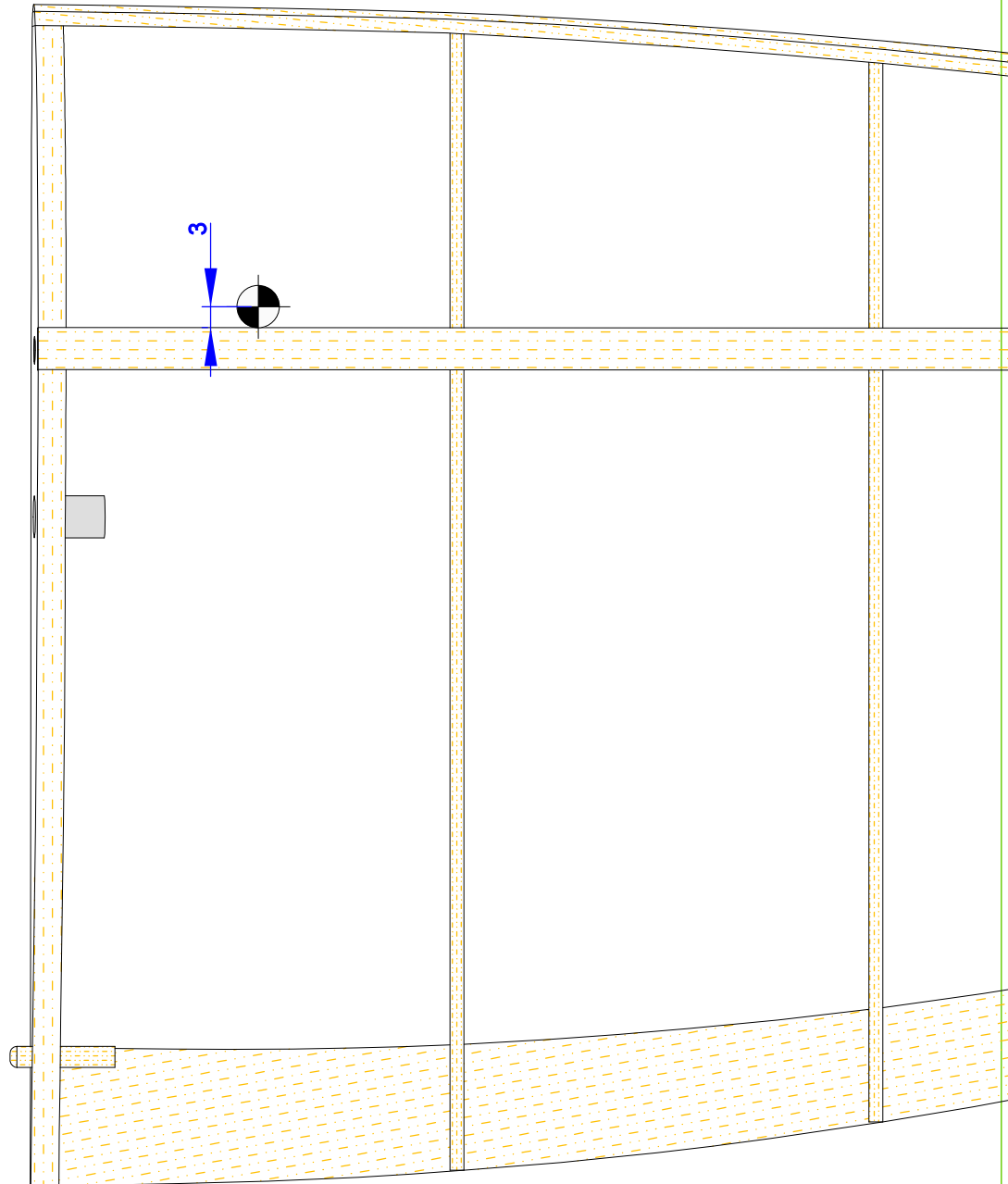


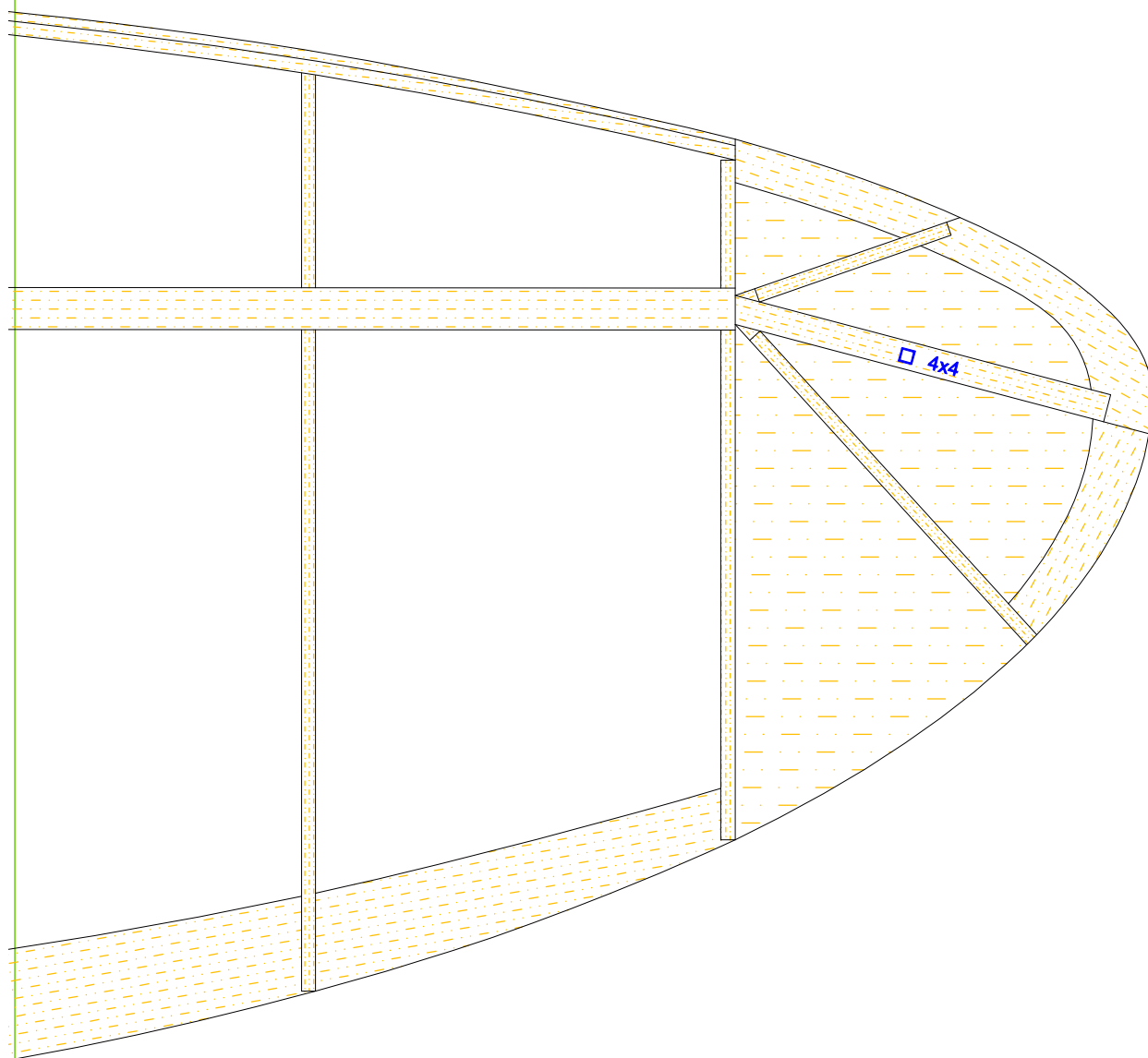
Hilfsdarstellung für den Bau der oberen linken Flügelhälfte

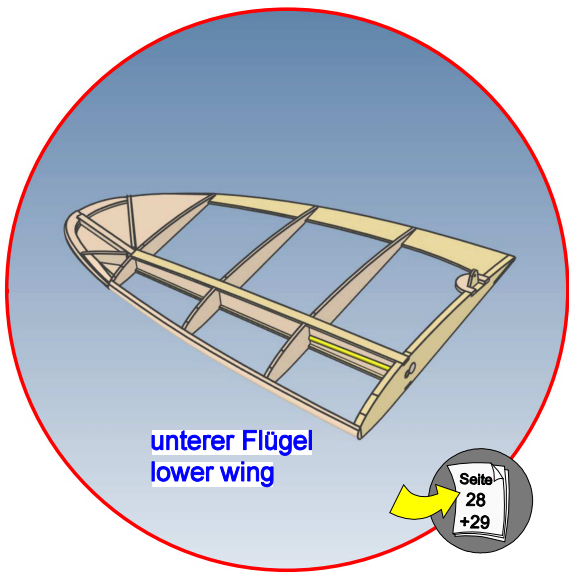
Control drawing for the top left wing assembly



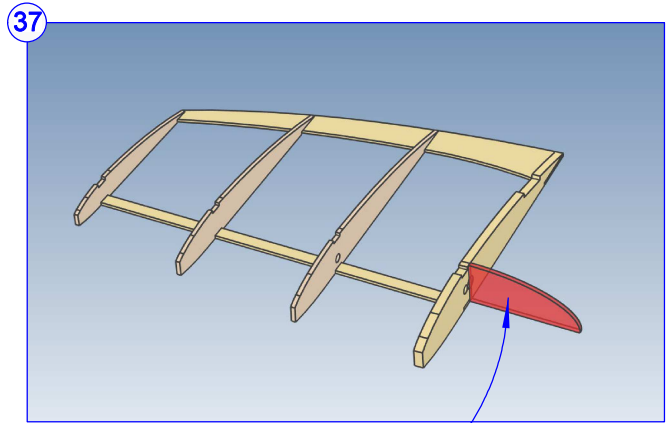




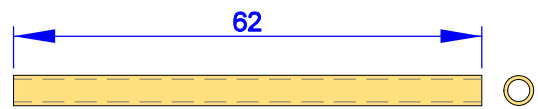
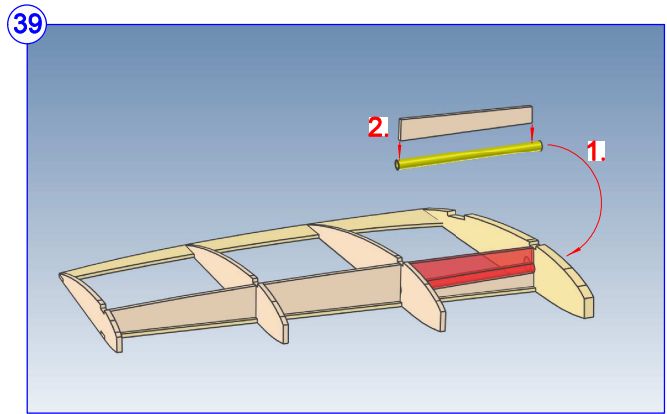
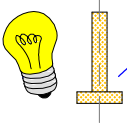
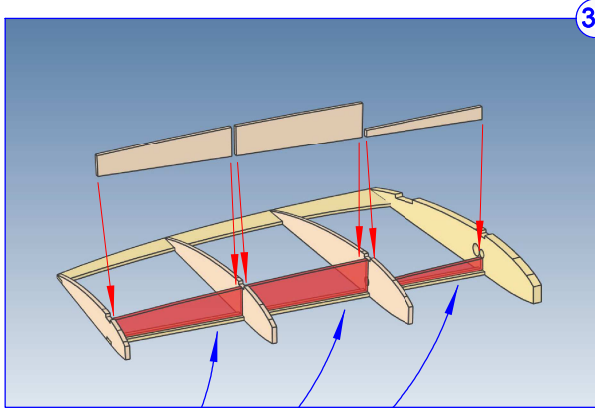




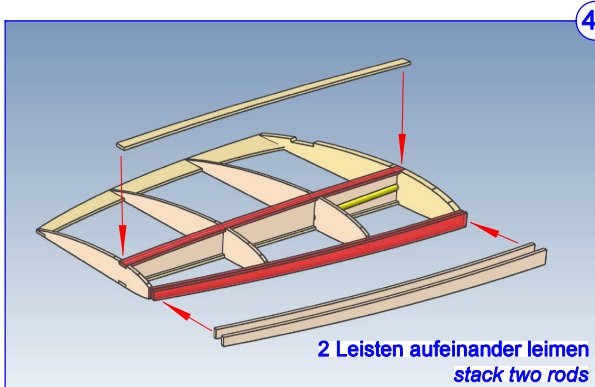
Seite
28
+29



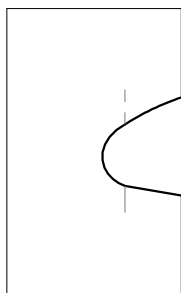
Kontrollschablone 3°
für Wurzelrippe
angle template for root rib



Messingrohr Ø 4 mm (innen-Ø 3,1 mm)
brass tube

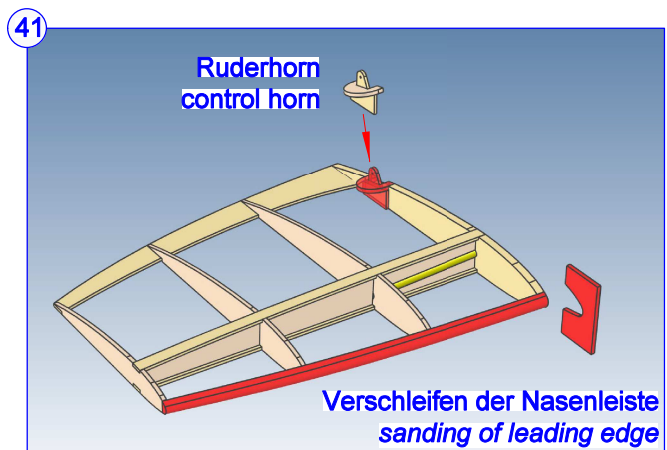


2 Leisten aufeinander leimen
stack two rods



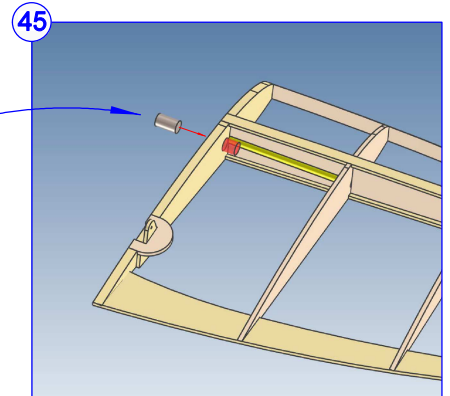
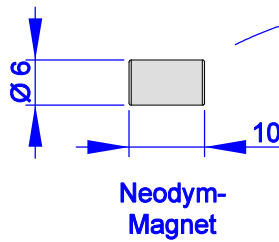
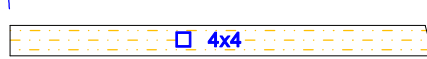
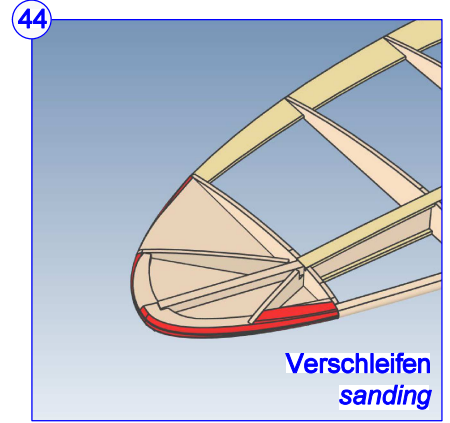
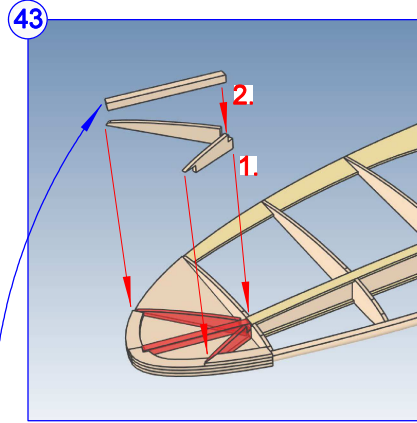
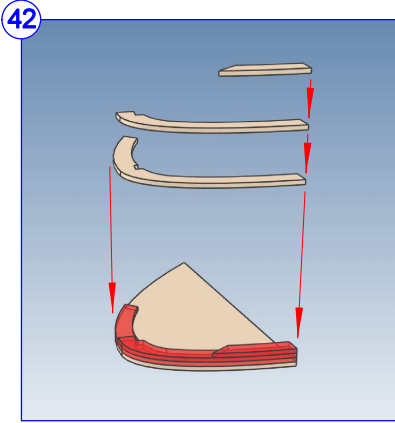
Nasenleisten-
Kontrollschablone

check leading
edge contour
with template



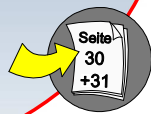
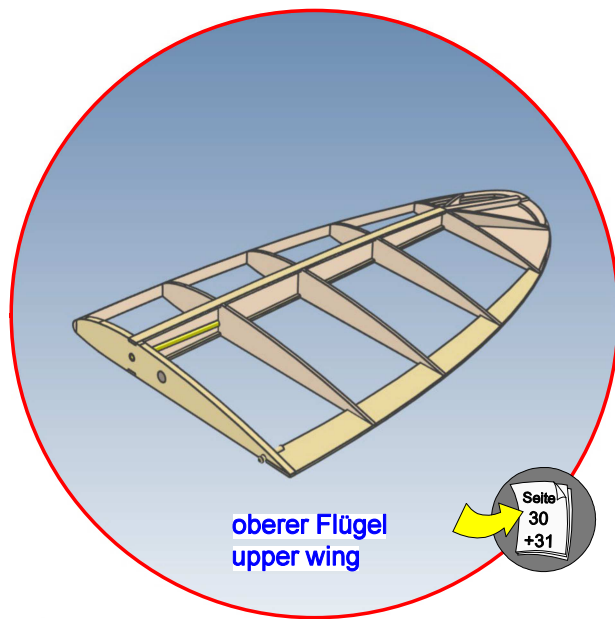
Ruderhorn
control horn

Verschleifen der Nasenleiste
sanding of leading edge



Polarität passend zum Rumpf beachten!

polarity must match the fuselage magnets!

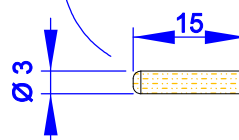
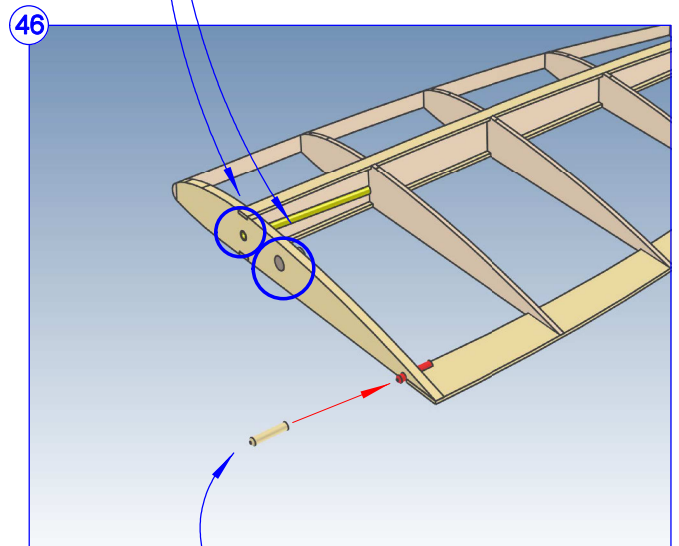


Seite 30 +31

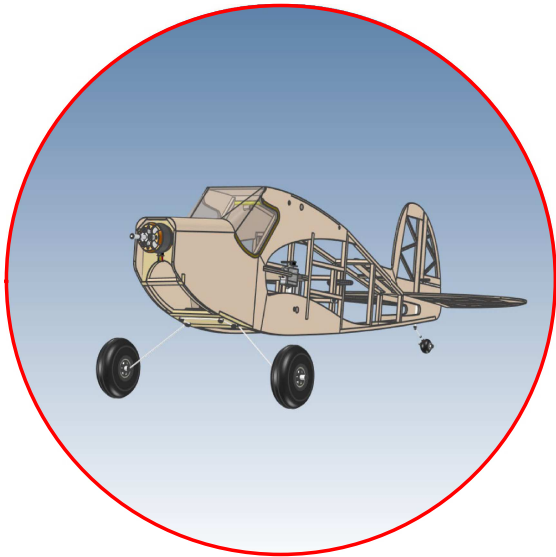
Der obere Flügel besitzt ein Rippenfeld mehr und wird genauso gebaut wie der untere Flügel. Der einzige Unterschied besteht in der Wurzelrippe, welche kein Ruderhorn besitzt, aber dafür einen Torsionsstift (Abb. 46).

The upper wing has one more rib section and is built in the same way as the lower wing. The only difference is the root rib, which does not have a control horn, but has a torsion pin (Fig. 46).

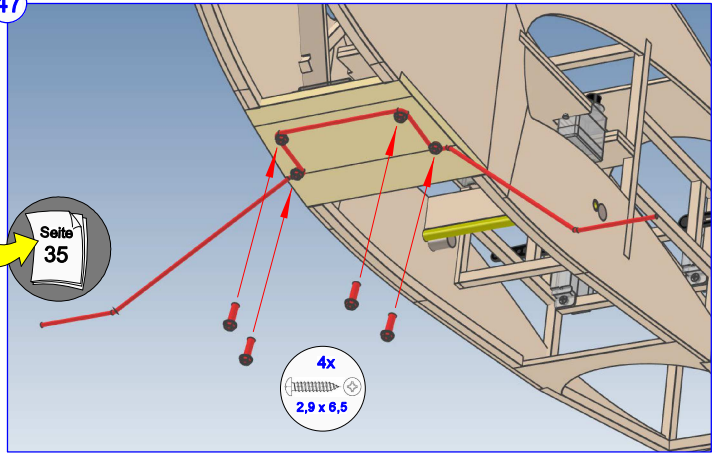
exakt bündig mit Wurzelrippe
exactly flush with the root rib



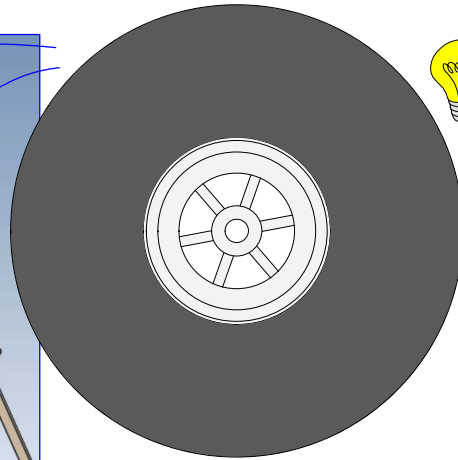
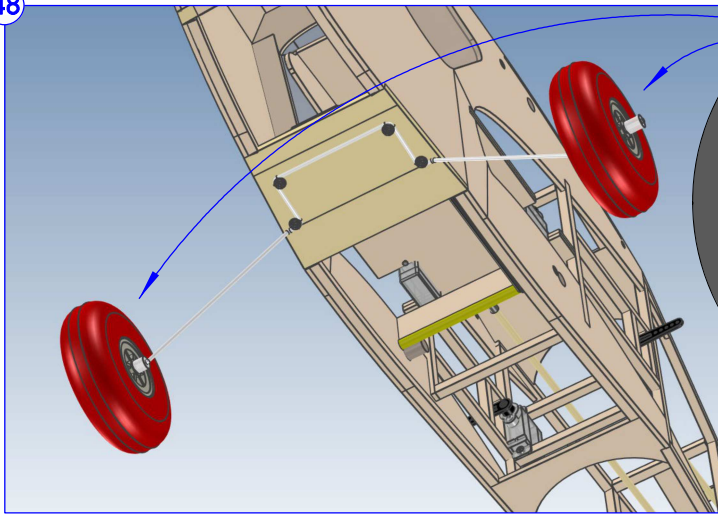
Holzrundstab
wood rod



47



48

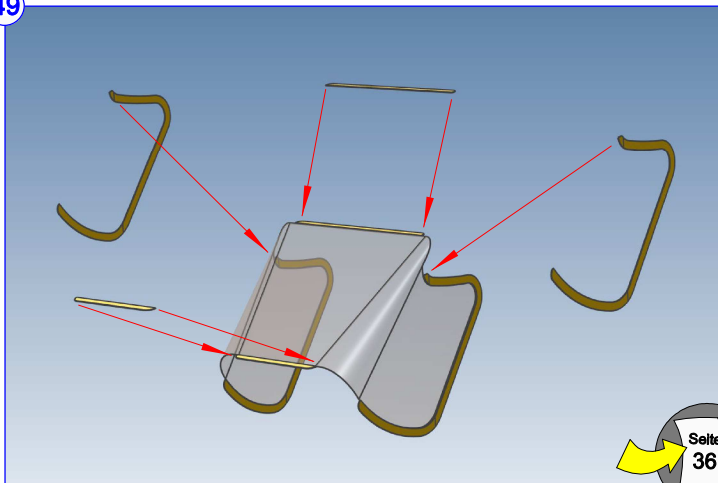


Achsdurchmesser mit mehreren Lagen Schrumpfschlauch aufdicken

fit axle diameter with several layers of shrinking tube

2x Leichttrad 60/20 mm (14g)
Aero-Naut Art.-Nr.: 735333

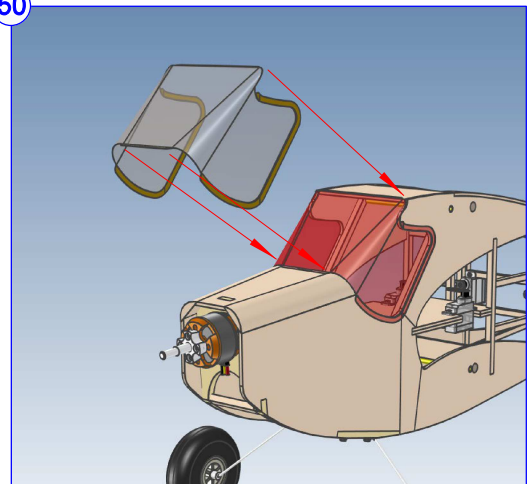
49



Farbige Klebefolie verdeckt die Klebestelle der Kabinenverglasung.

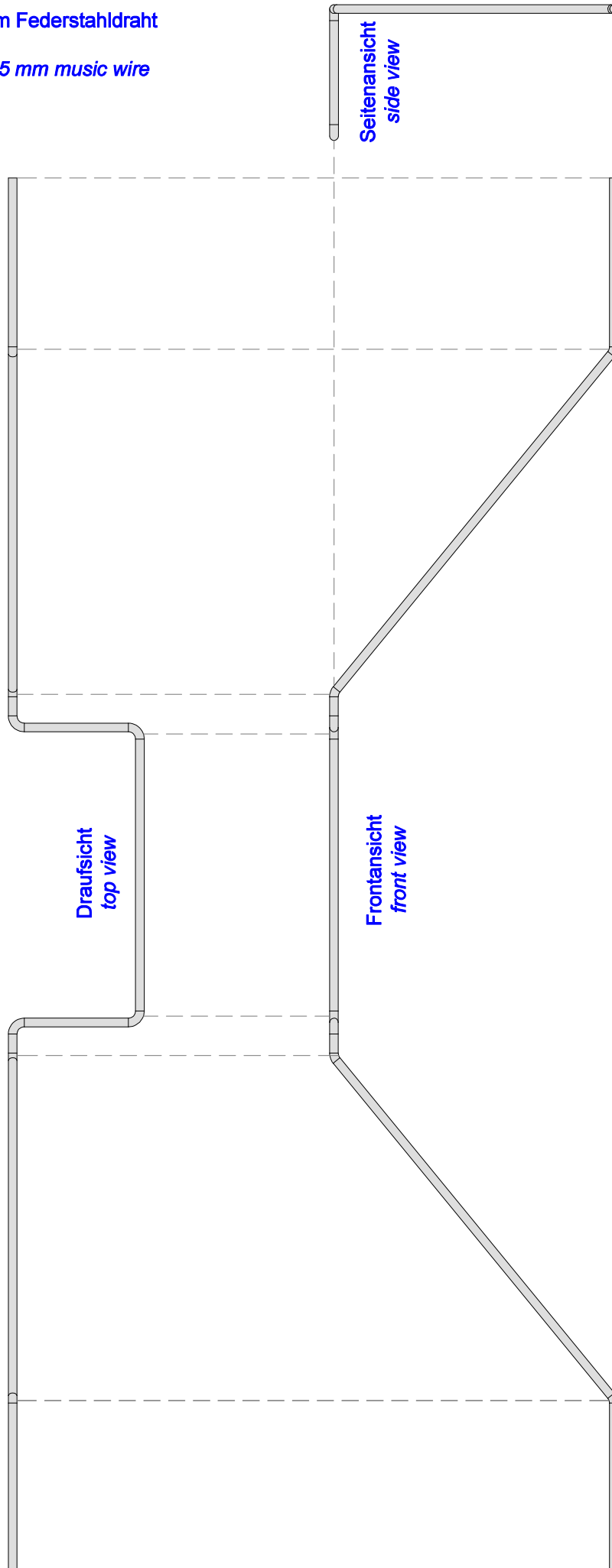
Colored adhesive film hides the glued joint on the cabin glazing

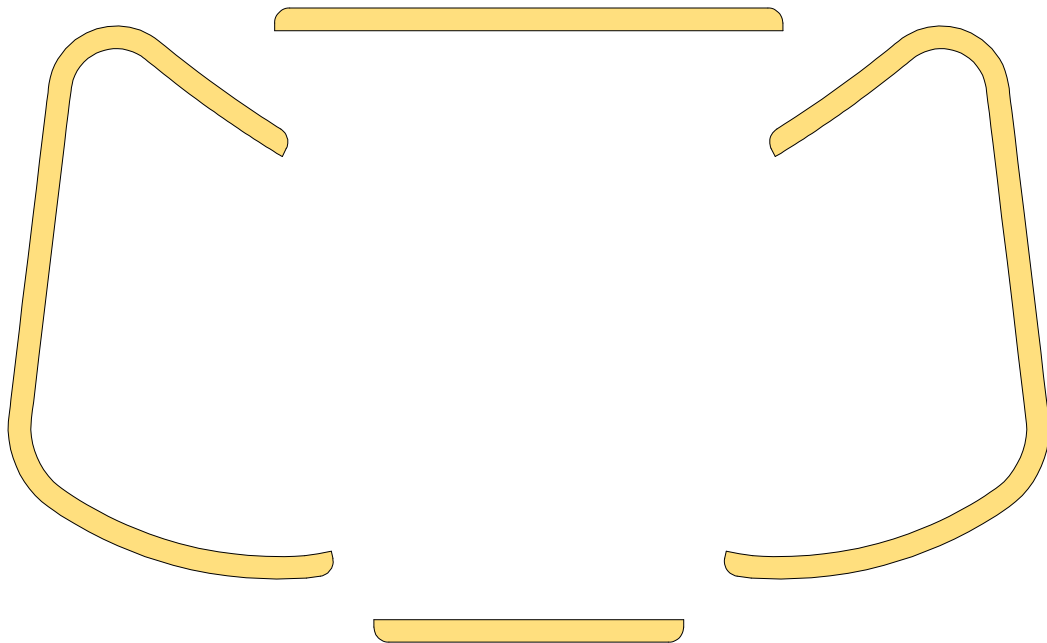
50



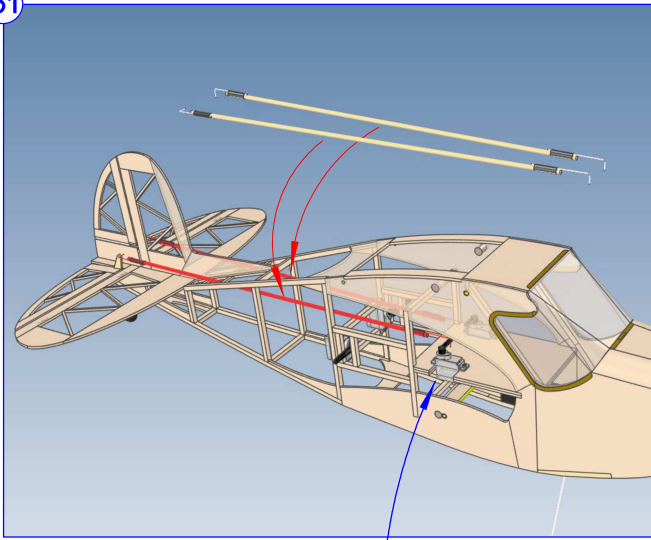
Hauptfahrwerk aus 1,5 mm Federstahldraht

landing gear, bent from 1,5 mm music wire



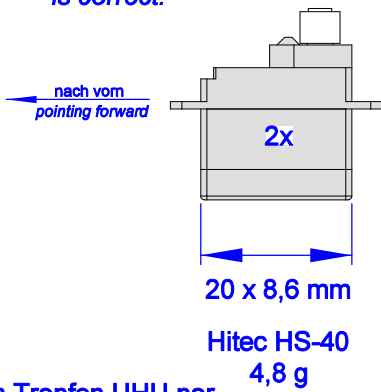


51



Einbauichtung der Servos beachten, damit die Gestängelänge stimmt

note the installation direction of the servos so that the length of the rods is correct.



Ein Tropfen UHU verhindert die Gestänge daran, aus den Anlenkungen zu rutschen.

A drop of contact glue prevents the rods from slipping out of the horns.

0,8 mm Stahldraht
0,8 mm music wire

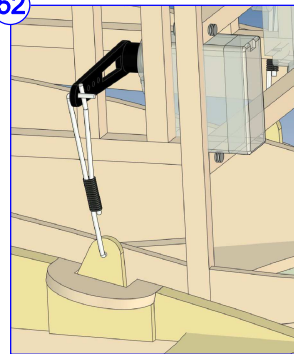
Sekundenkleber und Schrumpfschlauch
CA + shrink tube

nach oben gebogen
bent upwards

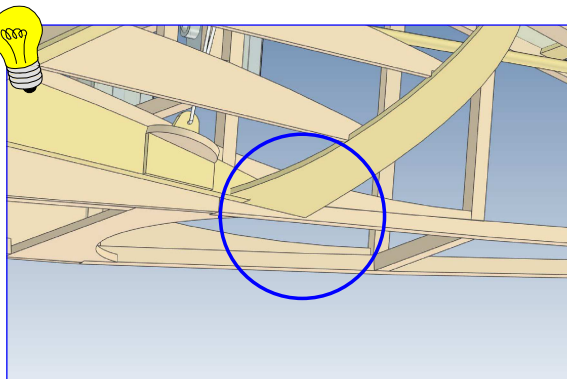
Holzrundstab Ø 3 mm
wood rod

CFK-Stab Ø 3 mm als Flügelverbinder
connect wings to fuselage with CFK-rod Ø 3 mm

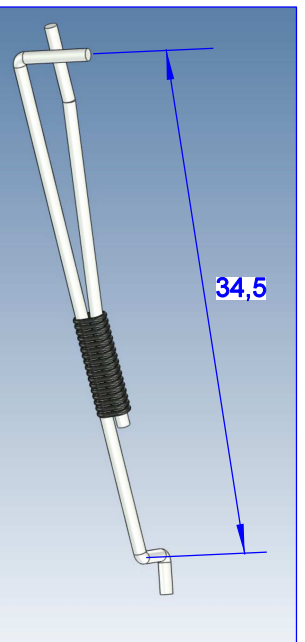
52



Querruder-Anlenkung
Linkage for ailerons

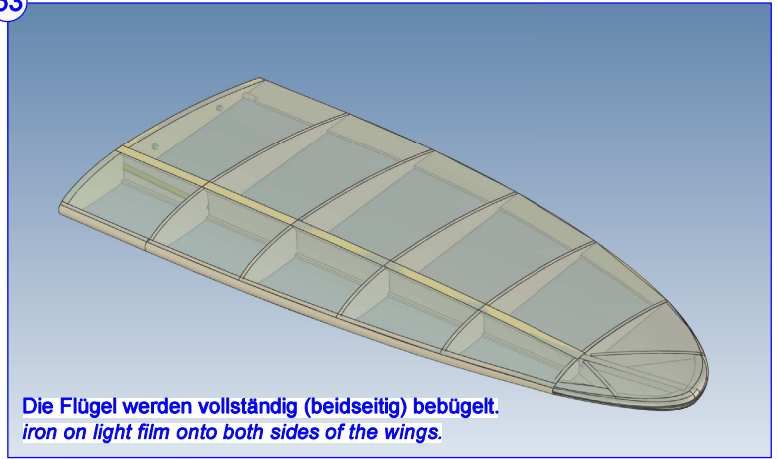


Querruder-Neutralstellung: Endleiste steht bündig mit Rumpf-Unterkante
Aileron neutral position: trailing edge is flush with the lower edge of the fuselage





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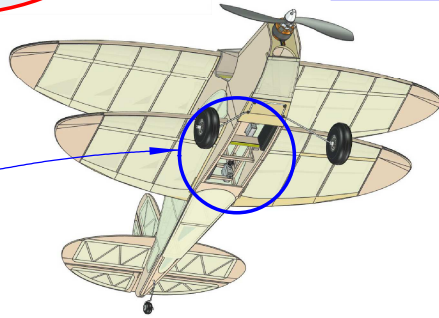


Die Flügel werden vollständig (beidseitig) bebügelt.
iron on light film onto both sides of the wings.

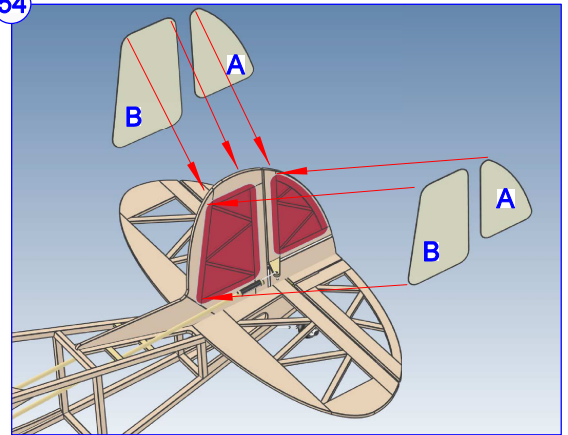


Dieses Feld unbespannt lassen

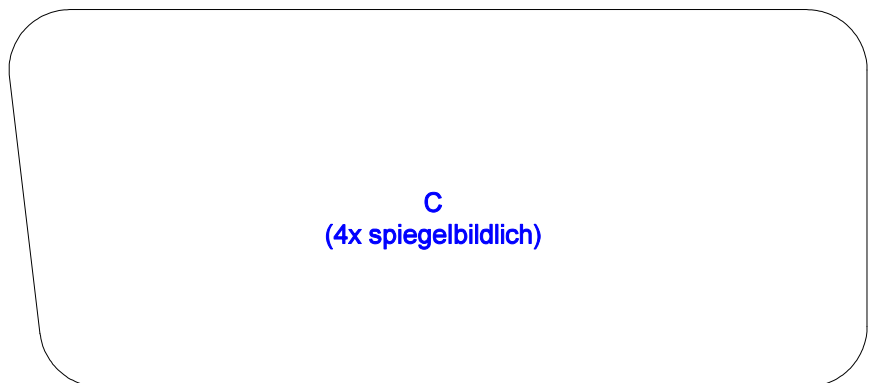
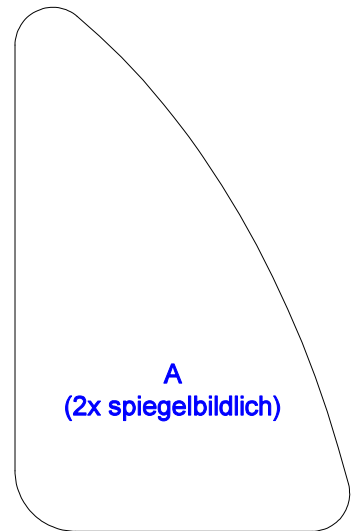
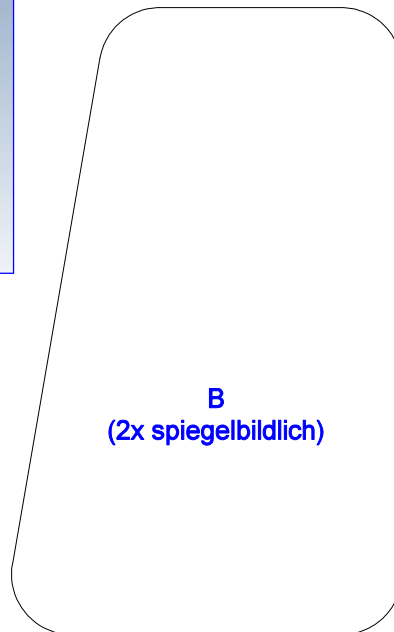
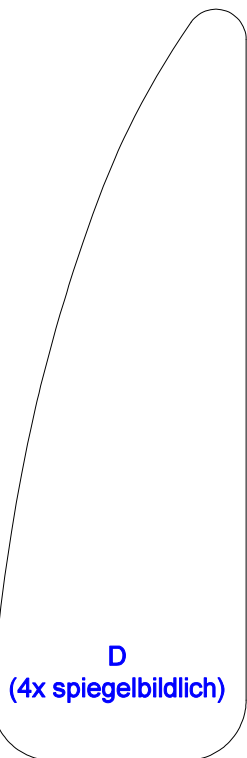
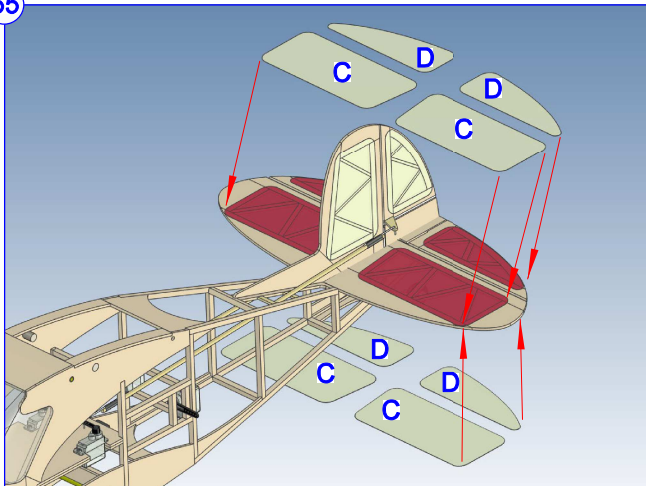
Leave this area uncovered



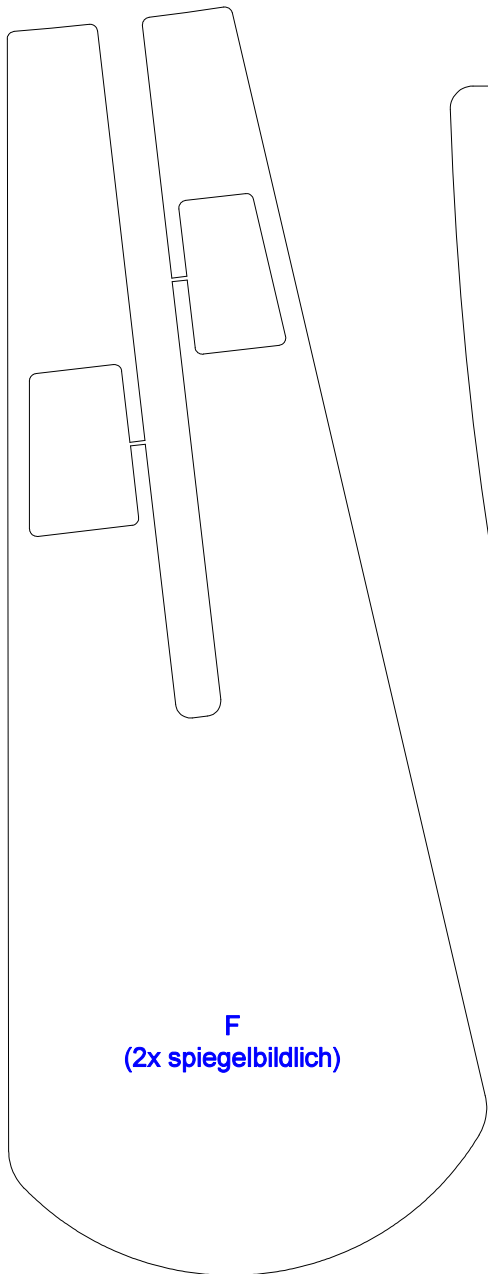
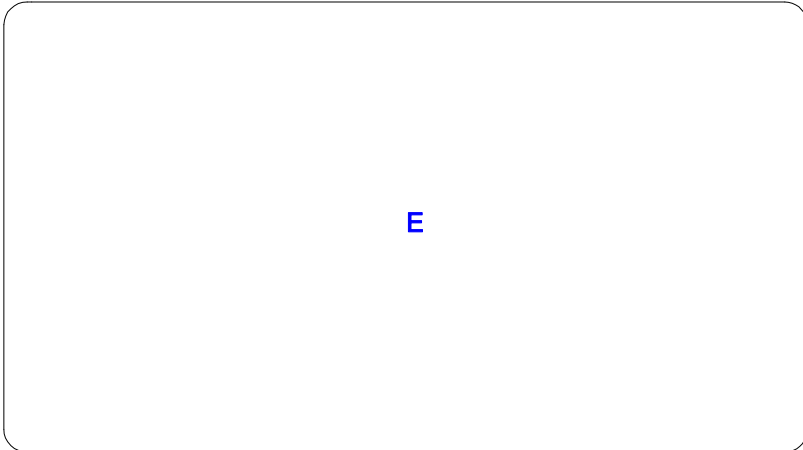
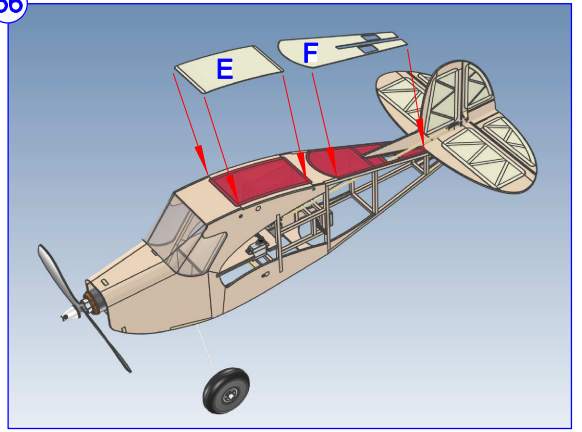
54



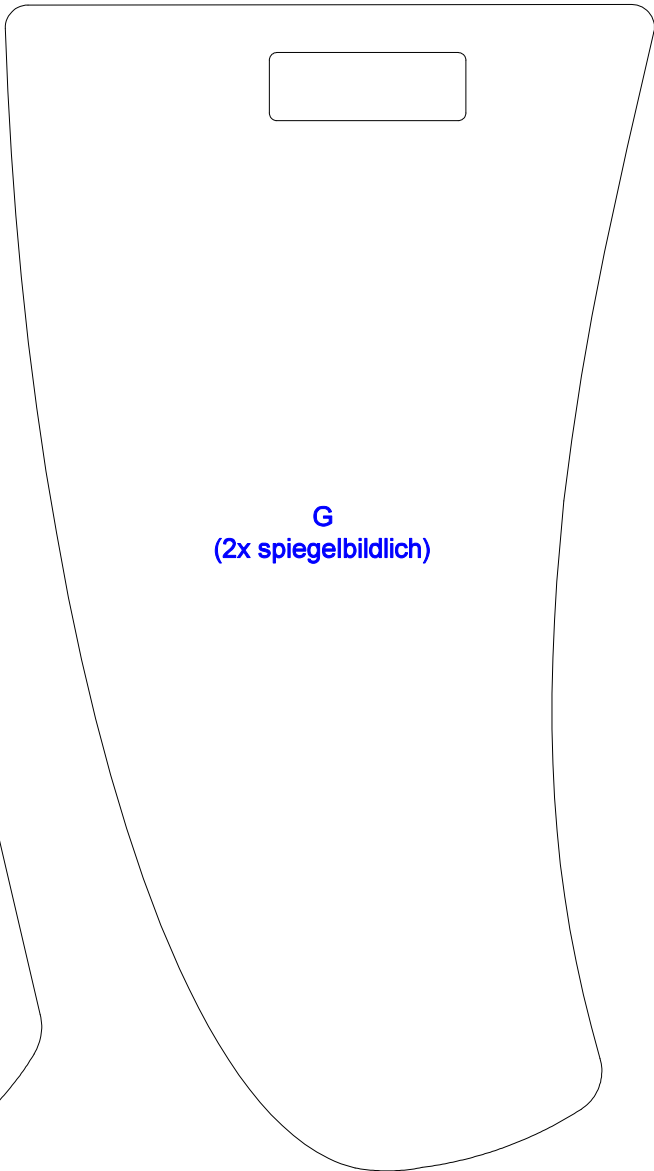
55



56

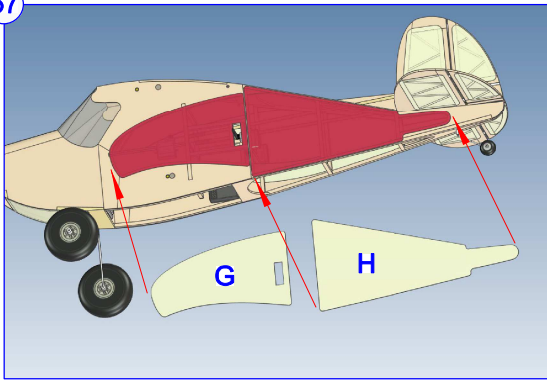


F
(2x spiegelbildlich)

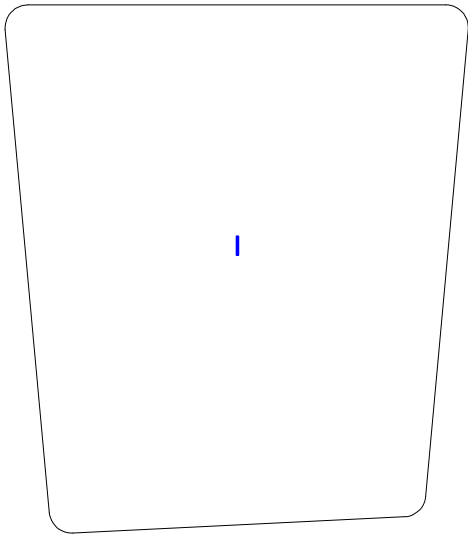
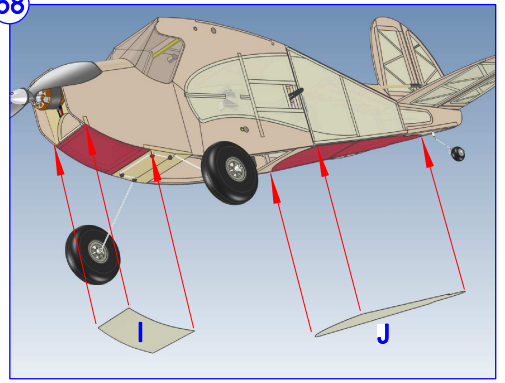


G
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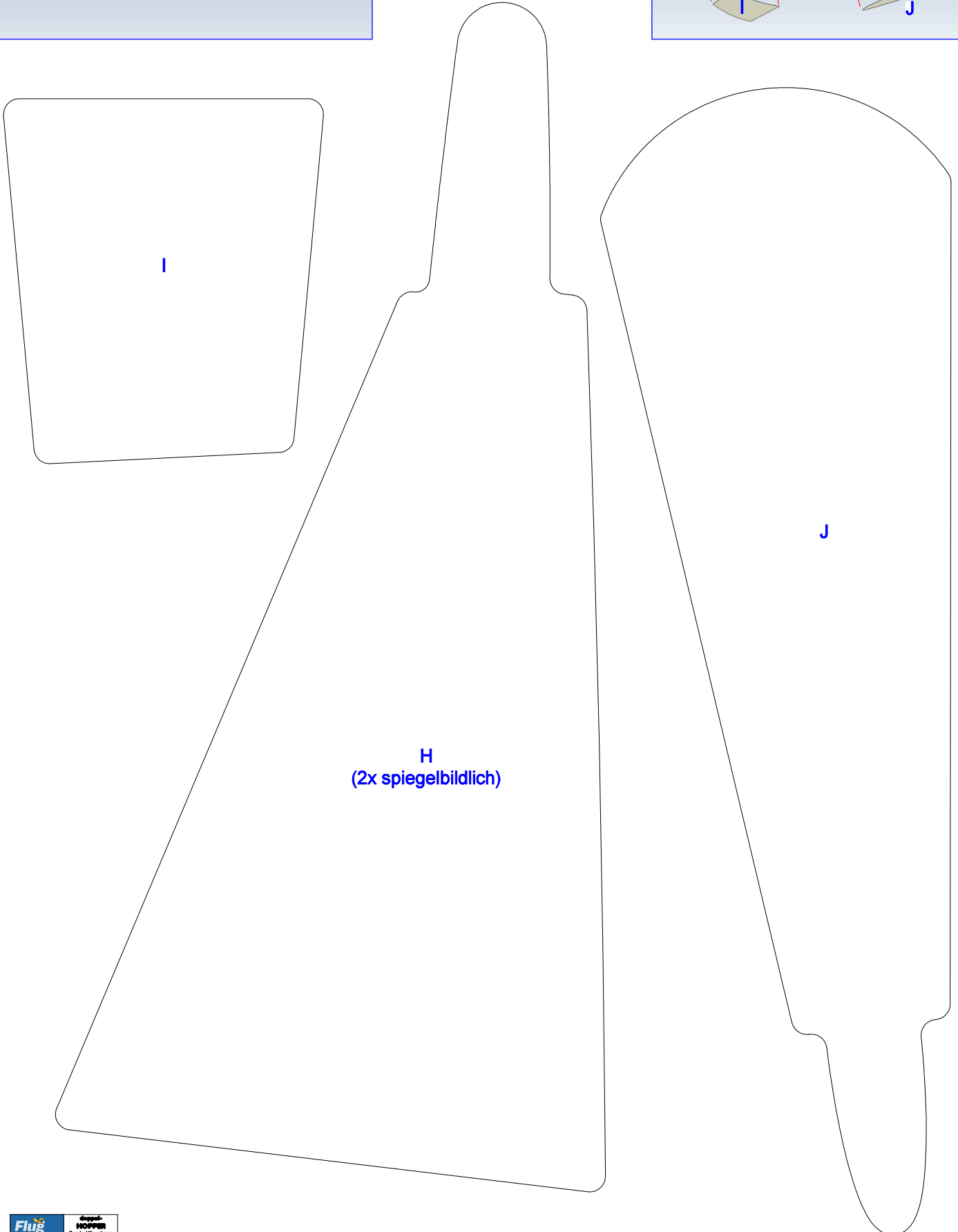
57



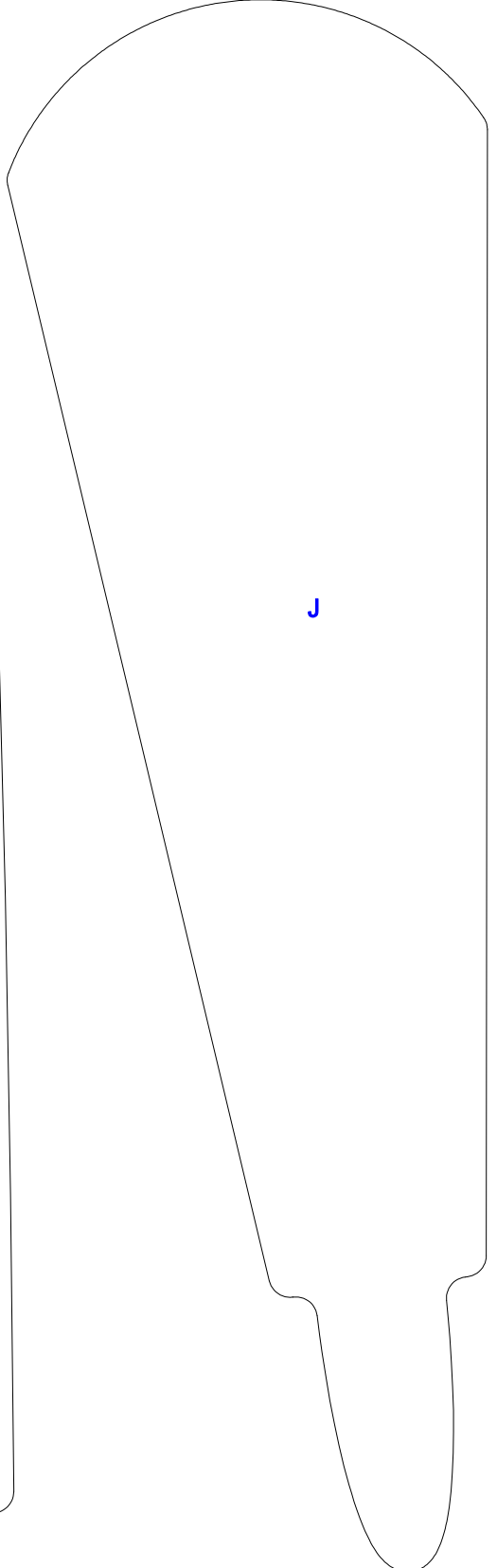
58



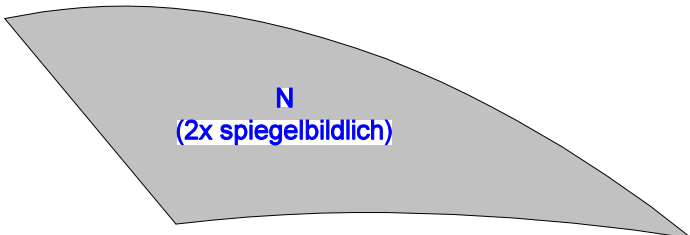
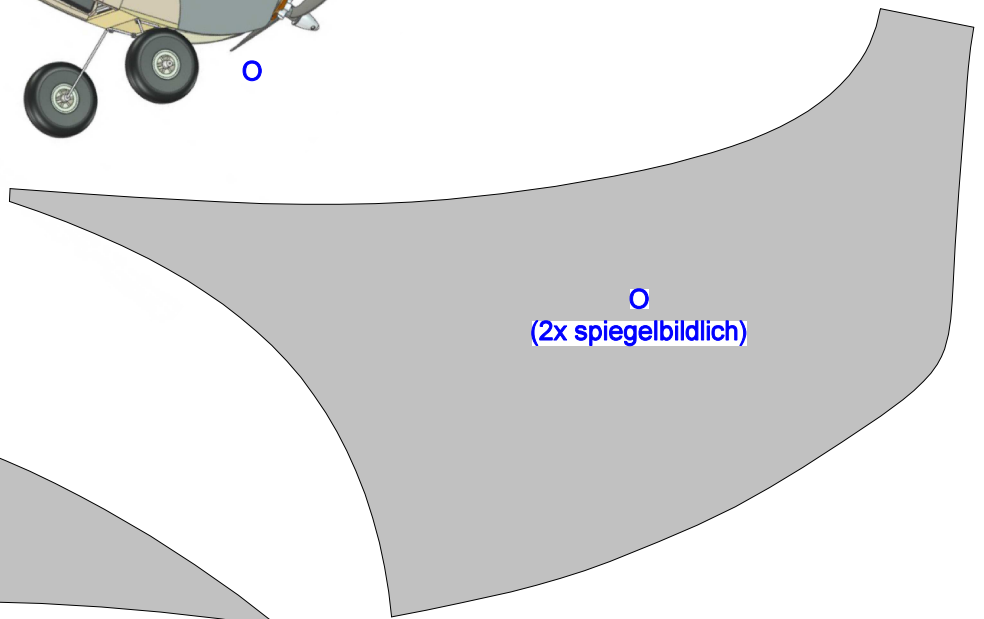
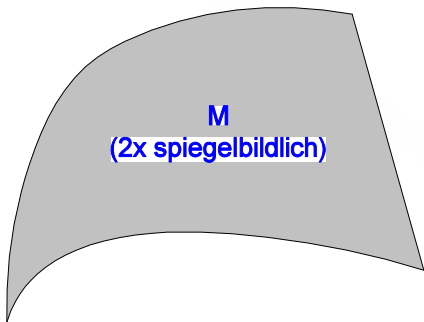
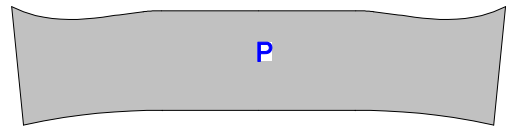
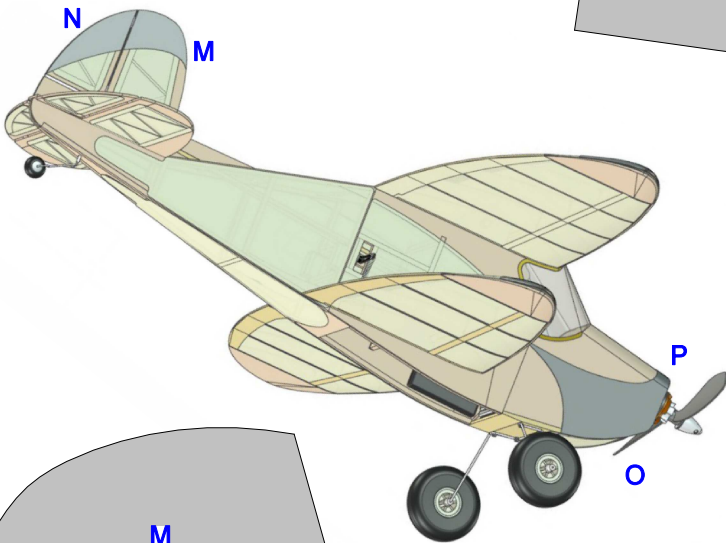
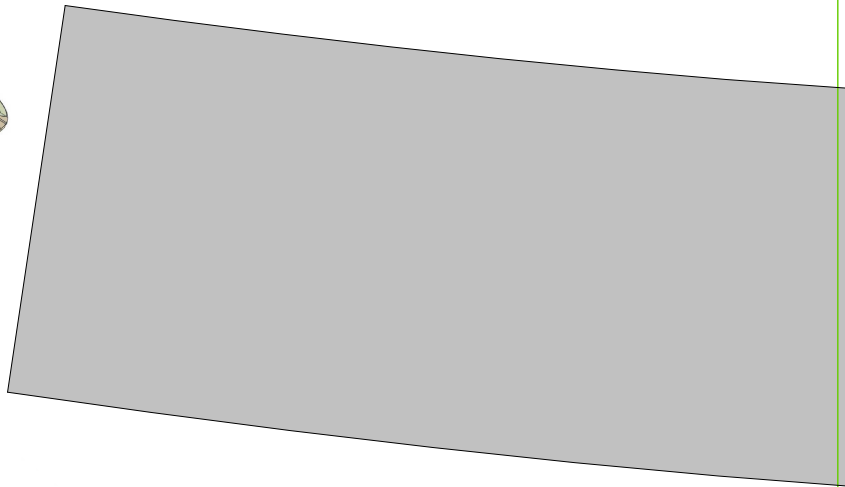
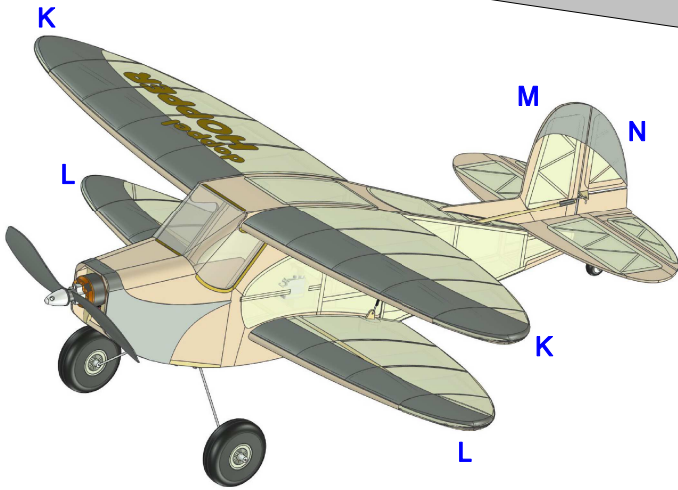
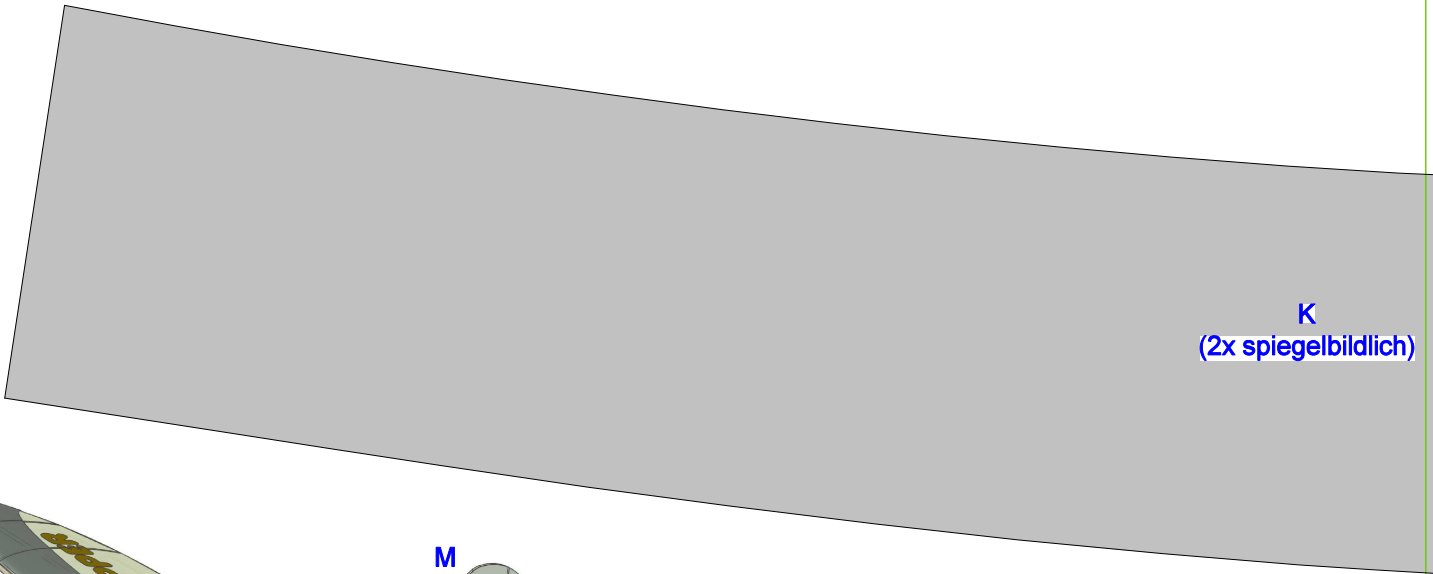
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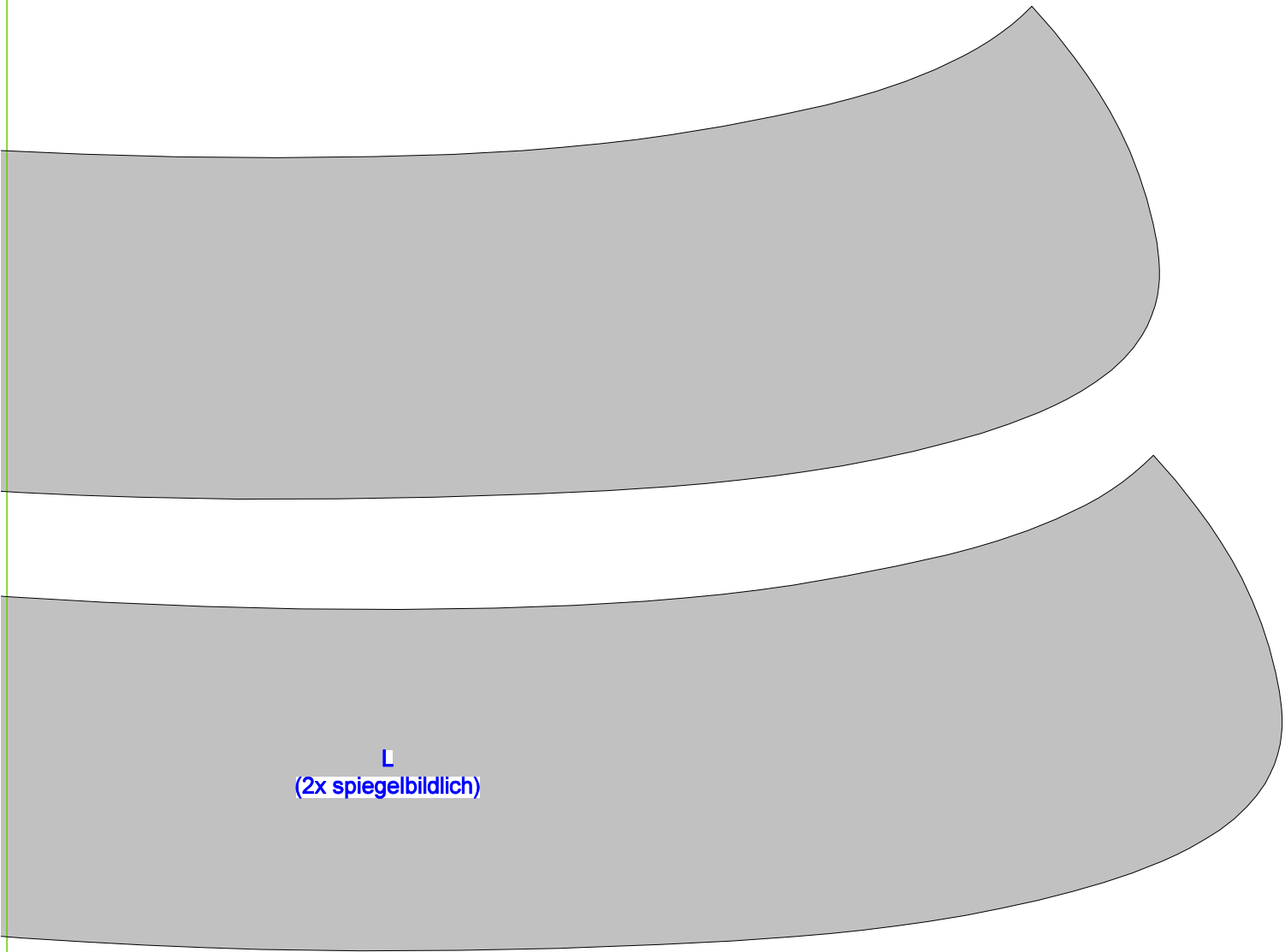


H
(2x spiegelbildlich)



J



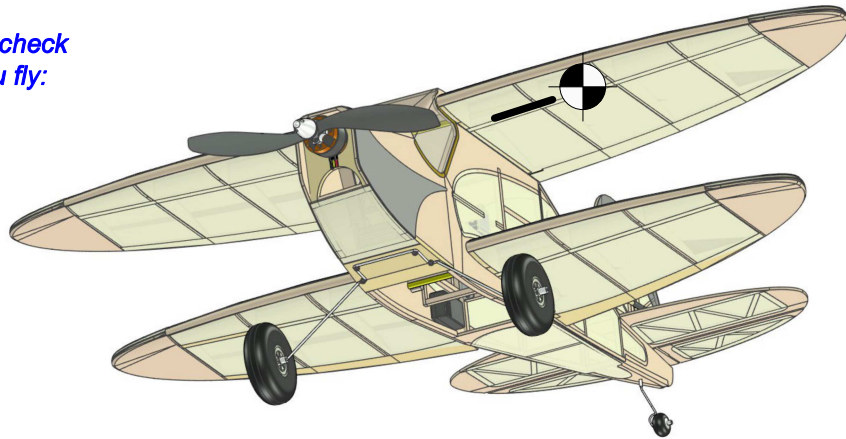


L
(2x spiegelbildlich)

doppel HOPPER

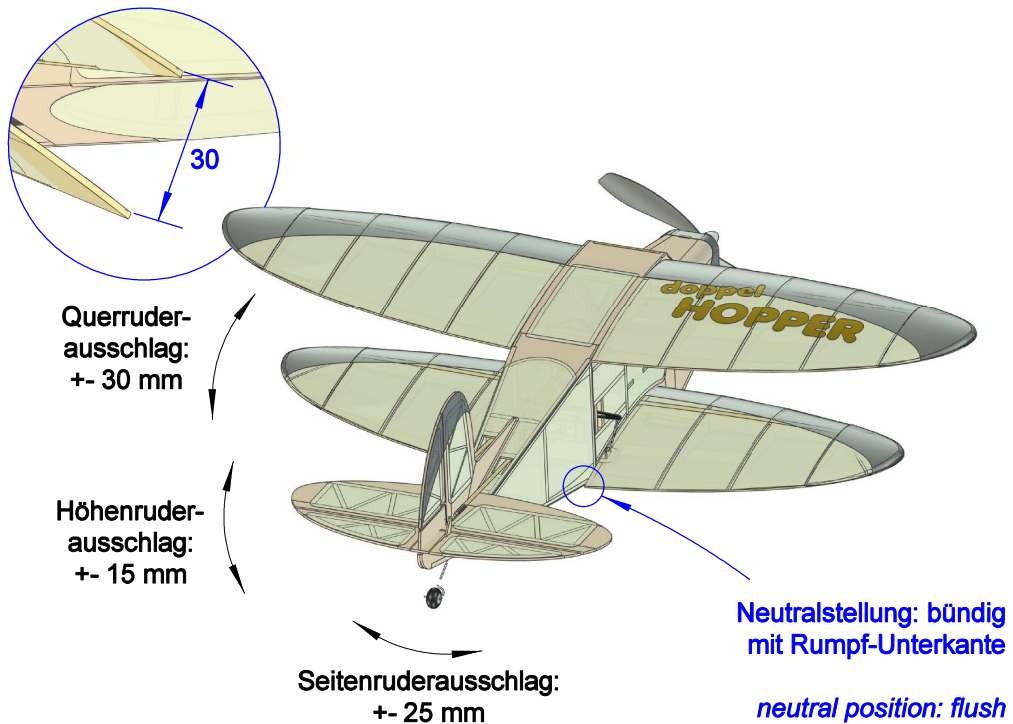
Hinweise vor dem Einfliegen:

*Things to check
before you fly:*



Justieren Sie den Schwerpunkt auf 3 mm vor der Holm-Vorderkante durch passende Positionierung des Akkus. Bei Verwendung der vorgeschlagenen Komponenten liegt der Akku auf dem Fahrwerksspann.

Balance the center of gravity 3 mm ahead of the front edge of the spar. Therefore the battery can be placed on the landing gear plate



Beruhigen Sie die Ausschläge mit 20 bis 30% EXPO. Das Modell fliegt am Schönsten, wenn man es weich steuert.

*Add 20 to 30% EXPO to the deflections.
doppel HOPPER flies best when
controlled smoothly.*