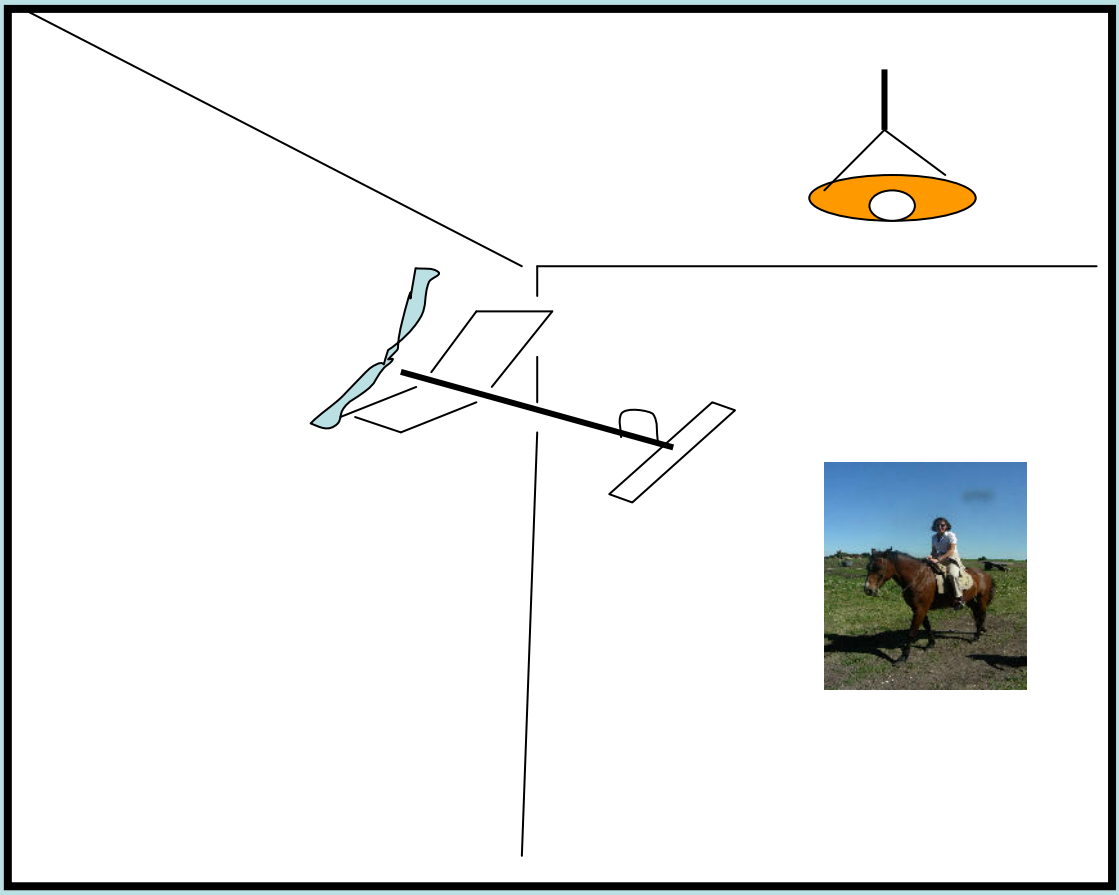
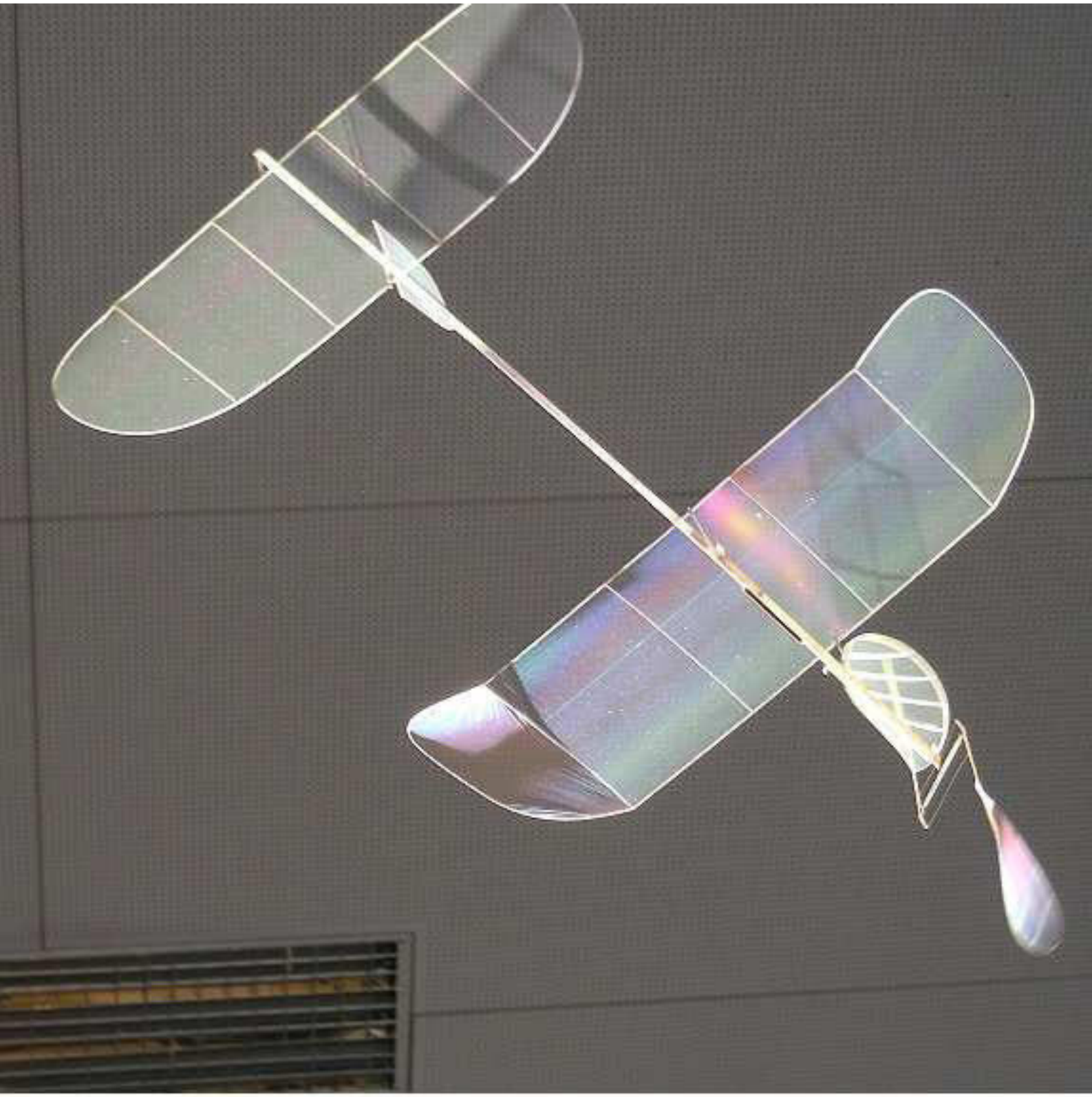
FREIFLUGSEMINAR 2014

STUBENMODELLE

VOL EN SALON





F1D by René Butty (VD prop)

Chronologie Saalflug

1938: Journal Robinson : Micromodèles in den USA, 3-4g, bis 80 cm Spannweite, fliegen bis 20 min, Microfilm Bespannung.
1948: Ein Saalmodell in Paris (Guyot) gesehen.

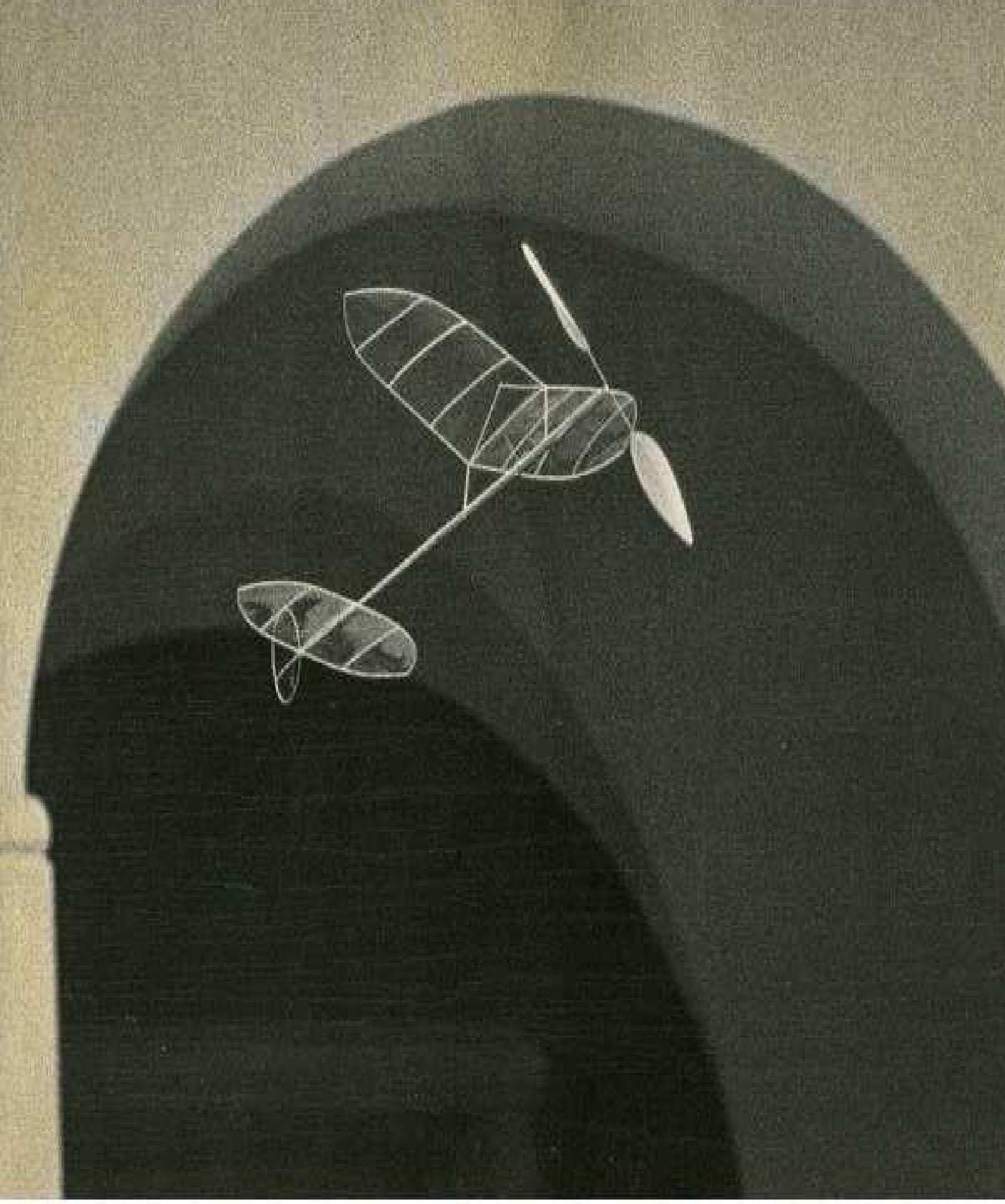
1960 & 1962: Erste Saalflug Wettbewerbe in Wipfingen (12 Teilnehmer, Flüge bis 4 min). Plan Sieger, Alfred Schiller (Spannw. 32 ~cm, AR, Sept. 1962, S. 518,)

1961: Saalmodel, Titelbild der AR

1978: Baukurs in Zürich (F1D mit Holzprop.).

1988: Tom Vallee, Pete Staehling, und 6 andere treffen jedes Jahres.
Bieridee : im meinen Wohnzimmer fliegen ! → Living Room Stick (LRS) Mini Sticks (grösseren Lokalen).
Erster Wettbewerb : 3 min. Vallee. Micron bester Flug : 10 :30.
1990: Mini Stick hat Erfolg (USA, UK, Japan)

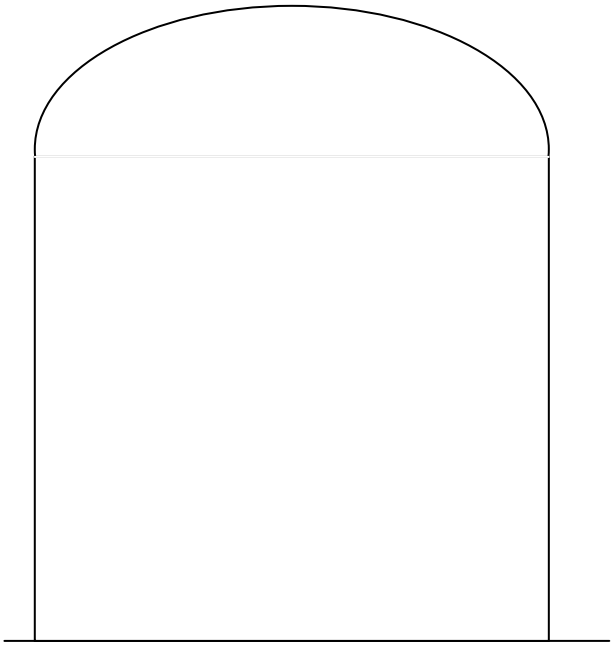
2012: Baukurs in Walde (F1D)



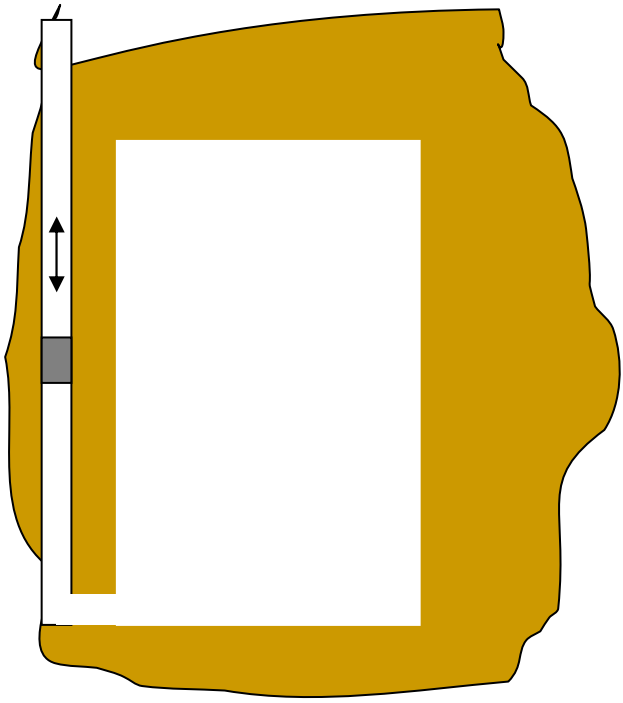
ANFÄNGERMODELL

Baukurs in Zürich 1978

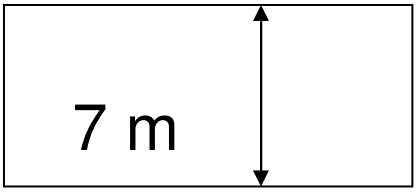
SAALFLUGPLÄTZE



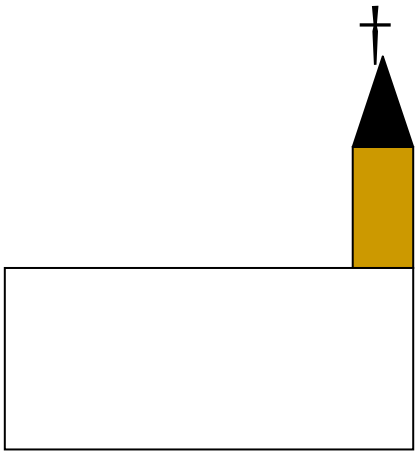
LAKEHURST



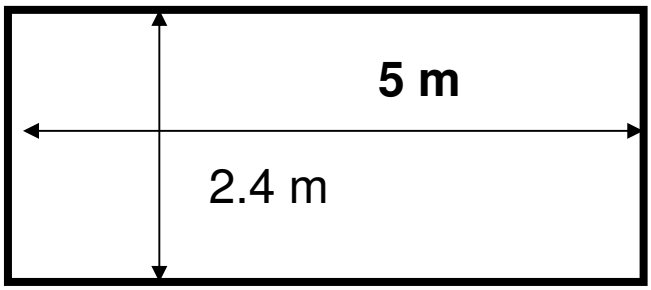
SLANIC



TURNHALLE



KIRCHE



STUBE

SAALFLUGPLÄTZE 2

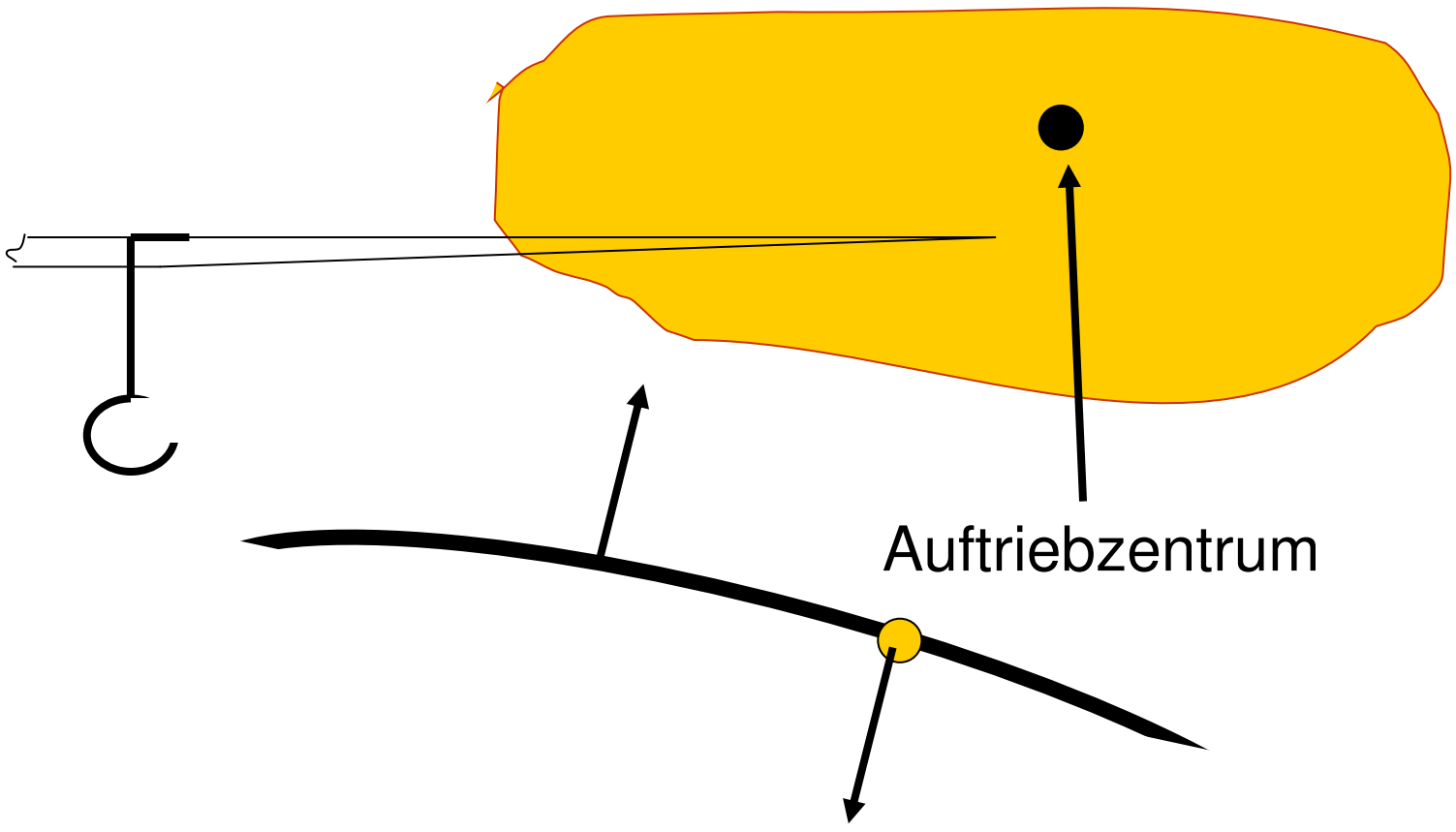
HOHE FLUGPLÄTZE

Man probiert die ganze Höhe auszunützen. Oben ist die Luft oft wärmer. Das Gummi gibt mehr Energie ab. **Normale** Propeller. Rekord: 62 Min.(>F1D).

MITTLERE UND TIEFE FLUGPLÄTZE

Grosse Vorteile der **VP** und **VD Propeller**, die aber nur bei wenigen Kategorien zugelassen werden.

Zugelassen sind aber **aerolastische Propeller** in allen Kategorien:



SAALFLUGKATEGORIEN

KATE-GORIE	SPAN cm	Fl. Tiefe cm	Länge cm	HLW	Ø prop	Gew-icht Min.	Gummi Max.	Rumpf	Prop.	Werk-stoffe	Gadget
F1D	55	20		45		1.2	0.6			alle	VP, VD
F1L *Easy B*	46	7.6		50 %		1.2		Stäbe	balsa	normale	
F1M	**46**					**3**	**1.5**			?	?
Limited Penny-plane	**46**	**12.7**		10.16 x 30.48	30.48			Stäbe			
F1R	**35**									?	?
Guer-rilla	Keine Vorschrift										
A-6	Flügel-fläche **378** cm^2		**15.3** **stick**		**15.36**			Strenge Bestimmungen-- >Bau sehr einfach Balsa 1.5 oder 1 mm. Prop. Blätter : ebene Platten			
Mini Stick	**17.78**	**6,35**	**25.4**	**50%**	**17.78**	**0.425**		Stäbe	balsa	normale	
M-10	10			50 %	8.5				balsa	normale	

F1D : stick : Cylinder, boom : Konus (ev. F1M &R)

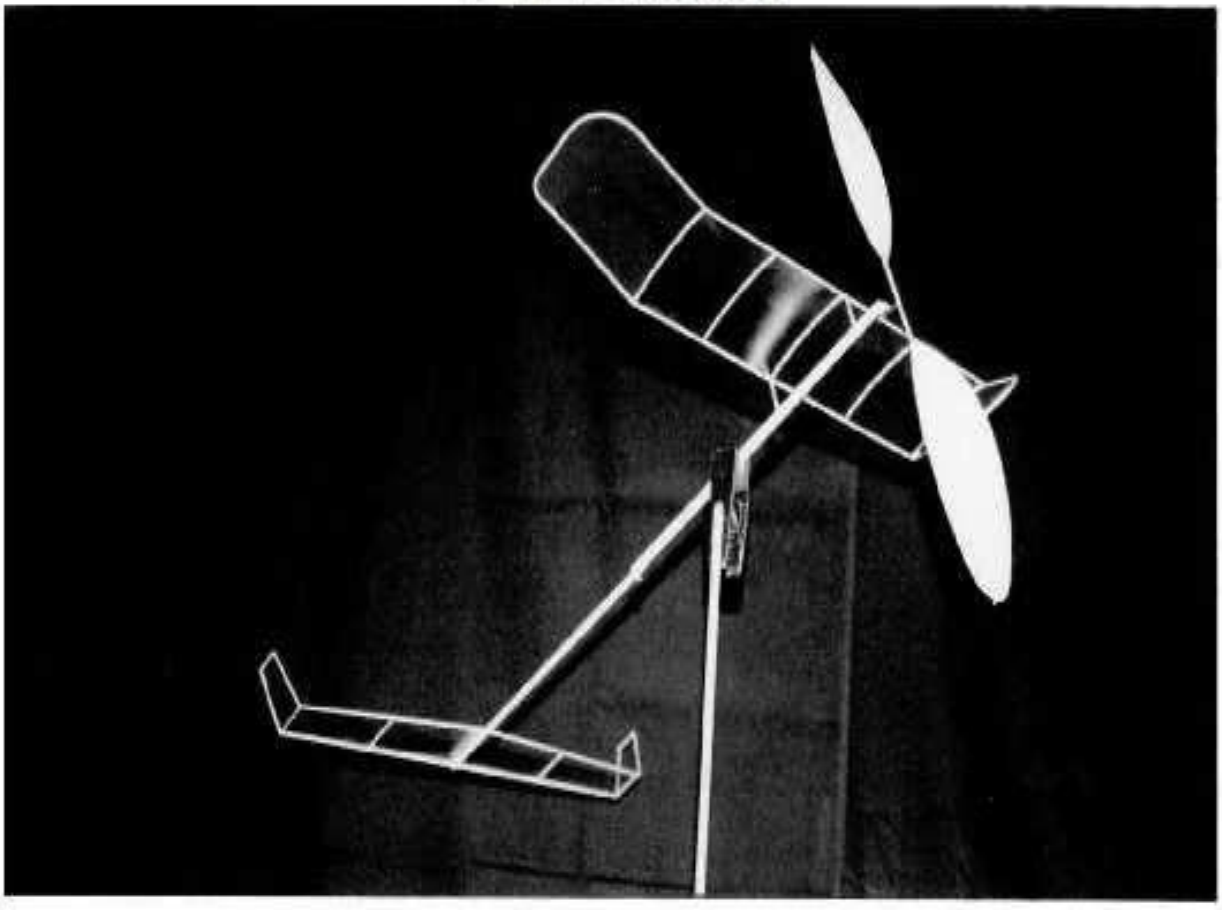
Die anderen Kategorien : Stick & boom : je 1 Stab, keine exotischen Werkstoffe (B, W, C-Fasern, metallische Verspannung).

« Microfilm » verboten (d. h. auf Wasseroberfläche gebildeter film)

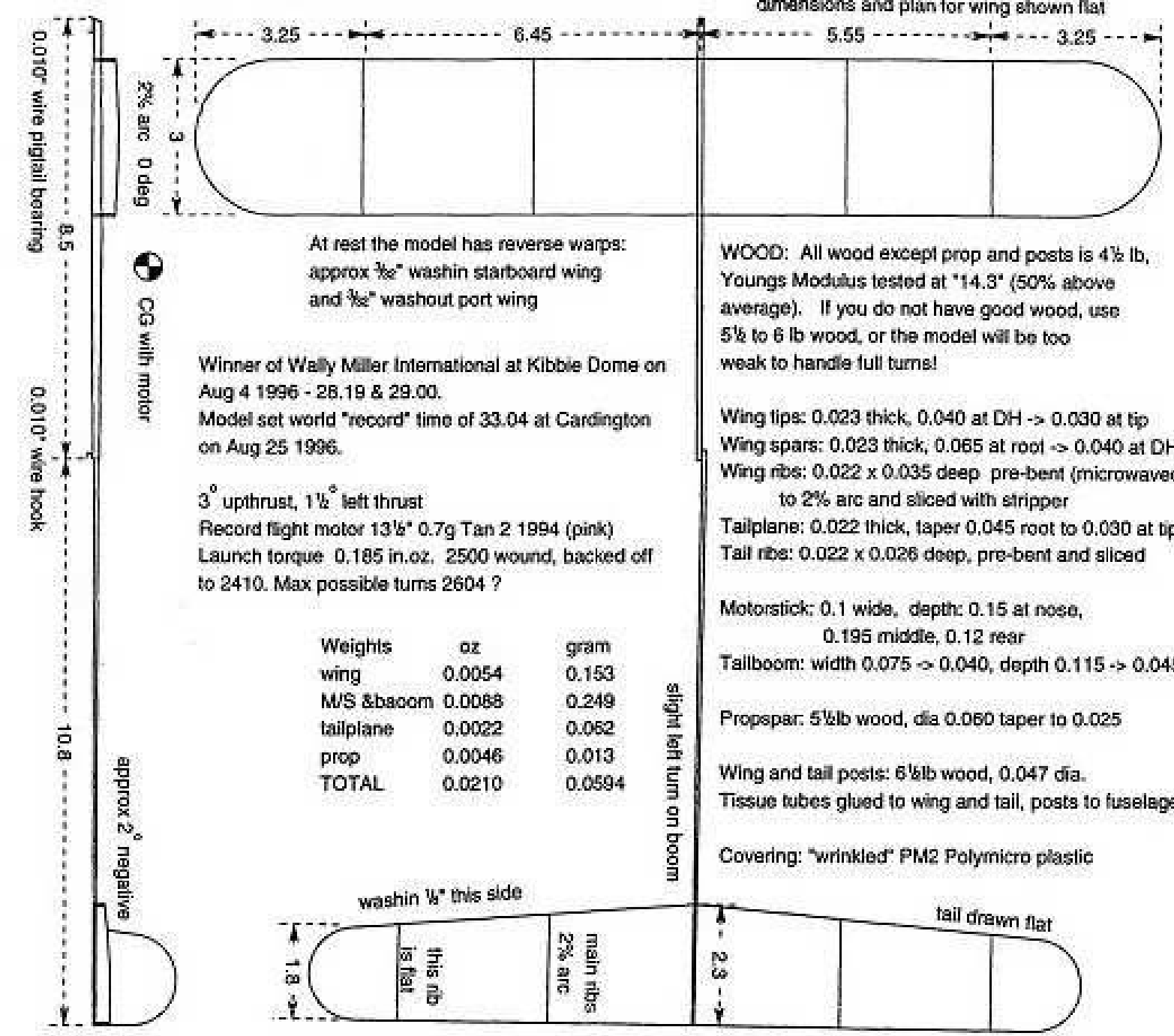
Baukurs : F1M, F1R → Mini Stick & M-10

A-6 : Eventuell für Schüler

F1L Coslick



F1L Spirit Stan Chilton



At rest the model has reverse warps: approx 3/32" washin starboard wing and 3/32" washout port wing

Winner of Wally Miller International at Kibbie Dome on Aug 4 1996 - 28.19 & 29.00.
Model set world "record" time of 33.04 at Cardington on Aug 25 1996.

3° upthrust, 1½° left thrust
Record flight motor 13⅛" 0.7g Tan 2 1994 (pink)
Launch torque 0.185 in.oz. 2500 wound, backed off to 2410. Max possible turns 2604 ?

Weights	oz	gram
wing	0.0054	0.153
M/S &baoom	0.0088	0.249
tailplane	0.0022	0.062
prop	0.0046	0.013
TOTAL	0.0210	0.0594

WOOD: All wood except prop and posts is 4½ lb, Youngs Modulus tested at "14.3" (50% above average). If you do not have good wood, use 5½ to 6 lb wood, or the model will be too weak to handle full turns!

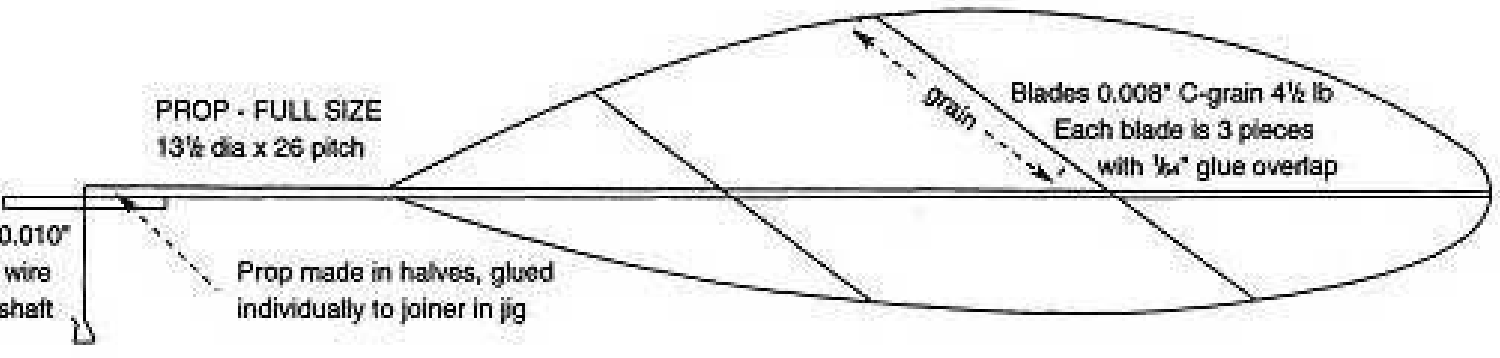
Wing tips: 0.023 thick, 0.040 at DH -> 0.030 at tip
Wing spars: 0.023 thick, 0.065 at root -> 0.040 at DH
Wing ribs: 0.022 x 0.035 deep pre-bent (microwaved) to 2% arc and sliced with stripper
Tailplane: 0.022 thick, taper 0.045 root to 0.030 at tip
Tail ribs: 0.022 x 0.026 deep, pre-bent and sliced

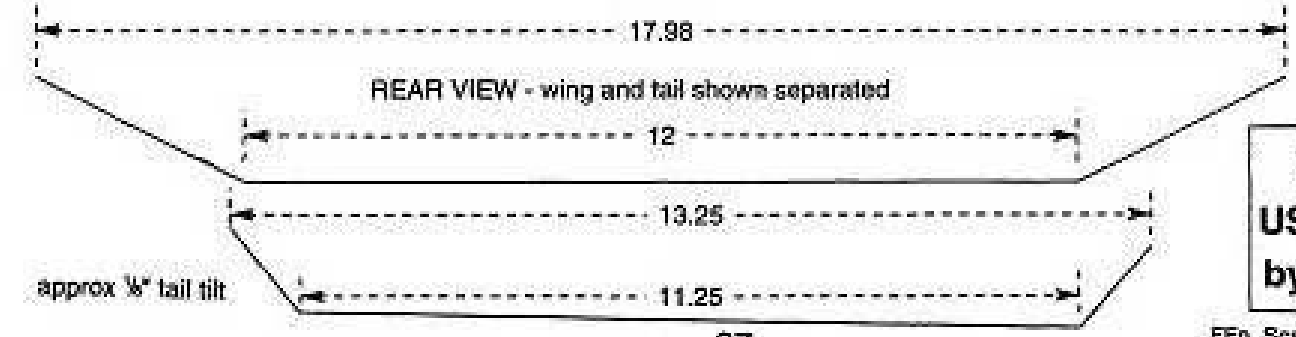
Motorstick: 0.1 wide, depth: 0.15 at nose, 0.195 middle, 0.12 rear
Tailboom: width 0.075 -> 0.040, depth 0.115 -> 0.045

Propspar: 5½lb wood, dia 0.060 taper to 0.025

Wing and tail posts: 6½lb wood, 0.047 dia.
Tissue tubes glued to wing and tail, posts to fuselage

Covering: "wrinkled" PM2 Polymicro plastic





Miller Lite
USA rules EZB
by Laurie Barr

FFn Scale 1:3 All dimensions ins

F1M (ANFÄNGER)

Spannweite: ≤ 460 mm

Gewicht ohne Gummimotor: ≥ 3 g

Gummigewicht: ≤ 1.5 g

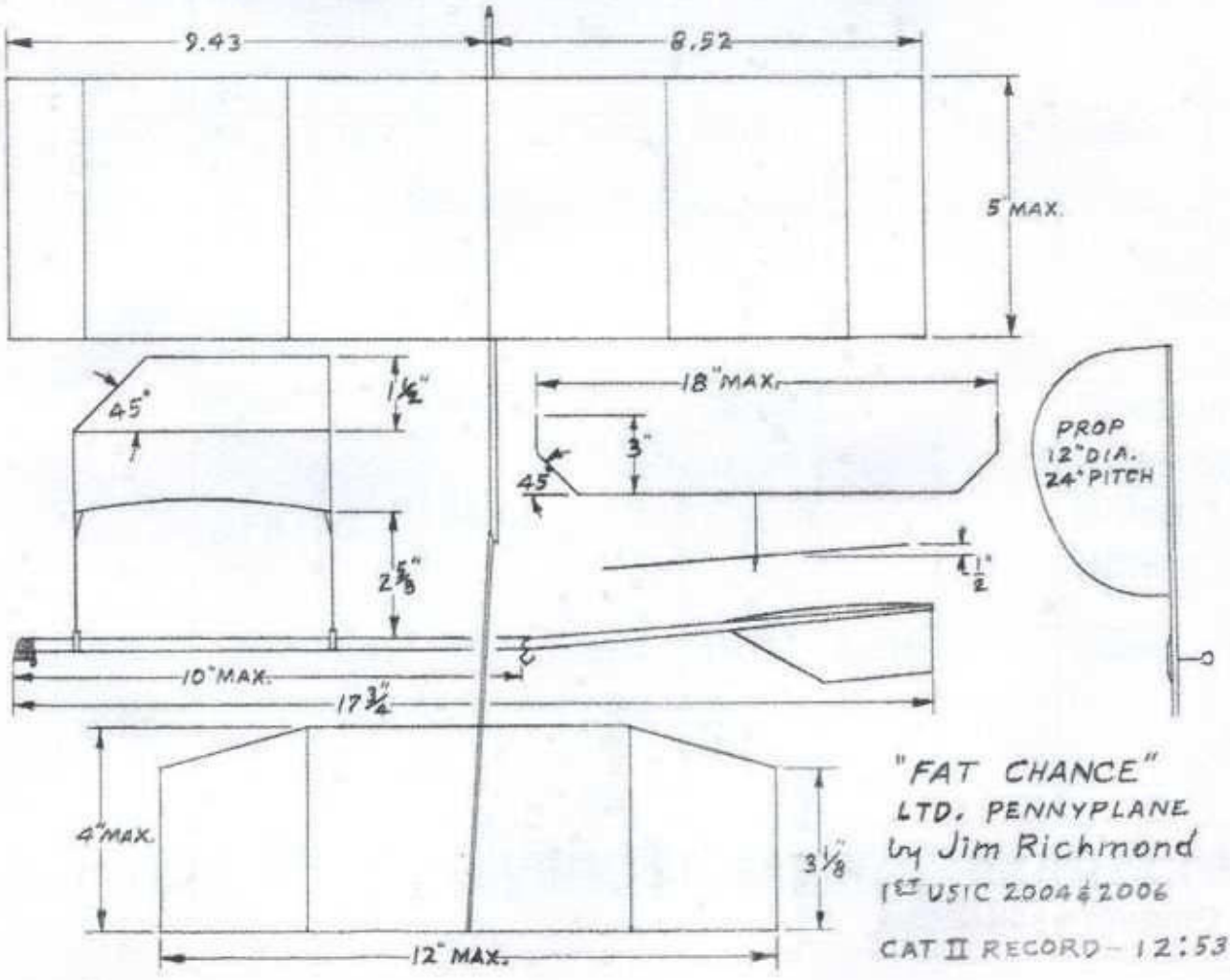
(Diese Bedingung entfällt bei Rekordsversuchen)

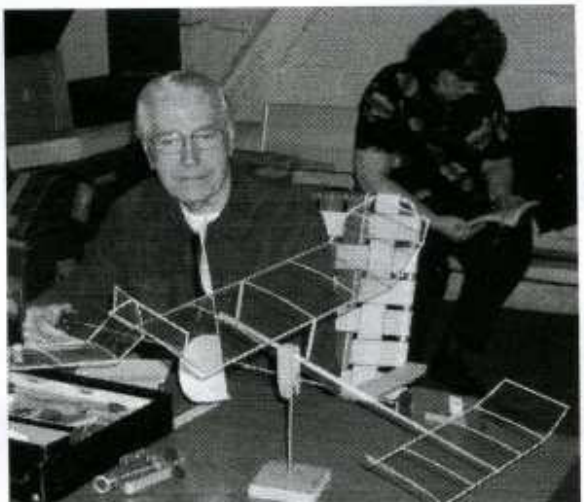
Microfilmbespannung nicht erlaubt.

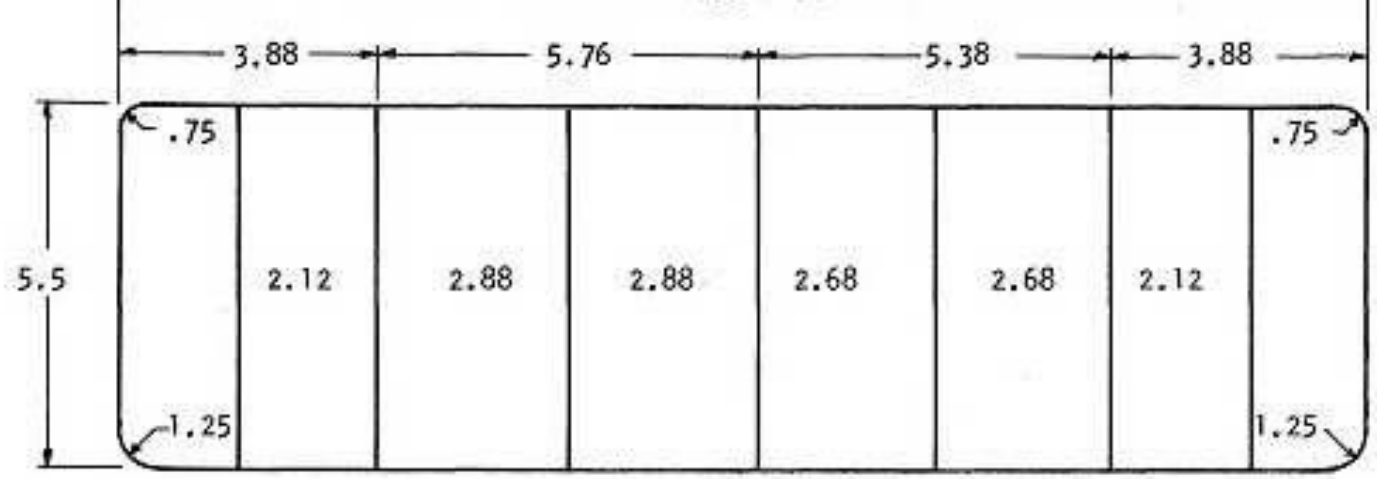
FAT CHANCE - LPP

Jim Richmond

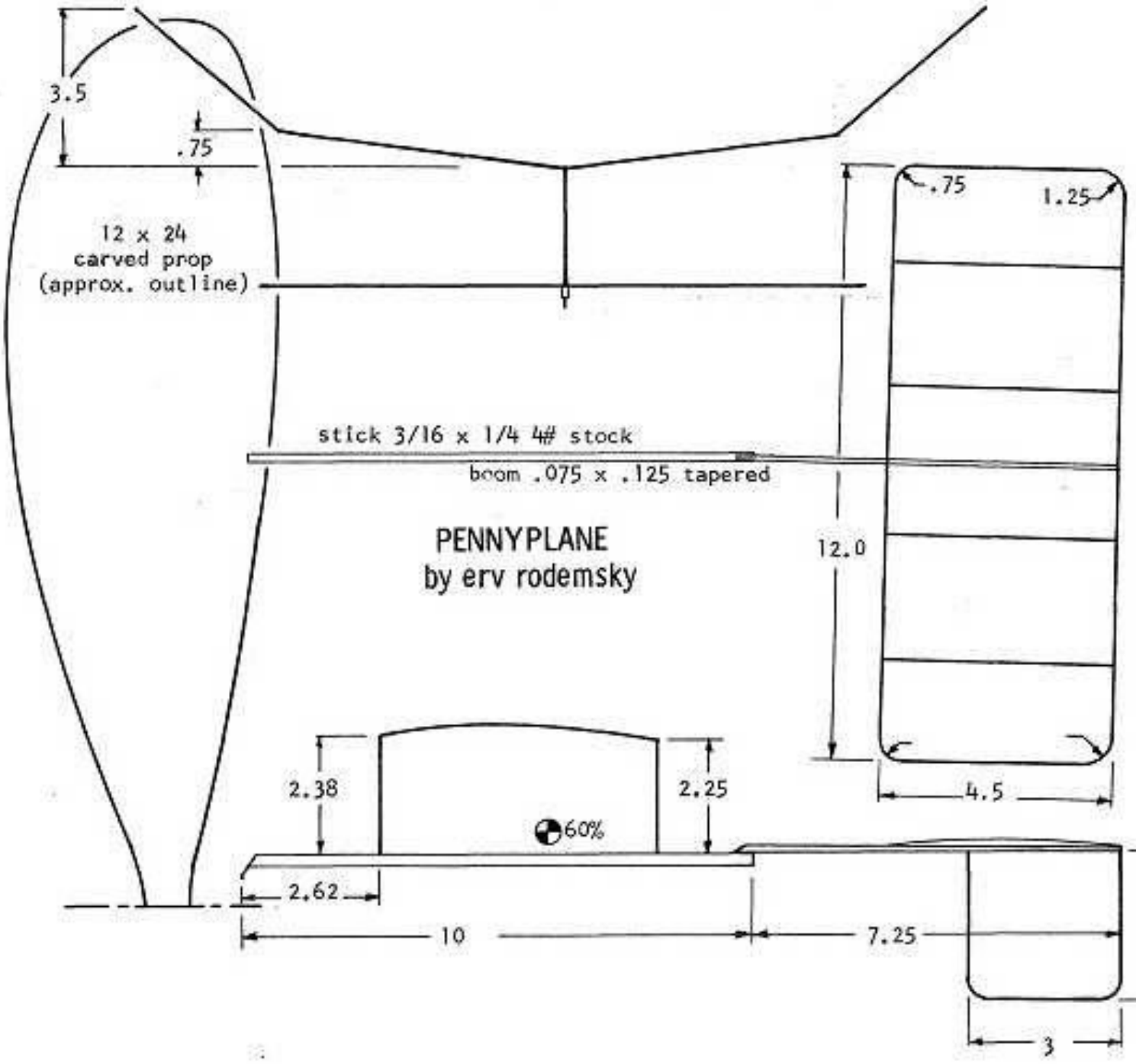
Cat II World Record - 12 min 53 sec - 3/31/2007







wing spars 1/16 sq. tapered to .04 sq. at tip



PENNYPLANE JAECKS 1992

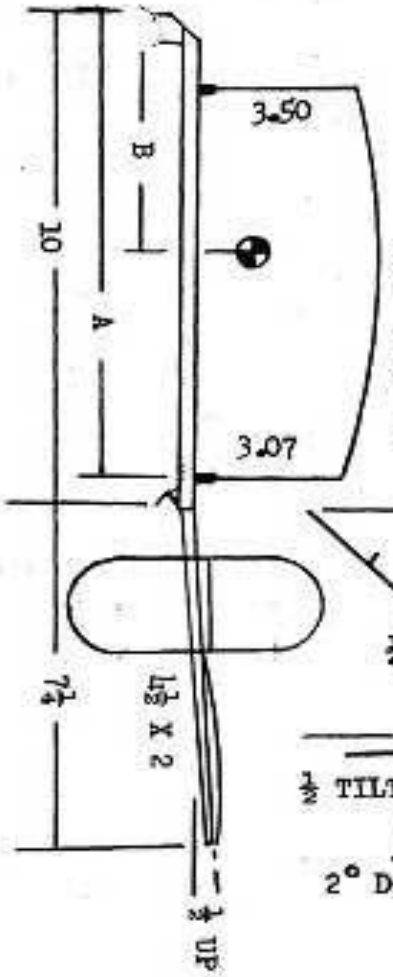
PENNY PLANE

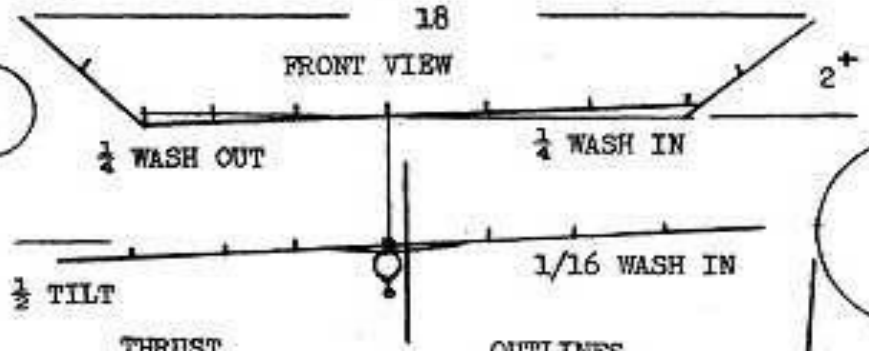
BODY & TAIL - .34 p
WING - .36 p
PROP - .25 p
NOSE WT. - .05 p

POWER .100 X 18 @ .79 p - 1450 TURNS
TIME 12 MIN. 19 SEC. FIRST 1973 NATS

BODY .025 ROLLED ON .220 FORM
TAIL BOOM .015 ROLLED

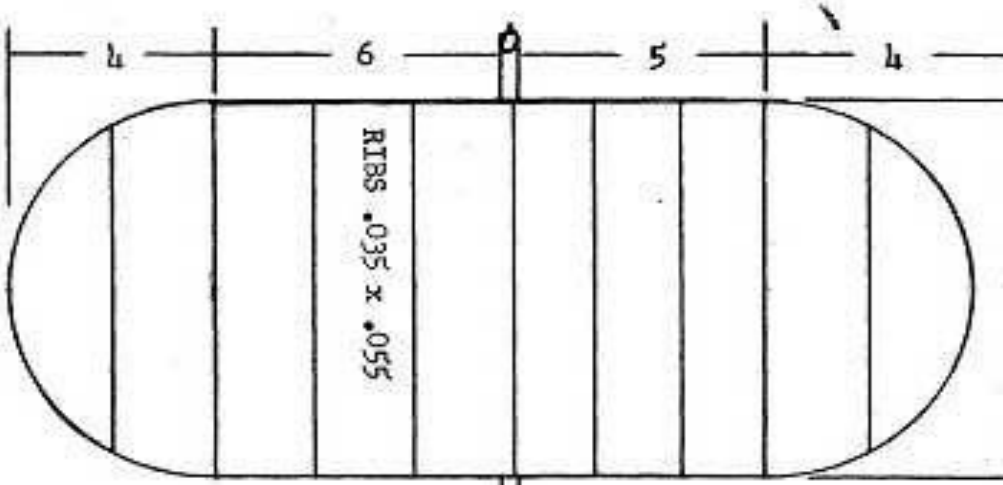
CMOS (4%) A = B x 1.2 + 2.5



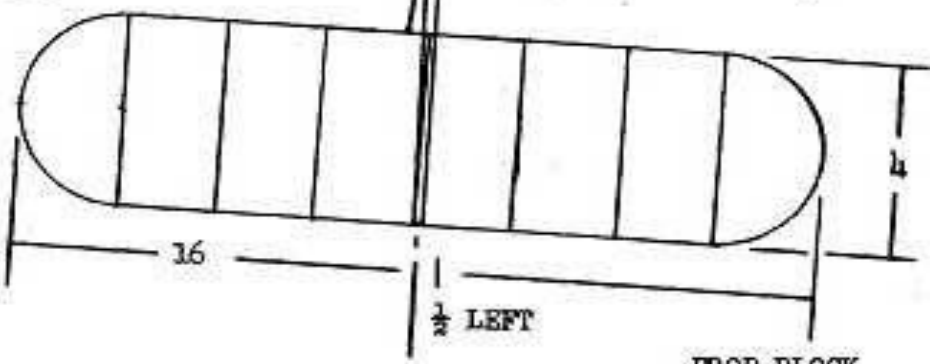


THRUST
2° DOWN &LEFT

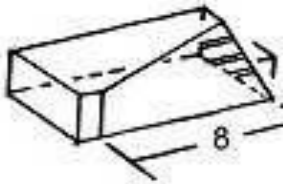
OUTLINES
RUDDER .040 x .040
STAB .040 x .050
LE &TE .055 x .080
TIPS .040 x .055



MICROLITE COVERING
AIRFOIL 4% - 25" R.ARCH
(WING & H. STAB.)



PROP BLOCK
3 x 1 3/4 x 10



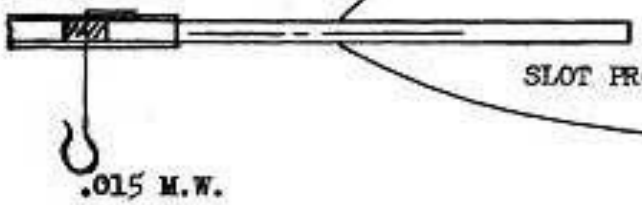
30° TIP AN

PROP HUB: SIX TURN TISSUE TUBE 3/32 ID x 1
3/32 ROUND SPAR WITH ¼ LONG I.D. PLUG.

17 D x 27 P .025 "C" GRAIN
WARP ON PROP BLOCK

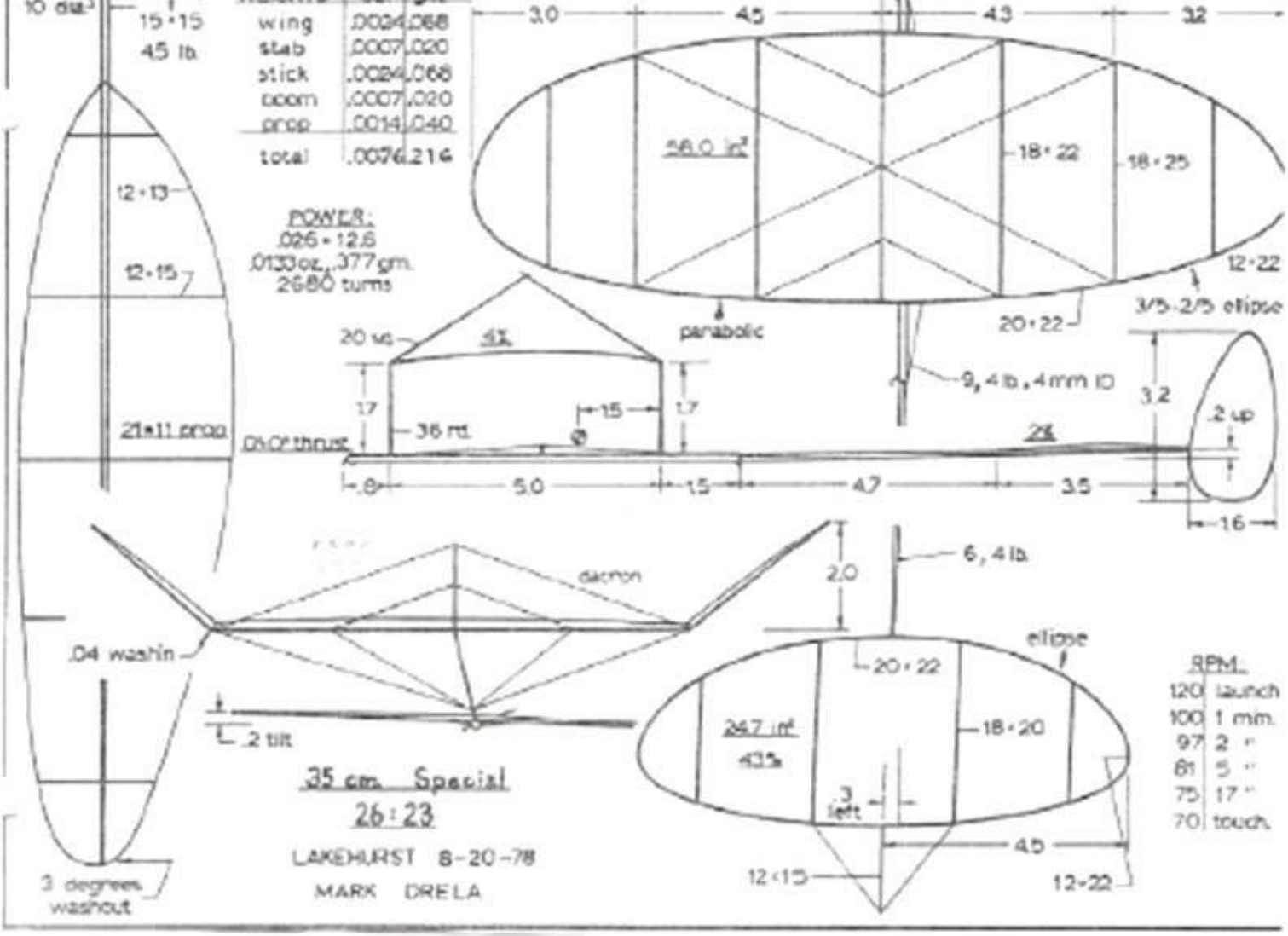
NOTE: SKEW WING POSTS TO OBTAIN
WASH IN & WASH OUT.

SLOT PROP BLADE TO ACCEPT SPAR.



D. M. JAECKS
7-9-72

SLOB DAN MEDIC
35 CM PAPER



STATE OF THE ART

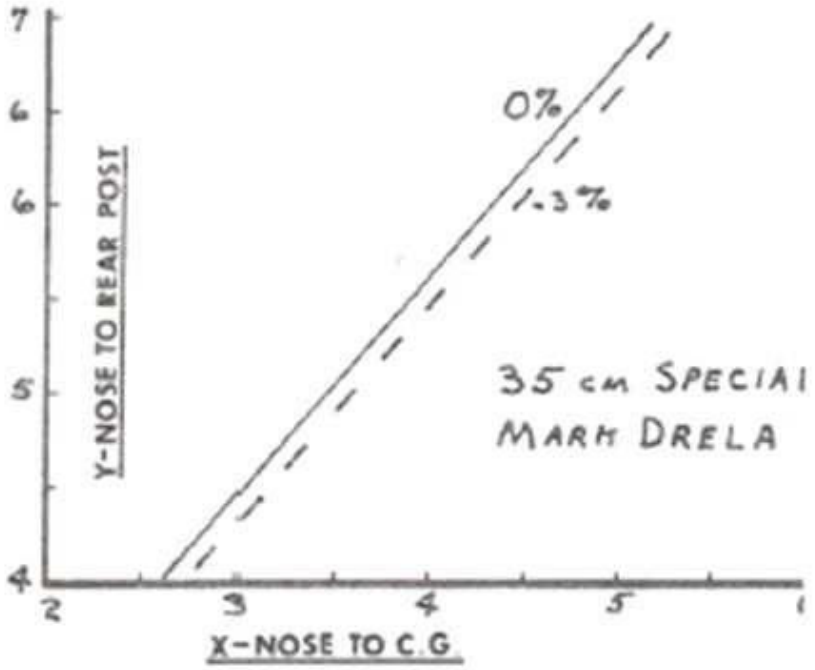
Dear Sir,

Included is a drawing of my 35 cm. model that managed to break Laurie Barr's record of 4h:00. The flight was made during the August AS session in Lakehurst under not the best of conditions. There was extensive air movement in the hangar at the time and the humidity was high (over 80%). I think the plane could benefit from a larger prop and more rubber. The weight can be brought down also, since the wood used for the model was not of the best quality. It appears that 3D duration is not for me! By the way, if anybody set there is looking for something different or challenging, then the 35 cm class is for you. These planes are extremely economical; a single sheet of wood will make two motorsticks or two tailbooms. Also, compared to, say, an A 2, they are far easier to build, fly, and handle. Try it, you'll like it!

Probably the most significant detail about this particular plane is the differential area in the wing in addition to the offset. The parabolic shape of the left wing concentrates more area in the tip than the elliptical shape of the right wing. This gives a plane that can bank up under full torque (that offset thrust), and still very little washin and wing lift. As I'll with a similar setup needed only 1/16" washin to control the power burst. This can do nothing but help the rules.

Mark Drela

D



MINISTICK

Eindecker

Kommerzielle Bespannung (kein Microfilm)

Spannweite: ≤ 17.78 cm

Flügeltiefe: ≤ 6.35 cm

Länge zwischen Haken und Lager: ≤ 12.7 cm

Länge (ohne Propeller): ≤ 25.4 cm

Höhenleitwerkfläche: ≤ 50% der Flügelfläche

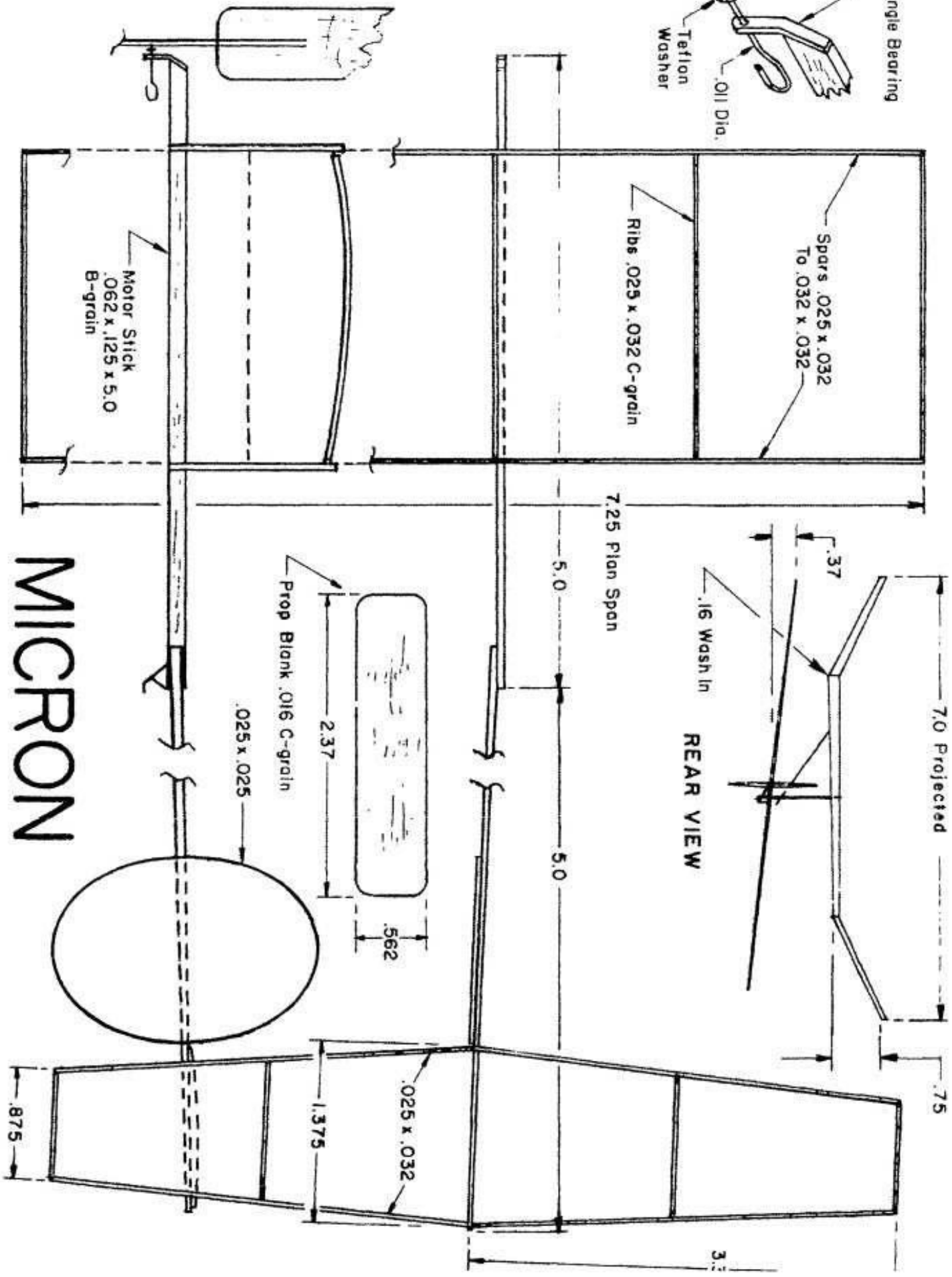
Propeller Ø: ≤ 17.78 cm

Propeller aus Holz, Achse aus Stahl (kein VP)

Gewicht: ≥ 0.425 g

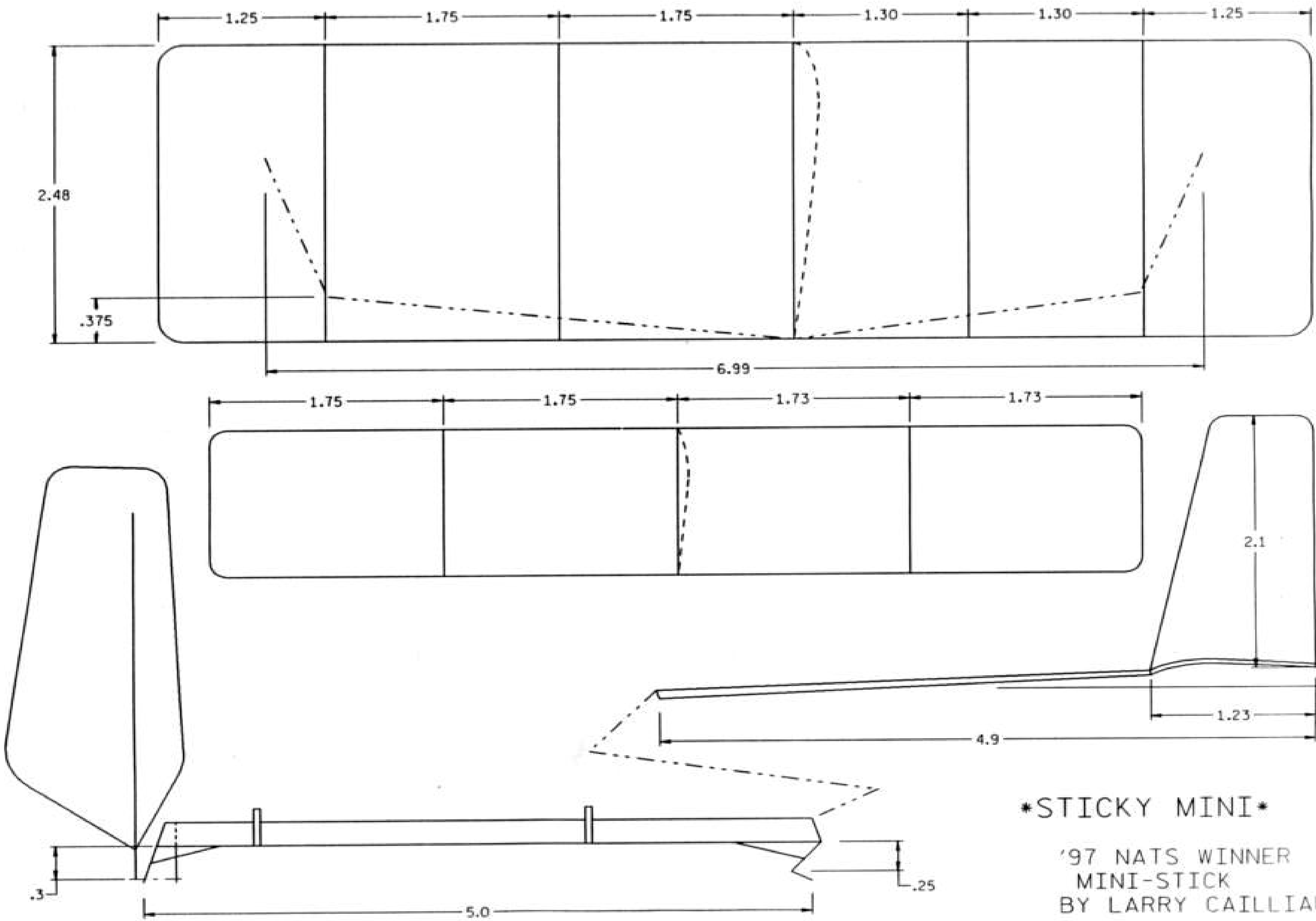
Nicht verwendbar:

Bor, Kohlenstofffaser, Kevlar, Metalldraht als Verspannung.



MICRON, MINISTICK BY TOM VALLEE

(Erfinder der Ministicks)



STICKY MINI

'97 NATS WINNER
MINI-STICK
BY LARRY CAILLIAU

MINISTICK, JAPAN

Lester W. Garber - EZB Design - March 1990

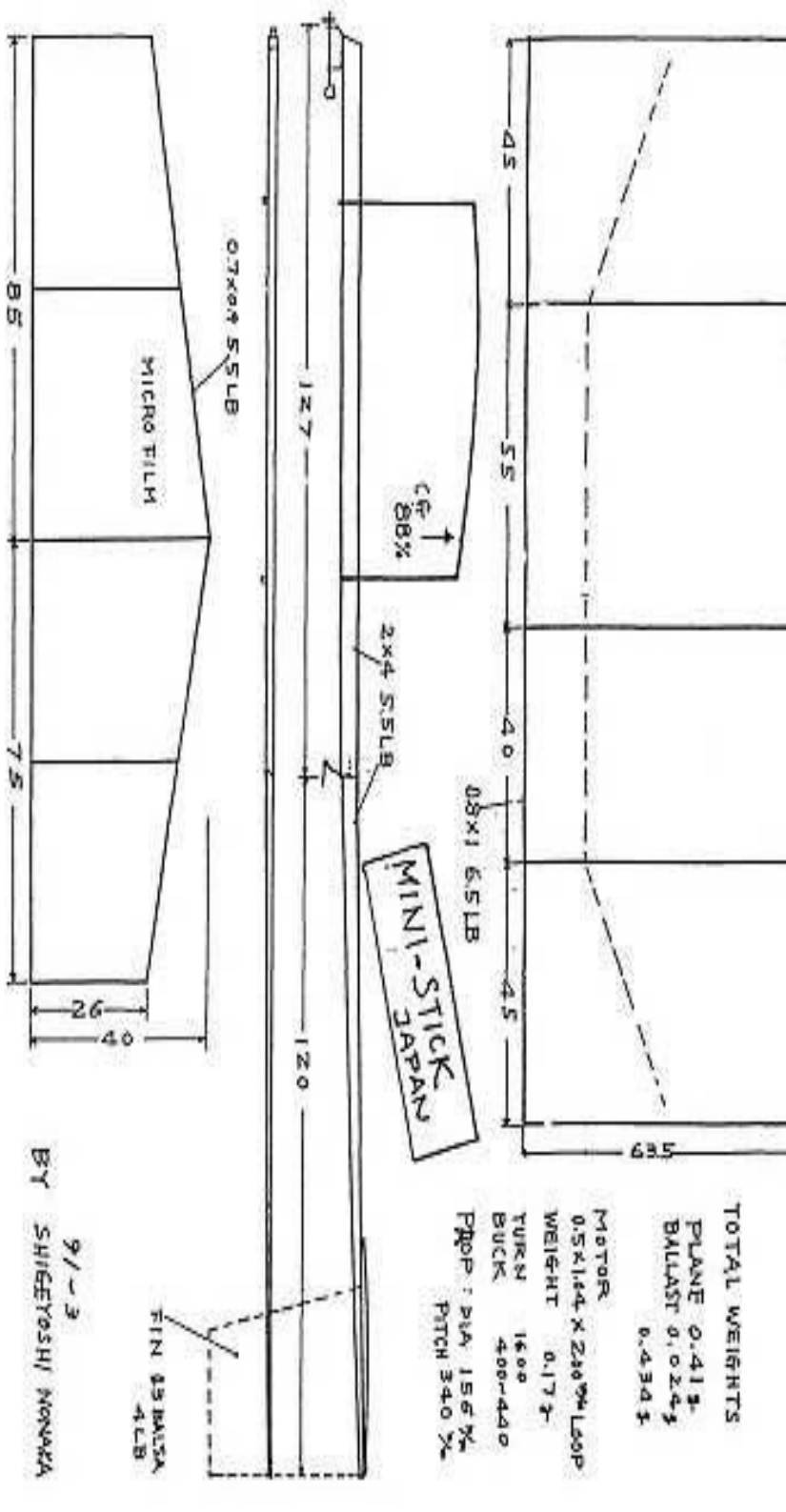
1) EZB WOOD SIZES AND DENSITIES.

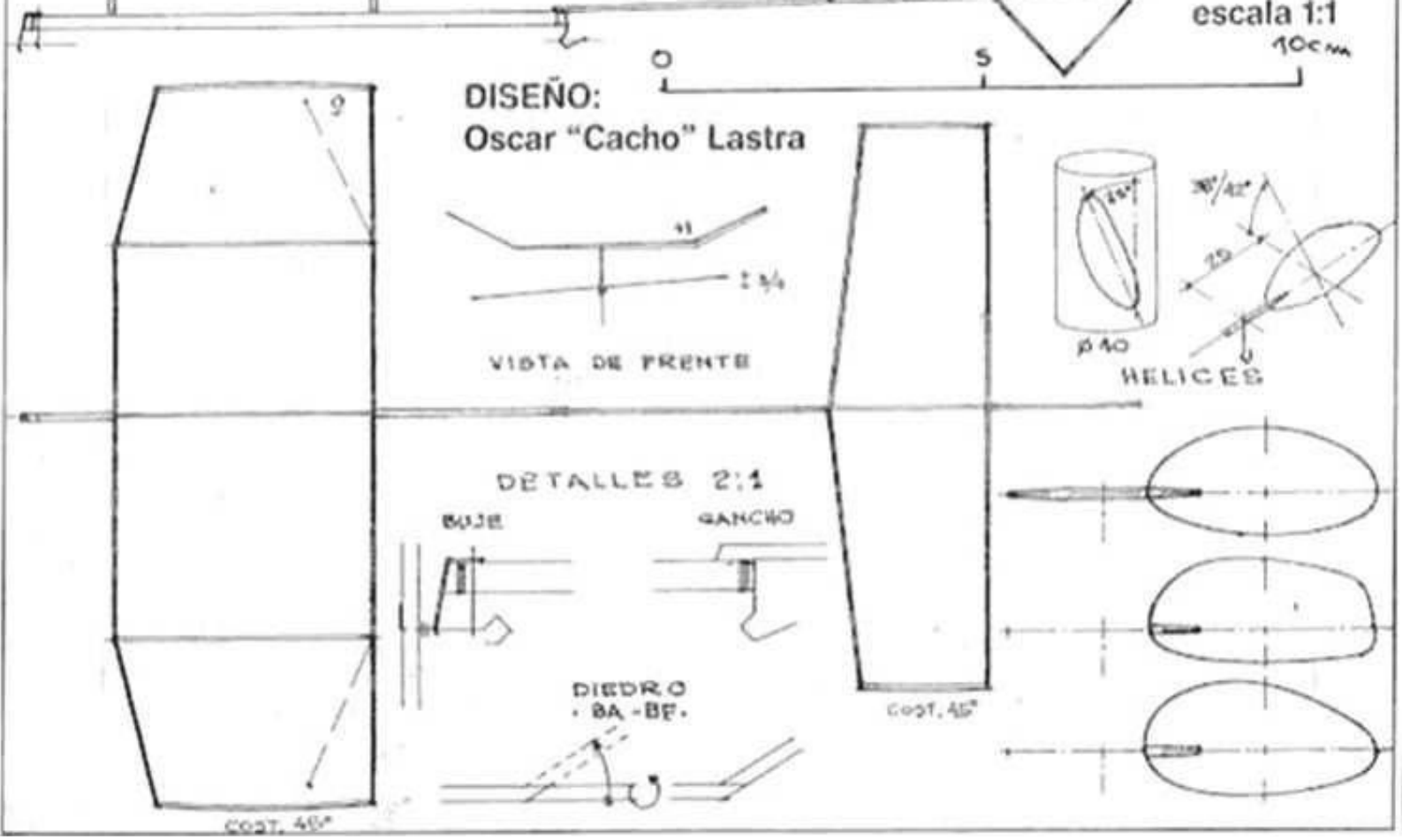
Motor Stick:	Size: .160Dx.080W to .240Dx.120W to .160Dx.080W x 9.5L Density: 3.7 lb/ft³. Weight: 0.191 gm.
Tail Boom:	Size: .090Dx.075W to .045Dx.040W x 11.5L Density: 4.2 lb/ft³. Weight: 0.051 gm.
Front Wing Spars:	Size: .070Dx.030W to .035x.022 x 10L Density: 6.5 lb/ft³. Weight: .027 gm @ 10L before cutting to final length.
Rear Wing Spars:	Size: .065Dx.027W to .030x.025 x 10L Density: 4 lb/ft³. Weight: .019 gm @ 10L before cutting to final length. Note: Left rear spar is heavier (.020 gm @ 10L) than is right rear spar (.018 gm).
Wing Ribs:	Size: .030Dx.019W Density: 4 lb/ft³. Weight: 5 ribs weighed .006 gm. Note: Stab ribs .025Dx.019W
Stab Spars:	Size: .040Dx.020W to .020Dx.020W to .040Dx.020W Density: 5.5 lb/ft³.
Fin Frame:	Size: .020 x .020 Density: 5 lb/ft³.
Wing Posts:	Size: .047 Dia x 1 L Density: 5.5 lb/ft³. Weight: 2 posts, .009 gm.
Prop Spar:	Size: .028x.028 to .059Dx.052W to .028x.028 x 12L Density: Center 3 in. section 6 lb/ft³. Outer 4.5 in. sections 4 lb/ft³. Weight: 0.032 gm. Note: Prop spar+.010 prop shaft+Teflon Brng: .049 gm.
Prop Blades:	Size: .005/.006 Quarter grain (Sand to dim. on glass). Density: 4 lb/ft³, (low as possible) Weight: .045 gm finished weight. Note: Grain at 30 deg. to prop shaft. On blades, glue blade sections with .060 lap joints before cooking blade to shape.

2) WEIGHTS OF COMPONENTS.

Flat wing frame:	0.112 gm.	
Covered flat wing frame:	0.192 gm.	(Mylar + Spray = 0.080 gm)
Covered wing w/ posts & Dih:	0.205 gm.	
Stab frame:	0.030 gm.	
Covered stab:	0.070 gm.	(Mylar + Spray = 0.040 gm)
Fin frame:	0.003 gm.	
Covered fin:	0.009 gm.	(Mylar + Spray = 0.006 gm)
Total Mylar + Spray:	0.126 gm.	
Nose Bearing (0.010 MW):	0.006 gm.	
Motor Stick:	0.191 gm.	
MS + Brng:	0.200 gm.	
MS + Brng + R.Hk:	0.214 gm.	
MS + Brng + R.Hk + T. tubes:	0.217 gm.	
Tail Boom:	0.051 gm.	

Body + Tail:	0.352 gm.
Wing + Posts:	0.205 gm.
Prop:	0.149 gm.
TOTAL WEIGHT:	0.706 gm.





Category M-10

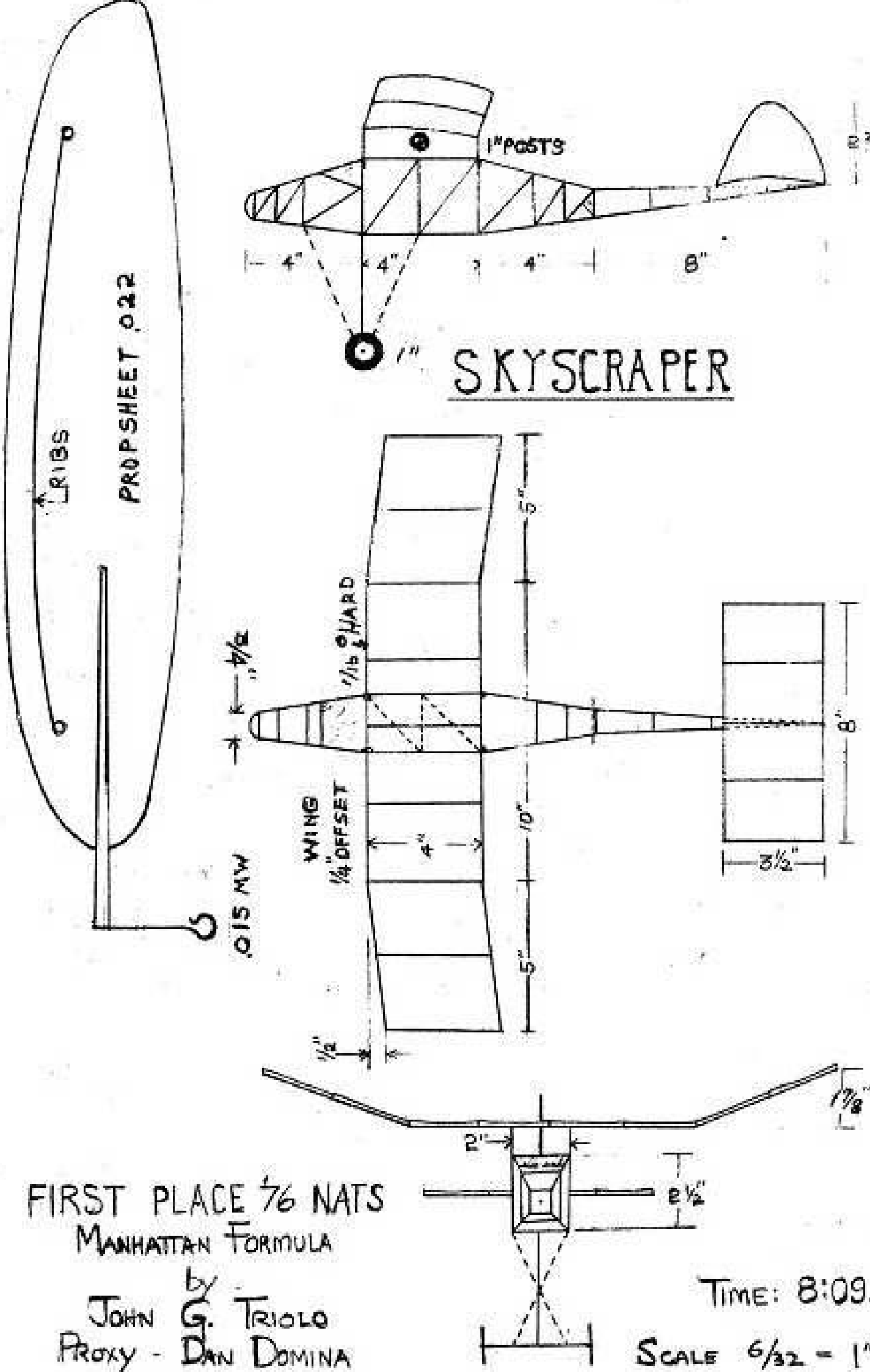
Monoplane with a single rubber motor.

Max wing span 10 cm. max stab area 50% of wing. Max prop diameter 8.5 cm.

Construction of solid balsa only

Covering any commercial plastic or paper. Microfilm not allowed.

(Argentina)



FIRST PLACE 1/2A NATS

MANHATTAN FORMULA

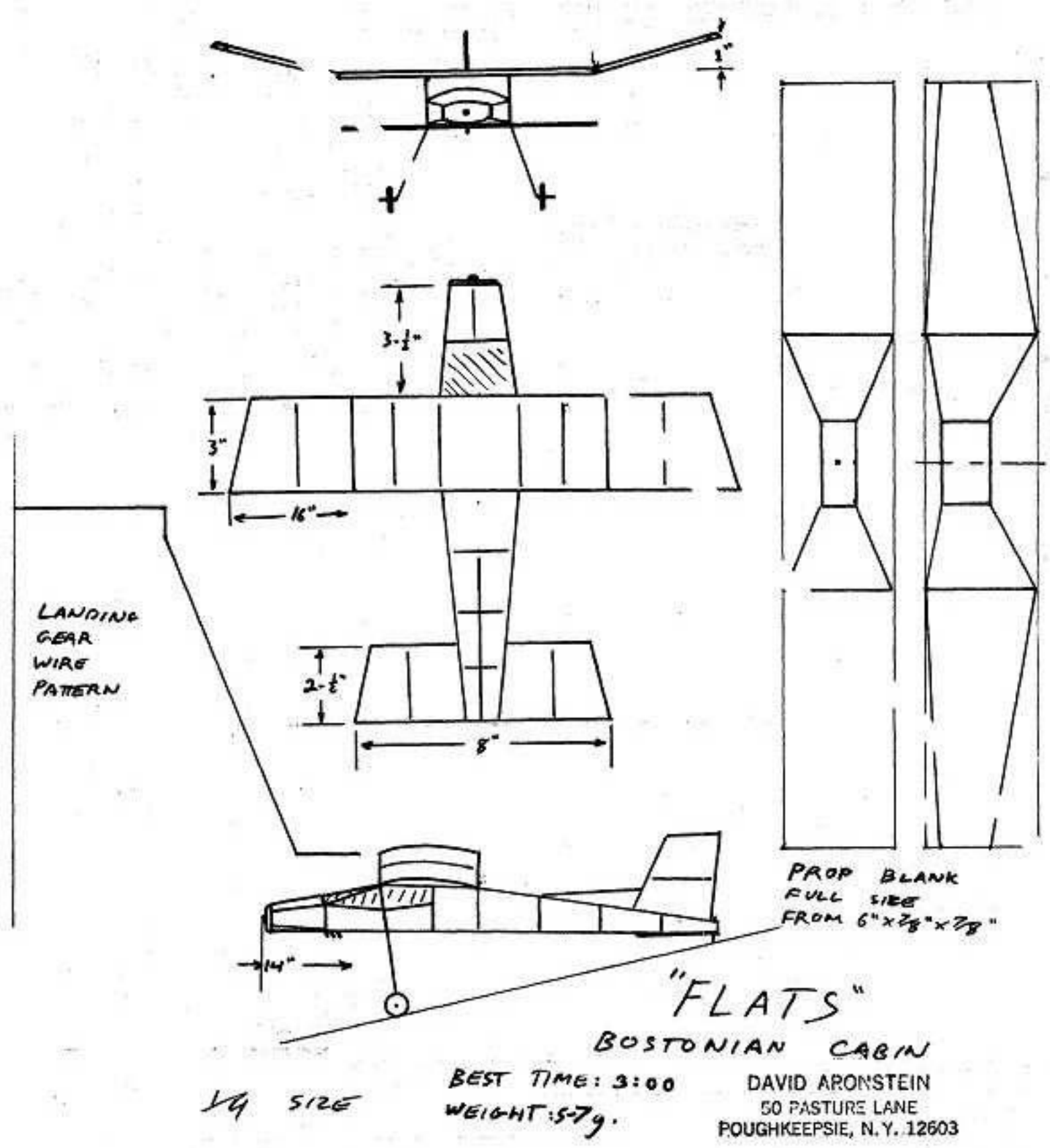
by

JOHN G. TRIOLO

PROXY - DAN DOMINA

TIME: 8:09.7

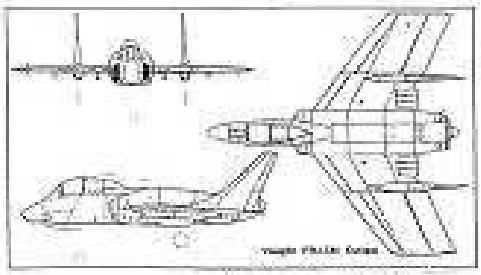
SCALE 6/32 = 1"



BOSTONIAN CABIN

FROM - Newsletter No. 62, June/July 1992
Boeing Employees Free Flight Model Flying Club *
(* also known as the Boeing Hawks)

President: Andy Page
Newsletter: [illegible]
Editor: [illegible]
Seattle, WA 98168
[illegible]



PLAN PAGE 1

CUTLASS
RUBBER DUCTED FAN
1992 DAVID ARONSTEIN

PLAN PAGE 2

CUTLASS
RUBBER DUCTED FAN
1992 DAVID ARONSTEIN

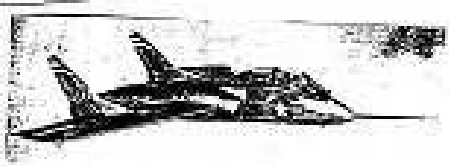
MAKE FIRST FLIGHTS WITHOUT VEE RUBBER BANDS THEN MOUNT THEM AT WHATEVER ANGLE NEEDED TO PRODUCE A CIRCLE

ANOTHER RUBBER POWERED DUCTED FAN BY DAVID ARONSTEIN FROM NEWSLETTER OF THE BOEING HAWKS

FLY INDOOR MODEL FROM THE RAFTER

BUILD WING OPENED-OUT SO THAT ALL SURFACES ARE FLAT, AND WARPING IS ACCOMPLISHED BY THE INCREASING L.E. DROOP TOWARD THE TIP.

TIP IS ANOTHER R4, SAME AS TOP



BAU EINES F1M

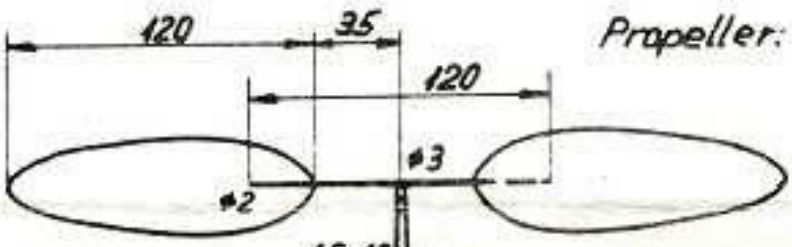
MOUSTIQUE
(D.Siebenmann)

oder

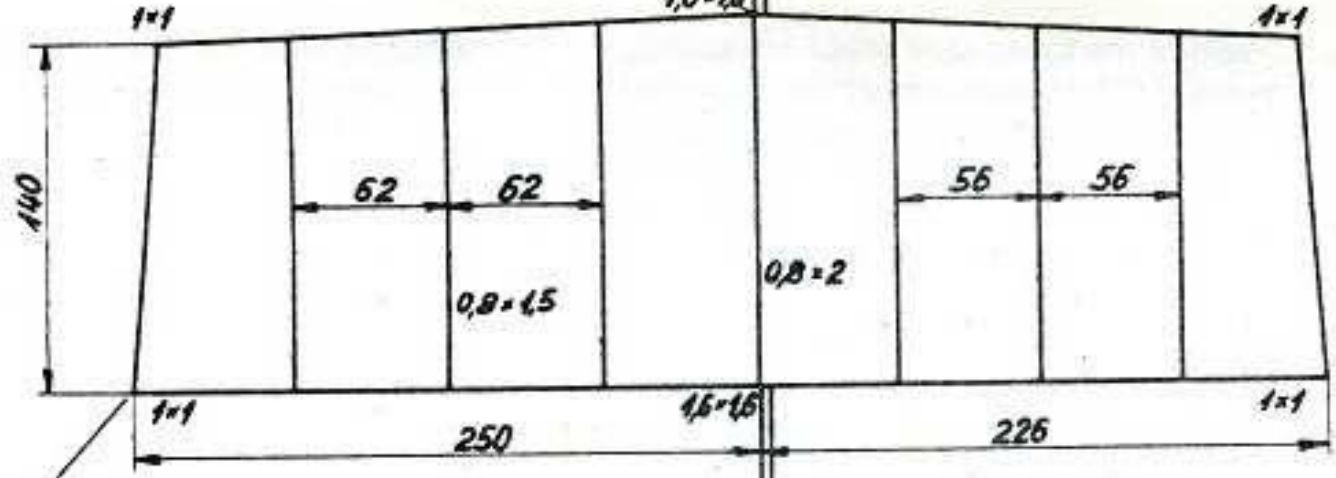
FANTASIE
(W.Heise)

Und später kann man ein Mini Stick, sogar ein M-10 bauen…

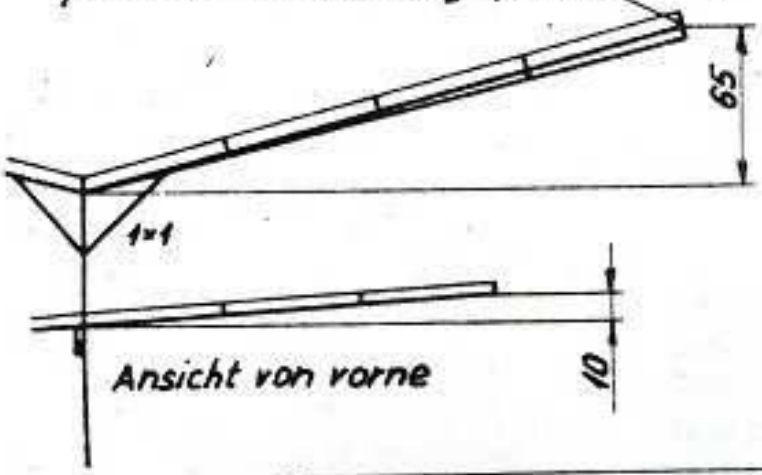
Skizze 1



Propeller: Stg.560
ø 310
Blattbr. 45



positive Schränkung 6mm



Moustique

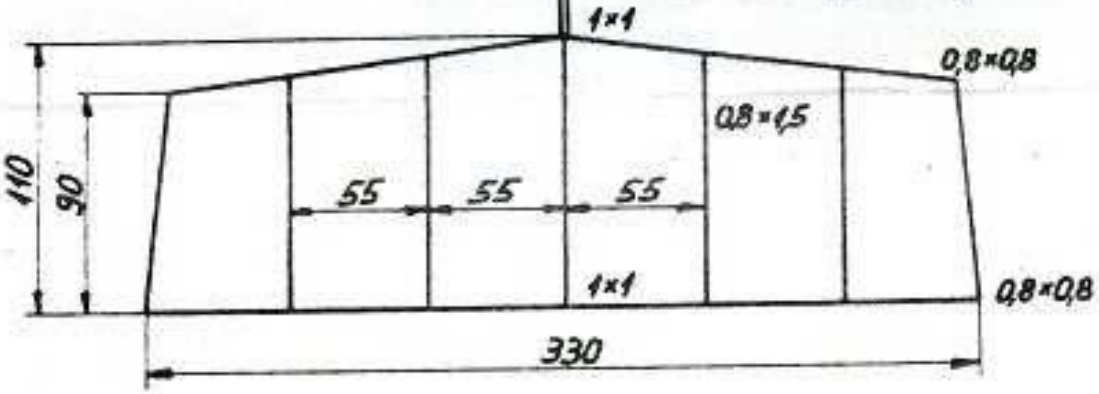
von Dieter Siebenmann

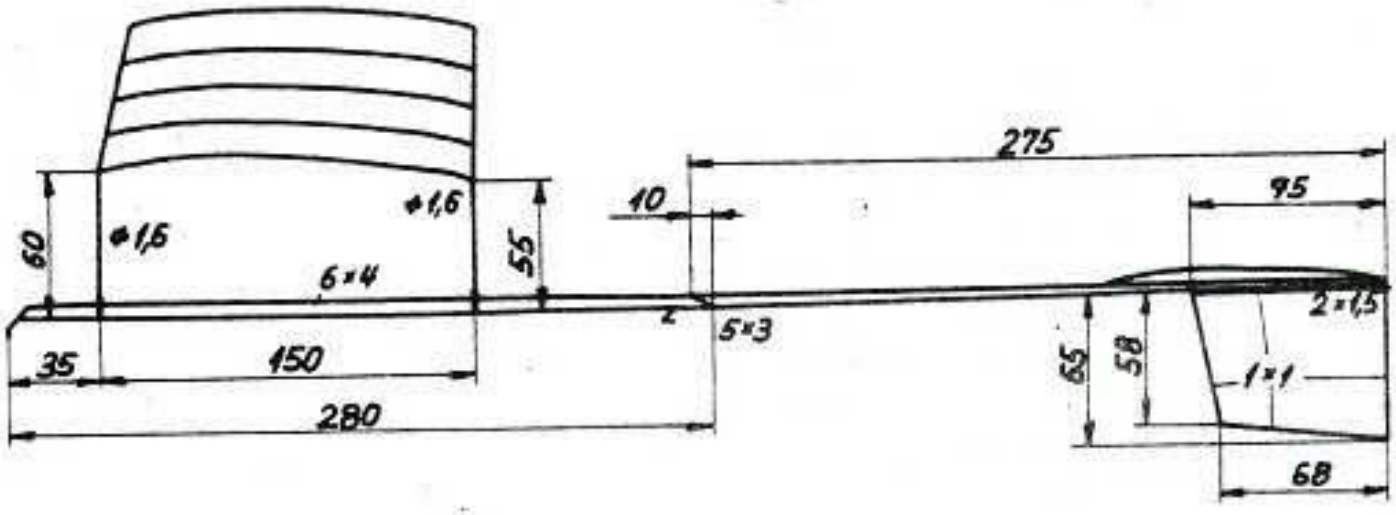
Masse und Querschnitte in mm

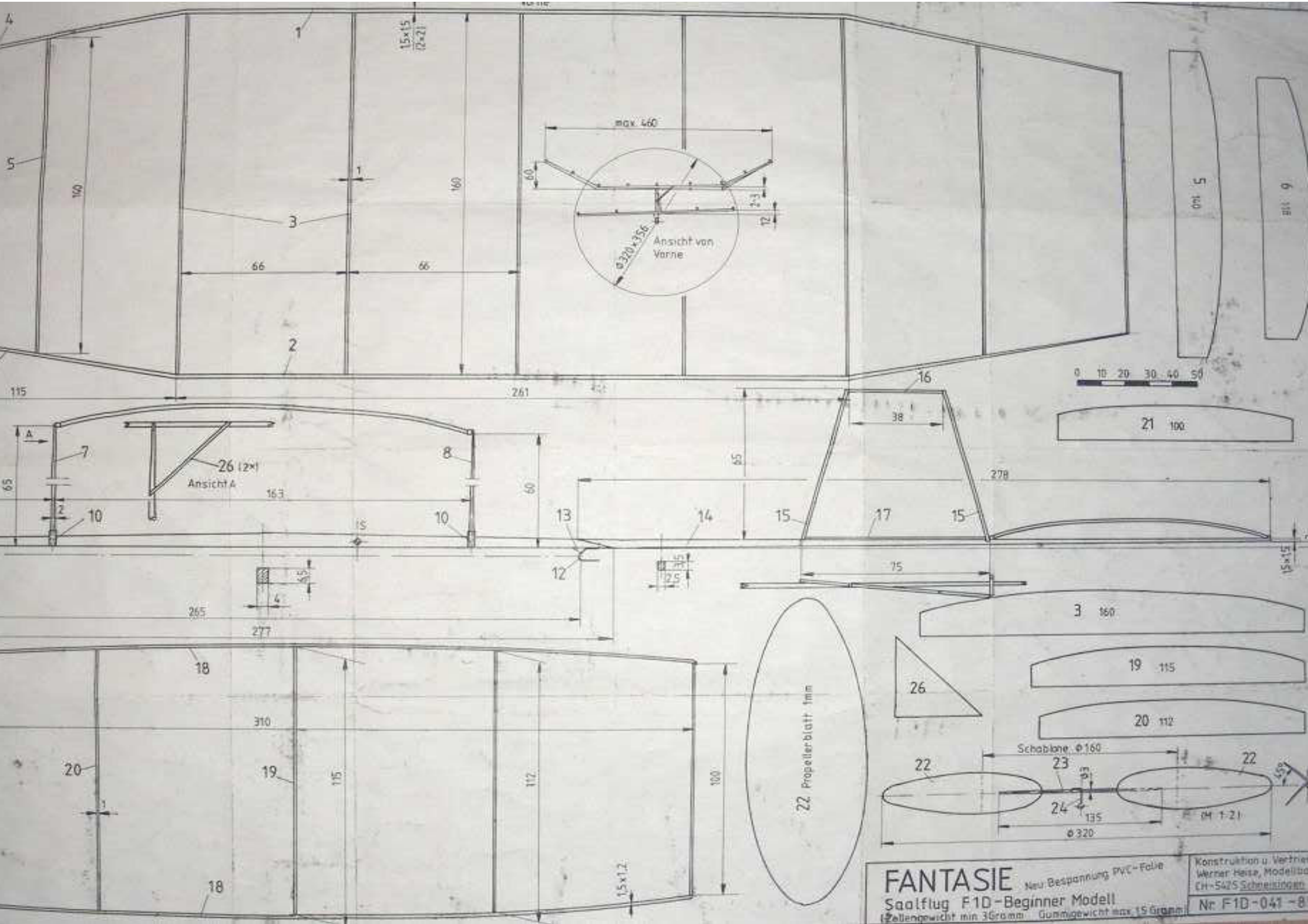
Spannweite 460mm

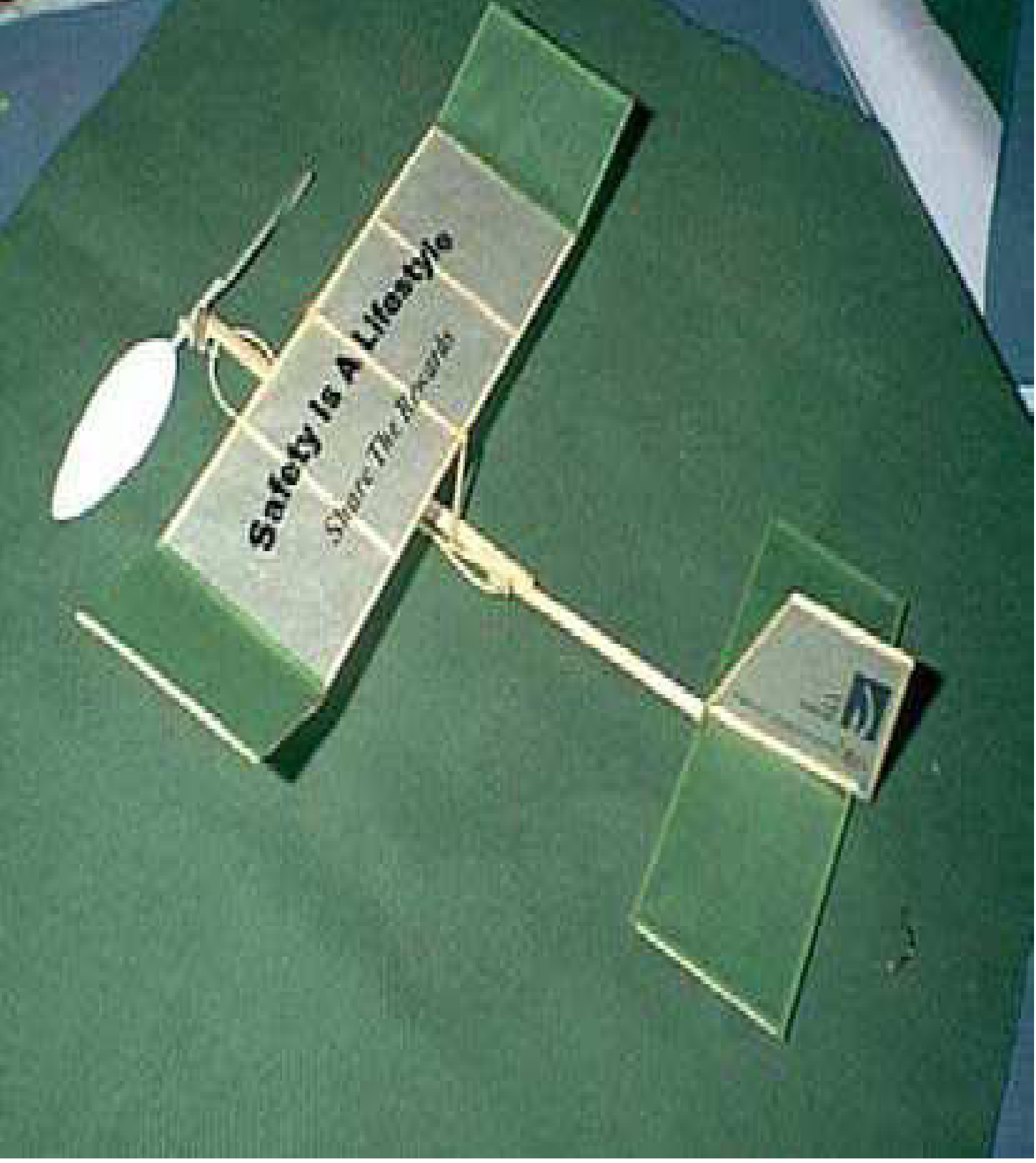
Gewicht min. 3g

Gummi 1 Ring 1×1,7
430 lang



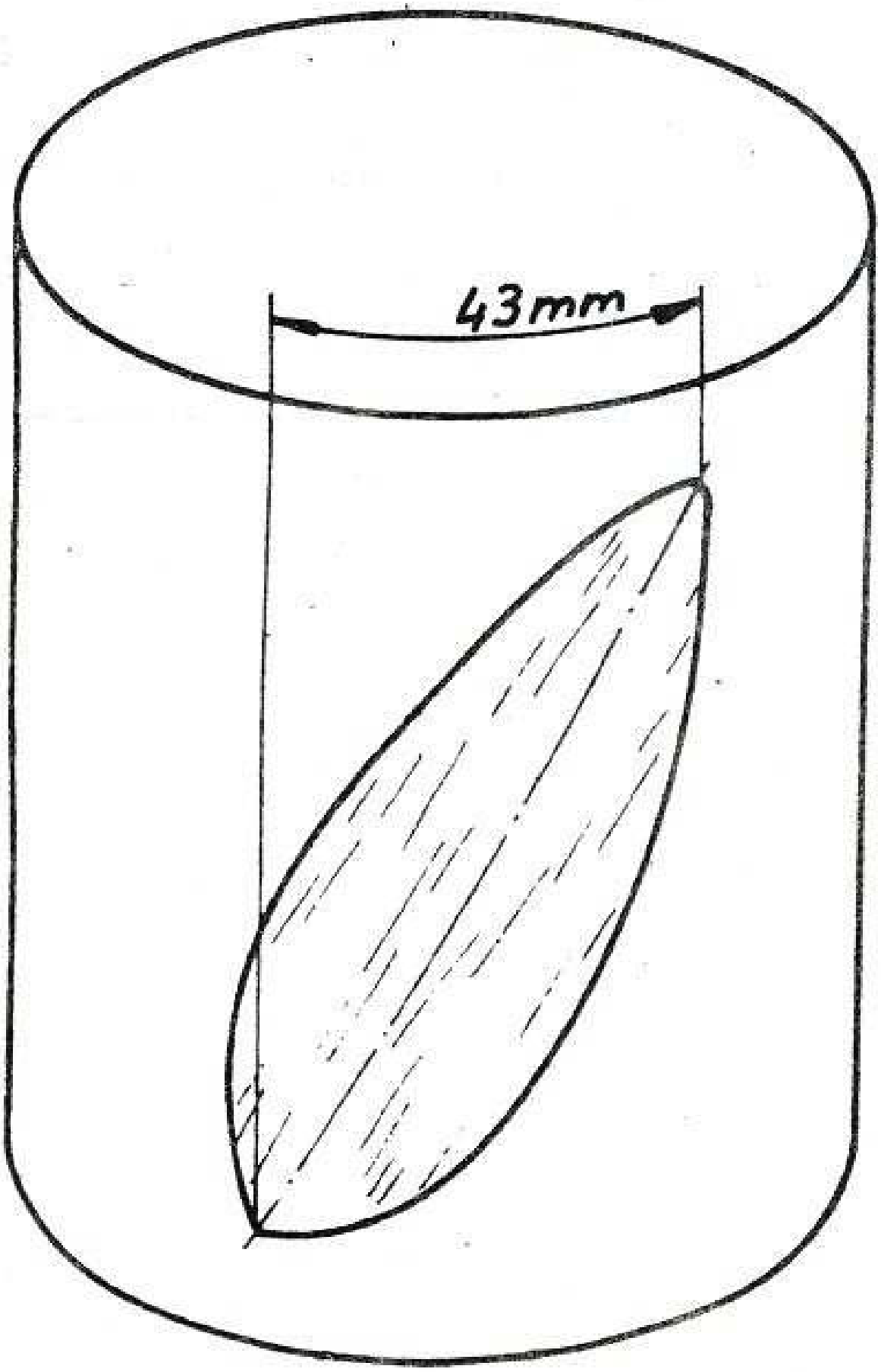



max. 460
Ansicht von Vorne
Ø320+356
Ansicht A
26 (2x)
Schablone Ø160
Ø320
M 1:2
22 Propellerblatt 1mm
0 10 20 30 40 50
FANTASIE
Neu Bespannung PVC-Folie
Saalflug F1D-Beginner Modell
Zellengewicht min 3Gramm Gummigewicht max 15 Gramm
Konstruktion u. Vertrieb
Werner Heise, Modellbau
CH-5425 Schneisingen
Nr. F1D-041-8



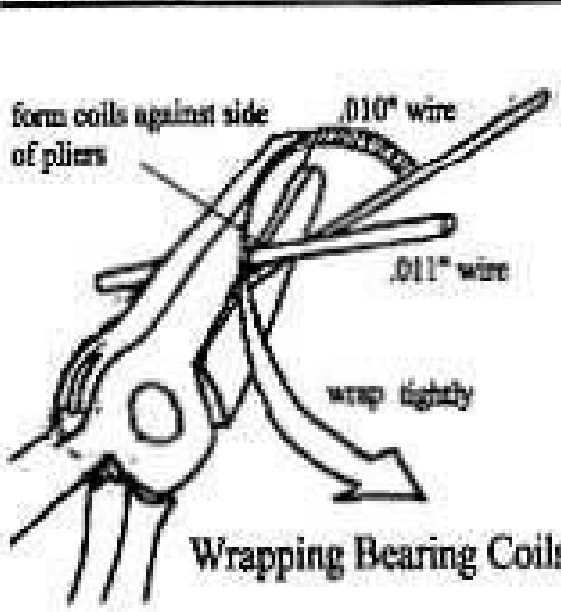
Guerrilla

Skizze 9

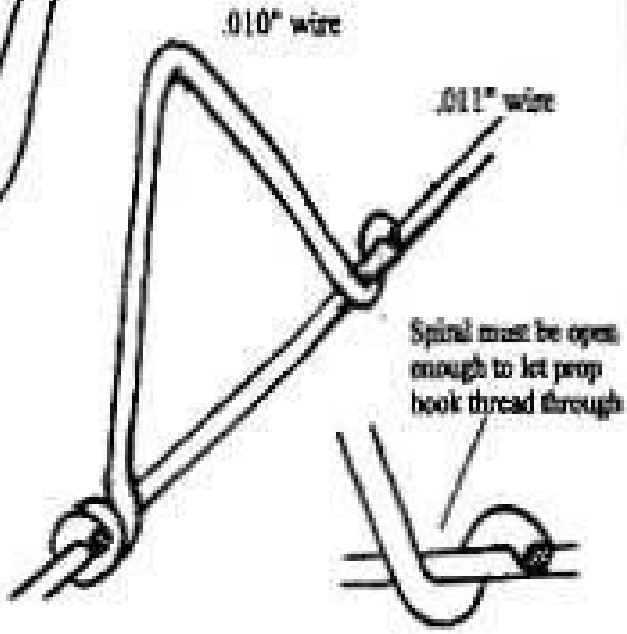


Durchmesser 110 - 130 mm

and the pig tail are in near perfect alignment.

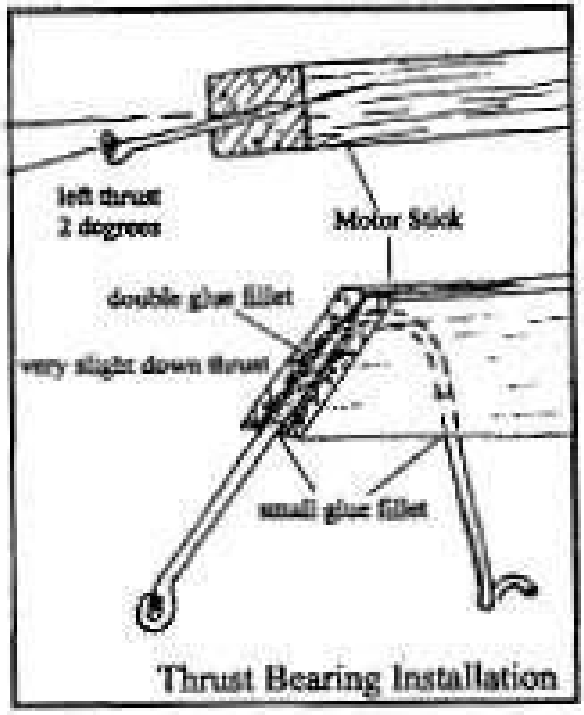


Wrapping Bearing Coils



Wire Thrust Bearing

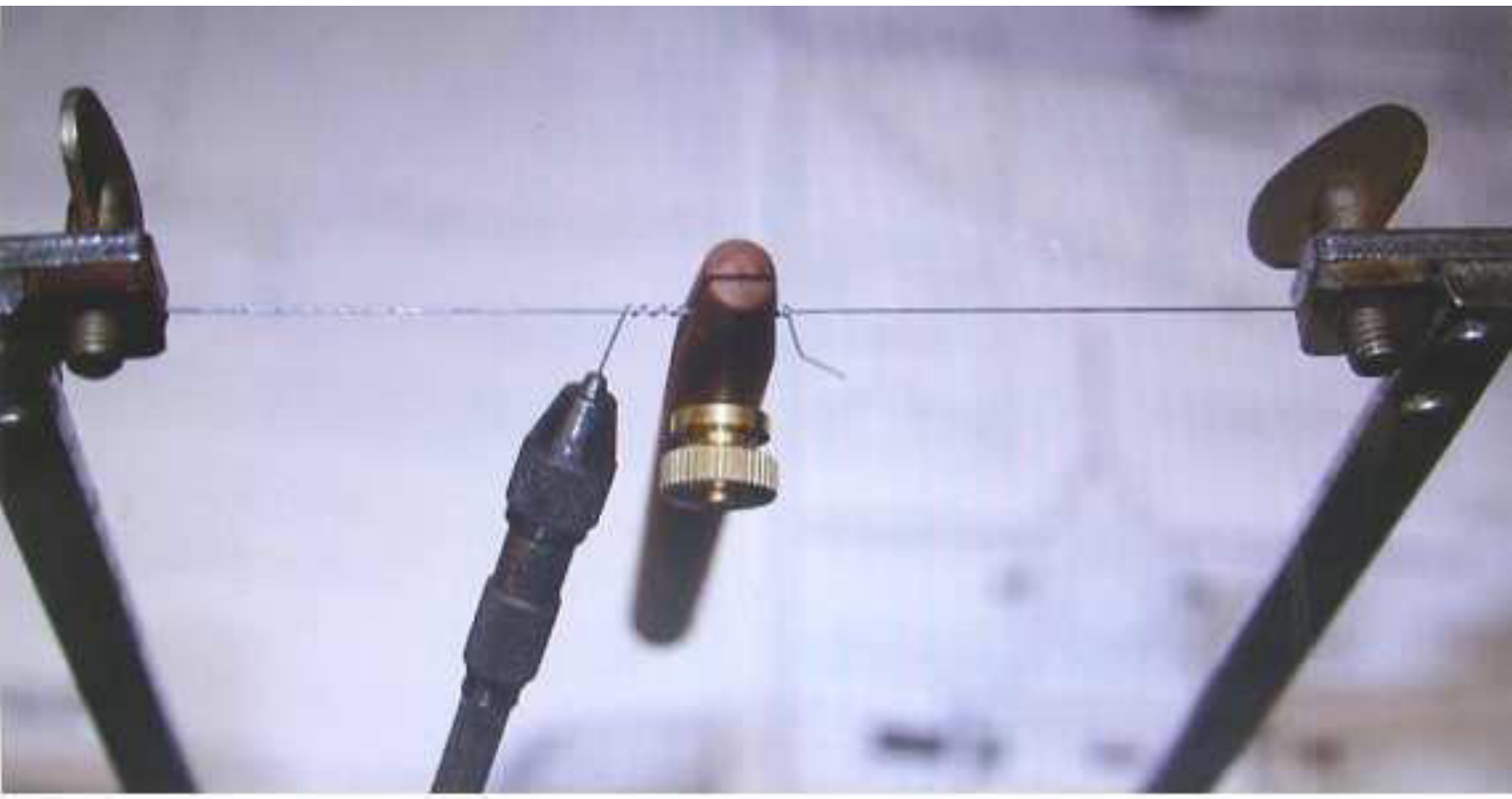
Making Thrust Bearings



Thrust Bearing Installation

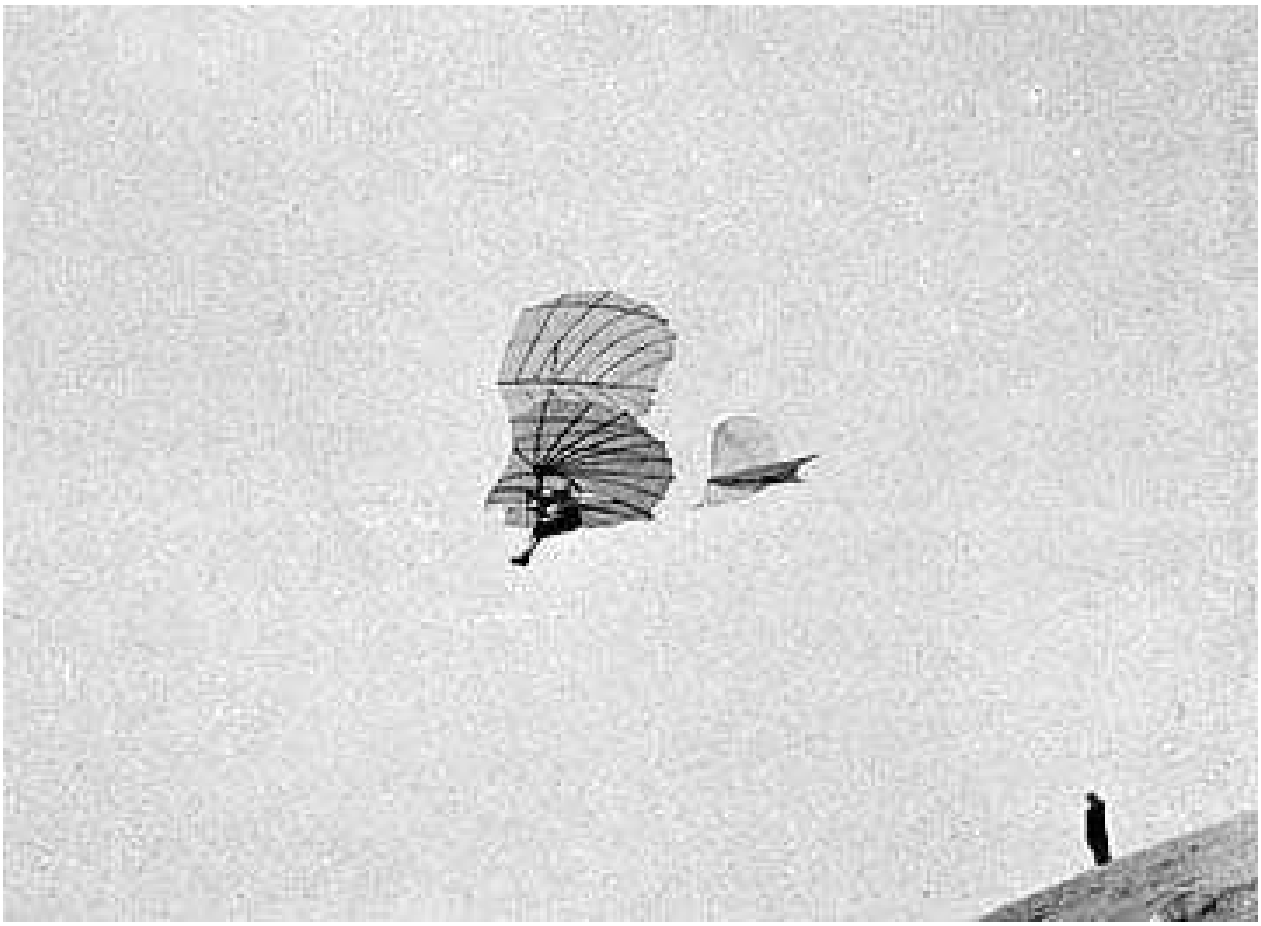
Before mounting the thrust bearing to the motor stick, make sure that the prop shaft can be threaded through the bearing. If the bearing front end is not ground down far enough, or if the pig tail is not properly formed, the prop shaft will not thread onto the bearing. Make sure that the front of the bearing is ground down to match the drawing. If the problem is with the pig tail, you might be better off by just making a new bearing. Once the bearing is made and you have it aligned you can use it to help get the prop shaft square with the prop spars. Temporarily mount the bearing to a 1/8 sq. piece of balsa, like a false motor stick. Do not mount the bearing on the real motor stick for this step, the pressure of getting the prop shaft straight might weaken the glue joint. At this time I have the prop shaft mounted to the prop spar. No blades. Put the shaft through the bearing and hook up a thin loop of rubber. Put in some hand winds and check to see if the spar is running true. If there is any wobble in the prop spars as they turn, make note of which spar is most forward, and then, grasping the prop spar where the wire shaft is bent and glued to the spar, bend the shaft until the prop spars turn straight. Go easy and make very small corrections.

Remove the thrust bearing from its temporary mount and clean off any glue. Cut a 1/4" deep slot in the front of the motor stick. Angle the slot to provide 2 degree left thrust. Place a piece of .010 wire 3" long through the bearing to check the thrust line. Slide the bearing into the slot. The reference wire should be .150" below the bottom of the motor stick. Do not place glue in the slot. The front of the bearing should intersect the lower right angle of the motor stick. (see drawing) Take a new razor blade and cut the front of the motor stick to match the front angle of the bearing. Recheck for 1 degree down and 2 degree left thrust. The front of the bearing must be flush with the motor stick. Apply two thin coats of glue, to the wire and wood. Build up a small glue gusset where the pig tail and the front of the bearing meets the wood. No extra glue is needed.



pig tail

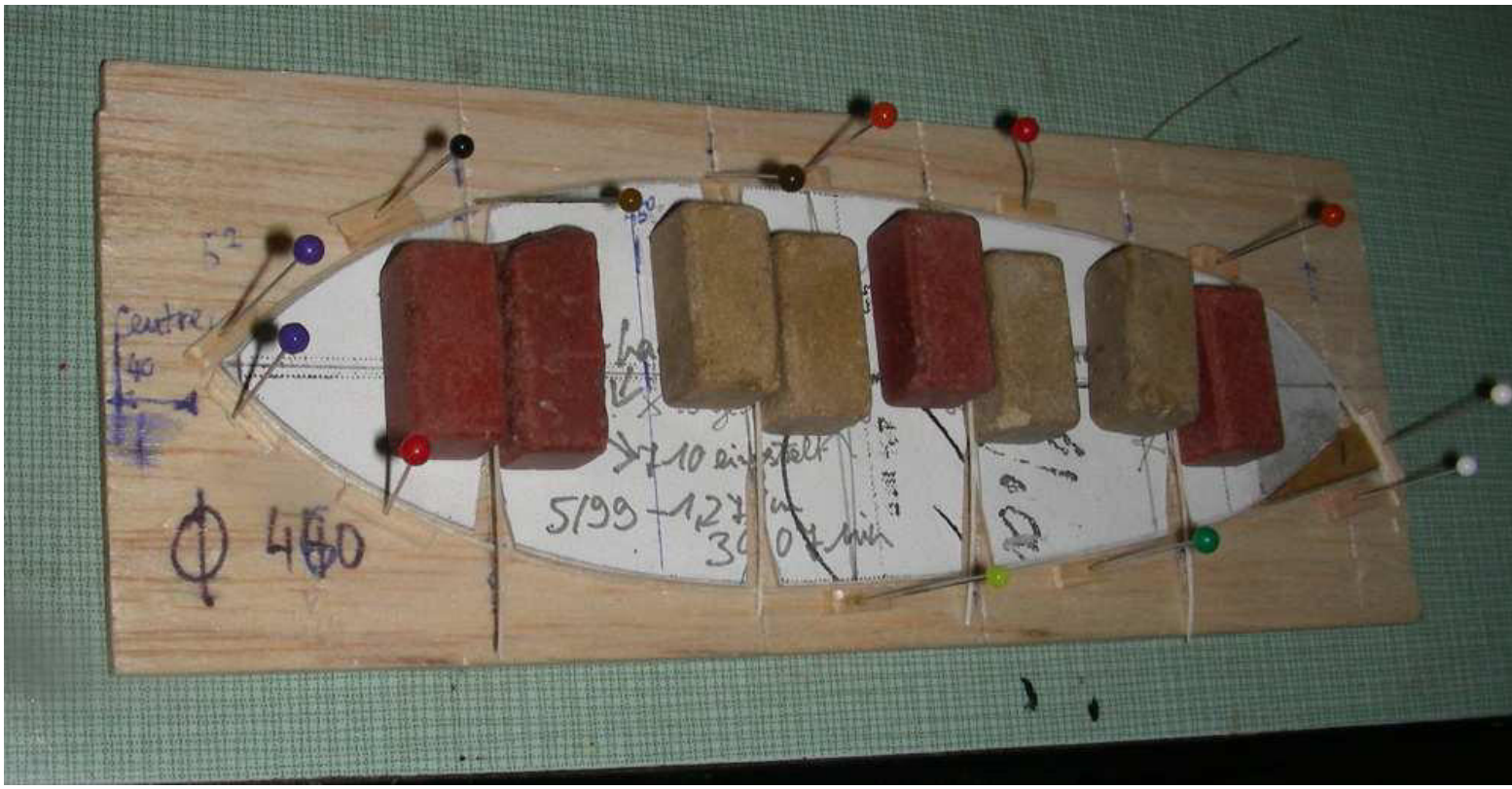
Vorderter Propellerachseträger



Otto Lilienthal (1895)

STEINBAUKASTEN ANKER (erfunden durch Otto Lilienthal)

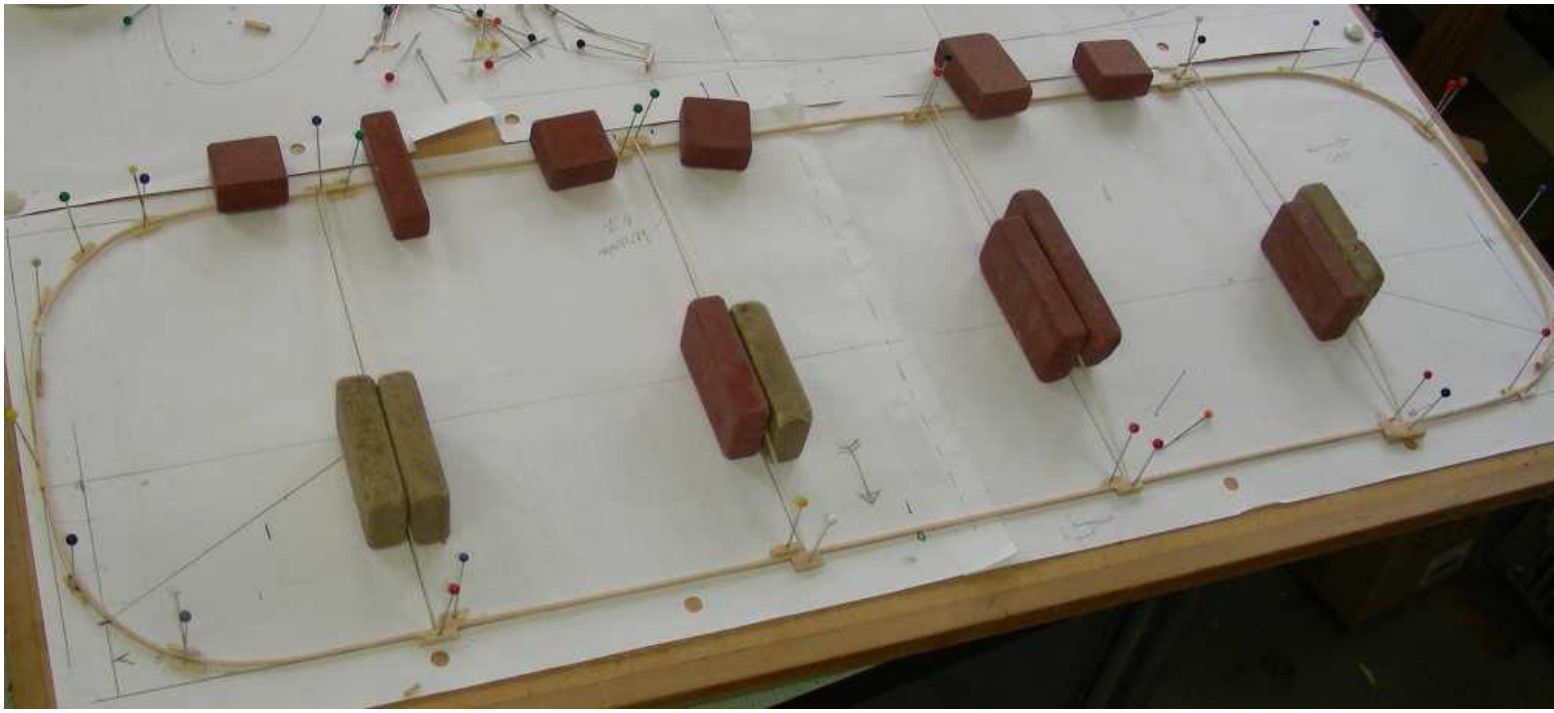
F1D



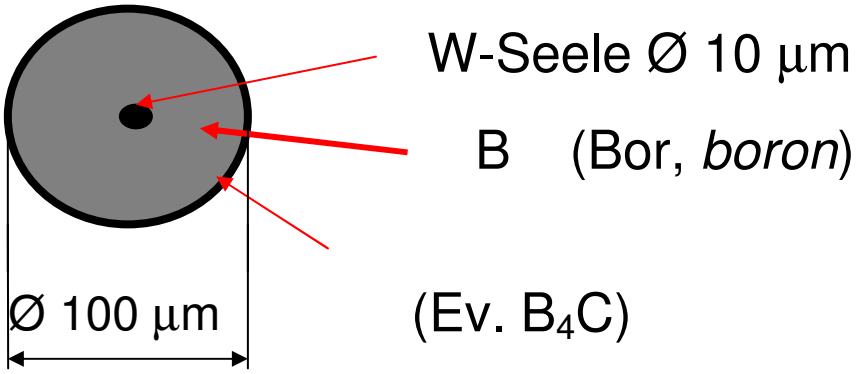
Bau eines F1D Propellerblattes

Diese Keramikklötze sind 25 x 12.5 x 12.5 mm gross (3.91 cm^3 → ~ 8 g).

Für den Flügel- und Leitwerkbau werden längere Klötze verwendet :



BORFASERN ALS WERKSTOFF FÜR F1D



Bor

Spez. Gewicht:	2.35 g/cm^3
Schmelzpunkt:	2300℃
Siedepunkt:	2550℃

Bruchfestigkeit σ:	> 3500 MPa
Biegeradius:	min. 25 mm

GEFÄHRLICHKEIT

Gefährlich sind die Faserbruchteile!

→ Entsorgung in **KVA**

Borfasern sollten **nicht** bei **F1A, B, C, E** verwendet werden:

Mögliche Gefahren:
- Borfasern leiten Strom →
  1 Totalschaden F1E in Walkringen (26kV)
- Risiko für Tiere bei verlorenen Modellen

Anwendung von Borfasern

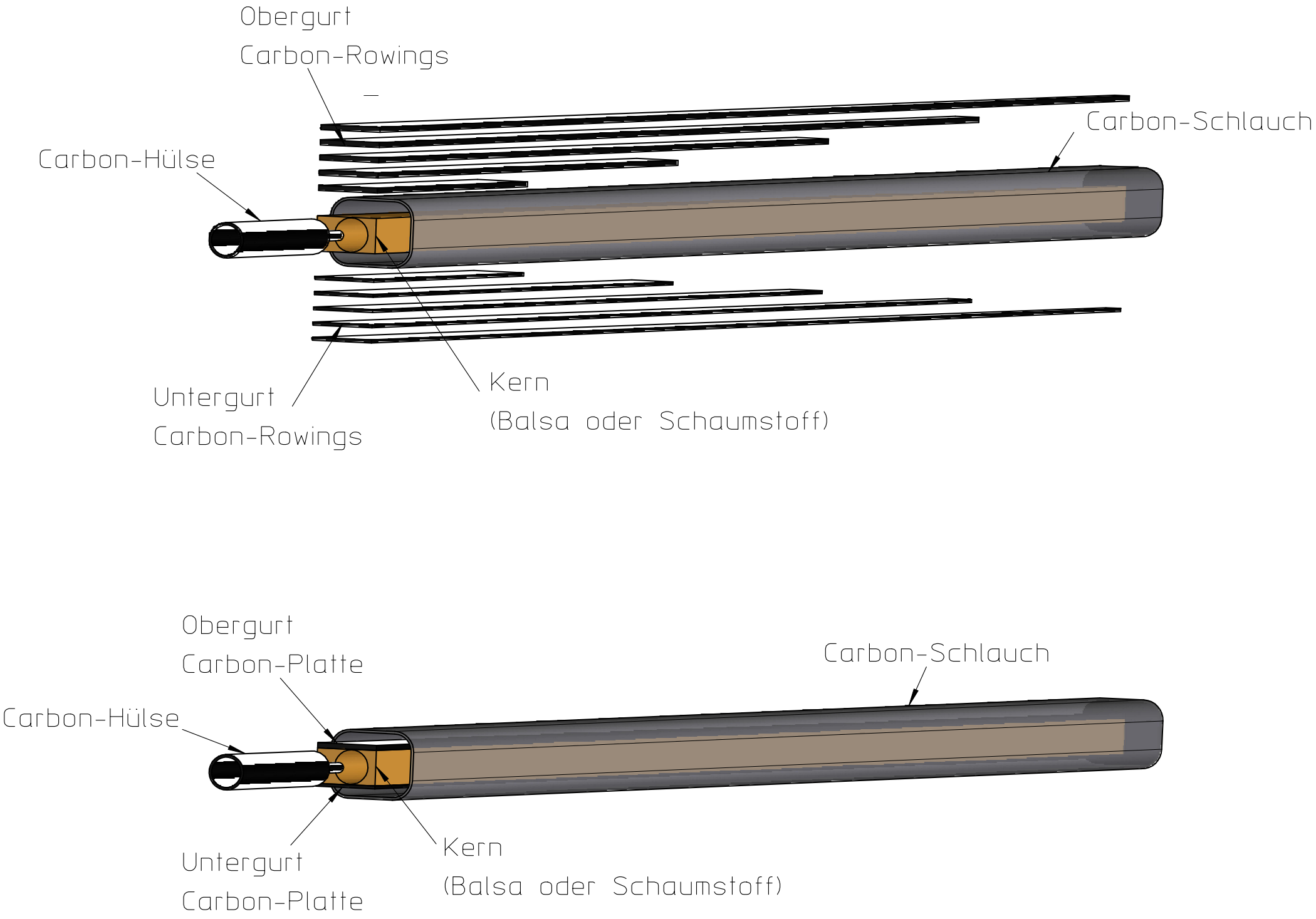
Bei Ø 90µm:

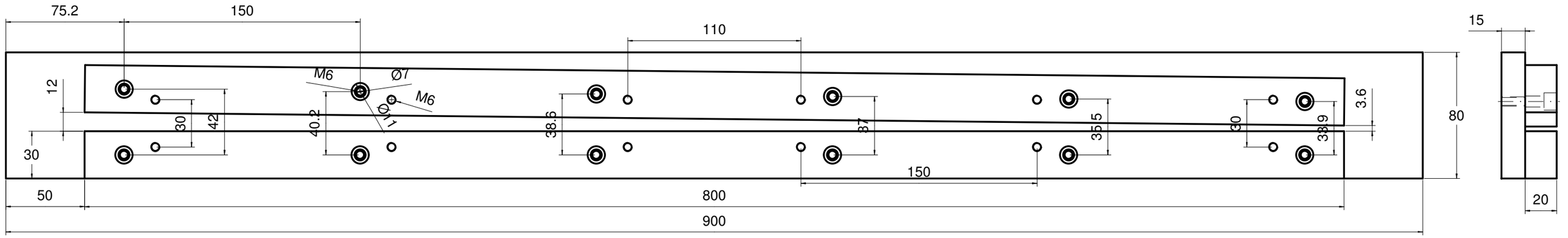
Gewicht /m: ~15 mg

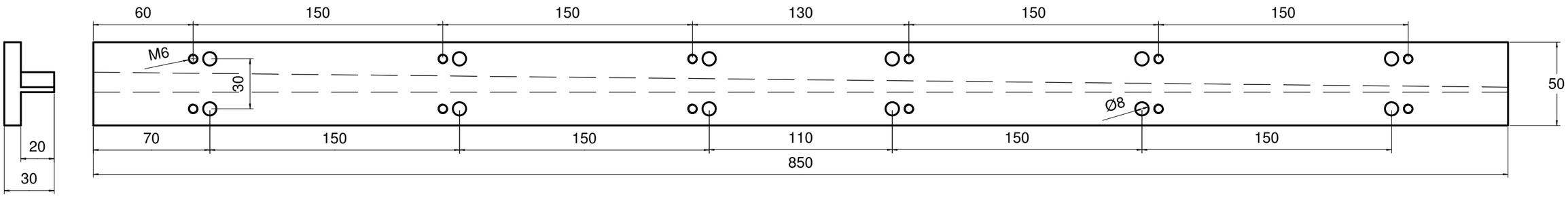
Anwendungen:

- Bau von Flügeln mit elliptischem V-Form (Siebenmann, & Lotz)
- Verstärkung von der Flügelmitte
- Verstärkung vom Motorträger
- …

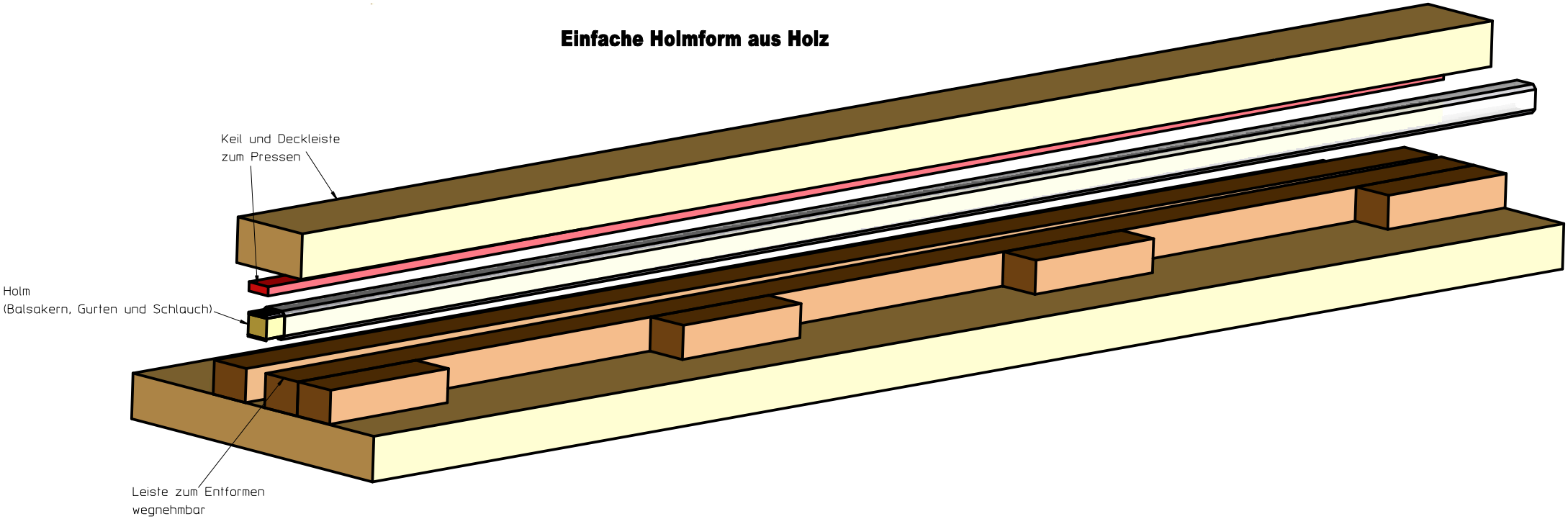
Holmfertigung


Obergurt
Carbon-Rowings
Carbon-Schlauch
Carbon-Hülse
Untergurt
Carbon-Rowings
Kern
(Balsa oder Schaumstoff)
Obergurt
Carbon-Platte
Carbon-Schlauch
Carbon-Hülse
Untergurt
Carbon-Platte
Kern
(Balsa oder Schaumstoff)

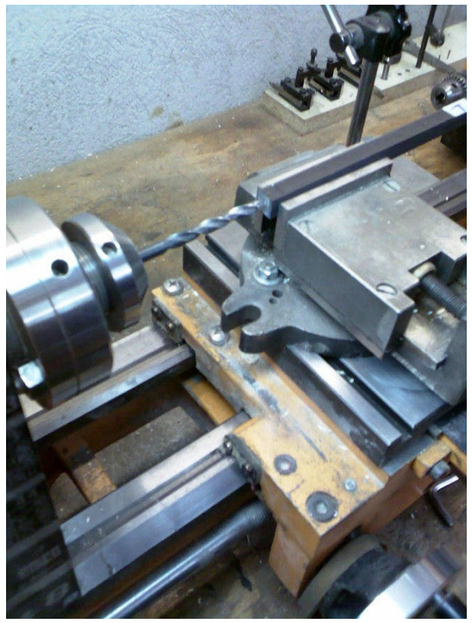

75.2
150
110
15
M6
Ø7
M6
12
30
42
40.2
11
38.6
87
35.5
30
38.9
3.6
80
30
150
50
800
900
20


60
150
150
130
150
150
M6
30
Ø8
50
20
30
70
150
150
110
150
150
850

Einfache Holmform aus Holz

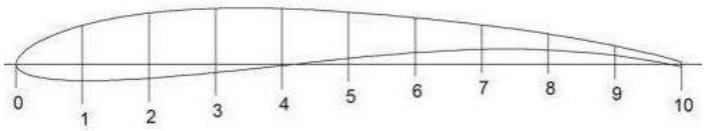


Holmfertigung in Bildern



LDA (low dragged airfoil)

Widerstandsarme Profile



Michi Bleuer

Inhaltsverzeichnis

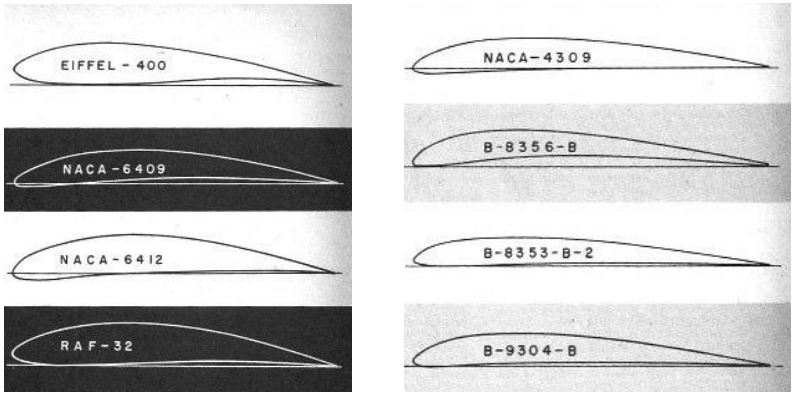
- Geschichte
- Ansatz LDA
- Bauarten
- Profile
- Vor- / Nachteile
- Fliegen
- Alternative
- Zukunft

Geschichte

- Profilveröffentlichungen 1960
- RC-Segelflug seit langer Zeit im Einsatz
  - Optimierung zu Hochleistungsprofilen
  - F3K (Handlauncher), Wurfgleiter
- F1A
  - 2007 erste Versuche bei F1A-Modellen (BE-9744)
  - 2008 Veröffentlichungen von Brian Eggleston
  - 2009 Erfolgreiche Einsätze bei Wettbewerben
  - 2012 Versuche mit Flapper-LDA
  - 2013 WM Podest alles LDA-Modelle

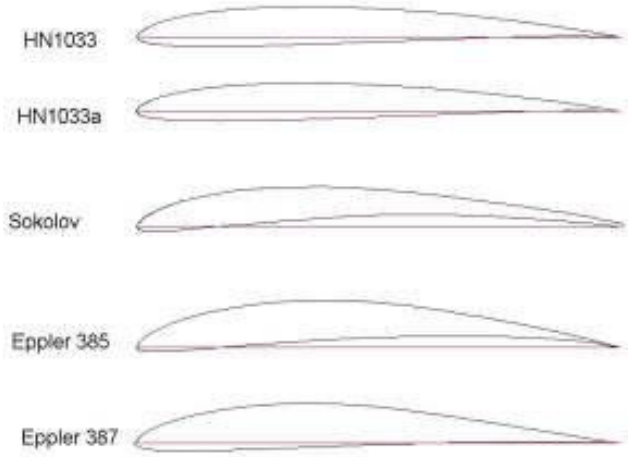
Geschichte

- Veröffentlichung diverser Profile 1960



Geschichte

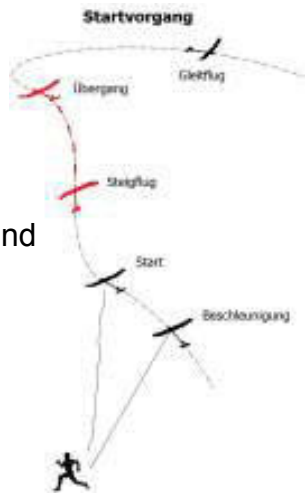
- **Weitere «alte» Profile**



Ansatz LDA

- **Widerstandsarmes Profil**

Ansatz: dickere und weniger gewölbte Profile mit weniger Luftwiderstand



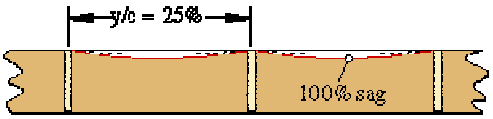
+ Starthöhe ca. 90-110m
- Gleitflug (Leistungseinbusse)

Resultat: **Durch die grössere Starthöhe ist eine deutliche Flugzeiterhöhung möglich, trotz der leicht niedrigeren Flugleistung!**

Bauart

- **Rippenbauweise**
  - hochfester Holm
  - kleiner Rippenabstand
  - stabile Bespannung

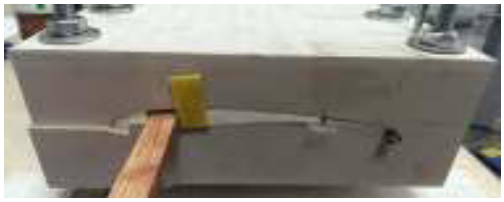
  + Herstellung
  + Lebensdauer
  - Profiltreue
  - Bespannung



Bauart

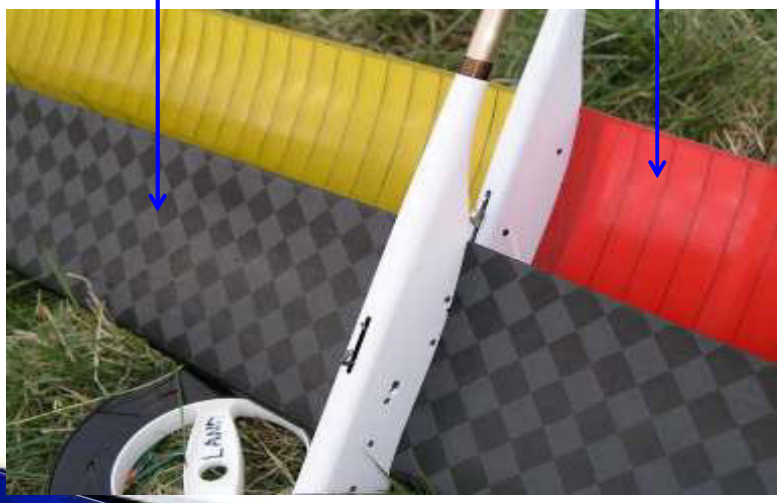
- **Schalenbauweise**
  - Rohacell® Kern
  - HM Kohlenschale
  - hochfester Holm
  - Form für Herstellung
  - Kohleverbinder

  - **+ Profilgenauigkeit**
  - **- Herstellung**
  - **- Kosten**
  - **- Lebensdauer**

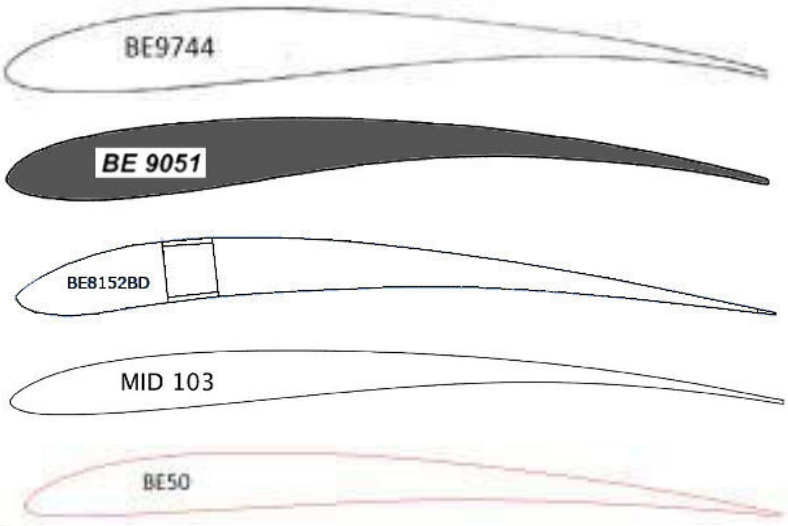


Bauart

- Schalenbauweise
- Rippenbauweise

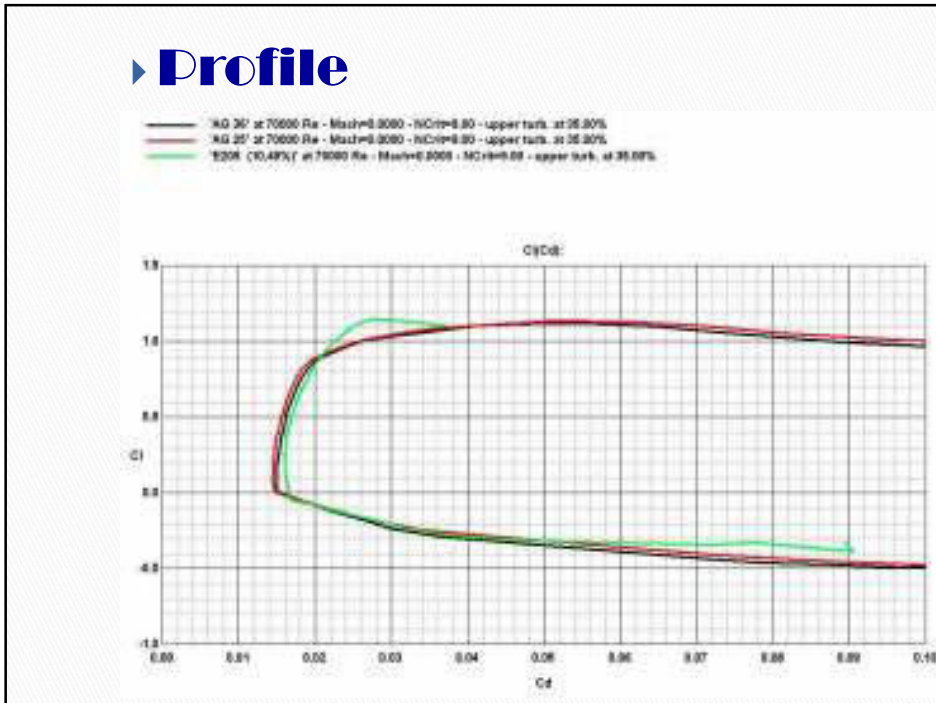


Profile

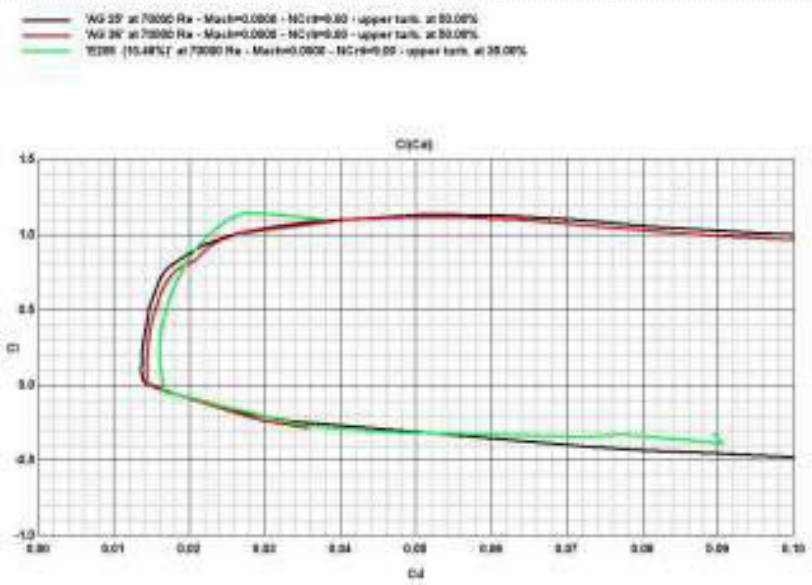


Profile

Profile



Profile



Vor-/ Nachteile

Vorteile
+ Starthöhe
+ Leistung
+ Flugzeit

Nachteile
- Thermik
- Strömung
- Startvorgang

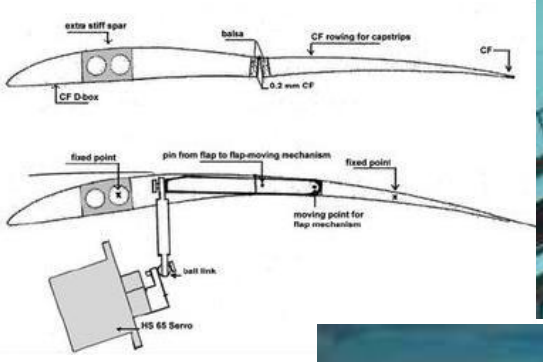
Einsatzgebiete
Fly-off
1. Runde
Ruhige Luft
ganzer Tag?

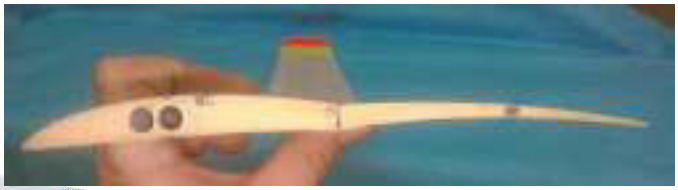
Trimmen / Fliegen

- Schleppen
  - Eigenwillig (ausbrechen)
  - Verhalten bei Thermik
  - Hackenposition
- Start
  - Beschleunigung
  - lange Steigzeit
  - maximale Starthöhe
- Flug
  - 1.Phase
  - Gleitflug / Kurve
  - Fly-off Setup

Fly-off Alternative

- Flapper





Zukunft

- Profilweiterentwicklung
- Flügelkonstruktion
- Flapper-LDA

LDA Start auf 100m

Besten Dank für Ihre Aufmerksamkeit

Fotos vom Seminar 2014