HOW TO BUILD "Hang Loose"

A "CHANUTE TYPE" GLIDER

BY JACK LAMBIE

* ILLUSTRATED BY MARK LAMBIE

INCLUDES:

★ PARTS LIST
★ DETAIL DRAWINGS
★ FLYING INSTRUCTIONS

OUR PRICE

$3.00

CHEAP*

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whole or part without the written
Go to the Used Lumber Yard and Purchase

Seven 14' x 6'' straight grained pieces of Yellow Pine "Door Jamb" wood sliced into the following sizes... (Aircraft grade wood may be substituted)

Such as Sitka Spruce or Douglas Fir (hand select)

28 ea 3/4" x 3/4" x 4' Universal Strut/Unit

4 ea 3/4" x 1 1/4" x 14' Bottom Spars

4 ea 3/4" x 1 1/4" x 13'6" Top Spars

2 ea 3/4" x 3/4" x 10' Stabilizer Spars

5 ea 3/4" x 3/4" x 3' Stabilizer Ribs

2 ea 3/4" x 3/4" x 4'6" Vertical Stabilizer Struts

2 ea 3/4" x 1 1/4" x 12' Tail Booms
ALL THE STUFF YOU NEED

THEN GET 2 15' BAMBOO POLES 2'' DIA.
CUT 2, 4'3'' LENGTHS FOR ARM PIT HOLDER
ALSO CUT THE REST INTO 4'6'' CHUNKS
SPLIT FOUR TIMES INTO 21 RIBS (SEE DETAIL)

96 4'' TRIANGULAR CARDBOARD GUSSETS
24 POLE HOLDERS (CLOTHES CLOSET TYPE)
25 YARDS 10' WIDE PLASTIC SHEET
2 2''X1''X1'' ALUMINUM ANGLES
66 WOOD SCREWS
24 2''X3/4' EYEBOLTS
1 PACKAGE COLORED CONSTRUCTION PAPER
300' BAILING WIRE
1 BALL HEAVY STRING RIB STITCHING
1 8OZ WHITE GLUE
200 STAPLES
1 ROLL 1'' MASKING TAPE

PLUS PATIENCE, A FRIEND, HILLS, SUNSHINE,
COURAGE AND A PLACE TO BUILD IT...
THE EMPENNAGE

NOTE: TOP RUDDER HELD IN PLACE BY BRACE WIRES ONLY

CARDBOARD FILLER

WIRE TO TOP OF + 2 STRUT
WIRE TO BOTTOM OF + 2 STRUT

12' 6"

12'

SEE CENTER SECTION DETAIL FOR EMPENNAGE/FLYELAGE ATTACHMENT DETAILS...

COVER BOTH SIDES OF VERTICAL STABILIZER WITH PLASTIC SHEET, STAPLE IN PLACE.

COVER ONLY TOP SIDE OF HORIZONTAL STABILIZER WITH PLASTIC SHEET. (SEE BUILDING WINGS)

ELEVATOR HELD IN PLACE BY SCREWS INTO VERTICAL STAB.

HOLE FOR WIRES

ELEVATOR HELD IN PLACE BY SCREWS INTO VERTICAL STAB.

ATACHING BRACE WIRES: LEAD WIRE THRU HOLES, BEND BACK AND WRAP.
(TURNBUCKLES OPTIONAL - WE DID NOT USE THEM)

BRACE WIRES

BRACE WIRES

GUSSETS IN ALL JOINTS

GUSSETS IN ALL JOINTS
"Gossamer Wings"

The upper wings are built shorter, this gives the dihedral when assembled...

Lower wings have only 4 ribs...

Lower wings illustrated

Build right wing with the center left

Glue all joints with white glue
Glue on gussets
Screw on pole holders
"Shine off" friends!

Use rounded leading edge in front

Gusset all joints both top and bottom

Be sure to label everything to avoid confusion

Upper wings illustrated

Upper wings have ribs every 2 ft except tips...

Pole holders on upper wings are on the bottom of the spars
"RIBS" * CURVED WOOD MAY BE SUBSTITUTED FOR BAMBOO.

- Tie ends of ribs to spars with string dipped in white glue, use liberal amounts on all parts and let dry thoroughly.

- Heat bamboo over stove and bend into ribs.

- Split bamboo as shown...

Each piece of bamboo should yield 4 ribs...

- Pole holder or front spar, shave strut to fit.

- Screws or screw-type beer bottle caps tacked into place.

"COVERING"

- Cut plastic sheeting for wing panels leaving excess to allow for fastening...

- Use masking tape on top of plastic on top of each rib before stitching.

- Staple plastic under leading edge stretch tightly back over wing fold under and staple...* A couple of friends will help to pull out wrinkles while you fasten the plastic on.

- Staple plastic under leading edge staple plastic under leading edge stretch tightly back over wing fold under and staple...

* Bottom of wings may be covered if desired.

String is looped around each rib through the covering to hold it down. Notice the finished wing light, strong, and transparent... but no feathers!
"TAIL BOOM MOUNT"  

NOTE: IT IS IMPORTANT TO ANGLE THE TAIL ASSEMBLY UP SO THAT THE WIND PUSHES THE TAIL DOWN AS YOU FLY (NEGATIVE ANGLE OF INCIDENCE).

- ADJUST FOR PILOT WEIGHT... LIGHT
- HEAVY
- HOLES FOR ADJUSTING ANGLE OF TAIL

STREAMLINE WITH CONSTRUCTION PAPER * TOP TAIL BOOM MOUNT SAME AS ILLUSTRATED EXCEPT IT IS NOT ADJUSTABLE.

"WIRING DETAIL"

WIRES ARE TIGHTENED BY CROSS WIRES EVERY OTHER BAY

TAPE ALL TOUCH WIRES

TAPE TO DISASSEMBLE

PLACE FOOT ON BOTTOM SPAR, PULL UP ON TOP SPAR, TAKE STRUT OUT, LEAVE WIRES ON.
WHEN THE CRAFT IS DONE, GO TO A LARGE SMOOTH HILL. WITH A HELPER ON EACH WING-TIP AND ONE ON THE TAIL, FACE INTO THE WIND.

TAKE ONE LAST LOOK DOWN THE 5 TO 10 DEGREE SLOPE YOU HAD DAMN WELL BETTER BE ON...

SHOUT "OK, LET'S GO" OR "I HAVE SLIPPED THE SURLY BONDS OF EARTH" OR "POWER TO THE PEOPLE" OR SOMETHING APPROPRIATE, ALL TAKE ABOUT SIX STEPS (QUICKLY) INTO THE WIND, SETTLE DOWN INTO THE ARMPIT HOLDERS, SHOUT "LET GO!" STAY AS FAR FORWARD IN THE "COCKPIT" OR "ARMPIT" AS POSSIBLE TO INSURE AGAINST A STALL. 

AT YOUR SIGNAL THE HELPERS GIVE ONE LAST SHOVE AND LET GO... WOW! YOU FLOAT OFF DOWN THE HILL INTO A NEW EXPERIENCE IN FLIGHT!!
IF THE MACHINE SEEMS TO STOP IN THE AIR
AFTER CLIMBING A BIT, YOU ARE STALLING...↑
MOVE YOUR LEGS FORWARD TO ANGLE DOWN
AND PICK UP SPEED.

IN THE NORMAL 10 TO 12 MPH WIND, GROUND
SPEED IS ABOUT 5 MPH OR SO. FULL STALL
LANDINGS AREN'T NECESSARY, BUT, IF YOU WANT,
MOVE THE LEGS BACK JUST BEFORE TOUCH-
DOWN AND THE GLIDER WILL FLARE UP AND
STOP DEAD.

TURNING IS ATTEMPTED BY SWINGING THE LEGS
INTO THE DIRECTION DESIRED. THIS IS NOT TOO
EFFECTIVE AS CHANLITE AND LILIENSTHAL DISCOVERED.

GOOD LUCK, REMEMBER, ALL HANG GLIDER PILOTS
ARE MORTAL...
FLASH!

IT IS RUMORED TWO BROTHERS FLYING FROM A LARGE SAND DUNE ON THE CAROLINA COAST HAVE INVENTED "NEW FANGED AERODYNAMIC CONTROLS"....

HERE IS A PLAN FOR THE N.Y.-PARIS VERSION OF "HANG LOOSE"*

- turn control operates ailerons and rudder
- three door hinges on each control
- 1/8" washers, 3/16" bolt
- 1/16" thimble
- 1/2" x 1" x 12" wood control horn
- control surface
- 1/8" ply gussets
- large pulleys
- 1/4" rubber shock cord
- tie downs OK
- extra struts to stiffen tips
- 1/16" cable
- 1/2" x 1/2" pine
- 1" minimum of pulleys
- check rigging to insure proper control action.
- for example a left turn requires N

* Hang Loose is a surfing term referring to a relaxed and confident style of riding waves.
OTHER THINGS I'VE LEARNED & POINTS OF INTEREST

HELPERS: Have the wing holders let go at the same instant. Many ground loops have resulted from one tip man letting go or pushing the wing differently from the other. Practice so the wing men have exactly the same degree of enthusiasm. The tail man is most critical. About 90% of the stalls on takeoff are due to the tail holder shoving down too hard or continuing to run and shove as the plane rises, thus causing a stall.

SPEED AND STALLING: Movie analysis of flights shows the importance of getting up good speed before and after takeoff. If the flyer is too eager and gets into the air before enough speed the ship will slow and drop a wing. It does not seem possible to bring up a stalled wing by weight shifting or controls.

TOWING: It appears that many outstanding flights have been made from level ground by towing with two runners holding lines attached near the wing tips. Well done it looks pretty spectacular and safe but I still say, "DON'T FLY HIGHER THAN YOU'RE WILLING TO FALL."

CONSTRUCTION NOTES: Use strong wire. Heavy bailing wire is fine. Piano wire or 1/16" cable is good. Be sure everything is square before flight. It seems like an obvious thing but some ships I've seen are so twisty from weak wire and out of line rigging that good flights are impossible.

COVERING: The center section should be covered as leaks in this area greatly reduce lift and increase drag. Extra strength can be gained by using Dacron and airplane dope. Glue on the Dacron and shrink tight by passing a medium hot iron over it. 4 to 6 mil polyethylene sheeting makes a very inexpensive covering. Doing the bottom of the wing seems to increase the glide distance. Real Mylar, if you can find it, is very strong and expensive, too.

DOUBLER:

RIBS: If bamboo is hard to find you can use those thin ones found in awnings and wall mats, but put one every foot instead of one every two feet. Aluminum tubing bent into a curve and screwed to the spars works well as does sheet plywood ribs cut from 1/8" sheet. Foam sheets cut into ribs and strengthened with cap strips make very strong and light ones. Good heavens, use your imagination!

WEIGHT CONTROL: Here's the details on the Rogallo or trapeze bar-type controls that have proven so successful. Make is from the same material as the spars or about .048 aluminum tubes. Wheels aid in pulling the ship back up the hill and in hard landings because it will just roll ahead instead of the sudden stop.
By Popular Demand!

We have made up complete kits on HANG LOOSE!!

Includes:

- Black or clear pre-cut covering
- 4 mil plastic
- Spars finished and marked
- Ribs, metal fittings, galvanized 1/16" cable, tape, string and gussets
- Screws, Plastic-cap

Price is $175 including shipping in USA.

From

Jack Lambie - 9460 Artesia Strut Fittings, ETC.
Bellflower CA 90706

Contact Southern California Hang Glider Association, Inc.
12586 Woodside St.
Los Angeles, Calif. 90066
Ph. (213) 397-4848

THE FUTURE?

I said this airline was short on capital. But this is too much!!!

SHUT UP about not at Wine yet!!!

WILDLIFE CONSERVATION

Wildlife Pelican

To go up push forward on the bar. You swing back thus moving CG back and pushing nose up. Watch speed!

ATTACH CABLE TO SEAT

BE SURE CONTROL CABLE IS ATTACHED TO BACK OF Rudder

Turns and banks are made by moving all the way out on the bar. This moves CG in direction desired.