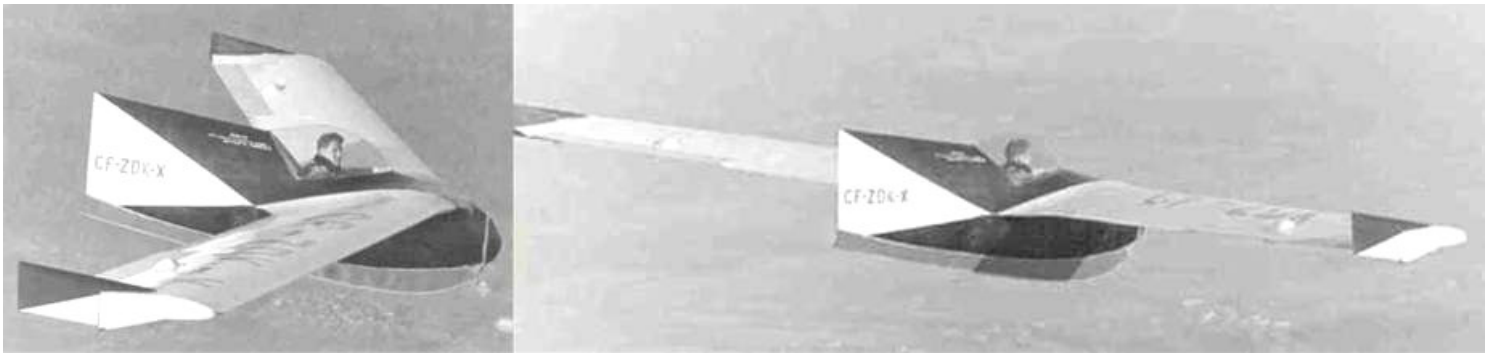
No. 213 MARCH 2004

T.W.I.T.T. NEWSLETTER

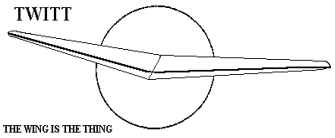


We haven't talked much lately about the BKB-1, so I thought I would include a couple of shots from the article on the website. This is Dave Webb during some of the initial test flights when the sailplane was still in Canada. We still wonder what it could do if built today with modern materials.

T.W.I.T.T.
The Wing Is The Thing
P.O. Box 20430
El Cajon, CA 92021

The number after your name indicates the ending year and month of your current subscription, i.e., **0403** means this is your last issue unless renewed.

Next TWITT meeting: Saturday, March 20, 2004, beginning at 1:30 pm at hanger A-4, Gillespie Field, El Cajon, CA (first hanger row on Joe Crosson Drive - Southeast side of Gillespie).



THE WING IS THE THING (T.W.I.T.T.)

T.W.I.T.T. is a non-profit organization whose membership seeks to promote the research and development of flying wings and other tailless aircraft by providing a forum for the exchange of ideas and experiences on an international basis. T.W.I.T.T. is affiliated with The Hunsaker Foundation, which is dedicated to furthering education and research in a variety of disciplines.

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Meetings are held on the third Saturday of every other month (beginning with January), at 1:30 PM, at Hanger A-4, Gillespie Field, El Cajon, California (first row of hangers on the south end of Joe Crosson Drive (#1720), east side of Gillespie or Skid Row for those flying in).

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PRESIDENT'S CORNER

This month I have included the annual roster of members at the end of the newsletter. Obviously the addresses are correct since no one has been complaining about not receiving their copy each month. However, there may be errors in the e-mail addresses so please check them closely and let me know if anything needs to be changed. I know how volatile some ISPs can be – here today, gone tomorrow – and I don't use some of the addresses very often, so make sure it's up to date.

I apologize for the fact that we don't have a formal program again this month. I was on track for one on a prototype model wing, but it fell through on such short notice that I couldn't find another speaker. I have a line on a speaker for May that I will start pursuing this week, so keep your fingers crossed that he will be available with this much notice.

For those of you on the east coast, I hope you are finally able to dig out from under the snow and get out your favorite flying wing and put it in the air. Take some pictures and send them in so the rest of the membership can see it in action.

As soon as I have all the correct information I will let you know where the Sailplane Homebuilder Association workshops will be in 2004. These are excellent venues for learning more about building techniques and, the ups and downs of some pesky design problems. There is one on the east coast, a central workshop that I think will really be in mid-America, and of course the western workshop over Labor Day weekend at Tehachapi. When you see the schedule for the one in your area be sure to mark you calendar and make your motel reservations. These are your chances to get hands-on with others who are interested in homebuilding, which is probably the only way you are going to get a flying wing into the air.

Andy

MARCH 20, 2004 PROGRAM

As we went to press we didn't have confirmation of a program. We are trying to get an instructor from one of the local community colleges to come in and talk to us about design engineering (aero, of course). This was a last minute substitution for the originally planned program that fell through and left us scrambling for a replacement. You can give us a call a few days before the meeting and we will let you know the outcome so you can decide on whether to do the traveling.

We were really looking forward to having a good program for you this month, but events seem to be working against us for right now.

LETTERS TO THE EDITOR

December 8, 2003

TWITT:

These pictures and article are from David Myhra's books on the Horten Brothers. It appears, by the information, that the accident of the Ho 9 V2 was caused by pilot error. Several things led to the crash, but the stall/spin situation happens often.

Richard Avalon

(ed. – Thank you for forwarding this material. I can't really publish any of it since it is copyrighted and I don't believe Myhra would give us permission because his books are still on seller's bookshelves. The pictures are photocopies so wouldn't reproduce very well for the newsletter. He also sent along the following written by Richard Anderson, EAA, Good Hope, IL, probably published in Sport Aviation.)

Top ten reasons Mitchell Wings don't have tails (with apologies to David Letterman):

10. Took so long to build wing, just said forget it, and went flying.

9. If other designers were any good, their planes wouldn't need tails either.

8. Superior stealth configuration fools FAA inspectors.

7. Last page of plans was missing.

6. Pilot is so skillful, doesn't need all that junk out back.

5. Built wing, ran out of money, said forget it, and went flying.

4. Only hanger available was real short and real wide.

3. Tails are for tailwheels.

2. Had a tail until that last real hard landing.

1. Makes them look so damn cool!

February 2, 2004

TWITT:

My name is Randy Taylor. I am a 20,000 hour Commercial Pilot as well as an accomplished RC Aircraft Pilot. I also have a Bachelor in Aerospace
Engineering from Auburn University. I have several model aircraft of a full-scale single pilot aircraft I am currently constructing. It is of a tailless design with a delta wing planform. I was searching for info on this design when I came across your website. The models I have flown have some undesirable stall tendencies.

I would like to join you. You may have the answers I need. Please tell me what I need to do to see more of your website.

Thanks,

Randy Taylor
randytaylor@direcway.com

(ed. – I wrote back to Randy since it sounded like he had something interesting going on, besides having some questions about handling characteristics. Unfortunately, he has not written back since then and we haven't seen a subscription check so are not sure if he is coming back.

If any of you are interested in a delta planform wing and would like to know more, contact Randy and see if you can get more information. Perhaps some response from the group will convince him he needs to join.)

February 17, 2004

TWITT:

Please renew my subscription for another year. I regret that I haven't been a more active member in terms of contributing material, but I enjoy hearing about everyone else's projects.

Keep up the good work.

Elliott Whitticar
Yardville, NJ

(ed. – Thanks for the renewal. We are always happy when our members enjoy the newsletter enough to keep coming back each year. We understand that not everyone has material to contribute, but we do encourage those that are working on projects or have come across something interesting to share it with the other members.)

February 7, 2004

Hallo,

I am working on a set of pages about cheap airplanes. I call them BULM (Basic /UltraLight /Motorized).

The Mitchell U2 is in it of course. But I can only find two pictures of the basic version of it. Do you have any other view of the cheap version? These days you can mostly find the ultramodern German U2 in the pictures.

Hope you can help. BTW, you can see a preview of the pages at:

http://users.skynet.be/nestofdragons/bulm.htm

Keep that brain spawning wings,

Koen Van de Kerckhove
nestofdragons@hotmail.com

(ed. – I referred Koen to Richard Avalon to see if he had some early pictures of the U-2 that would be of help. I also mentioned the BUG, having missed the point that all the criteria of BLUM had to be met. Koen wrote back with the following: "I cannot put the BUG in it. The M in BULM stands for Motorized. I want to ensure independent flying. Gliding is mostly done in a group, I think."

If anyone has other aircraft they think would fit into the BLUM criteria, you might pass it along to Koen just in case he doesn't already have it.)

(ed. – This came from Norm Masters and seems to have originated from a U-2 group list, similar to Nurflugel. Obviously, if you had lots of time on your hands there are a lot of different aviation oriented lists out there that could keep you busy at the keyboard. Thanks to Norm for including us in this exchange that also got Richard Avalon involved.)

Ryan wrote:

Group,

Are there any U-2s flying or projects in southern California?

Regards,

Ryan
rryan@san.rr.com
EAA Ch.14
San Diego, CA.

From: Norman Masters
To: U-2Wing@yahoogroups.com
February 10, 2004
Subject: U-2Wing

Ryan:

If you haven't been to a TWITT meeting you should go. Don't worry they'll let you in without being a member. They are a fun bunch and after the meeting they will probably show you around Bob's museum/hangar.

Get there early so you can visit with Bob and June before the crowd arrives.

From: "Richard <mitchellwing@earthlink.net>
U-2Wing
February 11, 2004

Norman and All:

Thanks for all of your input on the Mitchell wings. You have a great deal of aeronautical data and info on these things. Sorry to say, I don't have this type of data. I do have, however, the fortunate experience of working directly with Don. He was the kind of designer that could do things with airplanes that just worked. He vary rarely looked things up, he just did things. Kind of hard to explain, but it was like watching a great musician play without music sheets.

Also, for those of you who have not heard, Jon Jacobs, now holds the world record for Distance in a Straight Line on Limited fuel in the FAI Class, RAL1 (Microlights, Aerodynamic Controls Landplanes, Solo) For this record , you are allowed 7.5 kilograms, or 2.7 gallons of fuel. or 16.5 pounds of fuel. Jon practiced in

23 mph winds with gusts to almost 30 mph. Says a lot for the airplane and his skills. On the record attempt day he would have a 15 knot tail wind. His airspeed showed 45-50 mph and his ground speed showed between 65 and 82 mph.

The flight lasted 2 hours and 22 min. and he averaged 77.72 miles per gallon with an average speed of 72.25 mph, and the total distance was 171 miles and he still had 7 ounces of fuel remaining.

He had a 1/2 VW motor of about 14 horsepower. The B-10 was well built by Mike Wilson from the Toledo area and was about 20 years old and completely stock, with no modifications except a lexan windscreen to help divert the cold winds. So congratulations Jon (60 years old) and also for using such a fine and efficient airplane as the Mitchell Wing B-10.

Richard Avalon

March 1, 2004

RCSD Is Going On-Line

Hi Andy,

Unless you're a member of RCSE (the exchange), you don't know that RCSD has made available the January 2004 issue of RCSD in a .pdf format, on-line. The February issue will be available in a .pdf version soon, as well. However, the .pdf version will not include ads.

Could you cancel our ad in the TWITT newsletter, please, and take us off your exchange list for the newsletter?

I'd offer you a link off the RCSD web pages, but note that Bill & Bunny already have you included off their pages.

We plan to provide the current issue of RCSD in .pdf format at no charge starting with January. We will be phasing out printed snail-mail copies. The January issue is available at:

http://www.b2streamlines.com/January2004RCSD.html

If you have any questions, please let me know! I hope you enjoy viewing RCSD in full color!

Judy Slates
R/C Soaring Digest
RCSDigest@aol.com
http://www.b2streamlines.com/RCSD.html

(ed. – We have had a long term relationship with RCSD and are glad to see that they are progressing in a new direction.

I wrote them about our survey a year or so ago that found our members preferred to receive a paper copy of the newsletter rather than have to print it out from a computer file. They responded they had experienced the same response, but are now finding a new push to go electronic with the digest, thus have elected to discontinue the hardcopy version.

I don't have any immediate plans for converting to a pure electronic newsletter, but do see it sometime in the future, especially if the membership continues to shrink. I would like to hear from those of you who are on-line to see if you have changed your viewpoint, or whether you still prefer the hardcopy.)

February 12, 2004

Hi

I am trying to track down information on Bill Horton. Do you happen to know if he has any estate or who would be the copyright holder of his designs?

Thank you very much,

Matt Pollock
Matt.Pollock@fox.com

(ed. – I passed Matt the address for Russ Eckre, who is the last person we knew that had any information on William Horton. If anyone else has information that might be of help to Matt, please contact him.)

February 20, 2004

Dear Sir,

I write to ask if you still have copies of Al Bowers presentation on the HOrten designs as advertised on your web site.

Have you yet obtained the facility to pay by credit card, for overseas customers?

Kind regards

John ten Have
jtenhave@mets.mq.edu.au

(ed. – I included this one just to remind everyone that we do not have the capability to take payments for subscriptions or merchandise orders through credit

cards. We are just don't have the volume of transactions, and our price margins are so small due to our non-profit status that we can't absorb the extra cost of processing credit card or PayPal payments. I know this makes it hard for foreign members and those like John wanting to order a tape, but it is the best we can do under the circumstances.)

(ed. – Here are some of the more pertinent items from the Nurflugel mailing list. The first one is especially topical based on last month's meeting subject.)

January 14, 2004

Fauvel AV-222 3-D Diagram Wanted

I am interested in obtaining 3-D diagrams of the Fauvel AV-222 for use in constructing a 1/6 scale (stand-off scale, not exact scale), electric powered, radio controlled model. The web page

http://www.nurflugel.com/Nurflugel/Fauvel/e_AV222.htm

has one set of drawings; I will use these if I can not find anything better. I have sent an email message to the URL listed on that web page, but have not yet received a response.

Bruce W. Rose
bruce.w.rose@intel.com

(ed. – I missed this one last month, which would have made it more timely in trying to find an answer to his search. If anyone out there has or knows where he can get a set of diagrams, please let him know directly or through TWITT.)

February 3, 2004

Request for help: Richard Miller's address

Would anyone be so kind to provide to me the postal address of Richard Miller, his mailbox seems to be over quota and I need the postal address for a paper work to be sent to him.

Thanks

Peter F. Selinger
Peter.F.Selinger@jocki.org

(ed. – If anyone has Richards mailing address please pass it along to Peter. I haven't seen that he got an answer on the Nurflugel list.)

February 10, 2004

Subject: SWIFT Airfoils

After reading some material about it, I became curious about the design of the airfoils used in the SWIFT foot launched tailless glider. In case it is public information, does anybody has any clue where to find its coordinates?

Thanks,

Andre
almartins2000@yahoo.com.br

Andre,

According to the best information I have, the first prototype of the Swift used a Liebeck section. This was the Swift that debuted at the US Hang Gliding Nationals in the late 1980s (I think). From what I read this glider performed well in sink but came down like a brick when the pilot tried to fly fast.

According to the Stanford web site, the all-composite production Swift uses airfoils specially designed by the Stanford Group. I believe these are proprietary and are not available. (If anyone knows different, I'd be interested to hear.) You've probably already read this article, but in case you haven't check out:

http://aero.stanford.edu/Reports/SWIFTArticle1991.html

Most of the CB rigid wings (Atos, Stalker, etc.) likewise use proprietary airfoils.

However, one airfoil suitable for man-carrying swept wing gliders and for which the coordinates are available is the MH 78 designed by Martin Hepperle. Take a look at his web site:

http://www.mh-aerotools.de/airfoils/mh78koo.htm

Hope this is useful,

Vaughn Entwistle
ventwistle@zetron.com

CONTROL SYSTEM DESIGN

By Irv Culver

Cable tension is required to prevent lost motion (loose cables) at low temperatures, when the aluminum airframe shrinks more than the steel cables.

Cable tension is required to stiffen the cable axially. Note, the axial stiffness goes up as you increase the pre-tension, this is because the cables are wound or twisted so they can go around pulleys. The result is that the strands are not tight together at "0" tension so they act like a non-linear spring and require considerable tension to compact the strands together to achieve reasonable axial stiffness.

Cable tension causes friction mainly around pulleys, but also at bell cranks, etc. Large cables reduce the springiness on large airplanes and require more tension; result more friction.

The most successful answer is to swedge large diameter aluminum tubes over all the runs that do not go over pulleys. This increases the axial stiffness by at least a factor of 10. The result is smaller cables can be used. Also the aluminum tubing makes the cables expand and contract more like the airframe so less pre-tension is required. Result; less elasticity and less friction.

The other means to reduce friction is use large pulleys. Simple theory says that the friction caused by going around a pulley is proportional to the cable tension time the cable diameter divided by the pulley diameter. Test data and more elaborate theory suggest that the correct answer is more nearly the second power of this ratio.

If we assume that we must increase the pre-tension as we increase the area of the cable (cable tension ≈ diameter^2) then the above equation is:

$$\text{Friction} \approx \text{Cable Diameter}^3 / \text{Pulley Diameter}$$

Moral of this story is use minimum cable size and large pulleys on ball bearings with aluminum tubes swedged over all runs not used by pulleys. It is even more of a problem today due to the FAA requiring all control runs to be duplicated; 2 each (ed. – Not sure this applies to homebuilt aircraft, then or now).

For supporting the aluminum sheathed cable for long runs use micarta rollers on ball bearings, same as push pull tubes. A note on swedging the aluminum tube over the cables. Pre-tension the cable to approximate airframe system not cable limit design load or a little less, then swedge both ends of the tube for about 3". This pre-tension is to assure that a failure of the swedging will not cause failure of the control system.

Recommended pulley sizes – minimum pulley size is 40 X cable diameter, while maximum pulley size is ∞. If the control surfaces are aerodynamically boosted so that the control forces are low, then the required forces in the control system can be small, all except the lower (run around) cable on the ailerons. For this cable I recommend no pulleys, but rather a ball bearing bell crank at each end to turn the corner to the aileron. This should allow straight runs for this highly loaded cable.

I recommend using at least a minimum 3-times the cable diameter for the OD of the aluminum tube and of course the ID needs to be about .01" larger than the cable. Don't turn any more corners than necessary. Aluminum tubes come in 12' lengths so on long runs leave 3-4" of free cable between tubes so they can be stored. Design the airplane to allow the stiffened cables to be installed and removed.

ROGALLO WING HANG GLIDER

By Ray Roberts

Model Builder, August 1986, pp. 64-65

(ed. – This came in a package of material from Eugene Turner a while back and looked like an interesting project for a rainy/snowy day and only required simple materials. The actual hang gliders may have changed over the years, but the basics described in the article are still as relevant today as they were in 1986.)

This month's paper airplane, No. 11, is called the "ROGALLO WING HANG GLIDER."

The Rogallo Wing Hang Glider weighs approximately 35 lbs, is constructed from lightweight aluminum tubing, and covered with Dacron. Its average speed is 18-25 mph.

The Hang Glider is controlled through a combination of shifting body weight and manipulation of the crossbar (trapeze) located in front of the pilot. If you push it forward, the nose rises and the Glider slows down. Using this technique it can descend like a parachute. If you pull the trapeze back, the nose drops and speed increases. To turn, push the trapeze to the left and a right turn results. To achieve a left turn, push the trapeze to the right. Flights may be as short as a few seconds to as long as several hours.

Best flight conditions area steady 15 mph wind. Originating in California, hang gliding has grown into a popular national activity. Hang gliding's roots can be traced back to Otto Lillienthal's experiments of the

1890's. Today's materials and technology allows the average sportsman to enjoy this exciting pastime.

Hang gliding is not without danger! Common sense dictates the use of a helmet and sensible footgear, as well as light comfortable clothing to minimize scratches and brush burns. It is also recommended that you take lessons from a competent instructor before trying this exciting and dangerous sport.

SEE THE BACK PAGE FOR THE CUTOOUT

AVAILABLE PLANS & REFERENCE MATERIAL

Coming Soon: Tailless Aircraft Bibliography
Edition 1-g

Edition 1-f, which is sold out, contained over 5600 annotated tailless aircraft and related listings: reports, papers, books, articles, patents, etc. of 1867 - present, listed chronologically and supported by introductory material, 3 Appendices, and other helpful information. Historical overview. Information on sources, location and acquisition of material. Alphabetical listing of 370 creators of tailless and related aircraft, including dates and configurations. More. Only a limited number printed. Not cross referenced: 342 pages. It was spiral bound in plain black vinyl. By far the largest ever of its kind - a unique source of hardcore information.

But don't despair, Edition 1-g is in the works and will be bigger and better than ever. It will also include a very extensive listing of the relevant U.S. patents, which may be the most comprehensive one ever put together. A publication date has not been set yet, so check back here once in a while.

Prices: To Be Announced

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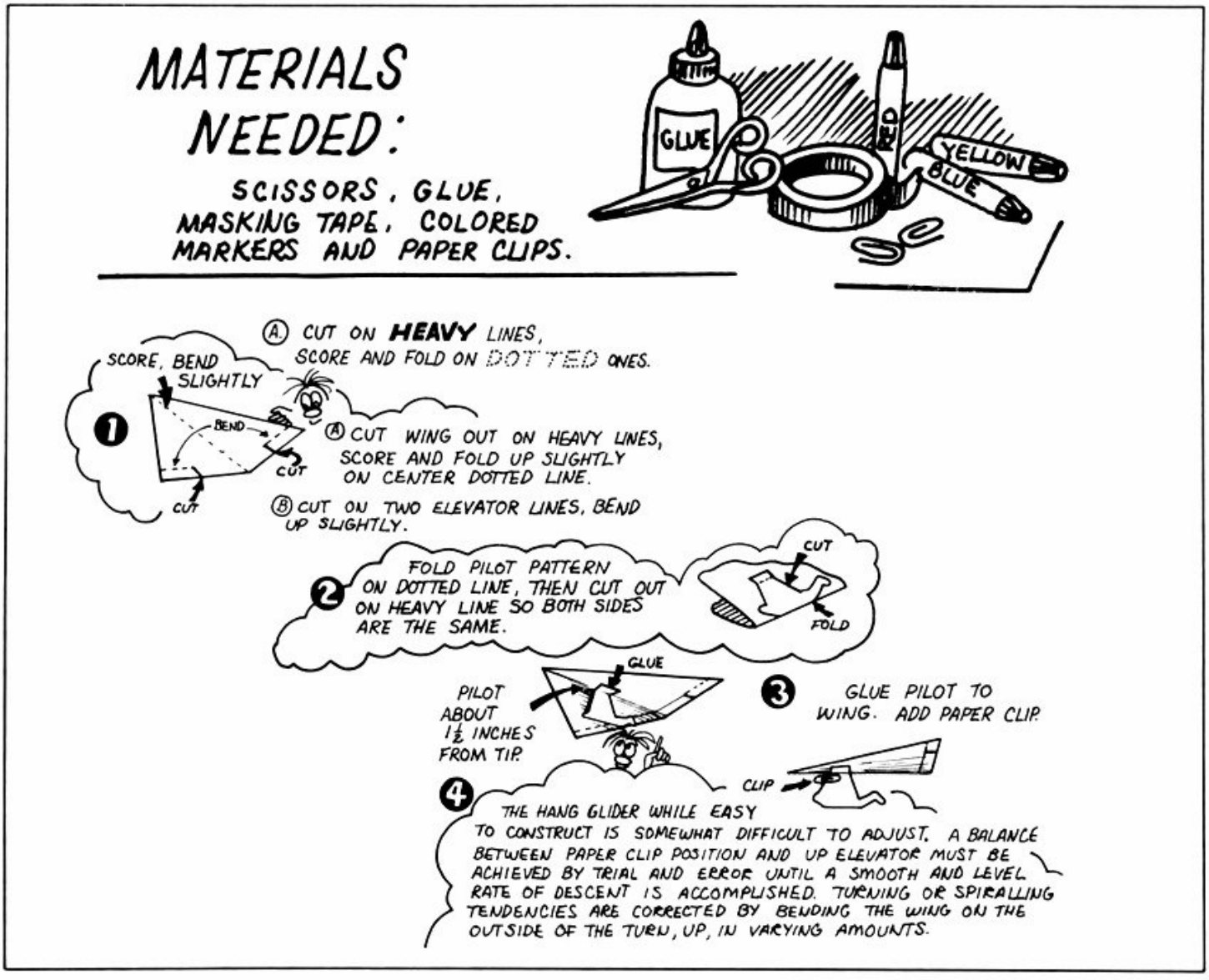

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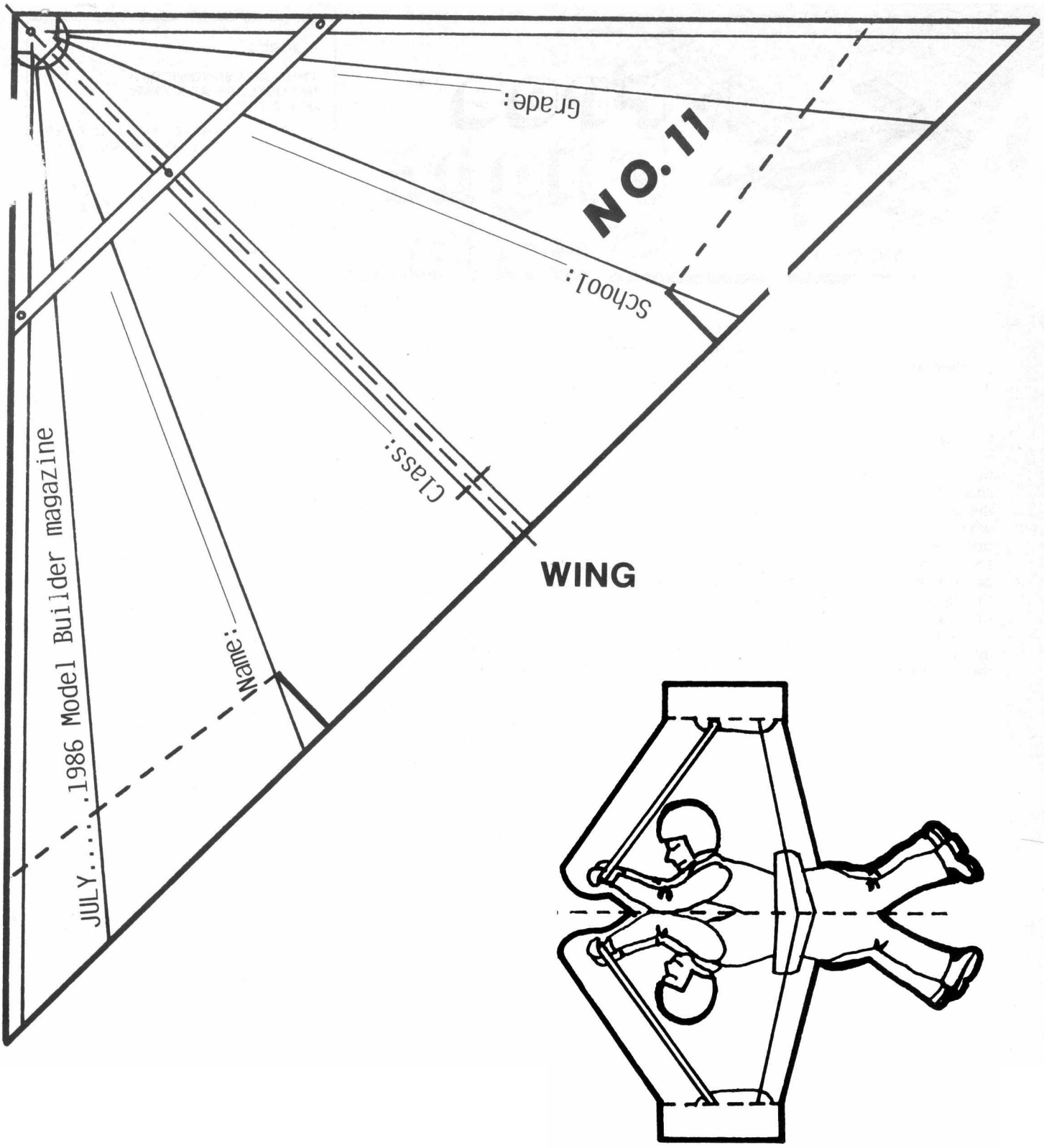
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