

INDOOR

NEWS and VIEWS

\$2/ YEAR NIMAS DUES \$1/ YR ADDITIONAL

Editor: Bud Tenny · Box 545 · Richardson, Texas · 75081

****NATIONAL INDOOR MODEL AIRPLANE SOCIETY****

New Members!

DANIEL G. BELIEFF, 204 Cedar Lane, Rockville, Md. 20851
 ROBERT J. DUNHAM, 4730 S. Yorktown Ave., Tulsa, Okla.
 ROBERT J. DUNHAM II (Family Member) 74105
 LARS GIERTZ, 11703 N. Willow Cir., Houston, Tex. 77071
 ALEX GODA, 329 East 83rd St., New York, N. Y.
 JIM KUTKUHN, 517 Georgetown Rd., Wallingford, Pa. 19086
 ROGER SCHROEDER, 4111 W. 98 St., Overland, Park, Kansas
 JOHN A. THORNHILL, 3334 Buchanan St. Apt. 103,
 Mt. Ranier, Md. 20822

Back Issues?

The recent postal rate increase raises the cost of mailing the current crop of back issues to 75¢. NIMAS members who wish a set of back issues (approx. 25 issues) can send the 75¢ (stamps preferred) and receive most of the issues from 1966 and 1967, plus 8 from 1965.

NIMAS Awards

Silver Cat. I HLG Award - 0:26.5, Jim Clem

Gold Cat. I HLG Award - 0:30.8, Dick Ganslen

Gold Cat. II HLG Award - 0:58.4, Dick Ganslen

A study of contest results listed in INAV yielded a list of over 15 NIMAS members who had qualified for one or more NIMAS Awards, but had not applied for them. And then there are those who have applied and not received their Award - sorry about that! There simply has not been time to make up the most recent ones - I hope to get to it in a few weeks.

NIMAS Aces

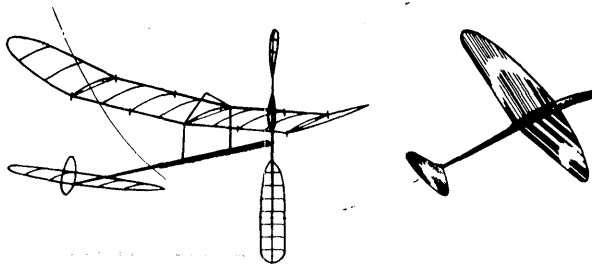
Last month's announcement of Hal Crane's Ace Award contained two mistakes: Hal Blubaugh won three Awards, but one was for glider. Also, Hewitt Phillips became a Cat. I Rubber Ace in April, 1967.

SPREAD THE WORD!

The Allegheny Model Aeronautics Council (Pittsburgh, Pa. area) held a Delta Dart contest recently. This was a brand new concept - contestants were children who visited a local shopping center which had a mall for flying. The entry fee was 25¢ (this gave them a one-day membership in AMA - a special deal where kids are covered for that day by AMA insurance for any event except those powered by engines larger than .049) and they were given a delta Dart kit. Members of the Council conducted building classes to help the kids get airborne, and gave flying demonstrations before the contest. Needless to say, this got a bit of publicity for the Council (they already are very active publicity-wise, since TV and radio stations let them make special demonstrations), and acquainted many more kids with modeling. A good idea!

CONTEST CALENDAR

MARYLAND - Wheaton. D. C. Maxcutors sessions at Kennedy High School - 7 pm to 11 pm, Jan. 26, 1968. Tom Vallee, 444 Henryton So., Laurel, Md. 20810 Phone 498-0790.
 NEW JERSEY - Union. Indoor sessions, Franklin High School, Union, N. J. 7 pm to 10 pm. Feb. 15, March 21. Ernie Kopecky, 38 Fawn Lane, Watchung, N. J. 07060
 PENNSYLVANIA - Philadelphia. Profile indoor scale session, Jan. 22, 1968. Bill Lindsay, 590 Byrn Mawr Ave., Byrn Mawr, Pa. 19010
 TEXAS - Denton/Dallas/Ft. Worth. Cat. I Record Trials on Jan. 20, 10 am to 5 pm. Bud Tenny, Box 545, Richardson, Tex. 75080 Phone 235-4035.



FAI INDOOR REPORT

New Steering Rule

The October CIAM meeting revised the balloon steering rule to read as follows:

To prevent a model from colliding with the structure of the building or with other models, a balloon, its line or a stick, two to eight meters long, may be used for three fifteen second periods during any one flight. The fifteen second period shall commence when the steering device first contacts the model, and the contestant may continue steering for the full fifteen second period regardless of the number of intermittent contacts between the steering mechanism and the model. The steering tactic is intended to change the model's direction of flight only.

It is the responsibility of the time-keepers to observe if the use of the balloon, or its line, or a stick by another competitor is likely to foul the model which they are timing, and to warn the user of the balloon or stick accordingly. If, however, a model is fouled by another competitor, the fouled competitor has the choice of another flight.

The source for the above was the December '67 Officer/Club mailing, and the revised FAI Rule Book will be available some time this year from AMA HQ.

INDOOR RULES

On page 46 of the Feb. '68 AMERICAN AIRCRAFT MODELER magazine there is an article which should be read by all indoor fliers. Entitled "New Indoor Rules?", it details the only two proposals now pending before the FFCB which affect indoor rules. You should read this article and then contact the FFCB member from your AMA District. The address will be found on p. 50 of the same magazine. One error was found in the presentation: The sentence just above the bold face heading "Proposal FF-67-A-1" should read, "Proposal FF-67-A-2 would orient the rules toward FAI practice without adopting FAI scoring and model steering." Whether you approve or disapprove of this proposal, be sure to express those views to your FFCB representative as soon as possible. If you fail to express your views, please fail to express your disapproval of the outcome!

RECORDS? MAYBE!

CAT. I RECORD TRIALS, St. Ed's High School, Dec. 10, 1967
 Lakewood, Ohio 35' ceiling.
 *Jr. AMA Cat. I FAI - 5:28, Linda Randolph
 **Jr. C Stick - 7:58.6, Linda Randolph
 CAT. I RECORD TRIALS, Texas Women's Univ. Dec. 23, 1967
 Denton, Texas 31' ceiling (AMA); 26' ceiling (FAI)
 *Jr. AMA Cat. I FAI - 8:01, Kristi Tenny
 **Jr. C Stick - 8:57, Kristi Tenny
 Jr. D Stick - 9:45.4, Kristi Tenny
 INDOOR CONTEST, Willis School, Jan. 7, 1968
 Hampton, Va. Cat. I 20' ceiling.
 Open C Stick - 15:30.2, Hal Crane

* & ** Linda's two records were set on Dec. 10, Kristi's followed on Dec. 23. Presumably both will be allowed, with the later records standing.

NEWS FROM AROUND THE WORLD

HUNGARY

On Sept. 9 the Hungarian Aero Club held a Cat. II R.T. in a 14.9 m site in Budapest. The previous FAI record (Hungarian National record) was held by Zoltan Ocsedy at 18:48. Andras Ree made 19:07, but Geza Varszegi's best flight was 20:00 for the new record. A planned Cat. I session was called off because of strong drift in a small site.

STATE OF THE ART

"Micro-Bird" by Fred Weitzel

Carl Goldberg's 4:05 record was the challenge. It had stood for 26 years, and seemed unattainable.

However, we had a new, light model, which had given a four minute flight at the previous session, so things looked promising. At that time the model had a very wide flapping arc, which gave a slow rate-of-flap that looked impressive. However, subsequent tests indicated that a narrow flapping angle might be more effective overall.

So the narrow flapping angle was used on June 11, and results were even better than expected, with 4:30.5 resulting on the first full wind-up. Fortunately this was an official flight, because on the next launch a spar snapped and the model shook itself to pieces in typical ornithopter fashion. (You just don't have minor accidents with these birds! - - and you don't get second chances either.)

Basically the design is the same as "Birdnik" (Nov. '65 INAV). The main difference is lighter construction, with mike wing and tail and more extensive bracing.

Actually it is a simple type to fly. Since there is no torque, turn can be in either direction. The model is not sensitive to power and can climb at a steep angle without stalling. So, the proper adjustment can be found quickly; after that it is simply a matter of "wind to the hilt and launch."

Of course, there are complications, mostly of a constructional nature. These are pretty well detailed on the plan. Dacron wing braces from the wing tips to the motor stick (fore and aft) were used but are not shown on the plan.

INDOOR PROFS - PRACTICE

Part III - Covering

One of the more difficult tasks in building good props is covering the finished framework. It is quite easy to distort a well-built prop while covering it, so the blades should be covered one at a time and then placed back on the building jig to dry thoroughly. Some builders then use heat to tighten the film on each blade before removing it, further insuring an undistorted blade. As usual when heat-tightening film, you should use considerable care to avoid over-tightening.

ASSEMBLE COMPONENTS OF FIXTURE AS SHOWN IN SKETCH. TIGHTEN THE PLAIN NUTS UNTIL THE RUBBER WASHERS LEAD AGAINST THE FIXTURE PARTS SO THAT, WHEN IT IS TWISTED IN OR OUT OF A HELIX, THE FIXTURE WILL HOLD THAT FIXED POSITION. THE SOFT PLASTIC WASHERS SHOULD HELP THE FIXTURE TO TWIST SMOOTHLY. A PLAIN NUT JAMMED AGAINST THE FIRST PLAIN NUT WILL PREVENT LOOSENING. COVER THE STRAIGHTENED FIXTURE WITH MIC, THEN SLIP INTO FIXTURE BASE BLOCKS AND SECURE WITH WOOD SCREWS. ① CAREFULLY TWIST THE FIXTURE INTO HELICAL POSITION AND SECURE TO BASE BLOCK WITH WOOD SCREW. ② THE TWISTED FILM SHOULD NOW CONFORM TO MOST PROP BLADE CONFIGURATIONS. LAY A PROP ON THE FILM AND PROCEED TO COVER IT AT YOUR LEISURE.

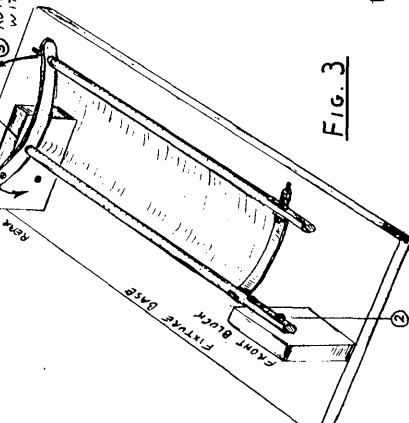
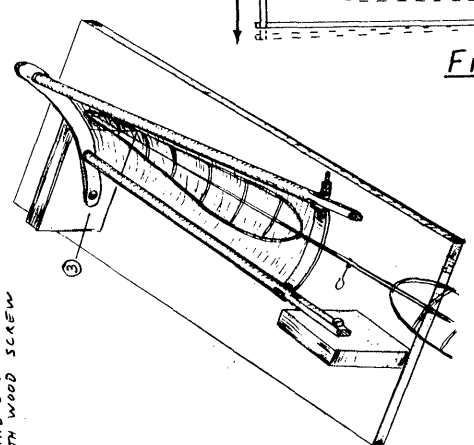
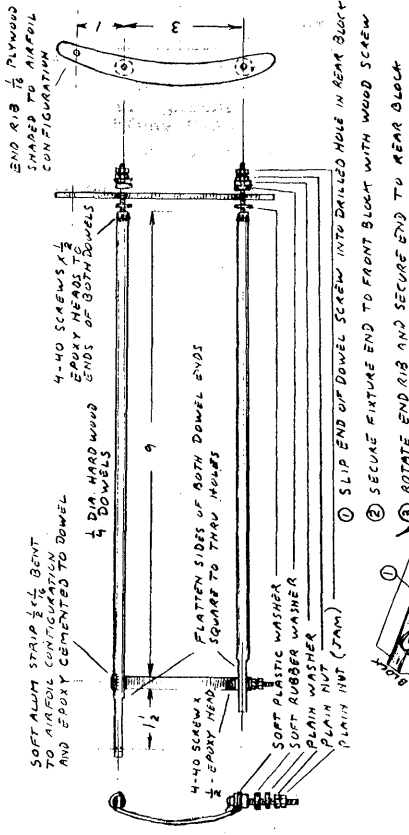


Fig. 3

Probably the most common way to cover props is shown in Fig. 1 below. The entire blade except the spar is moistened with water or saliva (saliva sticks better and dries slower) and the blade trailing edge is stuck to slack film on a hoop. The film next to the trailing edge is then trimmed loose to permit the rest of the outline and ribs to touch the film. This takes a light touch to avoid stressing the blade and a steady hand to avoid pulling the blade loose while trimming the film. To repeat; immediately place the wet blade back on the block to dry thoroughly before covering the other half of the prop.

Fig. 2 shows a prop covering frame. When building it, spread the ends at "A" while attaching the silkspan strip. This permits the silkspan to slacken when the frame relaxes. To cover the frame, squeeze the "handles" ("B") to tighten the silkspan; use rubber cement adhesive and aged microfilm. When the frame is cut loose, the frame will relax and slacken the film to make covering easier.

Fig. 3 details a prop covering fixture designed by Harry Lerman. The drawing and text is self-explanatory, and the device is quite good as long as the fixture is covered with very loose film.

Fig. 4 shows a modification to Harry's fixture which greatly eases the problem of slackening the film. Instead of covering the fixture on the bottom, install two strips of heavy silkspan across the top of the fixture, and cover it on top using rubber cement as adhesive. Thus, when the helix is twisted in (step 3, Fig. 3), twist the right hand dowel counterclockwise to slacken the film (Fig. 5)

A special vote of thanks to Harry Keshishian for making the photographic positive used in Fig. 3 and Fig. 4.

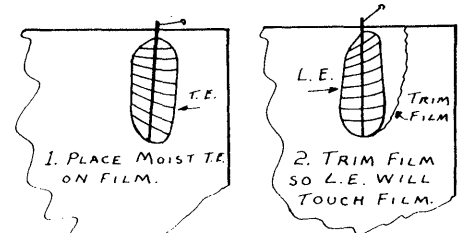


FIG. 1

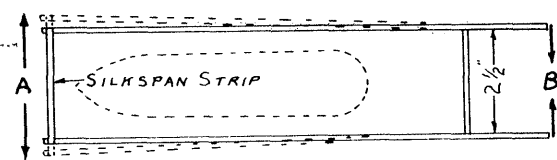


FIG. 2

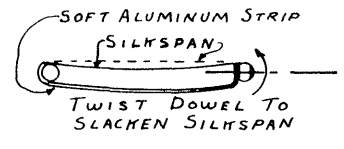


FIG. 5

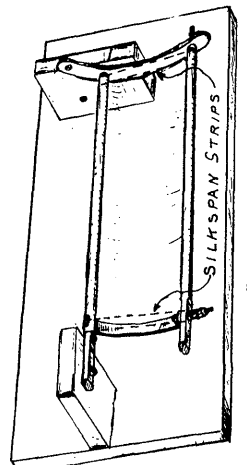
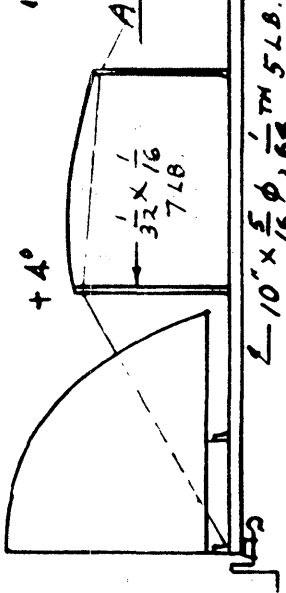


FIG. 4

"MICROBIRD" - INDOOR ORNITHOPTER

FRED J. WEITZEL

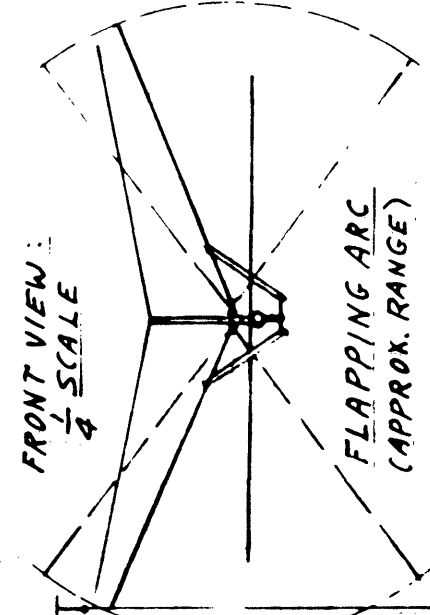


AREAS: FLAPPING WINGS: 42"
 FIXED WING: 39"
 TAIL: 33"

2 1/2" DIA.

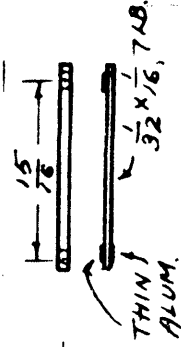
3 3/8

9"

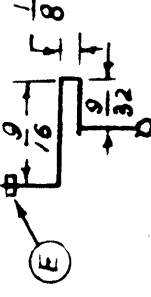


DETAILS: FULL SIZE

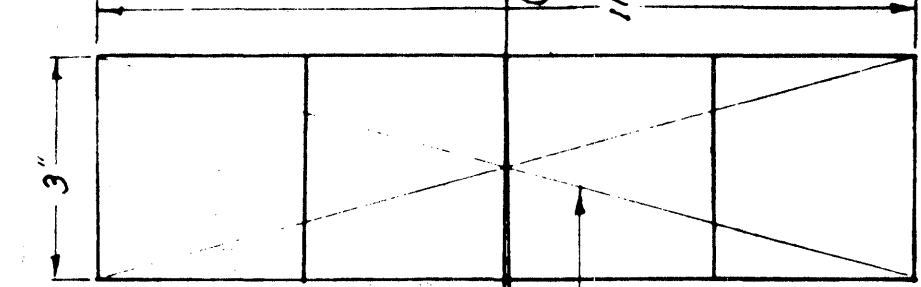
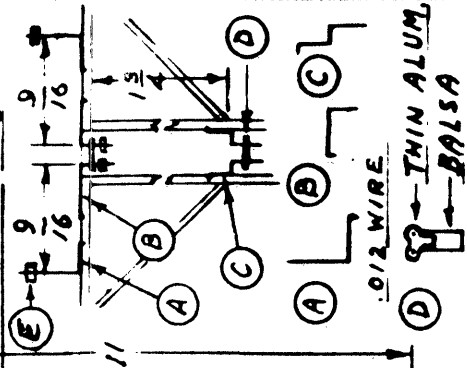
LINKAGE ARM:



CRANK: .015 WIRE



FLAPPING WING MOUNTING:



DACRON

CAT. III RECORD: 4:30.5
 JUNE 11, 67 LAKEHURST, N.J.
 - HANGAR #2

COVERING:

FLAPPING WINGS: COND. PAPER
 FIXED WING, TAIL & RUDDER: MIKE

Balsa chip-cement on after assembly. - FJW '67

REINFORCEMENT $\frac{3}{32} \times \frac{1}{16}$

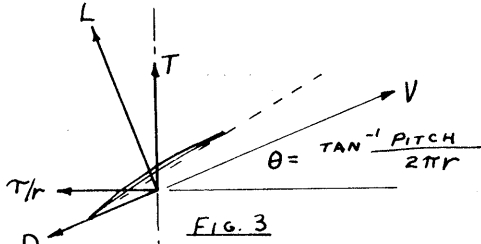
SPAR
 $\frac{5}{32} \times \frac{1}{16}$
 8 LB.

L.E. & T.E. $\frac{5}{32} \times \frac{1}{16}$
 RIBS $\frac{5}{64} \times \frac{1}{16}$, 5 LB.

Part II - Theoretical Considerations

Part I and the clarification above dealt with the "ideal" prop; that is, with a prop having constant pitch from hub to tip. The props we fly actually have the blade area beginning some distance out from the hub for practical and structural reasons. The discussions to follow deal with deliberate deviations from normal practice in a search for higher efficiency.

The following prop design discussion comes from Larry Renger (graduate of MIT in aero engineering). In Fig. 3, he shows a blade element located at radius r from the hub. The legends on the force vectors are: D = Drag, T = Thrust (thrust output of prop), L = Lift (of the blade element), V = velocity of the blade element and τ = Torque.



- (1) T (Thrust) = Lift $(\cos \theta - D/L \sin \theta)$
- (2) τ (Torque) = $r \times$ Lift $(D/L \cos \theta + \sin \theta)$
- (3) $\frac{T}{\tau} = \frac{\cos \theta - D/L \sin \theta}{r(D/L \cos \theta + \sin \theta)}$
- (4) $\frac{T}{\tau} = \frac{1 - D/L \tan \theta}{r(D/L + \tan \theta)}$

In the mathematical discussion above, equations 1 & 2 (derived from Fig. 3) are combined to yield eq. 3. It can be shown that (3) can be simplified to yield (4). D/L is estimated to be about .2 for normal indoor props. Using .2 as a value for D/L, a plot of T/τ can be computed using Eq. 4. Fig. 4 shows T/τ for a 34" pitch prop (solid line) and a 30" pitch prop (dashed line).

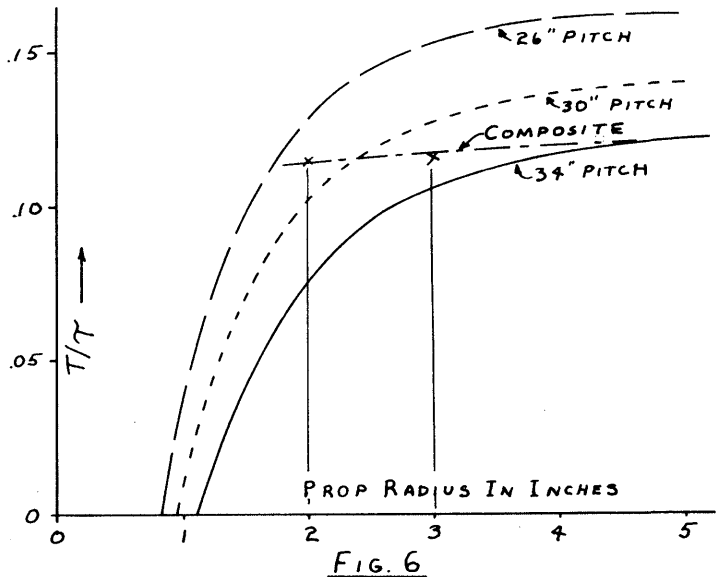
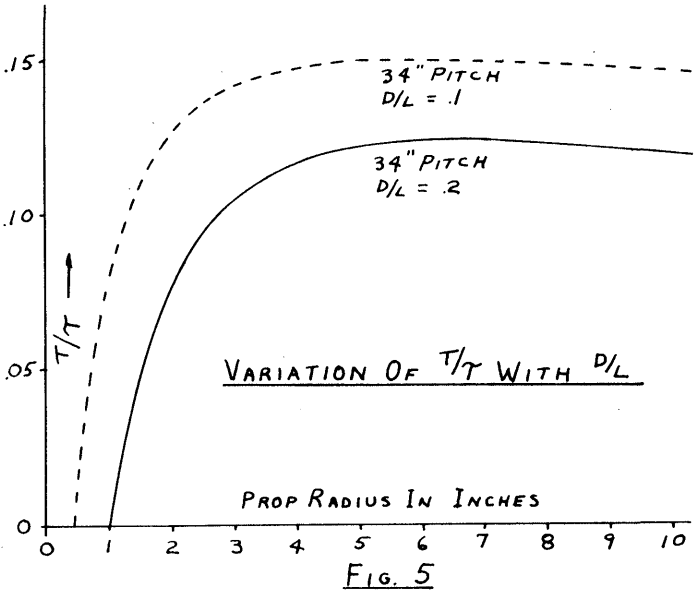
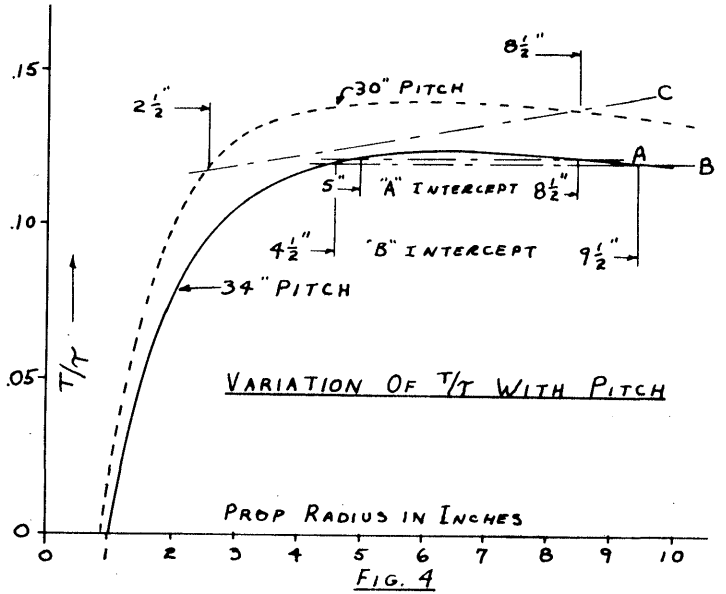
The ratio T/τ expresses directly the efficiency of the blade element, so Fig. 4 shows that prop efficiency gets better with lower pitch. It also shows that elements near the hub contribute little to thrust; in Fig. 3, if θ increases to a very large angle, Thrust as expressed in eq. 1 actually becomes negative - effectively it is pure drag for the model. This means that the prop will be more efficient if the hub section is left off.

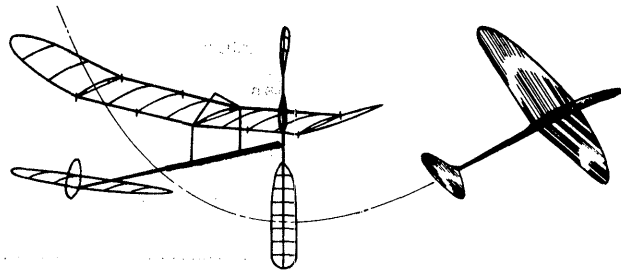
Meanwhile, prop efficiency can be increased by lowering the value of D/L. Larry estimates that D/L might go as low as .1; Fig. 5 shows the variation of T/τ for a 34" pitch prop as D/L changes from .2 (solid line) to .1 (dashed line). Larry feels that a D/L of .1 might be achieved by covering both sides of the prop. Once again, I have heard of double covered props being tried, but flight profiles were not taken. Since reduction of D/L results in higher efficiency of the propeller (as shown in Fig. 5), the prop will do the same work at lower torque input. So, a smaller rubber cross section will do the same job and you gain two ways - more turns possible and lower wing loading of the model. That's the theory - try it out!

Larry's design procedure calls for a horizontal intercept with the T/τ plot to determine prop diameter and blade length as shown with line "A" in Fig. 4. Line "A" would yield a prop with diameter 17" and a stubby blade segment only 3 1/2" long. Quite possibly this would give a prop with insufficient blade area. Line "B" would give a 19" dia. prop with a 5" blade segment - considerably more area. Of course you can use a tilted intercept such as line "C"; the whole point of this exercise has been to minimize the high-loss blade area near the hub.

Fig. 6 illustrates the theoretical effect of reducing blade angle near the hub. (This concept, plus the idea of eliminating blade area near the hub, was discussed in the July '63 INAV. No really exacting test of either concept has been made, but Stan Chilton, Hardy Brodersen and others flew props with the modified pitch distribution in the FAI team selection program just recently finished.) The three curves in Fig. 6 represent successively lower pitches - 34" (solid line); 30" (short dashes); 26" (long dashes). The curve for 34" pitch breaks downward beginning at 4" radius, while the other curves break closer. The dashed horizontal line represents a T/τ characteristic that would be nice to have; the x's represent the vertical coordinates necessary at 3" and 2" radius. It might be logical to assume that if the prop were 34" pitch from the tip to the

4" station, 32" pitch at 3" and 28" at 2" radius; then the composite characteristic might follow the desired curve. It certainly is worth a try - so practice recording flight profiles and try it!





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****NATIONAL INDOOR MODEL AIRPLANE SOCIETY****

New Members!

JAMES H. BENNETT, 324 Helfenstein Ave., Webster Groves, Mo. 63119
 MICHAEL D. COULSON, 1752 Hobson Rd., Ft. Wayne, Ind. 46805
 GUY EAVES, JR., 3232 Leslie Lane, NE, Atlanta, Ga. 30329
 FRANK LITTLETON, 1832 Bimini, Seabrook, Tex. 77586
 TOM MURRAY, 365 Bay St., Room 800, Toronto 1, Ont. Canada
 A. E. SORTWELL, 1036 Maple, Elk Grove Village, Ill. 60007
 JIM TEMPLETON, 1 Gemini Rd., Willowdale, Ontario, Canada

Thank You, Good Friends!

Last week, Jim Clem and Dick Ganslen dreamed up some sort of flimsy excuse (I should have been suspicious, since no excuse is needed for modelers to visit here) to drop in for a visit. After a certain amount of nervous suspense, they produced a pretty little speech and three packages. These mysterious packages contained a dial indicator caliper, an engraved Guinard stopwatch and a Hamilton Beach blender. The inscription on the watch told the tale: "In Appreciation - Ralph Tenny - Indoor Model Builders The World Over." The blender was a reward for Jody's outstanding patience and help (it is quite wearing to be the wife of a newsletter editor) over the past years

Thank you, each one of you. Dick and Jim were afraid that one of you might have dropped a hint - it was a total surprise and a very humbling moment - and will be remembered as long as I live. Special thanks are due to Jim and Dick and their wives for their planning and organizing this moment, and thanks again to all of you.

Nats Help Needed

Increased commitments to the Vietnam conflict are causing the U. S. Navy to request additional help from AMA to run the Nats. The National Free Flight Society and NIMAS have been asked to host Free Flight and Indoor events. Pending approval by HQ, we have directors for Indoor Rubber and Indoor HLG. Help is needed in all FF events (indoor and outdoor) as processors, recorders, and many other necessary tasks unknown to the average entrant. Any NIMAS member who plans to attend the Nats should consider helping on one or more days. All those who can help send NIMAS your name and indicate events where you feel qualified to help. The entire program will be coordinated through NFFS, for best management of manpower. It is not necessary to hold a CD license to help, even as event directors. Incidentally, it is likely that the Nats will be during the week of Aug. 5-10. The number of days allotted will be decided sometime this month. Info on the Indoor site should also be available for the March issue.

NIMAS Awards

Silver Cat. I Rubber Award - 11:59, Bob Champine

Junior NIMAS Awards

Silver Cat. I Rubber Award - 8:57, Kristi Tenny

Gold Cat. I Rubber Award - 9:45.4, Kristi Tenny

NIMAS Aces

After two goofed-up attempts to name the present NIMAS Aces, perhaps this will be correct and complete: Hal Crane Hewitt Phillips, Bob Randolph and Bud Romak.

INDOOR RULES

Indoor fliers are reminded that final vote will soon be taken on FF-67-A-1 and FF-67-A-2, proposals which will effect reasonably large changes in the structure of the indoor rules if they pass. Refer to p. 46 of the Feb. '68

AMERICAN AIRCRAFT MODELER for details of these proposals. An error in text appears on p. 50: The sentence just above the bold face heading "Proposal FF-67-A-1" should read, "Proposal FF-67-A-1 would orient the rules toward FAI practice without adopting FAI scoring and model steering." This proposal, if passed, will have a direct effect on your indoor activity. Contact your FFCB representative and express your approval or disapproval of these proposals as soon as possible. If you fail to make your views known, you have no complaint since you offered no guidance to the FFCB member.

NIMAS POSTAL MEET

Favorable comments on the rules for the Annual NIMAS Postal meet (formerly limited to Easy B) have resulted in the following setup:

Easy B event - Rules for model p. 78, '68 Rule Book.

HLG event - AMA Rules except two ceiling classes: Cat. IA - 18' to 25'; Cat. IB - 25' to 35'.

Rubber Event - AMA Rules except for ceiling measure. All model sizes combined.

General Rules: Enter (postmark) before March 31, '68. Entry fee 15¢ per event, stamps preferred. Separate events may be flown at different sessions, all flights for any single event must be made same session. Special events for Juniors, all other ages combined. NIMAS Certificates through 3rd place each event, special award for Juniors and high placing Seniors.

Ceiling measure: HLG - AMA (Sec. 8.21, p. 14, '68 Rule Book). Easy B and Rubber - FAI measure (p. 56, '68 Rule Book). Include ceiling measure with each entry.

Scoring: All results corrected to highest ceiling via NIMAS Fudge Factor: ratio of ceiling height for HLG, Square root of ratio of ceiling height for Rubber and Easy B events.

Send entry and result sheet signed by AMA member or AMA CD to: Bob Putman, 507 Darlene, Arlington, Tex. 76012

POSTAL CHALLENGERS

Bill Gibbs, 5005 Halifax, Cypress, Cal. 90630, would like to challenge other Juniors in Cat. I HLG, Indoor Stick and Cabin. Has choice of 25' (AMA) and 28' (AMA) sites.

CONTEST CALENDAR

COLORADO, Denver. Magnificent Mountain Men Indoor Contest. Feb. 11, 1968, Aurora Central High Gym, Aurora, Colorado. Stick, Paper Stick, HLG, Scale, Easy B and Delta Dart (Jrs. only). Ed Collins, 4318 E. Utah Pl. Denver, Colo. 80222

GEORGIA, Atlanta area. Easy B contest. Walt Rozelle, 1403 Midlawn Drive, Decatur, Ga. 30032 (Feb. 11, 1968)

NEW JERSEY, Union. Indoor sessions, Franklin High School, Union, N. J. 7 pm to 10 pm. Feb. 15, March 21. Ernie Kopecky, 38 Fawn Lane, Watchung, N. J. 07060

PENNSYLVANIA, Pittsburgh. 4th Annual Allegheny Indoor Air Meet, March 31, 1968. Delta Dart, HLG, Prefab, Easy B, Indoor Stick/Paper Stick, Scale, Originality & Performance. 5 age groups. Ron Ganser, 2500 Mission St., Pittsburgh, Pa. 15203

TENNESSEE, Tullahoma. Coffee Airfoilers Class AA Indoor Meet, Cat. I. Feb. 18, 1968. HLG, Paper Stick, Scale, Indoor Stick. Separate classes for Juniors. J. H. Perdue, 603 Crestwood Dr., Tullahoma, Tenn. 37388

TEXAS, Dallas/Denton/Ft. Worth. Cliff Model Club Annual Indoor Contest. Cat. I (31") HLG, Scale, Paper Stick, Indoor Stick (all ages combined); Jetco ROG (Jr. only) Bill Chenault, 5906 N. Jim Miller, Dallas, Tex.

OKLAHOMA - Tulsa. Tulsa Glue Dobbers Monthly Indoor Contest. Feb. 25, 1968. Air Guard Hangar at Tulsa Int'l Airport (56' AMA, 42' FAI). HLG, Easy B, Indoor Stick and Scale. Practice begins 9 am, official flying at noon. First Annual Tulsa Glue Dobbers Indoor Meet. Mar. 10, 1968. Site pending - Air Guard Hangar hoped for. Contact Bob Hanford, 3838 South 88th E. Ave., Tulsa, Oklahoma 74145. 918-627-6932

INTERNATIONAL CONTESTS

ROMANIA - International Indoor Contest, Salt Mine site. Organizer: Ion Bobocel, Aleea Titus no. 6, Raion N. Balcescu, Bucuresti, RS Romania. April 4-5, 1968
 CZECHOSLOVAKIA, Brno. International Indoor Contest. July 6-7, 1968. Info came from Rudolf Cerny, Sumavska 22, Praha 2-Vinohrady, Czechoslovakia.

INDOOR ELSEWHERE

Czechoslovakia has chosen their 1968 Indoor Team with a series of three competitions. The final score was the total of the results (two flight total) from the best two out of three. The results:

1. Jiri Kalina	52:50	44:45	97:35
2. Eduard Chlubny	48:45	40:45	89:30
3. Juraj Sitar	48:00	39:11	87:11
4. Karol Rybecky	47:57	36:18	84:15
5. Dagmar Chlubna	47:58	33:51	81:49
6. Rudolf Cerny	47:25	30:48	78:13

Kalina, Chlubny and Sitar will be the team, and Rybecky is alternate. The final session (all meets held in the big hall in Brno) was held Nov. 11 with temperature at 9° C. and high humidity. Turbulence and drafts plagued most of the rounds, ruining many models. The results:

1. Rudolf Cerny	23:30	23:55	47:25
2. Jiri Kalina	19:20	25:25	44:45
3. Juraj Sitar	18:54	20:17	39:11
4. T. Weigert	16:40	19:58	36:38
5. Karol Rybecky	18:08	17:50	36:18
6. Stefan Kekely	15:48	19:08	34:57
7. Dagmar Chlubna	19:45	13:09	32:54

A total of 17 contestants entered the competitions. The very poor weather has caused plans to begin the next team selection series in July. The Czech state of the art is advancing rapidly, with light models (about 125 sq. in. wing area) down to .021 oz.

STATE OF THE ART

The model of the month is the one which placed Eduard Chlubny on the Czech Indoor Team for the 1968 Indoor World Championship. Not many details are available except those on the plans, but average conditions in the hall in Brno dictates that the models must have good gust stability. See above for some contest results of this design.

THE LAB

The Blubaugh Fence

The Feb. '66 INAV contained a flight test report on a modification for IHLG - Hal Blubaugh's trailing edge fence which was mentioned by Bill Gieskieng in the '64-65 Zaic Yearbook (p. 164). A follow-up report in the April '66 INAV gave some added info, and showed the fence having an 8% edge over the same glider without the fence.

Since those reports, other fliers have tried the fence (see sketch below for example) with varying results. Ned Smith has had both good and bad flights, for an inconclusive result. Hank Nixon, flying in a 24' site, was getting between 0:24.5 and 0:26 with one of his gliders; with a fence added his flights ranged between .3 and .8 seconds higher.

Bob Clemens gave a fairly detailed report of his test, which used Larry Renger's "Boxy" (Sept. '65 INAV), built the size shown (2/3 full size). His best time in the 23' site he regularly uses was 0:25.2. He then added a fence which tapered from .05" at the wing root to zero at the tips. Average of the next 10 flights was 0:25.5, with the best flight 0:26.2. His comment on the test: "These times were achieved with very little if any increase in launch altitude, but with much smoother transition and definitely better sinking speed."

After flying the fence for some time, it is apparent that gliders just fly differently with the fence, and it seems that the fence has a definite advantage. I believe

that many experimenters have used a deeper fence than is optimum - my present guess is that between .05" and .07" is about right for most gliders. The only other hint I can offer is that the tail boom should be stiff - because no glider with a limber boom has ever flown well for me, if a fence was used also.



NEWS FROM AROUND THE WORLD

OHIO - Cleveland. A severe snow storm made travel rough for entrants. Conditions were the usual - turbulent and drafty. Winners: Paper Stick; Jr. - 7:32, Ronny Ganser, Sr. - 8:55, Mike Thompson, Open - 11:44, Bill Hulbert. Indoor Stick; Jr. - 11:33, Linda Randolph, Sr. - 7:18, Bill Schubert, Open - 12:15, Ron Ganser. HLG; Jr. - 1:25, Ronny Ganser, Sr. - 1:57.9, Bill Schubert, Open - 1:54, Don Eble.

TEXAS - Houston. Indoor activity is under way in Houston with sessions in a gym at Rice University. The group is active and enthusiastic, and should soon be turning very good times.

TEXAS - Dallas/Denton/Ft. Worth. With two record trials (contest on the side) to break in the excellent site at Texas Woman's Univ. in Denton, the fliers are getting the range in HLG. Mike Fedor has led the pack in HLG, with 0:29.5 as best official to date. Brian Ganslen is leading in Junior, with 0:22.8 for his best. Rubber events have been marred by drift due to temperature changes, and an early flight of 8:04.7 by Kristi Tenny won the January event - the air "went south" immediately after. Tom Peadon won second with his first indoor model, beating out Dick Mathis' 5:48.7. Will Dick let Tom build at his house again? Tune in next month!

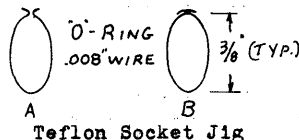
RECORDS? MAYBE!

GREAT LAKES INDOOR AIR MEET - Jan, 13-14, 1968 Cat. II Cleveland, Ohio. Public Hall, 80' ceiling. Open A ROG - 14:27.3, Bob Randolph Open Ornithopter - 3:15.0, Ken Johnson CAT. I RECORD TRIALS, Texas Woman's Univ. Jan. 20, 1968 Denton, Texas. 31' ceiling (AMA) 26' ceiling (FAI) Sr. AMA Cat. I FAI - 6:53, Mike Fedor

HINTS AND KINKS

Wire O-Rings

The Mar. '67 INAV hinted that a rubber O-ring slipped onto the motor before tying the knot would simplify hooking and unhooking the motor, besides permitting hook-up without losing turns. Fred Weitzel suggests that small wire can be formed into similar fixtures. The sketch below shows how: form an oval with small hooks, then hook the hooks and squeeze them shut. Relative weights: rubber O-ring - .002 oz., wire (010" wire) - .00045 oz., (.008" wire) - .00035 oz. Very small plastic sleeving 1/4" long slipped on the ring adds .0002 oz; I doubt it helps much, but it makes me feel better!



Dick Ganslen suggests that tissue sockets can be made by rolling them on small diameter teflon tubing. Insert music wire or other wire inside the tubing to stiffen it, then roll the socket as usual except let it dry in place. The glue won't stick to the teflon, so the finished socket will slide off later.

Save Microfilm Solution!

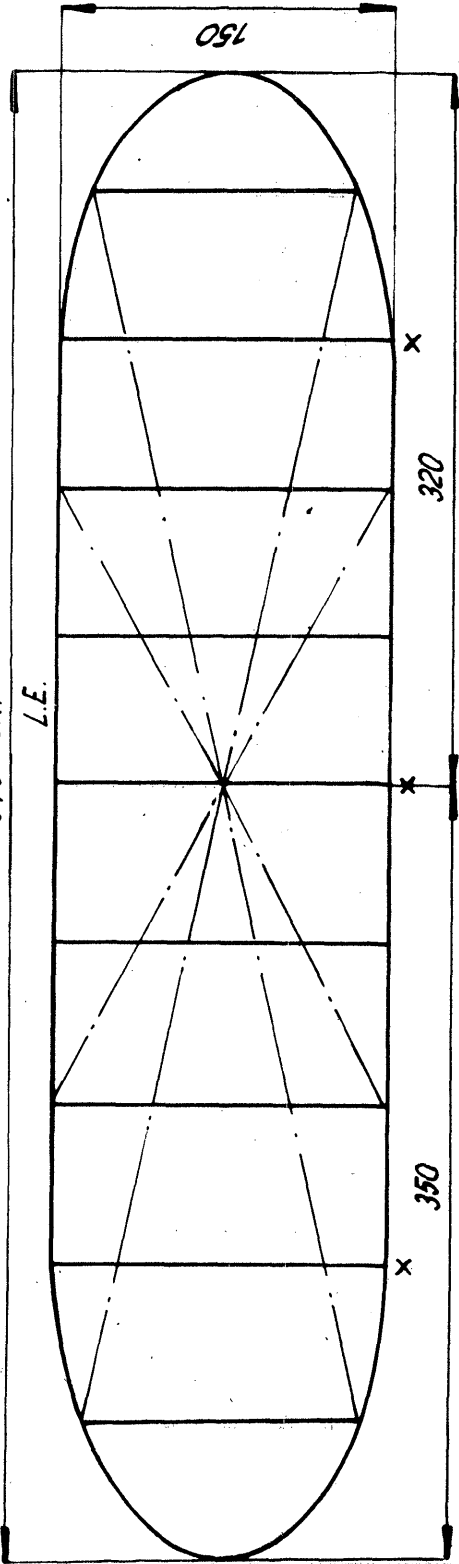
Tom Vallee suggests that you save a lot of microfilm solution if you use a small tank when pouring small hoops. This is an excellent approach; if you don't have a small tank and can pour large uniform sheets, several small hoops can be put on one large pour.

LAST MINUTE BULLETIN

AMA HQ has announced that the Mats will run Aug. 3 thru Aug. 8, with Navy airshow Aug. 3 & 4 and flying to begin Aug. 5. Extra flying hours each day are planned.

670 FLAT

L.E.

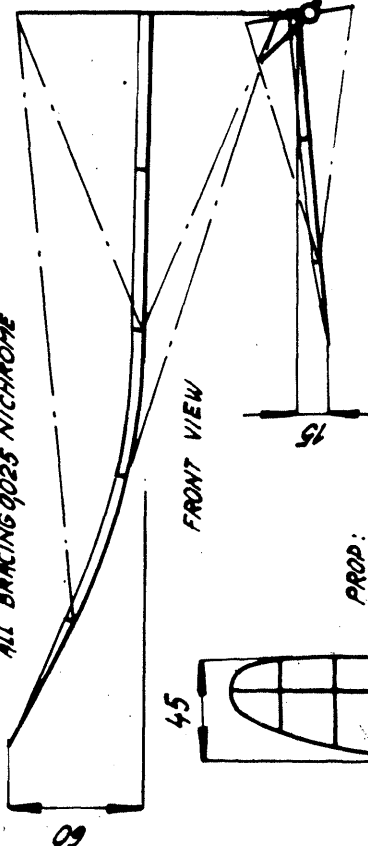


X COMPRESSION RIBS

648 PROJ SPAN

9,01 dm² PROJ AREA

ALL BRACING Q025 NICHROME



45

FRONT VIEW

PROP:

400 DIA

750 PITCH

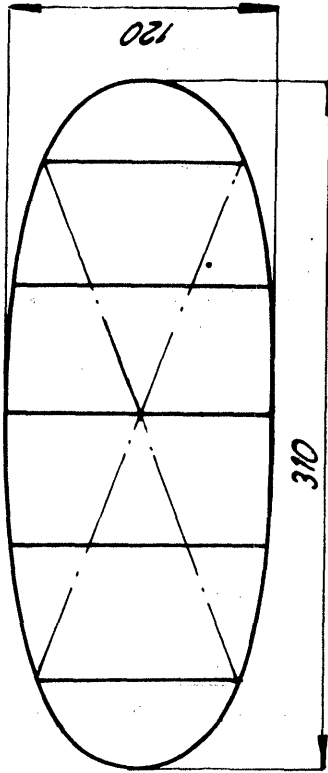
4%

60% CG

POWER:

400mm LOOP 12 x 109 PIRELLI

L.E.



8

3,15 dm² STAB AREA

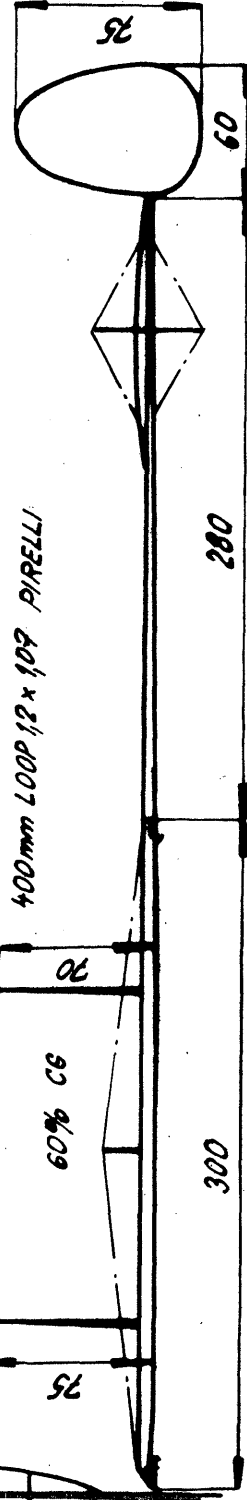
2ND PLACE QUALIFICATION FOR WCh. 1968

BEST SINGLE FLIGHT 26 min 4 sec.

WEIGHTS:

WING	0,235
FUS+TAIL	0,368
PROP	0,107

RUBBER	0,710
TOTAL	1,085
	1,795 gr



280

300

1967 FAI INDOOR STICK BY EDUARD CHLUBNY BRNO CZECHOSLOVAKIA

INDOOR PROPS - THEORY

Rebuttal To Part II

Several people wrote in with comments on Part II. I am now sure that the series is being read attentively and with appreciation - thank you for all the comments.

Roger Schroeder, Bob Platt and Larry Renger all wrote in to explain that parts of Part II were in error. Each arrived at the same conclusion by a different route - if anyone is interested in the derivation, write for a copy.

The first and major error is that T/τ does not express propeller efficiency directly. The correct expression is:

$$\text{Prop Efficiency} = \frac{T}{\tau} r \tan \theta$$

The general shape of the efficiency curve is similar to that for T/τ , with the same x-axis intercept. The slope of the rising part of the curve is steeper, and the curve rises to a maximum at $\theta = 45^\circ$.

Efficiency is not much different for pitches from 20" to 35", differing by about 2 1/2% at 6" radius. Bob Platt's comments indicated that efficiency falls by 10% going from 45° down to 12 1/2° and up to about 73° for D/L = .1. For D/L = .2 the limits are 20° and 60°, approximately.

Paragraph 5 (part II) is correct. Par. 6 is incorrect, in light of Platt's comments above. In the light of other comments all theory presented to date does not support the concept outlined in par. 7 and Fig. 6. Continued good results with props of this type are the only reason for including this approach. In effect: "Hang the theory - it works!"

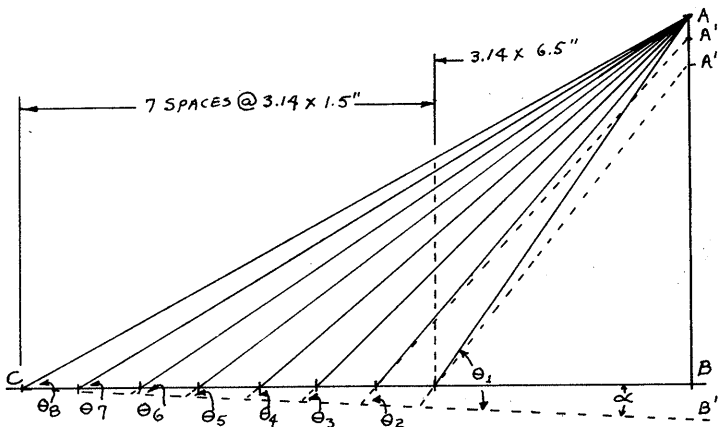
Other criticisms include objections by Walter Erbach. He points out that graphs in Figs. 4, 5 and 6 used fixed prop pitch (pitch of the prop block), which is correct. Either T/τ or Efficiency curves must use effective pitch. The built-in angle of attack changes the pitch required in the block to a higher value. Walter also claims that D/L = .2 is too low to be realized in practice, and has made measurements supporting this stand. Regardless of what value of D/L is obtainable, it is important to reduce this parameter to as low a level as possible to increase prop efficiency.

In summary, the study of T/τ was not wasted, because it underscores the undesirable effect of high blade angle near the hub. Some of the supporting material for this rebuttal will be presented at the end of the series.

An afterthought: Is someone willing to make a theoretical study of prop efficiency as applied to indoor models? That is, everything presented has been, or has followed the lines of standard propeller theory. T/τ has been shown to vary drastically with change in pitch; info is available on the torque/turns variation of pirelli as you change cross section size of the rubber. What is more efficient: A short loop of big rubber turning a high pitch prop slowly or a long loop of thin rubber (same weight of rubber) turning a low pitch prop at some higher RPM? Or, somewhere in between, as we now operate? Just as a truck or car is geared to match the torque curve of the engine and the type of service, is it possible that some combination of design RPM (and effective pitch) will result in a more efficient energy transfer than we now obtain?

Part III - Graphical Design

The method below has been suggested by Ned Smith and Charlie Sotich, and is the basis for the method used by



Hardy Brodersen. The graph is drawn to scale: line AB = Effective Pitch (Recap - Part 1, Dec. '67 INAV) = distance travelled by model during one revolution of prop. Line BC = 3.14 x prop diameter, and the other segments of BC represent 3.14 x diameter of each rib station. The line segments between A and line BC form the effective pitch angle for each blade station. A prop built to this design would have zero angle of attack, so line B'C is drawn with angle α = desired angle of attack for the blade. Extend the segments from A to B'C to form angles $\theta_1, \theta_2, \theta_3, \dots, \theta_{10}$. It should be noted that this will not result in a prop building jig with helical pitch distribution except in special cases.

The example discussed above was for a helical pitch jig. The dotted lines to A' and A'' show the type of pitch layout experimented with by Stan Chilton. Hardy Brodersen also reduces the angle of attack at the tip (washout) by the same method.

Next month - another graphical method and some arguments for prop gearing.

INDOOR PROPS - PRACTICE

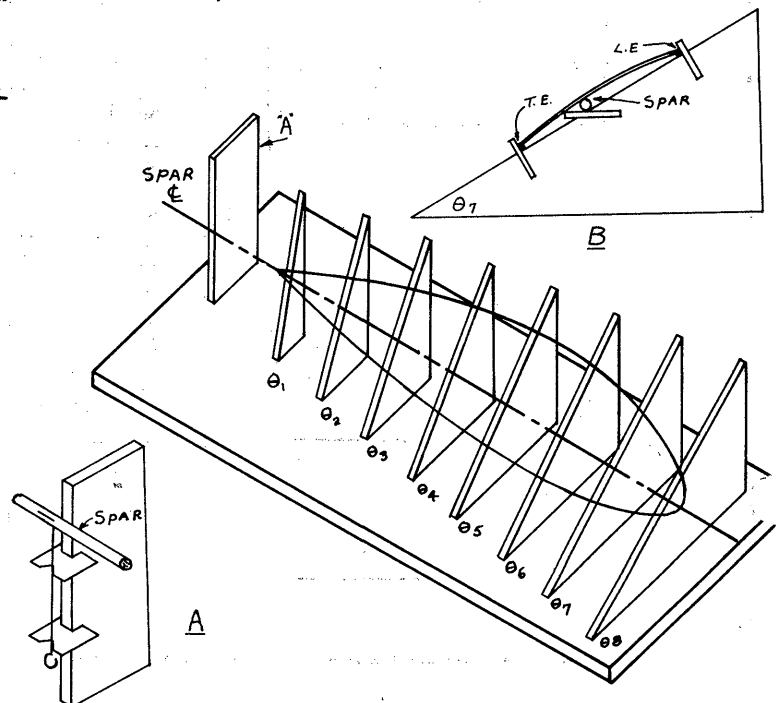
Part IV - Prop Jigs

Part I (Nov. '67 INAV) dealt with conventional prop blocks, design and construction. Carved prop blocks have several disadvantages. They are difficult to carve with ordinary tools, the block for a big prop is expensive, and you need so many if you build many different sizes of models. If you wish to experiment with non-helical pitch distribution (the THEORY series has implied that a prop which has a constant angle of attack will have a non-helical pitch distribution), it is difficult or impossible to carve a block to suit.

The prop jig below was submitted by Hardy Brodersen; he did not claim origin and I don't know who built this type of jig first. Nonetheless, this type of jig can be used to build props of any type of pitch distribution, and it can be quickly modified to produce a prop with different pitch at only one or two stations.

The design of this jig is done graphically - see the graph in THEORY (above). Each triangle in the jig below corresponds to a triangle in the sketch above, with like stations numbered alike.

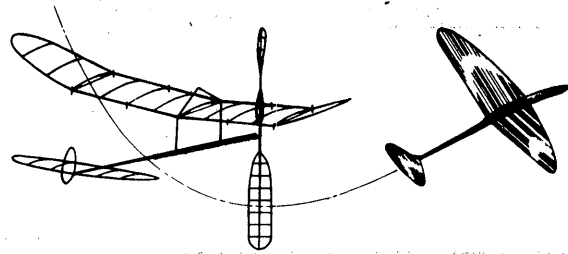
Cut the station triangles carefully to insure accuracy. Measure their locations carefully on the baseplate. Glue θ_1 and θ_8 in place and pin a piece of 1/16" music wire or tubing to those two stations in the position shown by the centerline on the sketch. If you then glue the other stations in place just touching the wire, the whole jig will have proper alignment. Block "A" is located at the center of prop spar, to give a vertical reference for the prop hook. Two sheet metal pieces can be inserted in "A" to give a better reference (see sketch A). Each rib station needs to have three pegs installed on it (see sketch B). The center peg supports the prop spar during construction, and the other two define the blade outline.



INDOOR**NEWS and VIEWS**

\$2/ YEAR NIMAS DUES \$1/YR ADDITIONAL

Editor: Bud Tenny · Box 545 · Richardson, Texas · 75081



NATIONAL INDOOR MODEL AIRPLANE SOCIETY

New Members!

HERBERT G. BAUGHMAN, 2345 13th St. SW, Akron, O. 44314
 JAMES HANST, RD #2, Box 421, Valencia, Pa. 16059
 CLYDE HARE, 2879 Anderson Dr., Allison Park, Pa. 15101
 PAUL KASTORY, 132 Bronx Ave., Pittsburgh, Pa. 15229
 JOHN H. KRICKEL, 1612 Springbrook Ct., Decatur, Ga. 30033
 JAMES H. PERDUE, 603 Crestwood Dr., Tullahoma, Tenn. 37388
 JIM STEVENSON, 4936 South 86th E. Ave., Tulsa, Okla 74145
 CHESTER WRZOS, 184 Oak St., E. Orange, New Jersey 07018

Family Memberships

JOHNNY KRICKEL, 1612 Springbrook Ct., Decatur, Ga. 30033
 CHARLES KRICKEL, 1612 Springbrook Ct., Decatur, Ga. 30033

Change of Address

Please note this change of address for Lew Gitlow and MicroDyne: P. O. Box 2338, Leucadia, Cal. 92024.

The Indoor Nats!

The Planning Meeting for the 1968 Nats was held at Olathe NAS, Olathe, Kansas during the week of Feb. 25, 1968. The following details about the Indoor Nats come from Pete Sotich.

The site will be the Kansas City Municipal Auditorium, which has floor area (inside the bleachers) of 125' x 200' with maximum ceiling of 96'. There are some obstructions which may or may not be movable, and their exact effect is hard to access from info presently available. Those who flew at Will Rogers Coliseum in 1964 can probably expect similar conditions; while the ceiling should be slightly better than the '66 Nats at the International Amphitheatre in Chicago.

Because of an attenuated schedule for the '68 Nats, Indoor will be flown on Sunday, Aug. 4, 1968, and will be staffed entirely by AMA personnel (timers and all). While every effort will be made to assure sufficient personnel, it is possible that a system of time-a-flight-fly-a-flight may be necessary. This can be minimized if rubber fliers will time HLG fliers (the usual time sharing schedule will be in effect) and visa-versa. Bud Tenny will CD the HLG session and Tom Johnson will CD the rubber session. Both of them will certainly appreciate all volunteer help that can be made available; please volunteer by sending your name to: Bud Tenny, Box 545, Richardson, Texas 75080.

It is anticipated that Indoor Scale will be held in similar fashion to last year, and will be CD'd by Jim Root, 3412 Norton, Independence, Missouri.

Dick Black Memorials

Jim Hanst recently made some color slides staged by Ron Ganser as the first contribution (finished artwork) to the Dick Black Memorial series. These particular slides are on the subjects of cutting spars and ribs, and pouring microfilm; they cover these two subjects well. After the slides are organized and the tape lecture made, these will be the first of the Memorial series.

To review what is planned, slide/tape lectures (combined with other audio-visual techniques where advisable) will be made available to clubs and individuals for instructional purposes. The following is a partial list of planned topics: Model winding, covering (paper and microfilm), model steering, model construction techniques, wire bending, rubber stripping and wood selection. Anyone who wishes to help with this project may contribute finished slides or suggestions for other topics.

Junior NIMAS Awards

The July '67 INAV announced the availability of NIMAS Awards for Juniors, with the following qualifying times:

Indoor Stick (Any class indoor model, single flight)

AWARD	Cat. I	Cat. II	Cat. III
Silver	7:30	15:00	21:00
Gold	9:30	18:45	26:30
Diamond	11:15	22:30	31:30

Indoor HLG (Best single flight of nine)

AWARD	Cat. I	Cat. II	Cat. III
Silver	0:18	0:34	0:41
Gold	0:22.5	0:41	0:49
Diamond	0:27	0:49	0:56

These awards, like the regular NIMAS Awards, are for NIMAS members only. Further details on the Award program can be obtained upon request.

NIMAS Awards

Silver Cat. I Rubber Award - 10:25, Bob Platt

Silver Cat. I HLG Award - 0:29.4, Ed Veselsky

Silver Cat. I HLG Award - 0:29.8, John Orrell

Gold Cat. I HLG Award - 0:32.2, John Orrell

NIMAS POSTAL MEET

A reminder to those who wish to enter the NIMAS Postal Meet: Your entry must be postmarked on or before Mar. 31, 1968. Check Feb. '68 INAV for nit-picking details; Easy B, HLG (2 classes), Indoor Rubber. Ceiling height corrected by NIMAS Fudge Factors.

Special note: Easy B to be paper covered only! Some of you have inquired; sorry I omitted that detail!

CONTEST CALENDAR

ALABAMA, Huntsville. Class AA Indoor Meet at Madison Co. Coliseum on March 31, 1968. Indoor Stick, Paper Stick, Cabin, Scale, Easy B. Cat. I Site. CD E. Minter, 2317 Calumet Ave. S.E., Decatur, Ala. 35601

MICHIGAN, Detroit. Annual Indoor State Meet; May 5 or May 12, 1968 at Michigan State Fair Coliseum. Firm date in April '68 INAV. Novice events: HLG, ROG and Cabin; two age classes for Novice. AMA events: HLG, Indoor Stick, Paper Stick, Indoor Scale. For entry blank or more info contact: Walter Hartung, 14759 Kilbourn Ave., Detroit, Mich. 48213

MISSOURI, St. Louis. March 15, 1968; Indoor Symposium by Kirkwood Thermaleers. Program by Lew Merlotti, Bob Hotze, Richard Hardcastle and Ed Capogreco. Held at Crestwood Bowl at 7:30 pm.

March 24, 1968 - Class AA Indoor Meet at East St. Louis Armory, 2931 State St.; 11 am to 5 pm. HLG, Easy B, Indoor Stick. Richard Hardcastle, 7319 Wise Ave., St. Louis, Mo. 63117

NEW JERSEY, Irvington. Indoor flying sessions; Madison Ave. Elementary School Gym every Tuesday 7 pm to 10 pm. Chester Wrzos, 184 Oak St., E. Orange, N. J. 07018, ph. 673-7951.

NEW JERSEY, Union. Indoor sessions, Franklin High School, Union, N. J. 7pm to 10 pm. March 21, 1968. Ernie Kopecky, 38 Fawn Lane, Watchung, N. J. 07060

PENNSYLVANIA, Pittsburgh. 4th Annual Allegheny Indoor Air Meet, March 31, 1968. Delta Dart, HLG, Prefab, Easy B, Indoor Stick/Paper Stick, Scale, Originality and Performance. 5 age groups. Ron Ganser, 2500 Mission St., Pittsburgh, Pa. 15203

TEXAS, Dallas/Ft. Worth/Denton. Class A Indoor contest, Mar. 24, 1968. Indoor Stick, Paper Stick, HLG, Scale, Sub.-Jr. Rubber (Delta Dart), Sub.-Jr. HLG. First place trophies plus NIMAS Certificates. Bud Tenny, Box 545, Richardson, Tex. 75080, ph. 235-4035.

VIRGINIA - Hampton. Brainbusters Annual Spring Indoor Meet at Willis School on April 14, 1968. Indoor Stick, HLG, Easy B. Cat. I site - 20' ceiling. Don Orr, 320-D 73rd St., Newport News, Va. 23607.

RECORDS? MAYBE!

BRAINBUSTERS CAT. I RECORD TRIALS - March 10, 1968
Willis School, 20' ceiling.
Open FAI Cat. I FAI - 17:29, Hewitt Phillips
Open C Stick - 19:30.2, Hewitt Phillips

INTERNATIONAL CONTESTS

ROMANIA - International Indoor Contest, Salt mine site. Organizer: Ion Bobocel, Aleea Titus no. 6, Raion N. Balcescu, Bucuresti, RS Romania. April 4-5, 1968
HUNGARY - Indoor Team Selection - Round 1, May 1, 1968 Hungarian Championship & Round 2, May 26, 1968; both these meets to be in Debrecen. Team selection, Round 3, June 9, 1968, in Budapest.
CZECHOSLOVAKIA - Brno. International Indoor Contest, July 6-7, 1968. Rudolf Cerny, Sumavska 22, Praha 2-Vinohrady, Czechoslovakia.

NEWS FROM AROUND THE WORLD

COLORADO - Denver. The Delta Dart portion of the Feb. 11 Magnificent Mountain Men contest was a smashing success. One hundred youngsters entered the meet and "zillions of airplanes crowded the sky with a blanket of humanity cheering them on." (Reported by Bill Gieskieng) This is one example of how successfully youngsters can be introduced to the concept of indoor flying; an easy next step is HLG and then Easy B.

TEXAS - Dallas/Ft. Worth/Denton. The Cliff Model Club Annual Indoor Contest was 38 entrants strong - one of the largest entries ever for this meet. The real battle - HLG - had been building up at previous flying sessions. Dick Mathis and Mike Fedor tied with 1:03.4 - a whopping 5.5 second increase over previous sessions. John Orrell was 3rd with 1:02. Brian Ganslen won Jr. HLG with 0:26, followed by Jimmy Clem (0:24.2) and Dennis Johnson (0:14.2). Other winners:

<u>Paper Stick</u>		<u>Indoor Stick</u>	
Dick Ganslen	8:32.0	Bud Tenny	11:27.0
Bob Wilder	7:44.8	Mike Fedor	10:19.0
Mark Valerius	6:02.0	Kristi Tenny	10:14.4
<u>Indoor Scale</u>		<u>Junior Jetco</u>	
Bob Wilder	111.4	Steve Valerius	1:20.0
Gene Simpson	94.0	Jimmy Clem	0:53.4
Mike Fedor	88.6	Louise Sturgill	0:46.0

STATE OF THE ART

Two of the top Easy B designs in the U. S. share the spotlight this month. The Kokomo Bomber by Jim Richmond and Al Rohrbaugh's Easy B are quite similar in design except for the rudder, and both models have rivalled times of Paper Stick models, even with all balsa props. Details are given on both built up and all balsa props, since the contests in the Midwest allow built up props on Easy B.

Jim explains certain design details of the Kokomo Bomber: "The stab is made without a center rib, but the paper is supported by means of a small balsa piece cemented to the boom. The wing rib layout adds strength to the wing by acting as a crooked spar. The fence on the stab trailing edge seems to reduce stall tendencies at the start. The extra wing offset was added for the same reason."

Al comments: "Although the light weight is an important factor for good duration, the prop is, as usual, somewhat critical. Due to the light wing, both tips will wash out under full power unless prop flare is enough to hold air speed low enough to prevent washout. The trick is to get maximum climb angle while keeping air speed just under stall. The wing is adjusted perfectly flat and the front wing post should flex sufficiently to permit the left wing leading edge to lift enough to give effective washin. When done properly, this method gives variable torque control while maintaining minimum washin. The rudder has approximately equal area above and below the boom to prevent rudder offset from twisting the boom. It might seem questionable to go to all this trouble, but it is a case of what the extra time is worth."

INDOOR PROPS - PRACTICE

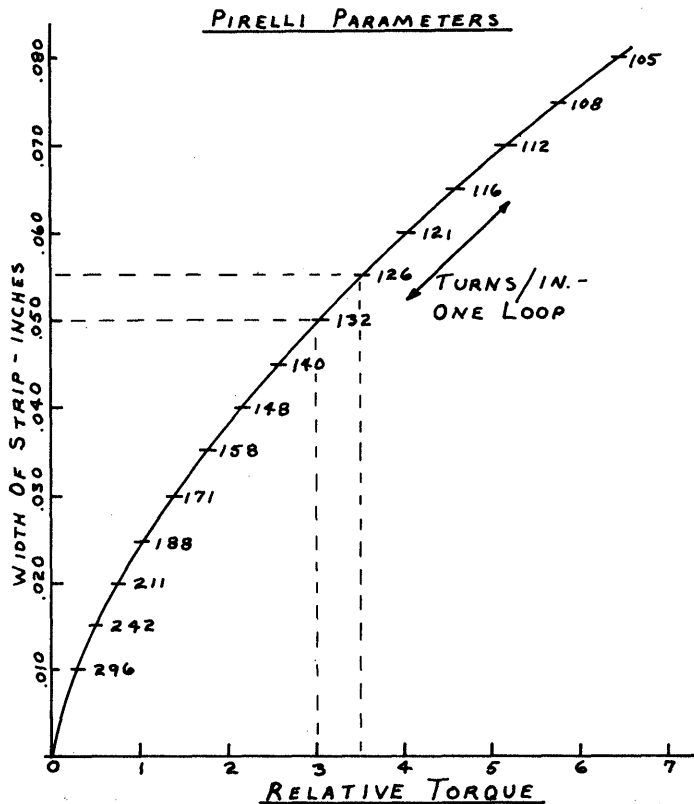
The continuation of Part IV which was scheduled for this issue will appear next month due to space limitations.

PIRELLI PARAMETERS

The chart below was furnished by Jim Richmond and the info presented in it was a joint effort by Jim and Charlie Sotich.

Pirelli is known as a highly variable substance, so none of the numbers below can be considered as absolute. However, the presentation gives maximum safe turns and relative torque as a function of strip width for the standard strip thickness.

An example on how to use the chart: if you substitute .055 rubber for .050 (same length loops), the weight will change by .055/.050 - an increase of 10%. Relative torque will increase by 3.5/3 or 17%, and the maximum turns will decrease by 126/132 or 4.5%. Since these are two standard rubber sizes, it is obvious that fine control of power has to be a matter of winding technique!



QUESTIONS AND ANSWERS

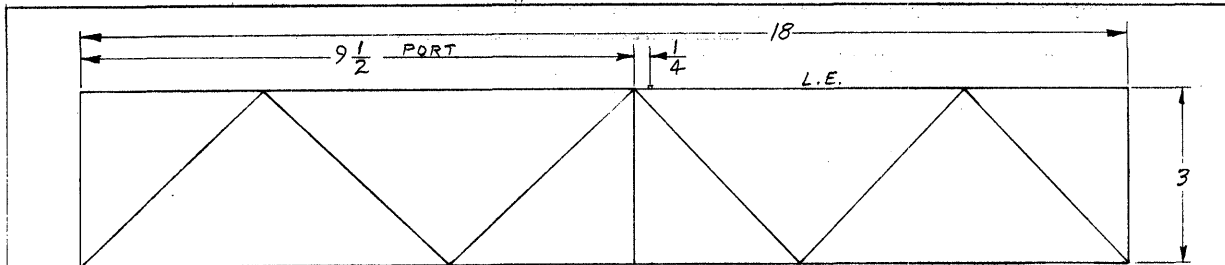
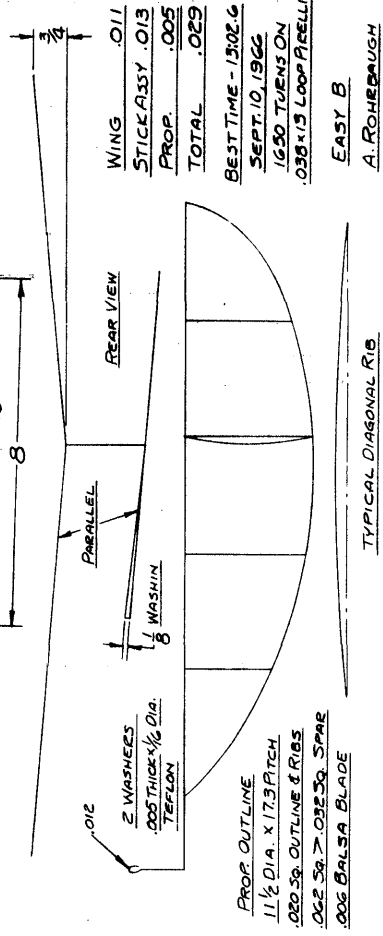
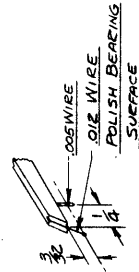
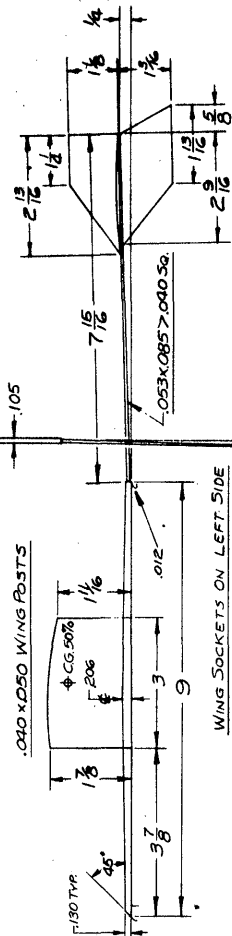
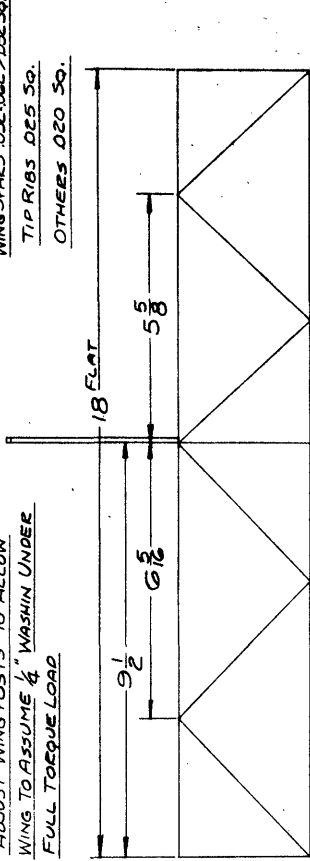
41. What is the best way to cover a prop with condenser paper?

The same problem of paper shrinkage exists for props as it does for other parts of a paper stick model, so the same precautions in that area apply. However, the real problem of prop covering is that the surface of the prop is a compound curve. It is near enough to a simple curve to use a single piece of paper; my method is this: Cut a piece of condenser paper about 1/4" larger all around than the blade outline. Fasten it to the spar at the hub end of the blade (microfilm solution makes an excellent glue for condenser paper), and pull it smoothly out to the tip. Glue it to the tip and wait for both places to dry before proceeding. Now use a fine brush and brush glue on the paper where the outline will touch it; start at the center of the blade outline on both the leading edge and trailing edge and work toward both the tip and hub. Glue a short bit at a time, working it as smooth as possible as you go. It is important to make the paper the same shape as the blade; this aids the paper in curving around the blade. After the glue has dried, trim carefully with a very sharp razor blade.

Various methods of pre-shrinking paper have been mentioned, any one of them will usually help prevent warps of condenser paper covered surfaces. Try this also: work inside a large deep box turned on the side. Place a heating pad inside the box, turned to low heat, and place the prop and paper inside for a couple of hours. This will dry out the paper and the air in the box; you can then proceed as outlined above.

WING SPARS .032x.042 > .032 SQ.
 TIP RIBS .025 SQ.
 OTHERS .020 SQ.

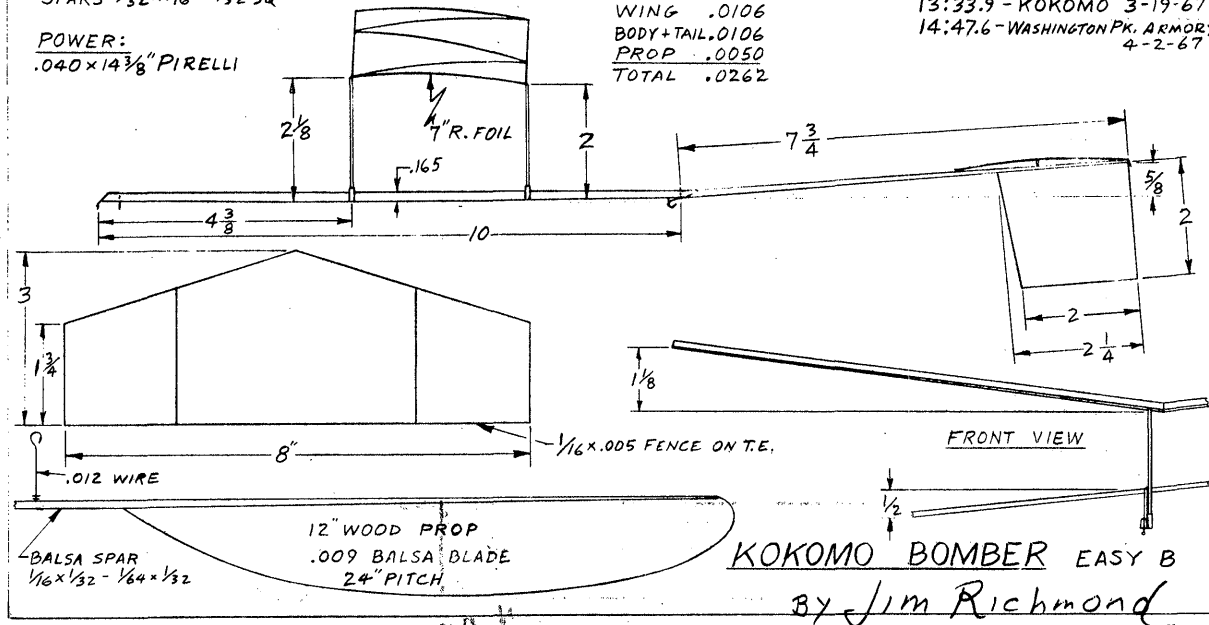
ADJUST WING POSTS TO ALLOW
 WING TO ASSUME 1/4" WASHIN UNDER
 FULL TORQUE LOAD



SPARS - 1/32 x 1/16 - 1/32 SQ.
 POWER: .040 x 14 3/8" PIRELLI

WEIGHTS:
 WING .0106
 BODY + TAIL .0106
 PROP .0050
 TOTAL .0262

BEST OFFICIAL TIMES:
 13:33.9 - KOKOMO 3-19-67
 14:47.6 - WASHINGTON PK. ARMORY 4-2-67



KOKOMO BOMBER EASY B
 by Jim Richmond

94

Part IV - Velocity Focusing

The following discussion is the brain-child of Bill Gieskieng, who first aired the subject in the MAGNIFICENT MOUNTAIN MEN Newsletter (a very entertaining sheet edited by Bill with the by-line "Official source of enthusiastic free flight propoganda"). Bill's topic then was FAI Power prop improvement; I inquired about applications to Indoor and got the following material.

Velocity focusing is the process of adjusting all prop blade station angles to approximately the same angle of attack at a given RPM and model velocity. Thus, Bill's design method begins with model velocity (there is not any shortcut to prop design - you gotta know velocity and you may as well make a flight profile while you're at it) the same as all other methods.

The most accurate method to handle velocity focusing combines trigonometric computation with graphical construction to design a prop construction jig such as was presented in PRACTICE - Part IV (Feb. '68 INAV). Fig. 1 illustrates the first step; the example presented will be for 60 RPM and velocity = 24"/sec. Line AC is 3.14 x prop diameter (16") and line CD is the distance travelled by the model in one prop revolution. This construction can be to scale, but keep the drawing large enough to retain reasonable accuracy.

Line AD represents the blade angle at the tip of a prop of 24" pitch, while AE is the angle at 5" diameter. A prop of 24" pitch would have zero angle of attack at 24"/sec. velocity and would give essentially zero thrust. To create useful thrust the blade needs an angle of attack. This series has used 7° as a convenient number, but no definitive work has proved 7° is any better than 5°, or any other angle.

Trigonometric computation of the angles in Fig. 1 gave 25.5° and 56.9°. Add 7° to each station (Fig. 2) to yield lines AD' and AE'. (This can be done graphically, but it is more accurate to compute E'B and D'C by trig.) The new pitch at station C is 32" and at B it is 31.8". For this case of velocity and RPM, velocity focusing yields helical pitch. It is well to note that for each different RPM only one velocity will satisfy the condition of uniform angle of attack across the prop blade. This is true for any prop with pitch distribution related to velocity; but the chances are slim that helical pitch is suitable for most common cases of velocity and RPM.

60 RPM is faster than most serious fliers use. Using 24"/sec. velocity, let's design a 16" dia. prop for 45 RPM. For those familiar with Bill's terminology, the basic rectangle (ACDF) represents the unloading factor (velocity where prop "unloads" or quits developing useful thrust.) The unloading factor is computed by dividing the velocity in inches/sec. by rev./sec. In our example, this is 24"/sec. divided by .75 RPS = 32"/revolution.

Fig. 3 is the graph for this example. Note that pitch must increase toward the hub if the prop is to have constant angle of attack across the blade. It was mentioned in the Feb. '68 issue that pitch limits for best efficiency would range from 20° to 60°; the example in Fig. 3 has 74° at 2 1/2" radius and 40° at the tip. Clearly, much of the proposed blade will be operating in a very inefficient manner. (The supporting material for assuming that 20° to 60° is most efficient will be presented in the April INAV.)

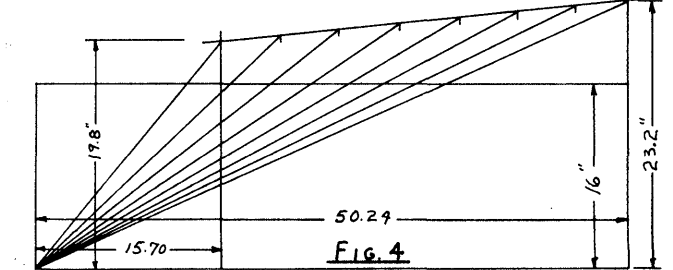
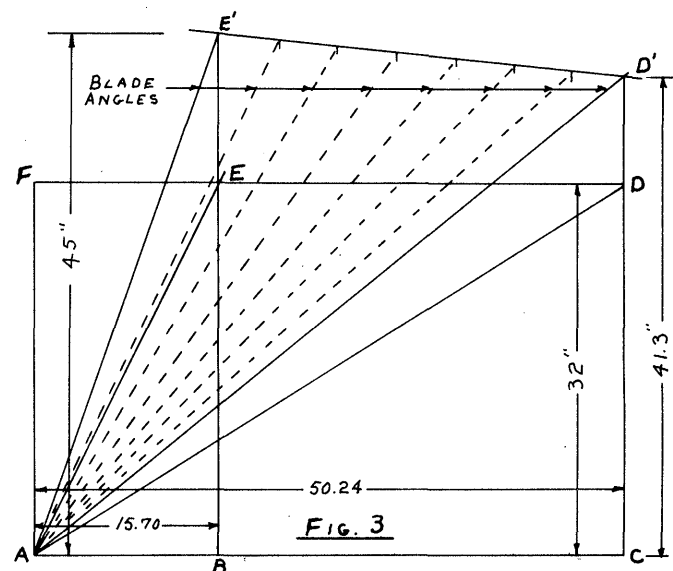
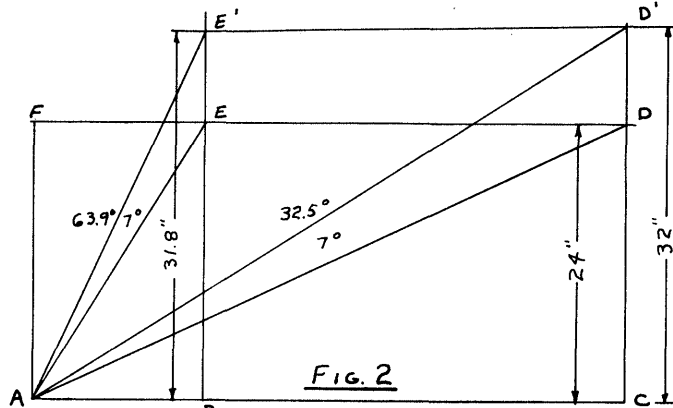
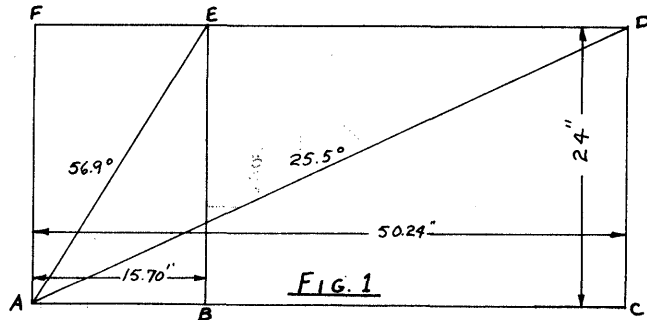
Fig. 4 shows an example for 90 RPM and 24"/sec. velocity. Note that the slope of line D'E' is reversed from Fig. 3; blade angle ranges from 52° at 2 1/2" to 35° at the tip. This prop is theoretically very efficient, but what good is a 90 RPM prop?

Bill suggests that indoor props be geared up at least 2:1 to take advantage of the higher theoretical efficiency inherent in higher RPM configurations. For the example of Fig. 4, 2:1 gearing would give 90 RPM on the prop, but the motor would be unwinding at 45 RPM. The obvious disadvantages of gearing are: an approximate 10% weight penalty due to the weight of the gears, and gear friction will absorb about 10% of the energy of the rubber.

Theoretically, several gains should offset the losses: the geared prop will absorb less torque; possibly less than half as much. This permits lower cross section and lower rubber weight to yield similar total turns input to prop system. Lower torque reaction (resulting from higher T/T ratio) means less torque counteracting adjustments such as washin/washout and higher model efficiency. Also, changes in model velocity have lower effect on blade angle of attack. That is, a change of velocity to 26"/sec. will reduce the angle of attack in Fig. 3 by nearly 3°, while the angle of attack in Fig. 4 changes about 1°. Thus, a change in velocity due to gusts, upset, poor trim, CG

shift (knots in motor bunch up to one end of the stick) will have a much lower effect on prop efficiency when the RPM is high. In the opposite case, where model velocity decreases, a slow RPM prop (Fig. 3) will already have most of the blade near the critical angle. As velocity drops, much of the blade can stall and contribute to a model stall. Quite possibly this is one cause of the "square turn" exhibited by some models in less than ideal air. Almost always, this maneuver gets the model into trouble!

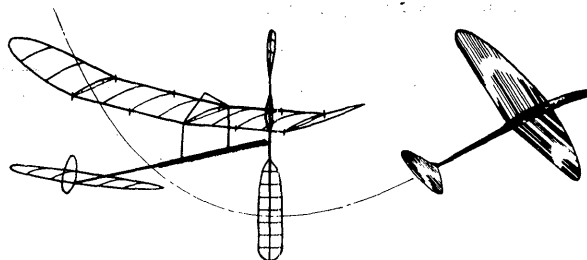
Next month: a report of the material offered in rebuttal to the errors in Part II.



INDOOR**NEWS and VIEWS**

\$2/ YEAR NIMAS DUES \$1/ YR ADDITIONAL

Editor: Bud Tenny · Box 545 · Richardson, Texas · 75081



****NATIONAL INDOOR MODEL AIRPLANE SOCIETY****

New Members

DR. EDGAR M. BOLLIN, 4829 Revlon Dr., La Canada, Cal. 91011
 WAYNE O. BYAL, R.R. #1, Mingo, Ia. 50168
 WILLIAM COLDITZ, 116 Smithfield St., Pittsburgh, Pa. 15222
 JIM DAVIDSON, 1815 Melbourne Ave., N.E., Huntsville, Ala. 38501
 MIKE FEDOR, 1926 Ballaway, Grand Prairie, Tex. 75050
 ROGER M. LANG, 34-21 80th St., Jackson Hts., N.Y. 11372
 DICK MATHIS, 2841 University Dr., Dallas, Tex. 75205
 JAMES H. PERDUE, 603 Crestwood Dr., Tullahoma, Tenn. 37388
 PAUL TRYON, 3128 Glenwood Ct., St. Ann, Mo. 63074

The Indoor Nats

As noted last month, the Indoor Nats will be held in Kansas City Municipal Auditorium, which has 96' ceiling and clear floor area of 125' x 200'. The event will be held on Sunday, Aug. 4, 1968 and will be staffed entirely by AMA personnel for all official duties including timing. At the last count, only two NIMAS members have volunteered to help with timing - many more are needed! In the event that too few volunteers are available, a time-a-flight-then-fly-a-flight policy will be necessary.

Nats entry blanks will be made available again this year by request. Send a stamped, self-addressed envelope (not necessary, just helpful) to AMA HQ with your request.

Indoor Scale At Nats

Indoor scale will be held at the Nats again this year, sponsored by various groups within NFPS. For more info, write Jim Root, 3412 Norton, Independence, Missouri.

Trophy Plates?

Below are reproduced a view of special trophy plates which were used for an indoor contest recently. The plate is produced by a special photographic process on brushed aluminum and protected by an almost impervious coating. Anything which can be printed photographically (including half-tone photos) can be used, and the cost is less than most regular engraving processes without the airplane image. At least one club has expressed an interest in the plates; write Bud Tenny, Box 545, Richardson, Texas for details if you are interested.

This process was used to reproduce charts from INAV for my tool box, which certainly reduces wear and tear on the back issues! If enough interest is shown in these metal charts, they will be made available at cost. These charts have been set up for reproduction so far:

Feb. '67 INAV - Arc Thickness Nomogram
 May '67 INAV - C. G. Location Chart
 Mar. '68 INAV - Pirelli Characteristics

FIRST PLACE
INDOOR SCALESECOND PLACE
INDOOR STICKNIMAS AwardsSilver Cat. I HLG Award - 0:27.2, Mike FedorGold Cat. I HLG Award - 0:33.2, Mike FedorGold Cat. I HLG Award - 0:34.3, Bud TennySilver Cat. I Rubber Award - 11:06, Mike FedorSilver Cat. I Rubber Award - 10:00, Dick GanslenSilver Cat. I Rubber Award - 11:50.2, Jim ClemGold Cat. I Rubber Award - 13:03.8, Jim ClemDiamond Cat. I Rubber Award - 15:17, Bud TennyDiamond Cat. I Rubber Award - 15:25.4, Stan ChiltonNIMAS POSTAL MEET

Junior entry in all events was disappointing; those Juniors who entered will receive a reprint of the Bilgri indoor series (1960 MAN) and a small plastic slide rule in addition to NIMAS Certificates. The results were computed by standard NIMAS Fudge Factors, correcting to the highest ceiling flown in each event:

<u>Entrant</u>	<u>Ceiling</u>	<u>Time</u>	<u>Fudge</u>	<u>Score</u>
<u>Junior HLG - Cat. IA (18'-25' ceiling)</u>				
Bill Gibbs	21.0'	0:51.7	1.0	0:51.7
Kenneth Fitch	19.0'	0:44.4	1.1	0:48.0

<u>Open HLG - Cat. IA</u>				
Ken Fitch, Sr.	19.0'	0:49.0	1.16	0:56.7
Nat Antoniolli	22.0'	0:48.7	1.0	0:48.7
Clarence Mather	22.0'	0:47.1	1.0	0:47.1

<u>Open HLG - Cat. IB (25'-35' ceiling)</u>				
Bud Tenny	31.0'	0:34.3*	1.0	0:34.3
John Thornhill	30.0'	0:22.0*	1.13	0:22.7

<u>Junior Easy B</u>				
Robert Dunham	55.0'	6:46.6	1.0	6:46.6

<u>Open Easy B</u>				
Bob Platt	20.9'	8:42	1.62	14:12
Clarence Mather	22.3'	9:57	1.57	13:36
Richard Hardcastle	34.5'	9:58.6	1.26	12:34.6
Fudo Takagi	24.5'	7:32	1.5	11:16.8
Hal Crane	20.9'	6:55	1.62	11:12
Mike Fedor	26.0'	6:11	1.45	9:00
Bud Tenny	26.0'	5:25	1.45	7:52.2
Bob Dunham	55.0'	7:39	1.0	7:39
Bob Putman	26.0'	4:24	1.45	6:27.6
John Thornhill	30.0'	2:47	1.42	3:57

Thanks to all who entered; those who didn't enter, you missed a fun session at the least!

CONTEST CALENDAR

MARYLAND - Baltimore. Baltimore Aero-Craftsmen Annual on April 28, 1968 at 5th Regiment Armory, Bolton and Hoffman Streets. Cat. II, Max ceiling 75', lights at 35'. Contact Bob Sifleet, 61 Straw Hat Rd., Owings Mills, Md. 21117 Ph. 301-356-4421.

MICHIGAN - Detroit. Annual Indoor State Meet on May 5, 1968 at Michigan State Fair Coliseum. Novice events: HLG, ROG and Cabin; two novice age classes. AMA events: HLG, Indoor Stick, Paper Stick, Indoor Scale. Walter Hartung, 14759 Kilbourne Ave., Detroit, Mich. 48213 Ph. LA 7-7620

NEW JERSEY - Lakehurst. Cat. II - April 21, May 19, June 9, 1968. C. V. Russo, 143 Willow Way, Clark, N. J. 07066 Ph. 382-0871.

OHIO - Akron. Record Trials in 90' Goodyear hangar, April 28, May 12, June 23, 1968. You must give advance notice of attendance to Bob Randolph, 5785 Forest Ridge Dr., N. Olmsted, O. 44070, in order to obtain clearance for entry.

TEXAS - Dallas/Ft. Worth/Denton. At least one all-HLG meet and regular Cat. I RT's (no formal competition) planned - contact Bud Tenny, Box 545, Richardson, Tex. 75080 if you wish to be notified.

VIRGINIA - Hampton. Sanctioned meet or RT at Willis School, April 21, 1968. Hal Crane, 4002 Buchanan Dr, Hampton, Va. 23369

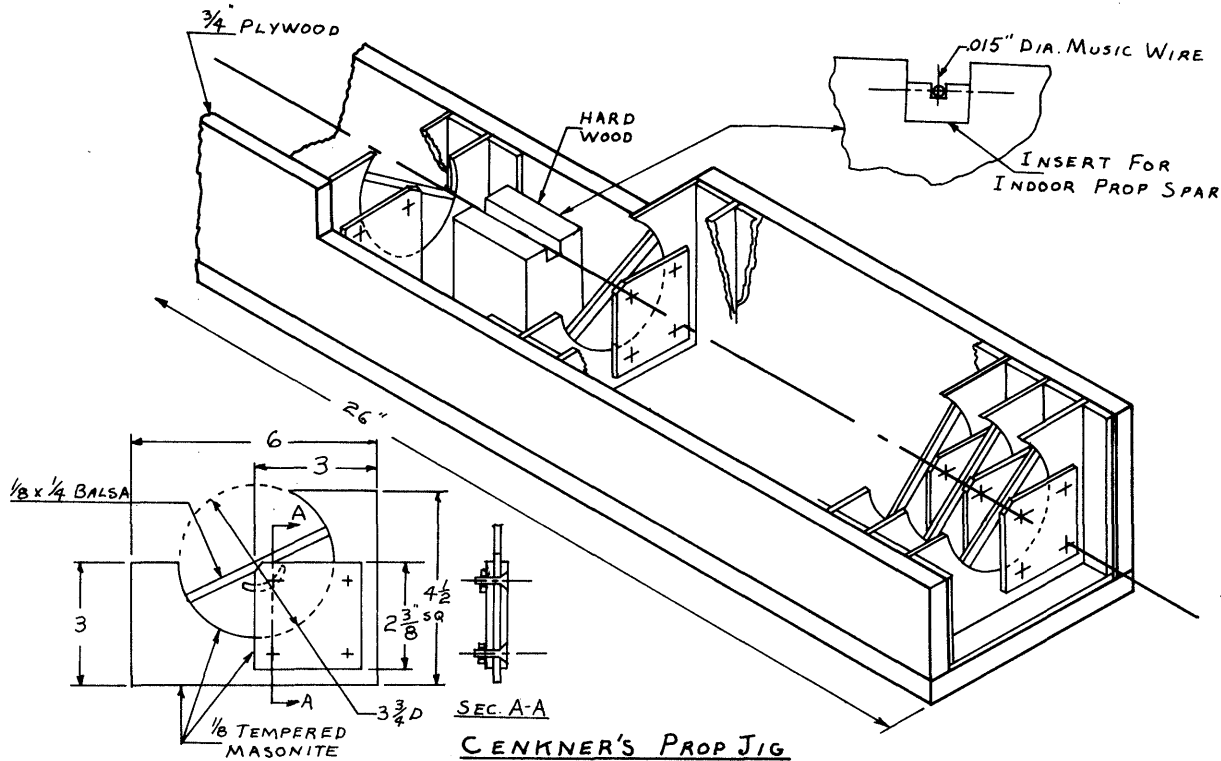
INDOOR PROPS - PRACTICE

Part IV - Prop Jigs

The prop jig below was designed and built by Ed Cenknner for Wakefield props. The blade angle at each station is adjustable according to whatever design scheme you prefer. To build indoor props on the same jig, an insert is

put into the center block. Note that a music wire peg is used to align the spar during construction, then the prop shaft is installed after construction.

Since the drawing was made, Ed has added a pitch scale to the end stations. The pitch is then set at each end, and a string stretched between them. For helical pitch, each intermediate station is set tangent to the string.



STATE OF THE ART

The model of the month is long overdue - Harry Lerman's FAI. The model set the Cat. II FAI record at 17:46 early in the team selection program last year. The record didn't last long after qualification trials were held in higher sites, but the flight stands as a site record for the MIT Armory and is excellent time for the ceiling. The model uses a long motor stick and long inboard wing, typical of other models currently winning in FAI. Possibly this design pre-dated current winners; at least it is contemporary to models flown by Richmond and Rohrbaugh. A full size prop outline is furnished on the plan and full size wing and tail outlines are available on request.

NEWS FROM AROUND THE WORLD

OKLAHOMA - TULSA

The first Tulsa Glue Dobber's Annual was an excellent contest, in the usual TGD tradition. Poor weather outside threatened the lighter models at times, but conditions averaged out to quite good. Most events were fought down to the wire - really top competition. Probably the most notable was the close race between Tom Peadon's Vickers V-22 and Mike Fedor's Draine Turbulent. Tom had a very good scale model which made only short flights, while Mike made a flight of 1:32.6 to compensate for lack of scale detail. The results:

<u>Open HLG</u>		<u>Junior HLG</u>	
Dick Mathis	1:27.7	Bobby Hanford	1:11.5
Mike Fedor	1:26.8	Bobby Dunham	1:07.0
Bob Hanford	1:24.0	Mark Hawkins	0:41.8

<u>Open Easy B</u>		<u>Junior Easy B</u>	
Bob Dunham	7:39.0	Bobby Dunham	6:46.6
Mark Valerius	7:18.5	Steve Valerius	6:21.5
Bud Tenny	6:46.8	Bobby Hanford	4:49.5

<u>Open Scale</u>		<u>Junior Scale</u>	
Tom Peadon	130 1/2	Bobby Hanford	98
Mike Fedor	121 1/2	Greg Hibblen	74 1/2
Jim Stephenson	113		

<u>Indoor Stick</u>	
Stan Chilton	16:56.2
Bud Tenny	15:54.3
Bob Dunham	11:40.4

TEXAS - DENTON

The North Texas meet was also a hard-fought battle, with some of the same players from Tulsa. Stan Chilton and Bud Tenny battled it out with the same models, identical down to the same motors - looks like Bud would learn!

<u>Open HLG</u>		<u>Indoor Scale</u>	
Bud Tenny	1:07.3	Tom Peadon	131 1/2
John Orrell	1:05.7	Mike Fedor	115 1/2
Mike Fedor	1:04.1		
<u>Indoor Stick</u>		<u>Paper Stick</u>	
Stan Chilton	15:25	Dick Ganslen	10:00
Bud Tenny	15:17	Mike Fedor	6:11
Jim Clem	13:03.8	Dick Mathis	5:34.2
<u>Junior HLG</u>		<u>Sub-Jr Rubber</u>	
Robert Langenberg	0:32	Jimmy Clem	2:12
Jimmy Clem	0:30.4	Paul Brown	1:17
Paul Brown	0:30	Robert Langenberg	1:09.8

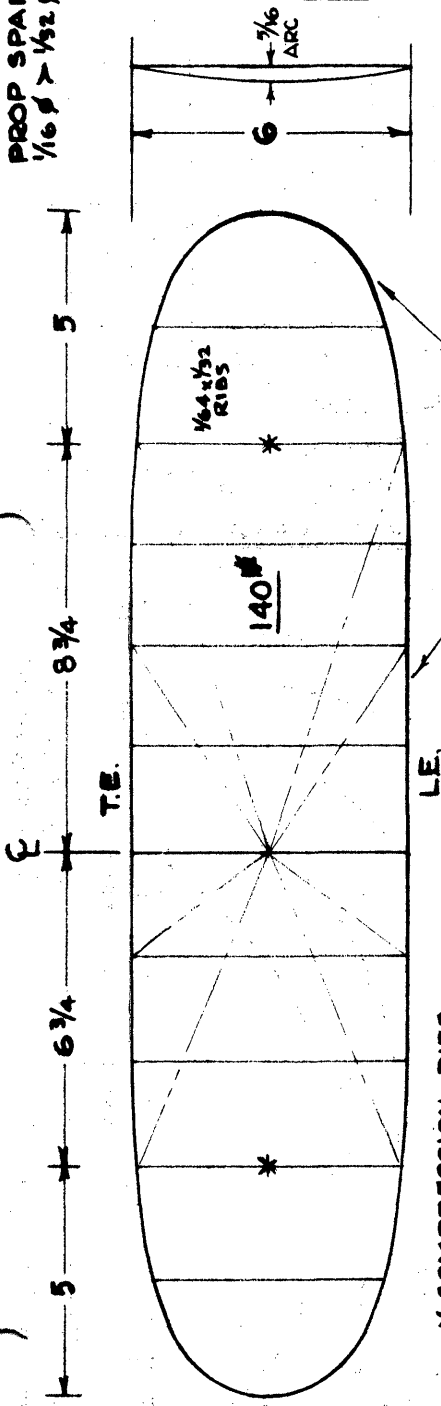
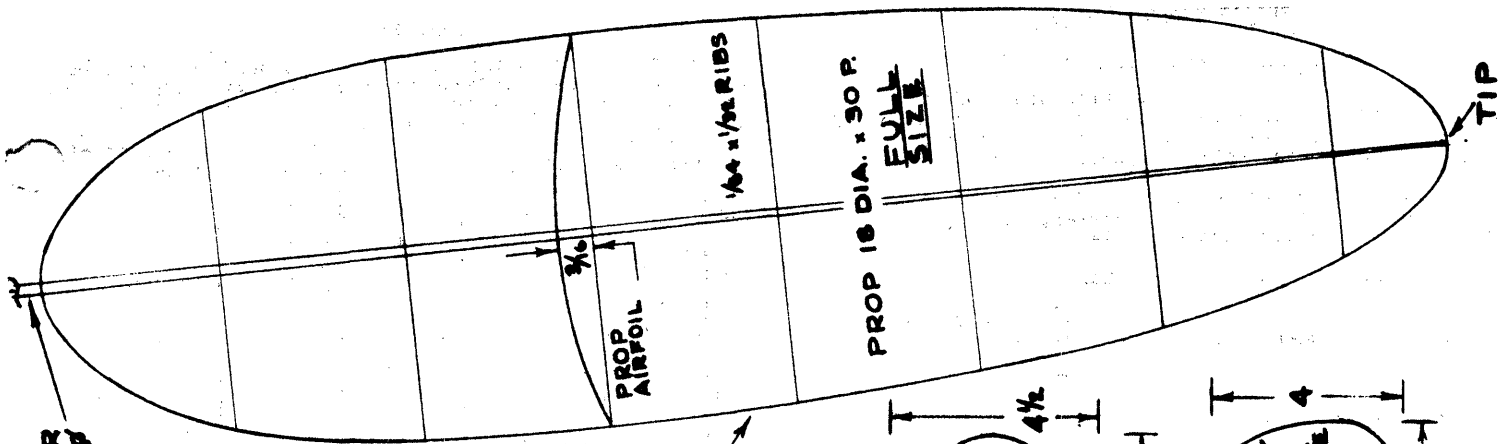
MISSOURI - ST. LOUIS

The McDonnell-Douglas meet drew fliers from Chicago as usual, and the major highlights of the meet came from the Chicago contingent. Rumor has it that this was the first HLG ever for Charlie Sotich, and Jim Richmond set a Paper Stick record with his "Kokomo Bomber" (March '68 INAV). The results:

<u>Junior HLG</u>		<u>Open HLG</u>	
S. Veselsky	0:50.5	J. Gremel	1:06.3
D. Veselsky	0:48.2	Bob Hotze	1:01.0
M. Hotze	0:23.4	Charlie Sotich	1:00.5
<u>Open Easy B</u>		<u>Indoor Stick</u>	
Jim Richmond	12:49.0	Jim Richmond	11:54.6
Richard Hardcastle	9:58.6	Charlie Sotich	10:42.4
Charlie Sotich	9:17.0	Richard Hardcastle	9:22.0

INDOOR - SOUTHEAST

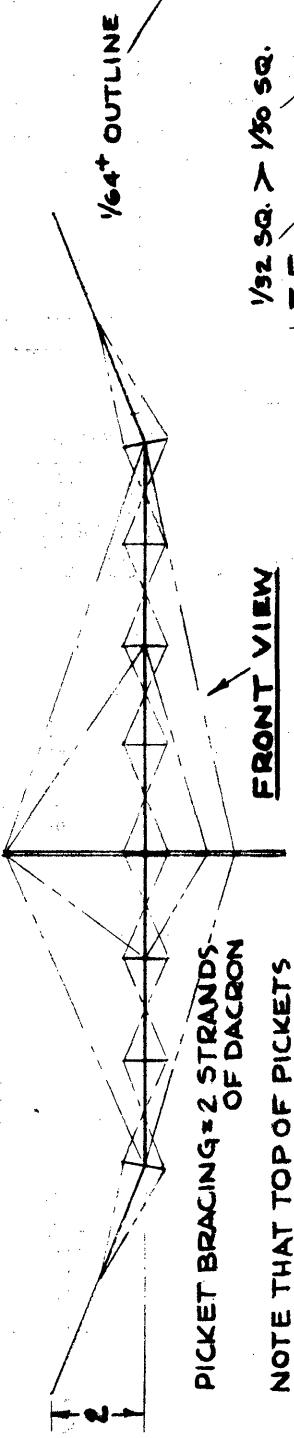
Those who read CONTEST CALENDAR regularly will have noted contests listed in three cities in the Southeast - Tullahoma, Tennessee; Atlanta, Georgia and Huntsville, Alabama. These contests are very important to Indoor in a couple of ways. First, they are either the first meet in the immediate area in many years, or the first indoor meet for the state, ever. More important, these meets were billed as "First Annual" - indicating a healthy look to the future. Further, correspondence with fliers from these areas indicate eager anticipation of future meets and sessions.



ALL SPARS $\frac{1}{32}$ SQ.; TIPS $\frac{1}{50}$ SQ. (BY SANDING)

$\frac{1}{2}$ COMPRESSION RIBS

ALL PICKETS $\frac{1}{64} \times \frac{1}{32} \times 1$

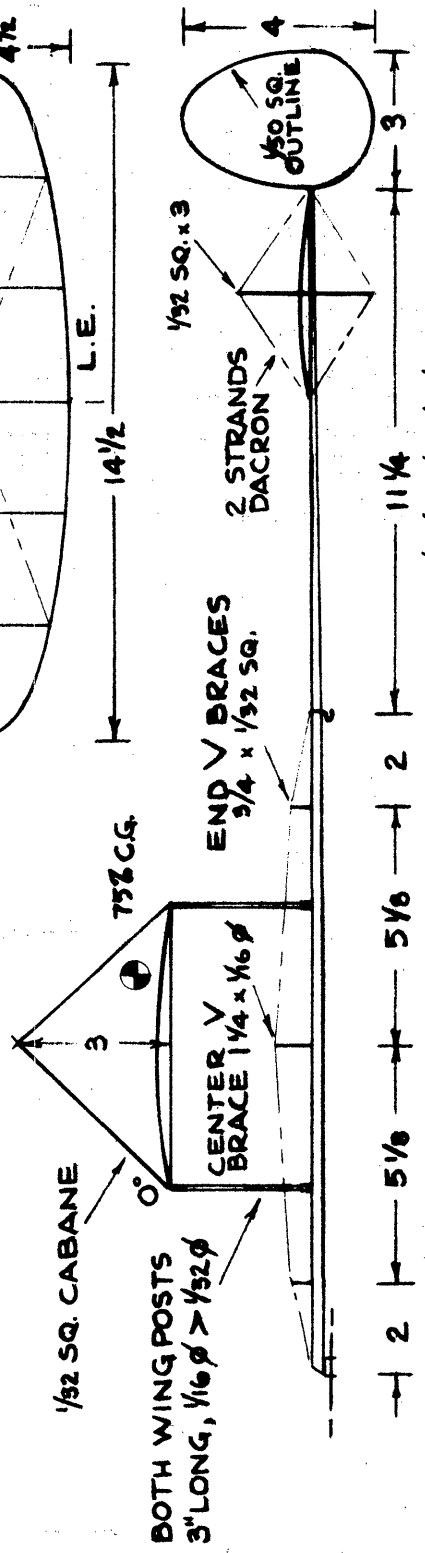


BOTH T.E. ARE WASHED OUT $\frac{1}{4}$

WING AND MOTOR STICK BRACING OF TUNGSTEN

PICKET BRACING = 2 STRANDS OF DACRON

NOTE THAT TOP OF PICKETS ARE NOT CONNECTED



BOTH WING POSTS 3" LONG, $\frac{1}{16} \phi > \frac{1}{32} \phi$

BOOM $\frac{1}{4} \phi > \frac{1}{16} \phi$ $\frac{1}{100}$ SHEET

65 CM. FAI
CAT. II AMA RECORD
17:46.0 4/25/67

DESIGNED BY:
HARRY LERMAN

DRAWN BY: BOB HANFORD

SCALE: $\frac{1}{4}$ SIZE EXCEPT AS NOTED

BARE WT. = .032 OZ. POWER = .074 POWER STRIP

Part V - Correction of Part II

Part II of this series presented some information that related prop efficiency to Thrust/Torque ratio. Two weeks later, three people had written to point out that prop efficiency was really proportional to $T/\tau r \tan \theta$.

Actually, each person made different trig substitutions and each got a different answer; it is possible to show that the answers are equivalent:

Larry Renger - Eff. = $T/\tau r \tan \theta$

Roger Schroeder - Eff. = $\tan \theta \left[\frac{1 - D/L \tan \theta}{D/L + \tan \theta} \right]$

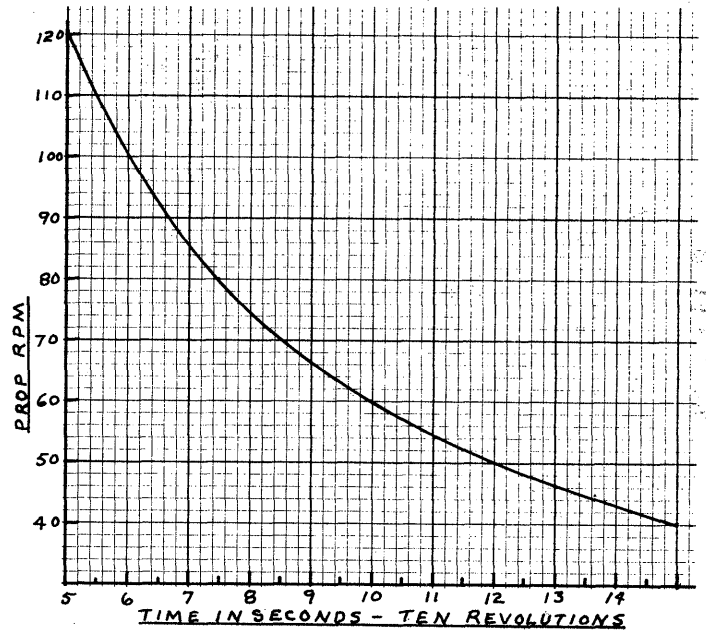
Bob Platt - Eff. = $\frac{1 - D/L \tan \theta}{1 + D/L \cot \theta}$

Copies of the derivations for the above are available upon request. The fact that three independent calculations arrived at equivalent conclusions is reasonable verification of the validity of the two graphs below. Schroeder's graph presents Efficiency as a function radius and clearly indicates rapid loss of efficiency near the hub. Platt's graph presents efficiency as a function of blade angle, which enables a designer to locate blade area according to the most efficient angles.

Both graphs strongly illustrate the effect of blade L/D on efficiency. No one has really proven just how bad or good our props are in terms of L/D; Larry Renger estimates that current practice may reach L/D of 5, while Walter Erbach has measured prop L/D as low as 2.

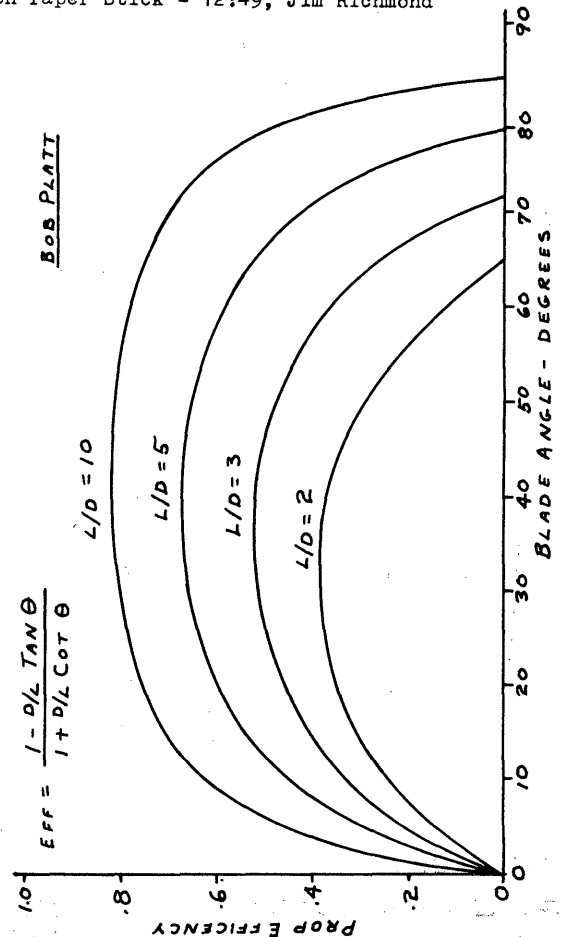
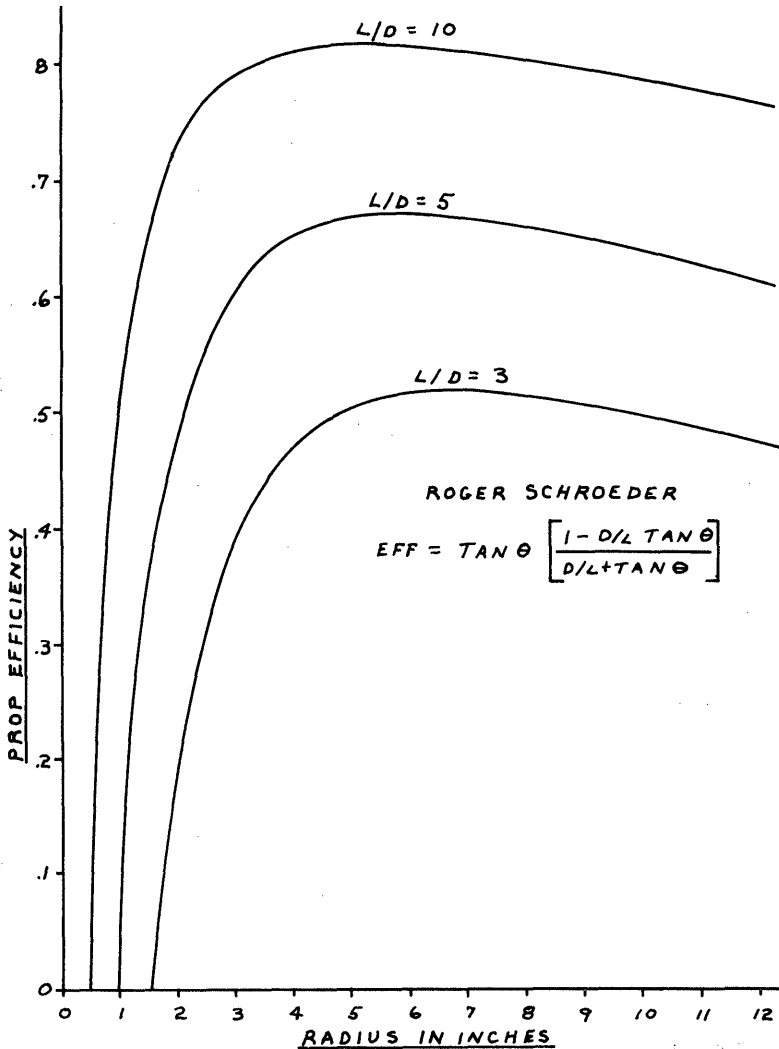
Next month: more on velocity focusing (described in March '68 INAV), which has become my personal favorite of all the methods of prop design mentioned. Questions or further rebuttal of material presented is welcomed, plus suggestions about prop topics which may have been ignored.

With continuing emphasis on flight profiles and close checking of model performance, a request was made for some sort of chart to give RPM directly. The result is the chart below, which graphs RPM vs. time in seconds for ten revolutions of the prop. Simply time ten revolutions of the prop and read RPM directly opposite this time.



RECORDS? MAYBE!

- NORTH TEXAS INDOOR MEET - March 24, 1968
 - Texas Woman's Univ., Denton, Texas Cat. I 31' ceiling
 - Sr. AMA Cat. I FAI - 11:06, Mike Fedor
 - Sr. C Stick - 12:54, Mike Fedor
 - Open FAI Cat. I FAI - 15:25, Stan Chilton
- MCDONNELL DOUGLAS INDOOR MEET - March 24, 1968
 - East St. Louis Armory, Cat. I ceiling
 - Open Paper Stick - 12:49, Jim Richmond



INDOOR

NEWS and VIEWS

\$2/ YEAR NIMAS DUES \$1/YR ADDITIONAL

Editor: Bud Tenny · Box 545 · Richardson, Texas · 75081

****NATIONAL INDOOR MODEL AIRPLANE SOCIETY****

New Members!

WARREN G. LAWRENCE, 2210 Tilson Cir., Decatur, Ga. 30032
 REX B. POWELL, 408 Glencoe Rd. SE, Huntsville, Ala. 35802

Sorry 'Bout Dat!

Last month, Jody was out of town during the time when the newsletter needed to be proofread. Thus, the April issue came out as the March issue (no, this was not a dodge to avoid Loof Lirpa's annual letter as was suggested by someone; Loof Lirpa hasn't written lately).

Besides the above, several errors crept into the results of the NIMAS Postal. First, all the results from Indoor Stick were omitted; these are listed below under POSTAL CONTESTS. Next, the asterisk (*) by the times of Bud Tenny and John Thornhill in Cat. IB HLG was supposed to tell you that these times were single flights. Finally there was an error in the ceiling height for times from Hampton, V. in Easy B. The correct ceiling was 19.8', the fudge factor changes to 1.66, Bob Platt's time changed to 14:36 (no change in place) and Hal Crane's time changed to 11:30 (4th place instead of 5th).

Move on to page 4: Roger Schroeder's graph of prop efficiency should have contained the notation that the curve was for 30" pitch. However, it was stated in the Feb. '68 INAV that efficiency varies only about 2½% at the 6" station, from 20" pitch to 35" pitch.

NIMAS Awards

Effective immediately, it is permissible to use FAI ceiling measure to define the ceiling height of your site in applying for NIMAS Awards. Please note that FAI measure was used when you fill out the application form, and read your Rule Book! The rule states that measure is made to "primary structure of the building." That does not include lights, wires to support bunting or decorations, or other auxiliary stuff which messes up the flying.

The general effect of the above will be to give a more realistic assessment of ceiling category, while retaining the same three AMA ceiling categories.

I wish to apologize to many NIMAS members who have had Awards coming for some time. I finally caught up with the backlog this month, and all the undelivered awards have been distributed except local ones that will be given out in person. If I have missed anyone whose award was listed anytime before this issue, please let me know.

Silver Cat. I Rubber Award - 10:13, Dan Belleff

Silver Cat. I Rubber Award - 11:54.6, Jim Richmond

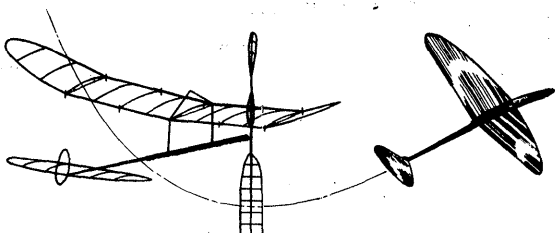
Gold Cat. I Rubber Award - 12:45.4, Bob Platt

Gold Cat. I Rubber Award - 12:49, Jim Richmond

Diamond Cat. I Rubber Award - 15:15, Tom Vallee

NIMAS Charts

Considerable response was made to the announcement of a new process for producing trophy plates and charts from INAV on specially coated aluminum plate. The charts have scaled down slightly from the size they are in INAV - to 3" wide from 3.7" wide. The first two that will be made available are the RPM/Time chart in the April '68 (Mar. #21) and the Pirelli Parameters chart from Mar. '68 #1 INAV. The Pirelli chart has been modified to include the weight/inch figures for Pirelli. Prices are based strictly on the amount of metal used: RPM/Time - 85¢; Pirelli Parameters - \$1; CG Location - \$1.10 (May '67 INAV) and Arc Thickness Nomogram - \$1.20 (Feb. '67 INAV).



New Film Now Ready

Joe Poloso has made another film of activity in Hangar #2 at Lakehurst - this one in color. It will be available for loan as soon as your editor gets to view it - perhaps in about two weeks. Get your name on the list!

Bilgri Reprints Available

By special arrangement with Model Airplane News, the three articles on indoor building by Joe Bilgri, which appeared in M.A.N. in 1960, have been made available at cost. This cost is 60¢ (which includes postage), and the money should be sent to Harry Keshishian, 7 Sagamore Rd., Arlington, Mass. 02174, or Bud Tenny, Box 545, Richardson, Texas 75080. (Price listed covers all three articles)

Help Wanted!

All fliers who plan to attend the Nats are reminded that timing help will likely be very short. Anyone who plans to attend should make plans to help time at the Indoor Nats, since Navy timers will not be available. A few of you have already volunteered, but many more will be needed. Please notify Bud Tenny, Box 545, Richardson, Texas 75080 if you can help, and whether you can help with HLG or rubber or both.

FFCB Chairman Resigns

I have deemed it advisable to resign as Chairman of the Free Flight Contest Board. I took this action because of a total lack of response by the AMA President to my official memos. I the hope that the president will name a Chairman he will communicate with. Certain FFCB business requires action by the president, so the FFCB is stalled until this action is taken.

POSTAL CONTESTS!

Recently Bill Gibbs issued a postal challenge to any takers - members of the D. C. Maxcutors took him up:

Name	Site	Stick	Paper	HLG
John Thornhill	20.5'	-	3:23.5	0:36.0
Dan Belleff	20.5'	-	6:31.5	0:47.2
Tom Vallee	20.5'	10:36.6	-	-
Bill Gibbs	21.0	8:10.4	3:46.2	0:52.4

NIMAS Postal Meet

Entrant	Ceiling	Time	Fudge	Score
Junior Indoor Stick				
Bill Gibbs	25'	8:23.2	1.02	8:33.0
Kristi Tenny	26'	7:37.4	1.0	7:37.4
Open Indoor Stick				
Hewitt Phillips	19.8'	19:30.2	1.14	22:15
Hal Crane	19.8'	15:20	1.14	17:30
Bud Tenny	26'	15:17	1.0	15:17
Clarence Mather	24.5'	14:09	1.03	14:35.4
Jim Clem	26.0	14:04	1.0	14:04
Brian Down	22.3'	11:07	1.08	12:00.1
Fudo Takagi	22.3'	10:45	1.08	11:37.2

CONTEST CALENDAR

- OHIO - Akron. Record Trials in 90' Goodyear hangar, May 12, June 23, 1968. You must give advance notice of attendance to Bob Randolph, 5785 Forest Ridge Dr., N. Olmsted, O. 44070 in order to obtain clearance for entry to site.
- NEW JERSEY - Lakehurst. Cat. II RT or contest - May 19, June 9, 1968. C. V. Russo, 143 Willow Way, Clark, New Jersey 07066 ph. 382-0871.
- TEXAS - Dallas/Ft. Worth/Denton. Cat. I RT May 18-19, 1968 with HLG only on May 18 and Rubber only on May 19. Bud Tenny, Box 545, Richardson, Tex. 75080 231-4035

RECORDS? MAYBE!

AKRON RECORD TRIALS - March, 1968 90' ceiling - Cat. II
Goodyear Hangar, Akron, Ohio
Open Paper Stick - 20:41.4, Bob Randolph

STATE OF THE ART

This month's presentation is also late - not due to any delay by Al Rohrbaugh - but to my own delay in sending it out to be drawn up. The model holds the Cat. II B Cabin record, and set the mark during the FAI Semi at Detroit last year. It is typical of Al's careful workmanship and light weight, and the time is excellent for the site (only 65' ceiling).

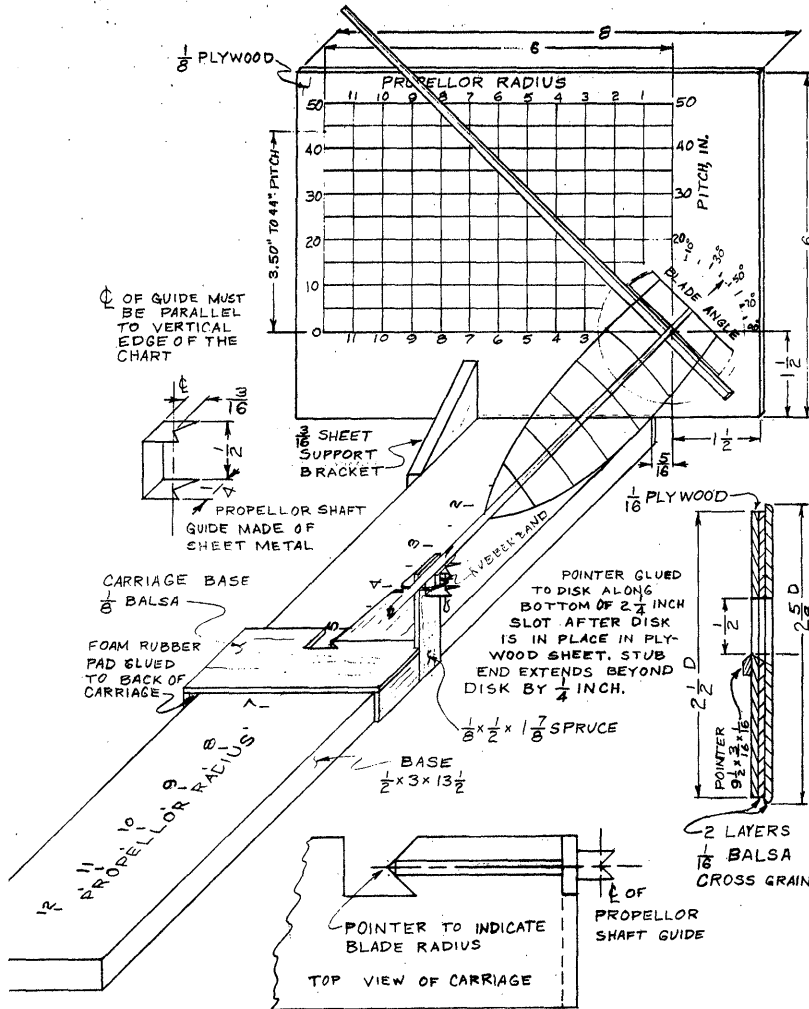
INDOOR PROPS - PRACTICE

A Direct Reading Pitchmeter

by Charlie Sotich

With the device shown it is possible to measure prop pitch directly at any point along the blade (starting about 1 1/2" from the hub). This makes it possible to compare props directly instead of assuming each is exactly like the block it was built on, and thus determine why different flight results are achieved with props that are supposed to be identical. The pitchmeter is easy to use:

1. Remove the carriage from the base and mount the prop, using a small rubber band to lightly pull the prop shaft into the bottom of the Vees.
2. Mount the carriage on the base with one prop tip in the slot of the disk. Rotate the disk to give clearance for the blade as you move the carriage to the desired radius for measurement, and stop the disk so the bottom of the slot is parallel to the bottom of the prop blade.
3. Read the blade radius from the scale under the carriage. Read down the chart along the line corresponding to this radius until you reach the top edge of the pointer. Now move horizontally to the side of the chart and read the pitch.



A few notes on the construction of the pitchmeter:

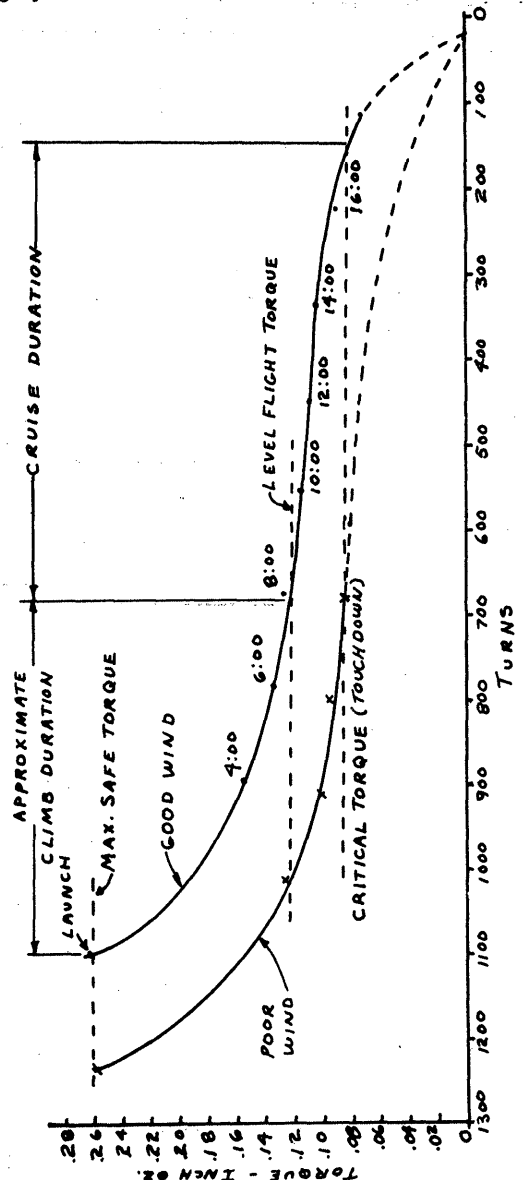
1. The axes of the chart must intersect at the center of the disk for accurate readings. Draw sharp lines on the plywood to mark the edges of the chart before cutting the opening for the disk.
2. Lay out the chart with radius increments of 1/2" spaced 1/4" apart. Lay out the pitch scale in increments of 1" pitch. Determine the spacing of the pitch scale by dividing 3.5" into 44 parts so each part = 1" of pitch.
3. The centerline of the Vees which hold the shaft must be parallel to the vertical lines on the chart. Mount a straight piece of wire in the Vees, and file on the Vees until the wire is parallel to the chart lines.
4. Lay out the prop radius scale on the base after assembly, using a ruler to measure from the face of the disk to the centerline of the Vees, and place marks on the base at the carriage pointer.

THE LAB

Altitude Control and Duration Prediction

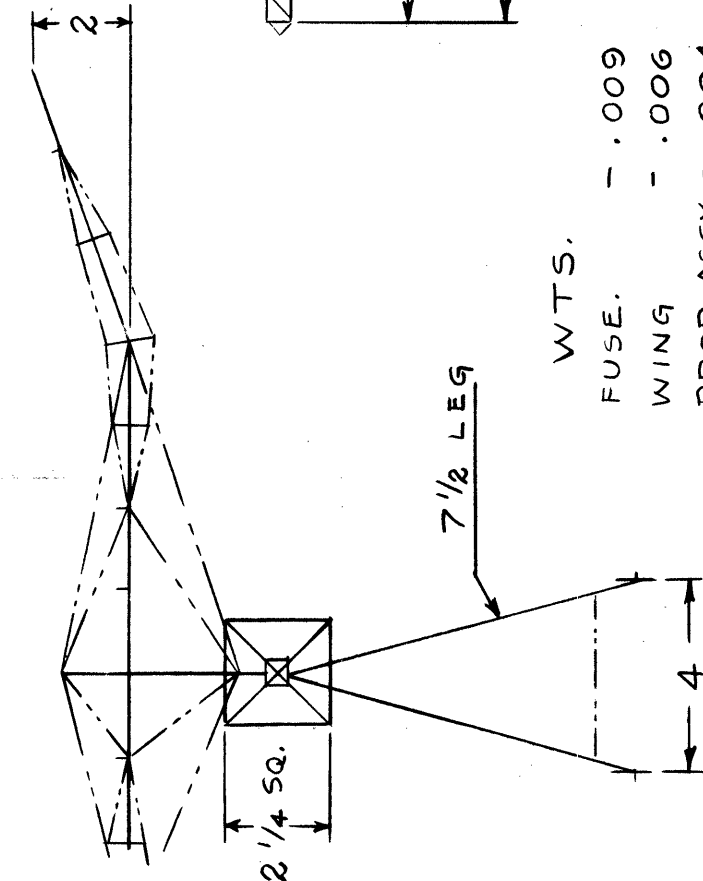
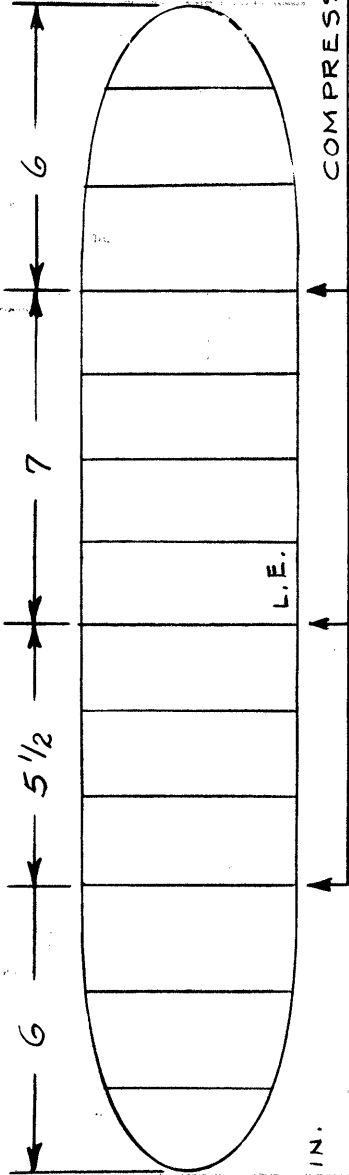
This is a preliminary report of a promising flight analysis method developed by Jim Clem. One of Jim's toy airplanes refused to rafter-bang properly, so he began using his torque meter to limit model torque at launch. The accuracy of this technique is astounding - he repeatedly uses maximum altitude and rarely touches more than two or three times per flight.

The next step was to obtain an RPM profile of a good flight. This information was used to reconstruct a torque profile of the flight. This was accomplished by winding the thoroughly rested motor in the same manner, then un-



ALL BRACINGS
.0005 TUNGSTEN

PROJ. SPAN - 23.9 IN.
99.48 SQ. IN.



WTS.

FUSE. - .009
WING - .006
PROP ASSY - .004
TAIL ASSY - .005
 .024 oz.

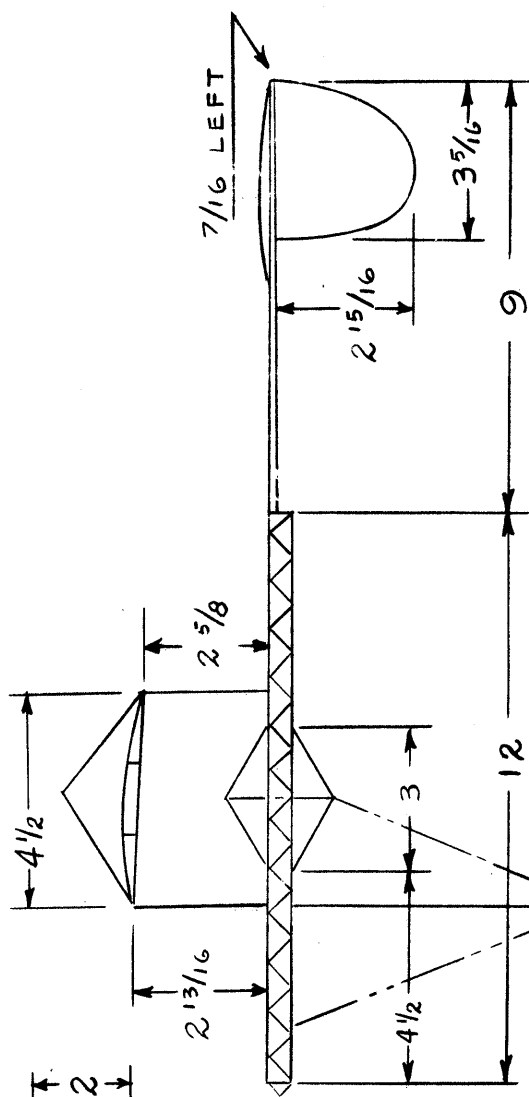
PROP: 15" D. x 27P.

SINGLE SPAR

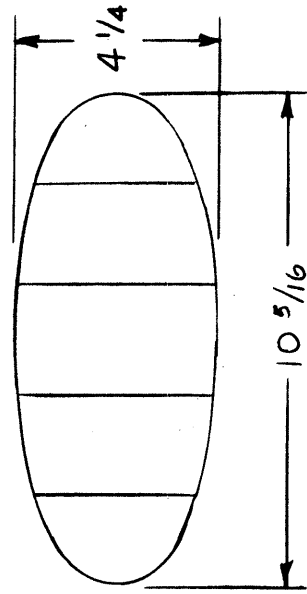
1 5/8 MAX. WIDTH @ 4 1/4 RAD.

17" LOOP OF .040 PIRELLI

1575 TURNS FOR RECORD



25/32 DIAM.



CLASS B CAT. II CABIN RECORD
JUNE 18, 1967 - DETROIT
COLISEUM - 65' CEILING.
18:25 MIN. - A. ROHRBAUGH

1/2 STAB. TILT

36.56 SQ. IN.

GEO. BATIOUK SR.

winding slowly and taking torque readings at three significant points: torque at launch (for reference), level flight torque and torque at touchdown. The graph below shows how these figures are used.

The maximum safe torque level represents that torque which limits altitude to just less than the available ceiling; it is reached by winding the motor past the required torque level and backing off turns until the torque is correct. Therefore, some new motor is treated in the same fashion and a plot of torque vs. turns is generated by unwinding the motor and recording torque at suitable intervals as shown in the graph below.

It is reasonably accurate to assume that a similar motor will give similar RPM profiles with the same prop and model, so time as a function of RPM (turns left after X minutes of flight) is marked on the torque curve. The three torque levels are marked on the graph, and flight times for end of climb and touchdown are then approximated from the graph as shown on the upper curve.

The lower curve on the graph was generated by using a different winding technique from the other curve. It is strong evidence that winding technique is critical, since this curve was taken just before the higher energy curve.

INDOOR PROPS - THEORY

More On Velocity Focusing

After several sessions using velocity focusing (March '68 INAV), I have become convinced it is the most flexible design method. In particular, velocity focusing designs directly the prop jig shown in the Feb. '68 INAV. This type of jig is easiest to modify, and seems to be easier to work with during prop construction.

Two characteristics of velocity focusing were not covered before. First, the design concept of a certain RPM coupled with a given model velocity tends to leave the impression that the prop is good only for that one velocity/RPM condition. Not so! Fig. 1 shows how RPM varies with velocity for the prop designed in Fig. 2. Design conditions for this prop were 1.6"/sec. and 50 RPM, which gives an "unloading factor" of 23". Other combinations of RPM and velocity with the same unloading factor are shown on the graph, which permits forecasting of RPM under other conditions of velocity.

The second unmentioned characteristic of velocity focusing is that the ideal (assumed by the method) of constant angle of attack across the blade is not linear as assumed in the preliminary discussion. That is, line D'E' is curved slightly in the area of interest (the blade is to extend from 3" radius to 9" radius). As shown in the dotted portion of D'E', the line rises steeply nearer the hub. This is of little concern as long as the blade area does not extend close to the hub, and so long as extreme combinations of low RPM and high velocity are not used.

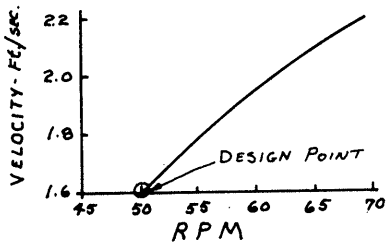


FIG. 1

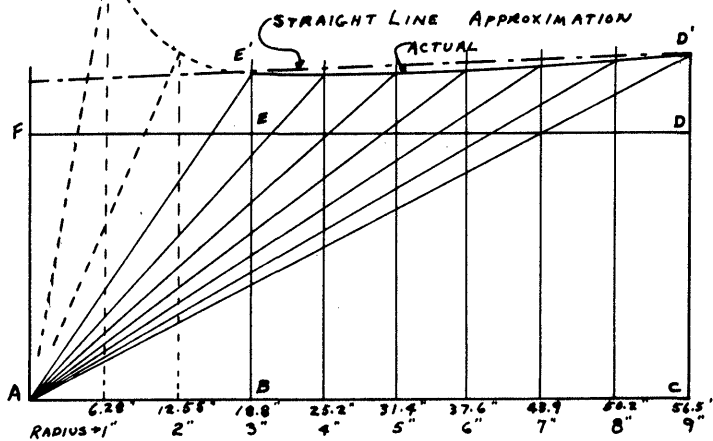


FIG. 2

A loose end remains with regard to VF prop design - how do you designate the pitch? How about 1.6/50/6 for a prop built from Fig. 2 above? (1.6 FPS velocity, 50 RPM and 6° angle of attack).

This presentation completes the series of prop theory. Rebuttal and other minor considerations will be presented in future issues as space allows - if you have comments, let's have them. The whole subject of flaring props has been purposefully left out, since no theory applies to non-rigid props directly; if you have helpful comments please air them.

THE LAB

A Rubber Testing Method

It is a matter of great interest to all serious fliers to find reliable, non-destructive methods to test Firelli. The real problem of testing rubber is that if you find out the ultimate energy storage potential of a piece of rubber by some test, you have just "used up" the piece you used for the test. Quality control on rubber strip seems to be difficult, because the quality seems to vary along the length of even short pieces of rubber. Thus, you can test completely one piece of a batch and get a bad motor right next to that section.

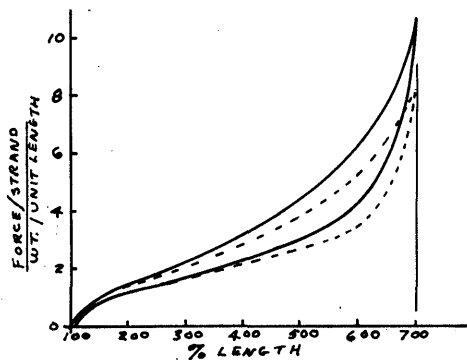
Charlie Sotich has developed a test for rubber which is showing promise. The basic test goes thus: A sample is weighed, then arranged in clamps that hold the ends. A 1" segment is marked on the sample and the whole piece (about 10" long) is stretched to 7 times normal length in six equal steps. The elongation of the marked segment and the stretch force is recorded at each step. The rubber is then relaxed in the same six steps and the force and elongation recorded at each step. This process gives the rubber some permanent "set" and some of the resulting slack will eventually come out as the rubber recovers.

This property of failing to return exactly to the same length is called hysteresis. A graph of the stretch force as recorded on both stretch and relax cycles will give an idea of the quality of the rubber.

The vertical (Y) axis of the graphs below is figured to this formula:

$$Y = \frac{\text{Force/Strand}}{\text{Weight/length}}$$

When this set of values is plotted against elongation, curves of the type shown below result. If you consider the area under the curve, the total energy input to the rubber has the bounds of the upper part of the curve and the X axis, while the usable energy lies between the lower part of the curve and the X axis. The area between the upper and lower parts of the curve is lost due to hysteresis and "set" in the rubber. Two sample curves are shown from different batches of rubber. The relative difference of quality can be expressed by a ratio of usable energy of the two samples.



NEWS FROM AROUND THE WORLD

GEORGIA - ATLANTA

Enthusiastic indoor fliers in Atlanta arranged a last-minute indoor session as an official part of the Georgia State Championships, with plans to make Indoor an annual event there. Not only is this the first Class AAA meet to hold Indoor in years, inclement weather increased spectator attendance and "exposed" over 100 fliers from three states to indoor flying - many built gliders on the spot. Guy Eaves won Easy B with 3:00, followed by Johnny Krickel (2:40.5, Sr.) and Charles Krickel (Jr. Easy B - 1:55.6). Open HLG - 0:35.1, Ben Cleveland, Sr. HLG - 0:30.8, Steve Perryman; Jr. HLG - 0:28.7, Charles Krickel. 20' ceiling!

INDOOR

NEWS and VIEWS

\$2/YEAR NIMAS DUES \$1/YR ADDITIONAL

****NATIONAL INDOOR MODEL AIRPLANE SOCIETY****

New Members!

LEONARD GOSS, 401 Norman Rd., Camp Hill, Pa. 17011
TOM PEADON, 2907 Hawthorne, Apt. 206, Dallas, Texas 75219
BILL SAUNDERS, 11613 LeBaron Terrace, Silver Spring, Md. 20902

Another Goof

After my listing of mistakes found in the April (March #2) issue, three people wrote to point out that 1.57 x 9:57 (Clarence Mather's Easy B time) was not 13:36 but 15:36. So, a belated and shamefaced congratulations to Clarence - who has received a new certificate proclaiming his winning 1st place in the 1968 Easy B Postal. One friend consoled me by pointing out that the mistakes wouldn't have been found if the paper wasn't read - thanks for reading it!

The Indoor Nats!

The site for the '68 Indoor Nats will be Kansas City Municipal Auditorium, with 125' x 200' floor area and 96' ceiling. All officiating and timing will be done by volunteers, with the time-a-flight, fly-a-flight policy as a backup in case too few helpers show up. As usual with a site having a small floor area, HLG and rubber events will be flown at separate times: HLG from 9 am to 2:30 pm and Rubber from 2:30 pm to 9 pm. If you possibly can help at any time during Sunday, Aug. 4, 1968, please notify Bud Tenny, Box 545, Richardson, Texas 75080.

Recent Publications

Bob Randolph's "Top Cat IV", the story of his "B" model design which held 5 records at the time of writing, breaks the long drought of indoor articles. It appears in the June '68 M.A.N. with full size plans available as ably drawn by Tom Vallee. The wealth of detail on the plans, coupled with many good hints in the article and detailed building instructions available from Bob make this an outstanding indoor package. Good work!

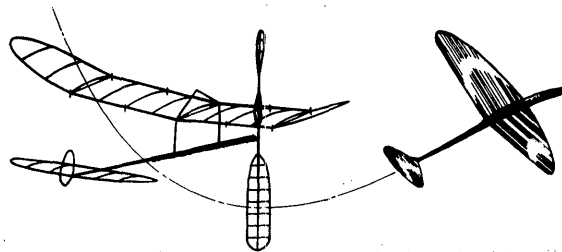
New Materials!

Krylon, Inc., the spray paint people, have produced a new product which may become almost indispensable around indoor modeler's shops. It is Pressure Sensitive Spray Adhesive, catalog #8010. It greatly resembles rubber cement, and becomes increasingly useful the longer you have it around. Erwin Rodemsky regularly uses it as stickum to cover with microfilm, at some slight weight penalty. In a test where I covered three 25 sq. in. stabs with test film, the average weight of 8010 was .0005 oz./stab. This would become an intolerable extra weight if used on a competitive weight model, but almost unnoticed on a paper ship. This material enabled me to cover two props in one hour flat - 25% of the time normally required. It is the only material I know of which would make it easy to double-cover a prop. Erwin strongly suggests that the material be used outside, where the sticky mist can drift harmlessly away. Also, if you cover a prop, you should mask off the spar with bits of jap tissue.

Micro-X, 5200 Seven Pines Dr., Lorain, O. 44053, found a new covering he calls MicroLite. It is polycarbonate plastic film, 80 microinches thick, and it weighs about half as much as condenser paper. It isn't legal for paper stick, but for demonstration models, ornithopters, indoor scale and possibly some outdoor uses it should be ideal. I will report more on this when I have tested it further.

Rubber Stripper Available

Bob Dunham, 4730 S. Yorktown Ave., Tulsa, Okla. 74105, is set up to make versions of the Bilgri type stripper from plexiglas. These will be complete except for spacers and blade, for \$5 each. Those who have constructed one realize this is barely a break-even price, and Bob makes this offer as a service to indoor fliers.



Editor: Bud Tenny · Box 545 · Richardson, Texas · 75081

Junior NIMAS Awards

Silver Cat. II HLG Award - 0:34.0, Bobby Dunham

Silver Cat. II HLG Award - 0:38.2, Bobby Hanford

NIMAS Aces

During the recent record trials at Denton, Texas, both Stan Chilton and Bud Tenny made Cat. I Gold Rubber flights to complete their three Award flights to become NIMAS Aces. Chilton's 14:49 and Bud's 13:46 were flights in their separate efforts to set a World Record. Elsewhere in this issue is given an account of Stan's success.

Plans are being made to provide a special plaque for NIMAS Aces, since no award exists at this time. It will be a while coming, as usual with all NIMAS projects!

NFFS Symposium

The first major technical effort of the National Free Flight Society is scheduled for Monday evening, Aug. 5, 1968, in the Base Theatre of Olathe Naval Air Station. It is shaping up to a very good show, with the list of contributors reading like a Who's Who of American FF. The titles of the papers sound like a summary of all the best from Zaic Yearbooks, and every effort is being made to make the papers technically correct.

The papers will be printed in one volume and will be available for the price of \$3.50. Plan now to get one! In fact, plan now to attend the Symposium!

RECORDS? MAYBE!

NORTH TEXAS RECORD TRIALS - May 18-19, 1968 30' 6" ceiling
Ballroom at Texas Woman's Univ., Denton Texas. Cat. I
Open B Stick - 17:03.8, Stan Chilton
Open FAI Cat. I FAI - 17:52.8, Stan Chilton

Possible World Record

Stan Chilton's FAI flight (above) was established under proper conditions for it to qualify as a World Record. All factors such as watch accuracy, site dimensions and other required items have been verified and the flight has been submitted to CIAM. Pending final approval, it is assumed that this flight will be recognized as a World Record.

The flight was the last one of the day, made so late that the timers had to come close to the model to see it land - the site isn't lighted. Stan was pushing the limit on his rubber to get the turns/torque required - he said later that he broke most of the motors he brought!

NEWS FROM AROUND THE WORLD

CZECHOSLOVAKIA

A 12 meter site in Ostrava, Czechoslovakia was the scene of one segment of the Czech national championships. Of the eleven entrants, the top five places were:

Jiri Kalina	16:17	19:50	36:07
T. Weigert	13:53	14:44	28:37
K. Rybecky	12:57	15:37	28:34
Rudolf Cerny	12:23	13:15	25:38
Eduard Chlubny	12:27	12:48	25:15

HUNGARY

Geza Varszegi has been chosen for first slot in the '68 Hungarian Indoor Team, and five other fliers (Biro, Ocsady, Ree, Buzady and Egri) are fiercely competing for the two remaining team positions. Two rounds of team selection have been held in Debrecen, with very poor air for Round I. Two more rounds remain, and final calculation will be made by taking the total of scores from the four rounds and adding each flier's four best starts from all other starts.

ROUND I

Geza Varszegi	25:40	27:00	52:40
Gy. Buzady	15:21	24:55	40:16
Antal Egri	19:40	20:26	40:06

Andras Ree	17:22	19:15	36:37
Karoly Biro	13:47	11:23	25:10
Zoltan Ocsody	10:08	4:40	14:48
ROUND II			
Geza Varszegi	25:29	27:35	53:04
Karoly Biro	26:13	24:58	51:11
Zoltan Ocsody	24:07	26:00	50:07
Andras Ree	20:57	26:27	47:24
Gy. Buzady	17:13	23:45	40:58

MARYLAND - BALTIMORE

The annual indoor meet held by the Baltimore Aero-Craftsmen on April 28, 1968. Times were quite good, considering the lights and rafters. The results:

Junior HLG		Open HLG	
Kenny Dunn	0:47.6	John Thornhill	1:23.8
Francis Fisher	0:25.0	Dan Belleff	1:17.5
B Stick			
Dan Belleff	10:32	Rudy Aukschun	8:14
Tom Vallee	9:35	Dan Belleff	7:13
Chester Wrzos	9:28	Chester Wrzos	6:06
Junior Easy B			
Raymond Crum	4:55	Indoor Scale	
Francis Fisher	2:22	Nevin Eintline	128 pts.
		Rudy Aukschun	118
		W. W. Bell	84

MICHIGAN - DETROIT

86 entries made the annual Michigan State Indoor Meet one of the larger indoor meets this year. Top winners:

Junior HLG		Open HLG	
Charles Kowalski	1:37.0	Bob Bienenstein	1:55.0
Warren Wells	1:04.4	Joseph Macay	1:39.7
Bob Mihora	1:01.0	Phil Klintworth	1:03.3
Junior Paper Stick			
Charles Kowalski	6:30.4	Bob Randolph	17:46
David Wyoich	2:29.0	Ed Stoll	17:09.1
Warren Wells	1:16.5	Jim Richmond	14:48.0
Indoor Stick			
Ed Stoll	21:41.4	Walter Hartung	148.7 pts.
Hardy Brodersen	21:01.2	Jim Richmond	134.3
Bob Randolph	21:00.2	Donald Roberts	132.0

PENNSYLVANIA - PITTSBURGH

268 contestants, 244 of them Juniors and 20 of them girls, made the 4th Annual Indoor Model Air Meet a major and resounding success. 179 entrants in Delta Dart and 84 Junior HLG entrants helped crowd the floor during flying hours and pointed up some need for improved speed of handling of contestants. In all, the meet reflected a net increase of 42%, with a 56% increase in Junior entry. This was an outstanding effort by Pittsburgh modelers as they staffed this meet. Space does not permit listing the winners, since there were 23 separate events.

STATE OF THE ART

Hal Crane's twin bill, two wing designs for a single model, was the holder of the Cat. I C Stick record for a while this spring, until clubmate Hewitt Phillips picked up the same record for himself. The record time was 15:30.2, but somehow I missed which combination did the time. It is of little consequence, since Hal has proven again and again that he is a past master at making time with relatively heavy models in a low ceiling site. Some of his comments about the models are: A model which is about 50% overweight will survive ceiling scrubbing with about 100 or 200 turns backed off from a full Cat. III windup. A climb that puts the model on the ceiling in 30 seconds has been used, but not with the models shown. With .078 x 16" rubber, these models climb to the ceiling (20') in about 45 seconds and stay at the ceiling about 9-10 minutes, landing with about 300 turns out of 1400 at launch (wind to 1500 - back off to 1400). Trim for nose up, slow flight to reduce impact velocity. A twisted wing (washin & washout) gives C-2 a 12' circle, and the increased assymetry of 654 improves the recovery from the wall. So do the prop spar extensions, which are 1/2" long.

A MICROFILM REPORT

Part I - Testing Methods

Testing and research on microfilm has been continued as I have had time, since the completion of the last series on microfilm in the May '66 issue. Something over 40 sample mixtures have been brewed up from 10 or 12 types of base, and several different plasticizers.

The present series of experiments have been directed toward creating a stable film with adequate strength and minimum static/sticky tendencies. An additional test which is a real "torture test" is the elevated temperature test to check for short-term heat warping, by placing a test panel in a controlled temperature oven. The following tests are performed on each sample:

Pouring test - purely subjective evaluation of the water handling characteristics. Basic objective is to get uniform gold colored film during good pouring conditions. At one time silver film was the standard, but pure silver film can range 2:1 in thickness for the same color - the thinnest bit of silver film is very fragile and subject to shattering - and you can't reliably tell it from good silver film.

Static test - a small triangular flap of film is cut loose with the hoop supported stationary in a horizontal position. Normal air currents in the room will cause the flap of film to wave gently. Film with high static effect will almost immediately "tuck up" accordion-pleat fashion, while static free film will wave for over a minute before the motion eventually builds up a small static charge. In the latter case, the flap generally folds over flat against the rest of the film.

Sticky test - this is also highly subjective, since the flap from the test above is grasped with tweezers and gently pulled loose if possible. Film which is absolutely non-sticky will pull loose without damage even in cases where the static charge is very high. (It is extremely unusual to find zero stick with high static.) Film with a very high degree of stickiness will rupture instead of separate - so the only ratings I assign are usually very low, low, medium and high stickiness.

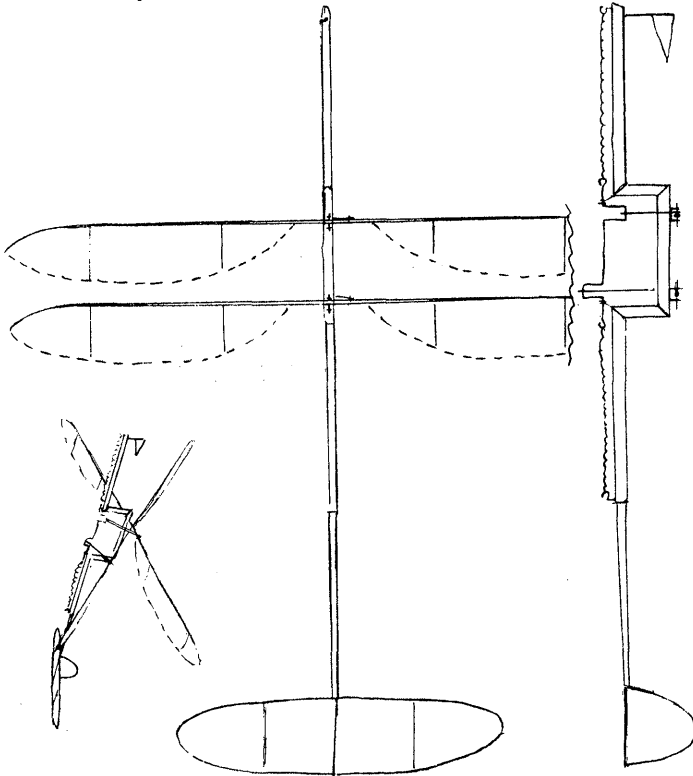
Stability test - a 9 1/2" x 3" stab is covered Bilgri-style with the test film, mounted on a piece of 1/4" square balsa and stored in a closed box. The samples are checked at three month intervals for warps, and samples rated on the basis of how soon serious warps occur. Note that some film samples will pull out most of the wrinkles, but won't have enough pull to warp even fairly light surfaces.

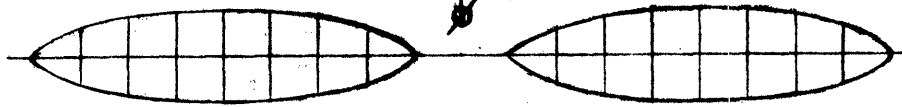
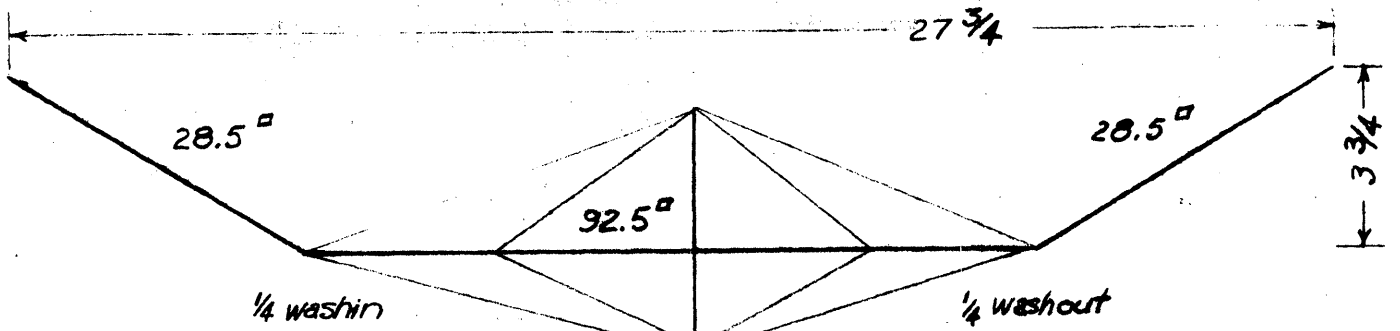
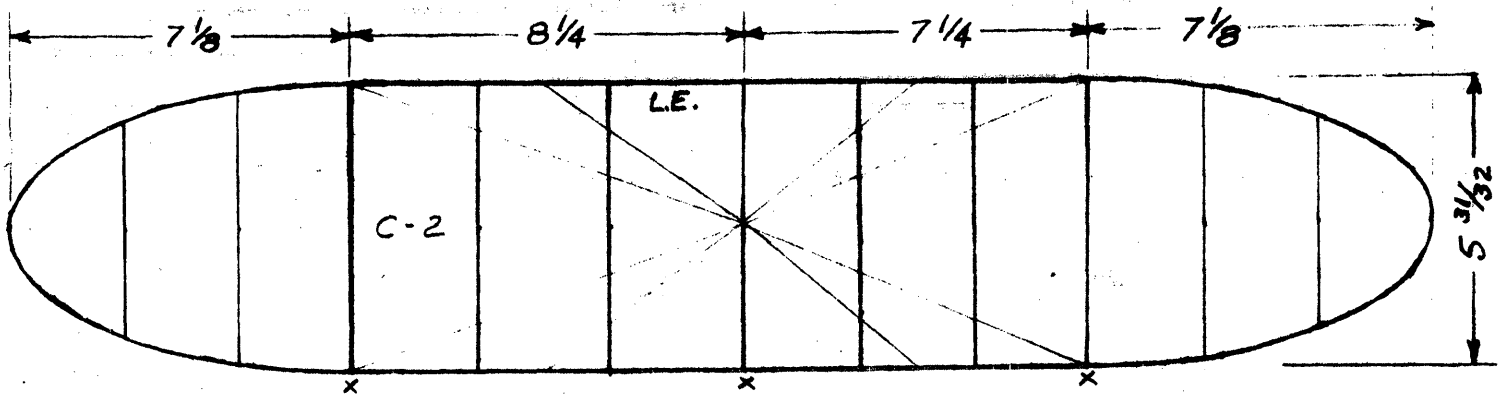
Elevated temperature test - samples like the stability test panels are mounted in an electronically controlled oven and raised to some high temperature for 24 hours, then allowed to cool. Only one sample has had the full course, and it survived to 160° F. with only minimum warping. With no established history on various types of film, 160° F. has little real meaning, but it sounds impressive!

Very high humidity has hampered much planned experimentation all this year, but future issues will summarize some completed experiments and give "recipes" of successful film solutions.

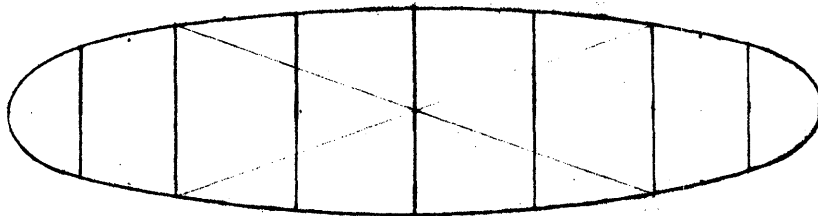
CHANGE OF PACE

Hewitt Phillips sent in the sketch below, which portrays the essential features of an ornithopter design he flew several years ago. The chief feature of this flapper arrangement (each flapper teeter-totters out of phase with the other) is smooth application of power. Hewitt's model flew well even though it was overweight and small. He feels it might be a good design for future attacks on the ornithopter record.



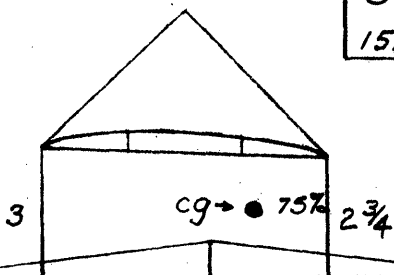


18x33x2
65rpm

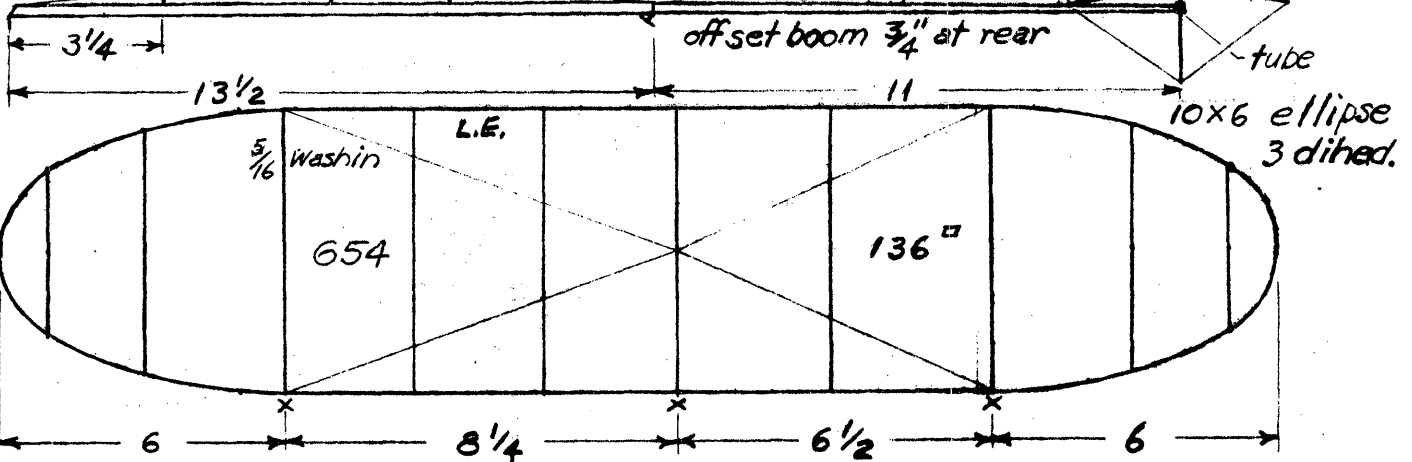
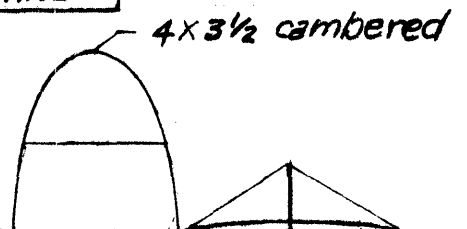


60^\square
 $4\frac{1}{2} \times 17$ ellipse
Incidence
adjusts.
Tilt $3/4$.

654-C-2 SCRUBBA
15:58 15:55 Cat I H.L. CRANE



C-2 .05 oz.
654 .045
.078x16 loop .055



THE LAB

Rubber Torque Tests

Several people are making intensive studies of pirelli rubber, with the goal of identifying extra good rubber for indoor use. All the various tests will be reported as this info is made available, and anyone with what they consider to be a valid test for rubber quality is requested to submit a report on the test.

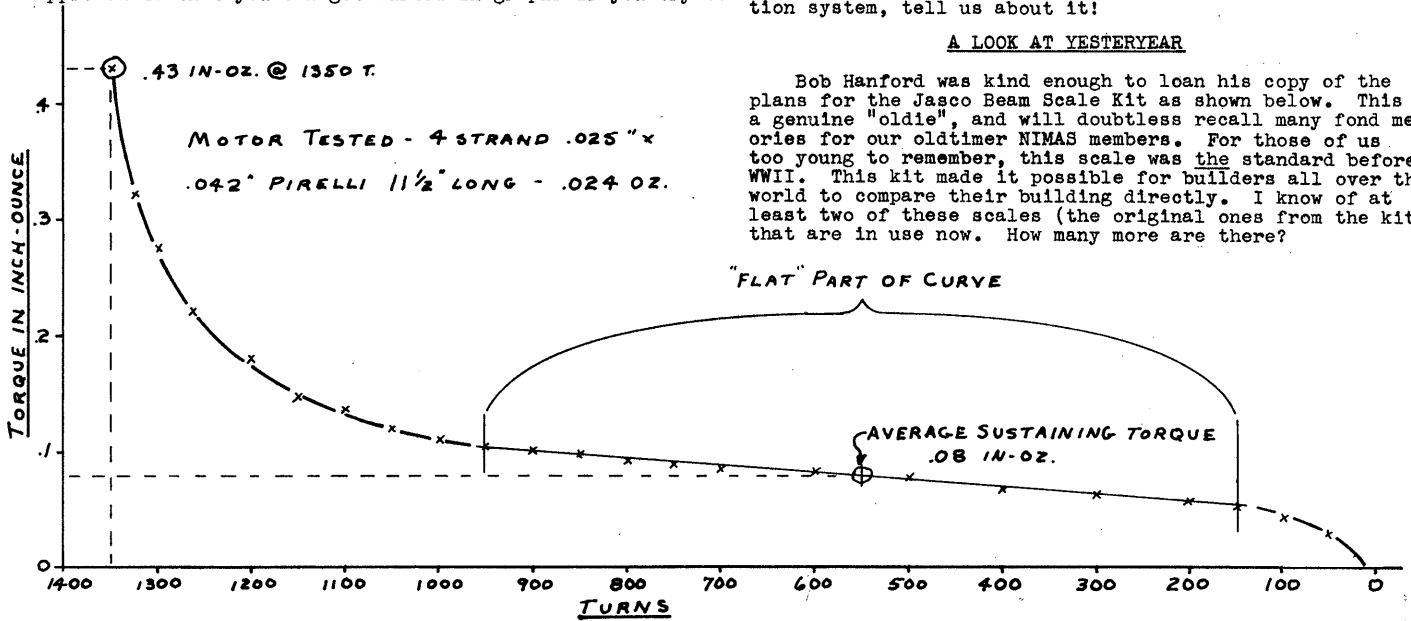
Meanwhile, a torque test (plot of torque vs. turns) is proving to be a good test of how much energy a given piece of rubber will deliver. One major difficulty with this approach is that you can get buried in graphs if you try to

carry them all to the field. To help reduce a graph to a few numbers to jot on the envelope you put the motor in, I offer the following suggestion. The graph below has had a straight line superimposed on the flat part of the curve, and end points of this line are established by noting the points where the curve deviates from the line. Another point well up on the high energy part of the curve is marked for identification (.43 in. oz. @ 1350 turns).

I propose that motors be identified with the high torque point and the value of the midpoint of the line segment (1350/.43; .08). In effect, this will serve as a definition of average sustaining torque, and this term will be used in future comments on rubber in INAV. Comments on this proposal are requested; if you have a pet classification system, tell us about it!

A LOOK AT YESTERYEAR

Bob Hanford was kind enough to loan his copy of the plans for the Jasco Beam Scale Kit as shown below. This is a genuine "oldie", and will doubtless recall many fond memories for our oldtimer NIMAS members. For those of us too young to remember, this scale was the standard before WWII. This kit made it possible for builders all over the world to compare their building directly. I know of at least two of these scales (the original ones from the kit) that are in use now. How many more are there?



CONVERSION TABLES

OUNCES AND GRAMS WT. IN OZ. x 28.35 = WT. IN G. WT. IN G. x .0353 = WT. IN OZ.	OUNCES AND GRAINS WT. IN OZ. x 437.5 = WT. IN GR. WT. IN GR. x .002287 = WT. IN OZ.	GRAMS AND GRAINS WT. IN G. x 15.43 = WT. IN GR. WT. IN GR. x .0648 = WT. IN G.
--	---	--

BEAM JASCO SCALE
DESIGNED AND MANUFACTURED BY JUNIOR AERONAUTICAL SUPPLIES CO.

WT. POSITION 1	2	3	4
IF WT. 1/100 oz. .0077	.01 oz. .0142	.0142 oz. .0283	.0283 oz. .0566
USED 1/100 oz. .07 in.	1 oz. .14 oz.	1.4 oz. 2.83 oz.	2.83 oz.
15 1/16 IN.	7/8 IN.	1 IN.	1.4 IN.
THEN WT. OF THE ARTICLE IS			

CONVERSION CHART - CUT OUT AND CEMENT ON BASE

NOT ACCURATE SCALE - USE PRINTED SCALE SUPPLIED

EXAMPLE SCALES - NOT TO BE USED IN CONSTRUCTION

CUT OUT PRINTED SCALE AND CEMENT TO BEAM

BEAM: 12 3/8

BASE: 10 1/2 x 3/8

CEMENT CHART ON BASE AFTER ALL THE FITTINGS ARE CEMENTED

BE BE SURE TO ALIGN THIS LINE EXACTLY UNDER KNIFE EDGES ON 1" LINE

CEMENT SCALE TO BEAM - AFTER CEMENT IS DRY TRIM BEAM TO SCALE

NOTES

THE BALANCING NUT SHOULD BE ON CENTER OF THE BOLT. IF IT IS NOT CENTERED IT SHOULD BE SHELLACED, DOPED OR VARNISHED TO MAKE IT IMPROVED TO ATMOSPHERIC CONDITIONS, BUT BE CAREFUL NOT TO SMOOR THE PRINTING.

WEIGHTS FURNISHED ARE: (1/100) oz. and (1/100) gr. OTHER USEFUL WEIGHTS ARE: 1/2 oz. (1/1000) oz., 1/2 oz. 1 oz., 1 GRAM AND 10 GRAMS.

ALWAYS BLOW DUST OFF THE WEIGHTS BEFORE USING

SIDES MAY BE BENT UP WITH SQUARE PLIERS

WIRE RING

CHEMIST PAN

SUGGESTIONS FOR SPECIAL PANS

SCALE SHOULD BE BALANCED WITHOUT WEIGHTS, AND IT DOES NOT HAVE TO BE RE-BALANCED WHEN WEIGHTS ARE CHANGED

ADJUSTING AND USING THE JASCO BEAM SCALE

BALANCE THE BEAM WITH NUT UNTIL POINTERS COINCIDE. PLACE THE LARGER WEIGHT, 10z., ON THE PAN, AND THE SMALLER WEIGHT, .01z., ON THE 1" MARK OF THE HUNDRETH SCALE. THE POINTERS SHOULD COINCIDE.

IF THE MOVING POINTER IS ABOVE THE STATIONARY POINTER, THE DISTANCE BETWEEN THE FULCRUM AND SUSPENSION POINT IS TOO LARGE. SHORTEN IT UNTIL THE POINTERS COINCIDE BY RECENTRING THE KNIFE EDGES OR BENDING THEM SO THAT THE DISTANCE WILL BE EXACTLY ONE INCH.

IF THE MOVING POINTER IS BELOW THE STATIONARY POINTER, THE DISTANCE IS TOO SHORT. RE-CENTRE OR BEND THE KNIFE EDGES UNTIL THE DISTANCE IS EXACTLY ONE INCH. REMOVE THE WEIGHTS AND RE-BALANCE THE BEAM WITH ADJUSTING NUT - RE-CHECK WITH WEIGHTS. IF POINTERS COINCIDE - THE SCALE IS READY FOR USE.

PLACE THE ARTICLE ON PAN. SLIDE THE APPROPRIATE WEIGHT ALONG THE BEAM UNTIL POINTERS COINCIDE. THE WEIGHT OF THE ARTICLE CAN THEN BE READ OFF THE SCALE. BE SURE TO READ THE RIGHT SIDE OF OTHER WEIGHTS. BESIDES THOSE GIVEN ARE USED, SEE TABLE ON BASE FOR EXAMPLE READING.

© 1936 BY JR. AERO. SUPP. CO.

JASCO BEAM SCALE KIT - DESIGNED AND MANUFACTURED BY JUNIOR AERO. SUPP. CO. - 203 E. 15th Street, N.Y.C. 3.

INDOOR

NEWS and VIEWS

\$2/ YEAR NIMAS DUES \$1/YR ADDITIONAL

NATIONAL INDOOR MODEL AIRPLANE SOCIETY

New Members!

Dr. LEIGH SIMPSON, R.D.#3, Fulton, N. Y. 13069
TED WHITE, Reservoir Rd., Fulton, Md. 20759

The Indoor Nats

The indoor section of the 1968 Nats will be held in the Kansas City Municipal Auditorium, 1310 Wyandotte, Kansas City, Mo. from 9 am to 9 pm on Sunday, Aug. 4, 1968. Hand launch glider will be from 9 am to 2:30 pm, and the rubber events will then run until 9 pm. All HLG fliers are requested to promptly clear the floor at the end of their session in order to enable the rubber fliers to safely unpack their models. During all the rubber flying, all contestants are requested to stay clear of the flight area. Once you launch it, all you can do is pray - unless you abort the flight with a balloon, so please help keep the air quiet for the benefit of models landing.

An attempt was initiated to obtain the site an extra day for a Cat. II Record Trials. No word has been received on this, and it must be considered that there will not be extra flying time. However, in case late word comes through, I will notify anyone who is interested. Please notify Bud Tenny, Box 545, Richardson, Texas 75080 if you want to receive notification.

NIMAS Charts

In the May '68 issue I announced that highly durable copies of various charts and graphs published in INAV would be made available. A fairly large number of these charts have been ordered, and production has been held up until this week. All orders currently on hand should be filled before the Nats, and a few of these may be available from me at the Nats. For those desiring more info, send a stamped envelope for zerox copies of the full size art work. The charts in production are:

1. RPM/Time - April '68 INAV - 85¢
2. Pirelli Parameters - Mar. '68 - \$1.00
3. CG Location - May '67 - \$1.10
4. Arc Thickness Nomogram - Feb. '67 - \$1.20

The initial comments on this special metal process suggested that trophy plates could be custom made for a price competitive with plain engraved plates, provided the required art work could be generated by the user. Those who requested further information were somewhat discouraged by the art work requirement, and only one club has ordered plates. A sheet of artwork has been worked up and is available for 15¢ per sheet. You can obtain a preview of the artwork (xerox copy) by sending a stamped envelope along with your request.

Recent Publications

The August issue of American Aircraft Modeler has an article which should be of interest to indoor fliers who care about their pirelli. "Rubber Motor Testing", by Jim Horton, dovetails nicely with material to be presented in INAV in issues to come. The particular part of interest to indoor fliers is Horton's break-in method. It may well be adaptable to indoor motors, and appears to be a valid break-in method which should give equivalent break-in with less chance of chafing the motor as often happens with break-in by winding.

Junior NIMAS Awards

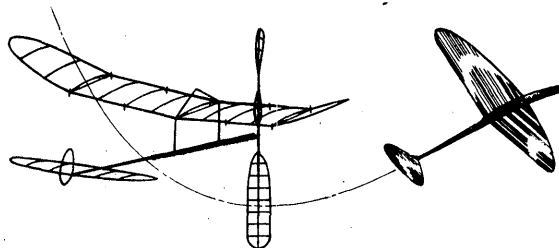
Silver Cat. II Rubber Award - 18:19, Bill Gibbs

Silver Cat. I Rubber Award - 8:23, Bill Gibbs

Silver Cat. I HLG Award - 0:21.4, Bill Gibbs

Gold Cat. I HLG Award - 0:25.5, Bill Gibbs

Diamond Cat. I HLG Award - 0:27.2, Bill Gibbs



Editor: Bud Tenny · Box 545 · Richardson, Texas · 75081

Junior Ace

As can be seen by Bill Gibbs' monopoly on NIMAS Awards this month, he has qualified as the first Junior Ace. It is not unusual for Bill to turn in outstanding performance in Indoor, since he carried home four Nats Indoor trophies last year. I understand Bill will attend the Nats this year, so he may well add more Awards to his Cat. II string.

As a reminder to NIMAS Juniors and family members, the Junior Award times are roughly 75% of Open times:

Indoor Stick (Any class indoor model, single flight)

AWARD	Cat. I	Cat. II	Cat. III
Silver	7:30	15:00	21:00
Gold	9:30	18:45	26:30
Diamond	11:15	22:30	31:30

Indoor HLG (Best single flight of nine)

AWARD	Cat. I	Cat. II	Cat. III
Silver	0:18	0:34	0:41
Gold	0:22.5	0:41	0:49
Diamond	0:27	0:49	0:56

RECORDS? MAYBE!

AKRON RECORD TRIALS - June 23, 1968 90' ceiling - Cat. II Goodyear Hangar, Akron, Ohio
Sr. AMA Cat. II FAI - 14:38, J. Serviates
Open A ROG - 15:53.2, Joe Hindes
Open C Cabin - 18:29.0, Bob Randolph
Open Ornithopter - 5:15.2, Ken Johnson

Possible World Record

Hard on the heels of Stan Chilton's record flight comes the announcement that Jiri Kalina, previous holder of the Cat. I World Record, has applied for a new record on the basis of a flight of 19:12 on June 15, 1968. For those interested in chasing this record, a World Record has to be exceeded by 2%. The next record jump will need to be to 19:35.

REPORT FROM CZECHOSLOVAKIA

Walter Erbach attended the International meet held in Brno, Czechoslovakia on July 6-7, 1968. He reports:

The Czechs were magnificent hosts. Competition was spirited but clean - with only official flying the floor was clear and no racing around. Prizes included beautiful Czech cut glass.

The contest was a two-day affair, held in the pavilion of the Brno display grounds. This is an area similar to our (U.S.) state fair grounds. The pavilion is circular with a vertical wall about 60' high, topped by a dome with a cupola in the middle. The highest point is 120', and the diameter is 300'. Unfortunately, incredible drafts prevent use of the upper 1/3 of the altitude. Any model flying near the cupola was sucked up (open vents) and shredded or spit out in pieces. Any model within 10' of the curved dome ceiling was almost a sure goner due to the chimney effect from open holes at the base of the dome.

The contest was very interesting; European style. Test flying was permitted only early in the morning, and only official flights during the day. This made it hard to know proper adjustment or rubber size. Despite this, and the building handicap, the flying was very good with four flights over 30 minutes. Competitors came from Germany, Austria and Italy, with three ladies: Dagmar Chlubna and Miluska Zolcer from Czechoslovakia and Ludovica Corazza from Italy. The results:

1. Jiri Kalina	Czech.	31:11	32:24	63:35
2. Karol Rybecky	Czech.	28:55	30:33	59:28
3. Eduard Chlubny	Czech.	28:46	30:03	58:49
4. Hans Beck	Germany	27:37	29:10	56:41
5. JuraJ Sitar	Czech.	28:16	23:55	52:11
6. Rudolf Cerny	Czech.	26:32	25:12	51:14

STATE OF THE ART

ROULETTE - Indoor Autogyro

This Model's performance on June 11, 1968 represented the fulfillment of a long quest. It began eight years ago with experiments that resulted in the design of "Mr. G", published in Nov. '62 INAV. A similar, but larger model called "G-III" was presented in Zaio's '65 Year Book.

"Roulette" is a direct descendent of "G-III", but the rotor mast was moved to the end of the stick to prevent the blades from hitting the wing. Also, more sophisticated construction was used; braced stick and tail surfaces, double thrust bearing and rounded tips. The result is a light weight model of the type which has become necessary due to the advance in autogyro times in recent years.

The flight system is still the same as for "Mr. G", with offset rotor to counter prop torque. Rotor tilt has been added to increase the anti-torque forces, allowing the use of a large prop and left turn. This combination gives sufficient torque correction to insure a fairly steep climb.

Even with this setup there is a limit to the power the model will handle without stalling. It is necessary to back off a few turns or catch the model and re-launch if it stalls badly. After that, it climbs smoothly. On the record flight it reached a height of 75-80 feet, which was just right for the peaked 107' height of Hangar #2.

Thanks are due to Ed Franklin for his help with the motor, and to Bill Bigge for his advice on hall air conditions.

by Fred Weitzel

NEWS FROM AROUND THE WORLD

AUSTRIA

Manfred Koller is training hard toward the World Champs in October, in addition to coaching indoor fliers in Vienna. His own Cat. I time has climbed to 15:01 for a new Austrian record. In a 12 m site he has done 18:33 without touching the ceiling, and at Debrecen he made flights of about 25 minutes.

ITALY - ROME

The first round of team selection for the Italian Team was held in Palazzo dello Sport (the WCh site) and drew 12 entrants. The results:

E. Corazza	21:31	19:44	41:15
C. Cotugno	20:52	18:53	39:45
G. Masciullo	20:12	19:29	39:41
L. Chiarottini	17:29	16:40	34:09
B. De Angelis	16:48	16:22	33:10
G. Federici	16:31	15:48	32:19

ROMANIA

The April International Contest in Romania brought out 30 contestants, with 5 coming from Czechoslovakia and 2 from Italy. The site was the large salt mine (75 m ceiling and 50 m x 100 m floor area) near the Carpathian mountains. The temperature is a constant 10° C., and there were a few light drafts to contend with. Two flight totals:

Jiri Kalina	Czechoslovakia	57:41
K. Rybecky	"	47:09
J. Sitar	"	41:59
Dagmar Chlubna	"	40:54
Egizio Corazza	Italy	39:18
N. Besman	Romania	37:40
Eduard Chlubny	Czechoslovakia	36:16
Otto Hintz	Romania	35:32

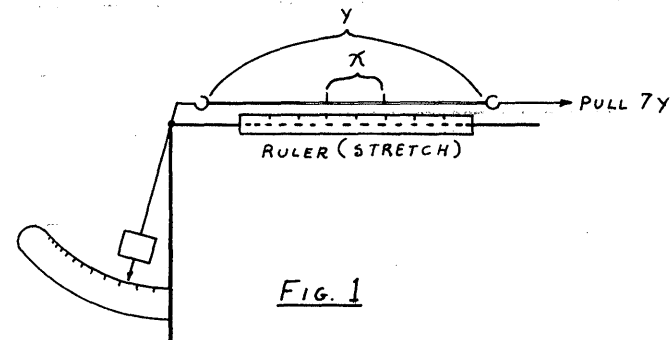


FIG. 1

THE LAB

Another Rubber Test

The May '68 INAV summarized briefly a test devised by Charlie Sotich. For review, Fig. 1 below shows this test schematically. The scale at the left reads force, while a ruler held next to the 1" segment (x) (which was marked on the unstretched sample) measures how much the marked segment stretches as the whole piece (y) is stretched to seven times normal length in six equal steps.

Considerable discussion between Charlie and myself has resulted in design changes for the basic machine as shown in Fig. 2 below. Cam "A" on the left was designed by Charlie so that its angular rotation is directly proportional to the force applied. Drum "B" on the right is used to wind up cable "C", which applies stretch force to the rubber; its rotation is already proportional to the amount of stretch except for a small error introduced by movement of the force hook (A1).

A potentiometer is mounted to the shaft of the cam and a multi-turn potentiometer is mounted on the take-up drum. (For you non-electrical cats, a potentiometer is a variable resistor like the volume control on a radio.) The circuit in Fig. 3 shows the electrical schematic. R1 is the force potentiometer, R2 is the potentiometer which produces a voltage proportional to the amount of stretch, and R3 can be set to minimize the error due to A1. In use, the motor is hooked up with zero slack and the position of the drum and cam set so the potentiometers R1 and R2 are zeroed. As the drum is turned, the amount of stretch can be read from voltmeter V2 and the force from V1. If you use a tape recorder, you can conduct the test by yourself by reading out the voltages at each stage of the test. You can then graph the test as you play back the tape. If anyone is interested in this type of test, I will supply more information on request.

This rig is slightly more complex than Charlie's, with these aims in mind:

1. A complete motor is tested as a loop. This provides a means to classify each motor according to output and will help insure that you use the poor rubber to hold the lid on your box instead of flying with it.
2. The basic tester is designed to minimize certain errors inherent in this type of testing. First, possible weighing errors are magnified when small pieces of rubber are used - this unit uses three times as much rubber as Charlie's unit. Second, the testing is reduced to a mechanical routine that can be repeated quickly and uniformly. This minimizes some error caused by hysteresis effects in the rubber; that is, if the test takes substantially longer one time than another, the rubber takes a temporary "set" proportional to the time force is applied.
3. If you have access to a laboratory X-Y plotter, it is possible to trace out the energy curve directly and continuously; an entire test can take as little as 2 minutes. To use a plotter, replace the voltmeters in Fig. 3 with the plotter input leads.

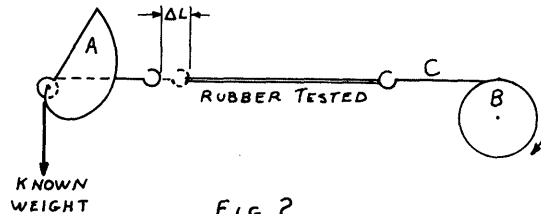


FIG. 2

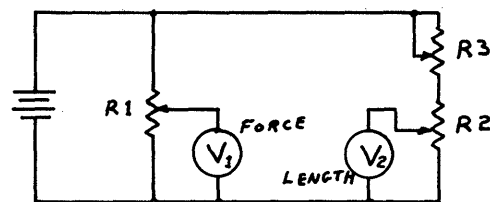


FIG. 3

"Roulette" - INDOOR AUTOGYRO

AREAS: ROTOR 38^{sq} WT. .0365 oz.
 WING 37^{sq} POWER .060 P.W.
 TAIL 35.6^{sq}

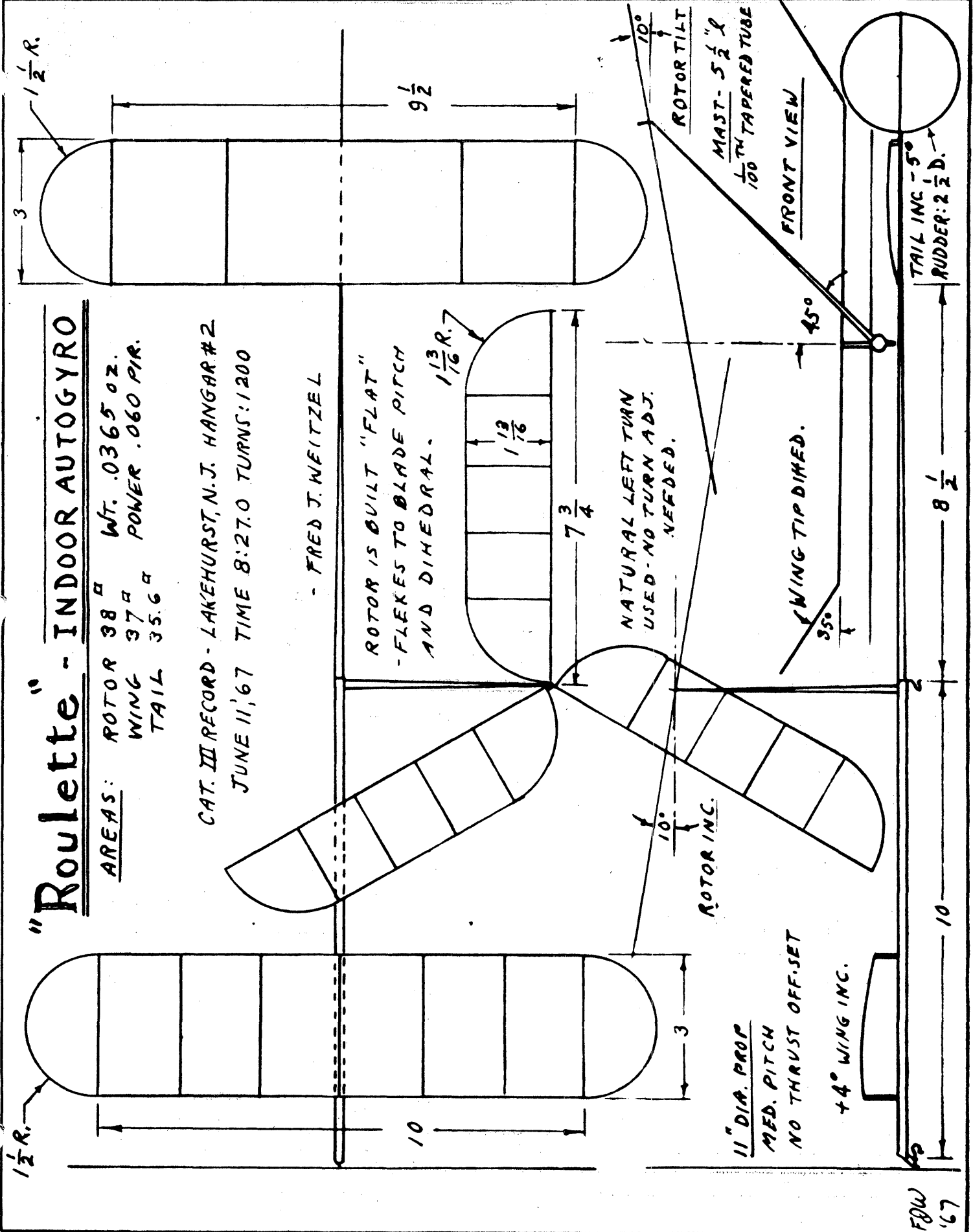
CAT. III RECORD - LAKEHURST, N.J. HANGAR #2
 JUNE 11, '67 TIME 8:27.0 TURNS: 1200

- FRED J. WEITZEL

ROTOR IS BUILT "FLAT"
 - FLEXES TO BLADE PITCH
 AND DIMEDRAL. $1\frac{3}{16}$ R.

NATURAL LEFT TURN
 USED - NO TURN ADJ.
 NEEDED.

WING TIP DIMED.

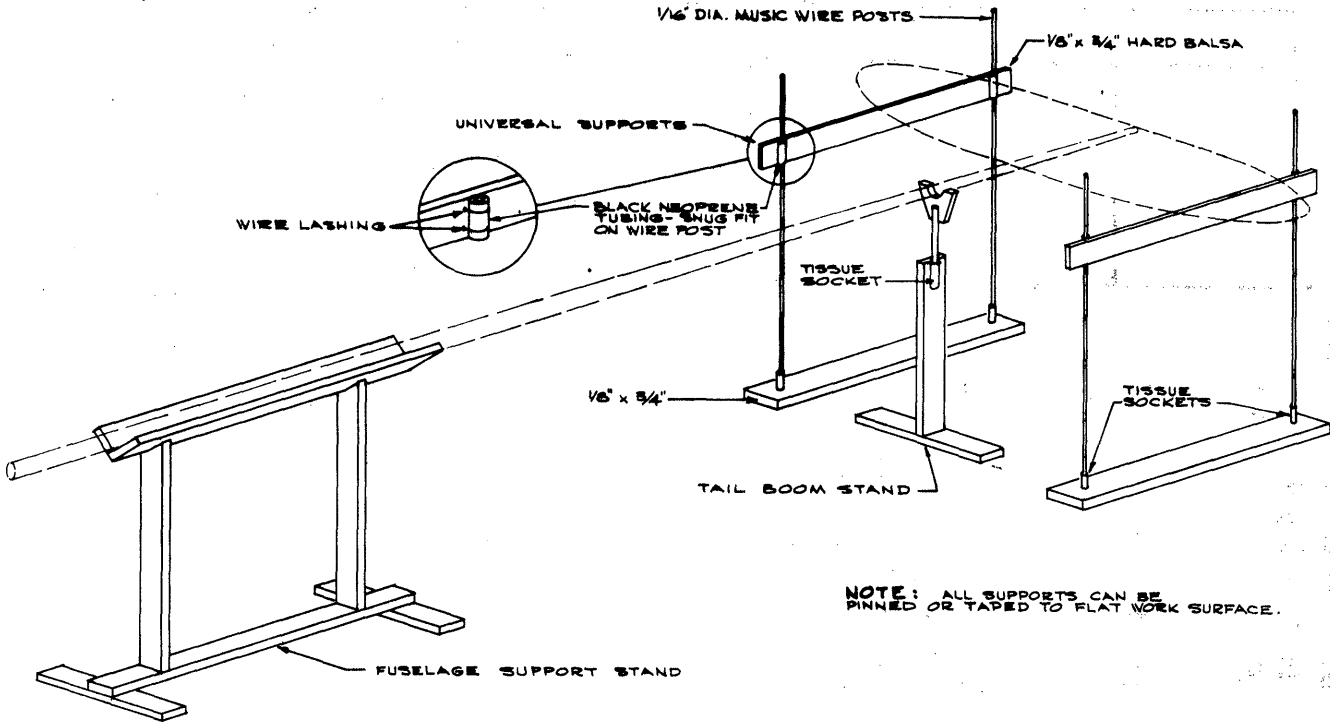


FBW '67

MODEL ASSEMBLY JIG

Very light indoor models are a problem to assemble with proper alignment - even very quiet rooms have air currents to give trouble. The set of jigs shown below makes the job much easier. Details of the universal supports are shown below and in Fig. 5 of the bracing article in the Oct. '66 INAV; and details of the other stands will be furnished on request. The jigs can be set up on any

flat surface, either pinned to the work surface or held in place with cellophane tape. The fuselage is held level by one jig, while all combinations of boom incidence, stab tilt and washin/washout can be held by the other jigs. All the jigs will pack into a small space to permit field repairs or re-rigging.



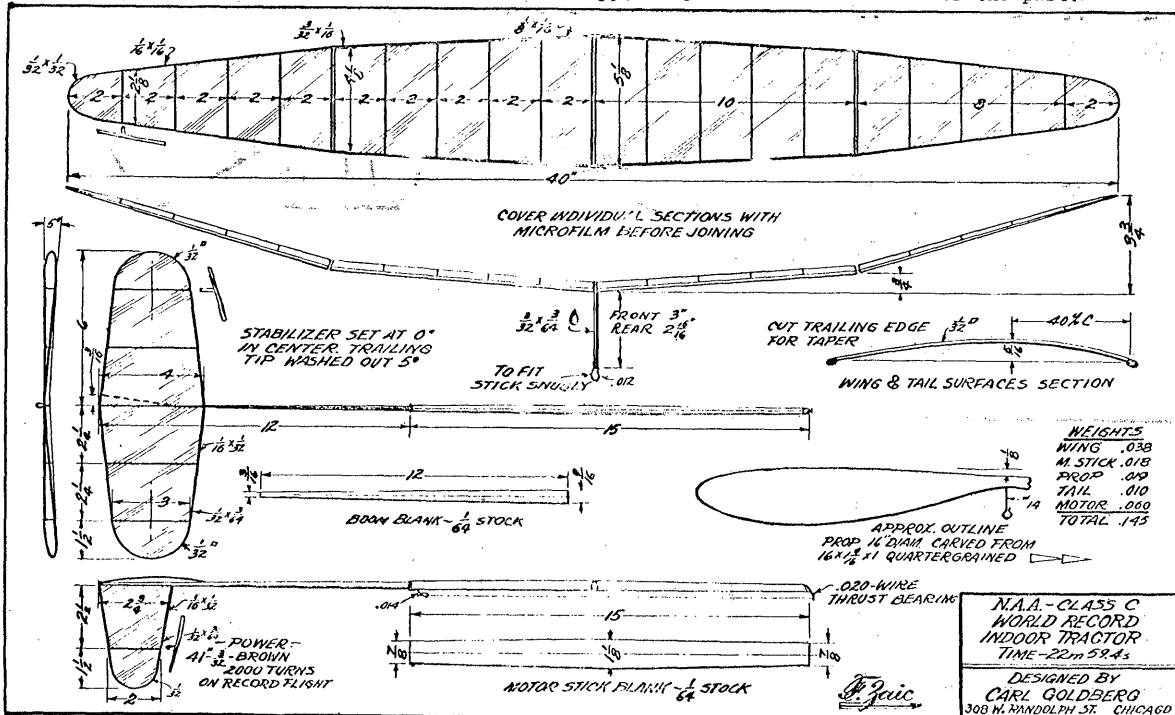
NOTE: ALL SUPPORTS CAN BE PINNED OR TAPED TO FLAT WORK SURFACE.

FUSELAGE AND BOOM ASSEMBLY JIG

A LOOK AT YESTERYEAR

Carl Goldberg was a pioneer of indoor model flying, and a real pacesetter also. This glimpse into the past shows Goldberg's World Record model which flew for 22:59.4

in a site just over 100'. Note the weights shown on the plan - and compare this to Class C weights today. The Cat. II C record is 29:21.5, but have we really advanced so much in 32 years? Thanks to M.A.N. for permission to present this reminder of the past!



MODEL AIRPLANE NEWS

JUNE 1963

29

The Goldberg World Record Model

THIS month's N.A.A. model plan is of the ship with which Carl Goldberg established the world record indoor flight of 22 minutes 59.4 seconds at the 1934

National Championship Meet in the Goodyear-Zeppelin Air Dock at Alton, Ohio.

This flight is the longest ever made officially indoors and might easily have been surpassed had Carl elected to try a second or third flight. However, he

made only one flight and the present record was the result. This model is of such merit that it might serve as a guide for indoor enthusiasts for years to come. The N.A.A. is fortunate, indeed, to be able to offer Goldberg's design to its junior members.

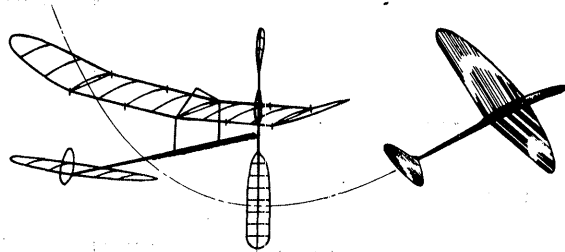
Carl promises to attend this year's meet in St. Louis and reports that he has a few improvements on his present design and hopes to show a longer flight than 25 minutes. For the benefit of those who may want to write him his address is now, 308 W. Randolph St., Chicago, Ill.

INDOOR

NEWS and VIEWS

\$2/ YEAR NIMAS DUES \$1/YR ADDITIONAL

Editor: Bud Tenny · Box 545 · Richardson, Texas · 75081



RESULTS FROM THE 1968 INDOOR NATS

Indoor Stick		Paper Stick		Indoor Cabin		Indoor HLG	
Junior		Junior		Junior		Junior	
*1. Linda Randolph	18:44.5	1. Linda Randolph	15:30.5	1. Bobby Dunham	11:58.4	1. Bill Gibbs	2:04.9
2. Bobby Dunham	15:23.0	2. Gerry Geraghty	12:52.7	2. Bill Gibbs	11:58.0	2. Bobby Dunham	1:50.8
3. W. Schlarb, Jr.	12:21.0	3. Bobby Dunham	11:51.9	3. Patrick Wood	5:58.1	3. M. Thompson	1:48.8
4. Kristi Tenny	11:05.5	4. Bill Gibbs	11:07.2	4. Michael Wood	4:22.5	4. D. L. Dock	1:44.2
5. Gerry Geraghty	9:40.5	5. T. Budding	10:56.8	5. W. Schlarb	3:44.0	5. Bobby Hanford	1:33.1
6. Bill Gibbs	8:36.6	6. R. Sherman	9:06.5	6. Bruce Paillet	3:04.5	6. R. Sherman	1:30.5
		7. B. Webster	8:19.0	7. Barry Paillet	2:40.4	7. Veselsky	1:28.0
		8. Patrick Wood	8:03.2	8. Justin Mills	1:27.3	8. M. Kerr	1:27.9
		9. Steve Valerius	7:26.3	9. James Mills	1:21.4	9. James Mills	1:23.9
		10. J. Haught	7:00.6			10. Gerry Geraghty	1:23.6
*Linda's best flight may be 23:12.1; she was using a Class C sized FAI model.							
Senior		Senior		Senior		Senior	
1. Jan Serviates	14:39.4	1. Jan Serviates	12:41.0	1. Jan Serviates	14:02.0	1. A. Markiewicz	2:10.6
2. Art Markiewicz	13:33.9	2. D. Domina	9:34.5	2. Susan Weisenbach	3:37.0	2. Jan Serviates	2:00.7
3. Susan Weisenbach	7:32.7	3. D. Powell	6:19.0	3. Thomas Mills	1:15.2	3. Thomas Mills	1:48.2
4. Hank Nixon, Jr.	6:36.6	4. Susan Weisenbach	4:46.5	4. M. R. Richardson	1:12.0	4. D. M. Wakerly	1:40.2
5. T. J. Rodgers	3:05.0	5. Hank Nixon, Jr.	4:05.9			5. M. Richardson	1:36.9
		6. T. J. Rodgers	2:36.0			6. W. Rupert	1:36.3
						7. C. Taft	1:24.1
						8. G. Brown	1:22.2
						9. G. Meyers	1:22.1
						10. Hank Nixon, Jr.	1:19.1
Open		Open		Open		Open	
1. Jim Richmond	31:07.8	1. Bob Randolph	18:40.0	1. Bucky Serviates	20:08.5	1. D. A. Reed	2:10.6
2. Manny Andrade	28:08.3	2. Dan Belieff	18:35.5	2. Al Rohrbaugh	19:36.0	2. Bob Larsh	2:09.4
3. Ed Stoll	27:22.5	3. Wally Mumper	18:34.6	*3. Bob Randolph	19:18.0	3. Jim Mills	2:04.8
4. Al Rohrbaugh	26:33.3	4. Phil Klintworth	17:41.0	4. Manny Andrade	18:11.4	4. Dick Mathis	1:58.7
5. Bud Romak	25:59.1	5. Charlie Sotich	16:48.0	5. Hal Crane	13:21.0	5. G. M. Lee	1:57.8
6. Bob Randolph	25:56.2	6. Wayne Zink	15:07.0	6. Jim Vale	10:00.0	6. Bucky Serviates	1:57.7
7. Bud Tenny	24:16.0	7. Hal Crane	14:11.5	7. Wayne Zink	10:02.0	7. Bob Sifleet	1:54.2
8. Stan Chilton	22:27.0	8. Al Rohrbaugh	14:03.5			8. A. L. Vaughn	1:53.6
9. Paul Tryon	20:18.0	9. Dick Ganslen	14:00.0			9. R. L. Young	1:53.2
10. Hardy Brodersen	19:29.0	10. Jim Vale	13:47.8			10. J. H. Gremel	1:53.0

The Indoor Nats

NIMAS and NFFS banded together for their first joint venture - hosting the 1968 Indoor Nats. If one can say there was any failure, it could only be around 7 pm, when the system of volunteer timers grew thin. Inspired timer recruiting by John Thornhill helped bridge the gap and probably everyone got flights who would have with the Navy timing crews of past years. What really happened was that faithful NIMAS members (rubber fliers) timed HLG, but not many HLG fliers stayed to help time rubber flights. A few NIMAS members who weren't flying and some very faithful NFFS members carried the slack for those who cut out.

I wish it would be possible to name everyone who did the timing - the list is truly long. Smooth operation of the desk was due to long, steady work by Roger W. Schroeder of Holbrook, Nebraska and Roger J. Schroeder (both are NIMAS and NFFS members) of Overland Park, Kansas. Recording of scores was handled by Carolyn and Fred Schroeder (son and daughter of Roger J.). After spending all day to audit the HLG scores, Tom Johnson CD'd the rubber events. We all owe these and the timers a big vote of thanks!

Although the Sweepette was still in evidence in HLG, a new breed of glider was making inroads into the winner's circle. This is a big glider - 65 to 75 sq. inches of wing. The largest ones were flown by Bob Hanford - 100 sq. inches - but he didn't get zeroed in in time. Larsh's Bunker Hill glider was a small one that did well, and Bob got an optimum pattern early for 2nd place. With only 17 seconds spread in ten places, Open HLG was hard-fought. A minor flurry of interest came when an unidentified flier presented a built-up glider covered with saran wrap. It was not a floater, because it got heaved to the top many times.

The most encouraging thing about the rubber events was the large number of youngsters who flew - more than 40 in

contrast to only 28 Junior and Senior rubber fliers last year. The times turned by these fliers were slightly better than in past years also - a "plus" all around.

Open competition was quite close in all events, but Jim Richmond took Indoor Stick effortlessly with a three minute margin - the first Cat. II "30" ever at a Nats. This was the first full-bore flight on one of his World Champs models - things are looking up for the U. S. Team in October! Randolph's win in Paper Stick was hard-pressed by his own design - Dan Belieff was also flying Top Cat IV as built from the M.A.N. article. Another very close race was Indoor Cabin, with Bucky Serviates leading to get first with an original model that flew very well.

Considerably more attention was paid to torque input in the rubber events - about a dozen torque meters were in evidence around the hall, including one to measure torque directly from the prop.

The jarring note of the meet was persistent and highly variable drift which prevented many models from showing their worth. Most of the drift took models into bleacher areas for relatively safe retrieval, but very high "blind" ledges claimed some models that were not recovered. The other hazard which worked hardship was midair collisions. At least two three-way collisions were noted, and one time a model which was dislodged from the ledge fell on another model. If the Tenny family experience was typical (surely not!), no one had many safe flights. Of nine attempts, we had four midair collisions and four landed in the balcony.

The Lighter Side: Early in the rubber session, a young boy who had generally been a nuisance kept up his warring ways. Several fliers shooed him away, but Jim Vale ejected him, squirming and squealing, from the site to a chorus of muted cheers of the bystanders! - - - One tired and sweating (the humidity and temperature were very

high) volunteer timer was heard to mutter "Now I remember why I don't like Indoor!" - - - One flier, winding on his torque meter, reaped many comments. "I never saw anyone wind up a table before!" "You won't get much time with that!" "I'll bet you don't get it off the ground!" - - - Jean Paillet eyed Jody suspiciously as she stood by with a camera. He remembered the Chicago Nats when her exploding flashbulb shattered everyone's composure as she took their picture in 1966!

RECORDS? MAYBE!

A number of official Nats flights exceeded records, but I have certain knowledge of only the following record applications being made:

Open AMA Cat. II FAI - 31:08, Jim Richmond
 Junior B Stick - 15:23.0, Bobby Dunham
 Junior B Cabin - 11:58.4, Bobby Dunham

The following flights exceeded records; applications may have been filed:

Open HLG - 2:10.6, D. A. Reed
 Open C Cabin - 20:08.5, Bucky Serviates
 Junior Paper Stick - 15:30.5, Linda Randolph

The Nats results listed elsewhere possibly contain at least one error - 18:44.5 as first place in Junior Stick. Thru an oversight during the auditing procedure, a 23:12.1 flight (also by Linda Randolph) was missed. Add to this her second best Paper Stick flight (14:41) and the following records will probably be applied for:

Junior C Stick - 23:12.1, Linda Randolph
 Junior B Stick - 14:41, Linda Randolph
 Jr. AMA Cat. II FAI - 18:44, Linda Randolph

CONTEST CALENDAR

- OHIO - Akron. Possible record trials in 215' Goodyear hangar. Contact Bob Randolph, 5785 Forest Ridge Dr. N. Olmsted, O. 44070 for info.
- NEW JERSEY - Lakehurst. Record Trials Sept. 16, 1968. Contact C. V. Russo, 143 Willow Way, Clark, N.J. 07066 for more info.
- NEW YORK - Long Island. LIAMAC 1st Annual Indoor Model Meet at Cantiague Park Skating Rink, Hicksville, L. I. Indoor Stick, Paper Stick, HLG, Easy B (paper covered only for Jr. only). CD Bill Dunwoody, 985 Fort Salonga Rd., Northport, L. I., N.Y. October 20, 1968. Site is 190' dia. dome w/50' ceiling in center.

PIRELLI LORE

In the May '66 INAV, the QUESTIONS AND ANSWERS column listed some very comprehensive questions about pirelli; storage, break-in, winding techniques and general care of pirelli. No really satisfactory answers were ever forthcoming and the questions remain largely unanswered. This column will offer bits and pieces of information about pirelli, as knowledge is generated by several fliers who are currently studying pirelli characteristics.

The May '68 INAV gave a preliminary report about using torque to control altitude in low ceiling sites. The plot below shows the importance of winding the motor in the same fashion for both flying and "calibration" of the rubber motor. The assumption behind the test is that .22 inch ounces of torque is the required launch torque. #1 curve was wound just past .22, then backed off to exactly .22 for a short pause. The curve was then run (13 1/8" motor and 12 1/2" hook spacing). 1 1/2 hours later, curve #2 was taken under similar conditions, except that near maximum turns were put in. Two advantages of the second approach are: near maximum winds gives both higher average torque and a longer cruise, and the max turns wind is easier to duplicate and gives you more practice.

****NATIONAL INDOOR MODEL AIRPLANE SOCIETY****

New Members!

JOHN B. CROSETTO, JR., 14809 S. E. 54th, Bellevue, Wash. 98004
 JACK KOEHLAR, 1231 Wayne, Topeka, Kan. 66604
 ED LIDGARD, 18570 San Jose, Lathrup Village, Mich. 48075

NFFS Symposium

If you missed the NFFS Symposium, you goofed! Not only was it an outstanding program, but the centerpiece of the presentation was "The Long Flight", filmed by Herb Franck. This movie has been a long time coming, but it was worth twice the wait if necessary. I would willingly view it many times more; it captures solidly the elusive feeling we all have had as we realize the magnificence of free flight for the first time. More important, it will communicate this feeling to those who have not tried free flight.

If you did not order (or buy in person) a copy of the Symposium Report, you can get a copy from AMA HQ by sending them \$3.50. Several of the papers published there deal with propeller theory, Wakefield props in particular, and other topics are covered also. One indoor paper, by Bud Tenny, is entitled "Choice of Rubber Motor For Low Ceiling Indoor", explains one method of rubber choice using graphical solutions of flight parameters.

NIMAS Awards

Diamond Cat. I Rubber - 15:02, Bob Platt
 Diamond Cat. II Rubber - 31:07.8, Jim Richmond

NIMAS Aces

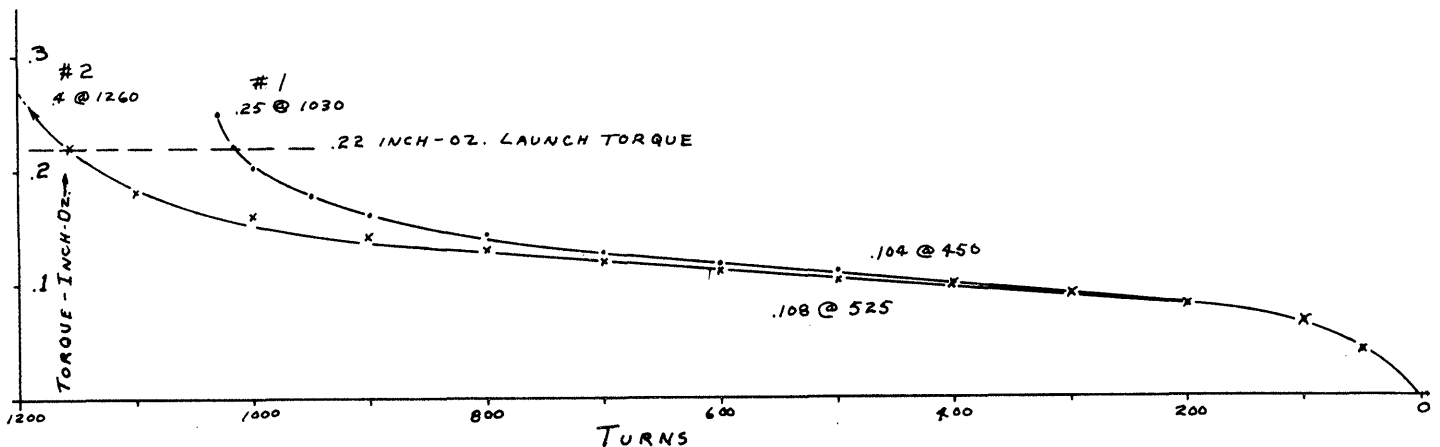
Add to the list of Aces Bob Platt (Diamond Award listed above) and Tom Vallee (his Diamond Cat. I Rubber Award announced in May '68 INAV). This makes a total of eight Open Aces and one Junior Ace.

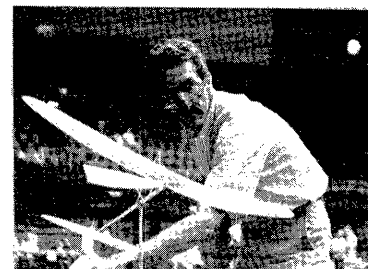
New Materials!

Last month's mention of Krylon spray adhesive caused Dave Linstrum to point out that 3M has marketed a similar product called Spray-Ment Adhesive. The Krylon product is not often available at dealers featuring Krylon paint, but both products should be available at office suppliers.

Indoor Films

Response to the initial announcement of Joe Poloso's new color movie of Lakehurst action was sufficient to tie it up for a while. If you would like to see this movie, send a card to get on the waiting list. It covers, with Joe's excellent technique, most phases of indoor flying. This one has been edited and has subtitles which add meaning to the action for those not acquainted with East Coast indoor personalities.





THE PICTURE STORY

Left Row - Top to bottom: Susan and Joe Weisenbach; Phil Klintworth (l.) and Ed Stoll prepare to fly; Manny Andrade and his fourth place cabin model; (l. to r.) Wally Mumper, Charlie Sotich and Jim Richmond declare "Jetex is the only way to go!"

Middle Row - Top to bottom: Bob Gibbs holds for son

Bill; Dick Ganslen and cigar; Al Rabe holds for Bud Tenny; Kristi Tenny launches D Stick.

Right Row: - Top to bottom: Linda Randolph and Bob; Stan Chilton checks torque prior to hooking up; Tony Schott; Hardy Brodersen and Paper Stick; Paul and Rosie Tryon prepare to fly an Easy B (youngest contestant?)

INDOOR**NEWS and VIEWS**

\$2/ YEAR NIMAS DUES \$1/YR ADDITIONAL

****NATIONAL INDOOR MODEL AIRPLANE SOCIETY****

New Members:

JOE BOYLE, JR. 219 Shanandoah Rd., Hampton, Va. 23361
 PAUL DESMET, 1405 Devonshire, Grosse Pointe Park, Mich. 48230
 WALTER D. KASKER, 675 Riveley Ave., Genolden, Pa. 19036

AMA Election

It will soon be time for AMA elections again - perhaps before the October issue of INAV comes out. This year we elect a new president and about half the district VP's. It is always important for AMA members to vote in these elections; the average vote nationwide is only 14%. It is easy to see how important one vote is: an average district vote will run no more than 300 votes and the victory margin of many candidates is no more than two or three votes! Contact your district VP if you want advance information on who is running in your district. Decide who will best represent you, and encourage all your friends to vote.

NIMAS Awards

In the 2½ years since NIMAS Awards were first set up, 42 fliers have received 92 awards. Eight of these fliers have received all three awards in a single category to become NIMAS Aces. 14 months ago the Junior Awards were set up and 4 Juniors have received 16 Awards, with two of them achieving Ace (see below). It is very pleasing to review the above, and to consider future activity!

Silver Cat. II Rubber Award - 21:25, Hal Crane

Silver Cat. II HLG Award - 0:50.0, Bob Dunham

Gold Cat. I Rubber Award - 12:54, Dick Ganslen

Junior NIMAS Awards

Silver Cat. II HLG Award - 0:37.2, Bill Gibbs

Gold Cat. II HLG Award - 0:43.8, Bill Gibbs

Diamond Cat. II HLG Award - 1:03.2, Bill Gibbs

Silver Cat. II Rubber Award - 15:23, Bobby Dunham

Gold Cat. II HLG Award - 0:44.4, Bobby Dunham

Diamond Cat. II HLG Award - 0:56.0, Bobby Dunham

Junior Ace

The two HLG flights above complete Bobby Dunham's Ace qualification, which makes him the second Junior to reach this status. Meanwhile, Bill Gibbs' flights listed above elevate him to Cat. II HLG Ace status also; he previously qualified as Cat. I HLG Ace and thus becomes the first NIMAS member of any age to become a double Ace!

NIMAS Charts

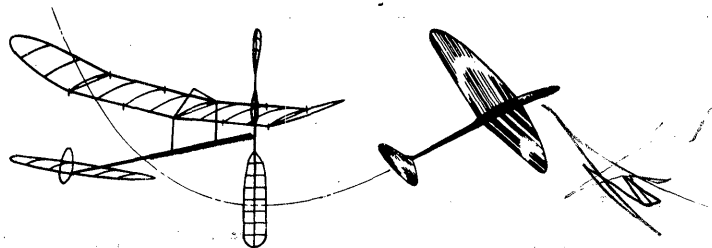
I will not repeat the rash promise aired in the July '68 INAV and say that all the NIMAS Charts presently on order will be delivered by a certain time. I hope to get them out soon; time has been at a premium since before the Nats and seems to remain so.

Bilgri Reprints

By special arrangement with MAN, the three articles on indoor building by Joe Bilgri which appeared in 1960 have been made available at cost. Send 60¢ to cover postage and cost to Harry Keshishian, 7 Sagamore Rd., Arlington, Mass. 02174 or Bud Tenny, Box 545, Richardson, Tex. 75080

Prop Design Graphs?

I have currently designed pitch distribution graphs of three props suitable for FAI models and one for B Paper.



Editor: Bud Tenny · Box 545 · Richardson, Texas · 75081

These graphs correspond to Fig. 2, p. 4 of the May '68 INAV, and will be made available if sufficient interest is shown. Prints will be Xerox of a tracing, suitable for direct transfer to balsa for construction of prop jigs of the type shown in Feb. '68 INAV.

FAI INDOOR REPORTKnow Your Team

Just over a year ago the U. S. Indoor Team Selection Finals were held in the Pompeian Court of Northwood Institute in West Baden, Indiana (report in Aug. '67 INAV and more pictures in Dec. '67 INAV). The top three winners in that event will represent the U. S. in the 1968 Indoor World Championship, which is to be held in Rome on Oct. 3-6 1968. Those team members are:

Clarence Mather: Clarence is 47, and is a Physics teacher in high school and junior college. His model interests include all types of FF models, with special emphasis on wakefield, indoor rubber and indoor scale. He lives in San Diego and is a member of the San Diego Orbiters.

Jim Richmond: Jim is 40 and is manager of the Tinning Division of Sunbeam Corporation. He has built all types of models, including CL stunt and speed. His career in indoor began six years ago and has developed to the point where he holds 4 U.S. indoor records and the Cat. III Indoor World Record.

Al Rohrbaugh: Al is 47 and a mechanical engineer. His model interests have ranged through indoor, FF and RC. He returned to indoor 3 years ago after a long layoff, with a quite consistent contest record which includes two Cabin records and winning the Stout Trophy at the '66 Nats.

Bud Romak: Bud is 39 and self employed. He has 25 years of experience in FF models, including 6 years in indoor. He is the Team Manager, and his experience for this job includes being a member of the 1966 Indoor Team.

U.S. indoor fliers are rightfully optimistic toward the outcome of the 1968 World Champs, with a superb team to represent us. We all wish them the best of luck!

World Championship Entrants

I have received very little information about European teams who might have entered the World Championship. The Hungarian team will be Gy. Buzady, Antal Egri and Andras Ree. Geza Varszegi qualified high through the entire program, only to develop an abcess on his leg and will not be able to go. Ferenc Somogyi will be team manager.

The only other fliers known to be planning to go are Manfred Koller of Austria and Hans Beck of Germany. The Czech's picked a team, but no names are known. Jiri Kalina is the top flier, but several others may have made the other team slots.

Time Is Short!

In three and one half months we should be starting a team selection program for the 1970 Indoor World Championship. At present, we have no chairman, committee or approved program. It is entirely in order for all concerned fliers to offer comments on the program which selected our present team, suggestions for change, etc. We also need volunteers for Chairman (the only person in the program who is restricted from competition), planning committee members, and CD's for qualification trials. Strictly for lack of someone else to coordinate preliminary planning, I will receive your offerings on this subject. I am not a candidate for any position in this program except contestant! Send comments, suggestions and names to Box 545, Richardson, Texas 75080, but please send same by Sept. 25, 1968. Later may be too late - time slipped up on all of us!

CONTEST CALENDAR

GEORGIA - Atlanta. The Decatur Flying 8-Balls MAC plan an indoor contest early this fall; possibly as early as October. Contact John Krickel, Box 15223, Emory Univ. Branch, Atlanta, Ga. 30333 for details.

NEW JERSEY - Lakehurst. Record Trials Sept. 16, 1968. Contact C. V. Russo, 143 Willow Way, Clark, N.J. 07066

NEW YORK - Long Island. LIAMAC 1st Annual Indoor Model Meet at Cantigue Park Skating Rink, Hicksville, L. I. on October 20, 1968. Indoor Stick, Paper Stick, HLG, Indoor Scale (AMA Rules) and Easy B (paper covered only for Juniors only). CD Bill Dunwoody, 985 Fort Salonga Rd., Northport, L. I., N. Y. Site is 190' dia. dome with 50' ceiling in center.

OKLAHOMA - Tulsa. The Tulsa Glue Dobbers plan an indoor meet sometime this fall. Contact Bob Hanford, 3838 South 88th E. Ave, Tulsa, Okla. 74145.

TEXAS - Dallas/Ft. Worth/Denton. Cat. I RT at Denton in Ballroom of Texas Woman's Univ. Sept. 29, 1968, 1 pm until dark. Rubber events only. Site can be opened earlier and possibly on 9/28/68 by special arrangement with Dick Ganslen (CD), 1204 Windsor, Denton, or Bud Tenny, Box 545, Richardson, Tex. 75080

VIRGINIA - Hampton. Cat. I RT at Willis School, either Sept. 20-21-22 or Sept. 27-28-29, 1968. Contact Hal Crane, 4002 Buchanan Dr., Hampton, Va. 23369 for date.

RECORDS? MAYBE!

LAKEHURST RECORD TRIALS - Aug. 18-19, 1968 Cat. III Hangar #6, Lakehurst NAS
Jr. Paper Stick - 21:07, Linda Randolph
Jr. AMA Cat. III FAI - 11:02, Linda Randolph

POSTAL CHALLENGERS

John Thornhill, 3334 Buchanan St., Apt. 103, Mt. Rainier, Md. 20822 wishes to challenge anyone in Manhattan Cabin or HLG. He has access to a Cat. I site.

A MICROFILM REPORT

Part II - Mixing Technique

The past several years of experience in mixing microfilm have taught me some shortcuts and techniques that may be of interest. First, accurate measurements and records are a must if you hope to duplicate that "super" formula after you use up the first batch. You must also insure that you use all of what you measure out, and you must be sure that you know what you are using.

A set of mixing utensils can be purchased at the drug store in the form of graduated medicine bottles of various sizes, and an eye dropper (be sure you get a glass dropper instead of plastic). A funnel is helpful, but be sure to get a glass one or test any plastic funnel to see that it does not dissolve in your solvents. A laboratory-type graduated cylinder is more expensive, but a 10 ml size cylinder is very helpful for measuring small amounts of solvent. The graduated bottles are available in 30 cc (1 cc = 1 ml), 60 cc, 120 cc, 250 cc and 500 cc sizes. An eyedropper can be calibrated to measure 1 cc increments, or used to meter out a specified number of drops.

Very thick liquids such as nitrocellulose syrup are very difficult to measure accurately. They should be measured with the final container if possible; that is, a larger graduated bottle which will hold all of one batch of solution. Also, care should be taken to pour without dribbling any down the inside of the measuring container. In the first case, if you measure in one container and pour into another, much of the syrup will adhere to the measure. If you rinse it out, you must use only that solvent intended for the mixture. In the second case, if you dribble it down the side, the measurement is inaccurate.

If you begin with nitrocellulose as a base, you should measure both the weight of nitrocellulose (a postage scale is adequate) and the amount of solvent it takes to put it into solution. Thus, you can duplicate the syrup mixture when you use up the first batch. It is also advisable to use the least amount of solvent you can and still make a "pourable" mixture.

When you mix a new formula for the first time, it is a good idea mix a fairly large quantity. The first benefit gained is that ingredients which are a small fraction of the total will still be large enough to measure easily. Second, if the mixture is not correct, you can divide it into smaller portions. Modify a small portion until you get the desired result; if you goof up you need only pour out the small sample instead of the whole batch

STATE OF THE ART

At the Detroit FAI Semi last June, Bob Randolph flew the model of the month to a new B Stick record of 22:47. The model is quite similar to his Top Cat IV, which was featured in an article in the June '68 INAV, and has been built in several versions. The record snip had a few minor differences from the drawing, notably a "reverse" airfoil, no compression rib at the center and no rib in the rudder. The whole model is exceptionally light, and has flown on rubber as thin as .033". Unusual characteristics of the model are a very small rudder, set straight ahead (another change from drawing), with turn derived from the wing offset and stab tilt. Bob says that models with this adjustment apparently fare better in drift - a point that is well worth checking out. The "reverse" airfoil is an experimental feature which Bob says seems to slow the climb during the burst - very beneficial under low ceilings.

THE LAB

Joe Hinder uses this test to sort fresh rubber, with the warning that it is a highly subjective sort of test. That is, it requires both judgement in application and experience in interpretation to achieve repeatable results.

The basic method is to hang a paper clamp on a length of rubber exactly 10" from the point of support (another clamp). He then adds a fixed amount of weight (which just happens to be 385 grams total weight with the clamp) and measures the length as soon as the rubber stops its rapid stretch. The rubber will continue to stretch slowly, so he takes another reading after 60 seconds.

In practice, the supporting clamp is mounted on a vertical scale or ruler. A segment of rubber is fastened in the clamp and the second clamp is fastened on at the 10" mark. The extra weight is then added and two readings taken. The 385 gram weight (an arbitrary choice) is reduced by half for 1/8" rubber so comparison can be made between 1/8" and 1/4" flat rubber.

The meaning of the readings is as follows: 1/4" flat pirelli will stretch about 14" initially. Very fresh or poor rubber will stretch an additional 1/2" in 60 seconds, and cured (aged) rubber of good quality will only stretch 1/8" more in 60 seconds. Comparisons between other sizes of rubber can be made by scaling the weight in proportion to the width of the strip.

FINER POINTS OF IHLG

by Nat Antonioli

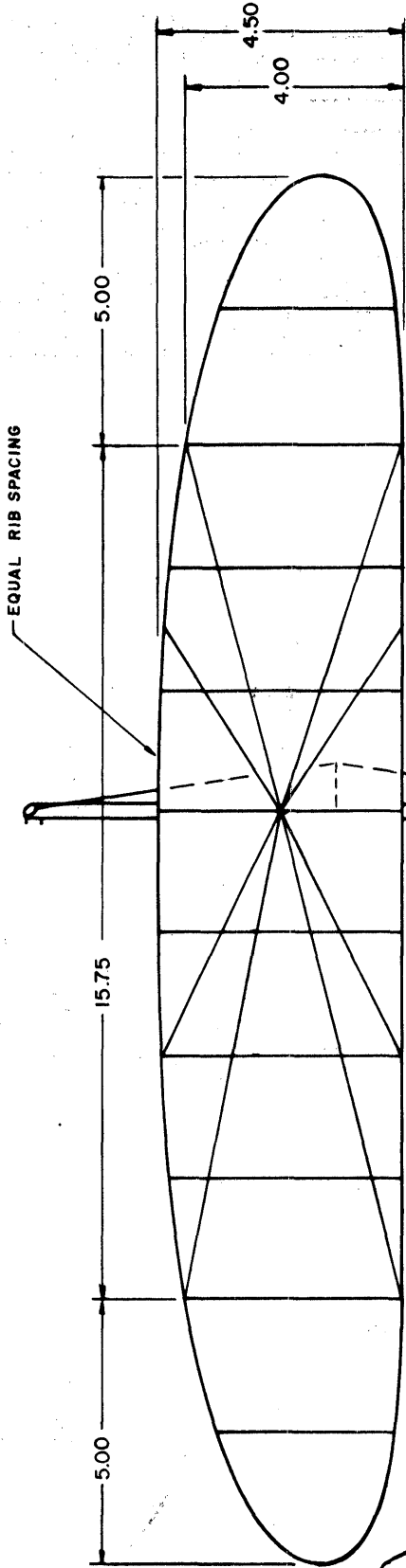
I think it's best to divide the subject into 3 categories: Construction, Adjustment and Design Philosophy.

Construction

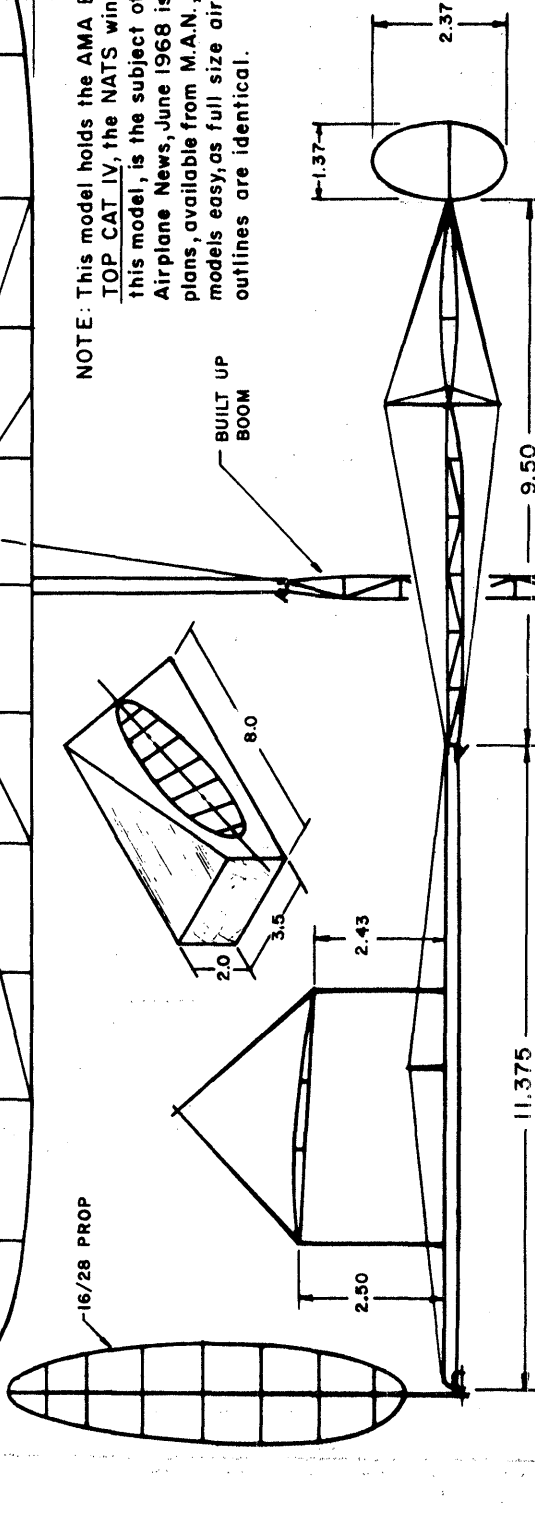
First, the model must be light in weight, for obvious reasons. This must be accomplished by careful choice of material. Use fairly stiff "quarter grain" wood (4# to 6# wood) for wings and tail surfaces. Such wood prevents wing and tail flutter (these are usually very thin) during launch and retards formation of warps later. Fuselage wood should be stringy "B" grain wood between 6# and 8# in weight to prevent fuselage flutter and whip on launch. It is common to see low ceiling gliders which can be thrown to the top of a site and won't pull out; but recovers perfectly when thrown to a lower altitude. Fuselage and/or tail flutter is almost always the reason. Assembly of gliders should be with "white" glue or Tite-Bond. Regular model glues of the cellulose acetate type (Ambroid) tend to shrink too much, causing potential warps. These glues are only good for emergency repairs during flying.

Adjustment

The design should include an asymmetrical wing (longer on inside of turn) and the launch and glide should be in the same direction. Such a configuration and launch keeps the inside wing up in launch and glide. This is quite important where the site has limited floor space - it makes a consistent launch recovery and glide pattern much easier in narrow sites. A small amount of stab tilt helps to hold a consistent glide circle. It is usually best to use a minimum of rudder tab for turn; a rudder adjustment that is right for glide is usually too much for the launch. One more comment about the offset wing: this eliminates need for clay on the "inside" wing and cuts down on the total weight of the glider. The drag of clay on the wing tip will cut down duration, as will clay blobs for nose weight. Make a preliminary adjustment of the glider with clay, then inset a piece of lead into the nose. Make the lead slightly lighter than necessary and make final trim with a smear of clay. Such reduction of drag can increase low ceiling times up to one second.



NOTE: This model holds the AMA B stick record for Category 2. TOP CAT IV, the NATS winning paper stick version of this model, is the subject of a feature article in Model Airplane News, June 1968 issue. Use of full size TOP CAT IV plans, available from M.A.N., makes building either of these models easy, as full size airfoils, prop, wing, and stab outlines are identical.



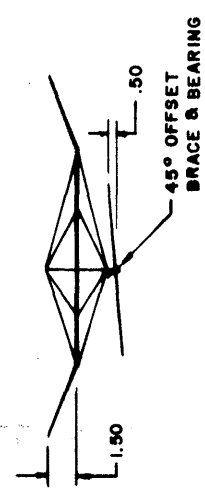
WEIGHTS	
WING	.0053
FUSE.	.0092
PROP	.0034
TOTAL	.0179 OZ.

TOP CAT III FAI

DESIGNED BY: BOB RANDOLPH



SCALE - INCHES



FRONT VIEW

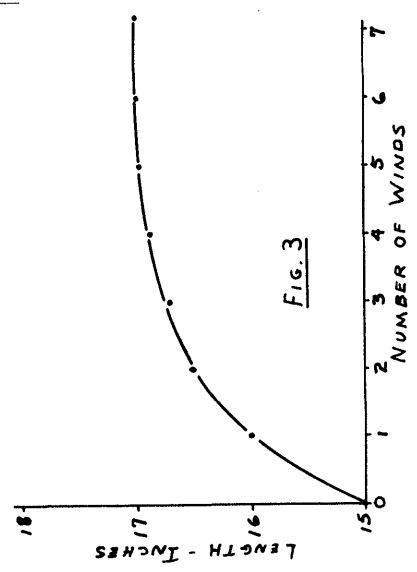
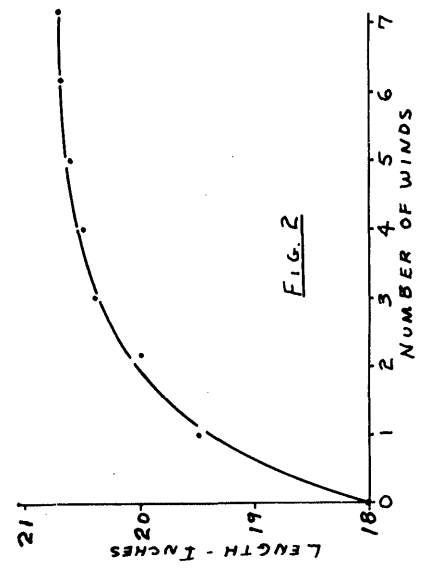
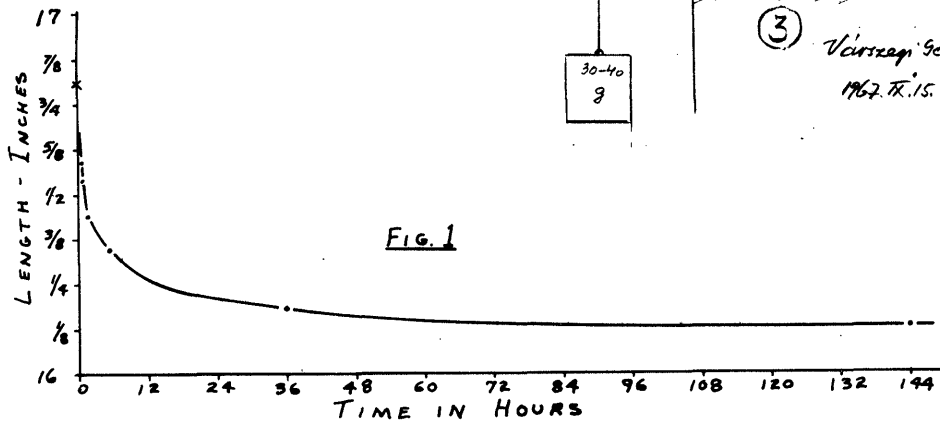
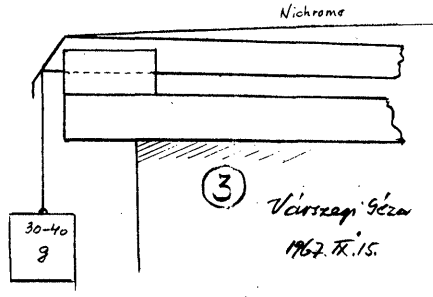
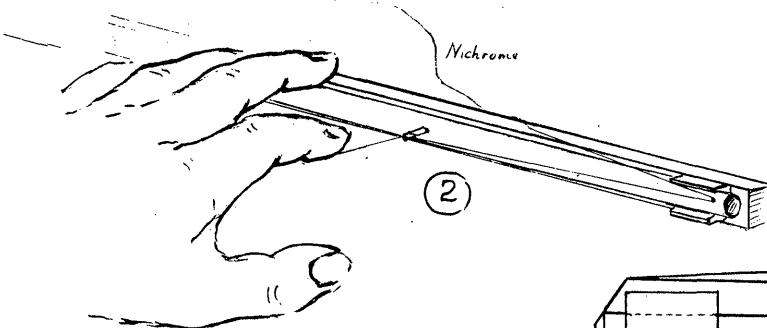
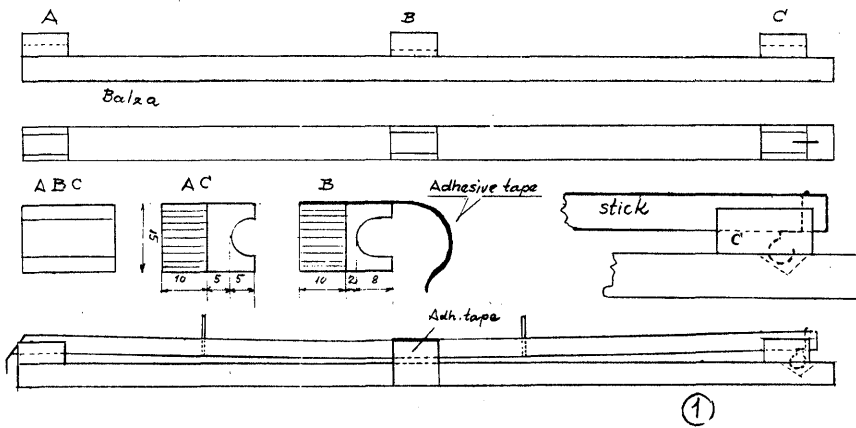
Design Philosophy

Keep the model and design simple and light, and use conservative planform design and proportions. Refine the basic design as you learn; do not hesitate to try changing the design a little at a time, but be sure that you test each change thoroughly. Seek advice from an acknowledged expert. Once a novice overcomes the hurdle of getting consistent flights, he should refine the adjustment technique and try more of his own ideas as he goes along.

FUSELAGE BRACING JIG

The jig detailed below was designed and submitted by Geza Varszegi (member of Hungarian Indoor Team in 1962 and 1966, and leading contender for 1968 Team). The jig is arranged so the fuselage can be reverse bowed or pre-loaded to any practical degree, or braced straight. By using a weight as shown in sketch 3, any degree of tension may be used in the brace wire. A similar approach should be used with two-wire bracing, except that a small guide can be made to help align each pair of posts. Also, great care must be taken to insure equal tension in each wire, and both wires should be installed simultaneously.

TÖRZSMEREVI TŐ ESIKŐZ



PIRELLI LORE

The three curves below indicate Pirelli's response to break-in. The data was all taken by winding, but it is quite reasonable to assume that the final conclusions will apply to rubber broken-in by stretch methods, providing the break-in is complete.

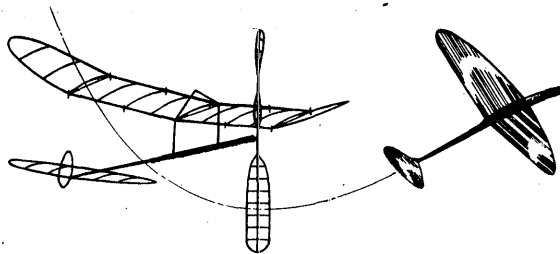
Fig. 1 is the result of a "rest test" by Jim Richmond. It shows that a motor takes about one week to come to a stable length after being wound, and that the process is nearly complete after 24 hours. The test was made after the 6th wind on a motor which was 15" long new. Fig. 2 shows the increase in length of a motor with successive windings. Bob Platt wound the motor 7 times, taking about 15 minutes to unwind, and letting the motor rest for 30 minutes between winds. Under these conditions the motor stretched a total of over 15%. Fig. 3 shows a similar run with a 15" motor, rested for 24 hours between winds. Here the maximum stretch was about 13%; both motors can be expected to recover to just over 10% permanent elongation as demonstrated by Fig. 1.

INDOOR

NEWS and VIEWS

\$2/ YEAR NIMAS DUES \$1/YR ADDITIONAL

Editor: Bud Tenny · Box 545 · Richardson, Texas · 75081



INDOOR WORLD CHAMPS RESULTS

	NAME	COUNTRY	I	II	III	IV	V	VI	TOTAL
1.	Jim Richmond	U. S. A.	32:11	28:37	-	26:30	33:40	36:18	69:58
2.	Jiri Kalina	Czechoslovakia	28:09	34:44	33:22	34:46	33:28	04:20	69:30
3.	Eduard Chlubny	Czechoslovakia	09:38	31:46	33:51	30:32	22:10	33:28	67:19
4.	Hans Beck	Germany	03:21	32:42	-	29:58	28:32	33:22	66:14
5.	Manfred Koller	Austria	30:06	30:13	23:54	33:06	12:10	13:19	63:19
6.	Clarence Mather	U. S. A.	32:38	27:30	29:04	29:14	00:11	00:11	61:52
7.	Egizio Corazza	Italy	32:01	26:30	29:02	26:38	23:33	24:39	61:03
8.	Vilim Kmoch	Yugoslavia	06:16	30:00	23:10	30:01	28:58	07:13	60:01
9.	Jiri Sitar	Czechoslovakia	26:21	11:39	-	00:10	25:04	32:43	59:04
10.	Walter Hach	Austria	27:58	28:59	-	26:42	25:17	29:43	58:42
11.	Andras Ree	Hungary	27:35	25:38	28:17	29:11	09:49	23:42	57:28
12.	Antal Egri	Hungary	11:43	26:40	28:18	28:47	28:34	27:20	57:21
13.	Carlo Cotugna	Italy	14:11	08:13	00:04	26:38	15:35	27:54	57:21*
14.	Kurt Vogler	Germany	26:41	28:37	-	09:14	22:43	28:40	57:17
15.	Al Rohrbaugh	U. S. A.	08:54	27:19	21:45	29:53	24:02	24:52	57:12
16.	Harro Erofejeff	Finland	21:29	25:24	17:59	26:32	26:42	28:18	55:00
17.	Teodor Strasberger	Yugoslavia	26:36	21:37	22:42	26:05	25:10	26:53	53:29
18.	Werner Wetzel	Germany	26:15	09:08	19:35	27:12	24:33	16:07	53:27
19.	Esko Tirronen	Finland	26:48	00:52	-	04:54	21:50	26:36	53:24
20.	Leopold Gabriel	Yugoslavia	17:59	00:12	20:36	24:46	22:49	24:31	49:17
21.	Olof Nordlund	Finland	00:52	00:28	18:46	23:31	22:43	10:39	46:14
22.	Gyorgy Buzady	Hungary	20:01	01:36	19:23	17:16	17:25	15:50	39:24
23.	Germano Masciullo	Italy	12:53	06:11	17:49	18:14	12:20	17:32	36:03
24.	Guy Cognet	France	07:10	08:58	12:44	12:18	12:48	11:07	25:06

TEAM PLACINGS

1.	Czechoslovakia	195:53	6.	Hungary	154:13
2.	U. S. A.	189:02	7.	Italy	151:38
3.	Germany	176:58			
4.	Yugoslavia	162:47	8.	Austria (2 men)	122:01
5.	Finland	154:38	9.	France (1 man)	25:06

*The Individual Official Results sheet listed Cotugna with 57:21 total as shown, but his best two flights total 54:32. The team total shown above is correct, so this correction would place Cotugna in 16th place and move Vogler, Rohrbaugh and Erofejeff to 13th, 14th and 15th places respectively.

1968 World Indoor Championship

by Clarence Mather

"Terrific!" is the best way to describe the '68 World Indoor Championship. That includes the planning and execution of the contest by the Italians, the flying site, the standard of flying, and the comradeship of the modelers. The twenty-four contestants representing nine countries made this the biggest Indoor Champs yet!

I would like to describe some aspects of the entire trip although a detailed report would fill many pages. So, I'll try to be concise. It began with an overnight flight from San Diego to rendezvous with the rest of the team at Philadelphia. Then a day of processing at McGuire AFB, New Jersey and another overnight flight to Frankfurt, Germany. Apparently AMA HQ did their job well because we had no problems.

The models survived the trip with only minimal damage, due to sturdy boxes, well-packed parts and generally careful handling by air line and Air Force handlers. They all were very cooperative to our needs. Al Rohrbaugh's king-size box containing ten (10) models received especially tender care when it was rumored among the baggage people that it contained a special radar set!

The modelers were in considerably worse condition than the models since we had gone two nights with just a couple of hours sleep each. Due to time differences, travel, model flying and various other activities we spent little time in bed.

After some hours of recuperation at Frankfurt we crammed the mountain of baggage and boxes into a VW Microbus and set out on the Autobahn - the original freeway. We then discovered that Romak is a natural Grand Prix driver!

In Europe many drivers use just two speeds - zero and full throttle! If something is in the way, honk the horn and use any lane (or half a lane) to get around. Brakes are used only as a last resort and seem to be regarded as a sign of impotence. Tail-gating and cutting in and out sharply are the usual techniques. It is a tribute to the exacting skills of the European drivers that we saw only four or five accidents during our travels. Anyhow, Romak took to this high speed bedlam like a duck takes to water and so we crossed Germany, Switzerland and Italy. Border guards paid scant attention to our luggage until we got to the Italian line. There a couple of militant young guards took one look at the stuffed Microbus and decided that we were trying to bootleg pizza or spaghetti into the country. They directed us to some other authority, but since they could speak no English and we no Italian we could not figure out where or who. After blundering about for a time we finally got to the big wheel. After opening one model box he gave us admission and we continued on our way.

When the team first joined up we discussed mostly modeling but soon talk turned to other things. With Al as sparkplug the conversation took on what I would call a "stag party" tone. It stayed in that vein for most of the trip and Al's seemingly endless supply of stories, poems, and salty observations kept us in a jocular mood.

In Florence we stopped at the home of Egizio Corazza and were greeted warmly and hospitably by Egizio and his gracious wife. Egizio's models showed a very high degree of construction skill that we were to find the rule rather than the exception among European models.

We arrived in Rome on Monday night and got our first look at the Sports Palace. It is a beautiful building! The Sports Palace is at the extreme south edge of Rome and was built for the 1960 Olympics. It is a circular building with two tiers of seats surrounding a floor diameter

of 164 feet (yep, 50 meters). A domed roof arches up from the highest row of seats to a peak of about 115 feet. The roof consists of fluted concrete beams and glass. It does not catch models but there is a speaker/lights complex at top dead center that did catch a few high climbers. The Palace is drafty by day but is an excellent site at night.

We tested our models for many hours over the next few days and found it difficult to get altitude. If we did get good altitude, drift carried the models into the seats. Getting to a rapidly drifting model in time to avoid a damaging seat landing was difficult. Sections of the seats were isolated from each other by tall glass panels, thus requiring a trip through corridors and up or down stairs.

Contestants from other countries kept arriving and we had an opportunity to meet persons we knew only as names from these pages. Usually at least one member of a team could speak English, so we had many cordial conversations. Inspecting the models and watching them in action gave plenty of evidence that the competition was tough! The models were well built, light, and cruised at low RPM. They all stuck to shortish motor sticks and booms rather than the long ones used by the American team. The Czech models in particular looked much like Bilgri designs. Many others had narrower chord wings of perhaps 100 to 120 square inches. Vilim Kmoch used a completely flat stabilizer on a model that flew very well.

On Thursday we had our first chance at evening flying. The powerful lights warmed up the air somewhat and it was definitely more buoyant and fairly stable - much less drift than in the daytime. Our models came to life in this air and Richmond and Rohrbaugh had test flights exceeding thirty-one minutes.

Finally, Friday evening arrived and so did the opening ceremonies. Dignitaries present included a general from the Italian Air Force. Each team marched out to the center of the floor to the strains of its national anthem - a proud moment for us all. Then came the flying. First to test the air was a member of the host country. The air seemed good and soon there was a waiting line to fly. Officials wisely held to a maximum of four models in the air at one time to reduce the chances of collision. One of the pre-contest favorites, Kalina of Czechoslovakia, was up high for a good flight but then drifted over into the seats for 28:09. Mather was the first American up. The model stayed right over the floor, climbed to perhaps 95 feet and did a nice 32:38. Richmond did not climb as high yet did 32:11. Rohrbaugh climbed beautifully but hung on the center post at 8:54. Corazza of Italy did 32:01 and Koller of Austria did 30:06. Those were the longest flights of Round One. Since I was leading, I immediately suggested that we end the contest right then! The suggestion received little support from the others.

In Round Two the air was cooler and less buoyant. Richmond did 28:37, Mather 27:30 and Rohrbaugh 27:19. None got high. Kalina "leaned on" his winder and his model was soon up bouncing around the center post. It did not hang and he got a great 34:44. Hans Beck, 1966 World Champ of Germany did 32:42, Chlubny of Czechoslovakia 31:46, Koller 30:13 and Vilim Kmoch of Yugoslavia 30:00, for high flights of that round.

It had been difficult to see the models against the glare of the bright lights, so on Saturday only part of the lights were turned on. That made it easier to see the models but the air stayed cooler. Kalina's model climbed rapidly, struck the top, tail slid down buckling the tail boom, but then it popped straight again and the model went on to do a great 34:46! Chlubny did 33:51, Koller 33:06, Kmoch 30:01, Beck 29:58, Rohrbaugh 29:53 and Mather 29:14 for high times on Saturday.

At the end of Round Four the U.S. Team was leading with 179:52. Czechoslovakia had 173:07 and West Germany 171:25. The lead was nice but Sitar of Czechoslovakia had a low flight in that total and we knew he could do much better.

Richmond had been flying his very light model which had great potential but had not reached high altitude. So on Sunday he tried a larger motor which collapsed the stick and ruined the model. The Jim assembled an older, stronger model and put up a 33:40 flight which still did not reach the top. The last round came up with him needing almost thirty-six minutes to pass Kalina for individual honors. Jim wound the model as never before and it responded perfectly! The model climbed right up next to the roof, touched a short rope that dangled from the center, then descended slowly for a magnificent 36:18! That was the longest flight of the meet by over one and a half minutes and gave Jim a deserved World Champion honor.

Meanwhile Sitar turned in 25:04 and finally a 32:43 to

give Czechoslovakia the team lead. Rohrbaugh could not get his model high enough for it to realize its great potential. Mather wound to breaking on the last flights and something twisted to give a power stall. And so the flying ended, thrilling or frustrating, but always exciting.

We were sad to see the contest end and have to start the long journey home, but there are many pleasant memories that make it all worthwhile. The associations with the members of our team and all the other fliers were great. It was a pleasure to fly in such a well organized and well conducted contest. The tours of the historical sites and beauties of Rome and Tivoli that were arranged by the contest committee were outstanding experiences. The banquet of sumptuous Italian food and the awarding of prizes were fitting climaxes to the whole affair.

We who were lucky enough to participate would like to offer thanks to a number of people: to the Italians for conducting such an excellent contest, to modelers like Joe Bilgri for keeping Indoor alive, to Bud Tenny for this newsletter that has done so much to keep Indoor growing in popularity, and to Bud Romak for doing a fine job as Team Manager and who supplied us with snazzy turtle neck sweaters properly lettered.

****NATIONAL INDOOR MODEL AIRPLANE SOCIETY****

New Members!

RICHARD ENNIS, 2401 Taxco Rd. #105, Ft. Worth, Tex. 76116
JIM GREMEL, 8618 Jo Court, Berkeley, Mo. 63134
RICHARD POWELL, 804 Windsor, Denton, Tex. 76201

Family Memberships

JEAN ELEECE ENNIS, 2401 Taxco Rd. #105, Ft. Worth, Tex. 76116

Honorary Members

P. H. LAGAN, 28 Avro Cres, Christchurch 4, New Zealand

Ernie Kopecky Ill

Ernie Kopecky is seriously ill, recovering from open heart surgery. He is in Columbus Presbyterian Hospital in New York, but get well cards and encouraging notes should be sent to his home: 38 Fawn Lane, Watchung, N. J. 07060.

Change of Address

Bob and Linda Randolph and family have moved to 25145 Lawton Ave., Loma Linda, Cal. 92354 and requested that their friends note this new address. A reminder: any NIMAS member who moves may request a similar announcement.

NIMAS Awards

Gold Cat. I Rubber Award - 13:35.4, Bob Champine

Diamond Cat. I Rubber Award - 16:23, Bob Champine

Diamond Cat. I Rubber Award - 15:44, Jim Clem

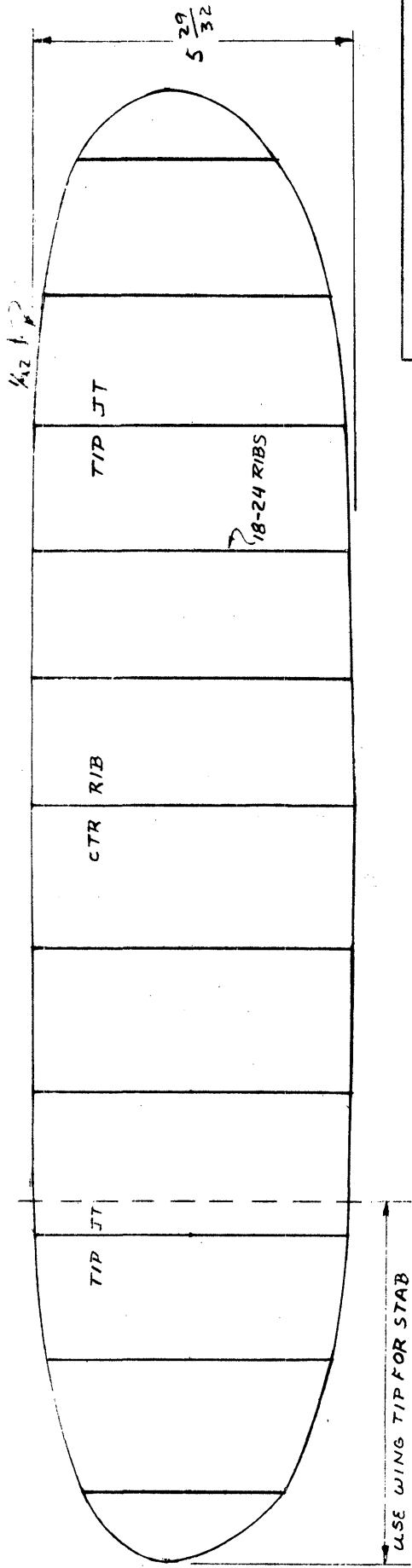
Rubber Evaluation Opportunity

Frank Zaic has started to produce some special beginner kits of HLG, Catapult Glider and rubber powered model types. The catapult and rubber models use large quantities of 1/8" Pirelli. He is therefore making an offer to indoor fliers: "I will be using 1/8" Pirelli as a standard part in the Jasco kits, and will be getting several shipments a year. I will be glad to send 24" sample lengths from every new shipment to any indoor builder who will take the trouble to send me a self-addressed and stamped envelope and ask no questions. In return, pass the word if the lot is good or bad so there will never be a shortage of top flight rubber."

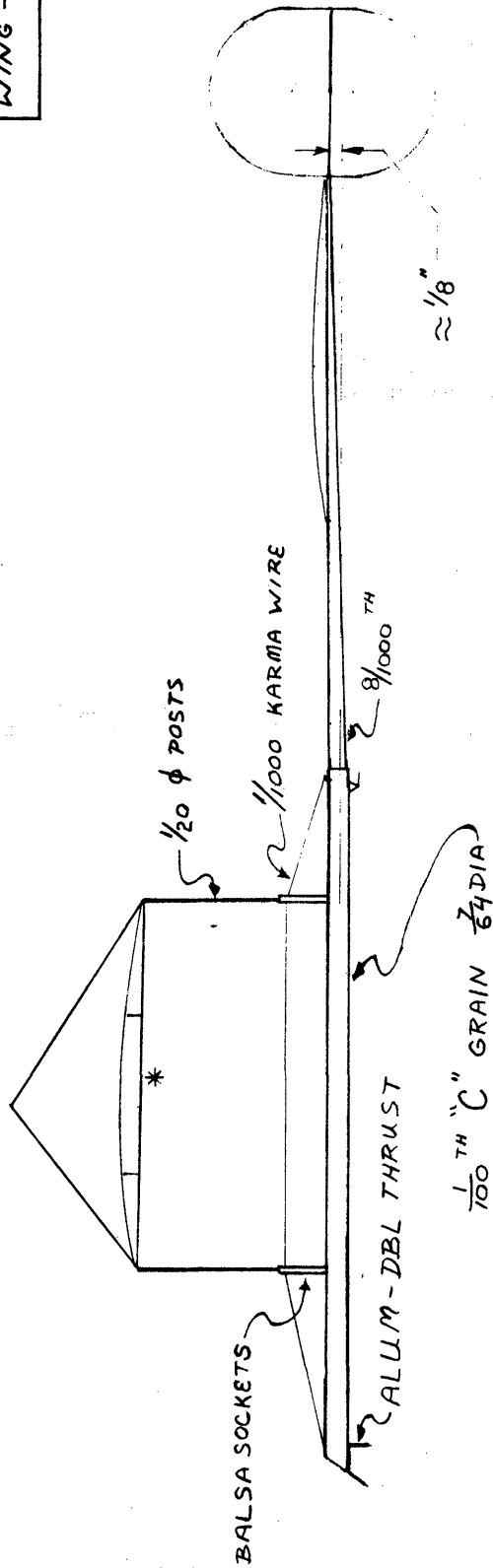
NFFS Announcements

NFFS Public Relations Director Dave Linstrum has asked that the following announcements be made:

1. The 1969 FAI FF W/Ch may be held on East Coast USA. All free fliers should keep alert for notices about status. Timers, scorekeepers, and proxy fliers will all be needed. This is a rare opportunity to see a W/Ch first hand. Plan to attend, help make it a great W/Ch. Look for word from AMA and NFFS in late Fall - actual approval of USA as host would be at November CIAM meeting.
2. 1971 FAI FF Team Selection planning has begun and qualification trials will be held in Spring of 1969, Semi-Finals in Summer of 1969 and Finals in Summer of 1970. Exact dates and details should be available in early 1969. Best way to receive info is to get on the list - if you flew in 1969 program you are on list, otherwise write Dave



STAB - $5\frac{1}{2} \times 1\frac{3}{8}$ - 5 RIBS
 WING - $5\frac{7}{8} \times 26\frac{9}{16}$ FLAT



GOLD MICROFILM -
 SEMI-LOOSE

MODEL WT. - .026
 RUB. WT. - .033 ($\approx 1\frac{1}{4}$ LP)

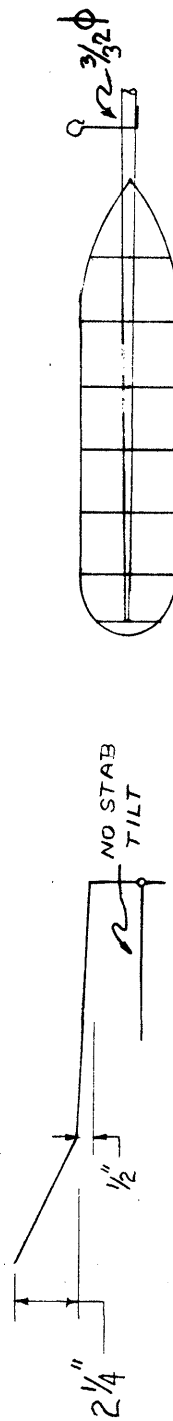
COPPA URBE

WINNER - OCT, 1967

BY VIRI KALINA

CZECHOSLOVAKIA

SCALE: 1" = 3" DRN: CLT 7/1/68



ALA-BILGR! PROP 16 DIA x 38 PITCH

STANDARD WING BRACING
 NO BRACING ON STAB
 ALL BRACING WIRES $\frac{1}{100}$ NICHROME
 EXCEPT MOTOR STICK

Linstrum (program administrator), 12411 Leigh Lane, Maryland Hts., Mo. 63042.

3. NFFS will hold the 2nd Annual NFFS Free Flight Symposium at Willow Grove Nats. Those interested in submitting papers should write Dick Mathis, 1222 Briar Cove, Richardson, Tex. 75080. Copies of 1968 Symposium Report are available from NFFS. 104 pages, 12 papers, illustrated, soft cover. \$3.50 postpaid. Send money to Annie Gieskieng 730 Moore #2, Lakewood, Colo. 80215.

FAI INDOOR REPORT

Team Selection Program

A program essentially similar to the one which was used in 1967 has been submitted for approval. Main differences: Local Trials qualify all who make 60% of top time for that Trials. Entrants in AMA meets who fly model 65 cm span or less can qualify for Quarter Final by making 60% of winning time for the event flown in.

Meanwhile, manpower is still short. Bob Champine and Dick Ganslen will serve as program coordinators in Eastern and South Central areas respectively. A few CD's have volunteered to run meets, but we still need North Central and Western coordinators and a Program Chairman. Volunteers?

CONTEST CALENDAR

GEORGIA - Atlanta area. The Decatur Flying 8-Balls MAC 1st Annual Indoor Contest, Nov. 17, 1968. Site is the Cumming High School Gym, a reasonably clear dome about 30' usable. Easy B and HLG (Jr. & Sr.-Op.); Paper Stick and Indoor Scale (all ages combined). Warren Lawrence, Box 225, Decatur, Ga. 30031.

MARYLAND - Silver Spring. Indoor sessions, 7 pm to 11 pm, at John F. Kennedy High School Gym. Oct. 25, Nov. 8, Nov. 22, Dec. 6, Dec. 20, 1968. School address: 1901 Randolph Rd., Silver Spring, Md. Bill Saunders, 11613 Le Baron Terrace, Silver Spring, Md. ph. 301-593-7196

OKLAHOMA - Tulsa. Tulsa Glue Dobbers RT, Friday pm (Oct. 25, 1968. "Jingle Bells Jamboree", Class A Indoor Meet, Dec. 8, 1968. Trophies 1st only; expert/novice breakdown in HLG, Easy B, Indoor Stick. Events: HLG, Easy B sized paper covered, Paper Stick, Indoor Stick, Indoor Scale. Bob Hanford, 3838 South 88th E. Ave, Tulsa, Okla. 74145.

TEXAS - Dallas/Ft. Worth/Denton. Cat. I RT, Oct. 27, 1968 Stan Chilton CD, 446 Ida, Wichita Kan. 67211. Site can be opened on 10/26, 1968 by contacting Bud Tenny or Dick Ganslen.

RECORDS? MAYBE!

BRAINBUSTERS RECORD TRIALS - Sept. 28-29, 1968 Cat. I Willis School at Hampton, Va. 20' ceiling
 Open B Cabin - 7:33, Tom Vallee
 Open C Cabin - 9:42.4, Hal Crane
 Open Paper Stick - 13:06.0, Bob Platt
 Open D Stick - 17:45.7, Hal Crane

POSTAL CONTESTS!

Tom Vallee proposed a postal meet between entrants in the Hampton, Va. Cat. I RT and the Denton, Tex. Cat. I RT, in Paper Stick, Indoor Stick and FAI. The challenge was

accepted before it was known that Bob Champine, normally at Hampton, would be in Dallas. (No fudge factor was used, by agreement of both sides.) (FAI times 2 flight total)

Hampton	Paper Stick	Indoor Stick	FAI
Hal Crane	10:03	17:45.8	
Tom Vallee	10:05	13:25	28:55
Bob Platt	12:37		

Denton		
Bob Champine	15:27	31:58
Jim Clem	15:20	31:07
Bud Tenny	14:43	13:26 (1)

INDOOR SCALE AT NATS

This information was only recently received; the top places at the NFFS Indoor Scale event were:

Class I - Pre-WW I		Class II - WW I	
1. Tom Peadon	184.4	1. Jed Kusick	109.2
2. Fulton Hungerford	177.8	2. Jed Kusick*	108.7

Class III - Inter War		Class IV - WW II & Racer	
1. Don Garofalow	187.8	1. Russ Kuhlén	54.0
2. Ken Johnson	146.2	2. Lloyd Wood	48.0

*Kusick donated 2nd place trophy to 2nd highest Jr. point winner, Fred Schroeder. Special Craftsmanship Award went to Fulton Hungerford for his amazing Wright Model "A". Special award for Junior high time went to Patrick Wood, 58 points.

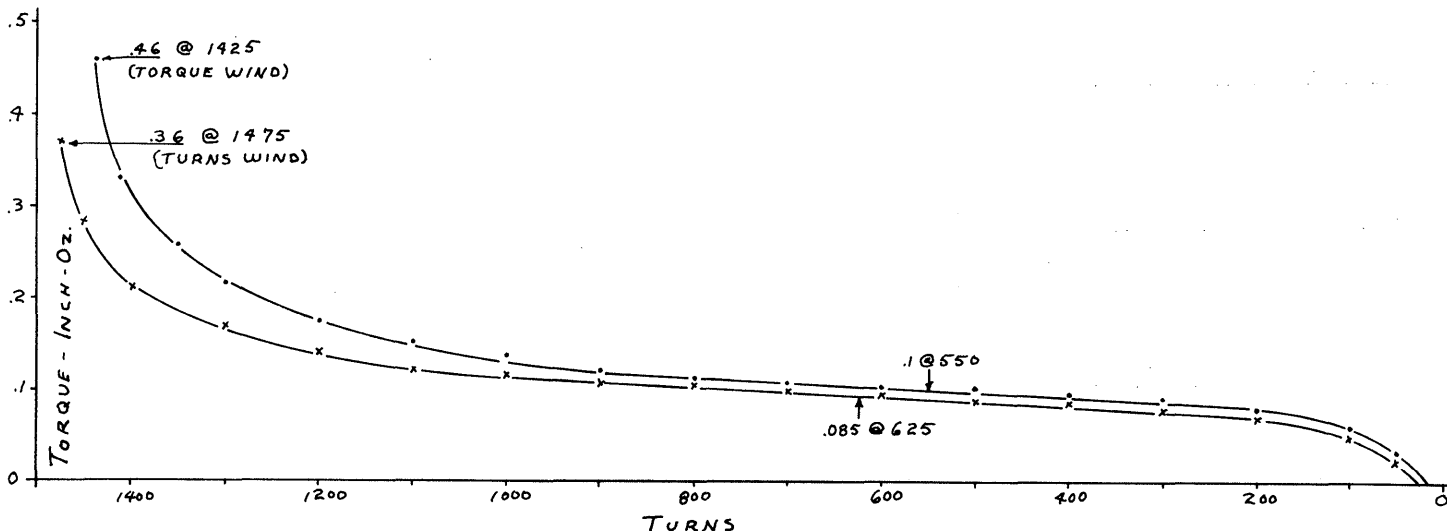
STATE OF THE ART

The model of the month is by Jiri Kalina, and the plan information was furnished by Bud Romak. Bud traded models with Jiri at Coppa Urbe in Rome. Coppa Urbe was the first international meet held in Italy, and was the "proof of the pudding" of Italian W/Ch facilities. Jiri won the contest with this model, by a good margin. The model is believed to be quite similar to the ones Jiri used to set the Cat. I World Record (twice), and to place 2nd at the 1968 Indoor World Championship. With such an enviable series of performances, it is clear that Jiri is a master craftsman and a tremendous competitor!

PIRELLI LORE

Winding technique is very important to the shape of the torque curve. The graph below shows the difference between a "torque" wind and a "turns" wind on a motor 16 1/2" long operated on 15" hook spacing (length after break-in). The "torque" wind yielded 15% higher average torque and a shorter cruise portion.

To define the type of wind, a "torque" wind is started by beginning to wind before stretch, winding as you stretch out to 2 1/2 or 3 times normal length, and crowd the torque as you come in early (winding on a torque meter is a must to know where you are at all times). The "turns" wind is begun by stretching out to more than 3 times normal length before winding, and coming in only enough to keep the torque level from zooming to the break point. It should be obvious that practice is required for maximum turns in either case!



INDOOR

NEWS and VIEWS

\$2/ YEAR NIMAS DUES \$1/ YR ADDITIONAL

****NATIONAL INDOOR MODEL AIRPLANE SOCIETY****

New Members:

Brig. Gen. FRANKLIN M. DAVIS, 26 Abingdon St., Arlington, Va. 22204

Honorary Members

GUY COGNET, 43 rue Gardenat-Lapostol, 92 Suresnes, France
P. H. LAGAN, 28 Avro Cres, Christchurch 4, New Zealand
KURT VOGLER, 42 Oberhausen, Schmiedstr. 62, Germany

Sponsored Junior Memberships

Our newest sponsored Junior member is Phillip Lawrey, 221 Auburn St., Auburndale, Mass. 02166. Phil was nominated by Ray Harlan, and has the following remarks about his modeling experience:

"I have been modeling for about four years and have built numerous stunt and sport models including a twin engine model which incinerated itself the first time I tried to fly it. I have also built about 17 indoor HLG (all bombs) and a lot of rubber powered semi-indoor models (Jetco ROG type), a couple of indoor scale machines and a few other models. I have also built some towline gliders, and a few 1/2A FF, but there is little space around here."

Phil has expressed an interest in building indoor rubber and ornithopter models, and flies with the Tech Model Aircrafters club at M.I.T.

Those NIMAS members who may have forgotten about the sponsored Junior program can write and ask for details. In brief, the program operates on donated funds and pays \$2 toward each membership. The Junior gets a full membership and any special help possible at the rate of \$1 for the first year; regular rates thereafter.

Change of Address

John T. Ganser has moved; his new address is:
#7 Clinton Ave., Merchantville, N. J. 08109.

AMA Election

This newsletter is planned to arrive at your house in time to remind you that AMA ballots must be postmarked on or before November 15, 1968 in order to be counted. It would be ideal to have a large ballot return for once; the average for past elections is about 14% return from those eligible to vote. Shameful!!

Junior NIMAS Awards

Silver Cat. I Rubber Award - 9:15.6, Bobby Dunham

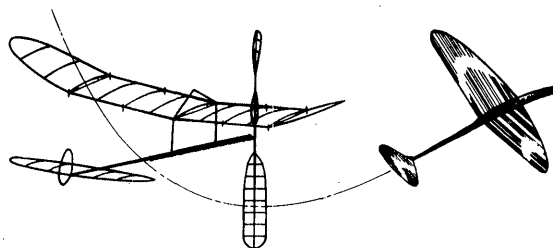
Gold Cat. I Rubber Award - 9:44.0, Bobby Dunham

Financial Report

As INAV moves into the eighth year of publication, it shows an increase in average circulation of 12% - about three year's growth in one. In plain numbers, the average circulation was 249 issues per month; correspondence was slightly lower at 693 incoming letters and 893 outgoing. Income was \$708, with \$651.80 expenses for a \$57.20 surplus. This brings the NIMAS operation about even over the past seven years. The expense breakdown:

Printing INAV	\$248.36
INAV Postage	191.85
Other postage	126.00
Office Supplies	85.59
	<u>\$651.80</u>

As usual, the time it takes to prepare any issue of INAV amounts to about 65 hours per month, counting proof-reading by Jody, assembling the mailing by the whole family, and time donated by others such as draftsmen and any one else who contributes material to the issues.



Editor: Bud Tenny · Box 545 · Richardson, Texas · 75081

SPECIAL INTERNATIONAL ISSUE

This issue is dedicated to indoor fliers all around the world, in recognition of the wonderful spirit of comradeship and international cooperation so often demonstrated whenever indoor fliers gather. It is appropriate also to share my appreciation for the cards I receive from the various international meets. These cards, signed by all the fliers present, give me a warm feeling of having been among friends, in spirit if not in body.

FAI INDOOR REPORT

Program Officials Chosen

Clarence Mather has been appointed as Team Selection Chairman, with Bob Champine, Jim Richmond and Dick Ganslen serving as Area Coordinators for the Eastern, North Central and South Central areas respectively. Western Area Coordinator post is open, with either Mather or Bud Romak as likely candidates. It is not too early to begin planning for the team qualification trials, so those who are interested in flying in the program should contact the Area Coordinator nearest you so he will be able to plan Trials in your area.

Bob Champine
360 Abingdon Circle
Hampton, Va. 23369

Jim Richmond
131 Pamela Drive
Bensenville, Ill. 60106

Dick Ganslen
1204 Windsor
Denton, Tex. 76201

Clarence Mather
3880 Ecochee Ave.
San Diego, Cal. 92117

Team Selection Program

The following text has been released by AMA HQ for publication in the Club Mailing and Model Aviation:

1. Entry requirements:

a. A contestant who wishes to qualify at a regular sanctioned AMA Indoor contest must preregister via AMA HQ by remitting a qualification fee (\$3 for Open members, \$1 for Jrs. and Srs.), in return for which he will receive a program entry form. The contestant must then fill out the form, obtain the meet CD's signature, to certify that the information is correct, then mail the form back to Headquarters. Note: the qualification fee mailing must be postmarked no later than midnight of the day before the contest of qualification.

b. A contestant who wishes to qualify via local qualification trials will pay a qualification fee (same as in 1. a., preceding), to the Contest Director at the first trials. Upon receipt by Headquarters of the contest report from the trials CD, with fees, those contestants who did not qualify will be forwarded a program entry form, as per a.

c. Those who qualify by either a. or b. will receive a notice of qualification, certifying eligibility for the quarter-finals.

d. Those with a program entry form from Headquarters may attempt to qualify at either local qualification trials or regular sanctioned AMA Indoor contests, without payment of further qualification fees.

e. Contest Directors of qualification, quarter or semi-finals meets may fly in those meets provided that two contestants or other officials time the CD's flights. The CD of the Finals meet, however, may not fly in that meet.

2. Local Qualification Trials

a. An unlimited number of local Qualification Trials may be held in the U. S., between January 1 and April 30, 1969. Each Trials shall be sanctioned through normal channels as for AMA contests and have a minimum of four entrants who hold a current AMA membership card with FAI stamp. Each contestant may enter any or all the local Qualification Trials in his Zone. FAI Rules shall apply

at each Trials, except that "rounds" need not be flown. Any ceiling height may be used for each Trials. All entrants who score at least 60% of the winning time at any Trials shall qualify for entry in the Quarter Finals.

b. A contestant at a regular sanctioned AMA Indoor contest, held between Jan. 1 and April 30, 1969, may qualify by scoring at least 60% of the winning time for that contest. Same AMA membership and FAI stamp requirements. Model flown in the contest must qualify for FAI Indoor.

3. Quarter Final Trials

a. Quarter Final Trials may be held in any ceiling height, and must be completed by May 31, 1969. FAI Rules shall apply, except that rounds need not be flown. All qualifiers from local Qualification Trials may enter any Quarter Finals anywhere, but only one. Top 80% qualify. Entry fees: Junior and Senior - \$1, Open - \$3.

4. Semi-Final Trials

Zone Semi-Finals will be scheduled one per Zone only. Entry fee - \$5 per entrant and must be completed by June 30, 1969. Any ceiling height may be used, and full FAI rules will apply, including the use of rounds. Qualifiers from Quarter Finals in any Zone may enter any Semi-Final in any zone but only one Semi-Final. The top three (3) from each Zone shall qualify for entry in the Finals; if less than 5 enter any Semi-Final, the top 50% will qualify for the Finals.

5. Team Selection Finals

The Finals shall be flown sometime during the summer of 1969, with FAI rules to be strictly observed, at a central U.S. Location. Entry fee \$5 per entrant, and the top 3 fliers shall represent the U.S.A. at the 1970 World Indoor Championships.

As an aside to the program rules above, some emphasis should be given to the matter of notification of next in line. If a qualifier finds himself unable to enter the next scheduled round, he is obligated to notify the first runner-up from the same Trials that he qualified from. In the 1967 Team Selection Program, this practice was not followed by a few fliers. Thus a few alternates could have advanced to the next round and did not.

INDOOR RULES

Contest Board Action

Recent FFCB action adopted major portions of one proposal and two cross proposals (FF67-A-1, -A-2, -A-3, as published in the Feb. '68 Model Aviation section of AAM.)

This action will change, effective Jan. 1, 1969, the indoor records picture. The new listing of events will be as follows:

Hand Launch Glider
Helicopter
Autogyro
Ornithopter
Rise Off Ground Stick Model - 30 sq. in. max.
Indoor Stick Model - 300 sq. in. max.
Paper Covered Indoor Stick Model - 100 sq. in. max.
Rise Off Ground Cabin Model - 150 sq. in. max.
FAI Indoor Stick - 65 cm max. span

For those fliers who will say they never heard of this proposal, Jan. '68 and Feb. '68 INAV called attention to the full text of the proposals and an error that appeared in the text. Further, the full text of this proposal has appeared twice in INAV in past years.

The records slate will not be wiped clean, as for some rules changes. Rather, the highest time in "B", "C" and "D" Stick will become the new record - in this case, the 19:30.2 C Stick record by Hewitt Phillips will be the new single Cat. I record. Similarly, the Cat. I Cabin record will be Hal Crane's 9:42.4 (formerly C Cabin).

CONTEST CALENDAR

GEORGIA - Atlanta area. The Decatur Flying 8-Balls MAC 1st Annual Indoor Contest, Nov. 17, 1968. Site is the Cumming High School Gym, a reasonably clear dome about 30' usable. Easy B and HLG (Jr. & Sr.-Op.); Paper Stick and Indoor Scale (all ages combined). Warren Lawrence, Box 225, Decatur, Ga. 30031.

MARYLAND - Silver Spring. Indoor Sessions, 7 pm to 11 pm, at John F. Kennedy High School gym. Nov. 22, Dec. 6, Dec. 20, 1968. Jan. 3, Jan. 17, 1969. School address is 1901 Randolph Road, Silver Spring, Md. Bill Saunders, 11613 Le Baron Terrace, Silver Spring, Md. Ph. 301-593-7196.

MASSACHUSETTS - M. I. T. Indoor sessions at M. I. T. Armory, 3 pm to 6:30 pm. Nov. 16, Dec. 14, 1968; Feb. 1, 1969. Contest Mar. 15, 1969, 1:30 pm to 8:30 pm. Ray Harlan, 15 Happy Hollow Rd., Wayland, Mass. 01778

OKLAHOMA - Tulsa. Tulsa Glue Dobbers Jingle Bell Jamboree, Class A Indoor Meet, Dec. 8, 1968. Trophies 1st only, expert/novice breakdown in HLG, Easy B, Indoor Stick. Events: HLG, Easy B size paper covered, Paper Stick, Indoor Stick, Indoor Scale. Bob Hanford, 3838 South 88th E. Ave., Tulsa, Okla. 74145.

PENNSYLVANIA - Philadelphia. Sky Pirates MAC 2nd Annual Indoor Model Contest, Philadelphia Convention Hall, 34th & Curie Ave., Nov. 17, 1968, 9 am to 5 pm. Events: HLG - Jr. & Sr.-Op.; Easy B (special rules; contact CD) - Jr.-Sr. only; Paper Stick - all ages combined; Indoor Stick - all ages combined; Indoor Scale - Jr. & Sr.-Op. CD: Charles Danila, 12111 Covent Rd., Philadelphia, Pa. 19154. Ph. NE 7-4034.

TEXAS - Dallas/Ft. Worth/Denton. Cat. I Indoor Contest, Nov. 30, 1968, 9 am to 6 pm. Site is ballroom at Texas Woman's Univ., near junction of University and Bell Avenues. Events: HLG, Easy B and Indoor Endurance (all rubber events flown against current record). Special classes and awards for Sub.-Jr. and Jr. CD: Dick Ganslen, 1204 Windsor, Denton, Tex. 76201, ph. 817-387-1969.

NEWS FROM AROUND THE WORLD

NEW YORK - LONG ISLAND

The LIAMAC Indoor Championships was the first major indoor meet of the winter season, and had a good turnout. 34 entries in 6 events turned good times under the 50' high dome:

Junior HLG		Sr.-Op. HLG	
1. Ron Stransky	0:51.9	Karl Birkel	1:11.0
2. Bruce Paillet	0:49.9	Ed Franklin	1:07.1
3. Ken Fitch, Jr.	0:47.0	Jean Paillet	1:04.5
4. Barry Paillet	0:45.9	Jim Daley	1:03.0
5. Bob Sylvia, Jr.	0:28.7	Pete Nishanian	1:00.1

Indoor Stick		Easy B (Jr. only)	
1. C. V. Russo	14:17.0	Richard Nawoyshi	4:45.0
2. Ed Archer	13:24.8	Ken Fitch, Jr.	4:18.6
3. Jim Daley	9:16.3	Michael Daley	4:00.8
4. Dan Domina	8:34.5	Barry Paillet	3:51.7
5. Jim Vales	7:32.4	Mark Daley	3:21.5

Paper Stick		Indoor Scale	
1. Jim Daley	9:49.2	Ed Archer	153.8
2. Ed Archer	9:46.7	Ed Beshar	144.0
3. Dan Domina	8:59.0	Don Garofalow	140.2
4. Karl Birkel	7:46.6	Jim Daley	126.2
5. Chester Wrzos	7:10.5	Salvatore Alu	105.5

TEXAS - DALLAS/FT. WORTH/DENTON

Two record trials and several impromptu sessions have set the tone of future performance - if you make allowance for variable conditions prevalent in the TWU ballroom. Bob Champine now holds the site record with 18:16, done with an almost-Richmond FAI model. Stan Chilton and Bud Tenny have topped 16 and 17 minutes repeatedly, and Jim Clem is consistently over 15 minutes. On the HLG scene, Tom Peardon, Dick Mathis and Frank Jarratt have worked up into the 33+ second range, which spells misery for any who hope to win at HLG this season!

A LOOK AT YESTERYEAR

The June '68 INAV presented the Jasco Beam Scale as a reminder of times past. One of the first to comment was Frank Zaic himself; he gives the following background.

It was my first item and was advertised in the Classified section of Model Airplane News. And on several occasions the 50% that came with the order meant that I could eat that day.

The metal parts were selected from the Stimpson catalog and the total cost may have been 5%. Anyone looking close would see parts that normally were used for low cost thermometers - also hour hands that were used on those "Will Come Back At" signs. The big stroke of luck was the pivot fitting with an exact 1" spacing.

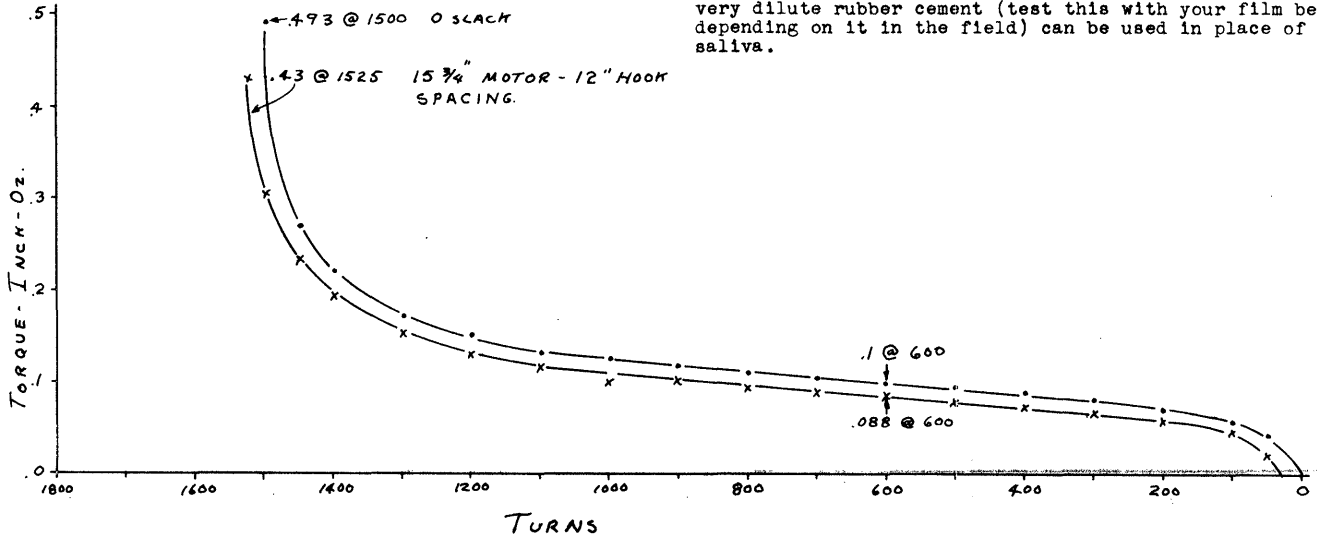
The weights would normally be on the expensive side, but I hit on the idea of having enamelled wire weighed on an accurate scale and then determining how many inches it took to make .1 oz. and .01 oz. A wire gage was selected so variations in length of 1/4" would mean an error of less than 1/6400. The wire was then wound on a mandrel in a hand drill. And all this for only 50¢.....

RECORDS? MAYBE!

TULSA GLUE DOBBERS Cat. I Record Trials, Oct. 25, 1968
 School Gymnasium - 21' ceiling
 Junior B Stick - 9:44.0, Bobby Dunham
 Junior FAI Stick - 9:15.6, Bobby Dunham
 Junior B Cabin - 5:26.0, Bobby Dunham
 TULSA GLUE DOBBERS Cat. II Record Trials, Nov. 2, 1968
 Air National Guard Hangar, 42' FAI, 56' AMA
 Junior B Stick - 15:58.2, Bobby Dunham
 FAI Cat. II FAI - 19:16.8, Stan Chilton
 DENTON, TEXAS Cat. I Record Trials, Oct. 27, 1968
 Ballroom at TWU, 24.5' FAI, 30.5' AMA
 AMA Cat. I FAI - 17:20, Stan Chilton

PIRELLI LORE

The amount of slack in a motor (before it is wound) is important in determining the actual value of the average torque. As can be seen in the plot below the shape of the two curves is almost identical. The upper curve was taken with zero slack - 15 3/4" motor length before winding, and 15 3/4" hook spacing. The lower curve was taken one hour later with 12" hook spacing, and gave 12% lower average torque.



HINTS AND KINKS

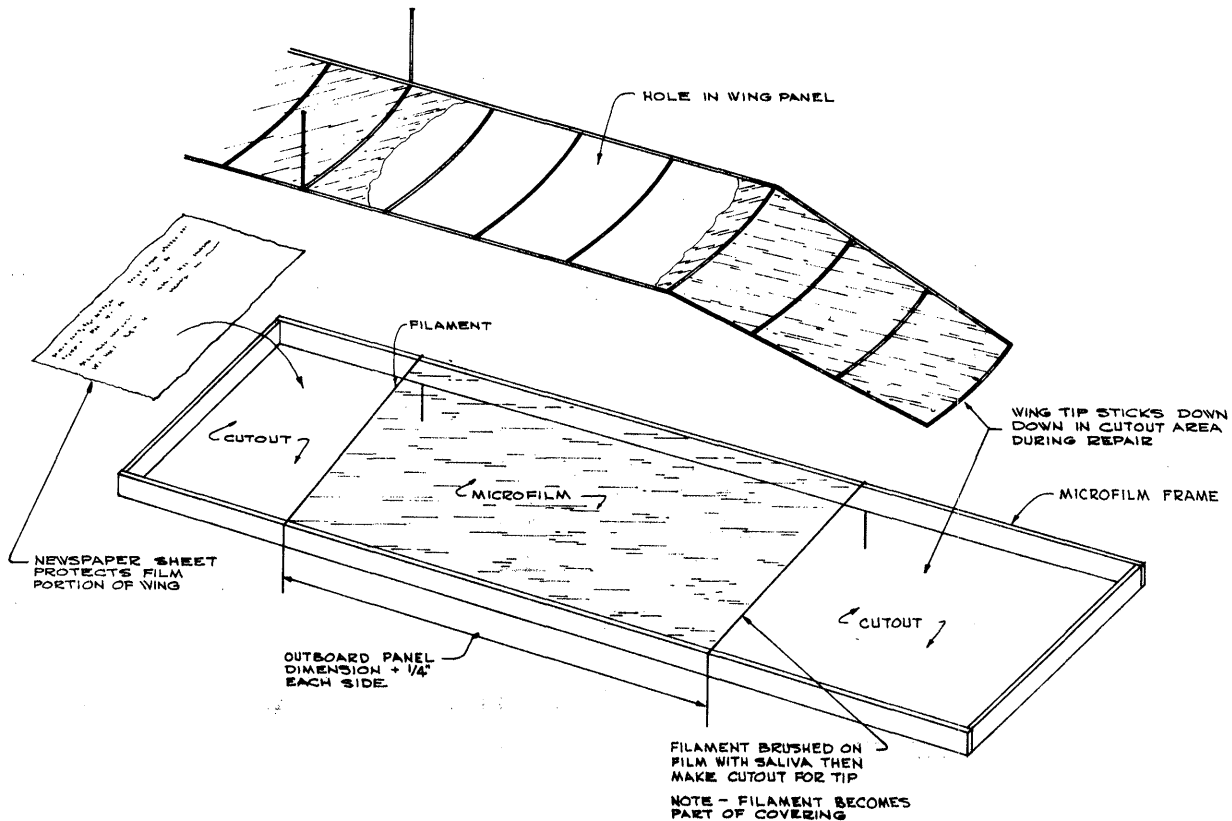
Loose Wing Post?

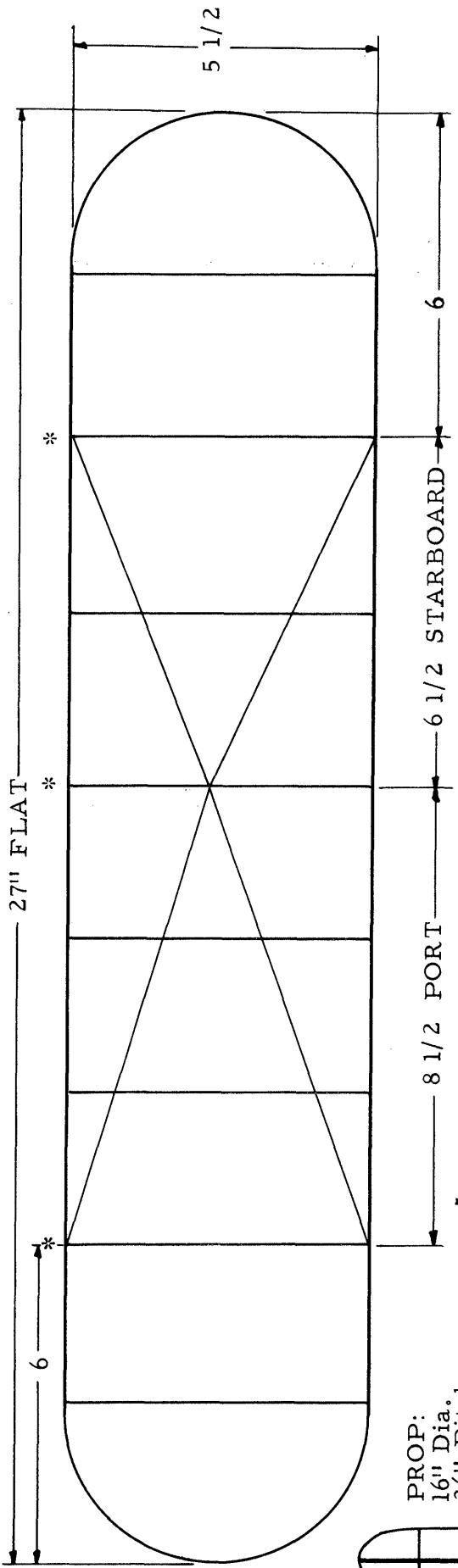
Bob Randolph suggests that a thin coat of rubber cement will make a loose wing post fit nicely. It is more permanent than using water to swell the wood for proper fit and is still adjustable without sticking.

Film Repaired Easily

When Bob Putman lost a large section of covering on a wing, he was able to repair it neatly and quickly by the method sketched below. Dacron monofilament was wet down to the hoop with saliva, to support a section of film long enough to make the patch. The rest of the film was stripped from the hoop to allow clearance for the wing tip and cabane (not shown). Top bracing on the damaged side also had to be removed. The wing was lowered onto the hoop and stuck in place. Note that the monofilament becomes a permanent part of the patch. Thanks to Jim Mills for drawing this sketch.

It is also possible to use dacron monofilament to help bridge across large areas when you patch: in some cases very dilute rubber cement (test this with your film before depending on it in the field) can be used in place of saliva.

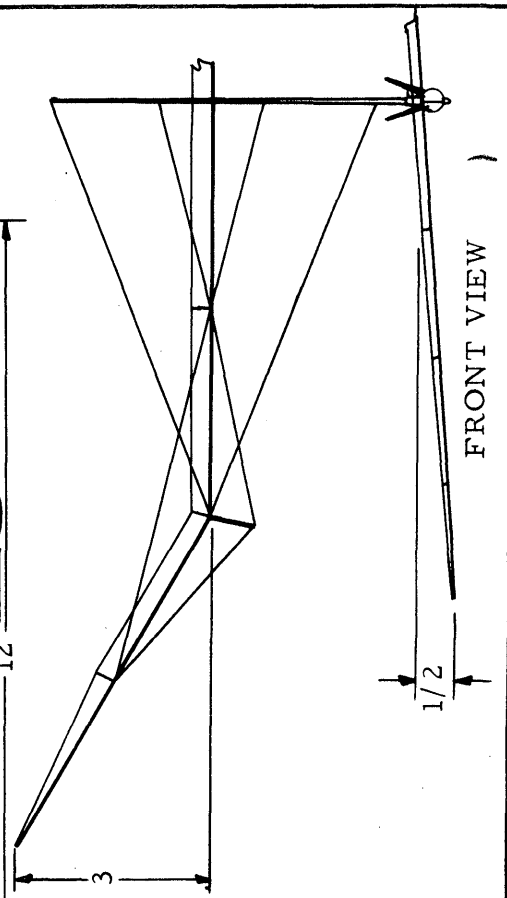
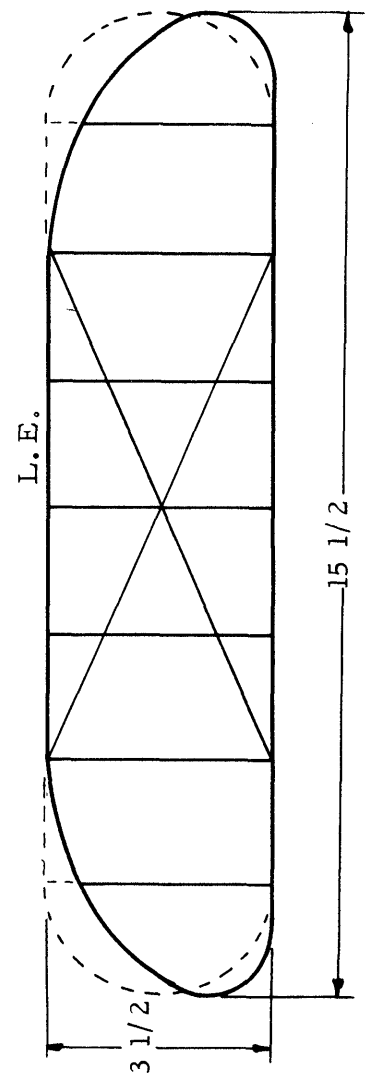
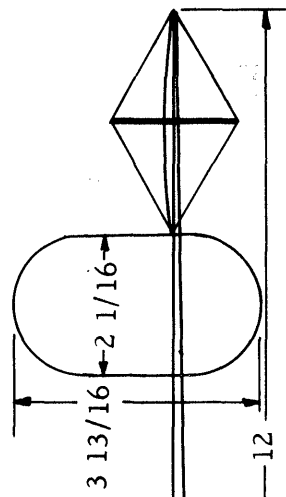
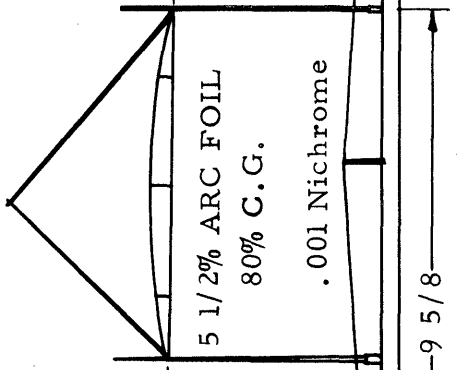
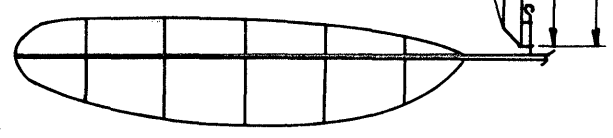




PROP:
1 1/2" Dia.
36" Pitch

WEIGHTS

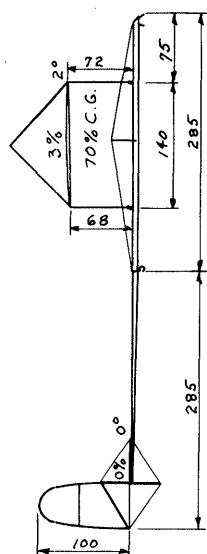
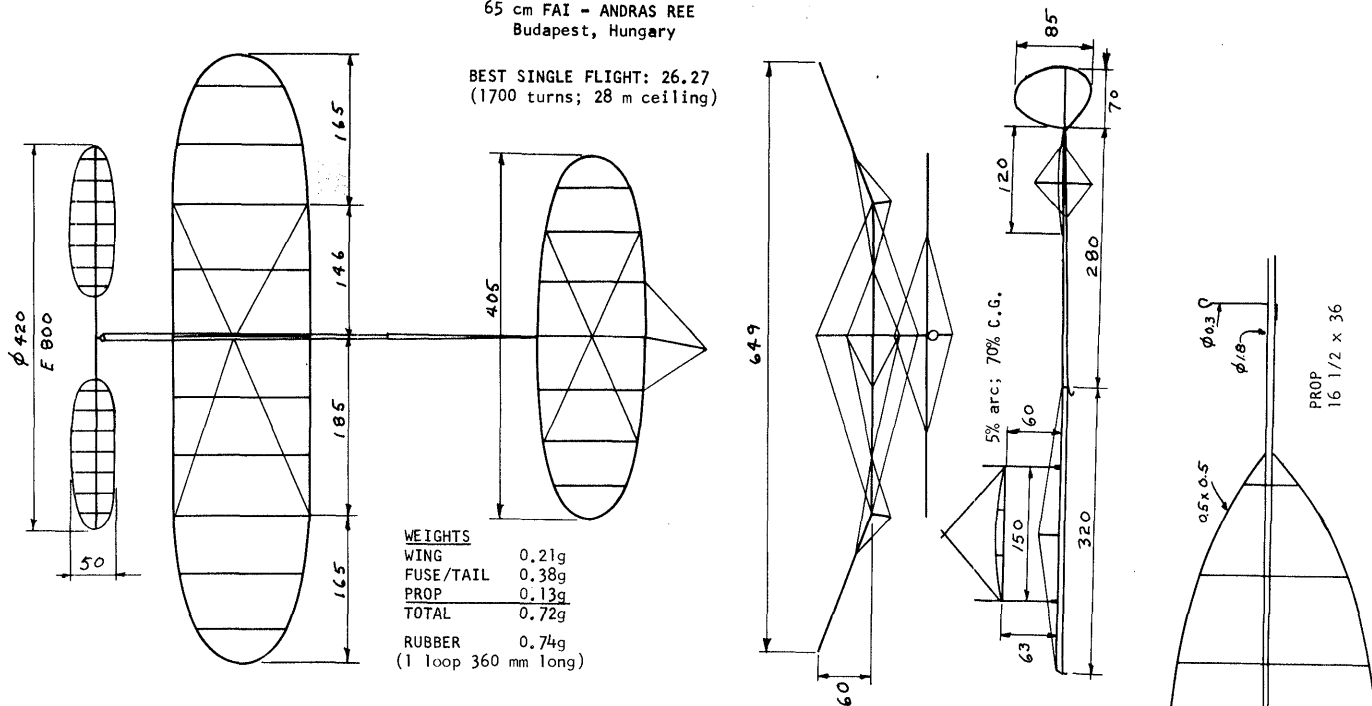
Wing	.0067	.0071
Body/Tail	.0085	.0128
Prop	.0039	.0046*
Total	.0191	.0245



FRONT VIEW

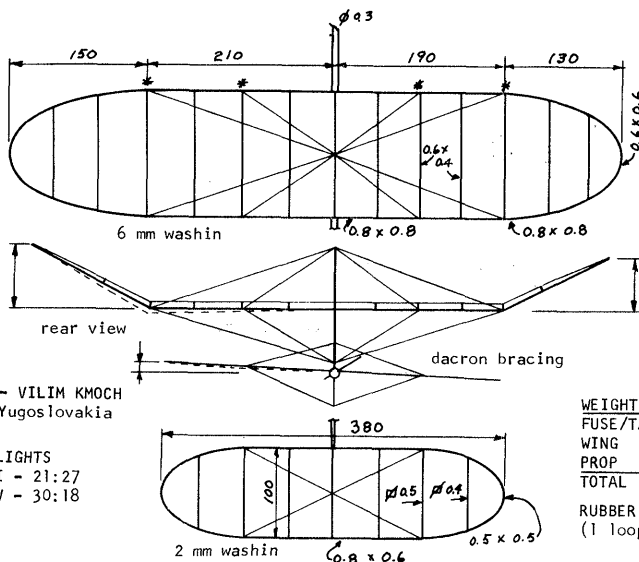
65 cm FAI - ANDRAS REE
Budapest, Hungary

BEST SINGLE FLIGHT: 26.27
(1700 turns; 28 m ceiling)



65 cm FAI - VILIM KMOCH
Zagreb, Yugoslavia

BEST FLIGHTS
Cat. II - 21:27
Cat. IV - 30:18



STATE OF THE ART

This month's three-way presentation leads off with a composite plan of Jim Richmond models. The basic design differs from the original presentation (July '67 INAV) in that the fin was moved from behind the stab to in front. Two weight schedules are shown, both lighter than the .0267 oz. shown originally. The .0191 was the weight for Jim's 1968 Nats winner, which had the dotted stab outline shown. The other weight schedule is for his West Baden winner, except that the prop weight may have been somewhat different. At the World Champs, Jim flew the Nats winner until it refused to hold together under increased turns needed for winning time. Jim then switched to the West Baden model with a stiffer than normal prop to win with a great 36:18 - 1½ minutes higher than the next closest time. Other slight differences in various models include CG as far forward as 75% and either karma or dacron bracing on wing and stab. An outstanding characteristic of all this design series is a nose-up attitude during the entire flight, and a forward cruise speed lower than most similar models, without undue sensitivity to drift.

The other two models shown represent Yugoslavia (Vilim Kmoch; 8th place at the W/Ch) and Hungary (Andras Ree). Andras was runner-up in the Hungarian team selections with the design shown; I understand he proxy-flew the models of Geza Varszegi, who was unable to make the trip due to illness. The model by Andras can perhaps be considered typical of the Hungarian models, and of many of the other European models besides.

Three differences show up immediately in Vilim's model in spite of the first-glance similarity. The upright fin, integral with the stab bracing, is a neat solution to a problem which is personally vexing. In addition, the stab has zero camber, and the wing airfoil is only 3%. The model is lighter than the other two, with the shortest motor stick. It is interesting to note that all three of these models had almost exactly the same wing loading, in spite of the 7% lower "dry" weight of Vilim's model. A full size copy of Vilim's prop outline will be furnished upon request.

INDOOR

NEWS and VIEWS

\$2/ YEAR NIMAS DUES \$1/YR ADDITIONAL

****NATIONAL INDOOR MODEL AIRPLANE SOCIETY****

New Members!

EVA BIDDLE, 2156 Street Rd., Warrington, Pa. 18976
 CHARLES R. CARTER, 2291 Gold Star Hwy., Mystic, Conn. 06355
 BENJAMIN F. KOON, 1400 MacDade Blvd., A-327, Woodlyn, Pa. 19094
 JOSEPH G. SOVA, 977 E. Philadelphia Ave., Youngstown, O. 44502

Family Members

NEAL ROZELLE, 1403 Midlawn Dr., Decatur, Ga. 30032

Kopecky Recovering

We are happy to report that Ernie Kopecky is at home and recovering from his recent heart surgery and hepatitis. He expresses his gratitude for your many cards and letters and says they meant a lot to him.

Season's Greetings

We wish all of you the very best in this Christmas season and the new year to come. It is impossible for us to send cards to all of you, so we use this method to send you our greetings.

Help Wanted!

In this month's PIRELLI LORE, it is explained that good answers to some aspects of pirelli usage depend upon a testing program more comprehensive than I can undertake at this time. Therefore, there is a great need for many people with torque meters to run parts of the test series. Rubber will be furnished - all you have to do is run the tests and summarize the results. Help! Drop a card to Bud Tenny, Box 545, Richardson, Tex. 75080 today!

Decals Needed!

The current supply of NIMAS decals, which were run at cost after the art work was converted into silk screens, is almost exhausted. Does anyone have the capability and inclination to help out?

Site Survey Form

Several years ago it was suggested that a survey of active sites be made and the results made available. The project has dragged for lack of help, but a coordinator is now on the job. The forms should soon be available and on the way to you.

NIMAS Awards

Silver Cat. I HLG Award - 0:28.2, Dan Belleff

Silver Cat. II HLG Award - 0:48.0, Dan Belleff

Gold Cat. II HLG Award - 1:02.5, Dan Belleff

Diamond Cat. II HLG Award - 1:05.0, Dan Belleff

NIMAS Aces

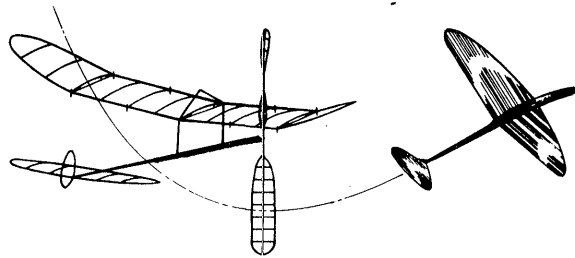
Dan Belleff is the latest NIMAS Ace (see above) and the first flier to become a Cat. II HLG Ace. In spite of the times shown above, he was able to garner only second place at the Philadelphia meet, where those times were flown! The boys play rough now and then!

FAI INDOOR REPORT

Program Suggestions

Clarence Mather has set forth the following goals for the upcoming Team Selection Program:

1. Select the best team to represent us in 1970.
2. Raise money for the Team Travel Fund.
3. Improve the standard of indoor flying.



Editor: Bud Tenny · Box 545 · Richardson, Texas · 75081

4. Create more interest in indoor flying.

Of these goals, #1 is obviously the most important, but #2 is also very important. Last time, about 50% of the total Fund was donated from outside the program, and the total was barely adequate to cover the needs. Not many of our fliers can really afford a lot of expense, so a good Fund broadens the field of possible fliers. Goal #3 comes automatically - in fact, the 65 cm birds have improved the average performance tremendously in just one W/Ch round and there is talk of 40 minutes to come!

Clarence has suggested that all CD's holding indoor meets between January 1 and April 31 (time limits for Local Qual. Trials) could help raise money for the Team Travel Fund by running one or more events in the meet as FAI "benefit" events. The method would be to charge a normal entry fee and give nominal prizes; leaving some profit (?) to be donated to the Travel Fund. The same thing could be done at Record Trials - where no prizes are expected anyway.

FAI Rules

The following rules have been taken from the latest edition of the FAI Sporting Code, and are directly applicable to all rounds of the Team Selection Program:

3.4.6 Collision Rule: In the event of a collision between two models in flight, both competitors may immediately choose, either to retain the time of the flight or to recommence the flight.

3.4.7 Steering of model (use of balloon): To prevent a model from colliding with the structure of the building or with another model, a balloon, its line or a stick of 2 to 8 meters long may be used for three 15 second periods during any one flight. The 15 second period shall commence when the steering device first contacts the model, and the contestant may continue steering for the full 15 second period, regardless of the number of intermittent contacts between the steering mechanism and the model. The steering tactic is intended to change the direction of flight only. It must be performed by the contestant. In cases of physical disability of the contestant prior arrangement for a substitute must be made with contest officials.

It is the responsibility of the time-keepers to observe if the use of a balloon, or its line, by another competitor is likely to foul the model which they are timing, and to warn the user of the balloon accordingly.

If however a model is fouled by another competitor, the fouled competitor has the choice of another flight.

3.4.9 Timing of flights: The timing of each flight shall commence when the model is released. Timing shall terminate when:

a. the model lands normally on the floor of the building.

b. when the model comes into contact with any part of the building other than the floor and translational movement ceases, the timekeepers shall continue to time the flight for 10 seconds. Should the model remain in contact with the building after 10 seconds, timing will cease and 10 seconds will be subtracted from the time of flight. Should the model release itself from contact with the building in less than 10 seconds, timing will continue normally.

c. jettisoning occurs.

3.4.10 Number of helpers: The competitor is entitled to have one helper in the starting area.

3.4.12 (partial) Ceiling height definition: The height of the ceiling is defined as the vertical distance from the floor to the highest point at which a circle 15 meters can be inscribed, below the primary structure of the building.

Area Coordinators

The following people have agreed to serve as Area Coordinators in the geographical regions nearest to the address shown:

Joe Bilgri
1255 Blackfield Dr.
Santa Clara, Cal. 95051

Dick Ganslen
1204 Windsor
Denton, Tex. 76201

Jim Richmond
131 Pamela Dr.
Bensenville, Ill. 60106

Bob Champine
360 Abingdon Circle
Hampton, Va. 23369

STATE OF THE ART

The model of the month was flown to a very close second place in the 1968 W/Ch. by Jiri Kalina, and it holds one World Record and a Czech national record. Compare the plan shown with Jiri's '67 Coppa Urbe winner (Oct. '68 INAV) and note design changes in this version. Thanks to Rudolf Cerny for sending this information!

Information not shown on the plan, or not adequately explained follows:

The 30" pitch prop (small outline) was used for the Cat. I World Record and the Czech Cat. IV record. In Cat. I a 12.6" loop of .043 rubber with 1750 turns gave 19:20 in a 6.5 m site, with a substantial amount of ceiling scrubbing. In Cat. IV (the big hall in Brno) a 14.16" loop of .043 rubber and 1950 turns gave 32:24. The Cat. I motor weighed .0214 oz; the Cat. IV motor weighed .0267.

The larger prop outline, with 14.2" loop of .043 rubber and 1950 turns gave two 34+ flights at Rome. The model weight schedule is:

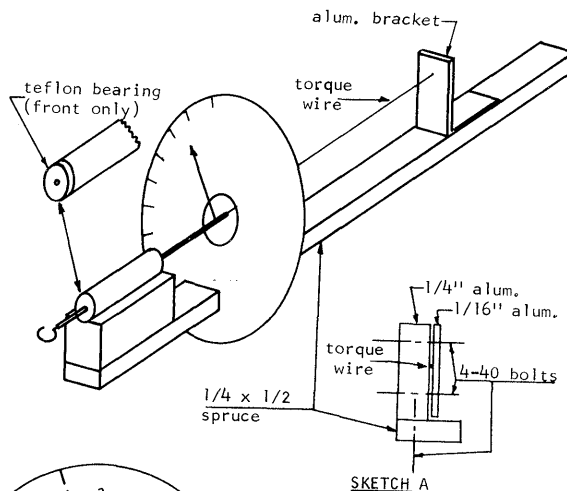
Wing	0.22g	.0078 oz.
Boom/stab/fin	0.11	.0039
Stick	0.20	.007
Prop	0.10	.0035
	0.63g	.0222 oz.
Rubber	0.75	.0266
	1.38g	.0488 oz.

If the printer follows instructions, the model plan is 1/5 size and the props and airfoils are full size.

THE LAB

Improved Torque Meter

Some previous issues have shown torque meters, all of which had one fault in common. The scale and pointer were right next to the hook, and a broken motor tends to scramble the pointer or worse. The device sketched below will take a lot of abuse. A single teflon bearing in the front absorbs side loads due to unhooking the motor, and catches broken motors. The torque wire solders into the 1/16" dia. brass tube in front, just behind the scale. At the rear the torque wire passes through an aluminum bracket and is clamped in some fashion so it can be adjusted for zero. An improved clamp is shown in sketch A - this one permits both zero adjustment and minor changes in length (during calibration). Sketch B shows the calibration method. A balanced beam or rod is attached to the front hook, and a .1 oz. weight placed exactly 1" from the center of the hook. Then rotate the torque meter so the beam is level and mark the pointer position on the scale. Do this with the same weight at 1" increments until you have the desired range - a minimum of .6 inch-oz. should be used. On the original device, 2 1/2" of .012" dia. music wire gave .8 inch-oz. of torque in about 300° of rotation.



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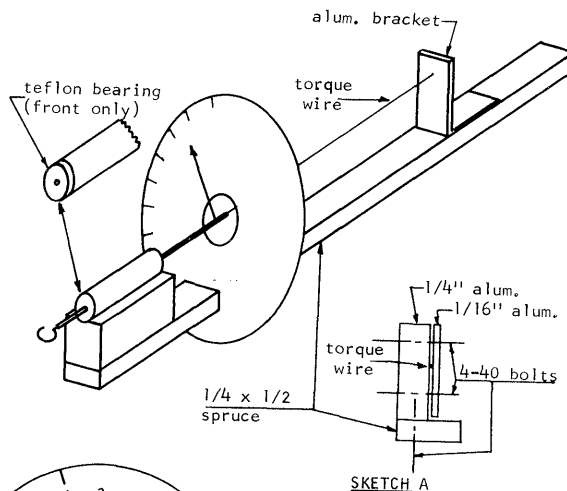
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It should be noted that Local Qualification Trials should be in the planning stage now, even if they are late in the period set for these events. Each event must be cleared in the normal manner with the Dist. Contest Coordinator, but each event should also be cleared with the Area Coordinator listed above. It would also be helpful if each approved date be sent to INAV for publication.

LAST MINUTE BULLETIN: Poland has been chosen as host for the 1970 World Championship. Details when available.

INDOOR RULES

The Free Flight Contest Board has defined built-up fuselage as "a structure assembled from discrete structural members into a framework essentially open in nature; if such a framework is covered, the covering material must not contribute significantly to the compressive strength of a load bearing member."

CONTEST CALENDAR

CALIFORNIA - San Diego

Cat. I indoor contest for HLG, Easy B and Scale late in January. Contact Clarence Mather for details at 3880 Ecochee Ave., San Diego, Cal. 92117.

ILLINOIS - Chicago

Arrangements have been made for indoor fliers to use the Washington Park Armory this winter. Contact Pete Sotich, 3851 West 62nd Place, Chicago 60629 or Al Sortwell 236 Placid Place, Elk Grove Village, Ill. 60007 for info about possible contests or flying sessions.

INDIANA - Kokomo

Chuck Borneman announced an indoor session at the old Purdue Fieldhouse in West Lafayette, Ind. for Dec. 8. If enough interest was shown, more such sessions will be held at the same site. To find out more, and express your own interest, contact Chuck at 1401 W. Taylor, Kokomo, Ind. 46901 or call him at 317-459-3656.

KANSAS - Kansas City Area

HLG & Delta Dart contest, Feb. 15, 1969. 1 pm to 6 pm at a site to be announced. Contact Roger Schroeder, 4111 West 98th St., Overland Park, Kansas for details.

MASSACHUSETTS - M.I.T.

Indoor sessions at M.I.T. Armory, 3 pm to 6:30 pm. on Dec. 14, 1968 and Feb. 1, 1969. Contest Mar. 15, 1969, 1:30 pm to 8:30 pm. Contact Ray Harlan, 15 Happy Hollow Rd., Wayland, Mass. 01778.

MARYLAND - Silver Spring.

Indoor sessions, 7 pm to 11 pm. at J. F. Kennedy High School Gym. Dec. 20, 1968, Jan. 3, Jan. 17, 1969. School address is 1901 Randolph Rd., Silver Spring, Md. Bill Saunders, 11613 Le Baron Terrace, Silver Spring, Md. 20902 Ph. 301-593-7196.

MISSOURI - St. Louis

Indoor sessions Jan. 17, Feb. 9; indoor contests Mar. 9 and April 7, 1968. Indoor Symposium Jan. 17, 1968. For details: Jim Gremel, 8618 Jo Court, Berkeley, Mo. 63134, ph. 524-0884; Dick Hardcastle, 1616 Dearborn, St. Louis, Mo. 63122, YO 6-0037; Bob Hotze, 673 Craigwoods Dr., Kirkwood, Mo. 63122, TA 2-1257.

VIRGINIA - Hampton

Cat. I RT at Willis School in Hampton, Va. Dec. 28-29 1968, with Easy B and HLG on 12/29 1 pm to 5 pm. Rubber record challenge 3 pm to 9 pm 12/28 and 5 pm to 9 pm, 12/29/68. Hal Crane, 4002 Buchanan Dr., Hampton, Va. 23369

WASHINGTON - Bellevue

Indoor contests in January and March, 1969 at Interlake High School, 16245 N. E. 24th, Bellevue, Wash. Contact John Crosetto, 14809 S. E. 54th, Bellevue 98004, ph. SH 6-2781 for rules and dates.

RECORDS? MAYBE!

PHILADELPHIA SKY PIRATES 2ND ANNUAL INDOOR MEET, 11/17/68

Philadelphia Convention Hall, Cat. II, 80'+ ceiling
Open HLG - 2:14.8, Bob Gutal

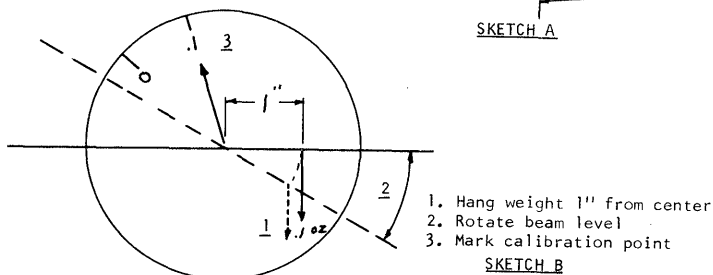
DENTON INDOOR CONTEST, Nov. 30, 1968, 30' 6" ceiling

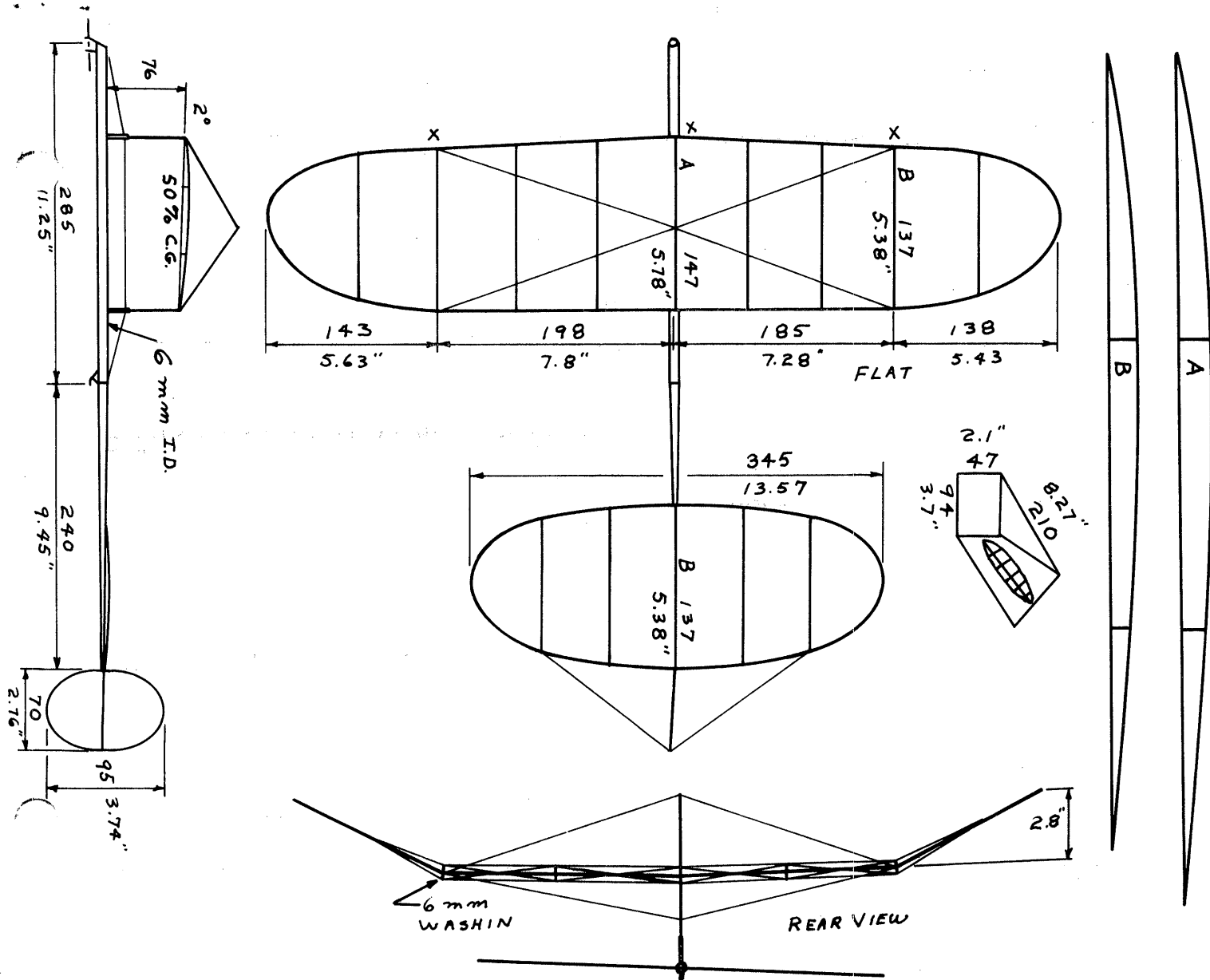
Ballroom, TWU, Denton, Texas Cat. I AMA & FAI

Junior C Cabin - 5:17, Bobby Dunham

Junior HLG - 1:08.2, Bobby Hanford

Open HLG - 1:14.5, Dick Mathis





65 cm FAI INDOOR

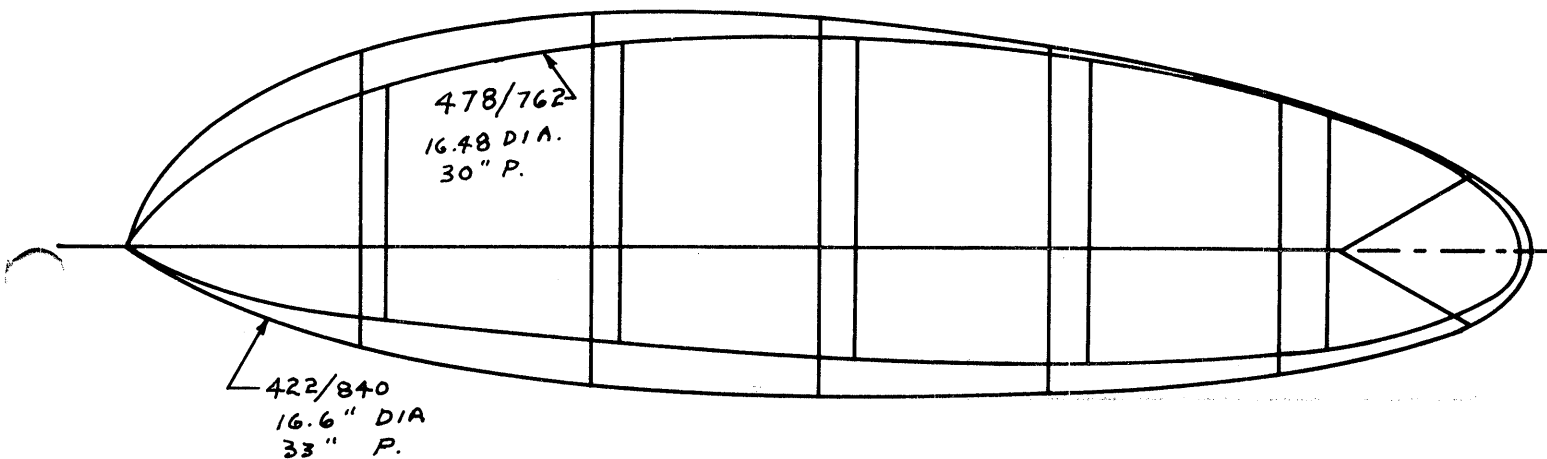
JIRI KALINA - CZECHOSLOVAKIA
 Cat. I World Record - 19:20
 Czech Cat. IV Record - 32:24
 2nd Place 1968 W/Ch - 69:30

WING:

25 1/2" Projected Span
 135 Sq. In. Proj. Area

WEIGHTS

Wing	.215g	.0077 oz.
Stab/Fin	.07	.0025
Stick	.205	.0073
Boom	.04	.0014
Prop	.11	.0039
	<u>.64g</u>	<u>.0228 oz.</u>



PIRELLI LORE

Walter Erbach took rightful exception to the Pirelli Lore material presented in the Nov. '68 INAV. His arguments were basically that a single test result was used to support a general statement; this is a valid objection. He also objected on the basis of tests that he conducted in the past, but I could not accept the test procedure he used. I have decided that my test erred in that the motor was not allowed to rest a minimum of 24 hours (see Sept. '68 INAV) and no effort was made to determine the state of breakin of the motor (no followup made at zero slack). As it stands, the curves presented gave a very good picture of loss of torque due to motor fatigue (or failure to return to original length).

In a long series of tests, I have found the following to affect torque curves: winding technique, amount of rest the motor has, speed of unwinding, speed of reading torque (how long you wait at each point to read torque) amount of breakin the motor has, and amount of slack in the motor before winding.

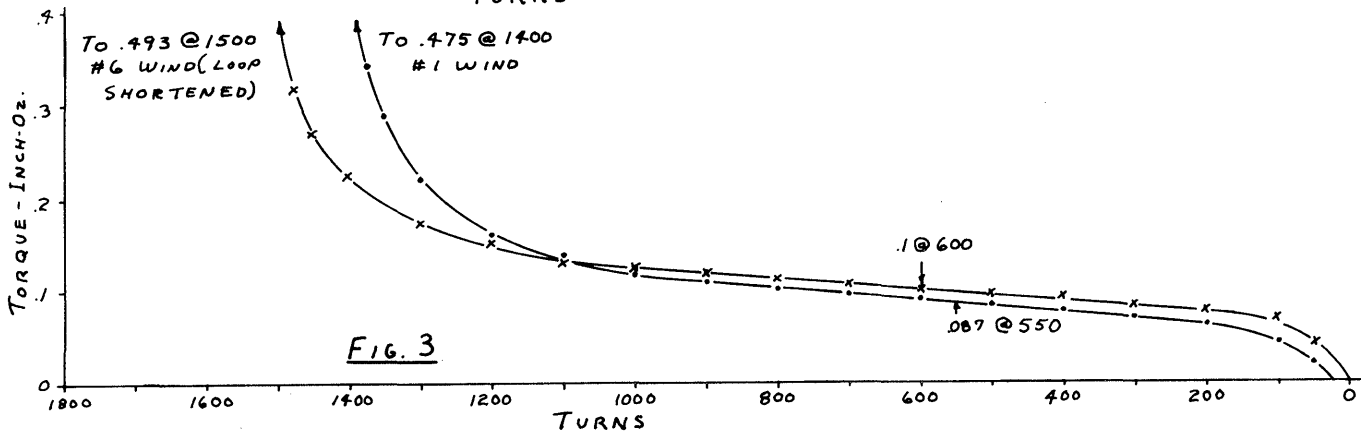
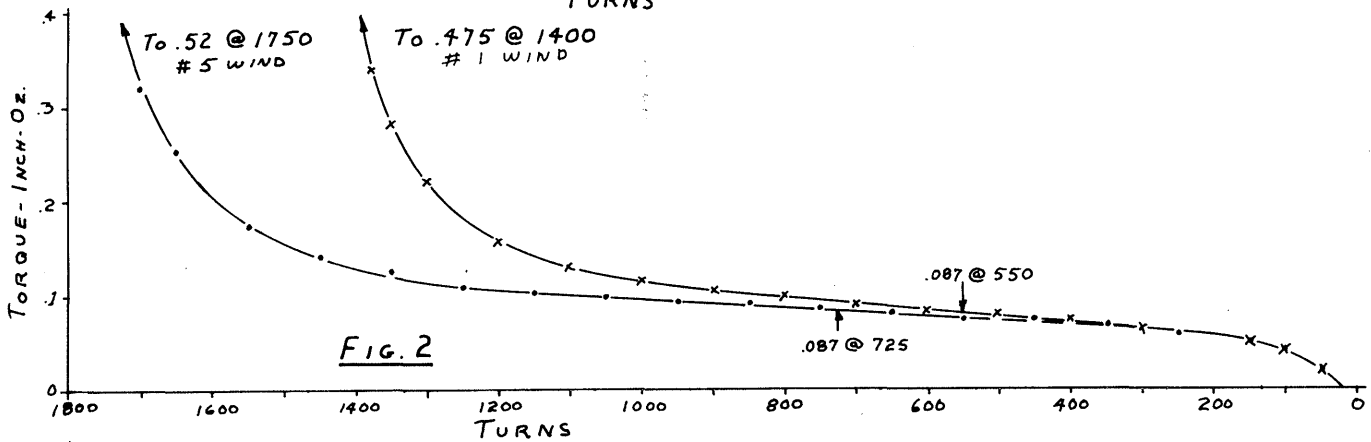
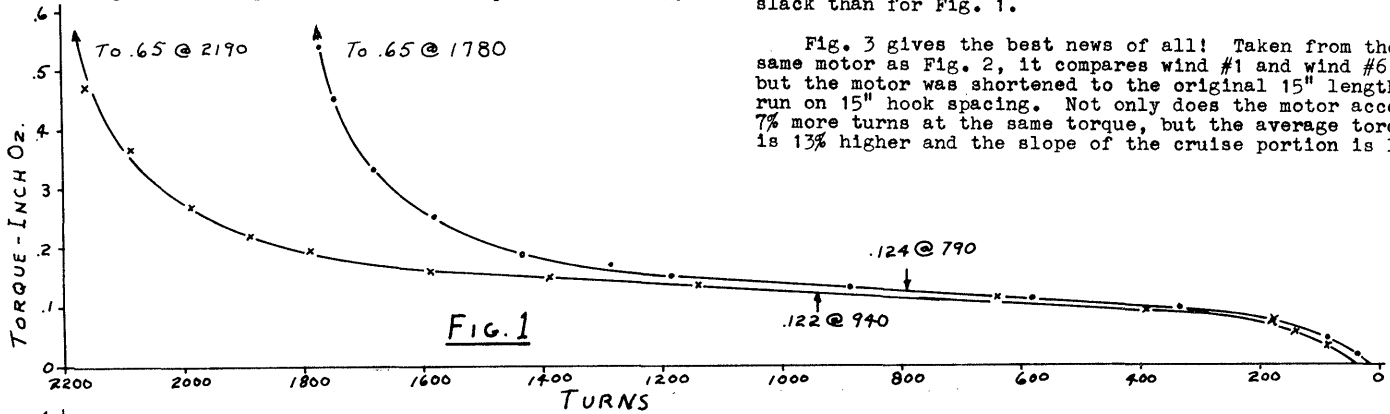
This series was begun in an attempt to define several characteristics of pirelli, and point the way to more efficient usage of pirelli, since no one has ever admitted knowing these things with enough certainty to tell others about it. In order to overcome several shortcomings in test procedures, I have outlined a better test program. However, such a program would entail far too much investment of time for me to undertake it, since a single test of a single motor represents the better part of an hour.

I will furnish motors to anyone who will test them as outlined and return the results for inclusion in future INAV reports. The test can be designed to offset the differences between individual torquemeters and operators, and will yield much significant information. Meanwhile, the information below represents (once again) only a single test motor in each case and indicates a trend rather than an absolute quantity.

One of the most pressing questions raised over pirelli is whether to break-in the motor or just fly it in (fly the model with new rubber and then increase turns and/or shorten the motor as it breaks in). The graphs below give clear evidence that pirelli improves with break-in. Fig. 1 comes from Bob Platt - it shows the first wind and the seventh on an 18" (new) loop of .071 pirelli. The motor was wound to the same torque level each time; about 15 minutes was required to take each torque curve and the motor was allowed to rest 30 minutes before the next wind. Torque was taken with 12" between hooks - which is why the average sustaining torque is lower on the 7th wind (over 7" of slack). The 7th wind had 15% more energy and 22% more turns than #1 wind; average torque was .124 in. oz. for #1 and .122 in. oz. for #7.

Fig. 2 shows winds #1 and #5 on a 15" (new) motor run on 15" hook spacing. Again, extra turns and energy are apparent - note that the average torque is the same, but that wind #5 has a flatter and longer cruise portion. 24 hours rest between winds was allowed, giving somewhat less slack than for Fig. 1.

Fig. 3 gives the best news of all! Taken from the same motor as Fig. 2, it compares wind #1 and wind #6 - but the motor was shortened to the original 15" length and run on 15" hook spacing. Not only does the motor accept 7% more turns at the same torque, but the average torque is 13% higher and the slope of the cruise portion is less.

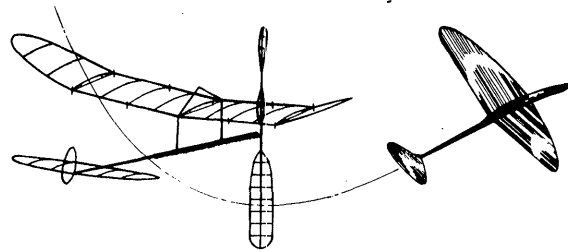


INDOOR

NEWS and VIEWS

\$2/ YEAR NIMAS DUES \$1/YR ADDITIONAL

Editor: Bud Tenny · Box 545 · Richardson, Texas · 75080



****NATIONAL INDOOR MODEL AIRPLANE SOCIETY****

New Members!

- JOE DEADY, 466 155th Ave. SE, Bellevue, Wash. 98004
- DAN DOMINA, 1229 S. Long Ave., Hillside, N. J. 07205
- ANNIE GIESKIENG, 1333 S. Franklin St., Denver, Colo. 80210
- BENJAMIN F. KOON, Jr., 1400 MacDade Blvd., A-327, Woodlyn, Pa. 19094
- HERMAN NEWKIRK, 18595 Marine View Dr. SW, Seattle, Wash. 98166
- NICK PANAGIOTOU, 3911 Norton Ave., Oakland, Cal. 94602
- PETER PATTERSON, 15042 SE 15th., Bellevue, Wash. 98004
- DON STEEB, 955 Milstead Way, Rochester, N.Y., 14624
- O. C. STEWART, Box 168, 8060 Spencer Hwy, Pasadena, Tex. 77505
- JIM WALTERS, 240 SW 184, Seattle, Wash. 98166

Family Members

- BENJAMIN F. KOON III, 1400 MacDade Blvd., A-327, Woodlyn, Pa. 19094
- SCOTT NEWKIRK, 18595 Marine View Dr. SW, Seattle, Wash. 98166
- JAY PATTERSON, 15042 SE 15th, Bellevue, Wash. 98004

Change of Address

These NIMAS members have requested that their new addresses be published:

- BILL HANNAN, P. O. Box 1596, Escondido, Cal. 92025
- KEITH VARNAU, 900 W. Belden Ave., Apt. 211, Chicago, Ill. 60614

Bill Hannan is the man who has all those scale model goodies (Graphics), and says that his product lists are available for the price of a 6¢ stamp.

Sorry About That!

In the Nov. '68 INAV, our newest sponsored Junior was introduced as Phillip Lawrey; it should have been Lawry.

In the Dec. '68 INAV, a note pertaining to wingspan and projected area appeared just under the rear view of Kalina's model. Oddly enough, this should have appeared in the Nov. '68 issue, on the plan of Jim Richmond's W/Ch winner! It was a separate note which apparently worked loose from the plan and stayed unnoticed in the plan envelope and then dropped out in December. So, the printer put it where he thought it belonged!

In the Dec. '68 INAV, Bobby Dunham's C Cabin record was listed as 5:17.0; should be 5:14.2.

Dick Black Memorials

At long last two Dick Black memorial lectures are ready for showing. One is on balsa wood selection and cutting, and the other on pouring microfilm. These are slide-tape lectures, using audio tape at 3 3/4 inches per second playing speed and 35 mm color slides. These are to be available to clubs or individuals on a first-come, first-served basis. All mailing will be by first class mail (approximate cost 30¢) and individuals are requested to keep any one lecture no more than 2 days. Clubs can have a lecture 5 days, and a reasonable effort will be made to "bracket" club meeting dates if you request it.

NIMAS Awards

- Silver Cat. I HLG Award - 0:24.8, Dick Mathis
- Gold Cat. I HLG Award - 0:27.7, Dick Mathis
- Diamond Cat. I HLG Award - 0:38.0, Dick Mathis
- Silver Cat. II HLG Award - 0:51.0, Dick Mathis
- Gold Cat. II HLG Award - 1:01.0, Dick Mathis

Diamond Cat. II HLG Award - 1:07.0, Dick Mathis

NIMAS Aces

Flights made at the '68 Nats and at the Denton indoor meet in November added up to Cat. I and Cat. II Ace rating for Dick Mathis. This makes Dick the first Open double Ace, and only the second to make Cat. II Ace in HLG.

Steering Pole?

Stan Chilton located a telescoping fiberglass fishing pole, 20' long, that is light, strong and ideal for pole steering. It is available from Sears, Roebuck & Co. for around \$10, price depending upon whether you get it from a catalog order or regular store. The store part number is 535-305361, catalog number (Spring/Summer '68 catalog) 6 K 30536C.

More Volunteers Needed

So far, two people have volunteered to help run some of the tests being set up in support of the PIRELLI LORE series. Four more volunteers with torque meters are needed, besides some help in reducing the data. This last task will consist of averaging results from three motors at each of several stages of the test and producing charts from which graphs will be drawn. Help! Drop a card to Bud Tenny, Box 545, Richardson, Tex. 75080

FAI Benefit Events

It was announced in the Dec. '68 INAV that Clarence Mather (Indoor Team Selection Chairman) had suggested that extra money for the FAI Inboard Travel Fund could be raised by special "team benefit" events. In line with this idea, NIMAS has available trophy "makings" for 55¢ per trophy. You get a piece of mahogany cut to shape and two plates with the design shown below. The wood block needs a light sanding and whatever finish you choose; the plates (one event plate and one place plate) are then put in place with contact cement. The finished trophy is in the form of a paperweight of the shape sketched below. It is 4" long and about 1 1/4" high and 1 5/8" wide. This low cost award scheme permits over 50% of the entry fee (assuming \$1 per entry and 4 entries) to be donated to the Travel Fund. The FAI Benefit plates shown below are now available, and the FAI Challenge plate can be made ready in short order. Submit 55¢ per trophy desired, and then refund whatever postage cost it takes to deliver them; send orders to NIMAS, Box 545, Richardson, Tex. 75080.

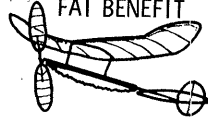
FAI BENEFIT



FAI BENEFIT



FAI BENEFIT



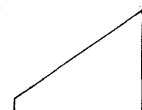
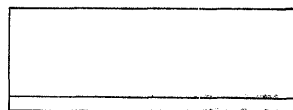
FAI CHALLENGE



1st PLACE

2nd PLACE

3rd PLACE



As an afterthought, it should be noted that benefit meets would not have to involve FAI models, nor would the contestants have to have FAI stamps unless they were trying to qualify for the Quarter Finals.

FAI INDOOR REPORT

Rules Correction

The Dec. '68 INAV listed pertinent parts of the FAI Sporting Code which will be enforced during the Team Selection Program. AMA HQ has informed INAV that the second paragraph of the steering rule beginning with "It is the responsibility" was deleted by unanimous vote of the 1967 CIAM meeting. For those with a copy of the Sporting Code, that is Sec. 3.4.7 "Steering of Model" that is affected.

Local Qualification Trials

The following Local Trials have been announced. If your area is not represented, contact the Area Coordinator listed below for more information. If you know of a any Trials now set up but not listed, please notify us at Box 545, Richardson, Texas 75080.

CALIFORNIA - San Diego. FAI Benefit meet & FAI Local, Feb. 1, 1969. Clarence Mather, 3880 Ecochee Ave., San Diego, ph. 273-9396.

OKLAHOMA - Tulsa. FAI Local Jan. 11-12, Feb. 8-9, 1969.

Bob Hanford, 3838 S. 88th E. Ave., Tulsa, NA 7-6932

MISSOURI - St. Louis. FAI Local, Feb. 23, 1969, East St. Louis Armory (Cat. I) Dick Hardcastle, 1616 Dearborn, St. Louis, YO 6-0037.

TEXAS - Dallas/Ft. Worth/Denton. FAI Benefit meet, HLG, Easy B, Rubber. Bud Tenny, Box 545, Richardson, Tex. 214-235-4035.

TEXAS - Houston. FAI Contest, Feb. 2, 1969, FAI Local, Mar. 16, 1969. Lars Giertz, 11703 N. Willow Circle, Houston, PA 3-6463.

VIRGINIA - Hampton. FAI Local Jan. 26, Mar. 1, April 5-6, 1969. Bob Champine, 360 Abingdon Cir., Hampton 23369.

Joe Bilgri
1255 Blackfield Dr.
Santa Clara, Cal. 95051

Jim Richmond
131 Pamela Dr.
Bensenville, Ill. 60106

Dick Ganslen
1204 Windsor
Denton, Tex. 76201

Bob Champine
360 Abingdon Circle
Hampton, Va. 23369

CONTEST CALENDAR

CALIFORNIA - San Diego. Indoor meet, HLG, Easy B, Indoor Stick. Feb. 1, 1969, Colina del Sol Auditorium, 54th & Orange St., 8 am to 5 pm. Clarence Mather, 3880 Ecochee Ave., San Diego, Cal. 92117. Practice flying same site Jan. 12, 1969.

INDIANA - West Lafayette. Purdue Aeromodelers plan a meet in February. Purdue Fieldhouse, 65' ceiling, 150' x 180' floor area. Chuck Borneman, 1401 W. Taylor, Kokomo, Ind. 46901, ph. 317-459-3656.

KANSAS - Olathe. HLG & Delta Dart contest at Olathe NAS Drill Hall. Feb. 15, 1969, 1 pm to 5 pm. Roger Schroeder 4111 West 98th St., Overland Park, Kansas.

MASSACHUSETTS - M.I.T. Indoor session at MIT Armory, 3 pm to 6:30 pm, Feb. 1, 1969. Contest Mar. 15, 1969. Ray Harlan, 15 Happy Hollow Rd., Wayland, Mass. 01778.

MARYLAND - Silver Spring. Indoor session at JFK High School, Jan. 17, 1969. School is at 1901 Randolph Rd., Silver Spring, Md. Bill Saunders, 11613 Le Baron Terrace, Silver Spring, Md. ph. 301-593-7196.

MISSOURI - St. Louis. Indoor sessions Jan. 17, Feb. 9; indoor contests Mar. 9 and April 7, 1969. Indoor Symposium Jan. 17, 1969. Jim Gremel, 8618 Jo Court, Berkeley, Mo. 63134 ph. 524-0884.

OKLAHOMA - Tulsa. Cat. I RT & contest Jan. 11-12, TGD 2nd Annual Indoor Contest Mar. 9 (?), 1969. Bob Hanford, 3838 South 88th E. Ave., Tulsa 74145 ph. NA 7-6932.

TEXAS - Dallas/Ft. Worth/Denton. FAI Benefit meet, HLG, Easy B, Indoor Rubber. Bud Tenny, Box 545, Richardson, Tex. 75080 ph. 214-235-4035.

TEXAS - Houston. Indoor sessions Jan. 12, Mar. 2, 1969 6 pm to 11 pm. Gene Simpson, 4327 McDermed Dr., Houston, Tex. 77035 ph. PA 3-8413.

RECORDS? MAYBE!

BRAINBUSTERS RECORD TRIALS, 12/28-29/68, Cat. I
Willis School, Hampton, Va. 20' 6" ceiling.
Open B Cabin - 8:09.2, Tom Vallee
Open B Stick - 17:13.5, Tom Vallee
Open FAI Cat. I FAI - 17:54.8, Hal Crane
Open AMA Cat. I FAI - 17:41.0, Hal Crane
Open D Stick - 17:21.4, Hal Crane
Open Helicopter - 6:55.9, Tom Vallee

STATE OF THE ART

Here is another composite plan - Stan Chilton's B/FAI model in two versions. For the basic model, check back to Dec. '67 INAV (Goldilox - 1967 version). From a 5% wing thickness and 50% CG, Stan has advanced to 100% CG and thicker airfoils as noted on the plan. Goldilox II was the version which set the 17:52 World Record (he held the record for three weeks) and held (until last week) the B Stick and both the FAI and AMA Cat. I FAI records. Goldilox III exceeded the B Stick and FAI Cat. I FAI records under somewhat poor conditions on Nov. 30, 1968, but with no sanction in force to qualify the 17:20 time. G-III is visibly better in the air, and the flaring prop looks much more efficient in flight. Stan's models are extremely well constructed, flawless and clean. These models are very well developed; perhaps the best developed B Stick design we have witnessed. Note that G-II set the records on rubber weighing 73% of the airframe weight - this is possible because the model will climb for about 9 minutes when launched with .12 inch-oz of torque - and probably flies level at .08 inch-oz, perhaps the lowest torque during level flight of any model of comparable size. The major departure of this model from normal practice is the reduced pitch near the prop hub. No one can explain just why such a prop should work, but Stan's props produce an improvement in performance on other models with no other changes.

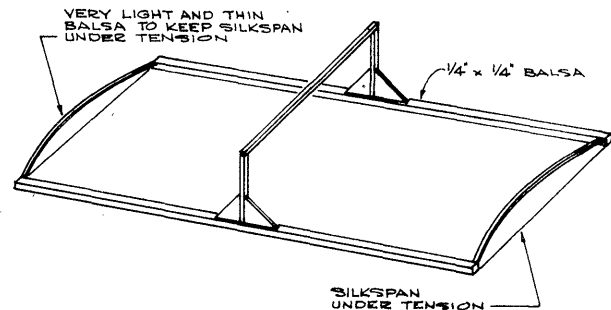
POSTAL CHALLENGERS

Pete Paterson, Jim Walters, Joe Deady and Herman Newkirk, members of the Boeing Hawks who joined en masse this month, offer a challenge for Cat. I Easy B and HLG to any clubs willing to take them on. Their sites are 20' and 23' high, and they will use standard NIMAS fudge factors.

HINTS AND KINKS

Kopecky Covering Frame

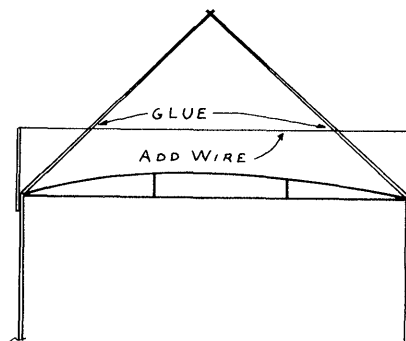
The sketch below amply covers the construction of this useful gadget by Ernie Kopecky. In use, the frame is covered by placing it directly on the storage hoop; the film can be caused to adhere to the frame either by water or by rubber cement (rubber cement is probably preferable). It is then placed over the surface to be covered. The wing or stab has previously been wet down to the board in typical Bilgri covering style. As the covering frame is lowered over the wing, the light balsa end strips permit the film to conform to the rib shape; thus giving a smooth covering job with little extra effort. Thanks to Jim Mills for drawing up this sketch.



KOPECKY COVERING FRAME

Weak Cabane?

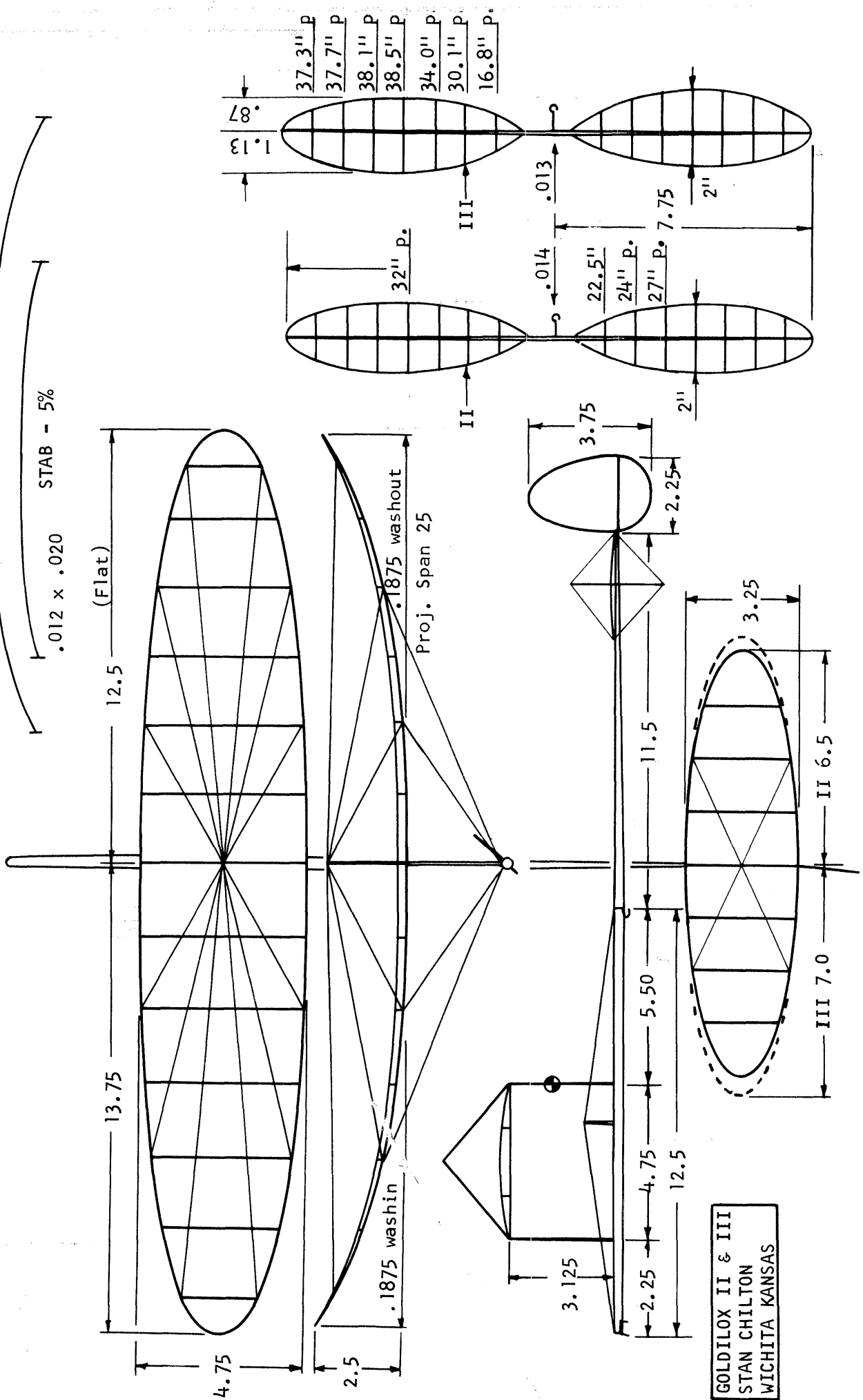
Hal Crane suggests that cabane bowing can be prevented by bracing it as shown in the sketch below. If you now use bracing with the short post extensions shown, all you need add is the wire!



WEIGHTS

Wing	.0066	<u>GOLDILOX II</u>	.0055	<u>GOLDILOX III</u>
Prop	.0036		.0036	
Stick + Tail	.012		.010	
Total	.022		.0191	
Rubber	.016		.0222	
Total	.0381		.0413	

PROP - 4% .014 x .020
WING - 6% .014 x .022
STAB - 5%
PROP - 4% .014 x .020
WING - 8% .014 x .022
STAB - 5%



GOLDILOX II & III
 STAN CHILTON
 WICHITA KANSAS

DESIGN FOOTNOTES

Constant Margin of Stability

Several months ago, a method of CG location was outlined. The method and discussion was based on Fig. 1 below, which came from an article by Hank Cole in Dec. '47 Air Trails. This graph has since become available in a metal plate for tool box use and is designated NIMAS Chart number III.

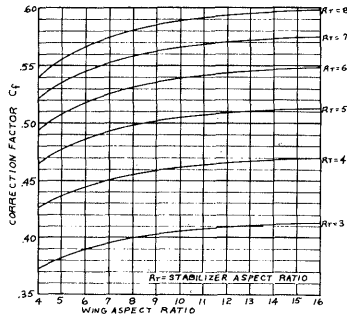
When this chart and discussion was printed, I had no experience in applying it to indoor. No doubt some of you suffered the same frustration as I did in applying this method to indoor models. The difficulty is that the chart assumes a fixed wing location, and ballast to locate the CG properly. Indoor models with wing location shifted to locate the CG properly force you to use a series of successive approximations - very tedious work.

So, why bother? The chart sets up a fixed margin of stability; different designs of similar weight adjusted to the same margin of stability fly in almost identical fashion. This is not necessarily true for models adjusted to have identical CG locations (such as 70% CG). To illustrate, consider two models of identical design but with different location of CG with respect to the thrust bearing. The model specs are: rectangular wing, 4" x 25" projected (100 sq. in., aspect ratio 6.25:1); stab, 2.8" x 12" (32.8 sq. in., A/R 4.3:1); 12" motor stick and 12" tail boom. In Fig. 2, Model A balances 6" from the nose, while model B balances 9" from the nose. Both models are assembled so the CG falls at 75%.

Let's figure the margin of stability on these models. Referring to Fig. 1 (Step 1) and Fig. 2, the tail moment of Model A is 17.9". C_p for both models (Fig. 1, Step 3) is .46. Computation of A.C. (aerodynamic center) for both models locates A.C. of model A 2.7" aft of the 25% chord; on model B the figure is 2.25". Both models have a 75% CG location; the margin of stability of A is $.7"/4" = 17.5%$, but on B the margin is $.25"/4" = 6.25%$. A 5% margin is about the most sensitive set-up which will fly well in average conditions, so model B is close to a critical adjustment and model A is too stable for best results.

As mentioned before, application of the principle of constant margin of stability is mathematically tedious. Fig. 3 illustrates a model (same design as A and B) with pertinent dimensions labelled to illustrate a graphical approach to constant stability margin. Tail moment arm will be $9.9" + 3" + Z$. For this example, let the margin of stability = 5%. Thus, dimension "M" is $.05 \times 4" = .2"$, for all models built to this design. Compute A.C. for $Z = 1"$ (A.C. = 2.10") and $Z = 6"$ (A.C. = 2.85").

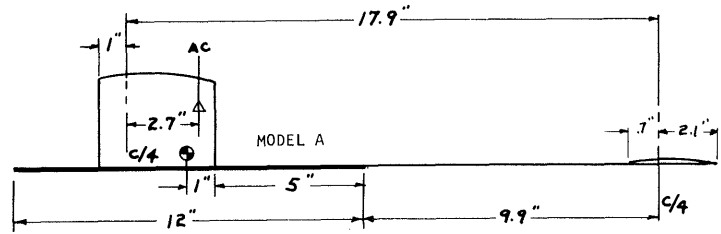
If $Z = 1"$, $Y = 11"$; for $Z = 6"$, $Y = 6"$. Referring to Fig. 3, for the case of $Z = 1"$, the CG will be 1.1" ahead of the wing TE. (AC is $3" - 2.10"$, or .9" ahead of the TE; $M = .2"$, so the CG is 1.1" from TE). Thus, since Y is 11", $X = 9.9"$. Similarly, for the case $Z = 6"$, $X = 5.65"$. Graph these two points (Fig. 4) and connect these points with a straight line. This line is the locus of all practical locations for the wing trailing edge, given the condition that the stability margin is 5% of the wing average chord. In the case of models with flying surfaces not rectangular, the graph is the locus of locations of the 100% average chord line, not the root chord.



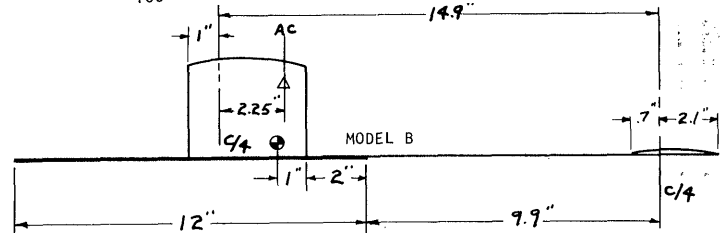
METHOD FOR DETERMINING POSITION OF C.G.
 STEP I Measure tail moment arm between 25% point on the average chord of wing and stab.
 AV. CHORD = Area/Spn
 STEP II Find Aspect Ratio of Wing and Stab
 Aspect Ratio = Spn/Av. Chord or Spn²/Area
 STEP III Find C_t from graph
 STEP IV Find distance from 25% point of wing to A. C.
 A.C. = $\frac{\text{tail moment}}{\text{wing area}} \times \text{Tail Mom. Arm} \times C_t$
 STEP V Locate C.G. 25% of average chord ahead of A.C.

FIG. 1

To summarize, compute the factors of Fig. 4, using a fixed stability margin. Balance the model, complete with prop and motor but minus wing, and measure distance X. Read Y from the graph and locate the wing TE accordingly. All models of similar size and weight, with the same margin of stability, will react to gusts and rafter-banging in very similar fashion. Constant stability margin is far more reliable for insuring good performance, in my opinion, than a specified CG location with regard to the wing.

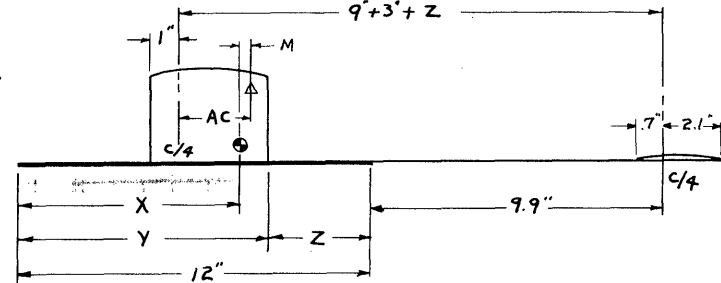


$AC = \frac{32.8}{100} \times 17.9 \times .46 = 2.7$ CG is .7" ← AC



$AC = \frac{32.8}{100} \times 14.9 \times .46 = 2.25$ CG is .25" ← AC

FIG. 2



$AC = \frac{32.8}{100} \times 13.9 \times .46 = 2.1$ ($Z = 1"$)

$AC = \frac{32.8}{100} \times 18.9 \times .46 = 2.85$ ($Z = 6"$)

FIG. 3

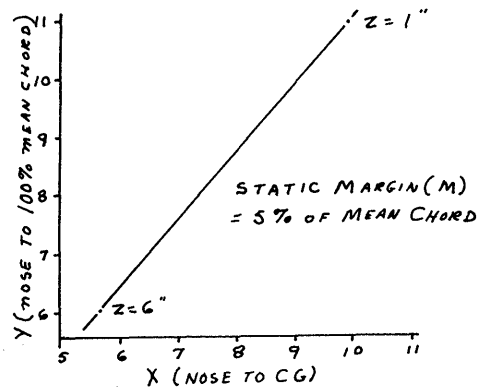
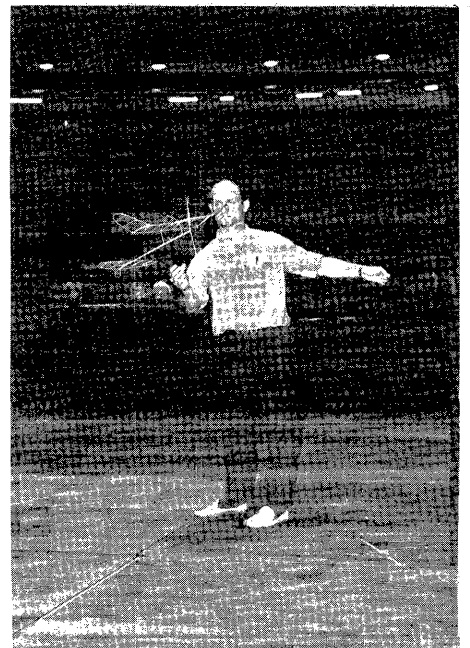
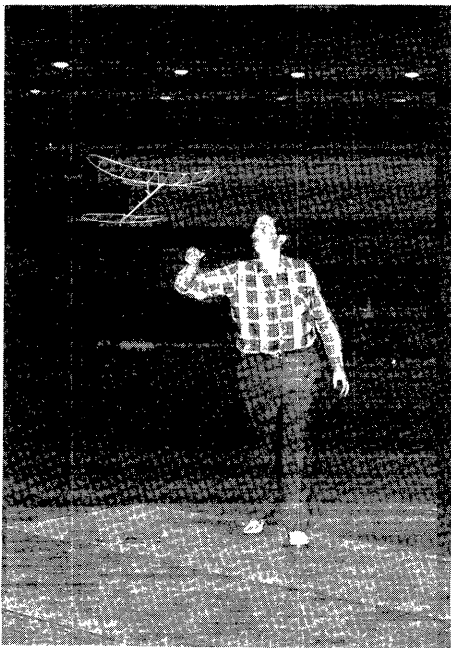
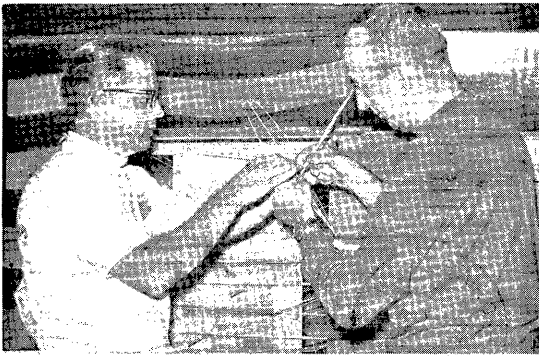
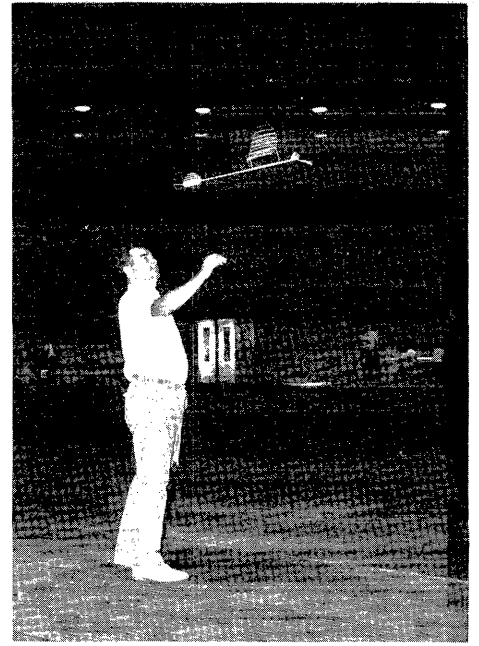
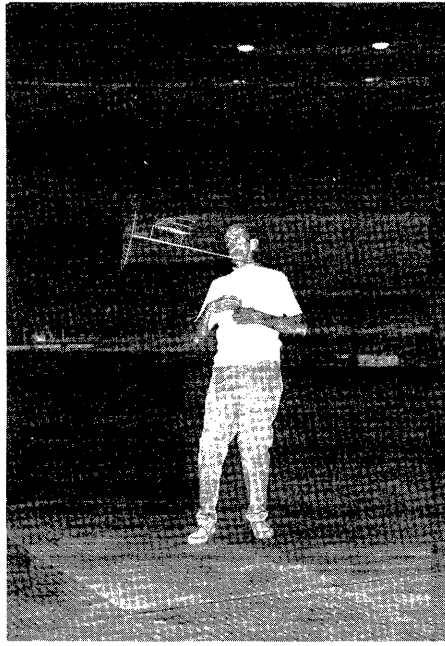


FIG. 4

ROME - THE PICTURE STORY

The pictures on page 5 were made available by Jim Richmond (pictures taken by a member of the Italian Aero Club) and by Eduard Chlubny of Czechoslovakia.

Top Row: Gunter Maibaum & Werner Wetzel (Germany); Clarence Mather; Gabriel Leopold (Yugoslavia).
 Middle: Al Rohrbaugh (US) and Egizio Corazza (Italy); the Czech team - Jiri Sitar, Jiri Kalina, Eduard Chlubny.
 Bottom: Hans Beck (Germany); Teodor Strasberger and Gabriel Leopold (Yugo); Manfred Koller (Austria).



INDOOR

NEWS and VIEWS

\$2/ YEAR NIMAS DUES \$1/YR ADDITIONAL

****NATIONAL INDOOR MODEL AIRPLANE SOCIETY****

New Members!

H. T. ADAMS, JR., P. O. Box 491, Rome Ga. 30161
 BERNIE BISHOP, 2706 Park Dr., Parma 34, Ohio
 VICTOR R. BOSWELL, 98 Ridge Rd., Greenbelt, Md. 20770
 CHUCK BROADHURST, 3818 El Ricon Way, Sacramento, Cal.
 95825
 GENE MENEGHINI, 1214 E. 169th St., Cleveland, O. 44110
 ELBERT MINTER, 2317 Calumet Ave., NE, Decatur, Ga. 35601
 CHARLES PETREVAN, 257 Ridgeroad Rd., Rochester, N.Y. 14626
 RICHARD F. SCHENZ, 5010 Hillridge Way, Fair Oaks, Cal.
 95628
 ALAN SZABO, 6499 Duval Rd., Mayfield Hts., O. 44124
 DON TEEPLES, 6207 Forest Mill Lane, Laurel, Md. 20810
 LEE WEBSTER, 1000 Sycamore, Manchester, Tenn. 37355

Family Memberships

BRIAN WEBSTER, 1000 Sycamore, Manchester, Tenn. 37355

Special Action Committee

In recent months, comments by NIMAS members indicated a need for material to help beginners (mostly Juniors) to get started in indoor flying. An action committee has been formed to address this problem. Possible products of this committee could take the form of group projects, new models and designs of graded skills, an instruction booklet, or combinations of these.

The committee needs help of all kinds - ideas, plans (drafting of plans), art work, photos, printing and/or duplication - you name it! If you can help, drop a note telling what you can do to: Roger Schroeder, 4111 W. 98th St., Overland Park, Kan. 66207 or Box 545, Richardson, Texas 75080.

Extra NIMAS Services

Those who have joined NIMAS in the past couple of years have received a sheet listing NIMAS services - NIMAS AWARDS and Certificates, free dacron, indoor films, etc. To the list you can add prop design charts (designed by the Velocity Focusing method outlined in March and May '68 INAV's), layout sheets for VF prop design, and calculation sheets for stability margin calculation (see Jan. 1969 INAV for details of stability margin). If you are interested, drop a line to Box 545, Richardson, Tex. 75080.

Dick Black Memorials

The Dick Black Memorial lectures have been started on their rounds - please make reservations early. Individual fliers are requested to return the lectures after two days if possible; clubs and groups are allowed five days and a reasonable effort will be made to bracket club meeting times. The only cost is to reimburse NIMAS for the postage costs incurred.

Meanwhile, many color slides are needed for future Memorial series; if you have proper equipment, please shoot sequential slides on any of the following topics:

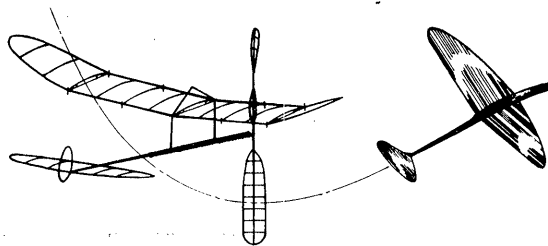
1. Covering and patching with microfilm and paper.
2. Bending and installing hardware on models.
3. Construction techniques - building framework, rolling tissue sockets, rolling tubes and booms, model assembly and balance, wire bracing, etc.
4. Model packaging for storage and transport.
5. Prop construction and prop jig construction.
6. Rubber stripping and methods of winding motors on and off the model; use of torque meters.

NIMAS Awards

Silver Cat. I HLG Award - 0:29.0, Tom Peardon

Gold Cat. I HLG Award - 0:34.5, Tom Peardon

Diamond Cat. I HLG Award - 0:36.1, Tom Peardon



Editor: Bud Tenny · Box 545 · Richardson, Texas · 75080

NIMAS Aces

Tom Peardon is the latest NIMAS Ace, based on the times shown above. He is the fifteenth NIMAS member to attain Ace, but only the fifth HLG Ace.

More Steering Poles!

After the announcement last month about telescoping fiberglass fishing poles (they are excellent FAI steering poles) available from Sears, Roebuck & Co., Tom Vallee noted that these are available in 12', 16' and 20' length, with prices from \$6.88 to \$9.88.

Rubber Winder?

Elbert Minter (new member this month) saw a winder at the Nats that he liked - can anyone give him information on how to get one? It was yellow plastic with crank on the side and winding hook coming out one end. Help!

Contest Results?

Many of you have sent in results from contests that had been announced in Contest Calendar. Please don't stop sending in this material - I try to find room for it, but it sometimes gets crowded out. Also, if those readers who really like contest results in INAV will drop a line, this will help me set space priorities. I can't give you what you like without knowing what it is!

Indoor Scale Sheet

Bill Hannan, P. O. Box 1596, Escondido, Cal. 92025 has excellent indoor scale instruction sheets, covering trim, balance and flying hints. He has offered a special price to NIMAS members - only 25%. It is a good buy!

FAI Benefit Meet

The Dallas/Ft. Worth/Denton FAI Benefit meet raised \$12 for the Inboard Travel Fund. This really is an effective way to raise the money - let's get with it! Any award system is OK, but the NIMAS trophies detailed in Jan. '69 INAV were well received.

FAI INDOOR REPORT

Qualification Trial Results

TULSA GLUE DOBBERS LOCAL TRIALS - Jan. 11, 1969
 Four qualifiers:

Bobby Dunham	10:04	8:35	18:39
Jim Gardner	8:02	10:09	18:11
Bob Dunham	8:25	9:23	17:48
Bobby Hanford	6:42	7:21	14:03

Team Selection Trials Schedule

CALIFORNIA - San Francisco. FAI Local, Mar. 1-2, 1969, Cow Palace. Bud Romak, 85 Sullivan Dr., Moraga, Cal. 94556. Flying session Feb. 9, 1969 beginning 10 am.

MISSOURI - St. Louis. FAI Local, Feb. 23, 1969, East St. Louis Armory (Cat. I). Dick Hardcastle, 7319 Wise Ave. St. Louis, Mo. 63117, ph. YO 6-0027.

TEXAS - Houston. FAI Local, Mar. 16, 1969. Lars Giertz, 11703 N. Willow Circle, Houston, Tex., ph. PA 3-6463.

VIRGINIA - Hampton. FAI Local Mar. 1, April 5-6, 1969. Bob Champine, 360 Abingdon Cir. Hampton, Va. 23369

CONTEST CALENDAR

INDIANA - West Lafayette. Purdue Aeromodelers Indoor Contest; tentative date March 9, 1969, 9 am to 4:30 pm. HLG, Scale, Easy B and Indoor Stick. Bob Fish, c/o Purdue Memorial Union, West Lafayette, Indiana.

KANSAS - Olathe. HLG & Delta Dart contest at Olathe NAS Drill Hall. Feb. 15, 1969, 1 pm to 5 pm. Roger Schroeder 4111 West 98th St., Overland Park, Kan. 66207

MARYLAND - Silver Spring. Indoor sessions at JFK High School, 1901 Randolph Rd., Silver Spring. Feb. 14, 28; Mar. 14, 28; Apr. 18; May 1, 16; June 6, 13 1969. Bill Saunders, 11613 Le Baron Terr., Silver Spring, Md. 20902, ph. 301-593-7196.

MASSACHUSETTS - M.I.T. Indoor contest at MIT Armory, Mar. 15, 1969. Ray Harlan, 15 Happy Hollow Rd., Wayland, Mass. 01778.

MISSOURI - St. Louis. Indoor session Feb. 9, indoor contest Mar. 9, 1969. Jim Gremel, 8618 Jo Court, Berkeley, Mo. 63134 ph. 524-0884. Indoor contest April 20, 1969, Dave Linstrum, 12411 Leigh Lane, Maryland Hts, Mo. 63042 ph. 314-434-8894. Events both contests: Easy B, Indoor Stick, Scale, HLG.

OKLAHOMA - Tulsa. TGD 2nd Annual Indoor Contest Mar. 9, 1969, 9 am to 5 pm; ANG Hangar. HLG, Easy B, Scale, Paper Stick, Indoor Stick. TGD Annual (AAA meet) will have indoor events, July 4-5, 1969. Bob Hanford, 3838 South 88th E. Ave., Tulsa, Okla. 74145 ph. NA 7-6932.

TENNESSEE - Manchester. Second Annual Airfoiler Indoor Meet, March 16, 1969. Manchester High School Gym, 8 am to 5 pm. Events: HLG, Scale, Paper Stick, Indoor Stick. Lee F. Webster, 1000 Sycamore, Manchester, Tenn. 37355, phone 615-728-3283.

TEXAS - Dallas/Ft Worth/Denton. North Texas Annual Indoor Meet, Feb. 23, 1969 9:30 am to 5:30 pm. Events: HLG Indoor Stick, Easy B (Jr. only), Sub. Jr. HLG. Bud Tenny, Box 545, Richardson, Tex. 75080 ph. 214-235-4035.

TEXAS - Houston. Indoor session Mar. 2, 1969 6 pm to 11 pm. Gene Simpson, 4327 McDermed, Houston, Tex. 77035, ph. PA 3-8413.

WISCONSIN - Milwaukee. Indoor sessions each Thursday 7:30 pm to 9:30 pm at Sherman Social Center, North 51st St. and W. Locust St. Ken Kraemer, 3945 N. 41st St., Milwaukee, Wisc. 53216

NIMAS POSTAL MEET

The 4th Annual NIMAS Postal will be held during Feb. and March, with entries to be postmarked by Mar. 31, 1969.

Events: Easy B, paper covered only, AMA Rules otherwise.

HLG - AMA Rules except two ceiling classes - 18' to 25' and 25' to 35'

Indoor Stick - AMA Rules except use FAI ceiling measure to compute fudge factor.

General Rules: Entry fee 15¢ per event, stamps preferred. Separate events may be flown at different sessions, but all flights for given event must be flown at one session. Please note ceiling height with each entry - it will be used to figure fudge factors, with standard NIMAS fudge factors. Separate class for Juniors in all events, with awards for high placing Seniors. Separate class for Sub-Junior (age 12 and under) in HLG. Entry open to all, no need to be NIMAS member!

POSTAL CONTESTS!

Tom Vallee issued a postal challenge to fliers at the Denton contest on Jan. 25, with these results:

Name	FAI	Paper	Stick
Tom Vallee	13:00 + 17:13 = 30:13	10:46	17:13
Stan Chilton		12:07	15:10
Bud Tenny	9:07 + 9:35 = 18:42	9:35	
Dick Ganslen		8:24	

DESIGN FOOTNOTES

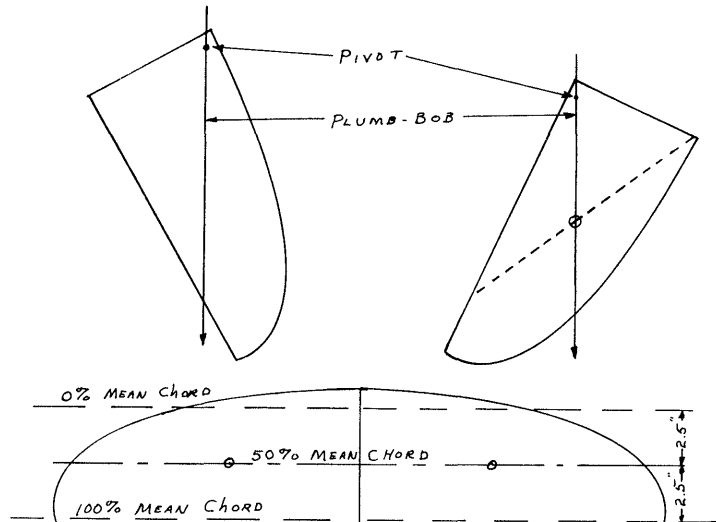
Constant Margin of Stability - Follow-Up

A couple of questions have come up about the presentation on stability margin in the Jan. '69 INAV. The graph shown in Fig. 4 is drawn from the computed values of X (distance from nose to CG) and Y (distance from nose to 100% mean chord) for each model design. That is, you make a graph for the given model design and stability margin, then all models built to that design can be balanced from the one graph. By the way, a different stability margin can be recorded on the same graph; it will be a line that is parallel to the first line and displaced to one side.

The matter of mean chord should be explained further, since the example shown was a constant chord wing for simplicity. The method shown below is sufficiently accur-

ate for the purpose and is simple. It will work for any shape of surface, and for assymetrical (offset) wings.

Make a scale drawing of the surface on thin cardboard, cut it out, and cut it in half. Pivot each piece on a pin at two different places and use a plumb-bob and thread to draw a vertical line across the outline. The intersection of the two lines locates the CG of each piece (centroid of the area). If the two pieces are then re-assembled and a line is drawn between the two centroids, this line is 50% of the mean chord. To locate the 0% and 100% lines, compute the mean chord. For the example shown, the root chord is 6" and the span (flat) is 27". Since the outline is a parabolic development, the area is span x root chord x .833 (see Jan '67 INAV or p. 206 in the 1959 Zaic YB). The area is then 134.5 sq. in. and the mean chord (area divided by span) is 5". The 0% and 100% lines can now be drawn in equidistant from the 50% line, and the stability margin graph can be constructed.



STATE OF THE ART

The model of the month is Dick Ganslen's 1967 Great Lakes Paper Stick winner. The winning time of 16:40 has not been exceeded in subsequent meets, in either paper or microfilm events. The model is mostly straightforward in concept and construction, except for the modified prop block and large amount of stick bowing. The last is a tricky technique - hard to master, but often effective.

PIRELLI LORE

The material presented below is excerpted from a report of his rubber test methods by George Zenakis, noted Wakefield flier and member of both the 1969 Wakefield and Nordic teams. It does not bear directly on Pirelli usage for indoor flying, except to determine the ultimate energy release of the rubber. In other words, the actual shape of the torque curve is also a major determining factor in proper rubber usage for indoor, and the energy release is not directly related to the torque curve in any way that we now understand. The report:

To measure the energy output of the rubber, I load all motors to the same value of force per unit of unbroken-in cross section area. This is the same (assuming that all motors are equal weight, as in normal wakefield practice - Ed.) as using a constant value of force times the unbroken-in length. The force is $F \times l = 150$, where F is maximum pull force and l is unbroken-in length in feet. Typically, the maximum force for a ten strand motor is 65 to 75 lbs.

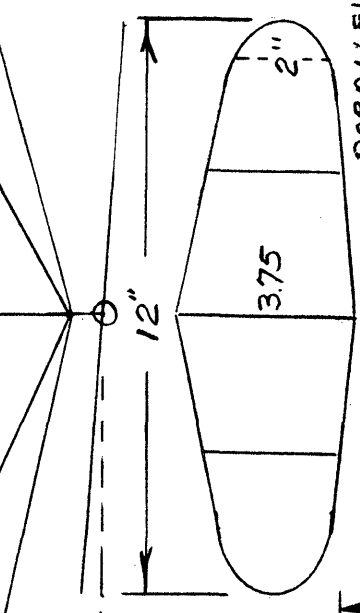
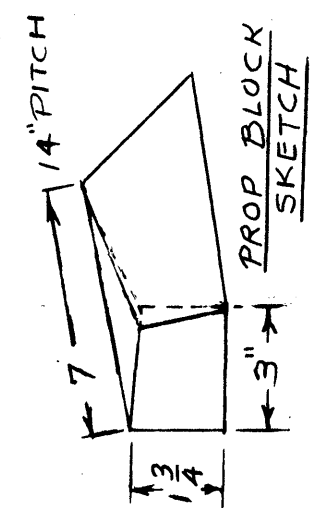
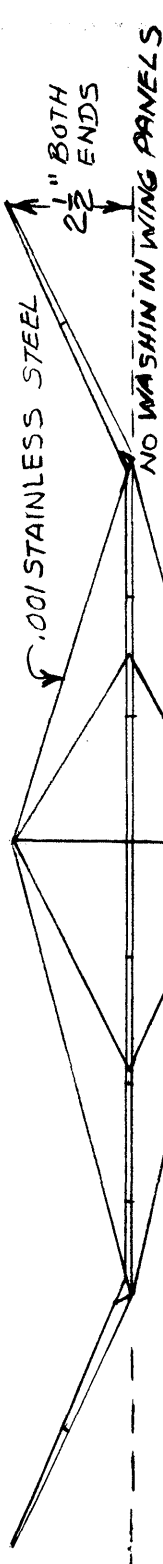
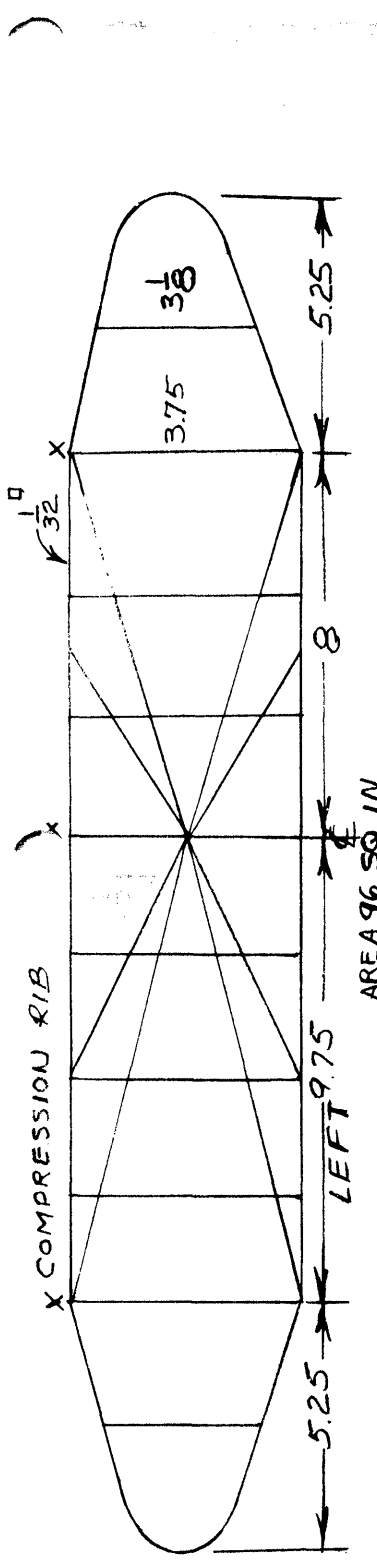
The energy measurement is made by pulling the motor to the required maximum force, then relaxing it slowly. A recording of force vs. elongation is made as the motor is relaxed, with the recording being made on a friction wheel disc integrator. This gadget gives the answer on a three digit counter; this count is proportional to the area under the force vs. elongation curve.

By applying the proper factors for spring constant, integrator wheel size, etc., the three digit count can be converted directly to ft. lbs./lb., and the repeatability of the rig is quite good.

Some results obtained by George: so long as none of a skein of rubber has not been damaged (nicks or cuts, or chemical damage such as exposure to sunlight), the entire skein will test at the same energy regardless of varying cross section. (Remember, testing is on basis of weight.) That is, the rubber quality is uniform throughout.

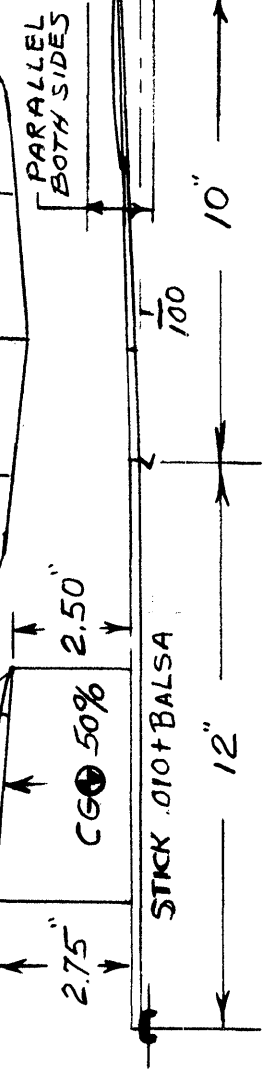
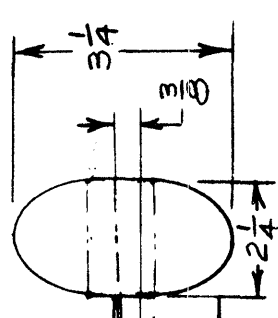
Feb 69

6" RADIUS ARC

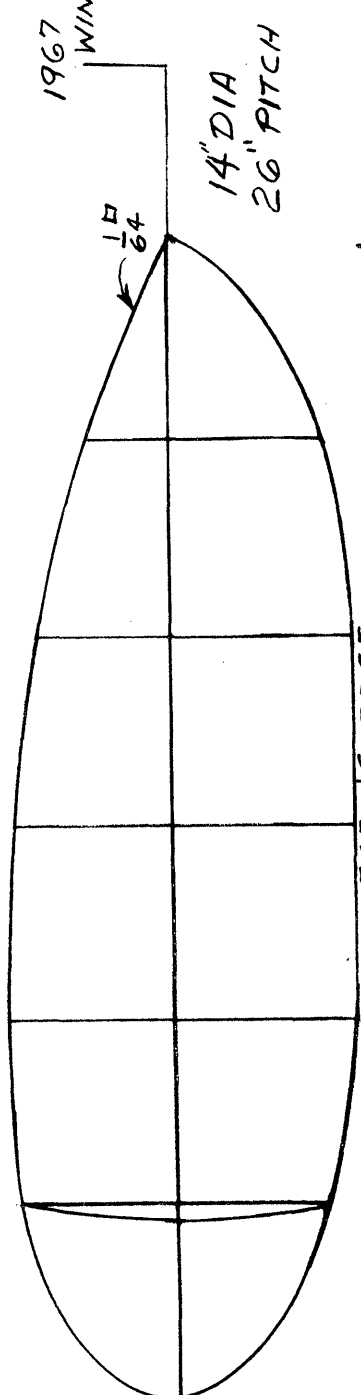


THERMAL HUGGER
BY
DICK GANSLER
DENTON, TEXAS

WING - .0260
STICK - .0120
TAIL }
BOOM } : 0095
PROP - .0090
TOTAL = .0571



GREAT LAKES INDOOR MEET
PAPER STICK
16 MIN. 40 SECONDS
1967 WINNER
.070 RUBBER 1940 TURNS
RUBBER WEIGHT .062
STICK FLEXES UNDER FULL
TURNS - SUBSTANTIALLY
CEILING 80 FEET



1967 WINNER
14" DIA
26" PITCH
LEADING EDGE PROP BLOCK CUT 1/4 INCH ON HUB END (SEE SKETCH)

BY E.M.H. 8/30/68

Repeated testing of motors (up to three tests) show no evidence of fatigue, with the same energy release from any motor under repeated tests. No difference is noted between tests conducted right after break-in and those made after several days of rest.

George has found no correlation between energy release and torque output or turns capability. That is, very good rubber can be quite stretchy (high turns capability) or have high torque.

MICROFILM TECHNIQUES

Optimum Pouring Conditions

Past commentary in these pages has referred to the uncertain nature of microfilm pouring - that it was almost a case of "black magic" when you got good results. It has been possible to isolate at least two factors responsible for inconsistent results, and my own pouring sessions have been happier since. These two factors are atmospheric pressure and relative humidity, with atmospheric pressure the most important. For my location, just under 1000 feet altitude, the atmospheric pressure (local pressure, not altimeter setting) needs to be about 29.50 inches of mercury or higher. For that pressure, the relative humidity should be 50% or lower. Tonight, I had beautiful results at 29.73 in. Hg. and 65% R. H.

Atmospheric pressure can be checked by calling the local airport or weather bureau and converting this to your own local pressure if you know what altitude you live at. The correction is approximately .115 in. Hg. per 100 feet of altitude above sea level (subtract .115).

Relative humidity can be checked by the wet bulb-dry bulb method. Get two inexpensive thermometers which read alike and close to the right temperature. Mount both so you can place them in the slipstream of an electric fan, and arrange a wick of soft absorbent cloth over one bulb and dipped in a reservoir of water. The water evaporates and cools the thermometer in proportion to the relative humidity. The chart below is arranged so you can read the difference between the two thermometers and convert this to relative humidity.

TABLE OF RELATIVE HUMIDITY - MEASURING MOISTURE								
Difference between wet-bulb and dry-bulb readings	Temperature of air, dry-bulb thermometer, Fahrenheit							
	30°	40°	50°	60°	70°	80°	90°	100°
1	90	92	93	94	95	96	96	97
2	79	84	87	89	90	92	92	93
3	68	76	80	84	86	87	88	90
4	58	68	74	78	81	83	85	86
6	38	52	61	68	72	75	78	80
8	18	37	49	58	64	68	71	71
10		22	37	48	55	61	65	68
12		8	26	39	48	54	59	62
14			16	30	40	47	53	57
16			5	21	33	41	47	51
18				13	26	35	41	47
20					5	19	29	36
22						12	23	32
24						6	18	26

Comparison of readings on the wet-bulb thermometer with those on a dry-bulb thermometer will show relative humidity by using this table. Top figures on the chart are the present dry-bulb reading. By checking the left column for degree difference shown on your two thermometers and across to the dry-bulb reading, you will find the relative humidity.
For instance, if the difference between dry- and wet-bulb thermometers is 6 degrees, and the dry bulb reads 70 degrees, the RH is 72.

A LOOK AT YESTERYEAR

Where Are They?

Ed Franklin, a long-term NIMAS member, asks if some of the East Coast old-timers are still around. For example, those who flew in the New York City Armories back in 1931 and 1932? How about former members of Gimbel's J.A.L.? And those from Stein's Sky Cadets (Ben Shereshaw was leader of this group)? If any of you know of any of these men and their present whereabouts, drop Ed a line at 226 Harrington St., Bergenfield, N. J. 07621.

HINTS AND KINKS

One of the major drawbacks to the prop jig type shown below in Fig. 1 is the difficulty of cutting accurate triangles. No matter how you run the wood grain, you always have one cut across grain that must be accurate. The easy way is to assemble the station from two pieces of 3/32" x 1/2" balsa, as shown in Fig. 2. Except for glue drying time, this method is much quicker; it is far more accurate than cutting wood to the right angle.

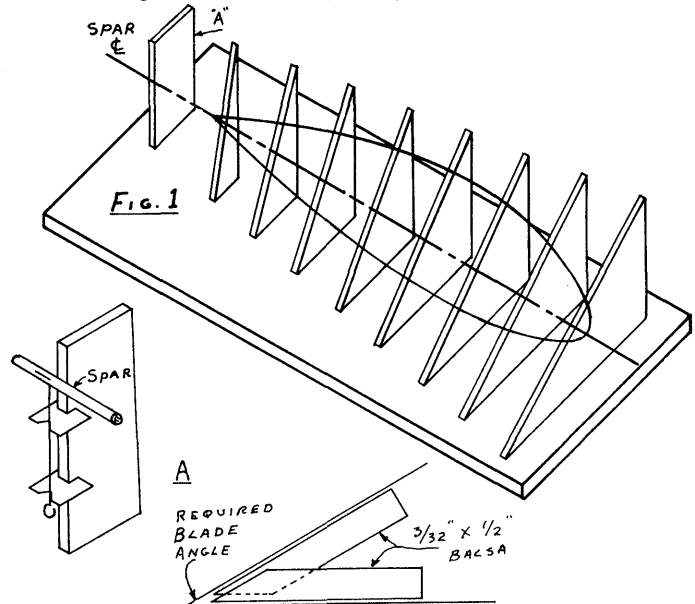


FIG. 2

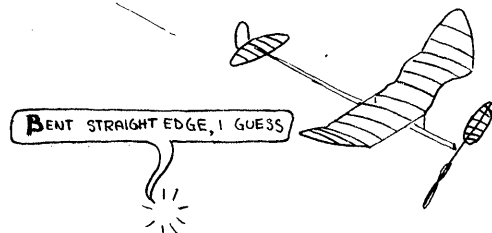
INDOOR ELSEWHERE

Czechoslovakia

My thanks to Dagmar and Eduard Chlubny for this information about Czechoslovakian indoor activity. Indoor flying began in Czechoslovakia in 1950-51 as a winter sport, with a lapse until 1955-56 when it began again. It has been a year-round activity since 1964. At first, times were around 5 to 8 minutes, improving to 11 minutes average in 1964. Eduard set a national record of 16:38 in 1964, with a typical model for that time: outdoor balsa frame, reed motor stick and balsa or human hair bracing. Dagmar's model for Debrecen (1966 W/Ch) was her first with rolled balsa motor stick, as indoor balsa first began to be available.

Prior to Debrecen, indoor information was scarce and limited to early issues of MAN plus sketches of winners from 1961 and 1962 W/Ch. Since Debrecen, INAV has been available, thanks to donations by many NIMAS members.

Team selection in Czechoslovakia is done by totalling scores from three national meets. In previous years, all these meets were in the big hall in Brno, and each flier was scored on the basis of the best two scores from the 3 meets. This year, one meet was held in the 12 m site in Ostrava, and the fliers scores based on a percentage of the winning times from each meet. The team for 1969 will be Jiri Kalina, Karol Rybecky and Eduard Chlubny, with Weigert as alternate.

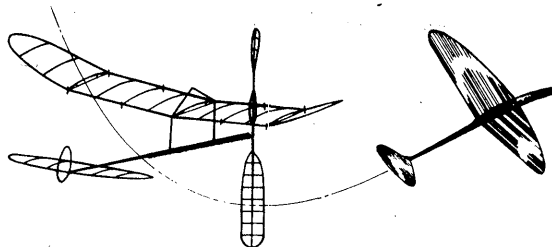


INDOOR

NEWS and VIEWS

\$2/ YEAR NIMAS DUES \$1/YR ADDITIONAL

Editor: Bud Tenny · Box 545 · Richardson, Texas · 75080



****NATIONAL INDOOR MODEL AIRPLANE SOCIETY****

New Members!

ROGER J. BEHRA, 257 E. 156th St. #302, Cleveland, O. 44110
 JOHN M. HOPPER, 23rd & S. Commerce, Russellville, Ark. 72801
 CARL O. JAEGER, 415 Moore Ave., Miamisburg, O. 45342
 DAVE RIGOTTI, 1451 Commonwealth, Cleveland, O. 44124
 GORDON WISNIEWSKI, 1801 S. 2nd St., Milwaukee, Wisc. 53204

Family Memberships

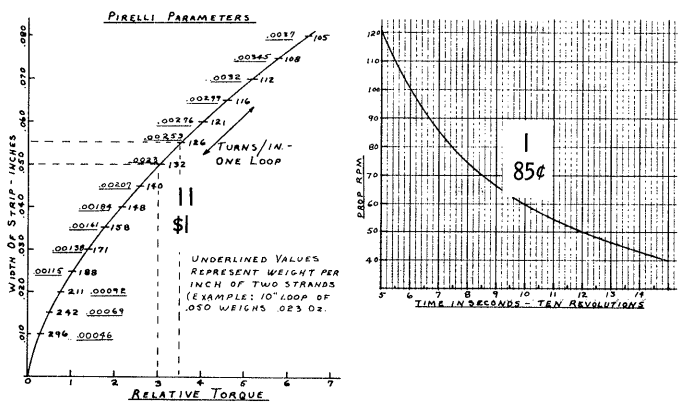
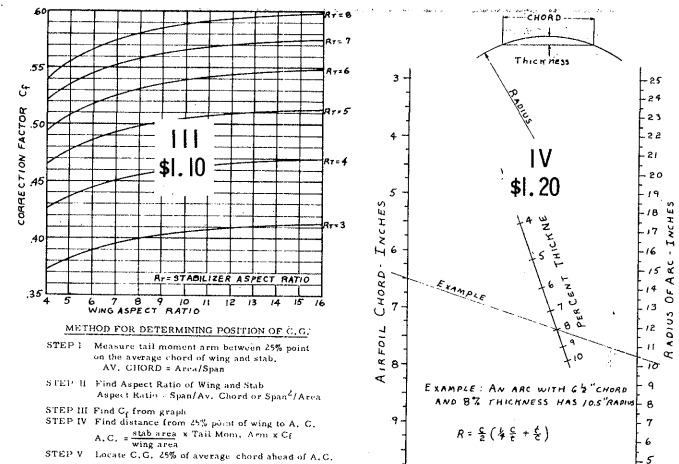
JOE R. MINTER, 2317 Calumet Ave. SE, Decatur, Ala. 35601

Goofs!

Elbert Minter's address was listed as Decatur, Ga. in the Feb. '64 issue - the address should have been Decatur, Ala. 35601 - a typographical error - and the date would have been 1969 except that the 9 came unglued!

NIMAS Charts

All of the original group of NIMAS Charts have finally been delivered and more are prepared for immediate delivery. The material covered by the charts is reproduced below about 2/3 normal size. Order by the number shown, for the price shown. For those who didn't see the original announcement, the charts are permanent aluminum, suitable for tool box use.



Change of Address!

Ron Ganser asks his friends to note that he has moved to 1745 Brett St., Pittsburgh, Pa. 15205.

Two Day Indoor Nats!

The 1969 Indoor Nats will be held at Lakehurst on July 14 and 15, 1969; Indoor Rubber (paper, mike and cabin) on July 14 and Indoor HLG and Indoor Scale on July 15. When the hangar was found to be available both days, it became possible for Indoor Scale to be made an official event. It should be noted now that this is not likely to be the case often (perhaps never again), and that each event will probably have to support itself in terms of manpower for timing. This likely will take the form of "time a flight, then fly a flight", and will require cooperation from all contestants.

NIMAS Awards

- Silver Cat. I HLG Award - 0:29.5, John Thornhill
- Silver Cat. I HLG Award - 0:29.0, Don Teeples
- Gold Cat. I HLG Award - 0:33.8, John Thornhill
- Gold Cat. I HLG Award - 0:35.9, Don Teeples
- Gold Cat. I HLG Award - 0:35.6, Dan Belieff
- Diamond Cat. I HLG Award - 0:36.8, Don Teeples
- Diamond Cat. I HLG Award - 0:39.6, Dan Belieff

NIMAS Aces

As shown above, Don Teeples has qualified as Cat. I HLG Ace with the times given, while Dan Belieff stacked both Gold and Diamond times on top his previous Silver to complete Cat. I Ace and become the third Double Ace in the history of NIMAS.

FAI Benefit Meet

The Brainbusters of Hampton, Va. are the latest club to hold a Benefit Meet to raise money for the Inboard Travel Fund - their March 1 FAI Local raised \$4 to help with Team travel expenses. Meanwhile, the Dixie Maxers of the Atlanta area will hold a raffle this month with the proceeds to benefit the Travel Fund. This idea of benefit events is excellent - our past Teams have done very well, both competitively and as good will ambassadors to our friends in Europe. They deserve our strong support, both in spirit and financially.

FAI INDOOR REPORT

Qualifiers Via Contests

Name	Meet/Date	Time/Winning Time	%
STAN CHILTON	Denton/Jan. 25	15:10/15:10	100
JIM CLEM	Denton/Mar. 2	10:38/10:38	100
KRISTI TENNY	Denton/Mar. 2	10:58/6:54	63

Qualification Trial Results

ST. LOUIS LOCAL QUAL. TRIAL (McDonnell FF Club)	Time	Time	Time
Paul Tryon	10:05	11:03	21:08
Tony Schott	11:14	8:43	19:57
Dave Linstrum	6:38	7:46	14:24
Richard Hardcastle	7:16	6:54	14:10
Nan Tryon	6:35	6:38	
1st BRAINBUSTERS LOCAL QUAL. TRIAL (Hampton, Va.)			
Hal Crane	11:03	12:16	23:19
Bob Platt	10:07	8:40	18:47
Bob Champine	9:06	8:43	17:49
Hewitt Phillips	6:08	8:09	14:17
COW PALACE LOCAL QUAL. TRIALS, San Francisco			
Carl Rambo	19:28	25:52	45:20
Bud Romak	21:49	23:25	45:14
Bob Randolph	22:08	19:07	41:15
Warren Williams	18:12	20:04	38:16
Joe Bilgri	18:20	17:31	35:51
Bill Gibbs	14:42	14:18	29:00

Team Selection Trials Schedule

NEW JERSEY - Irvington. FAI Local, April 15, 1969. Ernie Kopecky, 38 Fawn Lane, Watchung, N. J. 07060.

NEW JERSEY - Lakehurst. The following dates have been set pending Navy approval: April 27, 1969 - FAI Local; May 25, 1969 - Quarter Final; June 29, 1969 - Semi-Final. Chester Wrzos, 184 Oak St., East Orange, N.J. ph. 673-7951.

TEXAS - Dallas/Ft. Worth/Denton. FAI Local, Mar. 22, 1969 Dick Ganslen, 1204 Windsor, Denton, Tex. 817-387-1969. Special note: The floor in the ballroom will be freshly refinished - rubber-soled shoes are a must!

Special Note To CD's

Clarence Mather has requested that all CD's of all FAI Team Selection Trials send him a copy of the results with addresses of the qualifiers, so he may contact them any time it is necessary. His address is 3880 Ecochee Ave., San Diego, Cal. 92117, ph. 273-9396.

In the interests of better communication, will all CD's please send word of planned Qual. Trials to Box 545, Richardson, Texas 75080.

Special Note To Contestants

If there is the slightest doubt of whether there will be a Local Qual. Trials in your area, you should enter the program by sending \$3 to AMA HQ to get the program entry forms. You will then be able to qualify at any indoor meet if you fly a model of 65 cm span or less and make at least 60% of the winning time in that event.

CONTEST CALENDAR

ILLINOIS - Chicago. Pete Sotich has announced sessions at the Washington Park Armory in Chicago on Saturday from 9 am to 5 pm. HLG flying is held from 9 am to 12 noon and 4 pm to 5 pm, while indoor rubber is scheduled from noon to 4 pm. This scheduling is contingent upon Nat'l Guard drill schedules; phone the Armory at 312-752-9006 or 312-752-9795 and check before driving to the Armory.

MARYLAND - Silver Spring. Indoor sessions at JFK High School, 1901 Randolph Rd., Silver Spring. Mar. 14, 28; Apr. 18; May 1, 16; June 6, 13, 1969. Bill Saunders, 11613 Le Baron Terr., Silver Spring, 20902, ph. 301-593-7196.

MARYLAND - Ft. Meade. Class AA Indoor meet by D.C. Maxecutors and Ft. Meade Modlers, Cat. I (34.5' ceiling). Ft. Meade Field House, 9 am to 5 pm. HLG, Easy B, Indoor Stick, Scale, plus special Sub-Jr event - Delta Dart.

MASSACHUSETTS - M. I. T. Indoor contest at MIT Armory, Mar. 15, 1969. Ray Harlan, 15 Happy Hollow Rd., Wayland, Mass. 01778.

MISSOURI - St. Louis. Indoor contest Apr. 20, 1969. Dave Linstrum, 12411 Leigh Lane, Maryland Hts., Mo. 63042, ph. 314-434-8894. Easy B, Indoor Stick, Scale, HLG.

NEW JERSEY - Irvington. Indoor sessions at Madison Ave. Elem. School, Mar. 18, 25; Apr. 1, 15, 29; May 6, 13; 17' ceiling. Chester Wrzos, 184 Oak St., East Orange, N. J. 07018, ph. 673-7951.

OKLAHOMA - Tulsa. Record Trials Apr. 12-13, 1969. TGD Annual (AAA Meet) will have indoor events July 4-5, 1969. Bob Hanford, 3838 South 88th E. Ave., Tulsa, Okla. 74145, ph. NA 7-6932

PENNSYLVANIA - Pittsburgh. Invitational Indoor Fun Fly, Mar. 16, 1969, 10:30 am to 4:30 pm, Soldiers & Sailors Hall, Fifth Ave. at Oakland. Easy B, HLG, Delta Dart, Scale. Jim Hanst, Box 421, Valencia, Pa. ph. 443-6064 or Paul Kastory, 132 Bronx Ave., Pittsburgh, Pa. 15229, ph. 761-8730.

PENNSYLVANIA - Pittsburgh. Fifth Annual Indoor Air Meet, April 12-13, 1969. Regular indoor events on Saturday, and the special Junior events on Sunday. Ron Ganser, 1745 Brett St., Pittsburgh, Pa. 15205.

TENNESSEE - Manchester. Second Annual Airfoiler Indoor Meet, Mar. 16, 1969. Manchester High School Gym, 8 am to 5 pm. Events: HLG, Scale, Paper Stick, Indoor Stick. Lee F. Webster, 1000 Sycamore, Manchester, Tenn. 37355, phone 651-728-3283.

WISCONSIN - Milwaukee. Indoor sessions each Thursday in March, 7:30 pm to 9:30 pm at Sherman Social Center, North 51st St. and W. Locust St. Ken Kraemer, 3945 N. 41st St., Milwaukee, Wisc. 53216.

STATE OF THE ART

Part of the uncertainty surrounding the Constant Margin of Stability concept (Jan. '69 INAV) is what margin of stability to use. Richard Ennis made a survey of all the 65 cm models in past INAV's, and the results are tabulated below. Where wing location data was not given, this was scaled from the plan. Since the concept is based on info computed for outdoor models, the graph (NIMAS Chart III) gives coefficients that result in negative values of margin stability for some of the models listed.

Model	Issue	CG Location	% Margin
Goldilox III	Jan. '69	100%	+1.14
Goldilox II	Jan. '69	100%	-7.23
1968 Kalina	Dec. '68	50%	+17.6
Richmond '68 Nats	Nov. '68	80%	-5.4%
Knoch W/Ch.	Nov. '68	70%	-9.78
1968 Andras Ree	Nov. '68	70%	+6.38
Top Cat III	Sept. '68	Note 1	
Crane 654	June '68	75%	+9.0
Lerman 65 cm	Apr. '68	75%	-5.09
Chlubny	Feb. '68	65%	+5.0
Goldilox	Dec. '67	50%	+25.8
Rohrbaugh	Nov. '67	50%	+6.13
Bastard Mk. II	Oct. '67	90%	-17.6
1967 Andras Ree	Oct. '67	70%	+10.04
Otto Hints	Oct. '67	80%	-5.6
1967 Mather	Sept. '67	65%	+17.4
1967 Richmond	July '67	80%	+3.0
Phillips "B"	May '67	96.4%	+19.7

Note 1 - The plans had no CG location shown. Computations were made for 80% and 90% CG locations; the margins were +9% and -2.35% respectively.

Two models grace the plan page this month - Bob Randolph's Cat. II A ROG and Dick Mathis' "Ear Spear" HLG. Full size plans are available for both models upon request accompanied by stamped self-addressed envelope.

Bob's A record was set during the practice session for the 1968 Great Lakes meet, and the mark stood until late in June when Joe Hinds beat the mark at a session CD'd by Bob. Talk about mixed feelings!

Dick's glider was an early forerunner of the glider he set the Cat. I mark with late in 1968. He won first place with it at the 1st Glue Dobbers Indoor Annual in 1968. In that meet the glider started with a flat airfoil and was slightly heavy for the ceiling. He warped in the drooping airfoil and gained enough on sink rate to win.

RECORDS? MAYBE!

FAI BENEFIT MEET, Jan. 25, 1969, Cat. I, 30' 6" ceiling Ballroom, Texas Womans Univ., Denton, Texas
Junior Indoor Stick - 11:40, Kristi Tenny
D.C. MAXECUTORS CAT. I RECORD TRIALS, Feb. 18-19, 1969
Hangar #2, Bolling AFB, 34.5' ceiling.
Open HLG - 1:18.8, Dan Belleff
Open Helicopter - 7:14.8, Tom Vallee
BRAINBUSTERS FAI LOCAL, March 1, 1969, Cat. I
Willis School, Hampton, Va. 20' 6" ceiling
AMA CAT. I FAI - 17:59.4, Hal Crane
FAI CAT. I FAI - 18:27, Bob Champine
COW PALACE FAI LOCAL, Mar. 1-2, 1969, AMA Cat. II,
Cow Palace, San Francisco, Cal. 99' 6" FAI Cat. IV
Senior AMA Cat. II FAI - 14:42, Bill Gibbs

NIMAS POSTAL MEET

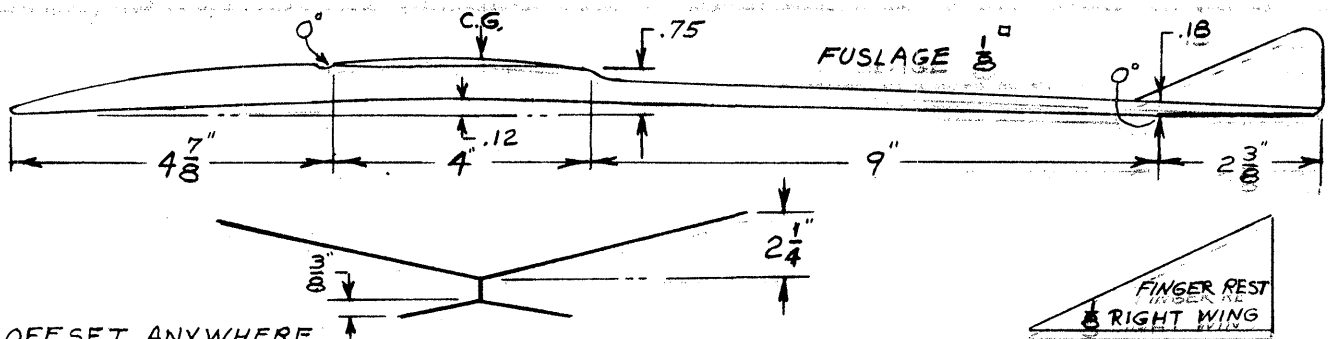
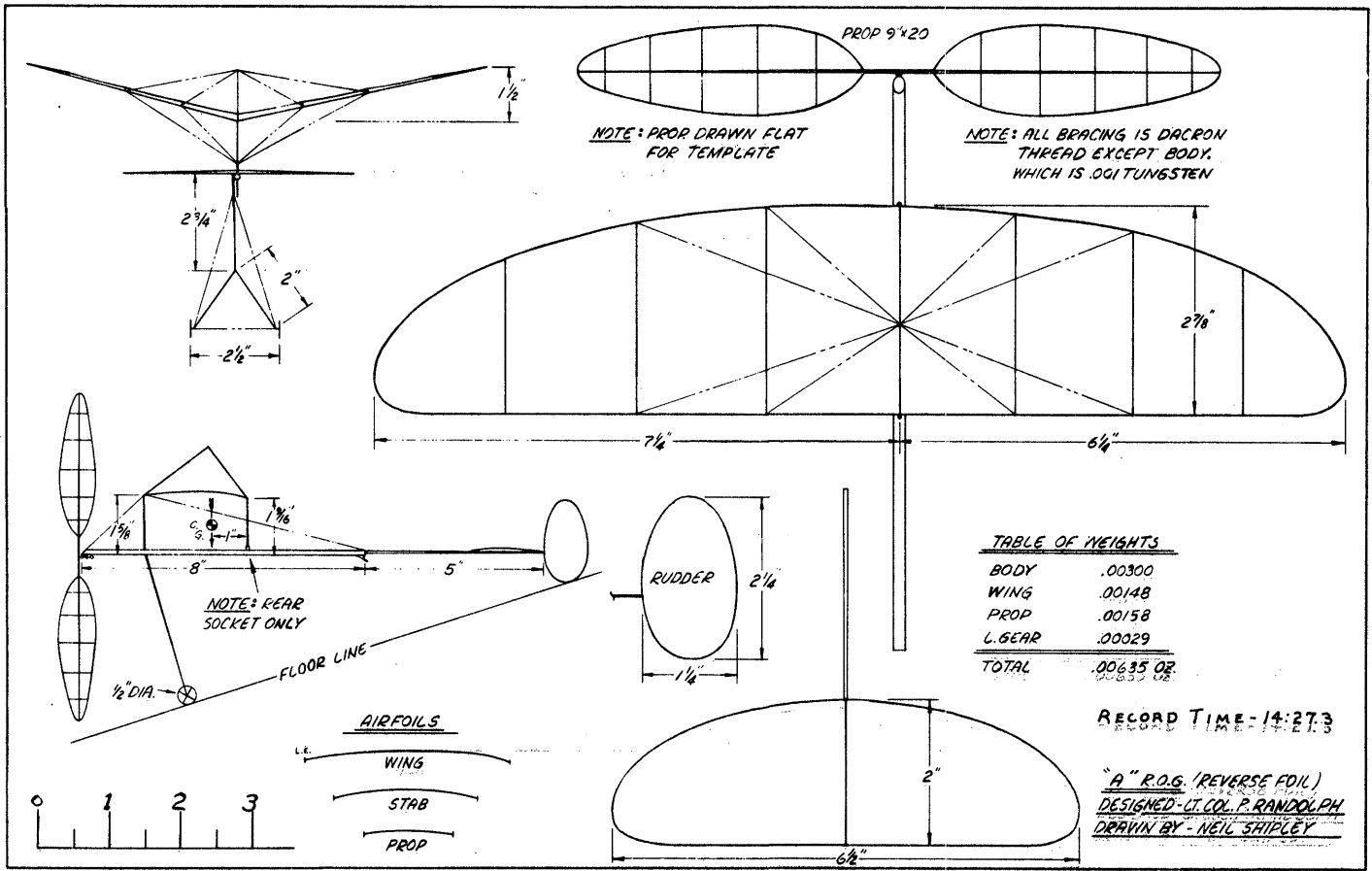
The 4th Annual NIMAS Postal ends this month, with entries to be postmarked by Mar. 31, 1969. Send entries to Bob Putman, 507 Darlene, Arlington, Tex. 76012, along with 15¢ (stamps preferred) per entrant.

Events: Easy B, paper covered only, AMA Rules otherwise.

HLG - AMA Rules except two ceiling classes - 18' to 25' and 25' to 35'

Indoor Stick - AMA Rules except use FAI ceiling measure to compute fudge factor.

General Rules: Entry fee 15¢ per event, stamps preferred. Separate events may be flown at different sessions, but all flights for given event must be flown at one session. Please note ceiling height with each entry - it will be used to figure fudge factors, with standard NIMAS fudge factors. Separate class for Juniors in all events, with awards for high placing Seniors. Separate class for Sub-Junior (age 12 and under) in HLG. Entry open to all, no need to be NIMAS member!



NO OFFSET ANYWHERE
LEFT-LEFT PATTERN
WITH RUDDER AND
LEFT WING WASH-IN
THREAD
ON L.E.

ALL Balsa "C" GRAIN

FLAT AIRFOIL EXCEPT 3/64" DROOP

"EAR SPEAR"
INDOOR HLG FOR 50'
CEILING BEST TIME
50.2 SEC.
By: D. MATHIS
DALLAS, TEXAS

WING 1/8"
TAPER TIPS TO .013

STAB 1/32"
TAPER TO .008

FIN 1/64"



MICROFILM TECHNIQUES - FOLLOW-UP

The "Optimum Pouring Conditions" discussion (Feb. 69 INAV) detailed tentative limits for both relative humidity and atmospheric pressure which encourage good results in pouring microfilm. It should have been stressed that such limits serve me well at approximately 700 feet altitude above sea level. I would very much like to have comments from others at other altitudes, in order to collect a more complete amount of information on the subject.

Meanwhile, a question was asked about correcting altimeter setting to local pressure. To explain further, a call to the weather bureau yields a number such as 30.21 inches of mercury (abbreviated in. Hg.). This number is used by pilots to adjust their altimeter so it will read altitude above sea level. As stated before, the correction is approximately .115 in. Hg. per 100 feet of altitude. For altitudes above sea level, the pressure is less and this correction is subtracted. For 700 feet above sea level, the correction is $7 \times .115$ or .805 in. Hg. For the example above, $30.21 - .805 = 29.405$. I would not try to pour, since the lower limit here is about 29.50. It is possible that a change in solvent balance of the microfilm solution would improve pouring at other pressures, but I don't have time to find out now!

HINTS AND KINKS

Glider Sanding Jig

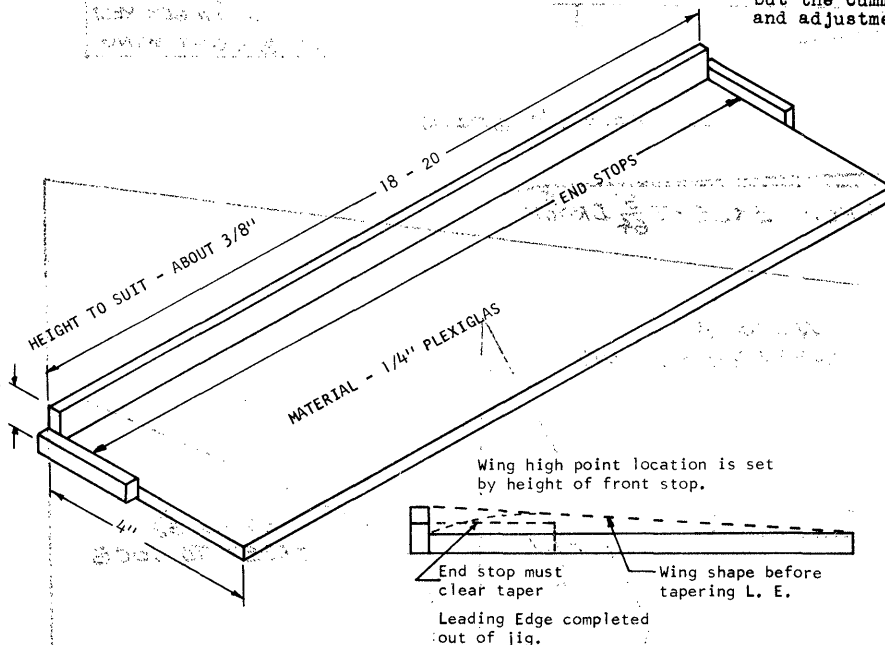
The sketch below details a sanding jig for HLG wings which was built by Bob Dunham from a design by fellow Glue Dobber John English. John's jig was made from wood, but Bob found plexiglas to be an improvement. The jig is for wings with straight trailing edge like the Sweepette, and makes it simple to produce an even airfoil by allowing the sanding block to ride on the edges of the jig.

The end stops keep the wing tight from end to end, and a shorter wing is wedged in place by removable fillers. Different wing thicknesses can be accommodated by shimming from the bottom, but care must be used to avoid sanding the trailing edge too thin. The wing leading edge can be finished easily and quickly after removing the blank from the jig.

An excellent sanding block for use anywhere is made by using contact cement to hold the sandpaper on 3" x 6" plexiglas. This makes a rigid and perfectly flat sanding block; two such blocks with a different grade of sandpaper on each face gives all grits needed to finish a wing.

End Lube Mess!

Wayne Zink suggests that rubber lube can be kept in a 15 cc nasal mist spray bottle (Dristan). All you need to do is remove the siphon tube and wash the bottle, and you have a handy dispenser for rubber lube. Be sure to mark the contents on the outside - this is a must for any drug container used for another purpose!



DICK BLACK MEMORIALS

The two Dick Black Memorial lectures have been on the go constantly since they were announced, and have been well received. As a reminder, clubs or individuals may use them, and the only cost is to refund the postage cost. Please keep them a minimum of time so others may use them also. Each one runs about 8 minutes and requires a 35 mm slide projector and a tape recorder capable of playing at 3 3/4 inches/sec. #1 covers microfilm techniques and #2 balsa wood selection and cutting.

POSTAL CONTESTS!

The D. C. Maxecutors flew a record trials at Bolling AFB (34.5' ceiling) and challenged entrants at the Denton contest (30.5') to a postal contest. The results:

Flier	Site/Ceiling	Fudge	Time	Score
Paper Stick				
Bob Randolph	Bolling/34.5	1.0	11:51	11:51
Bob Wilder	Denton/30.5	1.06	8:33	9:03.8
HLG				
Dan Belleiff	Bolling/34.5	1.0	1:16.3	1:16.3
Don Teeples	"	1.0	1:12.9	1:12.9
Dick Mathis	Denton/30.5	1.13	1:03.4	1:11.6
Tom Peadon	"	1.13	1:03.3	1:11.5
John Sites	Bolling/34.5	1.0	1:08.4	1:08.4
John Thornhill	"	1.0	1:03.3	1:03.3
Bud Tenny	Denton/30.5	1.13	0:52.6	0:59.4

C.M.O.S. - AGAIN

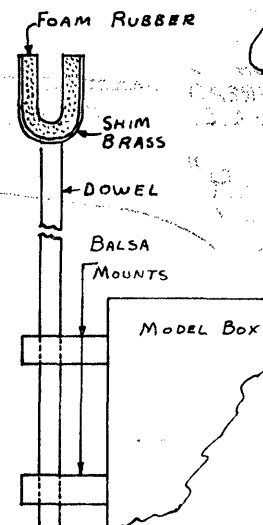
The constant margin of stability discussion (Jan. & Feb. '69 INAV) is based on an article by Hank Cole in Dec. '47 Air Trails. Hank used the term "aerodynamic center", which is customarily (in full scale aero work) used to define factors of the airfoil. Apparently Hank used the term in the context of "aerodynamic center of the model", which should not be too confusing.

Several people have questioned the importance of the CMOS concept, preferring to stick with locating the CG at some arbitrary location such as 70% of the root chord. If you get down to cases, Goldilox III (Jan. '69 INAV) has a 100% CG and +1.14% margin of stability, while Harry Lerman's FAI (Apr. '68 INAV, labelled Mar. '68) has a 75% CG and -5.09% stability margin. How many times have you designed a new model, only to have to move the wing after test flying? My personal record is about 9 out of 10 - so I'm delighted to be able to locate the wing correctly the first time on new models!

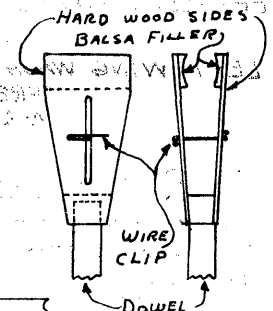
RUN-DOWN STANDS

One of the handiest things on the flying field is a place to "hang" your model while the motor runs down or while you repair or adjust it. The best two I've seen are reproduced below, reprinted from an early INAV. Both stands work well; Kowalski's design is easiest to make, but the Cummings design probably holds better for repair and adjustment.

KOWALSKI



CUMMINGS



INDOOR

NEWS and VIEWS

\$2/ YEAR NIMAS DUES \$1/ YR ADDITIONAL

Editor: Bud Tenny · Box 545 · Richardson, Texas · 75080

****NATIONAL INDOOR MODEL AIRPLANE SOCIETY****

New Members!

RON ETTELDORF, 1405 Elder St., Waukesha, Wisc. 53186
 STEPHEN J. FAUBLE, 801½ 5th Ave., Mendota, Ill. 61342
 JOHN A. HATCH, RD#2, Box 58, Rhinebeck, N. Y. 12572
 JOHN W. HILLEGAS, 7804 St. Clair, Cleveland, O. 44103
 DAVID A. JENCKS, 11 Revere St., Lexington, Mass. 02173
 ED LORENZ, 69 Colburn Dr., Poughkeepsie, N. Y. 12603
 TERRY THORKILDSEN, 3101 W. Willow Ave., Phoenix, Ariz. 85029

Special Action Committee

The Special Action Committee is evolving a plan of action to help Juniors learn indoor; the main thrust of the action will be personal contact. Model plans, jigs, and sources of material will be made available to all who would serve as instructors, and some special beginner kits will be designed.

The above program will adequately serve beginners who live near NIMAS members willing to serve as instructors, but what about those who don't? It is possible for an experienced builder to guide beginners by mail (I speak from experience, as some INAV readers know), so how about some volunteers? Send your name and address to Roger Schroeder, 4111 West 98th St., Overland Park, Kan. 66207 or to Box 545 Richardson, Texas 75080.

Help Wanted!

Enough printed material now exists to produce special pamphlets on prop design and construction, model design, construction techniques, and other topics. Help is needed in arranging this material, editing it in some cases, and pasting it up to serve as masters for multilith printing.

The completed masters could be printed in small lots if someone has access to multilith and would do it for the cost of materials. The alternative is \$4 per page in 100 unit lots if they are printed commercially. This is a substantial investment - out of reach for the NIMAS budget at this time.

Finally, more help is needed with the Dick Black memorial series. If you are building a prop, or a wing, or doing some other indoor building, take a series of color slides showing the step-by-step action and send them in to be combined with other slides to make up another of these popular lectures.

NIMAS Honorees

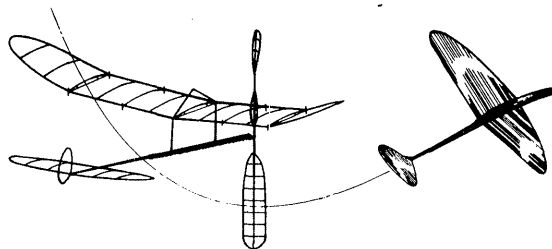
It has been suggested that there is a need for another type of NIMAS honor besides the NIMAS Awards. Do you know a NIMAS member who seems to spark indoor activity wherever he is? Someone who always seems to be able to locate sites and activate them? We have this type, and we all benefit from their efforts. How about some suggestions on what form the honor should take, some tentative standards to guide those who would nominate people for the honor, and suggestions for a name to call the honor?

Bargain Corner

Stan Chilton let us know of a special sale of Dial Thickness Gages by A.O.K. Tool Corporation, 82-21 Sutter Ave., Ozone-Park, N. Y. 11417. Their model SI-112 sells for \$9.90 in their 3rd Anniversary Sale, and measures up to .400" by .001" increments. This type of gage is "the" way to measure balsa, rubber, and other indoor stuff. Be sure to mention the anniversary sale when you order!

Pirelli Report

Several of the special tests for PIRELLI LORE have been completed, and the data will be sent out to volunteer workers who will reduce the data and plot it. If you are anxious to see the results, so are we!



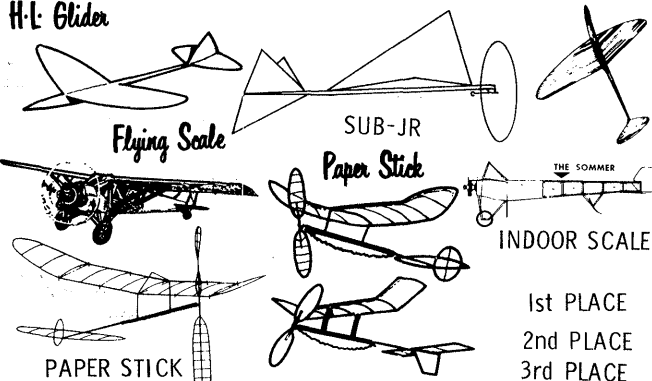
NIMAS Awards

Silver Cat. II HLG Award - 0:49.2, Edgar Franklin

Trophy Plates Take Time!

Although it has not been widely publicized, NIMAS has a trophy plate service - provided you plan ahead. Numerous "standard" designs are available, and sheets of art work such as the types shown below are available for you to paste up and arrange to suit your needs. Write to Box 545, Richardson, Texas 75080 for more information; but be sure to allow over a month to be sure there is time to set up and produce the plates you will need.

H-I Glider



Flying Scale

SUB-JR

Paper Stick

THE SOMMER

INDOOR SCALE

PAPER STICK

FAI INDOOR REPORT

1st PLACE
 2nd PLACE
 3rd PLACE

Special Note To CD's

Clarence Mather has requested that all CD's of all FAI Team Selection Trials send him a copy of the results with addresses of the qualifiers, so he can contact them if necessary. His address is 3880 Ecochee Ave., San Diego, Cal. 92117.

In the interests of better communication, will all CD's please send word of planned Qual. Trials to Box 545, Richardson, Texas 75080.

Special Note To Contestants

If there is the slightest doubt of whether there will be a Local Qual. Trials near you, you should enter the program by sending \$3 to AMA HQ to get the program entry forms. You will then be able to qualify at any indoor meet if you fly a model of 65 cm span or less and make at least 60% of the winning time in that event. Note CONTEST CALENDAR for this month, since this will be your last opportunity. Qualification must be completed by April 30, 1969, whether you qualify at a Trials or an indoor meet.

Team Selection Trials Schedule

ILLINOIS - Chicago. FAI Local, April 12, 1969, Washington Park Armory, 5200 Cottage Grove Ave., Chicago. Pete Sotich, 3851 West 62nd Place, Chicago 60629, RE 5-1353 Site is active Armory, so call PL 2-9006 or PL 2-9795 before leaving home to be sure event has not been cancelled by extra drill session.

MICHIGAN - Detroit. FAI Local, April 13, 1969, Michigan State Fair Coliseum. Paul Crowley, 32604 Tecla, Warren, Mich. 48093, ph. 313-294-0266

MICHIGAN - Detroit. FAI Quarter Finals, May 10, 1969, Michigan State Fair Coliseum. Ed Stoll, 30471 Manse, Mt. Clemens, Mich. 48043.

NEW JERSEY, Irvington. FAI Local, April 15, 1969, Ernie Kopecky, 38 Fawn Lane, Watchung, N. J. 07060.

NEW JERSEY - Lakehurst. The following dates have been set pending Navy approval: April 27 - FAI Local, May 25 - Quarter Final, June 29, 1969 - Semi-Final. Chester Wrzos, 184 Oak St., E. Orange, N. J. ph. 673-7951

OKLAHOMA - Tulsa. FAI Quarter Final, May 10-11, 1969, Bob Hanford, 3838 South 88th E. Ave., Tulsa, Okla. 74145, ph. NA 7-6932.

VIRGINIA - Hampton. FAI Quarter Final may be held at Willis School, Apr. 26-27, 1969. Bob Champine, 360 Abingdon Circle, Hampton, Va. 23369

Qualification Trial Results

DALLAS/FT. WORTH/DENTON LOCAL QUAL. TRIALS, Denton, Texas

Bud Tenny	7:58	5:35	13:33
Dick Ganslen	5:38	7:50	13:28
O. C. Stewart	6:37	5:40	12:17
Richard Powell	4:21	4:06	8:27

POSSIBLE WORLD RECORD

It is reported that Jiri Kalina of Czechoslovakia will apply for a Cat. IV World Record on the basis of his 39:18 flight with a 65 cm model during the International Meet in Romania on Mar. 20-23, 1969. This record is presently listed as 45:40, set with a 90 cm model by K-H Rieke at the 1962 W/Ch. The existing record is certainly an absolute indoor record, but it is hard to predict whether the CIAM will now make a distinction for 65 cm models.

REPORT FROM EUROPE

Mihail Teut of Romania reports that both a Romanian National Championship and an International Contest were held on March 20-23, 1969 - in the large salt mine. Otto Hints set a new Romanian record of 27:42 during the National Champs. The International Contest was attended by five countries - Czechoslovakia, Hungary, Italy, Romania and Yugoslavia. The results:

- | | |
|-------------------|--------|
| 1. Hungary | 164:09 |
| 2. Czechoslovakia | 156:26 |
| 3. Romania | 150:56 |

These times, and particularly Kalina's 39:18 flight which is being submitted for World Record, are unusually good considering that the mine is a constant 60° F.

CONTEST CALENDAR

ILLINOIS - Chicago. Weekly indoor sessions at the Washington Park Armory, contingent upon National Guard drill schedules. HLG 9 am to noon and 4 pm to 5 pm; indoor rubber noon to 4 pm. Call Armory at 312-752-9006 or 321-752-9795 to check drill schedule before leaving home.

MARYLAND - Silver Spring. FAI Benefit meet, Apr. 18-19, 1969. Provisional site arrangements require contestants contact Tom Vallee, 444 Henryton So., Laurel, Md. 20810, in advance. FAI Qual. by voucher, RT, HLG, Indoor Stick.

MARYLAND - Silver Spring. Indoor sessions at JFK High School, Apr. 18, May 1, 16, June 6, 13, 1969. Bill Saunders, 11613 Le Baron Terr., Silver Spring, Md. 20902 ph. 301-593-7196.

MICHIGAN - Detroit. Annual Indoor State Meet, May 3-4, 1969, State Fair Coliseum. Youth events May 3, 10 am to 3 pm; HLG, AMA CUB, PreFab, three age classes. Regular AMA events May 4, 9 am to 3 pm; HLG, Paper Stick, Indoor Stick, Flying Scale. Walter Hartung, 14759 Kilbourne, Detroit, ph. LA 7-7620.

MISSOURI - St. Louis. Indoor contest, Apr. 20, 1969, Dave Linstrum, 12411 Leigh Lane, Maryland Hts., Mo. 63042, ph. 314-434-8894. Easy B, Indoor Stick, Scale, HLG.

NEW JERSEY - Irvington. Indoor sessions at Madison Ave. Elem. School, Apr. 15, 29; May 6, 13. 17' ceiling. Chester Wrzos, 184 Oak St., E. Orange, N. J. ph. 673-7951.

NEW YORK - Hicksville, L. I. Cat. II Indoor meet May 4, 1969, 8 am to 5 pm. Sponsored by LIAMAC, at Cantiague Park Skating Rink, Hicksville, L. I. Site is 50' high, 190' dia. dome. HLG, Easy B, Scale, Paper Stick, Indoor Stick. Bill Dunwoody, 985 Ft. Salonga Rd., Northport, Long Island, N. Y.

OHIO - Cleveland. Cat. I RT, Easy B Contest, May 4, 1969, at Euclid Arena, 22550 Milton Ave., Cleveland. 30' ceiling, 85' x 180' floor. Contest portion for age groups 0-13, 14-16, 16-20, over 20. Dr. Vernon Hacker, 25599 Breckenridge, Euclid, O. 44117, ph. 216-261-4990.

OKLAHOMA - Tulsa. Indoor RT, Apr. 26-27, 1969. Bob Hanford, 3838 South 88th E. Ave., Tulsa, Okla. 910-NA 7-6932.

PENNSYLVANIA - Pittsburgh. 5th Annual Indoor Air Meet, April 12-13, 1969. Regular indoor events Apr. 12, and

Junior events Apr. 13. Ron Ganser, 1745 Brett St., Pittsburgh, Pa. 15205.

VIRGINIA - Hampton. Indoor contest and maybe FAI Quarter Finals, Apr. 26-27, 1969. Willis School. Bob Champine, 360 Abingdon Circle, Hampton, Va. 23369

CONTEST RESULTS

TECH MODEL AIRCRAFTERS CLASS AA INDOOR MEET, M.I.T. Armory
Cat. II, 45' ceiling.

- | | | | |
|---------------------|---------|---------------------|--------|
| <u>Indoor Stick</u> | | <u>Open HLG</u> | |
| 1. Harry Lerman | 17:35.6 | 1. Ed Archer | 0:59.5 |
| 2. Ed Archer | 14:06.2 | 2. Don Richard | 0:52.4 |
| 3. Jim Daley | 12:25.5 | 3. Jim Daley | 0:52.0 |
| 4. Sears McCarrison | 0:45.0 | 4. Ron Evans | 0:45.5 |
| | | 5. Sears McCarrison | 0:21.5 |

- | | | | |
|-------------------|--------|-----------------|--------|
| <u>Delta Dart</u> | | <u>Easy B</u> | |
| 1. Mike Daley | 0:56.1 | 1. Ira Lerman | 7:01.8 |
| 2. Mark Daley | 0:50.8 | 2. Ralph Lerman | 6:20.0 |
| 3. Mike Roby | 0:43.0 | 3. Mike Daley | 3:13.1 |
| 4. Dave Tencka | 0:36.0 | | |
| 5. Phill Lawry | 0:31.5 | | |

McDONNELL INDOOR MEET, March 9, 1969, E. St. Louis Armory

- | | | | |
|--------------------|----------|---------------------|---------|
| <u>Delta Dart</u> | | <u>Indoor Scale</u> | |
| 1. Ron Weaver | 192 sec. | 1. Art Biehl | 130 pt. |
| 2. Jeff Hardcastle | 118.3 | 2. Jim Richmond | 83.4 |
| 3. Mike Boyer | 114.8 | 3. Dick Hardcastle | 74.7 |

- | | | | |
|--------------------|--------|--------------------|--------|
| <u>Open HLG</u> | | <u>Junior HLG</u> | |
| 1. Dick Hardcastle | 1:08.4 | 1. Steve Veselsky | 0:49.0 |
| 2. Paul Tryon | 1:01.1 | 2. Jeff Hardcastle | 0:43.5 |
| 3. Bob Hotze | 0:57.8 | 3. Rick Ryan | 0:33.7 |

- | | | | |
|--------------------|---------|----------------------|------|
| <u>Open Easy B</u> | | <u>Junior Easy B</u> | |
| 1. Jim Richmond | 14:08.2 | 1. Craig Hardcastle | 3:01 |
| 2. Dick Hardcastle | 9:58.1 | 2. Karl Crosby | 1:37 |
| 3. Tony Schott | 7:45.2 | 3. Mitchell Blum | 1:07 |

- | | |
|---------------------|-------|
| <u>Indoor Stick</u> | |
| 1. Carl Jaeger | 10:42 |
| 2. Paul Tryon | 8:54 |
| 3. Jim Richmond | 8:34 |

SECOND ANNUAL AIRFOILER CLUB INDOOR MEET, Manchester, Tennessee

- | | | | |
|-----------------------|--------|----------------------|--------|
| <u>Paper Stick</u> | | <u>Junior Easy B</u> | |
| 1. Tom Killough | 9:25.6 | 1. Craig Hardcastle | 6:26.6 |
| 2. Richard Hardcastle | 8:41.8 | 2. Craig Powell | 5:32.8 |
| 3. Rex Powell | 8:01.5 | 3. Neal Rozelle | 4:47.6 |
| 4. Walt Rozelle | 6:52.6 | 4. Charles Krickel | 4:13.6 |
| 5. Lee Webster | 5:42.4 | | |

- | | | | |
|--------------------|--------|-----------------------|---------|
| <u>Open Easy B</u> | | <u>Indoor Stick</u> | |
| 1. Jim Davidson | 9:43.6 | 1. Richard Hardcastle | 16:15.2 |
| 2. John Krickel | 4:16.0 | 2. Walt Rozelle | 7:02.8 |
| 3. Howard Counts | 3:22.0 | 3. Arthur Mansfield | 4:46.8 |
| 4. Chet Tuthill | 3:20.2 | 4. Jim Davidson | 3:30.6 |
| | | 5. Rex Powell | 2:56.5 |

- | | | | |
|---------------------|--------|--------------------|--------|
| <u>Junior HLG</u> | | <u>Open HLG</u> | |
| 1. Steve Farmer | 0:53.0 | 1. Tom Killough | 1:05.2 |
| 2. Neal Rozelle | 0:50.4 | 2. Dick Hardcastle | 1:05.2 |
| 3. Jeff Hardcastle | 0:47.6 | 3. Rex Powell | 1:04.8 |
| 4. Craig Hardcastle | 0:44.0 | 4. Harry Grogan | 1:01.6 |
| 5. Craig Powell | 0:38.6 | 5. John Cartwright | 1:01.2 |

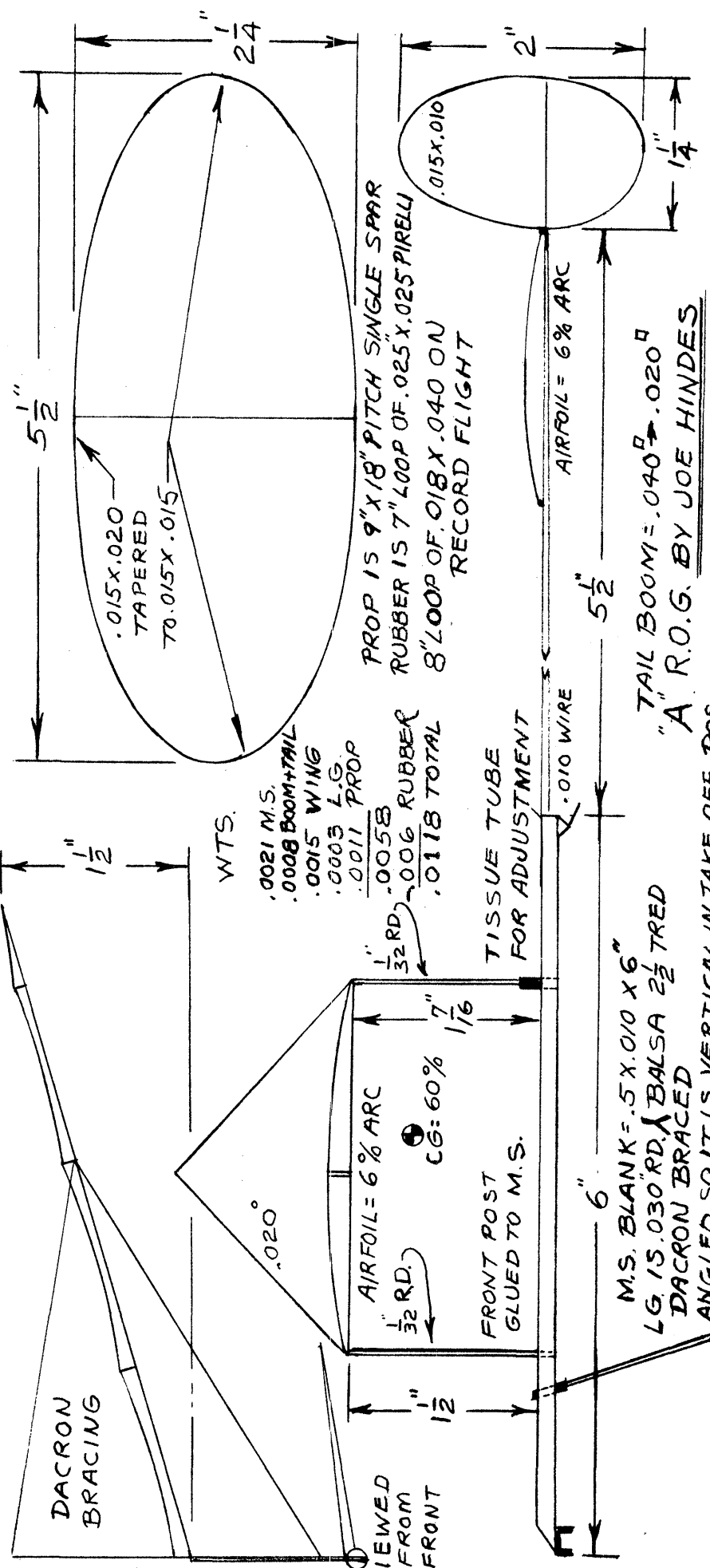
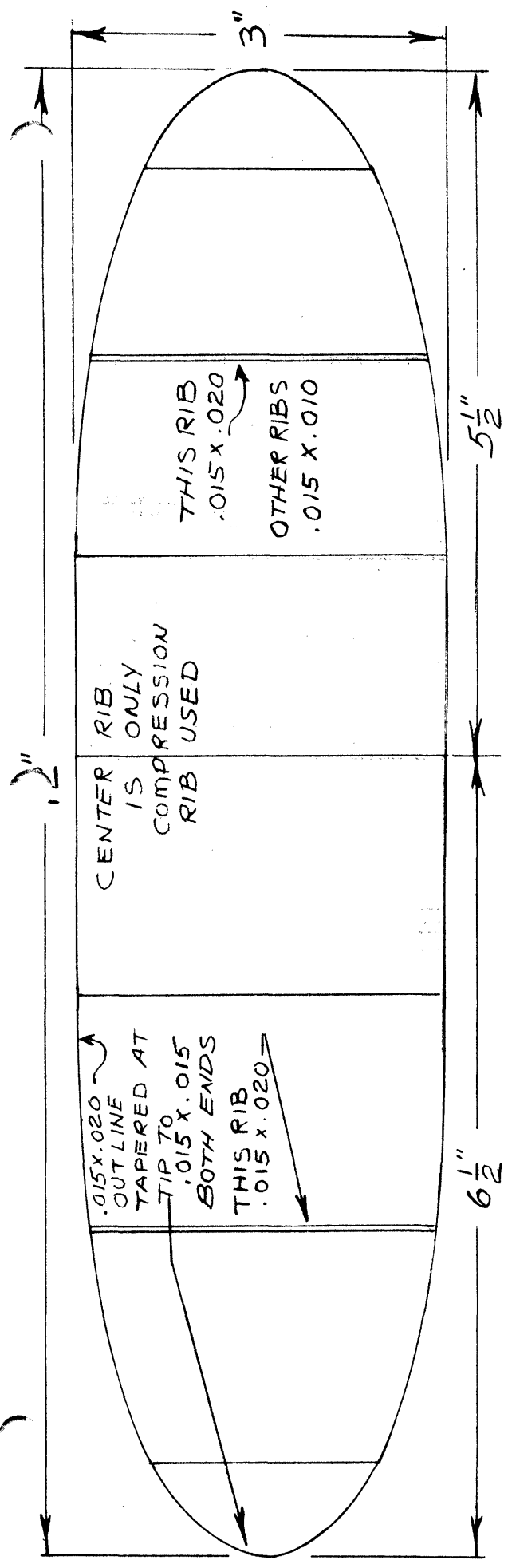
STATE OF THE ART

This month's model is the current holder of the Cat. II A ROG record at 15:53.2. Joe Hinds set the record at one of the many RT's held by Bob Randolph at Wingfoot Hangar in Ohio - taking the record from Bob. Compare the two models (Randolph's in Mar. '69 INAV) - they are quite similar. Joe said this model was both adequately strong and sufficiently stable to be ballooned easily - you just have to be able to catch it with the balloon!

A LOOK AT YESTERYEAR

Who was the first indoor flier? Hewitt Phillips was recently asked to check the technical accuracy of translations of letters of Alphonse Penaud. Penaud has been credited with being the inventor of the rubber-powered model airplane, and he did most of his aviation experimenting in Paris between 1870 and 1880. One letter to a T. J. Bennett in England said "The airplane which I sent you was demonstrated at a public meeting on the 27th of last November (1873) and made several circuits of the room, which was 19 x 19 meters." Hewitt told much more about Penaud and his models (helicopters, ornithopters and fixed wing pushers), but perhaps this glimpse can be wound up with a quote about making demonstrations with models: "I always tremble when I make an airplane model perform before the public, which, as everyone knows, is always cruel toward failure. Thanks to Heaven that up to now I have been successful in all my attempts."

April 69



BY: E.M.H. 8/30/68

"A" R.O.G. BY JOE HINDES

M.S. BLANK = $.5 \times .010 \times 6"$
 LG. IS $.030$ "RD." Balsa $2\frac{1}{2}$ TRED
 DACRON BRACED
 ANGLED SO IT IS VERTICAL IN TAKE OFF POS.

THE LAB

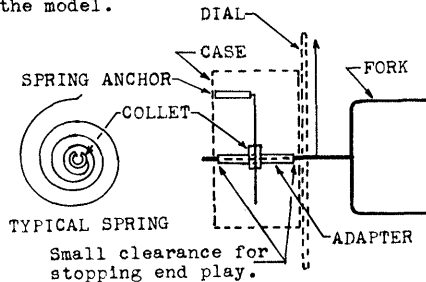
Launch Torque Meter

The Dec. '68 INAV presented a torque meter to be used as a winding stoooge and for checking torque curves of rubber motors under test or evaluation. If you use an "O" ring at the torque meter end, that type can be used as a rough check of torque that you launch with. For low ceiling flying, the launch torque determines very closely how high the model will climb. (See "THE LAB", May '68 INAV and "CHOICE OF RUBBER MOTOR FOR LOW CEILING INDOOR", p. 78 of the 1968 NFFS SYMPOSIUM REPORT.)

If you lose any turns hooking up after winding, or wait very long to launch, the torque level will change. Also, it is very difficult to hit a desired launch torque exactly while winding on a torque stoooge. The answer to all these objections and problems is to measure the torque just before launch. If you have this capability, it is a simple matter to hook up with a higher torque than needed and let the prop run in short bursts until the torque has dropped to the exact value needed.

A hairspring of suitable strength can be used to make a torque meter to make torque measurements on the model, as shown schematically below. The particular spring used in this torque meter cost \$1 postpaid at Addison Aero Parts & Sales, P. O. Box 216, Addison, Texas 75001; order part number 671-73 Hairspring. This spring has a split collet which will need an adapter. Make the adapter to fit the collet, and drill #67 thru the center of the adapter. Press a polished piece of 1/32" music wire thru the adapter to complete the main assembly. The case was made from 1/8" x 1/2" pine strips set on edge and covered with .020" aluminum to form a box. The only bearing necessary is to drill the case sides to fit the 1/32" music wire. Anchor the free end of the spring to the case, and assemble the case to the frame with small screws. Calibrate the unit in the same manner as for the meter in Dec. '68 INAV.

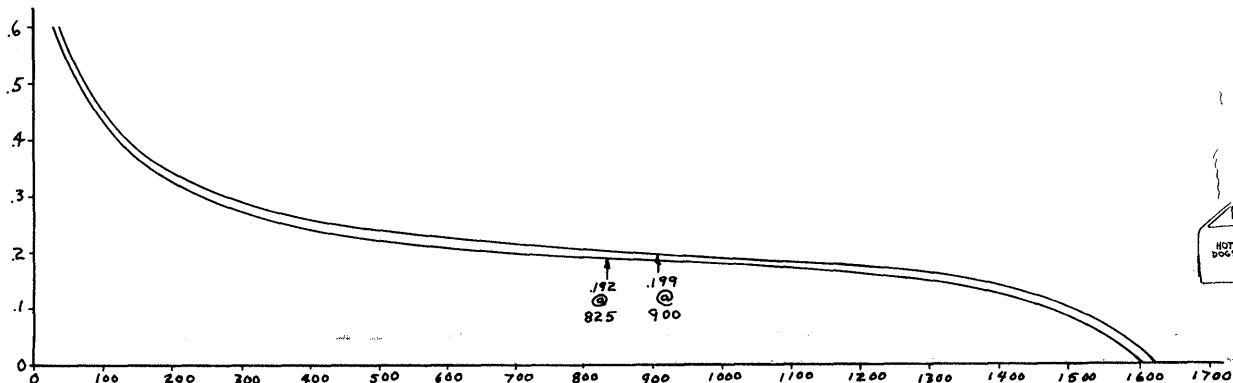
How do you use this device safely? Hold the model by the front wing socket (thumb and index finger of right hand) with the prop spinning free. Engage the fork with the prop shaft, which stops the prop. Read the torque and launch the model.



PIRELLI LORE

The Dec. '68 INAV showed that pirelli improves as it is broken in, both in energy output and number of turns. Bob Platt presented part of this information which showed how much a certain motor improved with successive windups. He later had second thoughts, and made the following comments:

"I thought that the previous tests showed definitely that used rubber was better than new rubber. However, I have decided that energy outputs can't be compared this way because the rubber is being stressed higher and higher with each wind. This is because the increase in length is accompanied by a reduction in cross-section, yet the motor is wound to the same maximum torque.



It finally occurred to me that a better test would be to compare a used (broken in) motor with a new one which was stripped to give the same cross-section area as the old motor. Then, when wound to the same maximum torque we would be comparing motors at the same stress. To improve accuracy I used two new motors and faired a curve through the points to represent new rubber. I also used one broken in motor and wound it twice (with two days of rest between winds) and faired through these points to represent broken-in rubber. The curves represent about 8% increase in energy output per unit weight."

MODEL STORAGE AND TRANSPORTATION

Part I - General Considerations

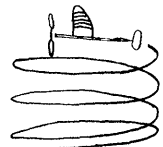
This series is an attempt to answer numerous requests for information about model boxes with comprehensive coverage of the subject. I invite contributions by anyone who has a different way of solving the problems involved with this field.

Boxes which house indoor models must be airtight so they can be carried outside safely. They should be constructed so that they can be opened without causing a big inrush of air. The models should not be packed too closely so there is danger of hooking one part on another as you remove the models from the boxes. Everything in the box must be secured so it can't come loose. It is advisable to use sway braces when models are packed closely - particularly if the box will be handled by others besides the owner. Large boxes should definitely have a handle, and a locking device to prevent accidental opening. It is advisable to have the box waterproofed inside and out - not necessarily so it will float but to prevent moisture from being absorbed by the material of the box.

Finish (both color and waterproofing) inside a box is important. If the box is black inside, it is easier to see model components due to the color contrast. It is important that the paint material be thoroughly dry before you use the model box. Otherwise, solvent evaporation from the paint may make the microfilm droopy. Note that this is not a reliable way to remove warps due to tight film! The film always recovers within a few minutes after coming out of the box, unless the film is sticky. In that case the slack film sticks to itself and pulls holes or warps the structure after you take it out of the box.

The choice of box type is an individual matter, based on model sizes and types to be carried, how many models must be carried, and general convenience. Many "full house" A ROG models do not come apart (see Randolph's A ROG, Mar. '69 INAV), and cabin models often have the wing integral with the built-up body and landing gear. These models require special boxes and different packing. Someone who flies only FAI size models needs a different box than someone who flies Easy B and paper stick. Another decision involves which model types to group together if you have too many models for one box. This series shows a number of different choices - don't get a headache making the choice!

Pat Percival



INDOOR

NEWS and VIEWS

Editor: Bud Tenny · Box 545 · Richardson, Texas · 75080

\$2/ YEAR NIMAS DUES \$1/ YR ADDITIONAL

****NATIONAL INDOOR MODEL AIRPLANE SOCIETY****

New Members!

TERRY BUDDINGH, 1689 Juniper St., Livermore, Cal. 94550
 ROBERT D. HABERSTROH, Route 1, Box 466, Ft. Collins, Colo. 80521
 MARLIN J. RABUCK, 157 Parkview Rd., Stratford, N. J. 08084

Indoor Nats - PAY ATTENTION!

The March '69 INAV announced that the 1969 Indoor Nats will be held on two days. Indoor Stick, Paper Stick and Indoor Cabin will be held on Monday, July 14, from noon to 8 pm. HLG and Indoor Scale will be held on July 15, from 10 am to 6 pm.

Registration will be held only at Willow Grove NAS, and you must register before flying. Registration opens 8 am, July 14, and continues during the week. This means that indoor rubber contestants must plan to enter Willow Grove NAS (near Philadelphia, Pa.) at 8 am when the base is opened to contestants, register immediately, and then go directly to Lakehurst, New Jersey to fly. Scale and HLG contestants are advised to register on July 14 also.

Elimination of registration at Lakehurst was necessary due to the impossibility of coordinating two separate registration centers, and to help reduce Navy manpower requirements. We have received assurances from AMA HQ and members of the Nats Executive Committee that there is ample time to complete registration and make it to Lakehurst before flying begins. Special registration procedures are being set up, and Pete Sotich has made maps with the fastest route marked available to all who wish them.

Indoor has been growing rapidly this year - let's have a large Nat's entry! Entry blanks are available from AMA HQ. Any requests for entry blanks must be accompanied by a stamped, self-addressed envelope. Use one 6¢ (or 7¢ if rates go up) stamp for each entry blank requested. Note that the deadline for advance Nats entry is June 15, 1969. If you miss that deadline, you must enter in person on July 14, and pay a substantial late entry fee. Either way you must register before you fly!

Indoor Nats Timing

The Indoor Nats will again be staffed entirely by AMA personnel - timing, paperwork - the whole project. It is virtually certain that each flier will have to time as many flights as he makes - time then fly! Juniors will be exempted, of course - so plenty of volunteer timing help will also be needed. Volunteer by sending your name to Box 545, Richardson, Texas 75080. If you can't help for the full eight hours, please note when you can!

NIMAS Awards

SILVER CAT. I HLG AWARD - 0:25.0, Hal Crane

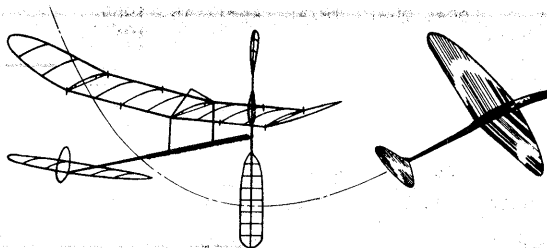
GOLD CAT. I HLG AWARD - 0:35.6, Rex Powell

HLG Plan Offered

Ron Wittman has offered to furnish a plan of "Tara 18" complete with full size outline drawings to any NIMAS member who will furnish a stamped, self-addressed envelope for the return of the plan. Send the envelopes to Box 545 Richardson, Tex. 75080. The plan includes info on the version which holds the Open OHLG record (19:32), and the Cat. II/III version which has won several places in Nats competition. This would be a good model for the 1969 Indoor Nats!

Please Have Patience!

If you have a NIMAS Award, or a NIMAS certificate coming, or if you wrote recently, it may be a while but you will hear from me! This winter has been especially busy; my total preparation for the Team Selection Program to date has been one box, one completed (but untested) model, and two model designs.



Because of the tight scheduling of the Team Selection Program, and the early Nats, the next two or three INAV's will be on a highly variable schedule. Stay cool!

Help Wanted!

It has been suggested that the NIMAS mailing list be broken down to a listing by states; this seems like a most useful thing to have. Will anyone handle the task of sorting the names and assisting in keeping the list up to date?

Competition Newsletter

One of the best ways to stay abreast of what is happening in AMA is to subscribe to the AMA Competition Newsletter. This is part of the new competition service which is offered to AMA members for \$3 per year. The newsletter is really outstanding, and content goes beyond AMA doings and covers technical matters.

FAI INDOOR REPORT

Team Selection Trials Schedule

CALIFORNIA - Edwards AFB. FAI Q-F - May 18, 1969. Entrants must contact Bob Randolph, 25145 Lawton Ave., Loma Linda, Cal. 92354 in advance so he can arrange for security clearance.

CALIFORNIA - San Francisco. May 25, 1969 at Cow Palace; FAI Q-F. FAI Semi on June 8, 1969. Joe Bilgri, 1255 Blackfield Dr., Santa Clara, Cal. 95051.

ILLINOIS - Chicago. FAI Q-F on May 4, 1969. Pete Sotich, 3851 W. 62nd Place, Chicago 60629. Call 312-PL 2-9006 or 312-PL 2-9795 (the armory) to check if a special drill has cancelled the session.

MICHIGAN - Detroit. FAI Q-F May 10, 1969 at Michigan State Fair Coliseum. Ed Stoll, 30471 Manse, Mt. Clemens, Mich. 48043.

NEW JERSEY - Lakehurst. FAI Q-F May 25, 1969; FAI Semi on June 29, 1969. Chester Wrzos, 184 Oak St., E. Orange, N. J. 07018 ph. 201-673-7951.

OKLAHOMA - Tulsa. FAI Q-F May 9, 1969, 5 pm to 10 pm. Note! This is a change of date and site! Bob Hanford 3838 South 88th E. Ave., Tulsa, Okla. ph. NA 7-6932.

TEXAS - Dallas. FAI Q-F on May 25, 1969. Dick Ganslen, 1204 Windsor, Denton, Tex. 76201 ph. 817-387-1969.

VIRGINIA - Hampton. FAI Q-F on May 17-18, 1969. Bob Champine, 360 Abingdon Circle, Hampton, Va. 23369

Qualification Trial Results

Qualifiers Via Contests

Name	Meet/Date	Time/Winning Time %
Bill Hulbert	Pittsburgh/4/12	14:08.5/14:08.5 100
Carl Jaeger	"	13:05/14:08.5 93
Ron Ganser	"	11:47/14:08.5 83
Dale Hacker	"	10:02/14:08.5 71
Lou Willis	"	9:32/14:08.5 67
Dr. Vernon Hacker	"	8:46/14:08.5 62

EDWARDS AFB QUAL. TRIAL (Bob Randolph sponsor)
 Robert Gibbs
 Paul Allen, Jr.
 Linda Randolph
 Fudo Takagi

CHICAGO AREA LOCAL QUAL. TRIAL, April 12, 1969 90' cell.

Erwin Rodemsky	16:04	27:47	43:59
Curtis Janke	19:55	22:12	42:07
Wayne Zink	18:14	16:52	35:06
Charlie Sotich	14:47	15:33	30:20
Wally Mumper	15:19	11:05	26:24

IRVINGTON, N. J. LOCAL QUAL. TRIAL, April 15, 1969
 Chester Wrzos 10:41
 John Triolo 10:13
 C. V. Russo 9:03
 Julius Rudy 8:37
 Richard Nawoyaki 7:52
 Emanuel Radoff 6:47

RECORDS? MAYBE!

FAI BENEFIT MEET, Bolling AFB, Apr. 19, 1969 Cat. I
 Hangar #2, 34.5' ceiling
 Open Paper Stick - 14:01, Bob Randolph
 Open Cabin - 12:54.2, Bob Randolph
 FAI LOCAL QUAL. TRIAL, April 12, 1969 CAT. II AMA
 Washington Park Armory, Chicago, Ill. 90' ceiling
 Open Paper Stick - 21:55.6, Jim Richmond
 AMA CAT II FAI - 33:20.5, Jim Richmond
 HAMPTON INDOOR CONTEST, April 26, 1969 Cat. I
 Willis School, 20' 6" ceiling
 Open Indoor Stick - 20:02.8, Hal Crane

POSSIBLE WORLD RECORD!

Hal Crane's 20:02.8 flight listed above was not only an unsteered flight, but it also fulfilled all requirements for a World Record. Hal had the foresight to have a World Record sanction in force, so he has filed to claim the record. The existing record is held by Jiri Kalina at 19:20, and Hal had to exceed that by 2% (exceed 19:43.2). If this flight is recognized, the next one will need to exceed 20:25. Hal's model was a 31.5" span "D" which weighed .0445 oz. and used .0415 oz. rubber. This is truly a magnificent achievement!

CONTEST CALENDAR

ILLINOIS - Chicago. Weekly indoor sessions at the Washington Park Armory, contingent upon National Guard drill schedules. HLG 9 am to noon and 4 pm to 5 pm; indoor rubber noon to 4 pm. Call Armory at 312-752-9006 or 321-752-9795 to check drill schedule before leaving home.

MARYLAND - Silver Spring. Indoor sessions at JFK High School, Apr. 18, May 1, 16, June 6, 13, 1969. Bill Saunders, 11613 Le Baron Terr., Silver Spring, Md. 20902 ph. 301-593-7196.

MICHIGAN - Detroit. Annual Indoor State Meet, May 3-4, 1969, State Fair Coliseum. Youth events May 3, 10 am to 3 pm; HLG, AMA CUB, PreFab, three age classes. Regular AMA events May 4, 9 am to 3 pm; HLG, Paper Stick, Indoor Stick, Flying Scale. Walter Hartung, 14759 Kilbourne, Detroit, ph. LA 7-7620.

NEW JERSEY - Irvington. Indoor sessions at Madison Ave. Elem. School, Apr. 15, 29; May 6, 13, 17' ceiling. Chester Wrzos, 184 Oak St., E. Orange, N. J. ph. 673-7951.

NEW YORK - Hicksville, L. I. Cat. II Indoor meet May 4, 1969, 8 am to 5 pm. Sponsored by LIAMAC, at Cantiague Park Skating Rink, Hicksville, L. I. Site is 50' high, 190' dia. dome. HLG, Easy B, Scale, Paper Stick, Indoor Stick. Bill Dunwoody, 985 Ft. Salonga Rd., Northport, Long Island, N. Y.

OHIO - Cleveland. Cat. I RT, Easy B Contest, May 4, 1969 at Euclid Arena, 22550 Milton Ave., Cleveland. 30' ceiling, 85' x 180' floor. Contest portion for age groups 0-13, 14-16, 16-20, over 20. Dr. Vernon Hacker, 25599 Breckenridge, Euclid, O. 44117, ph. 216-261-4990.

GEORGIA - Moultrie. Georgia State Championships at Spence AFB, May 3-4, 1969 (AAA) will have indoor May 3, 7:30 pm to 10:30 pm. Easy B, HLG, Paper Stick. Walt Rozelle, 1403 Midlawn Dr., Decatur, Ga. 30032 ph. 404-284-8110

WISCONSIN - Milwaukee. Indoor sessions 7:30 pm to 9:30 pm, May 8, 15, 22, 29, June 5, 1969 at Sherman Social Center, North 51st. St. and W. Locust St. Ken Kraemer, 3945 N. 41st. St., Milwaukee, Wisc. 53216

INDOOR WORLD CHAMPIONSHIP

Poland has withdrawn their offer to host the 1970 W/Oh because their site will not be finished. Romania has been accepted as alternate host, and the site will be the salt mine where Kalina did 39' with a 65 cm model. This site is 122 m below ground; 32.5 m wide, 65 m high and 120 m long. Drift is perhaps the lowest of any site in the world, but the temperature is constant at 9° or 10° C. More details and a site sketch next month!

NIMAS POSTAL MEET

Overall entry this year was somewhat bigger than last year, but youth entry was again pretty slim. All times are listed in seconds. The standard rubber fudge factor was used for rubber events (square root of the ceiling height ratio), and for HLG (except Jr.) the ratio of ceiling height was used since this has proved most equitable for small differences in height. The HLG Fudge graph was

used for Jr. HLG; this graph appeared in Oct. '66 INAV. All winners will receive NIMAS Certificates, and Junior entrants will receive a copy of the Bilgri reprint and a slide rule. The results:

OPEN EASY B	Time/ceiling	Fudge	Adj. Time
1. Clarence Mather	590/30'	1.16	690
2. Joe Pontecorvo	516/24'	1.31	674
3. Pete Patterson	492/24'	1.31	643
4. Jim Walters	392/24'	1.31	525
5. Howard Haupt	384/25'	1.28	492 (1st Senior)
6. Phil Hainer	383/25'	1.28	490
7. Joe Deady	367/24'	1.31	480
8. Rex Powell	395/31'	1.15	454
9. R. J. Dunham	453/41'	1.0	453
10. Fudo Takagi	352/25'	1.28	450
11. John Thornhill	318/30.5'	1.16	369
12. Martin Richardson	278/35'	1.08	301
13. Steve Kokita	169/25'	1.28	216

JUNIOR EASY B	Time/ceiling	Fudge	Adj. Time
1. R. J. Dunham II	467/41'	1.0	467
2. Kim Mather	255/25'	1.28	326
3. Neal Rozelle	287/35'	1.08	311

CLASS I OPEN HLG	Time/ceiling	Fudge	Adj. Time
1. Jim Walters	60/25'	1.0	60
2. Clarence Mather	59.5/25'	1.0	59.5
3. Nat Antonioli	59/25'	1.0	59
4. John Richards	49.4/25'	1.0	49.4

CLASS II OPEN HLG	Time/ceiling	Fudge	Adj. Time
1. Dan Belleff	76.3/34.5'	1.014	77.36
2. Don Teeples	72.9/34.5'	1.014	73.92
3. Dick Mathis	63.4/30.5'	1.15	72.91
4. Tom Peadar	63.3/30.5'	1.15	72.79
5. John Sites	68.4/34.5'	1.014	69.36
6. Bucky Serviates	65.9/35'	1.0	65.9
7. John Thornhill	65.2/34.5'	1.014	66.1
8. Tom Killough	56.3/31'	1.13	63.62
9. Bud Tenny	52.6/30.5'	1.15	60.49
10. Rex Powell	48.7/31'	1.13	56.16
11. Martin Richardson	52.6/35'	1.0	52.6

JUNIOR HLG	Time/ceiling	Fudge	Adj. Time
1. R. J. Dunham II	71.5/55'	1.0	71.5
2. Neal Rozelle	26.8/35'	1.40	37.6

SUB-JR. HLG	Time/ceiling	Fudge	Adj. Time
1. Jimmy Clem	30.9/30.5	1.0	30.9
2. Kristi Tenny	27.6/30.5	1.0	27.6

INDOOR STICK	Time/ceiling	Fudge	Adj. Time
1. Clarence Mather	972/22.3'	1.29	1252
2. R. J. Dunham	807/37'	1.0	807
3. R. J. Dunham II	716/37'	1.0	716 (1st. Jr.)
4. Walter Rozelle	449.9/21'	1.33	600
5. Carl Jaeger	540/35'	1.06	556

STATE OF THE ART

The model of the month is Dan Belleff's "Fluf-Duf" - which currently holds the Cat. I Open HLG record at 1:18.8 and has won or placed at many other meets. It is possible that Dan could tell you where to get full size plans, since this presentation is a blue-line print. Dan Belleff 204 Cedar Lane, Rockville, Md. 20851.

CALIBRATING INDOOR SCALES

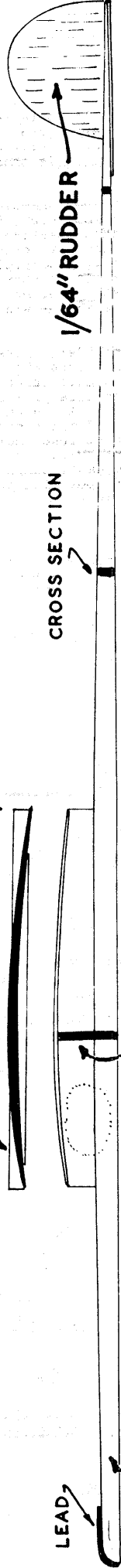
The March '64 INAV presented two indoor scales, and noted that weight for calibrating the scales could be made through access to precision laboratory balances. Bob Dunham has called to our attention an article "Direct Reading Indoor Scale" which appeared in the June '60 MAN. This is an interesting article about a different type of scale, but the real meat is in a chart of weights. Plain enamel covered magnet wire, obtainable at electronic supply houses, is made to close tolerances. The following chart gives the weight/inch of several wire sizes:

Wire Gage	Inches/Oz.	Wire Gage	Inches/Oz.
10	28.5875	26	956.25
12	37.41	28	1518.00
14	59.55	30	2415.85
16	94.575	32	3759.00
18	150.60	34	6097.50
20	239.25	36	9665.25
22	380.70	38	15369.0
24	602.25	40	24429.75

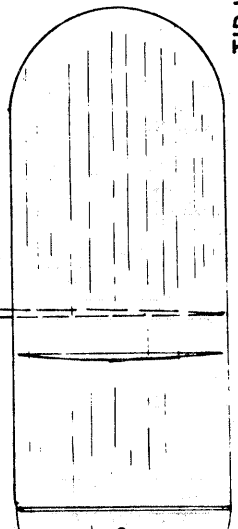
As an example of how to make a calibrating weight using the chart above, #34 wire is 6097.5 inches per ounce. A .001 oz. weight would then be 6.0975" long; if you can manage to measure it to just over 6.09" long it will be within .1% of the correct weight. Similarly, 15.06" of #18 wire would be exactly .1 oz.

Use care in making the weights for best accuracy. Be sure you use new, clean, unscratched wire, and get it as straight as possible to measure it. Use a machinist's ruler to measure the wire; file one end of the wire flat for reference and then cut and file the other end to the proper length.

WING SHAPED FROM 3/16" SUPER-LIGHT "C" GRAIN



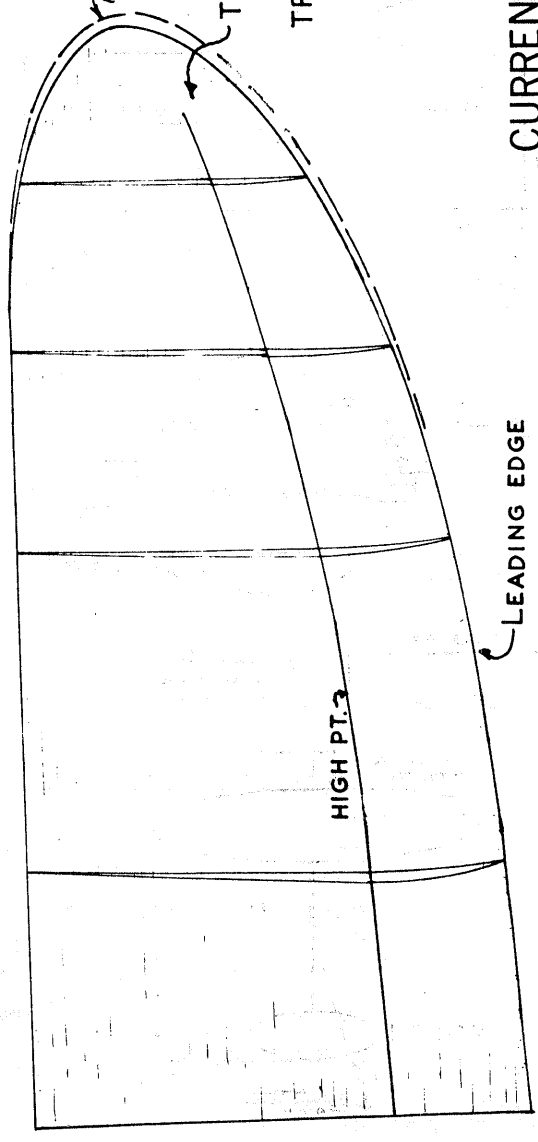
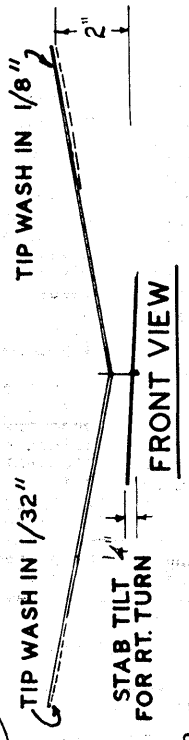
PYLON MOSTLY FOR HOLDING & FINGER CONTROL



STAB SHAPED AT CENTER; FLAT AT TIP

FLUFF-DUFF

DAN BELIEFF



TIPS SHOULD BE PAPER THIN

TRIM: RIGHT-RIGHT, GOOD RECOVERY IN BAD LAUNCHES DUE TO SHORT MOMENTS & SMALL STAB AREA. MODEL SHOULD WEIGH 5. GRAMS TOTAL. KEEP NOSE HIGH IN LAUNCH. DO NOT SNAP WRIST, ARM THROW BY JUMPING, USE SLIGHT "ENGLISH" FOR AID IN NEAR CEILING, PULL-OUT. SHIP HAS DONE 28.5 IN 21 FT.

CURRENT RECORD HOLDER CAT. I 1:188

BALLOON STEERING - ANOTHER LOOK

Balloon steering was covered in May '63 and June '65 INAV's. These two articles can be briefly summarized in the following remarks. The basics are simple, and only require practice - the higher the model the more practice becomes important. The most important single thing is to decide when to steer; do not delay in getting the balloon up while you decide. If you safely can do so, put the balloon up if you even suspect you will need it; then you can agonize to your heart's content and you are ready for the decision when it comes. If possible, the balloon should be much higher than the model, and the string must be pretty snug. A loose balloon will only wreck the model or catch the prop, since you can't move it as fast as you need to.

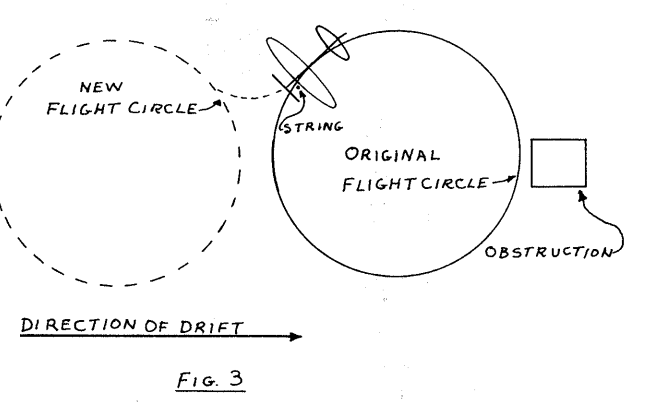
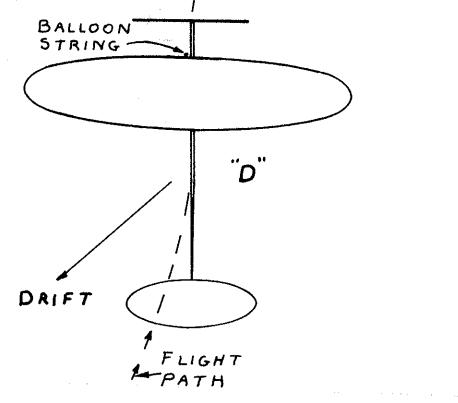
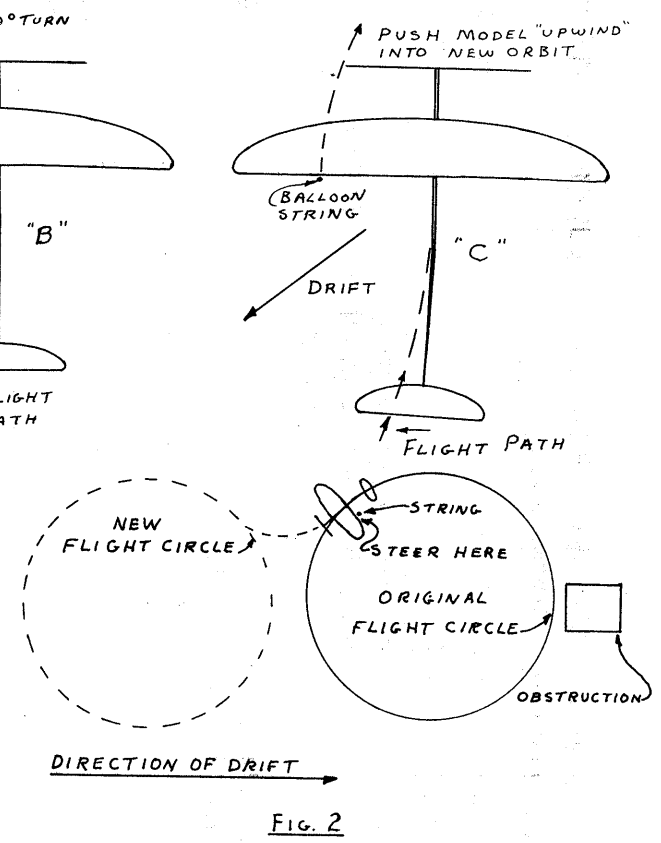
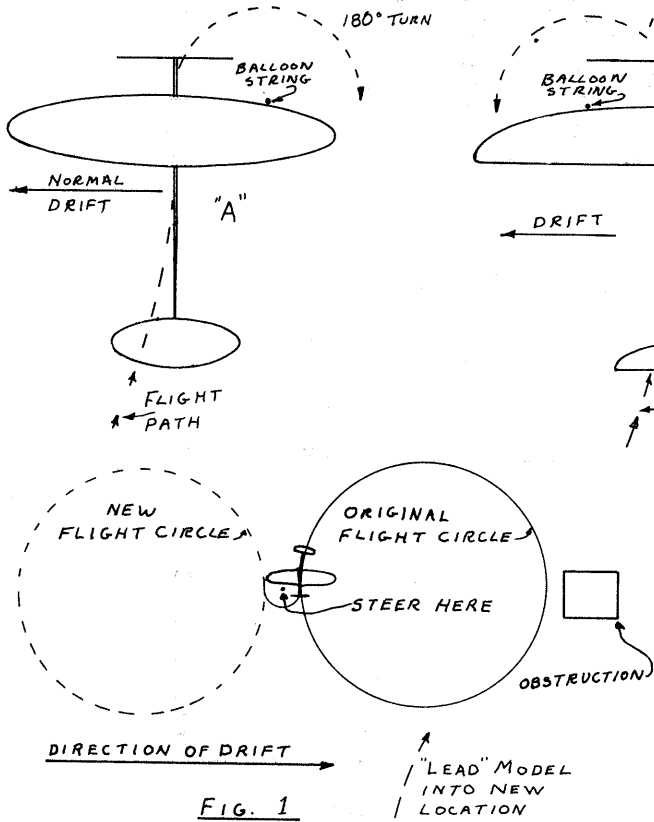
Three methods were discussed before, as illustrated in "A", "B" and "C" below, along with Fig. 1 & 2. "A" is the basic method outlined by Bruce Paton in 1963. The outboard wing is allowed to contact the string, and the model rotates 180° and you release it. Fig. 1 shows the action; the model winds up just over one flight circle upstream of its original orbit. Models in critical trim or those with extreme offset in the wing may either stall off the line or simply slide down the string.

This behavior can be overcome in some cases by using "B" or "C". In "B", the model is contacted on the inboard wing and allowed to pivot as before. Once again, models with critical trim may spin off the line if you do not use

a delicate touch. In "C", the model is contacted just behind the wing and is slowly pushed into a new orbit as in Fig. 2. You must move slowly in order to prevent a stall, but the model generally loses less altitude than with other methods.

An excellent method developed by Bob Champine is shown in "D" and Fig. 3. Incredible as it may seem, Bob passes the string through the prop arc (takes practice and timing to get it right!) and gets the string next to the inboard side of the motor stick. Now, with very careful moves, he "leads" the model where he wants it. It is easy to make one of two mistakes here - either stall the model by a sudden move and catch the prop, or snag the wing or prop as you release the model in the new orbit.

Two comments about rules are in order. First, AMA flights may not be steered; the time stops when you first touch the model. Second, FAI now permits three steers of fifteen seconds each per flight, and this is a lot of time which relieves the pressure somewhat. Although no clear ruling has ever been made, it is the opinion of most U.S. officials that you must break loose at least momentarily at the end of the fifteen second interval. It is to your advantage to do this anyway; if you can't complete a steer in 15 seconds you are either out of position or too tense to do it in unlimited time. Break away, take a couple of deep breaths and try on the next circle!



INDOOR

NEWS and VIEWS

\$2/ YEAR NIMAS DUES \$1/YR ADDITIONAL

Editor: Bud Tenny · Box 545 · Richardson, Texas · 75080

****NATIONAL INDOOR MODEL AIRPLANE SOCIETY****

New Members

PAUL H. ALLEN, JR., 18821 E. Leandora Ave., Glendora, Cal. 91740
 CHARLES E. BRAZZEL, 3616 Hester Lane, Huntsville, Ala. 35810
 FRED EMMERT, 300 Davey Glen Rd., Apt. 3509, Belmont, Cal. 94002
 HOWARD HAUPT, 5714 Bakewell St., San Diego, Cal. 92117
 TOM KILLOUGH, 7805 Mallard Rd. SW, Huntsville, Ala. 35802
 WILLIAM NAKASHIMA, M.D., 21707 McCoy Ave., Riverside, Cal. 92508
 VIRGIL A. SANDBORN, 917 Cheyenne Dr., Ft. Collins, Colo. 80521

Honorary Members

EDUARDO GRIPPO, Av. Mitre 2028, Florida Prov. Bs. As. Argentina

Family Memberships

PETER A. SANDBORN, 917 Cheyenne Dr., Ft. Collins, Colo. 80521

Indoor Nats - Reminder

The deadline for advance entry in the 1969 Nats is June 15, 1969. After this date you must enter in person at Willow Grove NAS, near Philadelphia, Pa., and pay a substantial late entry fee. However you enter, you must register at Willow Grove NAS before you fly indoor events at Lakehurst, N. J. Registration at Willow Grove opens at 8 am on July 14, 1969, and the Indoor Rubber events begin at noon the same day. This calls for prompt registration and an immediate trip to Lakehurst. A special line will be set up to facilitate indoor registration, and Pete Sotich has made available maps showing the fastest route from Willow Grove to Lakehurst.

Meanwhile, Senior and Open indoor contestants will have to share the timing load by the time-a-flight-fly-a-flight system. Also, volunteer help is needed to help officiate and time Junior flights. A few people have offered their services, but quite a few more are needed. Volunteer by sending your name to Box 545, Richardson, Texas 75080. Be sure to specify when you can help if you can't help with Rubber on July 14 and HLG or Scale in July 15.

Indoor Scale At Nats

Besides the regular AMA sponsored Indoor Scale event (monoplane and multiplane combined with trophies to 3rd in each age group), there will be two other scale events sponsored by NFFS. The first is the Navy Event - for any prop driven navy (any nationality) airplane - flown to AMA rules and judged by Navy personnel - all ages combined plus Jr. high point - trophies by NFFS. The second event is Peanut Scale, using official Peanut rules and with trophies by Bill Hannan.

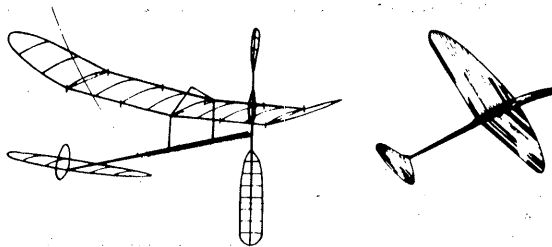
Scale registration! For the AMA event you must register at Willow Grove. For the Navy Scale and Peanut Scale event you can register:

1. By mail with Jim Hanst or Paul Kastory prior to July 1, 1969. (Jr. & Sr. \$1; Open \$1.50)
2. In person at Lakehurst NAS, before 12 noon on July 15, 1969. (Jr. & Sr. \$1.50; Open \$2)

Jim Hanst Box 421, R. D. 2 Valencia, Pa. 16059
 Paul Kastory 37 Tanglewood Dr., R.D. 3 Valencia, Pa. 16059

NFFS Symposium

The 1969 NFFS Symposium will be held Tuesday evening July 15, 1969 at the Chapel of Willow Grove NAS. The Symposium Report will be published in time for delivery at



the Symposium, and the price will be \$3.50 per copy for AMA members or \$4.50 for non-AMA members.

The Report contains 14 papers by recognized fliers of FF and Indoor. Tom Valles contributed a paper "Hall Meteorology, Geometry and Low Ceiling Endurance" which casts a lot of light on the problems of flying indoor under less than ideal conditions.

If you missed the 1968 Report, it can be had along with the 1969 Report for \$6, sale beginning at the Nats. Advance orders for either the 1969 Report by itself or the combo offer (request the 1968-1969 Combo) by sending a check for the proper amount to Dick Lyons, 717 Thomas Court, Libertyville, Ill. 60048 prior to July 15, or to Annie Gieskieng, 1333 S. Franklin St., Denver, Colo. 80210 after July 15, 1969.

FF/Indoor Ballot

Subscribers to AMA's Competition Newsletter and NFFS members received a ballot (the AMA ballot covers all model categories, while the NFFS ballot covers only FF/Indoor) which should be acted upon immediately. These really are not ballots, but are opinion polls. Speaking as a former CB member and Chairman, it is highly frustrating to try to determine membership attitudes toward proposed rules; and this "ballot" is an attempt to get inputs from more of the membership. Rather than gripe about rules changes after the fact, express your opinions through these ballots!

The indoor portions of the rules proposals deal with indoor cabin definitions and a proposed change in definition of indoor official flight. I hope that the presentation below comes out - it is reproduced from Competition Newsletter. It is a shame that AMA HQ has not seen fit to publicize these in the official publication (AAM)! On the basis of the info presented below, express your opinion to the FF/Indoor member of your district (listing in each AAM) or to Joe Boyle, FF/Indoor Chairman, 219 Shenandoah Rd., Hampton, Va., 23361 immediately!

Indoor Official Flight, Definition
 8.14. Existing and New. The FFCB is currently taking an initial vote on a proposal to revise rule book paragraph 8.14, 8.14a, 8.15 and 8.16 as follows:
 "8.14 Official Flight. Each contest shall be divided into a total of two flights. All flights are official flights regardless of duration. Delayed flights are not recognized, with one exception (see 8.16). Flights during which any part is dropped shall be considered an official flight with no time recorded."
 "8.15 Official Flight. An indoor flight occurs when a model starts the flight on its own power, or is launched by hand or by another contestant who is attempting to retrieve a model. At this point the contestant can make a decision as to whether the flight will continue until the flight is complete or call it a no flight (no time or no attempt is recorded). He must make that decision immediately and cannot reverse it later."
 "8.16 Timing of Flights. Every time paragraph by shortening as follows: "If the model does not free flight within the 10 seconds allotted, the watch shall be stopped, 10 seconds deducted from the time indicated, and the result recorded." (Delete the balance of the paragraph.)

Indoor Cabin. Comments on this subject have resulted in the chairmen circulating a proposal for initial vote providing for the maximum cross-section to be taken at some point on the fuselage which contains the rubber motor. At the same time, two cross-sections are being circulated for initial vote: one provides for the maximum cross-section to be taken at a point 1/2 the fuselage length, measured from the front of the nose block. The other provides for choosing into para. 8.14 rather than the existing rule book. The maximum cross-section must occur at some point on that portion of the fuselage which houses the motor(s). The surface area of that portion of the fuselage which houses the motor(s) shall not be less than 90% of the total surface area covered with a material which does not contribute to the compression load carrying capabilities of the fuselage.

Junior NIMAS Awards

GOLD CAT. II RUBBER AWARD - 20:52, Terry Buddingh

FAI INDOOR REPORT

Qualifier Notification

Very little has been said about it this year (not even by AMA HQ), but it is very important for any qualifier who finds himself unable to advance to the next round to let this be known. No matter why you can't fly in the next round - you must notify the first runner-up from the Quarter-Final that you qualified in. You really should tell AMA HQ and Clarence Mather (Program Manager). This used to apply to the complete indoor program, but it applies to Q-F and Semi qualifiers only now. So, if your name is listed in any of the results from Quarter-Final Trials below and you can't make it to any of the Semi-Finals listed, let this be known as soon as you decide! If you don't know who the runner-up is, contact the CD of your Q-F and

have him notify the runner-up. Clarence Mather's address is: 3880 Ecochee Ave., San Diego, Cal. 92117.

Semi-Finals Schedule

- WEST COAST - June 14-15, 1969. Cow Palace in San Francisco, 98' ceiling. Tentative schedule - 2 flights 6/14; 4 flights 6/15. Joe Bilgri, 1255 Blackfield Dr., Santa Clara, Cal. 95051.
- NORTH CENTRAL - June 21-22, 1969. Michigan State Fair Coliseum in Detroit, 65' ceiling. 3 flights on 6/21; 3 flights 6/22. Paul Crowley, 32604 Tecla, Warren, Mich. 48093, ph. 313-294-0266.
- SOUTH CENTRAL - June 21, 1969. John Mabee Gym at Tulsa University, 32' ceiling. 6 flights 8 am to 5:30 pm on 6/21. CD Bill Salnikov, 9906 S. Yale, Tulsa, Okla. 74135.
- EAST COAST - June 29, 1969. Hangar #5 at Lakehurst, N. J. 150+' ceiling. Chester Wrzos, 184 Oak St., E. Orange, N. J. 07018, ph. 201-673-7951.

Qualification Trial Results

- DETROIT AREA LOCAL QUAL. TRIAL, Apr. 13, 1969, 65' ceiling
- | | | | |
|-----------------|-------|-------|-------|
| Dick Kowalski | 22:34 | 24:15 | 46:49 |
| Bob Bienenstein | 20:26 | 20:45 | 41:11 |
| Pat Green | 19:37 | 21:19 | 40:56 |
| Ed Stoll | 18:26 | 21:05 | 39:31 |
| Paul Crowley | 17:21 | 18:19 | 35:40 |
| Paul Simon | 16:47 | 18:21 | 35:08 |
| Hardy Brodersen | 15:09 | 18:13 | 33:22 |
| Don Roberts | 12:48 | 16:39 | 29:27 |
- CHICAGO AREA QUARTER FINALS, May 4, 1969, 90' ceiling
- | | | | |
|----------------|-------|-------|-------|
| Erwin Rodemsky | 23:29 | 22:06 | 45:35 |
| Charlie Sotich | 21:24 | 21:03 | 42:27 |
- TULSA AREA QUARTER FINALS, May 9, 1969, 37' ceiling
- | | | | |
|---------------|--|--|-------|
| Bob Dunham | | | 22:59 |
| Bobby Dunham | | | |
| Jim Gardner | | | |
| Bobby Hanford | | | |
- ST. LOUIS AREA QUARTER FINALS, 50' ceiling.
- | | | | |
|-----------------|-------|-------|-------|
| Paul Tryon | 12:02 | 11:54 | 23:56 |
| Dick Hardcastle | 10:55 | 11:24 | 22:19 |
| Tony Schott | 9:04 | 9:30 | 18:34 |
| Nan Tryon | 4:33 | 6:47 | 11:20 |
- DETROIT AREA QUARTER FINALS, May 10, 1969, 65' ceiling
- | | | | |
|-----------------|-------|-------|-------|
| Paul Crowley | 18:44 | 12:37 | 31:21 |
| Dick Kowalski | 12:53 | 17:25 | 30:18 |
| Pat Green | 19:27 | 8:47 | 28:14 |
| Bill Hulbert | 12:38 | 12:31 | 25:09 |
| Bob Bienenstein | 11:20 | 11:05 | 22:25 |
| Carl Jaeger | 7:08 | 8:55 | 16:03 |
- VIRGINIA AREA QUARTER FINALS, May 17-18, 1969, 20' ceiling
- | | | | |
|--------------|-------|-------|-------|
| Bob Champine | 17:04 | 18:10 | 35:14 |
| Hal Crane | 16:11 | 18:16 | 34:27 |
| Tom Vallee | 14:50 | 18:17 | 33:07 |
- SOUTHERN CALIF. QUARTER FINALS, May 18, 1969, 75' usable
- | | | | |
|-----------------|-------|-------|-------|
| Bob Randolph | 24:24 | 23:40 | 48:04 |
| Bill Gibbs | 20:57 | 18:11 | 39:08 |
| Bob Gibbs | 19:34 | 18:09 | 37:43 |
| Warren Williams | 18:29 | 18:08 | 36:37 |
| Linda Randolph | 18:16 | 17:32 | 35:48 |
| Paul Allen | 18:26 | 16:36 | 35:02 |
- NORTHERN CALIF. QUARTER FINALS, May 25, 1969, 98' ceiling
- | | | | |
|------------|-------|-------|-------|
| Bud Romak | 29:04 | 29:00 | 58:04 |
| Joe Bilgri | 19:37 | 22:35 | 42:12 |
| Lew Gitlow | 20:55 | 16:20 | 37:15 |
| Carl Rambo | 17:00 | 16:08 | 33:08 |
- LAKEHURST AREA QUARTER FINALS, May 25, 1969, 150+' ceiling
- | | | | |
|--------------|-------|-------|-------|
| C. V. Russo | 27:07 | 32:11 | 59:19 |
| Pete Andrews | 27:07 | 31:49 | 58:56 |
| John Triolo | 26:42 | 25:45 | 52:27 |
| Julius Rudy | 24:18 | 23:46 | 48:04 |
| Jim Vale | 20:35 | 19:00 | 39:35 |
- NORTH TEXAS AREA QUARTER FINALS, May 25, 1969, 30' ceiling
- | | | | |
|--------------|-------|-------|-------|
| Stan Chilton | 14:57 | 15:45 | 30:32 |
| Bud Tenny | 12:15 | 11:41 | 23:56 |
| Dick Ganslen | 12:06 | 10:24 | 22:30 |
| Jim Clem | 11:27 | 9:11 | 20:37 |
| Kristi Tenny | 7:41 | 8:43 | 16:24 |
- CLEVELAND AREA QUARTER FINALS, May 25, 1969, 33' ceiling
- | | | | |
|-------------------|------|-------|-------|
| Ron Ganser | 5:55 | 10:31 | 16:26 |
| Ronnie Ganser | 6:22 | 7:43 | 14:05 |
| Dr. Vernon Hacker | 6:44 | 5:53 | 12:37 |
| Lou Willis | 5:42 | 6:12 | 11:54 |

FAI Finals

Although no final announcement has been made, it has been indicated by the program manager (Clarence Mather) that the Team Selection Finals will be held at Lakehurst in the time following the Nats events. That is, from 8 pm to midnight on July 14, 1969 and from 5 pm to midnight on July 15, 1969. The site is firm, but possible alternative flying times are being considered.

RECORDS? MAYBE!

- ST. LOUIS INDOOR MEET, Apr. 20, 1969 Cat. I
East St. Louis Armory
Open Cabin - 13:44.4, Bob Randolph
- VIRGINIA AREA QUARTER FINALS, May 17-18, 1969 Cat. I
Willis School, 20'6" ceiling
Open AMA Cat. I FAI - 18:17.8, Tom Vallee

CONTEST CALENDAR

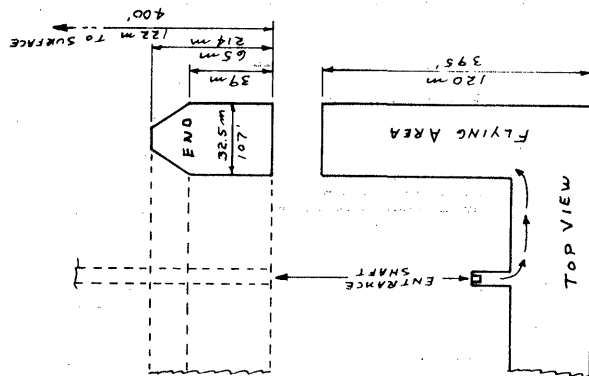
- ILLINOIS - Chicago. Weekly indoor sessions at the Washington Park Armory, contingent upon National Guard drill schedules. HLG 9 am to noon and 4 pm to 5 pm; indoor rubber noon to 4 pm. Call Armory at 312-752-9006 or 312-752-9795 to check drill schedules before leaving home.
- MARYLAND - Silver Spring. Indoor session at JFK High School, June 13, 1969. Bill Saunders, 11613 Le Baron Terrace, Silver Spring, Md. 20902, ph. 301-593-7196.
- OKLAHOMA - Tulsa. Tulsa Glue Dobbers 20th Annual (AAA) Model Airplane Championships will have a full slate of outdoor events (FF, CL & RC) plus: IHLG (Jr. & Sr.-Op.); Easy B (Jr. & Sr.-Op.); Scale (Jr. & Sr.-Op.); Paper Stick and Indoor Stick. 4 pm to 10 pm, July 4 and July 5, 1969.

STATE OF THE ART

Bobby Dunham won Indoor Cabin at the 1968 Nats and placed 2nd in Indoor Stick with the dual design featured this month. It was designed his dad, and the design is excellent for Juniors. The cabin design has two unique features which make it especially adaptable for Juniors - the fuselage is based upon a rolled tube which has lightening holes cut in it; while the thrust bearing is similar to normal indoor stick practice. Winding is done from the rear with prop in place, which leaves only tail hook-up after winding.

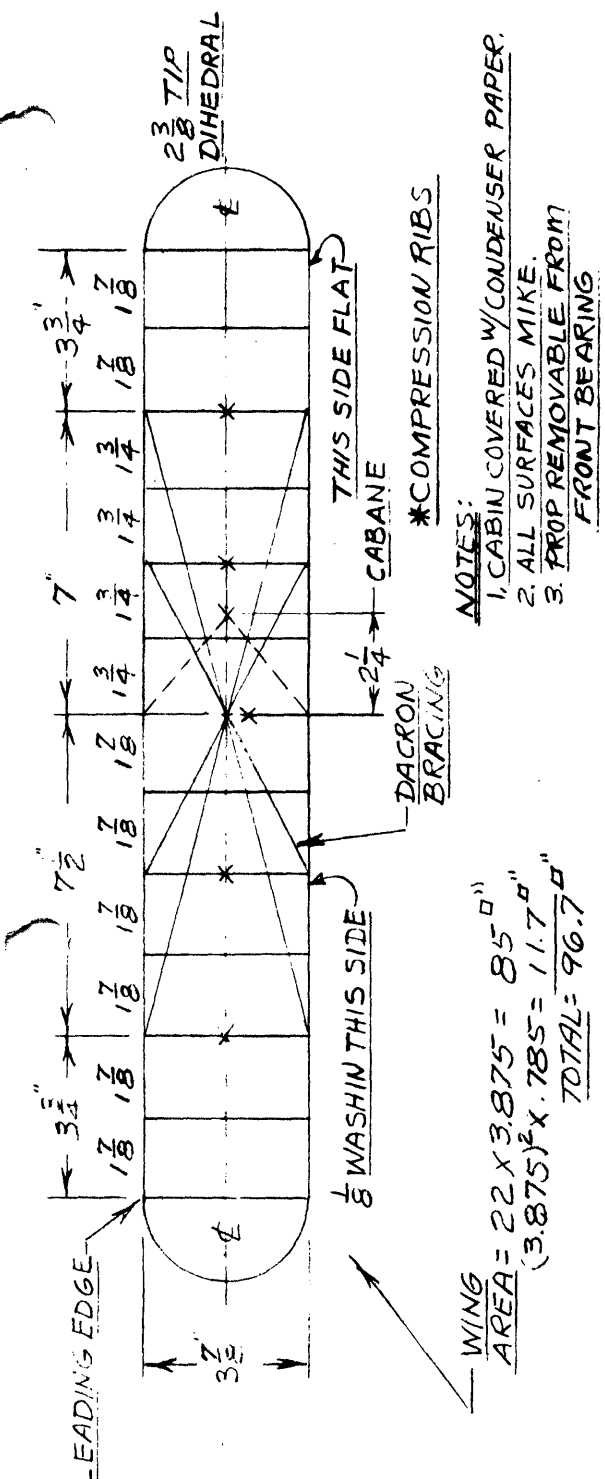
INDOOR WORLD CHAMPIONSHIP

The May '69 INAV announced that the 1970 W/Ch was to be relocated to Slanic Prahova - that fabulous salt mine in Romania. The sketch below was copied from info furnished by Rudolf Cerny of Czechoslovakia. The site is out in the middle of a football-shaped salt dome which is 1.5 miles long, with oval cross section about 1/2 mile x 1/4 mile in size. Air temperature in the mine is constant at 9° to 10° C, or 48° to 50° F. Humidity is normally just under 50% except in the summer, when it rises appreciably. Therefore, the W/Ch will be scheduled in March, April or May. The drawback of low temperature is mostly offset by complete absence of drift, so the 100' width is not a problem. Cerny has said this is probably the best indoor site in the world, and it sounds like it!



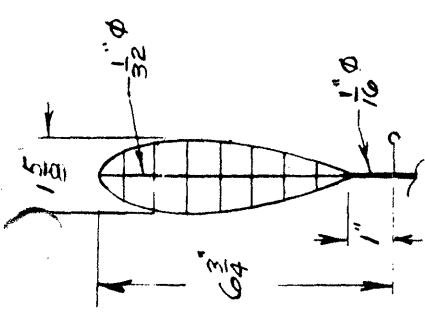
Mini - INAV?

This issue is somewhat abbreviated - the alternative was to make up a full issue later, after the models were ready for the Semi. I chose this route to insure that the more important flying schedules, rules matters, etc. could go in time to help where needed. So, whatever was on hand and ready is what you get!



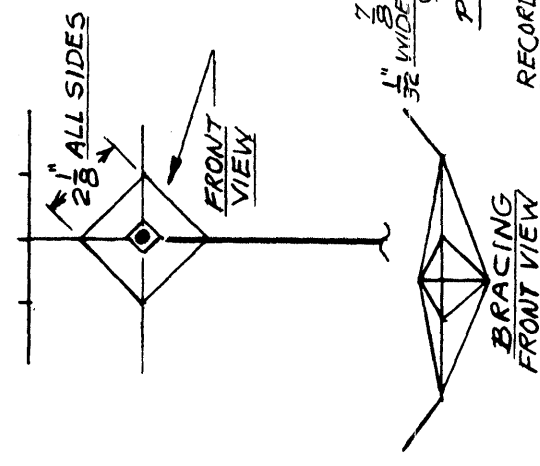
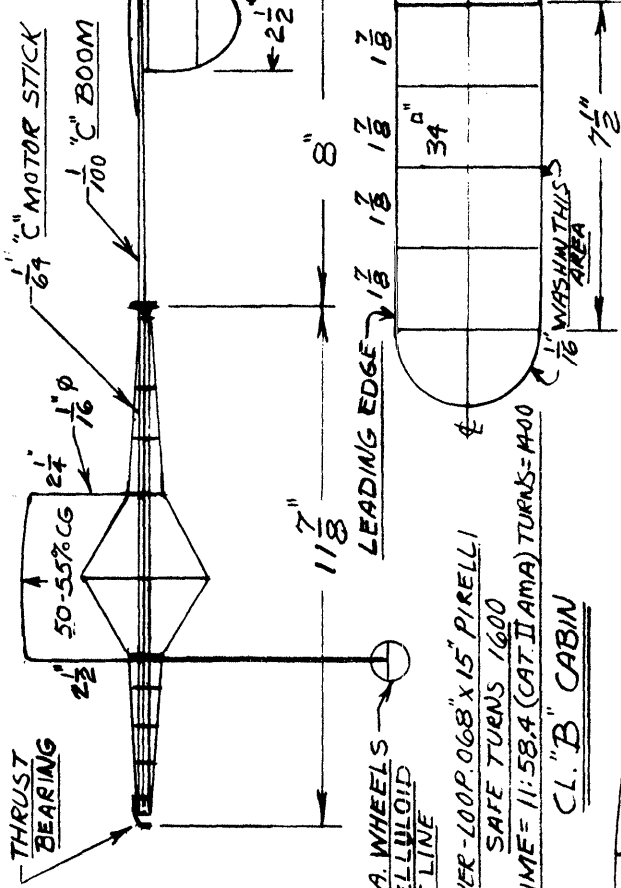
NOTES:
 1. CABIN COVERED W/ CONDENSER PAPER.
 2. ALL SURFACES MIKE.
 3. PROP REMOVABLE FROM FRONT BEARING

WING AREA = $22 \times 3.875 = 85.25$
 $(3.875)^2 \times .785 = 11.7$
TOTAL = 96.7



PROP - 1 1/2 X 22

BARE WT. = .056 OZ.
MOTOR WT. = .047 OZ.
TOTAL = .103 OZ.



BARE WT. = .034 OZ.
MOTOR WT. = .033 OZ.
TOTAL = .067 OZ.

CL. B MIKE COVERED STICK

POWER-LOOP .068" X 15" PIRELLI
 SAFE TURNS 1600
 RECORD TIME = 11:58.4 (CAT. IAMA) TURNS = 1400

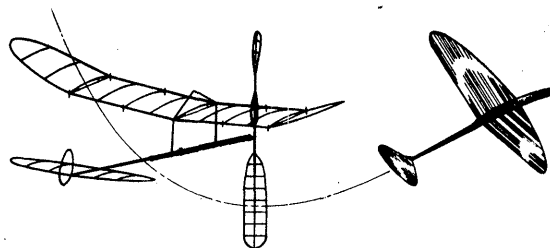
POWER-LOOP .045" X 16" PIRELLI
 SAFE TURNS 2000
 RECORD TIME = 15:23 (CAT. IAMA)
 TURNS = 1600

SCALE: 1/4 SIZE

INDOOR

NEWS and VIEWS

\$2/ YEAR NIMAS DUES \$1/YR ADDITIONAL



Editor: Bud Tenny · Box 545 · Richardson, Texas · 75080

THE 1969 INDOOR NATS

Indoor Stick		Paper Stick		Indoor Cabin		Indoor HLG	
Junior		Junior		Junior		Junior	
1. Ronny Ganser	22:55.6	1. Ronnie Ganser	10:20.1	1. Ronnie Ganser	15:37.2	1. Mark Kerr	105.0
2. Michael Kuehne	12:03.2	2. Michael Kuehne	8:58.2	2. Michael Kuehne	8:22.9	2. David Belleff	99.0
3. William Schlarb	7:56.0	3. Brian Webster	8:47.0	3. Barry Pallet	4:12.0	3. Donald Ganser	97.5
4. Michael Porykaza	6:12.2	4. James Haught	7:39.5	4. Bruce Pallet	3:56.0	4. Warren Carter	95.2
		5. Bruce Pallet	7:39.4	5. William Schlarb	3:55.5	5. David Pfeiffer	90.8
		6. William Schlarb	6:59.0	6. James Mills	2:55.0	6. Brian Pardue	89.0
		7. Barry Pallet	5:57.2	7. Justin Mills	2:10.8	7. William Schlarb	84.6
		8. Phill Lawry	5:15.2			8. Richard Sherman	84.6
		9. Justin Mills	3:31.0			9. Justin Mills	84.5
		10. Jason Tryon	3:14.2			10. Matthew Mills	83.2
Senior		Senior		Senior		Senior	
1. Dale Hacker	16:51.1	1. Dan Domina	14:49.4	1. Dan Domina	9:43.0	1. M. Thompson	123.6
2. Dan Domina	14:51.8	2. Jan Serviates	14:00.0	2. Jan Serviates	9:28.0	2. Jan Serviates	122.1
3. Jan Serviates	13:54.4	3. Susan Weisenbach	13:54.5	3. Terry Kuehne	7:08.0	3. Gary Myers	112.9
4. Terry Kuehne	9:54.0	4. Terry Kuehne	10:12.9	4. Dale Hacker	6:50.8	4. George Brown	111.7
5. Susan Weisenbach	9:09.5	5. Francis Donnelly	9:55.0	5. Susan Weisenbach	5:11.0	5. Ken Fitch, Jr.	108.8
6. Ken Fitch, Jr.	4:53.6	6. Paul Andrews	5:06.2	6. Ken Fitch, Jr.	1:10.2	6. Henry Nixon	106.0
		7. Ken Fitch, Jr.	4:25.8			7. Denny Dock	103.3
		8. Dale Hacker	4:03.0			8. Susan Weisenbach	103.0
Open		Open		Open		Open	
1. Ron Plotzke	42:53.0	1. Jim Richmond	26:56.0	1. Jim Richmond	22:43.2	1. Rudy Klumber	152.2
2. Joe Bilgri	38:21.4	2. Ed Stoll	21:17.3	2. Bucky Serviates	22:42.6	2. Bucky Serviates	135.1
3. John Triolo	37:56.6	3. Al Rohrbaugh	20:54.1	*3. Bob Randolph	21:12.8	3. Donald Reed	134.1
4. Jim Richmond	37:00.5	4. Charlie Sotich	18:15.0	4. Al Rohrbaugh	21:07.5	4. Larry Miller	131.0
5. Pete Andrews	35:09.2	5. Dan Belleff	18:08.7	5. Ron Ganser	15:05.0	5. Ron Higgs	127.5
6. C. V. Russo	33:45.4	6. Pete Andrews	17:09.0	6. Warren Williams	14:19.0	6. Jim Kutkuhn	127.1
7. Al Rohrbaugh	33:20.0	7. Bob Randolph	16:47.0	7. Hal Crane	12:33.6	7. Robert Gutai	124.6
8. Bud Romak	30:46.0	8. Phil Klintworth	16:45.2	8. Charlie Sotich	5:43.2	8. Dan Belleff	123.9
9. Ron Ganser	29:24.8	9. Tom Vallee	16:33.6	9. Tom Vallee	0:41.2	9. James Mills	121.9
10. Bob Randolph	29:01.0	10. Bob Clemens	16:20.0			10. John Pfeiffer	111.0

*Once again, Randolph's cabin model (reworked from last year) was under consideration for legality by the FFGB. He was allowed to fly, pending a ruling by the CB. Now, it gets more complicated. Frank Ehling (Technical Director of AMA) had also polled the entire Contest Board on the legality of the model and did not have the results back yet. Nats Tabulation officials felt that trophies should be held up pending a ruling of the FFGB, but John

Worth directed that trophies be awarded and to note on the published results that a Contest Board ruling was pending. If the ruling went against Randolph, the trophies were to be shuffled to reflect this placing: Rohrbaugh - 3rd; Ganser - 4th; Williams - 5th. Meanwhile, the FFGB ruled (in Nats meeting) that the model was illegal and Ehling was notified. Presumably, no further action was taken pending results of the poll of the whole CB.

1969 NATS COMMENTARY

The very first event of the Indoor Nats occurred the day before at the FAI Finals. Thanks to a special effort by AMA HQ, both late Nats entry and Nats registration was possible for all Semi-Final qualifiers; this was conducted at the hangar during the Finals. Very commendably, HQ waived late entry fees and made the on-site registration available when it was realized that FAI participants had been unavoidably shortchanged. The problem was that none of the FAI participants knew exactly when the Finals would be held. The announcement of Sunday, July 13 for the time of the Finals came two weeks after deadline for Nats entry and this was the first inking qualifiers had that the Finals would not conflict with the Nats. Thanks to the special HQ effort, several FAI fliers entered the Nats when they could not have done so otherwise.

On the other side of the coin, HQ adopted a very inflexible attitude about regular Indoor Nats registration which caused entrant hardship and outright boycott by some Eastern fliers. HQ had a very real and vexing problem regarding registration - in times past registration had been conducted simultaneously at the indoor site and at the Navy base. Not only did this create the need for dual records for about 20% of the total Nats entry, but for dual crews - both Navy (housing and mess) and AMA. In the case of limited housing, it was impossible to be fair in allotting housing priorities with two simultaneous registration operations.

Their solution was to require on-base registration for all indoor contestants. This was quite reasonable in itself. However, all registration opened only four hours before official flying began at Lakehurst - about two hours away unless you were intimately familiar with the route. In effect, indoor rubber entrants were limited to two hours to register. Those who lived near Lakehurst had two alternatives - drive to the vicinity of Willow Grove the day before and spend the night in a motel, or to leave home that morning, drive to Willow Grove and register, then drive to Lakehurst - 4 hours of driving in all. Those who were not FAI participants simply didn't enter.

Anyone who tried to express these problems or suggest an alternate procedure (many such procedures having been proved satisfactory in past Nats) met with a stone wall of indifference, lack of communication and/or outright rejection. It is extremely unfortunate that the situation came up, and even more unfortunate that there was no possible recourse and no discussion permitted.

The meet itself went smoothly. CD Chet Wrzos, who was recruited the day before, kept on top of everything and ran an excellent meet. Joyce Jaeger and Jody Tenny did an excellent job of running the desk and recording times as they came in, while Bob Champine processed cabin models and paper stick models. A limited number of Navy timers were on hand, and were supplemented by volunteer timers.

gathered from spectators and contestants. Flying conditions were almost uniformly good during the 8 hour flying time, and people took their flights without causing such a big pile-up in final hours of the meet as had been the case in past years.

In Indoor Stick, Richmond was working with a handicap, since his 41:45 model had collapsed when wound with a larger motor. Joe Bilgri and a few others were flying with D ships, but John Triolo and Pete Andrews flew FAI models and did quite well. Suddenly word was passed that Ron Plotzke was making a real good flight. The first reaction was "Ron who?" But then people began to remember that Ron Plotzke was an active and very competent member of the Detroit Balsa Bugs prior to 1961. Just how good Ron is became clear as his "300" landed at 42:43 on the first full wind-up. The model combined some new parts and some parts Ron had flown in the same hangar at the 1961 Nats - I sure wish my models kept that well!

Richmond didn't make another "40", but his Nats flight was his second longest flight ever. John Triolo set a new personal record with his FAI which may be the third longest 65 cm flight ever: Richmond's 41:45; Kalina's 39:18 and then John's 37:56.

FAI INDOOR FINALS

	I	II	III	IV	V	VI	Total
1. Jim Richmond	26:53	34:32	41:45	33:23	13:25	33:24	76:17
2. Pete Andrews	26:50	-	17:50	32:39	33:08	34:15	67:23
3. Clarence Mather	32:03	22:41	32:34	19:35	28:16	22:15	64:37
4. John Triolo	25:10	22:37	27:04	28:53	20:21	35:00	63:53
5. C. V. Russo	31:01	31:30	28:46	7:41	32:06	16:05	63:36
6. Joe Bilgri	24:42	26:16	31:01	32:29	28:57	27:14	63:30
7. Erwin Rodemsky	5:26	28:46	25:37	24:44	33:31	13:25	62:17
8. Bud Romak	29:22	30:19	31:04	16:20	27:03	11:27	61:23
9. Al Rohrbaugh	15:14	25:09	29:04	25:13	32:08	28:59	61:07
10. Dick Kowalski	0:14	30:57	0:27	11:06	28:59	0:28	59:53
11. Bob Randolph	27:51	30:13	27:36	11:32	26:04	-	58:04
12. Bill Hulbert	0:27	26:29	22:34	24:09	26:47	28:37	55:24
13. Paul Tryon	17:28	19:14	21:36	9:33	13:54	23:30	45:06
14. Bud Tenny	14:57	15:57	20:38	22:19	-	16:54	42:57
15. Stan Chilton	12:51	-	-	-	-	-	12:51

Fifteen men, calm but humid air in Hangar #5 at Lakehurst, and a crew of dedicated timers under the direction of CD Chet Wrzos - that's what it took to stage the 1969 Team Selection Finals. Jim Richmond, Clarence Mather and Al Rohrbaugh were the 1968 Indoor Team, and had a "bye" into the Finals, while the other 12 entrants qualified by winning at their respective Semi-Finals.

Monday morning quarter-backing of an event such as the Finals always includes a discussion of "the best time to fly". It seems safe to say that it made very little difference at this meet. No matter how you look at it, each round had a share of the high times. Each round had at least one flight longer than 32 minutes. The ten longest flights were pretty evenly spread out. The first came in Round II; III through V had two apiece and Round VI had three of the 10 longest. That score seems to give an edge to Round VI, but that round was cut short by a heavy rain which ruined the calm air and cut short flights by several contestants, including Richmond and Rohrbaugh.

First round times were not unusually high, with Mather, Russo and Romak leading. Russo moved into 1st in Round II followed by Richmond, Romak, Randolph and Mather. Round III - Richmond's 41:45 flight drew good wishes as it was apparent that it would be good, then cheers as it landed. Jim was clearly the leader, and Clarence Mather's second good flight put him in second by about two minutes. Five fliers appeared to be able to beat that 2 minute margin -

****NATIONAL INDOOR MODEL AIRPLANE SOCIETY****

New Members!

BOB BIENENSTEIN, 9821 Colwell, Allen Park, Mich. 48101
 J. G. PAILET, 30 Emerson Rd., Brookville, Glen Head,
 N. Y. 11545
 RON J. PLOTZKE, 36659 Ledgestone, Mt. Clemens, Mich. 48043

Family Memberships

BRUCE & BARRY PAILET, 30 Emerson Rd., Brookville,
 Glen Head, N.Y. 11545

Michael B. DesJardins

It is sad to announce that Mike DesJardins was killed June 15 when a Formula A racing car spun into the pit area where Mike was helping some friends. Mike was avidly interested in many activities, and gave much of himself to each activity. FF modelers will remember Mike's very effective term as "benevolent dictator" (Executive Director) of NFFS, and his work with the Team Selection Program. Mike is sorely missed, especially in his "home club", the Magnificent Mountain Men of Denver.

Meanwhile, Richmond won paper stick with one flight, then won Cabin with his second flight. Incidentally, that time was nearly beaten when Bucky Serviates made the last official flight of the day - just .6 second short!

HLG was ably CD'ed by Jim Purdue with assistance from Bob Champine and Marty Schindler from NIMAS ranks, and others from NFFS ranks. I was unable to spend enough time there to get a report, but I'll gladly print a report of HLG happenings if anyone will send it!

All in all, this was a very successful Nats, and much of the success is due to a NIMAS member still in the Navy. He is LCDR "Stan" Stanwick, who is one of the pioneers of modern indoor flying and is well known to Eastern fliers. Stan coordinated the Indoor Nats from the Navy end, and was responsible for all the logistics and the crew of Navy timers. Stan will soon retire from the Navy, and he will be back flying in his "old haunts" - the Lakehurst hangars. There were numerous volunteer timers on both days - too many to mention - but all who flew certainly owe them a big vote of thanks. Things would not have been as smooth as they were without all this dedicated help which supplemented the Navy timers.

Russo, Bilgri, Romak, Kowalski and Randolph.

In Round IV, Bilgri pushed a lot closer (3rd), while Pete Andrews began the push that moved him into 2nd in Round V. At the end of Round IV, it was Richmond, Mather, Bilgri, Russo and Romak.

In Round V, Pete Andrews and Russo moved up, putting Bilgri in 5th and Mather in 3rd. Rodemsky's model showed its potential, moving him from 9th to 6th, and Rohrbaugh moved from 10th to 8th and within striking distance if he could get another good flight.

Round VI held few surprises, because of the sudden storm. The air began to "boil" - models did everything except turn upside down. Pete Andrews and John Triolo got their best flights of the meet this round, landing before the turbulence built up. Suddenly, the meet was over and word was passed to pack the models quickly so they could open the door and wheel airplanes in out of the storm.

Hal Crane, Bob Champine, Carl and Joyce Jaeger, Manny Radoff and Ernie Kopecky helped to time, and perhaps other people helped also. The entire meet moved smoothly under the guidance of Chet Wrzos; the schedule was necessarily tight because of the one-day availability of the hangar, but a strict draw rotation prevented pile-up and lost flights. It was truly a memorable meet!

NFFS Symposium

SYMPO II, the 1969 NFFS Symposium Report, is available for \$3.50 per copy to AMA members or \$4.50 for non-AMA members. The 1968 Report is available with SYMPO II; \$6 for both. The 1969 report has a paper on hall metrology and indoor flying strategy by Tom Vallee, and a discussion of neutral point location by Hal Crane. Crane's paper gives a slightly different approach to margin of stability than the Cole method (Jan. '69 INAV - C.M.O.S.). Many other excellent papers on FF are included; it's a bargain!

NIMAS Awards

SILVER CAT. I HLG AWARD - 0:21.3, Bobby Dunham

GOLD CAT. I HLG AWARD - 0:26.6, Bobby Dunham

DIAMOND CAT. I HLG AWARD - 0:27.5, Bobby Dunham

DIAMOND CAT. I RUBBER AWARD - 15:20, Bobby Dunham

SILVER CAT. I RUBBER AWARD - 11:19.0, Bob Dunham

GOLD CAT. I RUBBER AWARD - 12:54, Bob Dunham

DIAMOND CAT. I RUBBER AWARD - 15:09, Bob Dunham

SILVER CAT. I HLG AWARD - 0:26.7, Bob Dunham

GOLD CAT. I HLG AWARD - 0:30.0, Bob Dunham

SILVER CAT. III RUBBER AWARD - 28:00.6, Hal Crane

NIMAS Aces

Bob Dunham won his Cat. I Rubber Ace award with three of his flights at the Tulsa Semi-Finals while his son Bobby "polished off" his Cat. I Rubber Ace as he became the runner-up for the Finals. Then, Bobby became the first Triple Ace by adding Cat. I HLG Ace to his laurels as he logged his flights at the Tulsa Glue Dobber Annual. This is one father-son team that really flies to win!

Scale Results?

We already have pictures on hand from the three Indoor Scale events at the '69 Nats, but we do not have the final results from the Navy Scale event and Peanut Scale. Most likely these results will be on hand for the Sept. issue.

FAI INDOOR REPORT

Semi-Final Results

Western Semi-Finals Gow Palace - 99' 6" ceiling

Bud Romak	26:01	27:37	53:38
*Carl Rambo	22:38	28:00	50:38
Joe Bilgri	25:11	24:45	49:56
Paul Allen	21:07	24:16	45:23
Bob Randolph	19:11	20:02	39:13
Linda Randolph	18:12	19:52	38:04
Warren Williams	18:50	18:00	36:50
Bob Gibbs	12:07	14:33	26:50
Bill Gibbs	8:49	14:16	23:05

*Carl Rambo resigned his position, and Paul Allen waived the chance to step up, leaving Bob Randolph as the third representative for this Semi-Finals.

Detroit Area Semi-Finals State Fair Coliseum - 65'

Dick Kowalski	23:40	25:07	48:47
Erwin Rodemsky	23:19	23:02	46:21
Bill Hulbert	24:17	21:49	46:06
Paul Crowley	21:10	20:09	42:12
Lou Willis	13:40	20:32	34:12
Carl Jaeger	15:08	16:04	31:12
Pat Green	20:16	5:28	25:44

Tulsa Semi-Finals John Mabee Gym; U of T - 34' 11"

Stan Chilton	13:11	18:35	31:46
Bud Tenny	14:00	16:34	30:34
Paul Tryon	14:29	14:01	28:30
Bob Dunham II	13:06	15:20	28:26
Bob Dunham	12:54	15:09	28:03
Jim Clem	12:18	15:43	28:01
Dick Ganslen	10:30	13:02	23:32
Nan Tryon	9:57	10:35	20:32
Jim Gardner	10:09	9:08	19:17

Eastern Semi-Finals Lakehurst #5 - 154' ceiling

Pete Andrews	34:34	32:27	67:01
John Triolo	29:41	32:10	61:51
G. V. Russo	30:18	27:53	58:11
Ron Ganser	26:03	31:08	57:11
Hal Crane	26:50	26:05	52:55
Bob Champine	26:35	26:08	52:43
Julius Rudy	19:06	21:06	40:12

FAI Program Summary

We have chosen a very strong team to represent the U. S. in Romania next spring, and these fliers had their "baptism of fire" in the challenging Lakehurst Finals. As usual, the hangar was humid, but with otherwise good conditions until the last. We can rest assured that Jim, Pete and Clarence will do their very best at the '70 World Championship, judging from their past performances.

The sad part is that we may have let them down in a very real sense. Most of you know that the money from the program entry fees is used to help cover team travel expense from home to the port of embarkation. In past years the program participation has been much higher than this year, with the resulting increase in the Inboard Travel Fund. The participation in past years has been: 1962 - 91; 1963 - 85; 1965 - 71; 1967 - 89. This year a grand total of 59 people entered the local Qual. Trials - nearly 20% fewer than the previous low ebb. The Inboard Travel Fund will be pro-rated between the team members according to how far they have to travel, with expenses beyond the

amount of the Fund coming out of the team's personal pocketbooks. Some of the pressure has been removed by the FAI Benefit meets held last spring, and these meets can still be held right up to the last minute before the team leaves for Europe.

RECORDS? MAYBE!

TULSA FAI SEMI-FINALS, June 21, 1969, Cat. I AMA John Mabee Gym, Tulsa University, 34' 11" ceiling.
Jr. AMA Cat. I FAI - 15:20, Robert Dunham II
Jr. Indoor Stick - 15:20, Robert Dunham II
Jr. Paper Stick - 9:52.0, Robert Dunham II
Jr. Cabin - 6:24.0, Robert Dunham II

1969 INDOOR NATS, July 14, 1969, Cat. III Lakehurst #6, 154' ceiling. (This flight exceeds existing times and may have been filed on.)
Open Paper Stick - 26:56.0, Jim Richmond

INTERNATIONAL CONTESTS

Czech Indoor Nationals

Walter Erbach reports: "The Czechoslovakian Indoor Nationals, held July 5-6 in the pavilion at Brno, was open to all builders and was a major European indoor contest.

There were 19 of the best builders from six countries; Czechoslovakia, Austria, Hungary, Italy, Romania and Yugoslavia. Since the competition was very serious, test flying was permitted only before and after official flying. Three rounds, with no intermission, were flown each day under standard FAI rules. This arrangement means that a modeler must know his model and be sure of its abilities.

High time of the contest was Eduard Chlubny's 33:52, done near the end of the first round. Heavy rains killed flying conditions for portions of each day. The remarkable quality of flying was demonstrated when 5 of the top 6 fliers had at least 3 of their 6 official flights over 25:50.

The prohibition against test flying during the contest develops builders who are very precise, keeping notes on everything. Some builders have complete books; one had a log of all the properties of every piece of wood in his stock." The results:

1. Jiri Kalina	Czech	31:20	30:56	62:16
2. Andras Ree	Hungary	31:01	30:35	61:36
3. Vilim Kmoch	Yugo	28:35	31:56	60:31
4. E. Chlubny	Czech	33:52	26:38	60:30
5. A. Popa	Romania	27:46	27:32	55:18
6. Weigert	Czech	28:59	25:57	54:56

Finland's Indoor Nationals

Esko Hamalainen sent the following report of Finland's Indoor Nats: "As you see, times were quite good in this hall of 13 m height, and my 20:57 is a new Finnish record for halls less than 15 m. Conditions were good, only some drift that caused 3 or 4 hangups in a loudspeaker in the middle of the hall. Practically all of us set new personal records! On Aug. 9-10 we will have the elims to pick our team for the 1970 World Champs in this same site."

1. Esko Hamalainen	20:06	20:57	41:03
2. Harro Erofejeff	18:47	19:12	37:59
3. Esko Tirronen	18:58	18:44	37:42
4. Harri Raulio	17:06	18:25	35:31
5. Ralf Ekholm	15:04	18:52	33:56
6. Pentti Nore	15:38	16:32	32:10
7. Leif Englund	13:24	13:20	26:44
8. Olof Nordlund	16:11	3:01	19:12

CONTEST CALENDAR

MARYLAND - College Park. Class AA Eastern Indoor Championships, Sept. 7, 1969, 8:30 am to 4:30 pm. Cole Field House, University of Maryland. HLG, Easy B, Indoor Stick, Paper Stick, Indoor Scale and Unorthodox Aircraft. The unorthodox aircraft event is described thus: Judged on the basis of originality, duration and craftsmanship (equal emphasis). Power optional, but must be suitable for safe indoor operation. CD - George T. Buck, 4215 Howard Rd., Beltsville, Md. 20705 ph. 301-937-7794.

NEW YORK - Hicksville, L. I. Cat. II indoor contest at Cantiague Park, Hicksville, L. I., N. Y. Sept. 28, 1969. Site is 190' dia. dome, 50' high. HLG, Easy B, Indoor Stick, Paper Stick, Scale. CD - Bill Dunwoody, 985 Ft. Salonga Rd., Northport, L. I. N. Y.

TENTATIVE - Record Trials by Bob Randolph, 25145 Lawton Ave., Loma Linda, Cal. 92354 (check with Bob in advance!) Edwards AFB, Calif. (Cat. II) - Aug. 24, 1969 and Bolling AFB (Cat. I) Sept. 16, 1969.

THE PICTURE STORY

Thanks to Bob Clemens, his son Chris, and Tom Vallee for these photos of the Indoor Nats. Pictures numbered from top to bottom:

Left Column

1. Ron Plotzke just after his 42:53 flight.
2. Joe Bilgri after wind-up by Bud Romak.
3. Richmond preparing for Nats official. The model is from same series he won with at West Baden and Rome.
4. Wally Mumper winds Charlie Sotich's cabin.

Center Column

1. Bill Bigge (r.) helps Dan Belleff ready his cabin.
2. Randolph's controversial cabin model. Note retracting landing gear.
3. Dan Belleff launches his cabin on Nats official.
4. Bilgri "D" (Vallee photo).

Right Column

1. Hal Crane steers (?) or beats (?) his cabin model.
2. Deep discussion! Bud Tenny (l.) and Erwin Rodemsky.
3. Randolph gets wind from unidentified helper.
4. Unidentified HLG flier ponders his models. (VALLEE)

LIGHTWEIGHT GLUE?

From the weight standpoint, I always thought that glue is glue is glue, and you only saved weight by careful application of the glue and by careful fitting of the pieces to reduce the amount of glue needed.

However, Curtis Janke suggested that very high viscosity nitrocellulose should make a glue to do the job with less weight involved. After some experimentation, a formula based on 2500 sec. N/C evolved which seemed to be strong enough. The test for strength was made by glueing two 1/16" sq. pieces at right angles in a simple lap joint and then loading the end of one piece (see sketch). Test results indicated that similar application methods between the test material and thinned Duco cement gave joints with 75% as much strength in the new material as with Duco.

A weight test was made by weighing balsa pieces before and after 1/8 cc of glue was added and allowed to dry. The test glue weighed .000185 oz., while the same amount of Duco weighed .00044 oz. - 2.4 times as much. Even if I used twice as much of the new material, the weight would still be less!

MODEL STORAGE AND TRANSPORTATION

Part II - Ready-Made Boxes

Many industrial firms receive shipments of material in boxes which turn out to be ideal for indoor boxes. Quartz rod and tubing comes in boxes which are usually 8" deep, up to 17" wide and up to 40" long, with a lid which slips over the top like the lid of a shoe box. Acoustic ceiling panels come in a variety of box sizes which can be easily adapted to models. Florists make shipments in a similar box, approximately 48" x 18" x 9", also with a slip-off lid. This "shoe box" type lid is preferable for cardboard boxes, and is not much trouble to make in case the box has flaps. Finally, it is not very expensive to have special boxes custom-made at a firm which specializes in this type of work.

Sears and similar stores sell storage boxes which are about 30" long, 13" wide and 15" deep, for prices up to \$2.50 apiece, depending upon how sturdy and decorative the boxes are. Such a box (Fig. 1 below) will hold two 65 cm models if packed in the manner shown in Fig. 2. Note that the wings are mounted on the same vertical slide, which necessitates removal of both wings to get the lower one. With care, either fuselage can be removed separately, and all the props are mounted on a single slide.

Hal Crane reports that Acushnet Titlist golf balls are shipped in a box of 24 dozen. This box is double thickness, with an inner box and an outer box. Make the following modifications: 1. Cut three of the four top flaps down to 3" wide. 2. Glue inner box to outer box, using white glue (white glue is ideal for all box work). 3. Leave the outer flap (hinged at rear) 9 1/2" wide, and the inner remaining flap is left full width. These changes are shown in Figs. 3 and 4, and arrangement for 2 65 cm models is shown in Fig. 5.

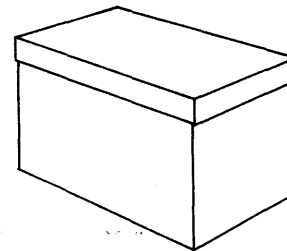
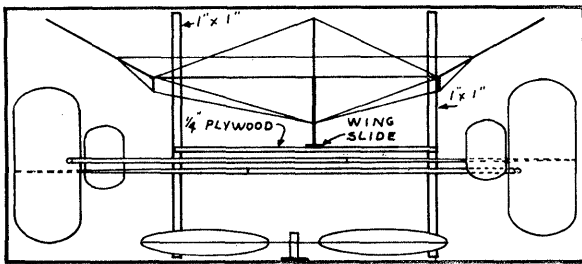
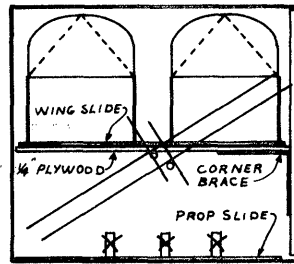


FIG. 1



TOP VIEW

FIG. 2



END VIEW

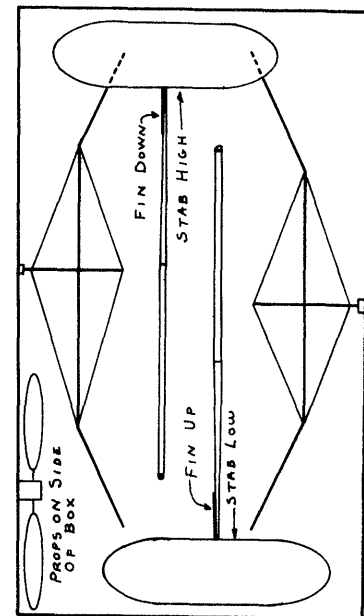
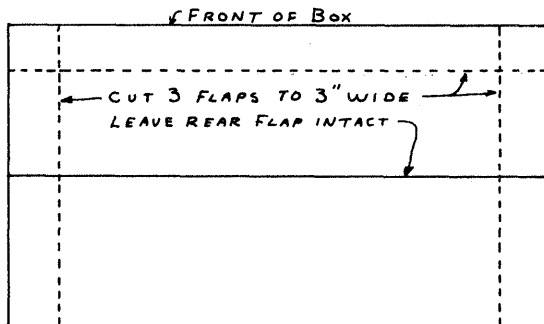
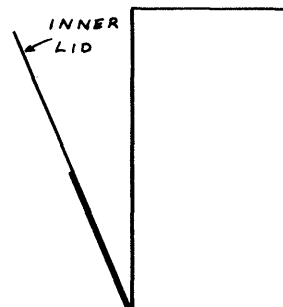


FIG. 5



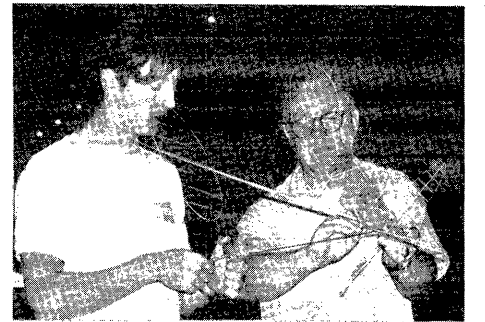
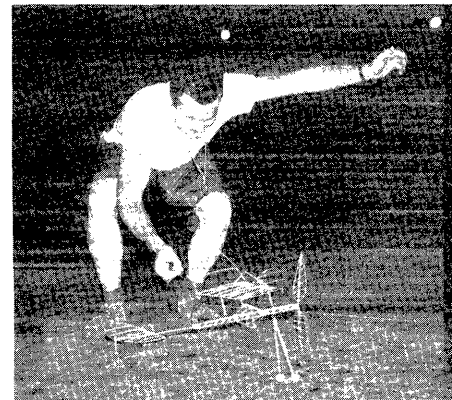
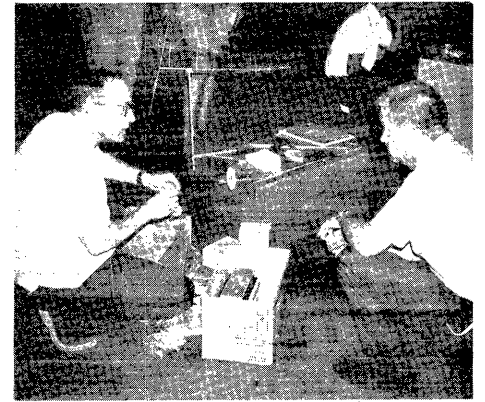
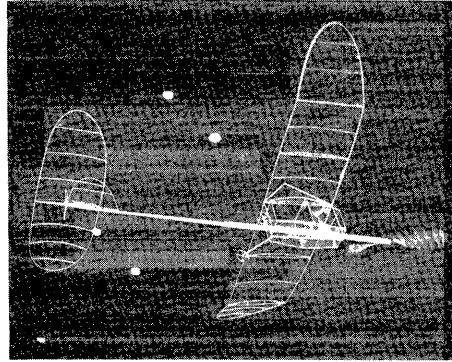
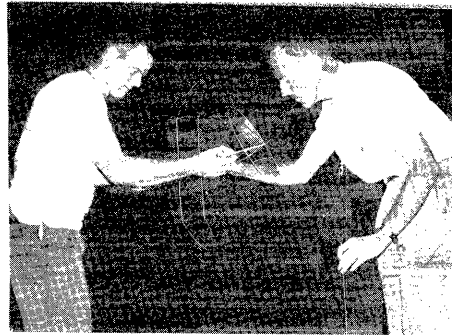
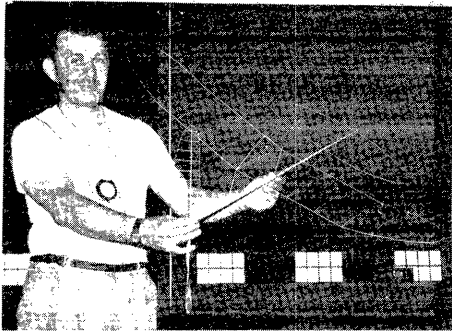
TOP VIEW (CLOSED)

FIG. 3



END VIEW (PARTIALLY OPEN)

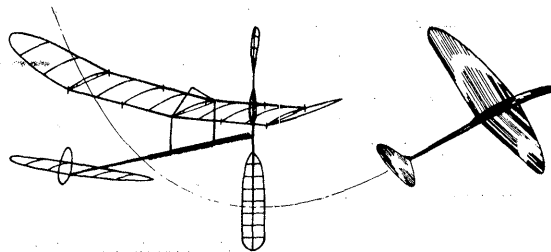
FIG. 4



INDOOR

NEWS and VIEWS

Editor: Bud Tenny · Box 545 · Richardson, Texas · 75080



****NATIONAL INDOOR MODEL AIRPLANE SOCIETY****

Dick Black Memorials

In Jan. '69 it was announced that two Dick Black Memorial Lectures were ready for circulation. Since that time numerous clubs and individuals have viewed them and expressed satisfaction with the content. Both lectures are available on this basis: Schedule your showing as far in advance as possible and reserve the lectures by sending your request to Box 545, Richardson, Tex. 75080. In most cases it is possible to meet your schedule and they will be sent in time for the meeting. In return, the user must reimburse NIMAS for postage costs and return the lectures by First Class mail.

These first two lectures deal with pouring microfilm and cutting and selection of balsa wood. Numerous others are planned on topics such as covering and patching with microfilm and condenser paper, indoor construction techniques, model boxes, rubber stripping, winding rubber, use of torque meters and wire bending. Any color slides you may have on any of these topics will help get more lecture packets on the road!

These lectures were established as a fitting memorial in remembrance of Dick Black. Dick was an early member of NIMAS and co-founder of NFFS, and contributed mightily to both organizations and to model building in general. His time was spent in helping others to learn how to build or to improve their building and flying skills, so these lectures carry on his work in his name.

FAI Benefit Meets!

Clarence Mather (team selection program manager) had the idea that indoor meets could award nominal prizes and donate extra entry fees to the Inboard Travel Fund which helps the team pay stateside travel expenses. This idea was taken one step further by Murray Frank (Contest Coordinator for Dist. VIII) and Sam Casey of Wichita Falls, Texas. They held two outdoor FF meets last summer and donated a total of \$61 to the Indoor travel fund. Thanks for the effort and the thought, Murray and Sam!

Meanwhile, it is not too late if you wish to hold an FAI benefit meet of your own - right up until the team is ready to leave early in April (see FAI Report). Prizes for these meets have varied from NIMAS Certificates to homemade trophies, and a few of the special NIMAS trophy "makings" (see Jan. '69 INAV) are available for this purpose at 55¢ each plus postage costs.

Top Ten Easy B

Bob Putman, manager of the annual NIMAS Postal Meets, has suggested that the results of the 1969 Postal be used to establish the Top Ten Easy B fliers. The list would be started all over again with each Postal, but fliers could submit new times during the year and "bump" their way to a higher place on the listing.

This sounds like a fine idea, so here is how it will work: The rules will be the same as for the Postal, except all flights will be "fudged" to 35' ceiling for the sake of uniformity. Send times to: Bob Putman, 507 Darlene, Arlington, Tex. 76012. A monthly announcement will be made of the Top Ten as changes occur. The rules are:

1. All pertinent AMA rules shall apply, except that FAI ceiling measure shall be used.
2. Easy B models shall conform to AMA rules, except limited to paper covering only.
3. No entry fee required, open to all fliers.
4. Include ceiling height with flight time.

Top Ten (taken from '69 Postal times and fudged to 35')

	Time/ceiling	Fudge	Adj. Time
1. Clarence Mather	590/30'	1.08	637
2. Joe Pontecorvo	516/24'	1.21	623
3. Pete Patterson	492/24'	1.21	594
4. Jim Walters	392/24'	1.21	473
5. Howard Haupt	384/25'	1.18	454
6. Phil Hainer	383/25'	1.18	453
7. Joe Deady	367/24'	1.21	443

8. Rex Powell	395/31'	1.06	420
9. R. J. Dunham	453/41'	.92	418
10. Fudo Takagi	352/25'	1.18	416

Top Juniors

1. R. J. Dunham II	467/41'	.92	431
2. Kim Mather	255/25'	1.18	302
3. Neal Rozelle	287/35'	1.0	287

FAI INDOOR REPORT

Team Manager Named

Joe Bilgri has been chosen as Manager for the 1970 U. S. Indoor Team. Joe has ample experience in this job, having been a team member in 1961 and 1966 and manager in 1962.

1970 Indoor World Championship

Romania has announced that They "agree in principle to organize the next World Indoor Aeromodelling Championships at the beginning of April 1970 in the salt mine of Salanic Prahova." This early date was doubtless chosen because humidity builds to high levels in the mine later in the year.

CONTEST CALENDAR

MARYLAND - Silver Spring. Indoor sessions at JFK High School, 1901 Randolph Rd., Silver Spring. Sept. 26; Oct. 10, 31; Nov. 7, 21; Dec. 5, 12, 1969 and Jan. 9, 16, 30; Feb. 20, 1970. Time: 7 pm to 11 pm.

NEW JERSEY - Lakehurst. Indoor flying at Hangar #5 on Sept. 21 and Oct. 5, 1969. Check with C. V. Russo, 143 Willow Way, Clark, N. J. 07066 for times and details.

NEW YORK - Hicksville, L. I. Cat. II indoor contest at Cantiague Park, Hicksville, L. I., N. Y. Sept. 28, 1969. Site is 190' dia. dome, 50' high. HLG, Easy B, Indoor Stick, Paper Stick, Scale. CD - Bill Dunwoody, 985 Ft. Salonga Rd., Northport, L. I., N. Y.

VIRGINIA - Hampton. Record Trials/FAI Benefit meet. CD Hal Crane, 4002 Buchanan Dr., Hampton, 23369 ph. 723-0861. Call Hal to confirm schedule.

NATS INDOOR SCALE RESULTS

NFFS sponsored events:

Navy Scale	Jr-Sr. Peanut Scale	Open Peanut Scale
1. Dave Stott	1. Paul Stott (Jr.)	1. Ralph Kuenz
2. Bob Thompson	2. Dale Hacker (Sr.)	2. M. Richardson
		3. Don Garofalov
		4. Dave Stott
		5. Fred Weitzel

AMA Scale:

Junior	Senior	Open
1. Brian Webster	1. Terry Kuehne	1. Walter Eggert
2. Michael Kuehne	2. Mike Thompson	2. Jim Richmond
3. Justin Mills	3. Denny Dock	3. Dave Stott
4. Bruce Paillet		4. Andrew MacIsaac
5. Barry Paillet		5. Don Garofalov

Walt Eggert's Pietsenpol was awarded the highest scale points - 87. It was beautiful, with sprayed dope finish, excellent engine details complete with spark plugs and ignition wiring and permanent interior details - pedals, stick, seats, etc. The rubber motor passed through a hole in the back of the seat.

Second place winner Jim Richmond had a well made Piliatus Porter (an excellent model but very little scale detail) that kept the old controversy alive - scale vs. flying - Jim's model scored low in scale points but tops in flying. Walt Eggert's model made only 59 seconds in flying, but this was still a darn good flight. (Comments by Paul Kastory.)

Pictures from all three events are on page 5, as taken by Tom Vallee and Bob Clemens. They are numbered vertically in columns; captions below the pix.

STATE OF THE ART

The model of the month is Bob Champine's FAI which set the FAI Cat. I FAI record of 18:27 on March 5, 1969 at the Willis School in Hampton, Va. The site is 20' high with a smooth ceiling (lights almost flush) and high times make ceiling scrubbing necessary. The model has a built-up boom, removable monowire fuselage brace and adjustable incidence stabilizer. Note also that although the general design layout resembles Richmond's models, wing offset has been increased and stab is offset, all to improve the off-the-wall recovery ability which helps a lot when the site is as small and narrow as Willis is. The graph below is a margin of stability plot for this model; this service will be presented whenever possible for stick models in this column.

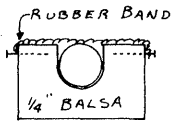
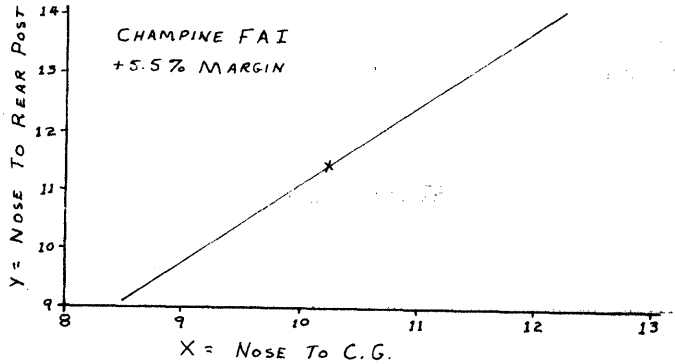


FIG. 1

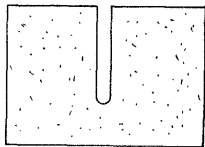


FIG. 2

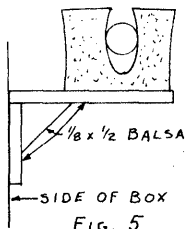


FIG. 5

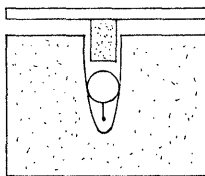


FIG. 3

MODEL STORAGE AND TRANSPORTATION

Part III - Model Arrangement And Mounting

It is also important that your mounting fixtures hold the model parts firmly without damaging them; but if the fixtures are so tight that you have to force the parts out, you may break them. I once made the mistake of using all-balsa fuselage holddowns (Fig. 1) with rubber bands across the top. In high humidity, the balsa block swelled up and the motor stick softened, thus giving a permanent crease in the top of the stick.

The best material noted so far for mounting model is foam rubber of the type sold for packing and for seat cushions. It can be cut with a sharp knife by successive slicing motions, or on a bandsaw if you cut slowly to avoid heat build-up or snagging. Large chunks can be cut into blocks, and the material is often available in thin sheets that cut nicely with scissors.

Motor sticks can be mounted in a foam block of the type shown in Fig. 2, where a narrow slot is expanded to fit the stick. An alternate arrangement is shown in Fig. 3, where a piece of balsa and a small foam block holds the stick in a wider slot. Fig. 5 is a balsa and foam bracket for mounting on the side of a box; it takes a little bit of experimentation to get the dimensions right to hold the stick firmly, but not too tight. Fig. 6 shows an ideal way to hold props, using foam blocks with slits cut in at the proper spacing.

Wings are a special problem to mount, since they are so long and especially fragile compared to their size. The best way to support the wing is by the posts, just as on the model, since the wing is designed to transfer all stress to those wing posts. This calls for a fixture like the one in Fig. 7 made from balsa and standard tissue sockets. If you brace the wing on demountable jigs (see Oct. '66 INAV) as I do, the wing stays with the same jig from the time of bracing until its demise.

Now that you have fixtures to mount the model, plan the arrangement within the box. Fig. 8 is reprinted from last month, with sway braces added; while Fig. 9 shows how models may be arranged to fit in a fairly narrow box, with box width limited by stab length. Figs. 8 & 9 are scale drawings of Richmond's model (chosen because of its long stab and long fuselage) in two "minimum size" boxes. Fig. 8 is a 30" x 13" x 15" ready-made storage box such as can be obtained from Sears, and Fig. 9 is a "scratch-built" box 9" x 17" x 30". The width can be reduced to about 1 1/2" more than the stab length, down to a 12" stab. Note that the models in Fig. 9 are mounted with wings high on the center web, with the fuselages low so the stabs clear the wing tips.

Sway braces, shown in Fig. 8, are a good idea anytime a part can rotate or swing to hit another part. In Fig. 8 they serve to prevent fuselage rotation which could put a stab tip through the wing. Sway braces are most often needed at wing tips, since wings tend to move more than other parts.

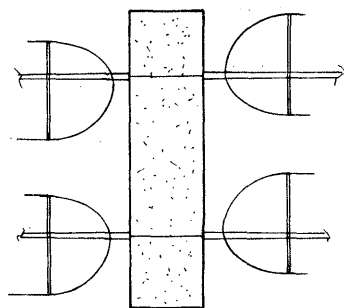


FIG. 6

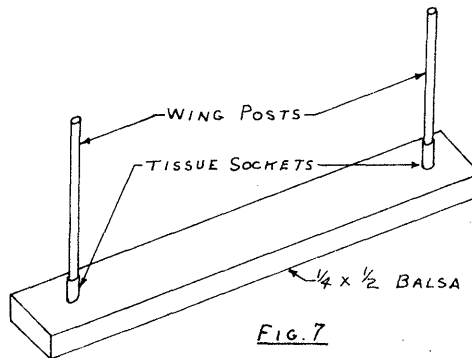
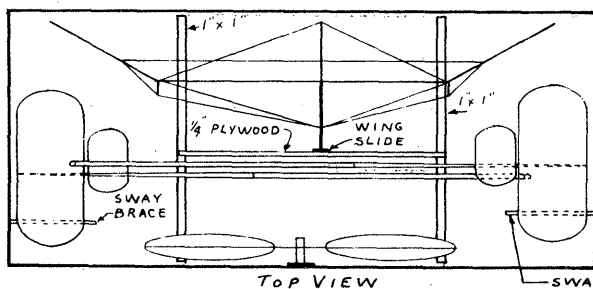


FIG. 7



TOP VIEW

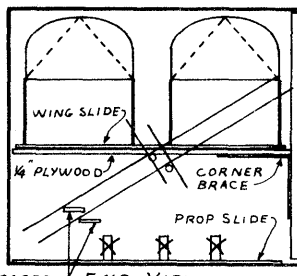


FIG. 8

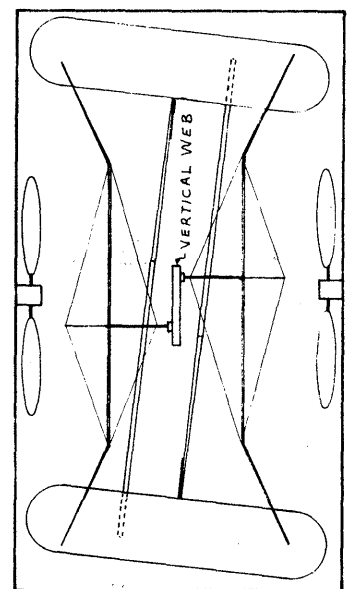
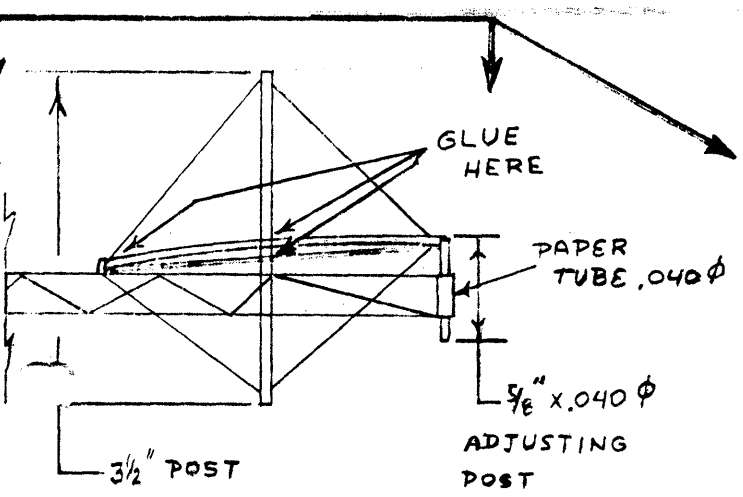
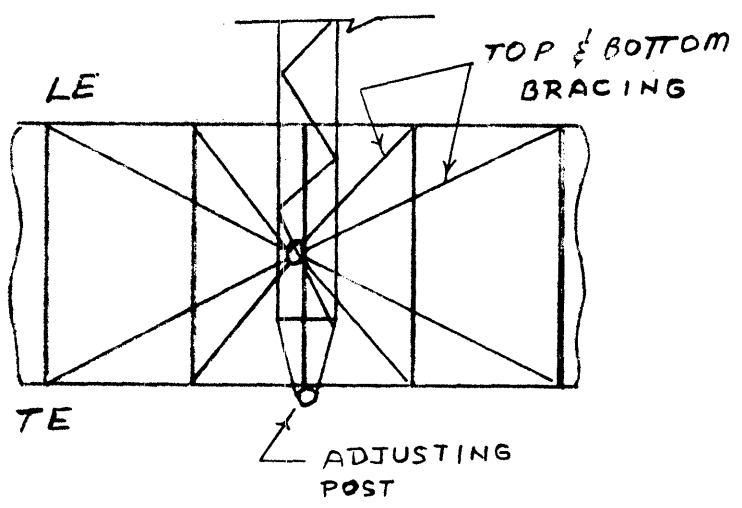
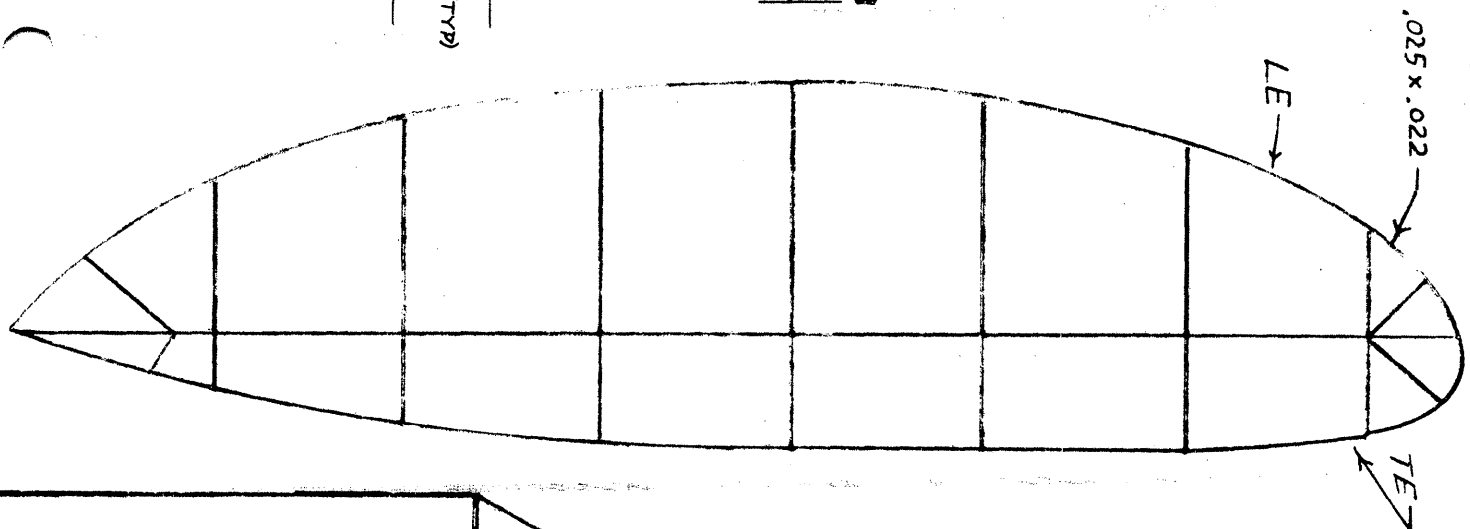
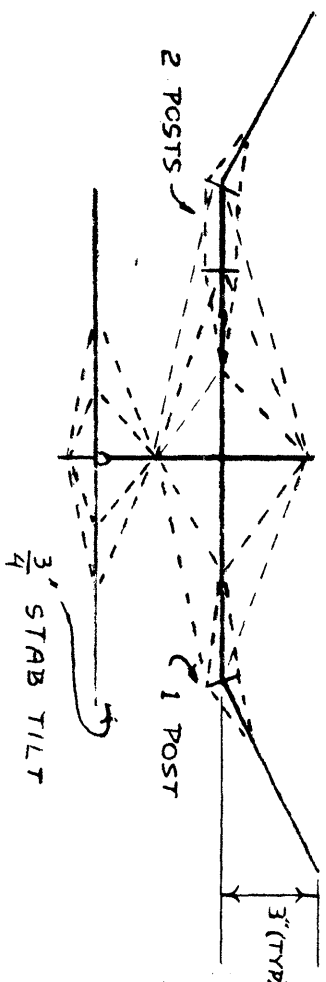
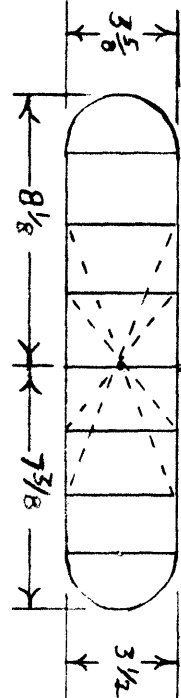
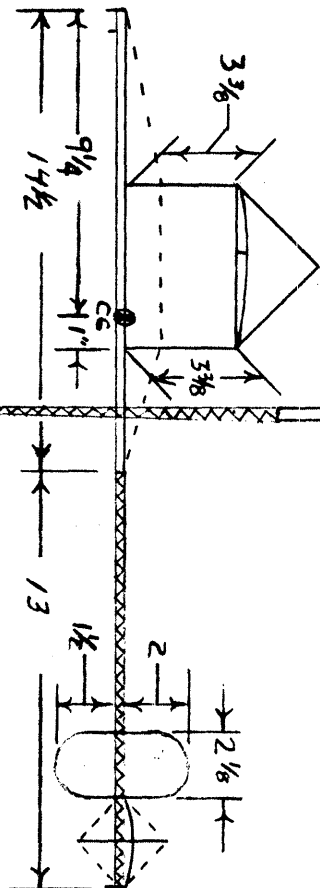
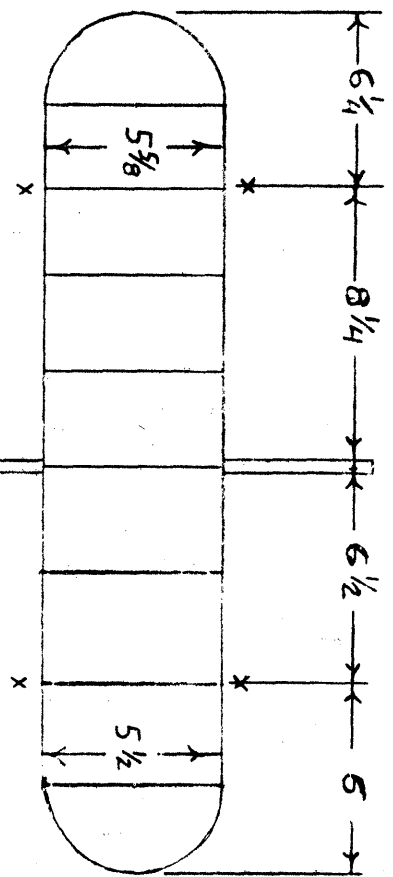


FIG. 9

CHAMPINE FAI
18:27 CAT. I



REAR VIEW

NOTES:
F/D - 36" / 16 1/2" TOTAL L.T. - .033 C.W.
12" L.O. .050 RUBBER - .025 OZ
LAUNCH TORQUE ~ .2" - OZ

MODEL STORAGE AND TRANSPORTATION

Part IV - Box Construction

Part I of this series (Apr. '69 INAV) dealt with basic box construction factors such as finish, seal and water-proofing, so these will not be repeated.

Three basic materials are usually used for indoor boxes - styrofoam, cardboard and wood; these materials may be combined in some cases. Fig. 1 below is reprinted from Jan '66 INAV - a styrofoam box built by George Bucic of the Chicago Aeronauts. This box has two minor disadvantages - it is light enough to be tumbled by a wind (but oh-so-easy to carry!), and is white inside. If you can find dark colored material, it would be ideal. George cut 4' x 8' sheets of 1/2" styrofoam with a razor knife and a straightedge to form the box; it was assembled with white glue. The box was assembled, finished on the outside with water soluble wood filler and topped with water-base paint. The doors were then cut loose and seal strips, drawers and model hangers installed inside; fastening hardware and a handle finished off the outside.

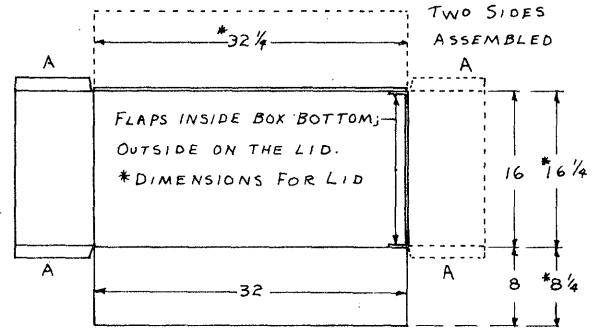
Perhaps the most common box material is cardboard - it is easy to work and readily available. Cardboard boxes have an inherent advantage if you plan ahead - limit their contents to two models of similar size such as two FAI's or two paper stick models. "Specialty" models such as a ROG, helicopter or ornithopter should be planned one to a box, but if you have several of one type like FAI, you may be better off with a larger multiple box like the one to be presented in Part V. The advantage of limiting models to two per box is that the boxes remain reasonably small, thus easy to store and carry. You seldom need more than two models for small contests, so this may be your best choice unless you do a lot of flying.

The best design for a cardboard box is to have the lid slip over the bottom, with the lid full depth. Both the lid and bottom are made the same way, in the style shown in Fig. 2. The corner reinforcement flaps (A) are bent to fit inside the bottom, and outside the top piece. These flaps can be omitted for the bottom piece, if the corners are reinforced with wood as shown in Fig. 3. You can also omit them on the lid by substituting a strong cloth-based tape at the corners, but this arrangement tends to loosen with age.

Two precautions are mandatory with this construction. The first is to use extreme care in layout, paying close attention to making exact right angles and correct dimensions. The second is to increase the size of the lid by exactly two thicknesses of cardboard, so it will slip over the bottom "just right". It is also important to make accurate cuts with a sharp knife, using a straightedge for a guide. Make two cuts - a light one just through the surface of the cardboard, and then finish the cut. Score the cardboard along the folded lines to insure that the cardboard bends on the lines. Use a rounded object to score along the lines, and try to avoid cutting the top surface of the cardboard. It is often helpful to use a straightedge to assist in making the bends - added insurance!

Clarence Mather designed a box using cardboard with wood reinforcing strips, as shown in Fig. 4. Clarence got his cardboard from refrigerator cartons, while the wood reinforcing strips were cut from 1" x 1" stock on a bench saw. The wood should be left at least 3/8" thick to prevent warps. The cardboard is tacked and glued all along its length during assembly, then the entire box can be finished in the usual manner.

The remaining box material is wood, and numerous hints for this construction will be found in Part V, where Al Rohrbaugh's box design will be covered. This box carried 10 complete FAI models to Rome, yet it is only 28 1/2" tall, 32 1/2" long and 17" wide.



LAYOUT FOR 8" x 16" x 32" Box
FIG. 2

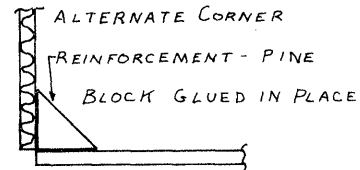


FIG. 3

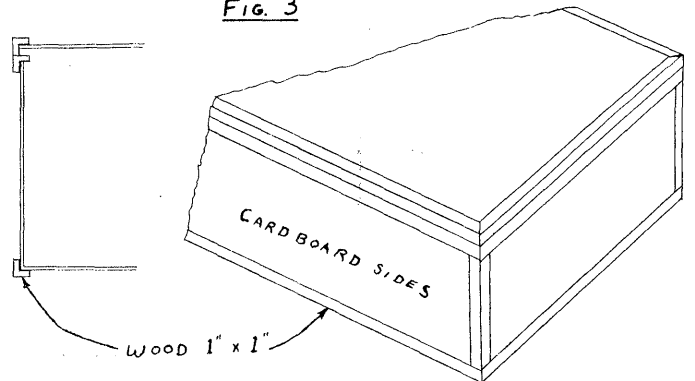


FIG. 4

INDOOR MODEL BOX
MATERIAL: EXPANDED POLY-STYRENE
BY **George Bucic**
CHICAGO, ILL.

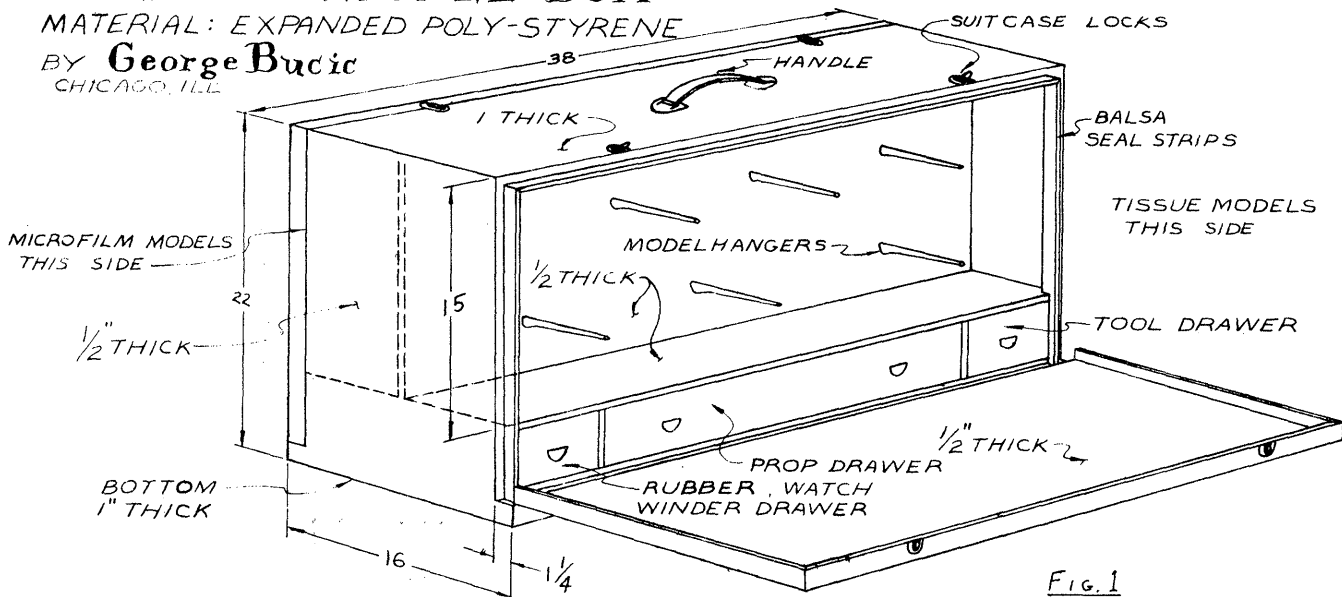
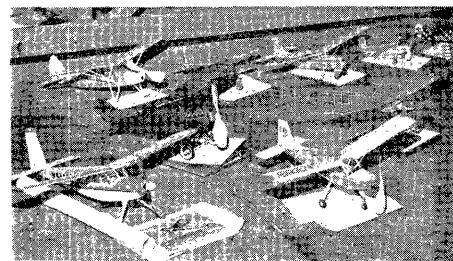
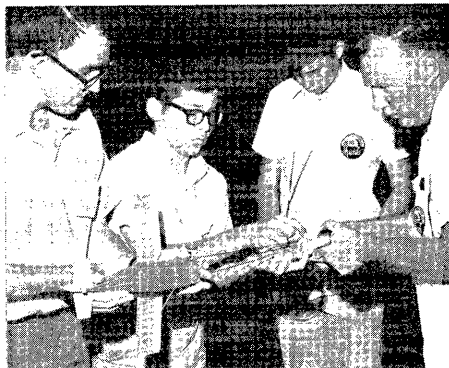
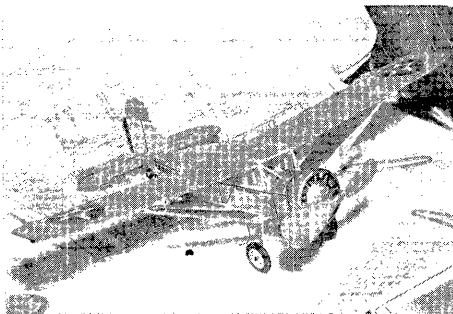
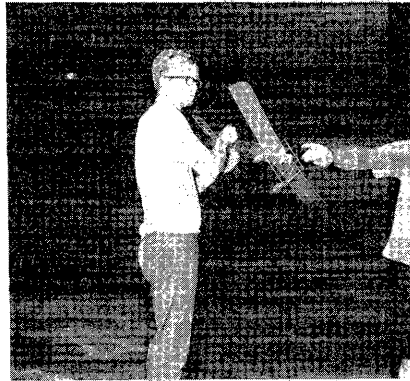
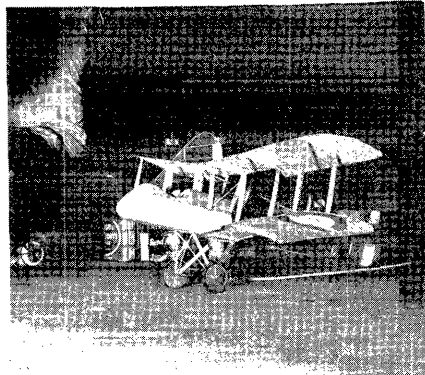
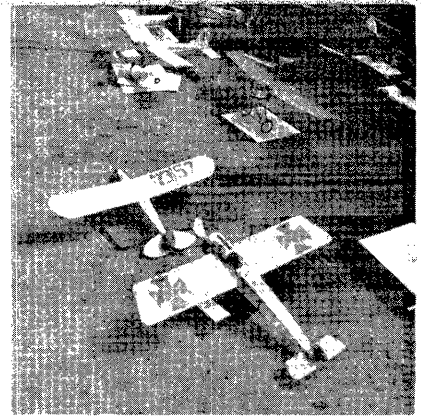
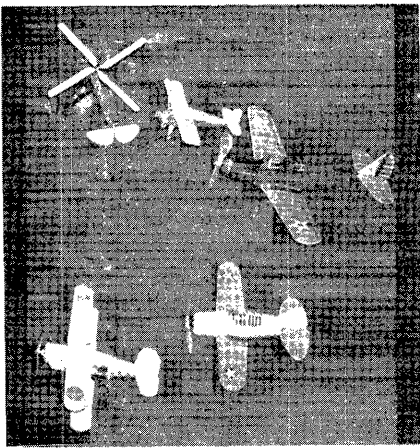


FIG. 1



Left Column

1. Autogyro, 3 Peanut entries, PT-19. Gyro flew well except for straight flight into wall. (Clemens)
2. Unidentified model - may be Peanut Scale entry.
3. Bill Hannan's Bellanca Skyrocket (Peanut). Proxy by Tom Stark. (Clemens)
4. AMA Scale entries await judging. (Clemens)

Center Column

1. Pietsenpol Air Camper held by Phill Lawry. Model may be 1st place AMA winner by Walter Eggert. (Clemens)

2. Scale model by Bucky Serviates.

3. Neemith Cougar (Peanut) by Martin Richardson (on left). Prop driven by 3 geared motors. Second place in Open Peanut Scale. (Clemens)
4. Wright Plier gets windup. (Clemens)

Right Column

1. More scale models await judging.
2. Ed Franklin and his scale entry.
3. More AMA Scale entries!

INDOOR

NEWS and VIEWS

Editor: Bud Tenny · Box 545 · Richardson, Texas · 75080

****NATIONAL INDOOR MODEL AIRPLANE SOCIETY****

NIMAS Services

The following forms are available at cost (approx. 5¢ per sheet): layout sheets for Velocity Focusing prop design (See Mar. & May '68 INAV) and calculation sheets for stability margin design (see Jan. '69 INAV). In addition there is a prop design packet which summarizes prop info in general from past issues of INAV. Request info from Box 545, Richardson, Tex. 75080.

NIMAS Member Honored

Dr. Richard Ganslen, better known as Dick to all his modeling friends, was recently named to the Helms Hall of Fame. This honor normally applies to track and field athletes, but Dick was honored for his scientific research in track and field athletics. His book on pole vaulting is a classic text on the subject, and his other research includes wind tunnel tests and computer analysis of discus and javelin flight.

Sites!

Several years ago Richard Miller started collecting info about various big hangars, and bemoaning the loss of hangars which were no longer available. In the same vein, John Thornhill sent me an advertisement showing how Bethlehem Steel helped install a roof inside the 190' hangar at Elizabeth City, N. J. This left 300,000 sq. ft. of space with 24' ceiling below the "roof" and a maze of hundreds of cables above the 24' deck. Instant Cat. II!

Then there is the new American Airlines hangar in Tulsa - 112' ceiling and 156,000 sq. ft. It is new, and will be used for maintenance of Boeing 747's. This makes it unlikely that it will be available for model flying - but it is a nice pipe dream!

On the other side of the coin, members of the D. C. Maxecutors credit John Sites with obtaining the use of Cole Fieldhouse at the University of Maryland for their Sept. 7 contest. The building was excellent, with low drift and high times. Better yet, things worked out so well that the meet may become an annual affair!

POSSIBLE WORLD RECORD

Word has been received that Jiri Kalina has submitted his recent 21:06 flight for consideration as a new Cat. I World Record. No information is available at present on his model or site.

INTERNATIONAL CONTESTS

On Aug. 2-3, the Hadju-Cup contest was held in Debrecen, Hungary. This was an international contest for individual entry only (no teams). 24 contestants came from Czechoslovakia, Romania, Poland, Italy and Hungary; the meet also served as the final round of team selection for the Hungarian 1970 Indoor Team. The team will consist of Andras Ree, G. Buzady and Antol Egri. The results:

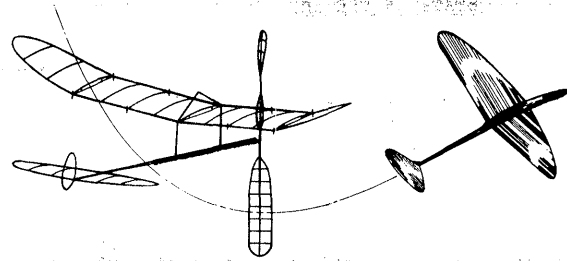
1.	E. Chlubny	Czech	32:02	33:29	65:31
2.	J. Kalina	Czech	28:52	30:23	59:15
3.	A. Ree	Hungary	29:15	28:53	58:08
4.	G. Varszegi	Hungary	28:09	27:09	55:18
5.	G. Buzady	Hungary	28:11	26:57	55:08
6.	T. Wiegert	Czech	27:45	27:20	55:05
7.	A. Popa	Rumania	25:57	27:45	53:42
8.	A. Egri	Hungary	25:28	26:10	51:38
9.	J. Zolcer	Czech	24:43	24:14	48:57
10.	A. Soltesz	Hungary	22:36	25:36	48:12

Chlubny's 33:29 was a new site record (beating Hans Beck's 32:42 during the '66 W. Champs with a 90 cm model) and a new Czech Cat. III record.

On Aug. 9-10, Finnish 1970 Indoor Team was chosen in their 13 m site. Their times:

1.	Esko Hamalainen	21:23	19:37	41:00
2.	Pentti Nore	19:26	19:30	38:56
3.	Harri Raulio	18:24	20:16	38:40
4.	Harro Erofejeff	17:20	19:20	36:40

The first three fliers will be the team, while Harro Erofejeff will be their manager. The 21:23 by Hamalainen is a new Finnish Cat. II record.



New Members!

ROBERT A. NELSON, 483 Manchester Rd., Yorktown Hts., N. Y. 10598

Change of Address

Please note the following address changes:

Bill Hannan (GRAPHICS) Chester Wrzos
P. O. Box A Box 517, Rt. 3
Escondido, Cal. 92025 Madison Hts., Va. 24572

Just a reminder: Any NIMAS members who move and want their new address to appear in INAV need only ask when they notify us of their new address.

Special Action Committee

Roger Schroeder, S.A.C. Chairman, has announced that help is now available to beginners who wish to learn to build indoor models. Those who know of such youngsters should help them contact Roger at 4111 W. 98 St., Overland Park, Kan. 66207. Anyone wishing to help as an instructor in the effort should also contact Roger.

Top Ten Easy B

No times have been submitted this month to vary the Top Ten standings. One flier noted that the model specs should be better defined regarding solid construction and bracing. So be it! The basic Easy B concept has always been solid motor stick and boom, with unbraced surfaces. Let your conscience be your guide, and we'll hold the meet according to that concept - it's all for fun anyway!

Who Is Flying Where?

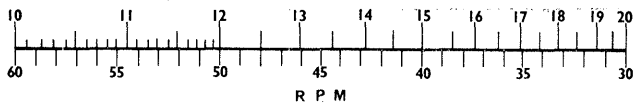
Gene Meneghini, 1214 E. 169th St., Cleveland, O. 44110 asks "Where is anyone flying in the Cleveland area?" If you have a site near Gene, drop him a line!

It would be a "good turn" for any groups in NIMASland to make known their flying schedules - just drop a line to Box 545, Richardson, Tex. 75080 and the info will be listed in Contest Calendar. This offer is not restricted to NIMAS members!

New NIMAS Chart

A new NIMAS Chart, designed by Erwin Rodemsky, is now available for 65¢. The chart, shown below, is 5 1/2" long and just over 1" wide. For higher RPM's, double the time measured for ten revolutions, and double the RPM figure.

SECONDS FOR TEN REVOLUTIONS



New Materials!

Several fliers have used Micro-Lite covering material, a plastic film lighter than condenser paper and sold by Micro-X. The same manufacturer has produced an even thinner film. Their brand name is Kimfol, and the new thickness is .00008" - only 8 times as thick as blue microfilm. The weight of this film is about half the weight of standard condenser paper - .0056 oz./100 sq. in. They also make an aluminized film which weighs just over .008 oz./100 sq. in. The plain Kimfol shows obvious static problems not shared by the aluminized version. For more info, contact Mr. M. J. Becker, Peter J. Schweitzer Div., Kimberly-Clark Corporation, 261 Madison Ave., New York, N. Y. 10016.

Contest Board Action

All the paperwork has caught up, and AMA HQ has announced the FFCB action (during the Nats) which ruled Bob Randolph's cabin model ineligible. The trophy entanglement is being straightened out and Warren Williams has been acknowledged as 5th place winner in Open Cabin.

STATE OF THE ART

The plan of the month is of Bobby Hanford's Cat. I Jr. HLG record model. In true modeling tradition, he bought wood and built the model the day before the meet - and set the record with it. This happened on the same day as Dick Mathis' 1:14.5 Cat. I record, and the site was the ballroom in Texas Woman's Univ. in Denton, Texas.

CONTEST CALENDAR

CALIFORNIA - Edwards AFB. Cat. II Record Trials, Nov. 9, 1969. Site either the C5A hangar or Weights & Balance hangar, depending upon availability. No special clearance needed for entry. Bob Gibbs, 5005 Halifax Circle, Cypress, Cal. 90630

MARYLAND - Silver Spring. Indoor sessions at JFK High School, 1901 Randolph Rd., Silver Spring. Oct. 31; Nov. 7, 21; Dec. 5, 12, 1969 and Jan. 9, 16, 30; Feb. 20 1970. Time: 7 pm to 11 pm.

WISCONSIN - Milwaukee. Indoor sessions each Thursday from 7:30 pm to 9:30 pm at Sherman Social Center, North 51st St. and W. Locust St. Ken Kraemer, 3945 N. 41st St., Milwaukee, Wisc. 53216, ph. 414-442-5864.

THE EASTERN INDOOR CHAMPIONSHIPS

This contest was held early enough to insure good air, in what proved to be an excellent site. It was the result of a lot of hard work by the D. C. Maxcutors, backed up by president John Sites' efforts to get the site and to get excellent publicity for the event. If they are able to make this an annual affair, it could work into one of the major indoor contests in the country. Good Work!

Junior HLG		Sr.-Open HLG	
1. David Cickle	66.8	1. Dan Belleff	122.0
2. Richard Persch	57.2	2. Bob Sifleet	102.0
3. Bruce Fallet	53.1	3. John Sites	94.0
Jr.-Sr. Paper Stick		Open Paper Stick	
1. Bruce Fallet	7:00	1. Bob Platt	14:37.5
2. Barry Fallet	5:09	2. Hal Crane	14:20.4
Jr. Easy B		Sr.-Open Easy B	
1. Bruce Fallet	5:47	1. Bob Platt	11:37
2. Barry Fallet	5:20	2. Tom Vallee	10:32.5
Indoor Stick		Indoor Scale	
1. Dan Belleff	24:07.6	1. S. Rolpe Gregory	96½
2. Hal Crane	21:43.2	2. R. Aubachun	87½
Unorthodox Aircraft			
1. Tom Vallee	77 pts.		
2. Jerry Weir	72 pts.		

A NICE TOUCH

When one looks back at a World Championship, the big show and excitement is not all that comes to mind. Without fail, European hosts make a special effort at small special touches. A sterling example is shown below - it was the place marker for Jim Richmond's plate at the Victory Banquet at the Rome Champs. Each flier received one, and some also received a cartoon depicting some facet of the contest activity. The cartoonist was one of the host group, and obviously enjoyed his sketching.



HINTS AND KINKS

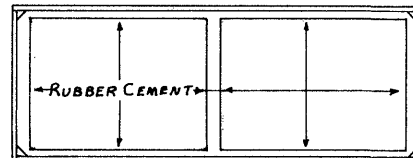
Microfilm Patching

Bob Randolph suggests that silver film can be used to patch with if the patches are made using very soft tissues such as Lady Scott brand. Put the film between two layers of tissue to cut it to size, peel off one side and apply the patch dry, then peel off the second tissue. By using such soft tissue, the film is not damaged, and the porous grain of the paper keeps the film from adhering to the paper.

Bob Dunham used to have trouble getting patching film to release from the paper carrier. Now he holds the patch at arm's length and sprays a short burst of Krylon spray adhesive toward it. Only a few tiny droplets of adhesive are needed on the patch to insure that the patch stays on the model instead of on the paper, and the weight added is negligible. A caution from Jody: Be sure that none of the spray adhesive drifts onto other objects like the furniture or other valuable things - it remains sticky! Let me hasten to add that it hasn't happened here; she thought of it in advance!

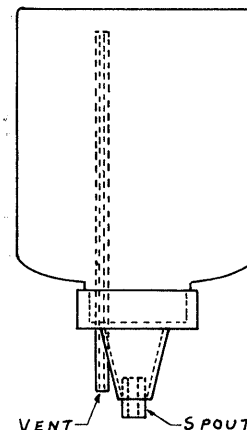
After Bob made the suggestion above, I tried the same thing, except I used tiny drops of water put in place with a soft brush. This also works well. In most cases, film that is not sticky will require that the edges of the patch be sealed down with water. In this case, the best type of paper carrier is a paper which is rough textured like newspaper, but it should not be as porous as newspaper. Thus, after the water droplets are put on the patch and the patch is placed on the model, water brushed along the edge of the patch does two things. It runs under the edge of the patch and adheres it to the model, and it also causes the paper to "pucker" and pull away from the patch so you can lift it off. Newspaper is porous so that the water soaks through the paper so quickly that the paper is stuck tightly to the patch - instant panic!

The process of making and storing patching material is speeded up by using rubber cement. Cut pieces of good bond paper to the largest size that will fit between the edges of the hoop (see sketch below), brush rubber cement along the edges of each piece, and lay the hoop on top of the paper. Make sure the film adheres to each piece of paper, then cut the sheets loose and store in a box. Use sharp scissors to cut patches to proper size and patch the model as discussed above.

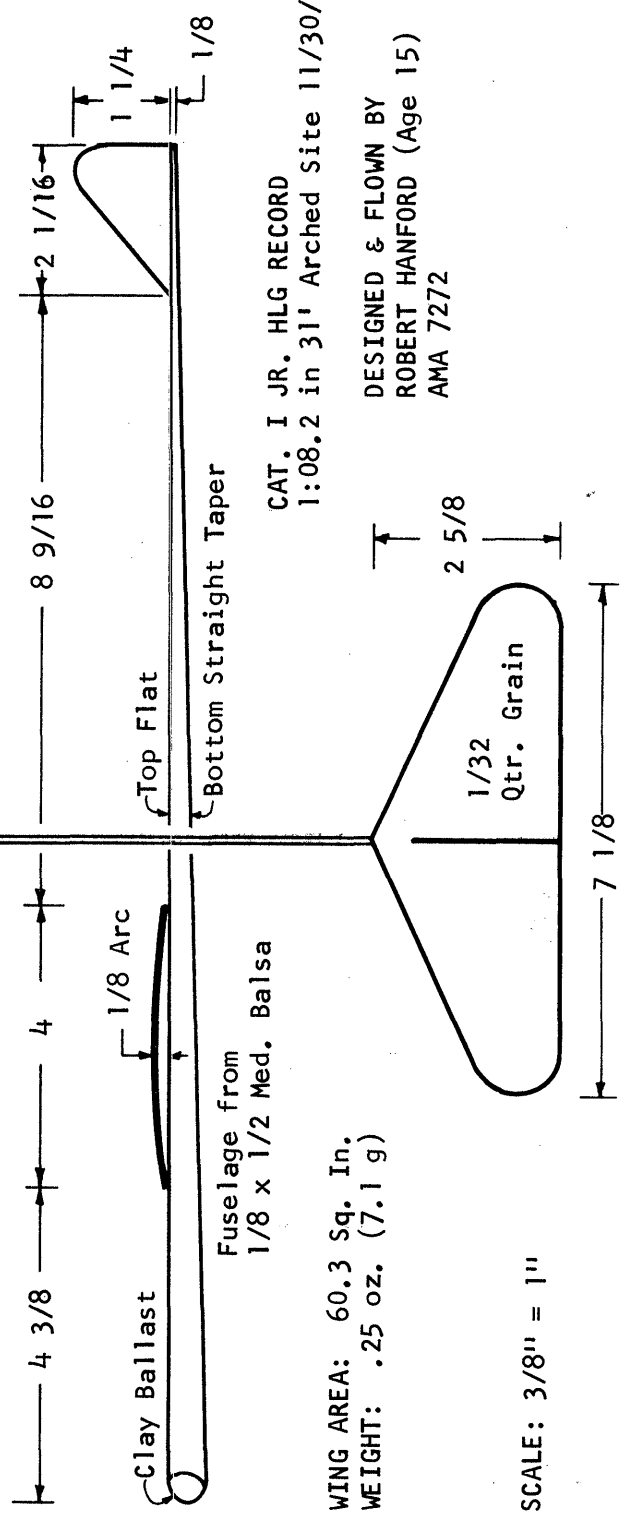
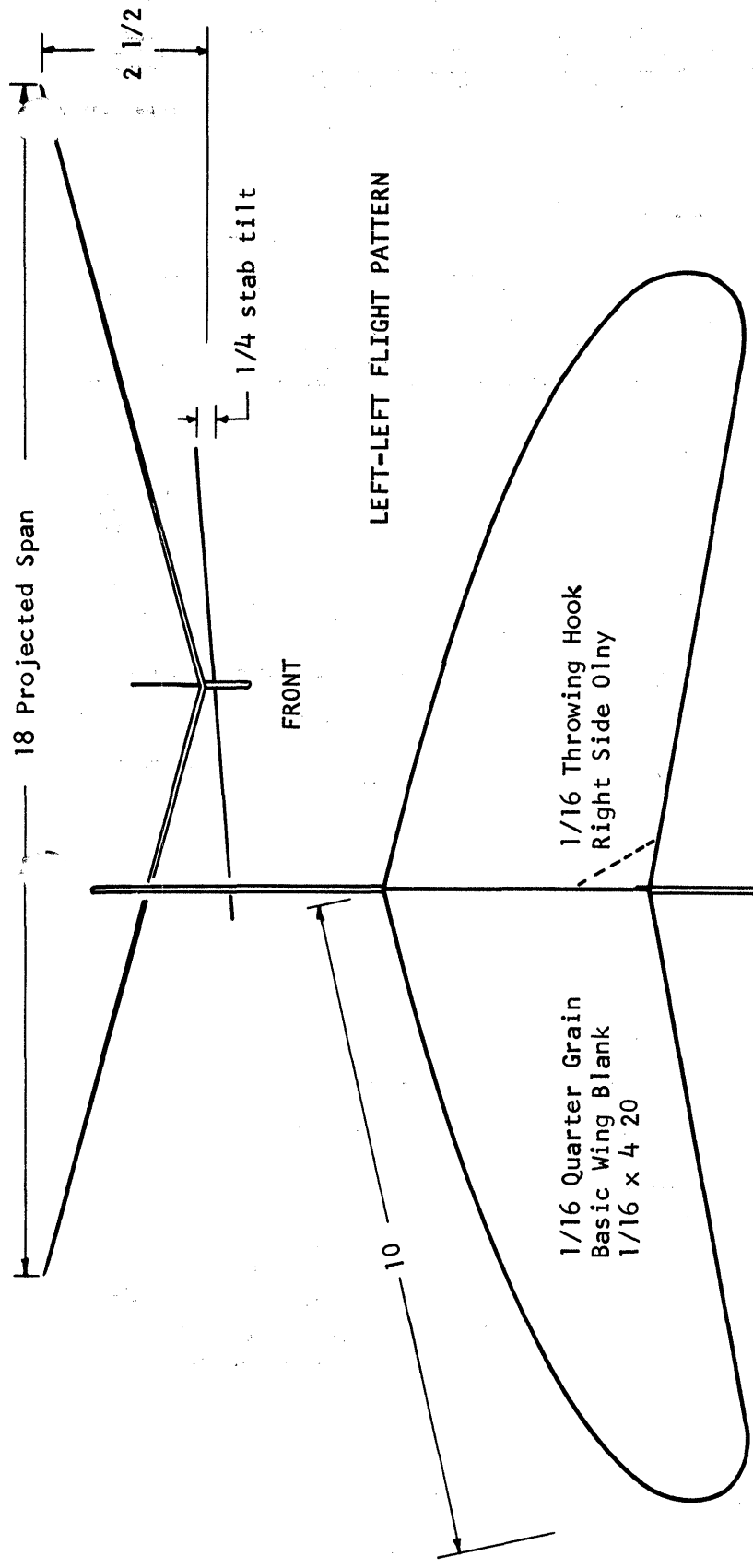


Film Pouring Spout

Numerous pouring spouts have been designed to pour microfilm, and some sort of self-regulating spout is a big help in getting uniform sheets. Most spouts are used to merely distribute the film, and are therefore filled each time a sheet is poured. This exposes the film supply to evaporation and agitation several times during a pouring session. The spout below, designed by Erwin Rodemsky, is both pouring spout and storage container. To use it, you invert it while covering the spout with a finger. Move the finger during the pour, while the second tube serves as the vent. Cover the spout again with the finger to stop the pour. Rinse the spout with acetone after the pouring session and stopper both tubes to prevent evaporation of the solvents.



Oct 69



CAT. I JR. HLG RECORD
1:08.2 in 31' Arched Site 11/30/68

DESIGNED & FLOWN BY
ROBERT HANFORD (Age 15)
AMA 7272

WING AREA: 60.3 Sq. In.
WEIGHT: .25 oz. (7.1 g)

SCALE: 3/8" = 1"

MICROFILM TECHNIQUES

Barometric Pressure - Follow-Up

The Feb. '69 INAV introduced the concept that barometric pressure exerts a powerful influence on the results we get when we pour microfilm, while the March '69 issue followed up on this theme and clarified one method of judging when to plan to pour.

When these two articles are considered together, they discourage those who live at higher altitudes and imply that successful pouring is difficult or impossible if you live under lower pressure. Recent experiments show that this need not be true; all you have to do is to modify the solvent balance of your formula. The principle is shown below in the two formulas given. Formula I "quits" about 29.50 in. hg. pressure, while Formula II has worked well down to about 29.00 and shows signs of going lower.

<u>Formula I</u>	<u>Formula II</u>
3/4 cc SIG Lite-Cote Dope	3/4 cc SIG Lite-Cote Dope
2 cc N/C 2500*	2 cc N/C 2500*
13 cc Methyl Ethyl Keytone	10 cc M.E.K.
4.5 cc Butyl Acetate	6 cc Butyl Acetate
1 cc Amyl Acetate	1 cc Amyl Acetate

*N/C 2500 is my code for 2500 sec. viscosity nitrocellulose dissolved in 100% M.E.K. I did not keep a record of the ratio of solvent to solids, so the next batch of N/C 2500 will likely differ somewhat!

A note on the characteristics of the films made from the formulas above: This film is an offshoot of one used for some time, based on SIG Lite-Cote dope. The original mix proved to be somewhat fragile, and N/C 2500 was added to improve the strength. This film is ultra-dry - so much so that it is difficult to patch using the same material. It is also the most stable film I have used, and is almost completely static-free. I have not made tests to prove it, but film from this formula gives the impression of being lighter, color for color, than other formulas.

MODEL STORAGE AND TRANSPORTATION

Part V - High Density Packing

Whether your're enroute to the World Champs or to the local flying site, it is nice to be able to carry everything in one load. In fact, when you travel, it is almost mandatory that the models occupy only one hand! After all, there is a limit to how much "extra" the Team Manager can carry!

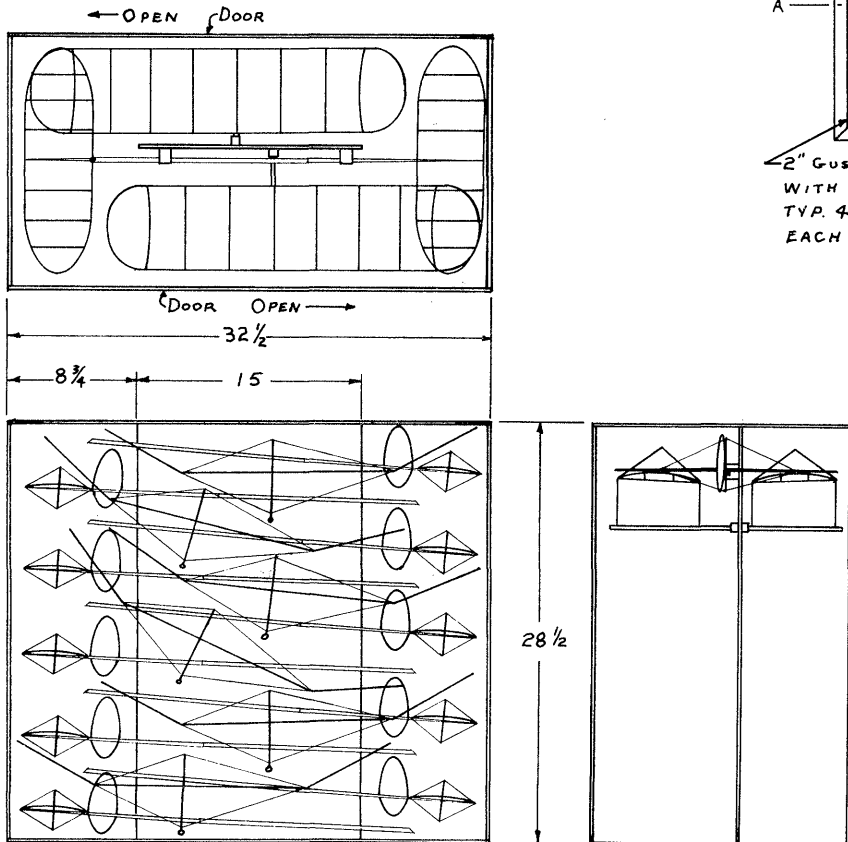


FIG. 1

Consequently, it was with great delight that I saw the sketch for Al Rohrbaugh's model box which holds 10 models and offers good access to all of them. Figure 1 below shows the basic arrangement, with some models eliminated from the end view. Two major features of this box make the big difference in packing and accessibility: the center web which serves to mount everything except props (the props can be mounted on the bottom), and the two sliding doors which give access to both sides of the box.

After his return from Europe, Al had the following remarks about the box: "The enclosed construction details show that the box is relatively airtight. In spite of that, it started to rain as I left Ft. Wayne airport and I lost my nerve and taped the edges of the box. On the way back from Rome I didn't tape it and experienced no damage due to air leakage. I conducted an experiment by allowing airport personnel to handle the box with no supervision on five different airplanes on the return trip. Some wings were damaged by rotating slightly and hitting the stabs. A simple but tedious solution is to place sway braces at the dihedral joints, but the real solution is to handle the box yourself."

The box was constructed of 1/4" thick brown paneling finished on the outside. A single 4' x 8' piece furnishes sufficient material for one box of the size shown. Al's box is shellacked inside (two coats, sanded between), and this darkens the color of the material to provide the dark background so helpful for visibility as you pack and unpack the models.

Fig. 2 shows a side view of the box with one sliding door partially open. This also shows the wood molding which serves to seal the edges of the box. Note that the molding fastens to the box except for one edge, where it fastens to the door. The basic box has an internal frame which shows up in the sectional views; and other details of the construction are shown also.

This concept can be applied to designing boxes for any reasonable number of models by varying the 28 1/2" dimension. My own box was 14 1/2" in this dimension and held four models and seven props comfortably.

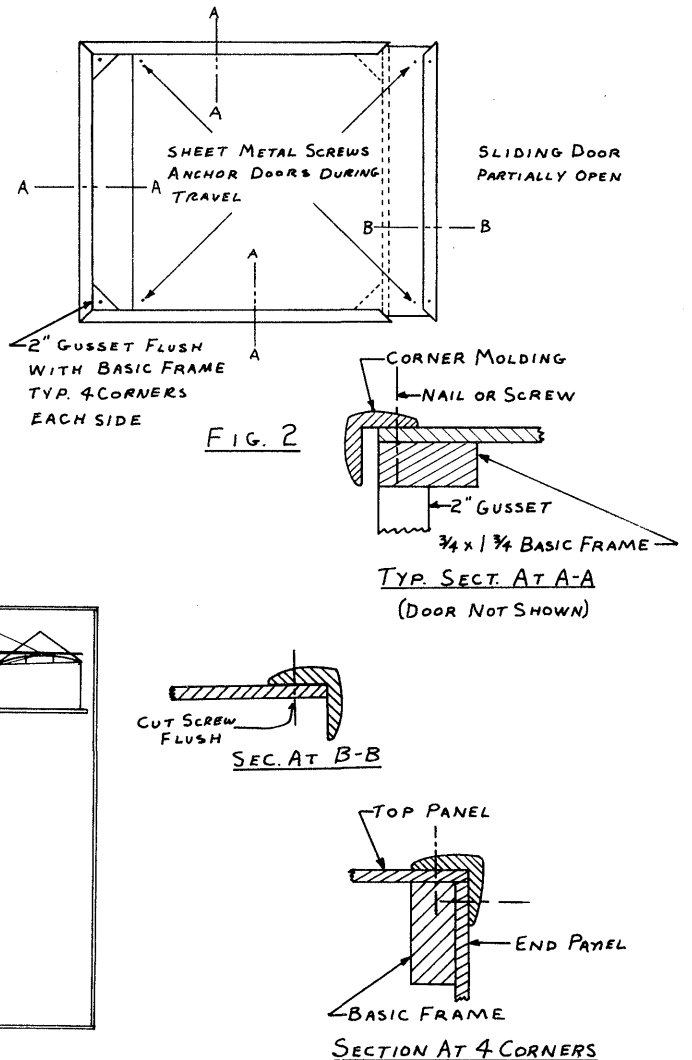


FIG. 2

INDOOR

NEWS and VIEWS

Editor: Bud Tenny · Box 545 · Richardson, Texas · 75080

****NATIONAL INDOOR MODEL AIRPLANE SOCIETY****

New Members!

SPEEDIE N. McDOWELL, 205 N. 4th St., Champaign, Ill. 61820

Family Memberships

THOMAS J. SOVA, 977 E. Philadelphia Ave., Youngstown, O.
44502

Telephone Numbers?

A NIMAS member who travels a fair amount has suggested that a list of telephone numbers be compiled and furnished upon request to other NIMAS members. This could be a good idea, if enough people cared to participate to make a list of useful size. How about some comments on this? Most members manage to find out my number (235-4035) if they need to call me names - how about the rest of you?

Special Action Committee

Roger Schroeder, 4111 W. 98 St., Overland Park, Kan., 66207, announces that eleven local instructors from different parts of the country have agreed to help beginners in Indoor. If you need help or know someone who does, get the complete address of the nearest instructor from Roger.

Donald Sump	Lewiston, Idaho
Orval Stewart	Nashville, Tennessee
Charlie Sotich	Chicago, Illinois
Jim Richmond	Bensenville, Illinois
Chester Wrzos	Lynchburg, Virginia
Phill Lawry	Auburndale, Massachusetts
Bud Tenny, Box 545,	Richardson, Tex. 75080
John Thornhill	Mt. Airy, Maryland
Dave Linstrum	St. Louis, Missouri
Cy Baucke	Fullerton, California
Roger W. Schroeder	Holbrook, Nebraska

The rest of you look on the list and ask yourself if your name should appear there!

I Apologize!

Last month's issue announced a "new" and thinner version of the polycarbonate film which Micro-X sells as Microlite. Due to a mixup on my part, and confusing info furnished by the manufacturer, I really was talking about Microlite. Thus, the thinnest film available is Microlite and it has found good use in scale models and ornithopter wing flappers, to name two uses. Jerry Skrjanc (Micro-X) states that the static problem I mentioned clears up almost completely by exposing the sheet to moving air. He also says (I agree) that this is the lightest covering material available besides microfilm, with a weight about half-way between condenser paper and microfilm.

More Info Sheets

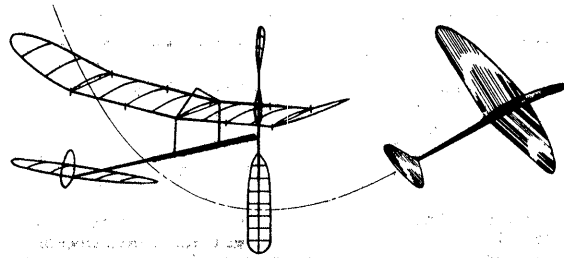
Some information sheets have been prepared on the constant margin of stability balance method. They summarize the CMOS method presented in the Jan. '69 INAV, in step-by-step example form. (The CMOS method of model balance enables flight characteristics to be duplicated more exactly from model to model than if a specified CG location is used.) These sheets are available by sending a stamped self addressed envelope with your request to: Box 545, Richardson, Tex. 75080.

Bilgri Reprints

Reprints of the three-part Bilgri indoor article from Model Airplane News are still available for 60¢ per set. These articles present a fairly complete picture of indoor construction and flying techniques and should be requested from Box 545, Richardson, Tex. 75080.

Financial Report

This issue is the first one of INAV's ninth year of publication. The average circulation for last year was 280 issues per month, which makes the second year that growth has amounted to a 12% increase. Income for the



year amounted to \$709.50 and total expenses for postage, office supplies and other supplies came to \$682.38. Direct INAV costs break down as follows:

Printing INAV	\$253.56
INAV Postage	205.18
Correspondence postage	99.40
Supplies	71.41
Other expenses	53.13
	\$682.38

Each issue takes about 65 hours of time per month, counting the help of the whole family on mailing nights and all help donated by draftsmen and other contributors to the newsletter contents. Time spent in answering correspondence is in excess of the 65 hours, and outgoing mail totalled 1094 pieces. Incoming mail totalled 798 items.

World Championship Dates Set

In a recent letter, Otto Hints of Tirgu-Mures, Romania said that the 1970 World Champs has been scheduled for April 2-6, 1969. The site, as has been announced before, is the huge salt mine - Salanic Prahova. A sketch of the site appeared in the June '69 INAV.

SPECIAL INTERNATIONAL ISSUE

This issue is dedicated to indoor modelers all over the world. At the present time, INAV goes to Canada and Mexico and to 18 other countries, and we usually get some sort of report from each country periodically. I really appreciate this correspondence, and look forward eagerly to receiving each bit of news about indoor flying elsewhere in the world. Thanks to all of you!

TOP TEN EASY B

During the month of October, Bob Platt and Hal Crane "bumped" their way into the Top Ten. This is justice of a sort - they would have been there already, except for illness of the CD they flew under last spring. Their entry arrived late - unknown to them, and they thought they had placed. Anyone else who wishes to submit new times (even if they didn't enter originally) may do so between now and the next Annual NIMAS Postal. Deadline for listing in any issue is the last day of the previous month (deadline for Dec. '69 INAV is Nov. 30, 1969). In order to submit new times, fly your Easy B under AMA rules and send the flight time to Bob Putman, 507 Darlene, Arlington, Tex. 76012 before the end of the month. Please restrict model design to solid motor stick and boom with unbraced surfaces, and be sure to include the ceiling height (FAI measure) of your site when you send in the times. Current Top Ten:

	Time/Ceiling	Fudge (to 35')	Score
1. Bob Platt	575/20'	1.32	760.6
2. Clarence Mather	590/30'	1.08	637
3. Joe Pontecorvo	516/24'	1.21	623
4. Pete Patterson	492/24'	1.21	594
5. Hal Crane	415/20'	1.32	549
6. Jim Walters	392/24'	1.21	473
7. Howard Haupt	384/25'	1.18	454
8. Phil Hainer	383/25'	1.18	453
9. Joe Deady	367/24'	1.21	443
10. Rex Powell	395/31'	1.06	420

Top Juniors

1. R. J. Dunham, Jr.	467/41'	.92	431
2. Kim Mather	255/25'	1.18	302
3. Neal Rozelle	287/35'	1.00	287

CONTEST CALENDAR

ARIZONA - Phoenix. Indoor sessions in Arcadia High School Gym, 7 pm to 10 pm the second Tuesday each month. Contact Terry Thorkildsen, 3103 W. Willow Ave., Phoenix, Arizona 85029 for further details. Cat. I site.

CALIFORNIA - San Francisco. Cat. II indoor contest, Dec. 13-14, 1969, 10 am to 4 pm each day; site is Cow Palace (96' ceiling). HLG, Paper Stick, Cabin, Indoor Stick (all with Jr.-Sr. comb and Open) FAI Stick - all ages combined.

All events flown both days. Bud Romak, 85 Sullivan Dr., Moraga, Cal. 94556 ph. 376-4624.

GEORGIA - Atlanta area. The Decatur Flying 8-Balls MAC 2nd Annual Indoor Contest, Nov. 23, 1969. Site is the Cumming High School Gym, a reasonably clear dome about 30' usable. Easy B and HLG (Jr. & Sr.-Op.); Paper Stick and Indoor Scale (all ages combined). Warren Lawrence, Box 225, Decatur, Ga. 30031.

ILLINOIS - Chicago. Cat. I indoor sessions at Girl's Gym of Forest View High School, 2121 Goebbert Rd., Arlington Hts., Ill. Sessions each Sunday from 9 am to 5 pm, except Dec. 7, Dec. 14, 1969 and Feb. 8, 1970. Call Al Sortwell at 312-439-1497 for directions to gym.

MARYLAND - Silver Spring. Indoor sessions at JFK High School, 1901 Randolph Rd., Silver Spring., Nov. 7, 21; Dec. 5, 12, 1969 and Jan. 9, 16, 30; Feb. 20, 1970. Time: 7 pm to 11pm.

MASSACHUSETTS - M. I. T. Cat. II indoor sessions at MIT Armory, Mass. Ave. & Vassar St., Cambridge, Mass., 3:30 pm to 6:30 pm, Nov. 15, Dec. 13, Jan. 31, Mar. 7. Indoor contest April 11, 1970, 1:30 pm to 8:30 pm. Ray Harlan, 15 Happy Hollow Rd., Wayland, Mass. ph. 358-4013.

NEW YORK - Hicksville. The Grumman Engineering Model Society is holding indoor sessions of the 1st & 3rd Wednesdays of each month, and welcome any and all indoor fliers. For more info, contact George Myers, 70 Froelich Farm Rd., Hicksville, N. Y. 11081.

OKLAHOMA - Tulsa. Tulsa Glue Dobbers indoor session, Nov. 23, noon to 6 pm, at the 15th St. Armory. Bob Dunham, 4730 S. Yorktown Ave., Tulsa 74105 ph. 918-RI 3-5424.

TEXAS - Garland. Class A indoor contest, Dec. 7, 1969, beginning 2 pm. Garland Community Center, Garland Rd. & Ave. F. 3 age classes in each event: Paper Stick, HLG, Indoor Scale, Matchbox. (Matchbox event models must fit in standard kitchen match box while ready to fly except for winding; can be glider or any kind of rubber powered model.) Paul Cardwell, ph. 214-279-0516.

WISCONSIN - Milwaukee. Indoor sessions each Thursday from 7:30 pm to 9:30 pm at Sherman Social Center, North 51st St. and W. Locust St. Ken Kraemer, 3945 N. 41st St., Milwaukee, Wisc. 53216, ph. 414-442-5864.

STATE OF THE ART

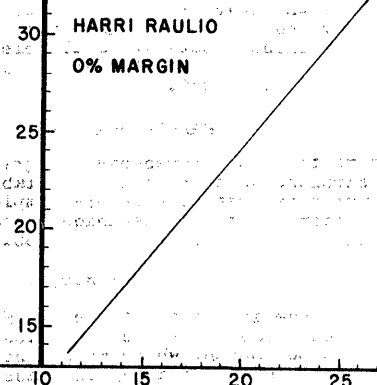
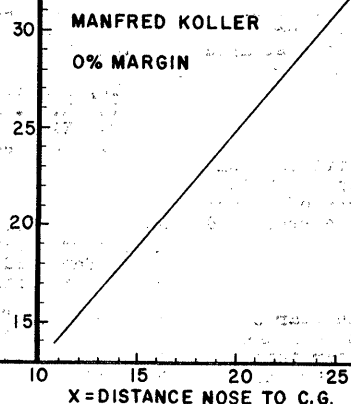
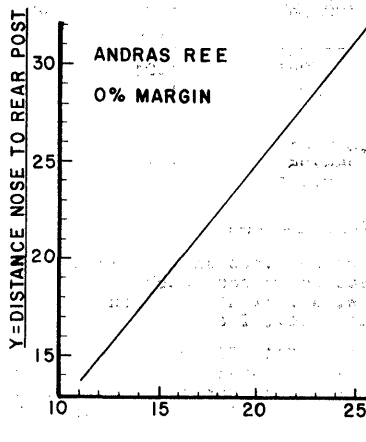
This month we feature five models from Europe, each one a high-ranking model in the country of its owner. The first one is Andras Ree's latest FAI. This model holds these Hungarian records: Cat. II (24:10) and Cat. III (29:22) and has the highest Hungarian Cat. IV time (31:01). This time would be a record except that it did not exceed the previous record by the required 2%.

Manfred Koller's "Bastard Mk III/2" was the model he flew to 5th place at the '68 World Champs. His single high time at that meet (33:06) is the Austrian Cat. IV record, and in addition the model set the Austrian Cat. I record at 15:01.

Harri Raulio set the second high time at the Finnish Team Selection Finals with model #3. His Cat. II time of 20:16 was only 1:05 lower than the new Finnish record set by Esko Hamalainen at the same meet.

Two more models appear on page 4; these were the top two winners from the Romanian Indoor Mats. Popa Aurel is 17 years old, and won the Junior event with PAM 969. Note that his model has a lighter wing loading than HOZ-969 by Otto Hints. Otto won the Open event and set the Romanian Cat. IV record at 27:42.

CMOS charts for the first three models appear below, and similar charts are available on request for the Roman-



ian models. All the charts were computed for 0% margin of stability to simplify the computation. Only Raulio sent balance info, and his model was flown at +10% margin.

MODEL STORAGE AND TRANSPORTATION

Part VI - Miscellaneous Topics

On his trip to the 1966 World Champs, Joe Bilgri's box held four complete models and parts of several more. The spare flight surfaces were stored in a false bottom to the box - covered flat and ready for use if needed. Fig. 1 below shows the general arrangement; the surfaces were covered on the box lid and then covered over with a false bottom until needed. All the spare parts needed to brace a wing (pickets, posts, cabane, etc.) were packed away in another box, and Joe braced two wings while he was there.

One of the problems Al Rohrbaugh had with his box (see Oct. '69 INAV) was that wing mount posts tended to rotate and permit the wings to hit other model parts. When I mounted my wings, I devised a mount that couldn't rotate, as shown in Fig. 2. The basic design consists of two 1/16" dia. music wires sticking thru the center web and long enough to hold one wing mount block on each side of the web. On the front side of the web the wires were reinforced with epoxy and blocks built up around the wires. These blocks also helped support the front mount by being made to fit tightly over the mount block. No such support was used on the back mounts, with no ill effects noticed.

This installment concludes the material on box design and construction. Thanks to all you who made favorable comments on the series, and if you come up with some better ideas, share them with us!

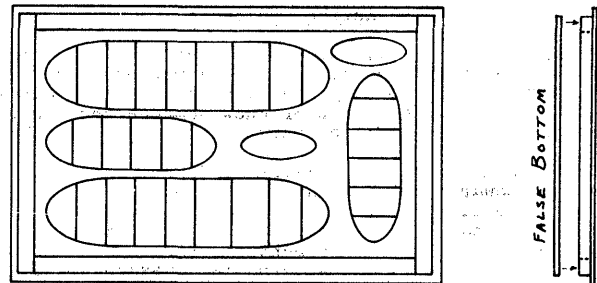


FIG. 1

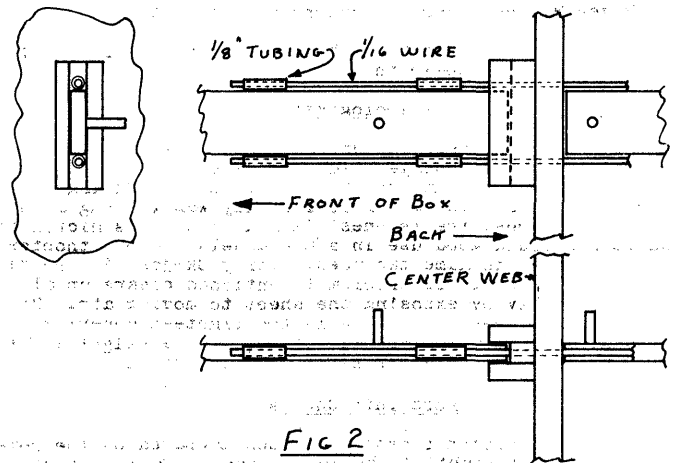
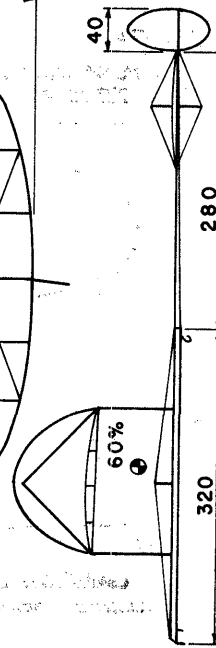
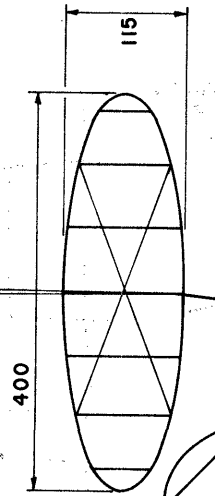
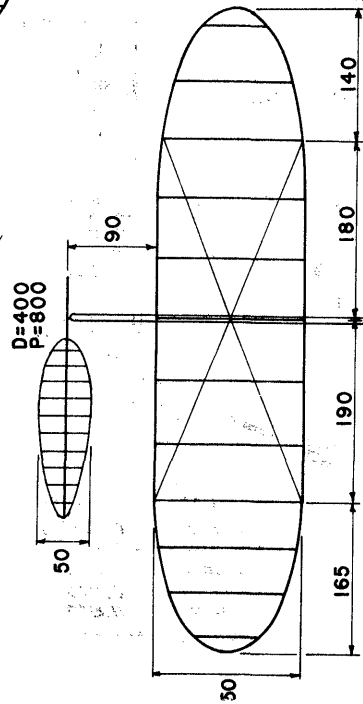
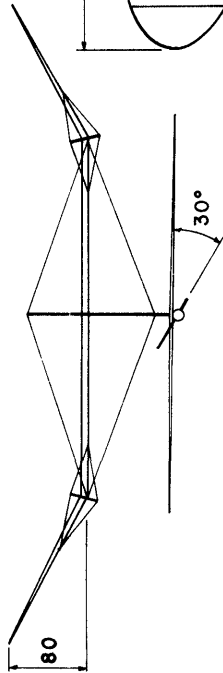


FIG. 2

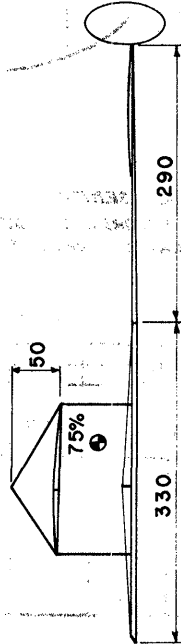
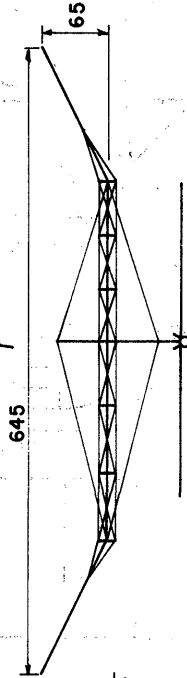
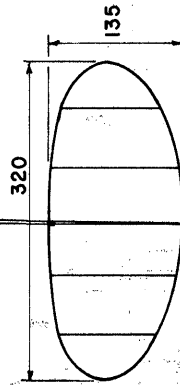
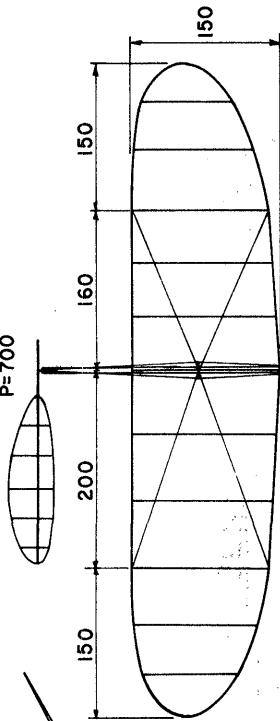


Model Weight 0.70g
Rubber-2 str. 1.0x1.2 Pirelli

65 Cm FAI

Harri Raulio
FINLAND

D=380
P=700

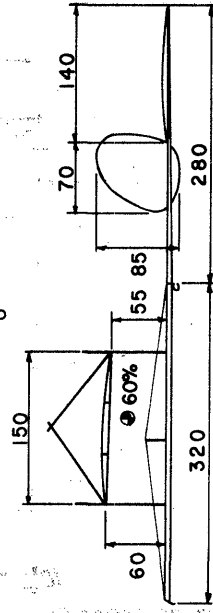
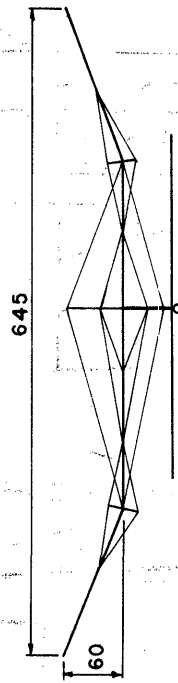
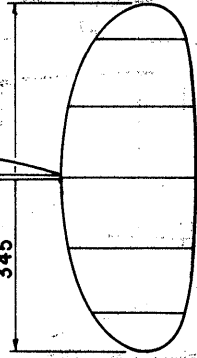
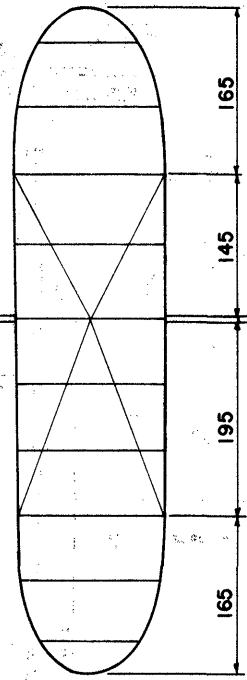
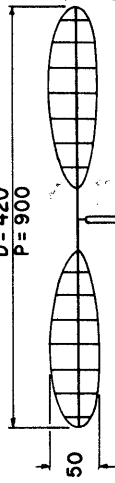


WEIGHTS
STICK & TAIL .30 g
WING .18
PROP .09
RUBBER .57 g

BASTARD Mk III/2

Manfred Koller
Salzburg, Austria

D=420
P=900

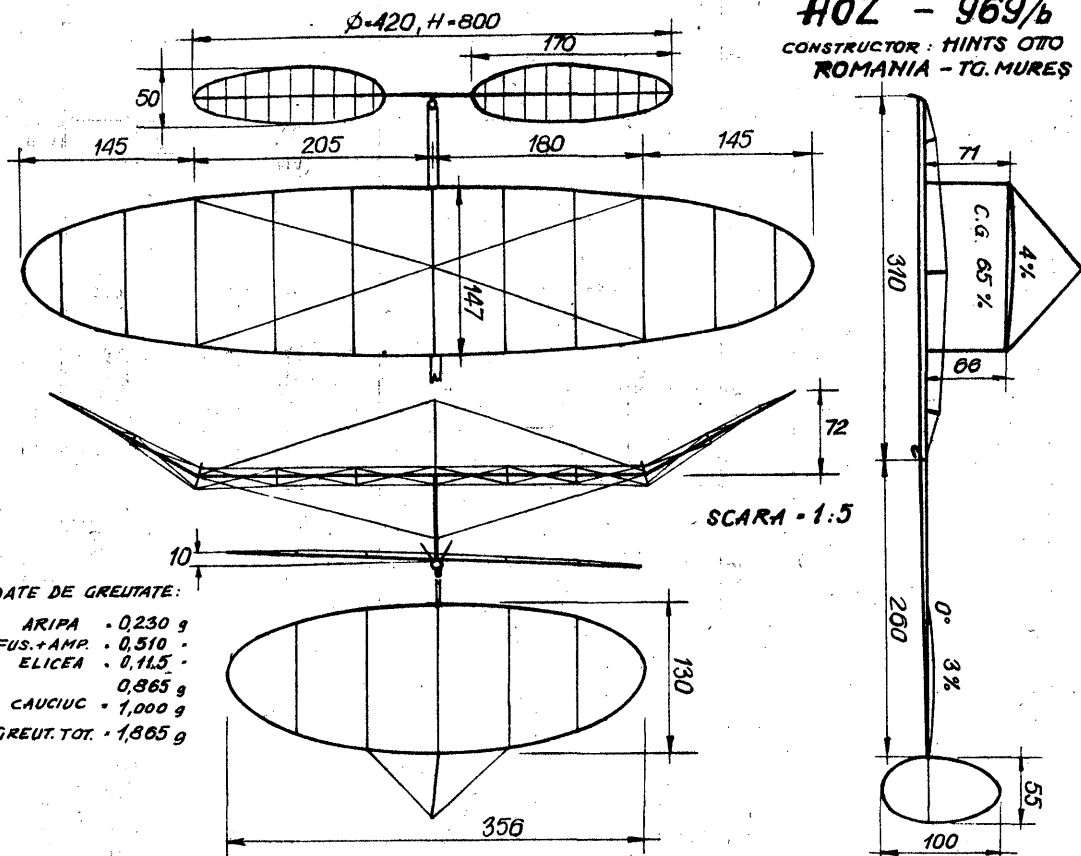


WEIGHTS
STICK & TAIL .41 g
WING .22
PROP .75 g
RUBBER .90

65 Cm FAI

Andras Ree
Budapest, Hungary

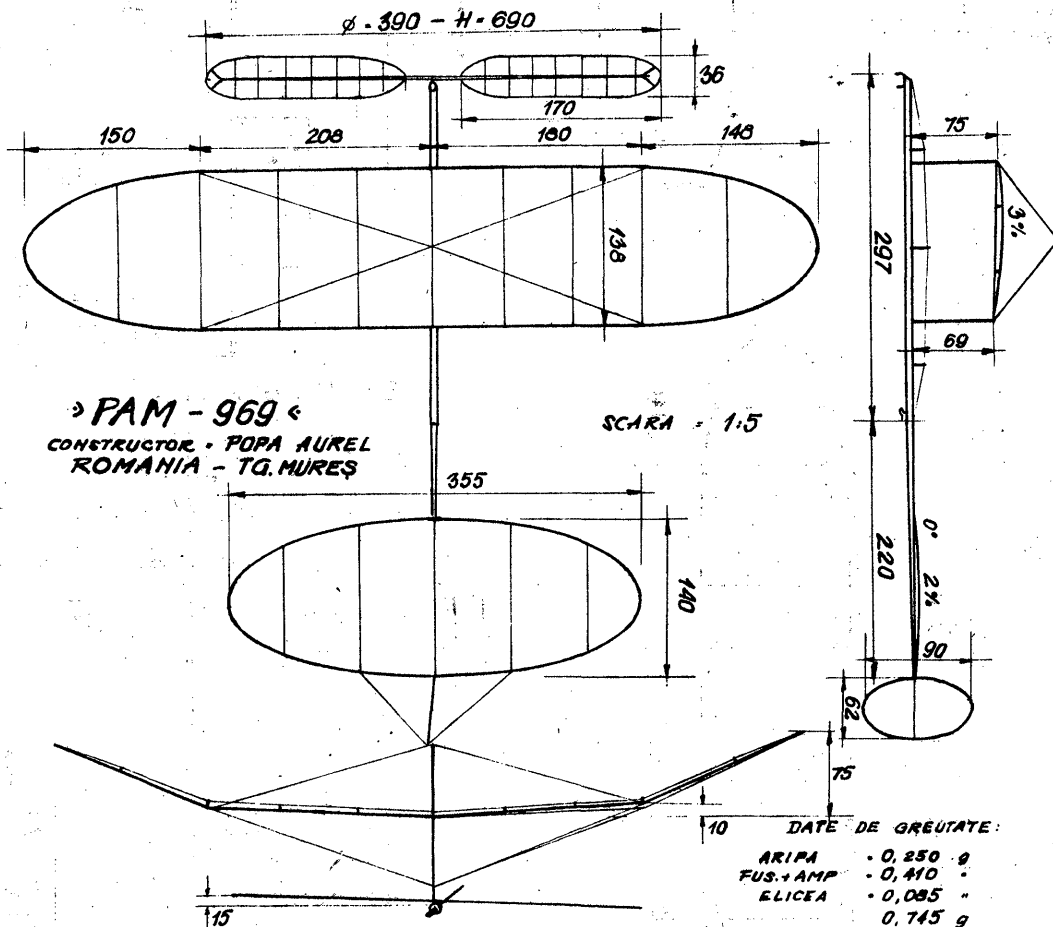
HOZ - 969/b
 CONSTRUCTOR: HINTS OTTO
 ROMANIA - TG. MUREȘ



DATE DE GREUTATE:

- ARIPA . 0,230 g
- FUS.+AMP. . 0,510 "
- ELICEA . 0,115 "
- CAUCIUC . 0,865 g
- GREUT. TOT. . 1,000 g

CAMPION SENIOR IN ANUL 1969 și
 DEȚINĂTORUL RECORDULUI NAȚIONAL ROMÂN CU 27 min. 42 sec.
 SLĂNIC - PRAHOVA, 1969. M. 22-25



FAM - 969
 CONSTRUCTOR: POPA AUREL
 ROMANIA - TG. MUREȘ

SCARA - 1.5

DATE DE GREUTATE:

- ARIPA . 0,250 g
- FUS.+AMP. . 0,410 "
- ELICEA . 0,085 "
- CAUCIUC . 0,745 g
- GREUT. TOTALĂ . 1,555 g

CAMPION JUNIOR IN ANUL 1969
 SLĂNIC - PRAHOVA, 1969. M. 22-25

INDOOR

NEWS and VIEWS

Editor: Bud Tenny · Box 545 · Richardson, Texas · 75080

****NATIONAL INDOOR MODEL AIRPLANE SOCIETY****

New Members

HARRY R. COOK, 6319 Marty, Overland Park, Kan. 66202
 T. G. CUNNINGHAM, 5740 North 11th Way, Phoenix, Ariz. 85014
 GEORGE J. FLYNN, 3 Ames St., Cambridge, Mass. 02139
 FRANK L. HAYNES, 992 Flindley, Bronx, N. Y. 10456
 WARREN G. LAWRENCE, 2210 Tilson Circle, Decatur, Ga. 30032
 MARK WRIGLEY, 70 Valentine St., New Bedford, Mass. 02744

Honorary Members

BRUCE EDWARDS, 170 Ladbroke Grove, London, W10, England

Family Memberships

T. G. CUNNINGHAM, Jr., 5740 North 11th Way, Phoenix, Ariz. 85014

Special Action Committee

The following indoor fliers have volunteered to act as local instructors for the NIMAS Special Action program (in addition to those listed last month):

Jim Noonan, 7454 W. Thurston Cir., Milwaukee, Wisc. 53218
 Vern & Dale Hacker, 25100 Euclid Ave., Euclid, Ohio
 Harry Cook, 6319 Marty, Overland Park, Kan. 66202
 Robert Underwood, 4109 Concord Oaks Dr., St. Louis, Mo. 63128
 Bob Dunham, 4730 S. Yorktown Ave., Tulsa, Okla. 74105
 John English, 4233 E. 52nd Place, Tulsa, Oklahoma
 Bob Hanford, 3838 S. 88th E. Ave., Tulsa, Okla. 74145
 Tom Vallee, 444 Henryton So., Laurel, Md. 20810

What do local instructors do, and how do they get the attention of the youngsters? Here is the story of one of the present crop of volunteers, relating his own methods:

"My technique for starting indoor model flying clubs is this: As a school teacher, I have a ready-made "door opener". I bring a simple model to school (paper pusher or Easy B), and fly it for the boys. I usually find at least one who is interested enough to try building one, using material I furnish. After this one succeeds, some of his friends usually give it a try. I have averaged 12 boys per school year who were getting 3-5 minutes with paper stick and usually 2 who achieve 5-7 minutes with a microfilm model (17' ceiling; these boys had no previous building experience and learned in a 6 month period). The 3 factors required for success are:

1. Someone interested enough to take time to work with young boys and girls.
2. Hold flying sessions at least once a week.
3. A goal. (This can be a simple perpetual high time trophy; give the more experienced fliers a handicap to provide a better chance for the newer ones.)"

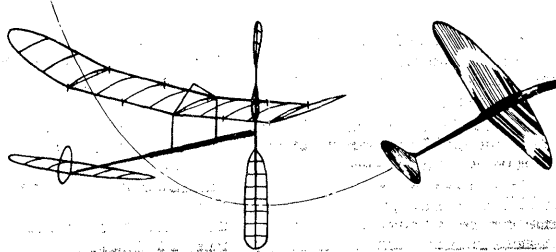
The above was written by Chester Wrzos, who founded a very active group in New Jersey and now has moved down to teach in Lynchburg, Virginia. FAI Finalists and 1969 Nats contestants will remember Chet as CD of both the Finals and the Indoor Rubber portion of the 1969 Nats at Lakehurst.

Merry Christmas!

Lack of time and finances prevents us from sending each of you a card, but we enjoy all the many cards we get each Christmas. So, Merry Christmas and a Happy New Year to each of you!

Rubber Strippers Available

Bob Dunham has offered to open up his production line on Bilgri-type strippers once again. These are very nice units made from plexiglas, and work very well with either a single blade or multiple blades (See Jan. '67 INAV). The price is \$5 per unit, with deadline on ordering set for Jan. 20, 1970. All units will be produced at the same time, according to orders on hand Jan. 20. Send orders to Bob Dunham, 4730 S. Yorktown Ave., Tulsa, Okla. 74105.



Spread The Word!

Ken Kraemer's weekly indoor activity (see Contest Calendar) was called to the attention of a local paper, and this resulted in an excellently written article, complete with good pictures. Let this be a reminder - it costs you nothing to try for publicity, and it often pays off very well. The only caution you should observe is to have a knowledgeable person accompany the reporter to explain in detail (and logical sequence) just what is going on.

Volunteer Needed

Two long overdue NIMAS forms for future surveys have now been designed, but they need to be typed in final form for printing in quantity. So, we need one volunteer with a typewriter to make one copy of each form - two pages of typing total. If the typewriter has one of the newer type fonts, this is preferable. Volunteer to Box 545, Richardson, Tex. 75080.

Site Survey Form

Years ago it was proposed that a survey be made of the sites in regular use around the country and that this info be published in a booklet for NIMAS members. A preliminary version of the form is now being sent out, but the collection of the information will be speeded if interested fliers will send a stamped envelope for their form. It will also ease the workload here - so send your envelope to Box 545, Richardson, Tex. 75080.

Winders?

It has been called to our attention that the W-16:1 ratio winder is out of production. This winder has been the "old faithful" for so many years, but now it is gone. Does anyone know of any existing supplies of these winders or of another low cost winder to fill the gap?

NFFS Design Competition

The National Free Flight Society and AMA are co-sponsoring a design competition for a small field rubber powered model. Entry deadline is April 1, 1970, and an entry blank and set of rules can be obtained from Annie Gieskieng, 1333 S. Franklin St., Denver, Colo. 80210.

NIMAS Awards

CAT. I HLG AWARD - 0:24.5, Patty Jo Thornhill

World Championship Dates

It was erroneously reported last month that the 1970 Indoor World Champs would be held April 2-6, 1970. The report from the November CIAM meeting places the dates as April 9-12, 1970. The geographical location of the salt mine is 60 miles north of Bucharest, Romania. This site is reputed to be one of the best sites in the world because of its combination of virtually zero drift and a 200' + ceiling height.

FAI Decals

Team Selection Manager Clarence Mather has attempted to distribute special decals (donated by NFFS) to all Quarter-Final and Semi-Final qualifiers. Qualifiers who have not received their decals should contact Clarence at 3880 Ecochee Ave., San Diego, Cal. 92117 and he will send the decals promptly.

INDOOR RULES

The following rules changes will apply to indoor flying beginning Jan. 1, 1970:

Add to Sec. 8.5 (Indoor Cabin Definition): The maximum cross-section must be taken at some point on the fuselage which contains the rubber motor.

Change the indicated paragraphs as noted:
 8:13 Official Flight. Each contestant shall be allowed a total of five flights. All flights are official regard-

less of duration. Delayed flights are not recognized, with one exception (see 8.14). Flights during which any part is dropped shall be considered an official flight with no time recorded.

8.14 Unofficial Flight. An unofficial flight occurs when a model strikes the balloon or tether of another contestant who is attempting to retrieve a model. At this point the contestant can make a decision as to allowing the time to continue until the flight is completed or call it a no flight (no time or no attempt is recorded). He must make the decision immediately and cannot reverse it later.

8.15 Timing of Flights. Shorten the paragraph as follows: If the model does not free itself within the 10 seconds allotted, the watch shall be stopped, 10 seconds deducted from the time indicated, and the results recorded. (Delete the balance of the paragraph.)

A check with AMA HQ gave the answer that present records will stand, which is reasonable in that no actual change was made in how the flights are qualified. On a historical note, this action is the final part of a package of recommendations generated by an indoor advisory committee set up in 1963. NIMAS members participated in the recommendation also, in the form of a rules questionnaire which was circulated as a part of INAV.

CONTEST CALENDAR

ARIZONA - Phoenix. Indoor sessions in Arcadia High School Gym, 7 pm to 10 pm the second Tuesday each month. Contact Terry Thorkildsen, 3103 W. Willow Ave., Phoenix, Arizona 85029 for further details. Cat. I site.

ILLINOIS - Chicago. Cat. I indoor sessions at Girl's Gym of Forest View High School, 2121 Goebbert Rd., Arlington Hts., Ill. Sessions each Sunday from 9 am to 5 pm, except Dec. 14, 1969 and Feb. 8, 1970. Call Al Sortwell at 312-439-1497 for directions to gym.

MARYLAND - Silver Spring. Indoor sessions at JFK High School, 1901 Randolph Rd., Silver Spring, Dec. 12, 1969 and Jan. 9, 16, 30; Feb. 20, 1970. 7 pm to 11 pm.

MASSACHUSETTS - M. I. T. Cat. II indoor sessions at MIT Armory, Mass. Ave. & Vassar St., Cambridge, Mass., 3:30 pm to 6:30 pm, Dec. 13, Jan. 31, Mar. 7. Indoor contest Apr. 11, 1970, 1:30 pm to 8:30 pm. Ray Harlan, 15 Happy Hollow Rd., Wayland, Mass. ph. 358-4013.

WISCONSIN - Milwaukee. Indoor sessions each Thursday from 7:30 pm to 9:30 pm at Sherman Social Center, North 51st St. and W. Locust St. Ken Kraemer, 3945 N. 41st St., Milwaukee, Wisc. 53216 ph. 414-442-5864.

EUROPEAN CONTESTS!

The Championship of Budapest, Hungary was held in September, with these three winners:

1. Andras Ree	24:10	23:35	47:45
2. Antal Egri	20:08	20:31	40:39
3. Geza Varszegi	19:44	17:24	37:08

This was the final indoor meet for the Hungarians for 1969, and their last opportunity to train for the World Champs, unless they can manage to get to the salt mine in Romania sometime before the meet.

On October 26, 1969, Coppa Urbe (an annual indoor meet in Rome) was held and the Italian team for the 1970 World Champs was selected from the winners. Two sets of results are noted below; the first is for FAI models and the second for a new "sport category" which has a minimum weight of three grams.

FAI Models

1. Egizio Corazza	29:29	30:31	60:00
2. Gennaro Masciullo	22:09	23:10	45:19
3. Luigi Chiarottini	20:36	21:32	42:08
4. Carlo Cotugno	20:43	20:59	41:42
5. M. Ludovica Corazza	20:11	20:26	40:37
6. Loris Kannerorff	16:19	19:03	35:22
7. Bruon Militi	15:08	16:26	31:34
8. Fernando Migani	13:59	12:21	26:20
9. Alberto Frioli	11:07	13:09	24:16

Sport Category

1. Armando Seghetti	7:39	8:55	16:34
2. Paolo Vittori	8:18	7:50	16:08
3. Paolo Martini	6:57	6:50	13:47
4. G. Carlo Domenici	6:36	6:14	12:50
5. Luciano Covaro	5:53	5:58	11:51
6. Walter Ricco	6:24	5:24	11:48

As noted above, the Italian team will be Corazza, Masciullo and Chiarottini. Except for Corazza, who flew in several other European meets this year, the contestants had not had an opportunity to test fly their models.

STATE OF THE ART

The model of the month is Tom Vallee's record holding helicopter. Note that the plan sheet shows three records in less than a year, with a longer motor stick for the last record. This model would be exceptionally easy to build, since the rotor blades would not require a special jig for the lower rotor. Try a helicopter - they are fun and a challenge. They also make fine crowd pleasers for demonstrations.

RECORDS? MAYBE!

These records should have been listed in the November issue, and have already been homologated. The marks were set at Willis School in Hampton, Va. (Cat. I, 20' ceiling)

Open Helicopter - 7:44.4, Tom Vallee
Open FAI Cat. I FAI - 18:48, Tom Vallee
Open AMA Cat. I FAI - 19:43.5, Tom Vallee

POSTAL CHALLENGES

Several fliers have been talking about the concept of postal competitions on flights which do not touch the top of the site. The usual NIMAS fudge factor would apply to the flights, and the concept should provide an interesting contrast to current flights which rafter-bang or ceiling-scrub for a considerable portion of the flights. It can be said with certainty that all present Cat. I records, including World Records, were set with the models in continuous or intermittent contact with the ceiling for about 55% of the flight. Those who are interested in this idea send in your times, listing the flight time, FAI ceiling measure of the site, and estimated altitude the model did attain. We'll have a "Top Ten Ceiling Dodger" listing!

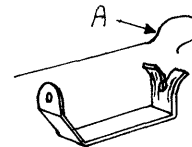
TOP TEN EASY B

	Time/ceiling	Fudge (to 35')	Score
1. Bob Platt	575/20'	1.32	760
2. Jim Walters	675/37'	.972	656
3. Clarence Mather	590/30'	1.08	637
4. Joe Pontecorvo	516/24'	1.21	623
5. Joe Deady	636/37'	.972	618
6. Pete Patterson	492/24'	1.21	594
7. Hal Crane	415/20'	1.32	549
8. Howard Haupt	384.25'	1.18	454
9. Phil Hainer	383/25'	1.18	453
10. Rex Powell	395/31'	1.06	420
Top Juniors			
1. David Sandelius	460/37'	.972	447
2. R. J. Dunham, Jr.	467/41'	.92	431
3. Kim Mather	255/25'	1.18	302
4. Neal Rozelle	287/35'	1.00	287

HINTS AND KINKS

Novel Thrust Bearing

Egizio Corazza of Italy sent in the following thrust bearing design (see sketch below). He says, "The front part of the dural bearing is bent and bored in the usual way; the rear part is bored and then cut from the end to the hole. The two ends are twisted and filed slightly with a thin knife file, so the prop shaft, first passed through the front hole, may fit into the rear hole through the slot. The fit should be tight enough that only the part marked 'A' will pass through the slot; thus when the shaft is pushed to the rear, the straight part won't come out and is held firmly."



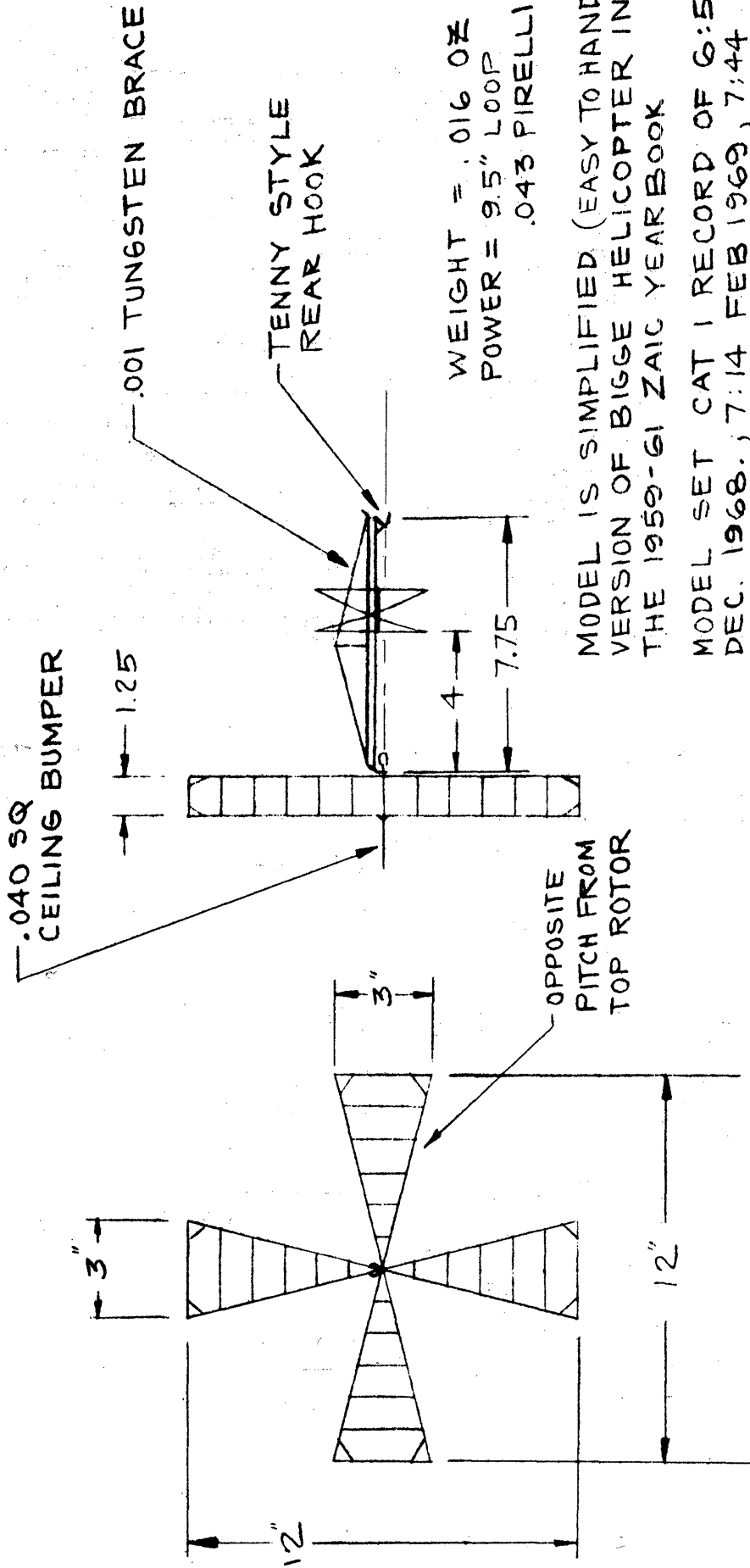
Dihedral Hint

Before he covers his wings, Bob Randolph glues a short length of dacron monofilament on top the spar at each dihedral joint. If the spar breaks completely as he puts in dihedral, the monofilament holds and prevents a rip in the film.

End Lube Mess

Wayne Zink stores his rubber lube in a 15 cc nasal mist spray bottle (Dristan), and is able to squeeze out the exact amount required. This type of bottle has to be disassembled to clean it, and Wayne removes the siphon tube at the same time. Similar bottles without the tube (just a removable dropper top) are available from W. H. Curtin and E. H. Sargent scientific supply houses.

DEC '69 INAV



MODEL IS SIMPLIFIED (EASY TO HANDLE)
VERSION OF BIGGE HELICOPTER IN
THE 1959-61 ZAIG YEARBOOK

MODEL SET CAT 1 RECORD OF 6:55.9,
DEC. 1968., 7:14 FEB 1969, 7:44
OCT. 1969

MOTOR STICK INCREASED TO 9:25" FOR
7:44 FLIGHT - NEW WEIGHT - 013 OZ.

CORKSCREW HELICOPTER

designed by
TOM VALEE

THE LAB

Two Rubber Tests

Jim Richmond, who obviously has good rubber to go with good models, has developed the following rating system for his rubber:

$$\text{Rating} = \frac{\text{Torque at 50\% turns} \times \text{Maximum Turns}}{\text{Weight of Loop}}$$

Jim says: "In my testing of rubber, I wind to a pre-determined torque - found to be the maximum safe torque for that size rubber, and the corresponding number of turns is 'maximum turns'. I then back off turns to 50% of the maximum and take the torque reading. The back-off is done rather slowly (not at any set speed), while the distance between hooks is maintained at 14" (or whatever it will be on the model). This method doesn't tell you anything about the shape of the torque curve, but it does provide a pretty accurate evaluation of the loop at the mid-point which can be compared with any other loop."

The Sept. '68 INAV presented a sorting test for new rubber, as developed by Joe Hides. I have worked with this concept until the following test method has evolved:

1. A clamp and ruler are arranged in a vertical plane as shown below.
2. A loop is formed from the rubber to be tested, and inserted in the clamp so that a 10" loop is formed. The loop is measured with 5% of the test weight hanging on it.
3. The test weight is hung on the loop (replacing the measuring weight), and the loop length is measured after 60 seconds. If the loop stretches down to the 5" mark, an arbitrary rating of 5.0 is assigned to the rubber. The test weight is figured on this basis:

$$\text{Weight} = \frac{\text{Area of loop cross section (sq.in.)} \times 11 \text{ oz}}{.0051 \text{ sq. in.}}$$

For example, a loop from rubber .124" x .041" has a cross section of .0051 sq. in. and the test weight is 11 ounces.

Both the above tests are experimental, and neither is likely to be the final answer. A summary of advantages and disadvantages would include the following factors:

Richmond test: It is sensitive to ambient temperature and to personal judgement of maximum torque allowable. It is slightly sensitive to the length of time it takes to back down to 50% max turns. The fact that Jim's test uses made-up motors can be good or bad, depending upon your viewpoint. On the plus side, Jim gets good results with the test, and it is directly related to the "real world".

My modification of the Hides test is also sensitive to temperature, and is very sensitive to accurate measurement of cross section. An improvement would be to use weight per unit length, but this would partially nullify the advantage of spot-checking on a complete skein. Also my test is not properly defined according to what rating number is ideal. On the plus side, the test can be done quickly, on rubber skeins before they have been stripped into indoor sizes. Rubber which tests between 4.5 and 5.2 seems to be very good for most indoor uses, but the test really only checks for relative torque/cross section.

If anyone tries any of these tests, please relate your findings and opinions. It is clear that accurate and meaningful testing of rubber will require much work!

A LOOK AT YESTERYEAR

The plan reprinted below came from Model Airplane News of May 1938. The article by Charles Belsky was entitled "A Low Aspect Ratio Tractor", and Mr. Belsky put forth the observation that low aspect ratio models were becoming more popular then. The chief advantage cited was more efficient structure due to shorter spars. Hal Crane please note the above! (Hal is now well aware of the advantages of the planform, and has been using it for some time. He has even developed theoretical calculations to show that optimum chord for 65 cm FAI is about 6 1/2".)

