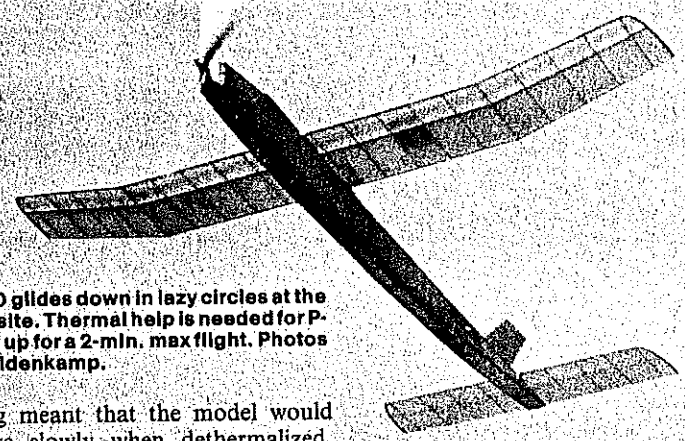
FLASH

Sweet P-30 wins again at the 1984 U.S. FF Championships!



Sweet P-30 glides down in lazy circles at the Perris, CA site. Thermal help is needed for P-30s to stay up for a 2-min. max flight. Photos by John Oldenkamp.

SWEET P-30

THE P-30 EVENT continues to be among the most popular at Free Flight contests. The models are small, easily built, and offer very satisfying performance. The 2-min. maximum flight limit for these models is good for a small-field event. Retrieval is less of a problem with these short flights, something that I like better as each year passes! P-30 is also an ideal event for a modeler's first Free Flight competition, because the required commercial plastic prop ensures good thrust. While sophisticated models such as Wakefields have their following, many modelers like a simple model at times. There is always the fun and challenge of trimming the model and picking "good air" for even the experienced flier.

P-30s have a maximum span and length of 30 inches. The airplane must have a minimum weight of 40 grams (which is just under 1½ oz.), and a maximum of 10 grams of rubber. There is no cross section or wing area rule, but only the commercially-available plastic, freewheeling props of about 9½ in. diameter may be used. The freewheeling prop has a lot of drag, which increases rapidly as the gliding speed increases. That factor would suggest a wing with a large chord and thick airfoil should be used. However, such a wing will reduce the climb, and altitude is also important for long flights.

When I decided to build a P-30, all of the models of others that I saw used narrow, thin wings—and they were high climbers. I decided to try a large wing with a 5-in. chord. The model flew well, but it had no distinct advantage over the others. One disadvantage showed up! The large-area wing meant that the model would sink more slowly when dethermalized. After two models were lost in thermals, I tried smaller wings!

Finally, I've settled on a 4-in. chord. It seems to be a good compromise between climb, glide, and dethermalizing speed. Of course, very strong thermals will carry almost any model up and away, so there is always the possibility of losing a lightweight model such as a P-30.

This model is very stable in all kinds of weather. It won the P-30 event in the 1983 Taft Free Flight Champs—in gusty, turbulent conditions.

Construction. Experienced modelers don't need any instructions for a simple model like this, so the following words will be for the benefit of those getting started in competitive Free Flight modeling. The wood sizes are standardized somewhat to make it easier to purchase the correct sizes. The fuselage frames and the wing spars and edges are all made of 1/32 sq. balsa. The balsa should be fairly hard, except possibly for the fuselage cross members. Built as shown, my model came out several grams under the 40 minimum. That is good because rubber-powered models tend to gain weight from repairs, rubber lube splatter, etc.

If you draw up the plans (instead of buying the full-size plans) be sure to check the angles of the wing and the stab carefully. The stab is set parallel to the reference line. The front of the wing is just over 1/8 in. higher than the trailing edge—1/32 in. is just right. This built-in longitudinal dihedral angle, often called decalage, is necessary for stability. The amount used is nearly the minimum, and it should be built in for ease of flight trimming.

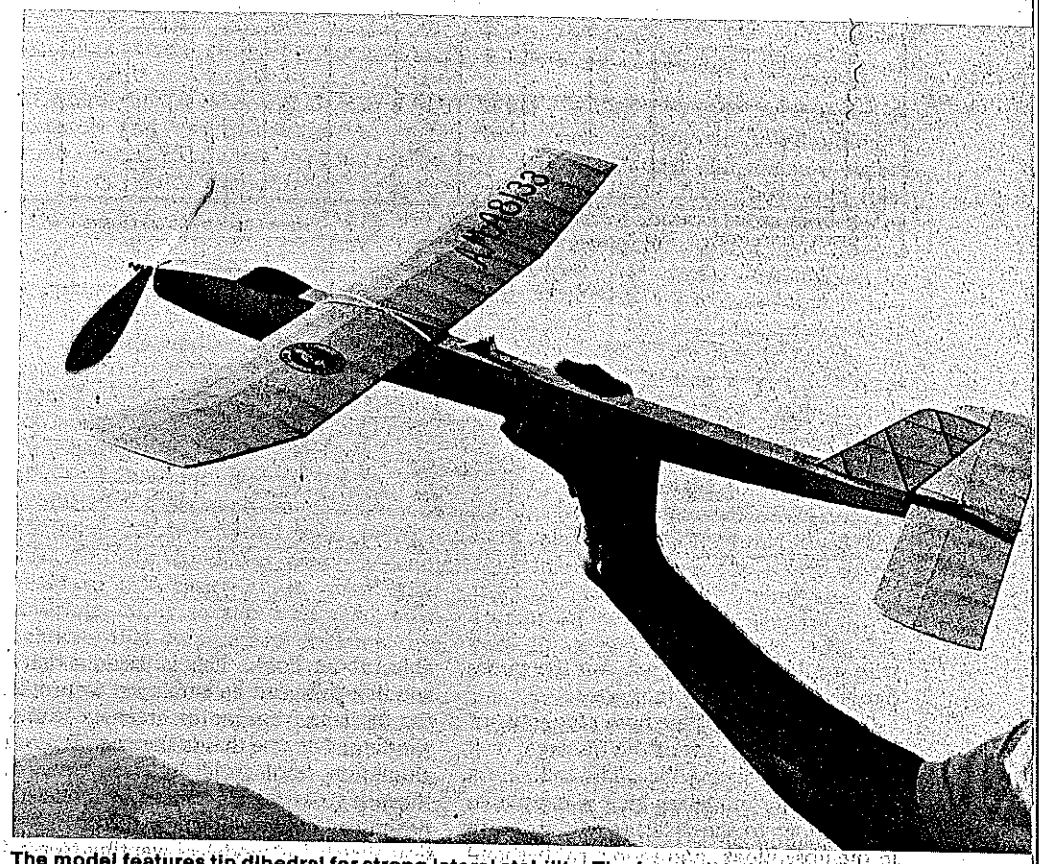
To assemble the frames, a construction surface is needed. Fiber insulation boards, such as Cellotex, work fine. Pins can be pushed into the fibers quite easily, yet the material is firm enough to hold the pins in position.

Fuselage. The longerons should be pre-bent to the curves that are needed so that they don't pull out of shape. Soak the strips and a few scrap pieces of the 1/32 sq. balsa in water for a couple of hours or more. Allow a soldering iron to partially heat up (it should be hot enough to make steam but not char the wood as it is drawn across the iron; use the scrap pieces for testing). As the wood is drawn across the iron, force it into a curve. Use scrap pieces to get the feel of how much force can be applied to the balsa without it breaking. Dip the wood in water after a few draws, and continue. The wood springs back somewhat but will hold some of the curve. Eventually, the pieces should nearly conform to the fuselage shape.

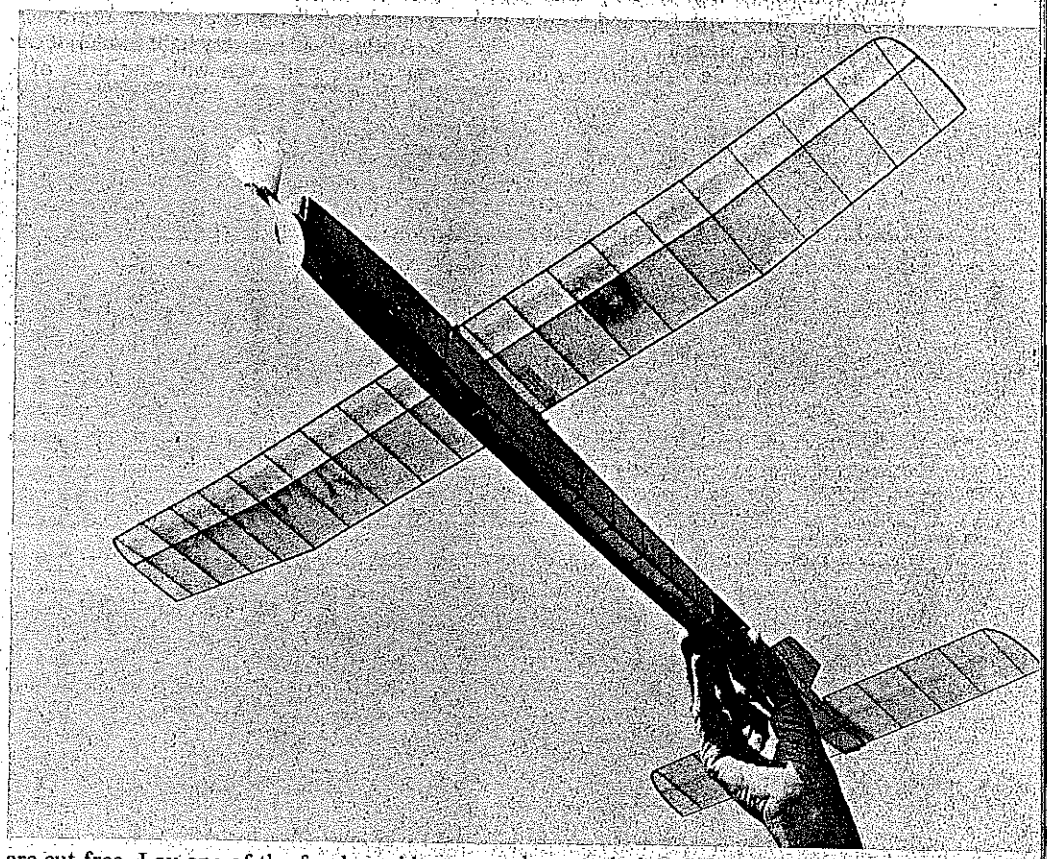
Lay a piece of Saran Wrap over the plan to keep the wood from sticking to the paper. Hold the strips of balsa in position by using the pins. There are currently several types of glue available, all of which

A P-30 rubber-powered model can be an interesting change of pace. With their fairly small size and required plastic prop, they can be built quickly and inexpensively. The text provides some excellent information for those who have only modest experience.

■ Clarence Mather



The model features tip dihedral for strong lateral stability. The forward dethermalizer fuse mounting (just behind the wing) shows clearly in the above picture. The moderately heavy plastic prop combined with a lightweight rear end allows the wing to be placed well forward—and a long, stable, efficient rear moment arm results.

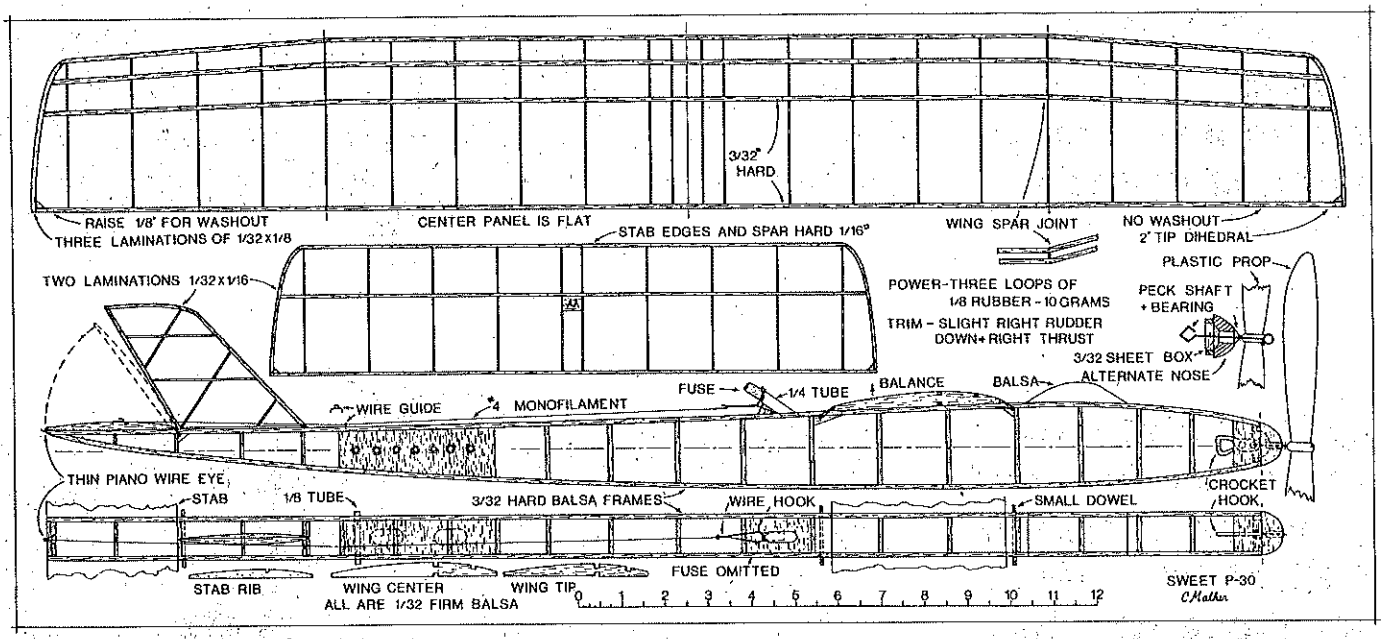


work fine if used properly. I favor the aliphatic resins, such as Titebond. They soak into the wood and form a very strong joint, they don't shrink, and they dry slowly enough so that pieces can be fitted carefully. Such glues are quite thick, so I usually squeeze some in a small bottle and add a few drops of water. This weakens the glue somewhat, but it is still plenty strong. The slightly-diluted glue will not keep very long, so only mix a small portion at a time. Coat both edges of a joint, and allow the glue to soak in for several seconds. As the pieces are joined, some glue will squeeze out. Use a damp brush to immediately remove as much of this excess as possible.

When the glue on one side frame is dry, remove the pins but leave the frame on the plan. Lay a piece of Saran Wrap over it, and assemble the second frame on top of the first to produce a matched pair. When the frames are removed from the plan and separated, drill the holes for the rear motor if not already done. Then run a glue ring around each hole on the inside to strengthen the balsa. (A number of holes are made because rubber varies in thickness from batch to batch and sometimes even varies at different places within a strip at times. The unwound motor must be slack for the freewheeling unit to function. But we don't want too much slack, so the multiple holes allow adjustment of the motor to the proper amount of slack.)

Utilize two jig formers to assemble the two side frames into a box. Jig formers are simply rectangular pieces of sheet balsa cut to fit between the frames. They are glued lightly in place and hold the frames in position while adding the fuselage cross members. Then the jig formers are cut free. Lay one of the fuselage sides flat with the inside facing up. Glue the jig formers vertically to it. Lay the second fuselage side atop the jig formers, taking care that the box so formed is square on the ends and the sides. Add all of the cross members and the sheeted areas. Cut a couple of observation holes in the sheeting on the bottom by the rear peg holes. The wood dowels used in medical swab sticks are a good size for the wing and stab hold-down rubberbands. Pieces of $\frac{1}{32}$-in. piano

FULL-SIZE PLANS AVAILABLE . . . SEE PAGE 180

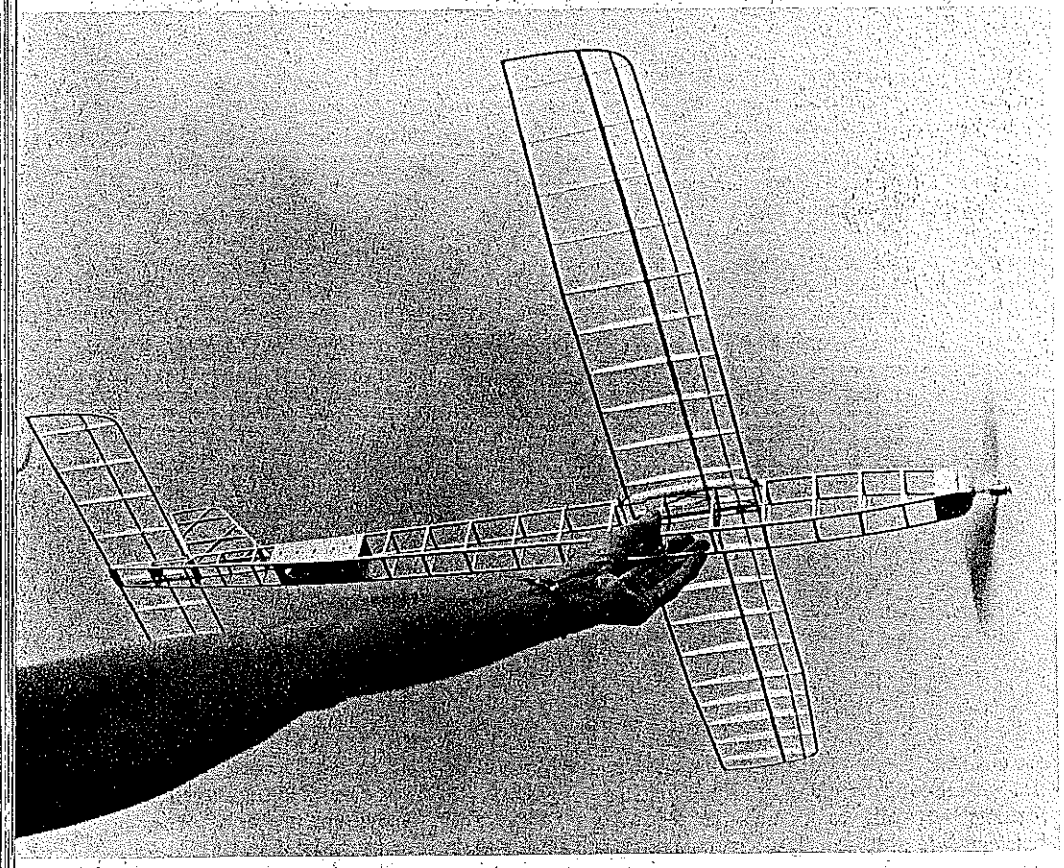


wire would also do the job, but the wire is harder to keep glued in place.

The inner part of the nose plug must fit snugly into the front of the fuselage, or it may fall out during the glide and ruin a flight. Some modelers glue a couple of small hooks to the fuselage, cut a groove in the nose block, and loop a rubberband around the block to hold it in place. Peck-Polymers sells nose bearings and prop shaft combos as well as the plastic props for P-30s. They work fine and are stocked by many hobby shops.

The fuselage side view shows a detachable rubber hook. This is used so that a winding tube can be employed to protect the fuselage from motor breakage during winding. The one that is sketched is a cast aluminum hook sold by Jim Crocket. Various types are homemade by modelers. A simpler unit is shown in the cross-section sketch for modelers wanting to wind the motors directly. The detachable type is recommended because, sooner or later, a motor will break even if the rubber is not wound to full turns.

As this P-30 is a very light model, it can soar quite well even with the drag of a freewheeling prop. Unless you plan to fly only in the early mornings or late evenings, a dethermalizer is definitely needed! The one shown on the plan is to reduce the fire hazard. (Many of our flying fields are covered with dry grass and brush—a fire just waiting to start! Fortunately, a fire isn't likely to start unless the igniter is down low where the dry material is dense. With the fuse located atop the fuselage, that is nearly impossible.) The dethermalizer line is tied to the eye at the rear of the fuselage and brought forward over the top of the stab. Thus, the line is fully exposed and is easy to install and to adjust. Al Ulm of the Orbiteers Club came up with that variation, I believe, and it works fine. The free end of the snuffer tube is cut with a projection sticking out to act as a hook for the forward end of the dethermalizer band. A fine jeweler's saw does this job well. Note that the projection blends into the rest of the tube in a rounded curve for strength. Don't put larger loads on this thin aluminum—the rubberbands do not have to be stretched more than twice their length. Glue the snuffer tube to the fuselage sheeting very securely. Then fill in the area below the tube with a piece of 3/16 balsa. The piano wire side hooks are then solidly glued to that piece. The whole unit can be secured with a piece of silk or gauze glued overall. The dethermalizer line is not installed until after the fuselage is completed.



This design makes use of the classic stick-and-tissue construction system. This produces very good strengfth while keeping the weight well to the P-30 event specifications.

Wing. Pick a piece of firm sheet of 1/32 balsa for the ribs. Cut 14 rectangular pieces a bit larger than the wing center panel ribs. Trace the rib pattern on two ribs, and place one on each end of a stack of the pieces. Pin the stack together, and shape the stack to the rib pattern.

For the tapered tip panels, cut out eight rectangular pieces, and trace the largest rib pattern on one end and the smallest rib on another. Stack the pieces with one pat-

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In .020 Replica Fred Emmert had 12:00 for first, second was Brad Levine with 10:49, third Dick Lyons with 8:39, fourth Bill Valentine with 8:06, and fifth Bob Sunberg with 7:59. A Cabin was won by Hal Cover with a time of 9:16, Larry Clark second with 8:50, third was Leon Nadolsky with 7:42, Al Heinrik fourth with 6:35, and Bill Booth 5th with 6:06.

B Cabin saw Sal Taibi again in first place with a fine time of 14:14. C. Meyerscough was second with 11:34, third was B. Aveustus with 9:28, and Dick Lyons fifth with 8:53.

C Gas was exciting. Doug Galbreath totaled an amazing 49:42 before finally missing a max. He used an O.S. VRB RC engine modified by Dukie. The plane had a 10:1 aspect ratio, and it weighed 43 oz. To say that it climbed rapidly would be putting it mildly. Ralph Prey totaled 29:47 for second place, third was Dan Keegan with 22:05, Scott Reid was fourth with 19:34, and Wes Funk fifth with 14:05. Doug won the Ocie Randall Trophy for the fourth time with his winning flight time.

A-B Nostalgia again proved that the later-year models fly longer with their better power. Dan Keegan maxed out to 27:29 for first, Jack Moreland maxed out to 26:22 for second, and Terry Thorkildson maxed out to 23:43. Jim Adams was fourth with 13:01, and David Martin fifth with 8:35.

The Saturday Night-Flying event was won by Travis Hunter with 29:54, Chas Dorsett second with 14:30, Bill Ruff third with 14:28, Scott Reid fourth with 14:05, and Forrest Staines fifth with 11:53.

Long before 6 o'clock on Sunday morning, the ½A Texaco and the regular Texaco models could be heard droning away in the good warm air. Even that early, it was starting to get hot.

Sal Taibi put up his ½A Texaco for a total of 45:35 for an easy win over Bob Dittmar's second-place 31:06. Jim Adams was third with 26:25, Bill Booth fourth with 20:47, and fifth was C.J. Jordan with 16:28. In the regular Texaco event, Bill Cohen ran away from the field with a flight of 29:32, almost double second-place R.B. McKenna's 17:48. Jim Crocket was third with 13:41, Larry Clark fourth with a time of 13:33, and Brad Levine fifth with 12:41.

C-D Nostalgia surprisingly had no max-outs. R.B. McKenna won with 14:37, Dan Keegan second with 10:58, and third was Al Heitick with 9:40. Hal Cover managed fourth.

D Gas found big Doug Galbreath maxing out with 23:25, Travis Hunter was second, also maxing for 20:07. Dan Keegan was third with 14:52, Bill Ruff fourth with 13:40, and fifth Scott Reid with 13:20.

Coupe d'Hiver was another of those Bob-White-maxing-out contests. His total of 1,111 handily beat Joe Foster, who had 1,025 for second. Paul Masterson (from England) was third, maxing to 695; Ding Zarate was fourth with 659, and Jim Quinn fifth with 582.

B Gas, for some reason or another, was scored in the FAI fashion. Bill Morgan maxed-out to 1,647 and first place. Don Berry maxed to second place and 1,140; Jack Moreland maxed to 960 sec. and third place; Jon DeFries was fourth with 896 sec. and Mike Stearn fifth with 856.

There were no scores announced for A-1 Towline, Payload, or Electric; however, the winners were as follows.

A-1 was won by Martyn Cowley, second Mike Johnson, third Steve Geraghty, fourth Antonio Abauza, and fifth Bill Booth, Jr.

Payload: first, Terry Thorkildson; second, Gus Sunberg; third, Erik Strengell; fourth, John Bonang, and fifth, Ron Wittman.

Electric was won by Blane Beron-Rawdon, second was Lynne Wainfain, third Jim Ogg, fourth Jim McDermoth, and fifth Tony Naccarato.

Last, and certainly not least, the Grand Champion, Marc Sisk, traveled all the way from Davenport, IA. It is really no wonder he won—he had as a helper his pretty wife, Hattie.

The Team Championship was won by San Diego Club #2 comprised of Cezar Banks, Paul Altonhoff (how that guy gets those Tomy timers around), and Bill Burke.

Joe Norcross announced after the contest that he will not be Contest Director next year, as he will be flying. All this in the one *hot* day of the contest on Sunday.

Sweet P-30/Mather

Continued from page 70

tern on one end and the other pattern on the other. Shape the stack to the rib patterns, then place the first rib on the left panel, the second rib on the right panel; continue the alternating placement.

Cut strips from ⅛ sheet for the tips. Make them an inch or so longer than minimum. Soak the strips in water overnight, and bend them in the same manner as the fuselage longerons. (If you don't like to make rounded tips, simply square them off. The model will fly as well.) Laminated tips such as these are light and strong.

Assemble the wing center panel on the plan. Use the hardest strips for the leading edge and the top spars. Note that the spars extend beyond the last rib so that a lapped joint can be formed with the tip panel spars. Such a joint is much stronger than butt joints. Usually, the bottom spars are added after the frame is removed from the board; pin the surface flat again while the glue sets.

Assemble the tip panels without the spars to make it easier to shape the joints. The right panel is flat, but the left panel is "washed out" ⅛ in. That means that the trailing edge is raised so that the whole panel is twisted. So prop up the trailing edge of the left tip while the panel is being assembled so that the ribs are glued with the twist built in.

Pin the completed center panel to the board, and set the tips in position—propped up to the correct dihedral angle. Cut the tip panel leading and trailing edges at an angle to mate with the wing edges. Don't fret if the joints are not perfect, though. One of the advantages of aliphatic glue is that it can be brushed into joint gaps to form a strong bond. Observe the panels from the rear so that the right one has no twist but the left trailing edge

is up about ⅛ in. Lay the tip spars in position, and angle the ends to form a good joint with the center panel spars. As each is glued, check the panels for unwanted warps.

Tail surfaces. The outlines for the stabilizer and fin are made of hard 1/16 balsa. Of course, 3/32 balsa can be substituted if you don't like working with the smaller sizes or if hard 1/16 is not available. However, the hard 1/16 makes a strong, light surface.

The stab ribs are made in the same fashion as the wing ribs. The fin has a symmetrical airfoil, which requires an additional step. As each rib is cut, the curved left side is sliced off. This portion is shown by a line in the top view. The fin is then assembled over the plan. When the fin is removed from the plan, the left sides of the ribs are glued back on. The fin airfoil is not critical, but it is given some thickness to resist warping and to be more effective than a flat plate.

Covering/finishing. In preparation for covering, sand all parts with fine sandpaper to remove bumps and rough spots. Then coat all of the wood parts that will contact the covering tissue with two or three coats of clear dope. The dope for this step can be fairly thick. Again, sand lightly with fine sandpaper.

Lay the piece of tissue over the area to be covered, and brush dope thinner liberally over the wood structure through the tissue. The thinner will penetrate the porous tissue and soften the dope, which will then adhere the tissue. Check for loose areas, and reapply thinner. Cover the fuselage before the fin is glued on, and cover the fin after it is glued on the fuselage.

The area of the fuselage that encloses the motor is given two layers of cross-grained tissue. That makes the fuselage very rigid. Apply one layer, water-shrink the tissue, and apply a coat of finishing clear dope. Then apply the second layer.

The finishing clear dope should be rather thin. Three parts of thinner to one part of dope is good. I like to use nitrate dope and add three drops of castor oil per ounce of the thinned mixture. That leaves the tissue with a bit of flexibility and reduces the amount of shrinking somewhat. Two coats will suffice.

Glue the fin on the fuselage with just a little offset for a right turn. Then cover it, water-shrink, and apply dope. Check carefully from the rear that about 1/32 in. more of the left fin side should be visible than on the right.

During the finishing process a warp may have developed. Boil water in a kettle having a spout, and place the warped part in the steam; twist in the opposite direction to remove the warp.

Flying. Weigh out 10 grams of ⅛-in. rubber strip, and make it into a motor of three loops (six strands). Make a secure knot by thoroughly soaking the ends with saliva and tying an overhand knot. Pull it tight to near the breaking point of the rubber. Again soak the ends, and tie another square knot upon the first.

Install the motor in the model, utilizing the peg hole that leaves the motor slightly slack. Aluminum tubing of ⅛ in. outside diameter will work for the rear peg, but if you stretch the rubber hard for a full-winds effort, be sure to slide a piece of 1/16 piano wire (or larger) through the tube first.

Assemble the model using rubberbands that are stretched to about twice their at-rest length. Slip the stab under the monofilament and connect a rubberband from one peg, then run it through the hook on the stab and onto the second peg. The stab will pull up in the dethermalizer position. Place a small rubberband over the snuffer tube end, straddle the fuse, loop under the side hooks, and connect to the hook at the end of the monofilament, pushing the rear of the stab down as you do so.

Check the balance point of the model, and add weight to the front or rear as necessary to achieve a balance 1 in. forward of the trailing edge. Observe the model from the rear. The stab should be parallel to the center section of the wing (though the right tip can be slightly high).

For flight testing, lubricate the motor. If the motor is placed in a small plastic bag and the rubber lube is poured inside, there will be less of a mess. (Fudo Takagi first suggested that procedure, I believe.) Try to locate an area covered with weeds or grass for testing. One disadvantage of freewheeling propellers is that a blade can snap off during a fast landing on a hard surface. Hand-glide the model with it pointed slightly nose-down into the oncoming breeze. The model glides quite slowly because of its light weight and the prop drag.

If violent diving or stalling occurs, check the wing and stab angles and the balance point. If OK, try a different launch speed. If diving persists, shim up the rear of the stab (conversely, put a shim under the front of the stab if the model stalls). Strips of IBM tab cards make good thin shims. Most models require some downthrust to avoid power stalls, so anticipate this by putting a 3/32-in. piece of balsa between top of the nose block and the fuselage.

Wind the motor about 100 turns, and launch it in a slightly nose-high position. Ideally, the model will climb a few feet and then glide down, all the while with a large right turn. If the model goes straight during both parts of the flight, steam a little more turn into the fin—or glue a small tab to the trailing edge of the fin up where the stab won't hit it. If only the power phase of the flight is straight, shim the left side of the nose block. If only the glide phase of the flight is too straight, place shims between the right side of the fuselage and the stab for "stab tilt." Power stalling can be corrected with additional downthrust or side thrust.

As the flight pattern smooths out, increase the number of turns. Eventually, the model should climb steeply in a slight right bank and circle. Try changing the down and side thrust by small amounts to get maximum altitude. These models are climbers!

If there is too much right rudder or right thrust, the model may drop the right wing during the first part of the climb. A fine balance is needed. If removing right rudder straightens out the glide too much, just add more stab tilt.

When fully stretched and wound, the motor will take about 1,000 turns (de-

pending upon the type of rubber used). The prop run is typically 20 or 25 seconds. Even though the model gets quite high, it will come down fast unless there is a thermal. For contest flying, practice picking good air as well as trimming the model.

Good Flying.

FF Indoor/Tenny

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Each new high-tech material requires some special handling and/or building techniques, and the race is on to develop reliable, low-weight building methods using these materials. **Help!** If *you* are using carbon or boron fibers, new plastic films, or any other materials which improve your models, tell us about it!

A word of warning! Howard Haupt is the editor of *El Torbellino,* the newsletter of the San Diego Orbiteers. In a very recent issue, he printed the following warning:

"Boron is a glass-like material and can be very brittle. Being brittle, it can shatter and cause small sharp slivers. These slivers can penetrate the skin with ease, but will *not* work themselves back to the surface. Once under the skin, these slivers are at least a minor irritant, at worst a danger to heart or lungs if they work their way into the bloodstream.

"Modern boron fiber is pretty well behaved, for it will break cleanly when bent sharply with pliers. One must take care to dispose of the scrap ends that are broken off. Little pieces of boron cannot be left laying about on the worktable or floor.

"Two ways were discussed to ensure proper disposal of all boron scrap ends. One, have a small bottle on your table which is the repository of all boron scrap as you work with the material. As you break the end off with the pliers, continue to grip it with the pliers and drop it into the bottle. Two, place masking tape on the end of the boron you are trimming. After breaking off the end with the tape attached, dispose of it in a wastepaper basket."

Bostonian. This year, Manhattan Cabin became an official event, and the rush is on to set records in all four AMA ceiling categories and three age classes. That unifies all the activity with standard rules. Now, from Ed Whitten's *New York Indoor Times,* we get this set of "official" rules for Bostonian Cabin:

1) Maximum projected wingspan(s) 16 in.; maximum wing chord 3 in.

2) Maximum propeller(s) diameter 6 in.

3) Power limited to rubber motor(s).

4) All surfaces double-covered.

5) Minimum weight, without rubber motor(s): 7 grams.

6) Maximum overall length 14 in., excluding propeller(s).

7) Fuselage must contain or exceed a theoretical "box" measuring 1½ x 2½ x 3 in., the longerons of which must both support the motor and form, or exceed, the box requirement. No motor sticks are allowed. Fuselage must have a forward windshield and a window on each side, each of at least one square inch in area.

8) Landing Gear must be fixed, with at least two wheels of ¾-in. minimum diameter, and rigid enough to successfully support the model to a hand-glided landing.

9) Rise Off Ground from at least two wheels is required in all takeoffs on all official flights.

10) Charisma Factor—The judge rates each model on how the model appeals to *him,* based on construction neatness, scalelike details, unique features of design, etc. A 1.00 rating up to 1.30 is used. Two models may be given the same rating. The models are not rated against each other, but against the 1.00 to 1.30 scale.

11) An unlimited number of flights is allowed, with the total (in full seconds) of the three best flights multiplied by the Charisma Factor determining the model's score.

12) More than one model may be entered, but only one prize to an entrant will be awarded.

Ed Whitten has said that "Bostonian Cabin models are Flying Scale models . . . except that there is no full-sized, man-carrying version!" Two photos of models built some time back by John Triolo are shown; perhaps you can see what Ed means. You might notice one design feature of these two models—John cleverly arranged the designs to accommodate full-length motors for best rubber usage.

More from Bedford. One of the "regulars" for sessions at Bedford Boy's Ranch, Bedford, TX, is Al Backstrom (Frisco, TX). Al flies some Indoor Scale, but his flying wing models are really fun to watch. The model he is launching in the photo is in the "flying-plank" style. These use nothing except a reflex airfoil for stability, but this model doesn't seem to lack stability. It can hit the ceiling and recover with very little loss of altitude—far better than most Scale models and better than some "serious" Indoor models!

Bud Tenny, P.O. Box 545, Richardson, TX 75080.

FF Duration/Meuser

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the inner and tip wing panels. The angles *B* and *D* are the angles you need to know when setting the ribs adjacent to the dihedral breaks (or when sanding them to the proper angle); the dimensions *m* and *h* are the amounts by which you prop up the end of one panel when you are gluing it to the end of another.

There are many scenarios, all involving considerable trial-and-error, by which modelers arrive at the final dimensions of their wings.

Ferrer's Second Notion, which seems pretty good to me, is that what the model designer would *really* like to do is: 1) establish the semi-span *a* and the tip angle *A*; 2) establish the *ratio* of *c* to *d*; and 3) invoke Ferrer's First Notion about the ellipse business. All the other numbers of interest should then fall out onto the floor.

Why the *ratio* of *c* to *d*? Well, suppose you decide that the rib spacing is to be uniform throughout the wing. Then, from previous experience (or perhaps simply a wild guess), you decide that the tip panel should have six rib spaces, and the inner panel should have 10. Then *c/d*, which John calls *R*, is simply 10/6 = 1.667.

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