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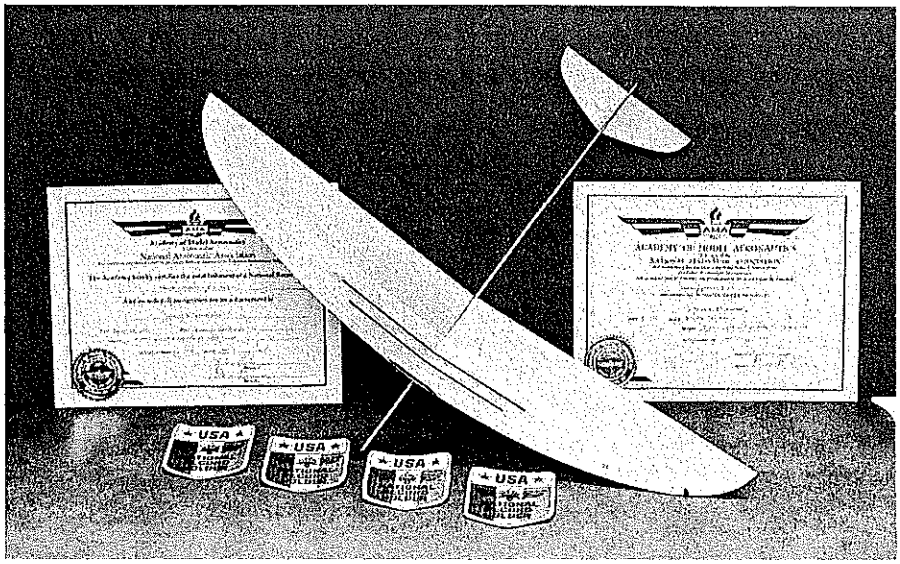


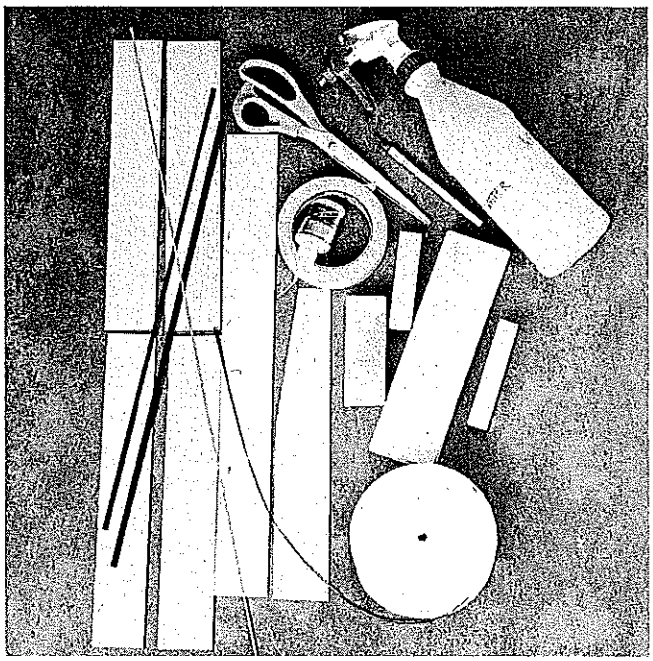
A completed Slow Poker with two of its latest AMA records. This series of high-tech Indoor Hand-Launched Gliders has dominated the field since 1986.

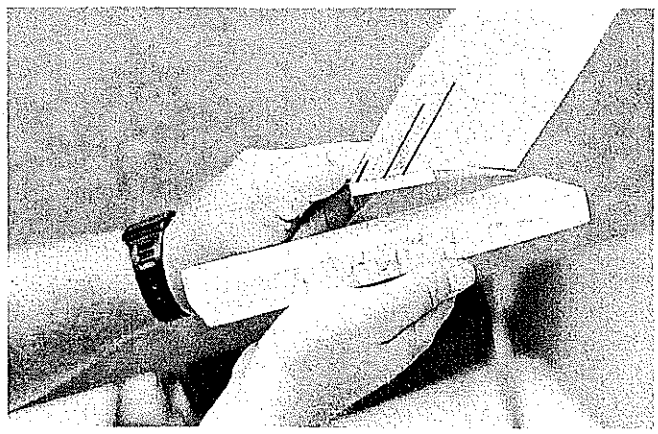
Slow Poker makes a rare outdoor appearance with author/designer Buddenbohm.

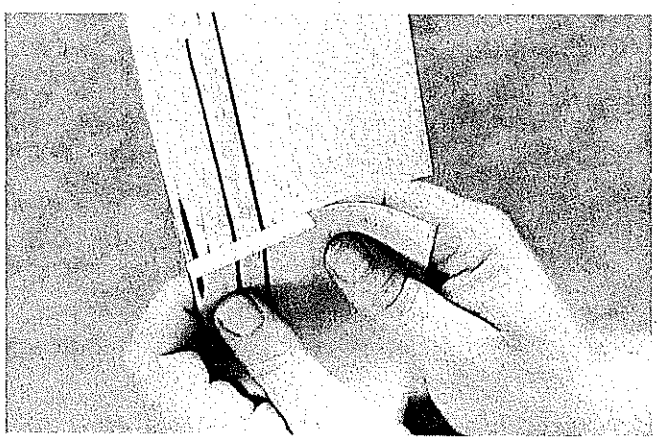
SLOW POKER

No stranger to making waves in IHLG, our author has another winner with this high-tech, 24 1/2-in.-wingspan, 6.2-gm national Indoor Category I Open record holder.

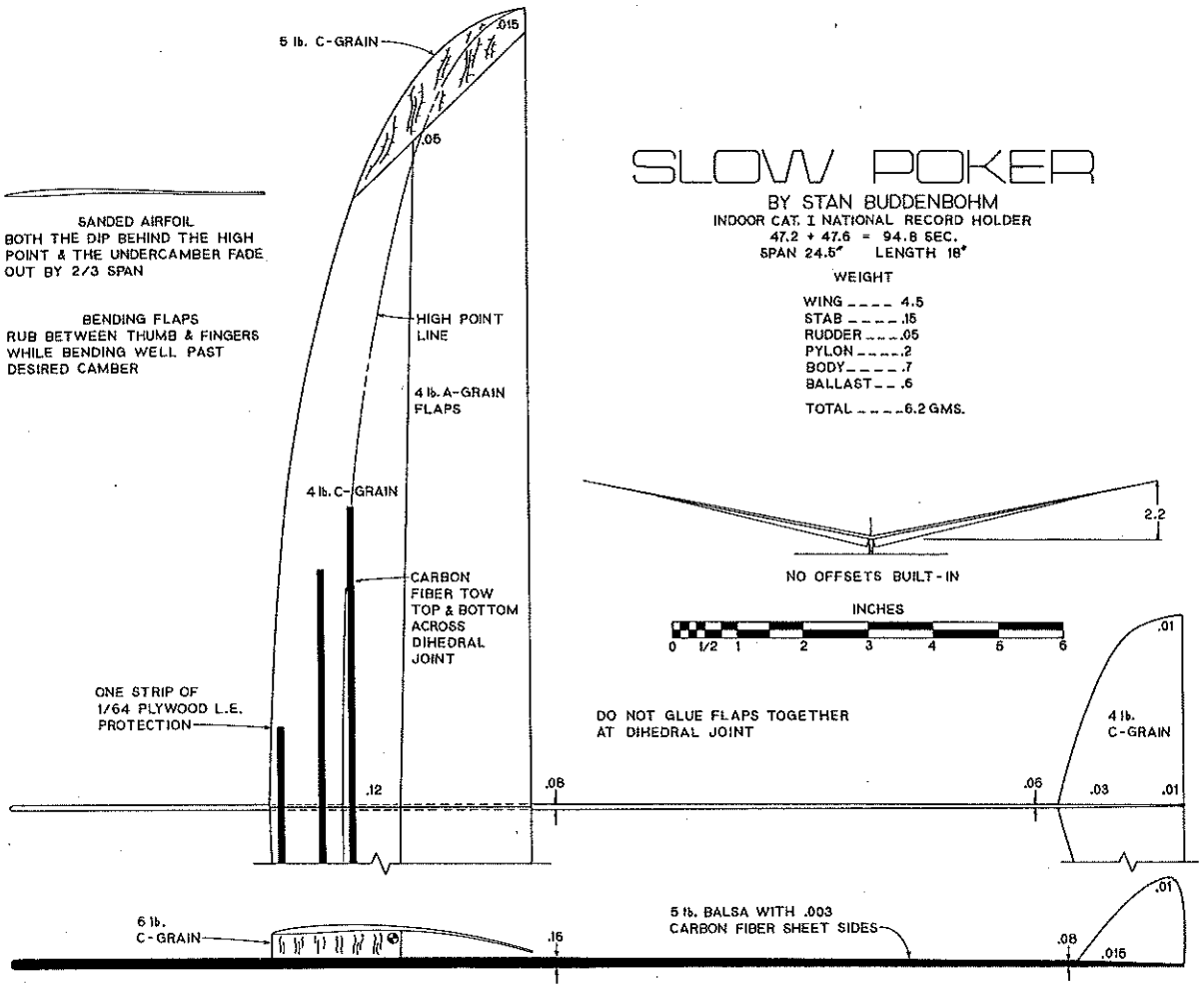
■ Stan Buddenbohm







Above: Make up this simple kit of parts, add the materials shown, and before you know it you'll be tickling the rafters with your own highly competitive little Slow Poker. Above right: If the model dives, adjust the wing incidence by sanding the bottom of the pylon as shown. Below right: Persuading the flaps to assume the correct airfoil is easy. Simply rub each flap between your thumb and fingers while bending it well past the desired camber—no water or forms are needed.



Slow Poker

Type: Indoor Hand-Launched Glider

Wingspan: 24½ in.

Wing area: Not available

Expected flying weight: 6.2 gm

Type of construction: Sheet balsa and carbon-fiber tow reinforcement

Type of covering/finish recommended: None

The carbon fiber tow stiffeners should be applied on the top and bottom across the dihedral joint. While this form of carbon fiber has the best strength-to-weight ratio, it also is somewhat difficult to work with.

Cut a piece of carbon fiber tow to length using scissors. Hold it by one end, lightly spray it with water, and squeeze it to a flat ribbon with your thumb and forefinger. Peel off a 1/8-in. strip, and repeat the process. The carbon fiber should be easier to handle after a few minutes of drying.

The extra camber in the flap is formed by grasping the structure between your thumb and fingers and bending it well past the desired shape while sliding your hand back and forth along the span. This can take minutes or hours, depending on the wood.

Fuselage. If the photos of this slender stick of laminated carbon fiber and balsa intimidate you, take heart. Building the fuselage will be a lot less difficult if you follow the correct procedures.

Begin with an 18 x 2-in. balsa sheet. Sand the thickness taper into the entire sheet. It's much easier to handle a piece this large than to work with a small one of the finished size.

Cut two strips of .003 carbon fiber sheet to 1/4 x 18 in. Sand the shine off one side of the carbon sheet to achieve a good carbon-to-wood glue joint. Use a sanding block to avoid splinters, and move the block *away* from the hand holding the carbon fiber to prevent the material from buckling.

Wipe off the dust. Affix a two-inch piece of drafting tape to the last quarter-inch of each end of the shiny side of the carbon fiber strip.

Turn the carbon fiber sheet dull side up over the waxed paper-covered building board, and run a large bead of thin instant glue along its entire length. Work quickly—you have 30 seconds or less in which to position the carbon fiber strip.

Use the tape handles to pick up the strip, turn it over, and hold it just above one edge of the fuselage sheet. Lower the carbon fiber until it contacts the balsa, then press it along the entire length. Keep some sort of shield between your finger and the carbon fiber to avoid splinters and to avoid getting glued to the model; waxed paper works well. The carbon fiber strip cannot be repositioned once it has made contact with the balsa, so you'll have to get it right the first time.

Turn the fuselage sheet over, and attach the second carbon fiber strip. Straighten the carbon fiber-trimmed edge with a sanding block. This will become the bottom of the completed fuselage.

Slice the laminated portion from the larger piece, and shape it to the final fuselage profile. To save weight, sand the rest of the shine from the carbon fiber. A small amount of glue along

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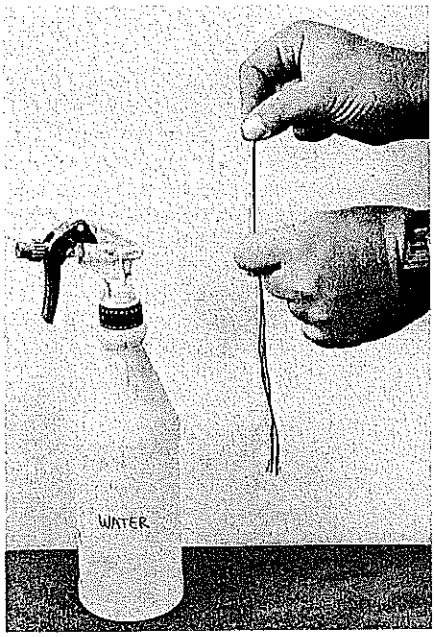
FEW aspects of Free Flight are more beautiful than the sight of an Indoor Hand-Launched Glider (IHLG) gracefully, smoothly, and ever so slowly descending from a 26-foot ceiling for a full 47 seconds. Three-quarters of a second can stretch to an eternity of pleasure when you're watching a glider circle lazily overhead.

Slow Poker, the latest in a series of high-tech IHLGs begun several years ago, has dominated the field since 1986. The model not only delivers 47-second flights on a regular basis but holds the current national Indoor Category I Open record of 94.8 seconds for two flights.

The first Slow Poker to make its mark did so by besting Phedon Tsiknopoulos's all-wood record. A later version overturned Mark Drela's high-tech record with an 82.8-second flight. Making small improvements in the glider boosted the record to 85.1 seconds.

The very large jump to the current record (in Indoor HLG, a few seconds *is* a very large jump) came about by rethinking design and trim philosophies. Like all successful low-ceiling gliders since the Stoy brothers' Coot, Slow Poker uses the flapper wing. This type of wing is designed to achieve lower drag by having the airfoil flatten on launch. To increase wing incidence, however, I used more undercamber and weaker "flaps" than in a conventional flapper wing. The higher incidence results in quicker recovery and a better glide.

I also increased the stabilizer area. Most designs attempt to save weight by using small stabilizers. Very small stabilizers, however, cause small, barely perceptible oscillations in glide speed, reducing flight time dramatically.



Cross-dihedral wing stiffeners are made by lightly misting loose carbon fiber tow, then squeezing it flat between thumb and finger.

Construction

If the building techniques described below are new to you, practice a little before using them on your carefully selected wood.

I recommend using instant glue throughout.

Wood selection is critical in building an IHLG. Be creative and persistent in your search for the very best. Check hobby shops, train shops, craft stores, and mail order catalogs. Sometimes you can use part of a larger piece; in other cases you can edge join several narrower pieces. Neither strategy has prevented me from producing recordbreaking models.

Be especially careful in selecting wood for the flaps. The wood must be under five-pound-density A-grain, or the flaps will be too rigid.

Wing. Build the right and left panels separately.

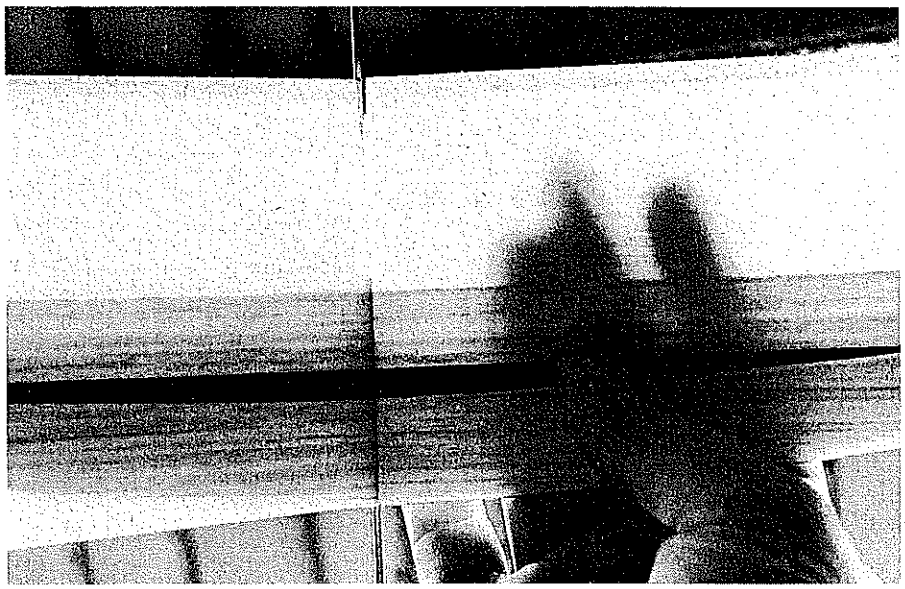
Glue the C-grain portion to the flaps as follows: True the edges with a straightedge and a large, straight sanding block. Place the pieces bottom side down on waxed paper. Butt the edges, and put a drop of glue at approximately one-inch intervals along the joint.

Turn the panel over. Correct any irregularities in the joint by sanding the bottom flat. Apply glue along the full length *of the bottom only*. Don't get carried away; glue adds weight.

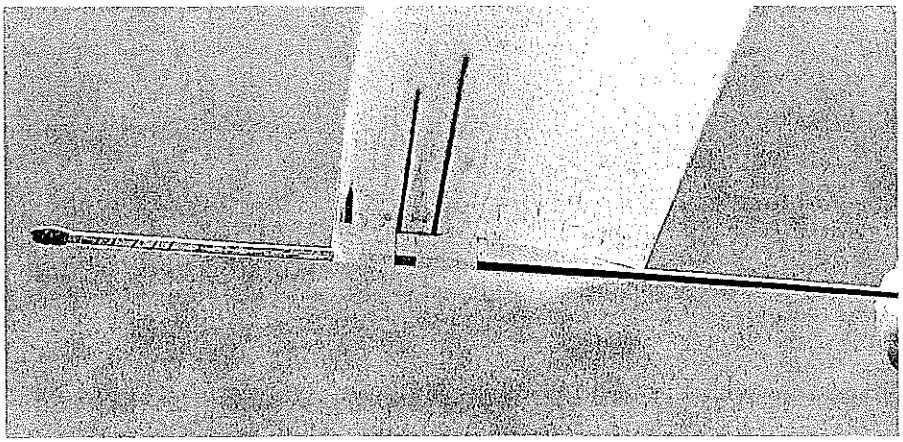
Shape the wing as shown. Add the plywood leading edge protector (see my "Zenith," December 1991 *Model Aviation*). Sand in the thickness taper from the center to the tip.

Begin sanding the airfoil as for a conventional Hand-Launched Glider, then add the unusual contours that are essential for obtaining the correct airfoil after the flaps have been bent. This is best done with a narrow sanding block. By the time you have sanded two-thirds of the length of the span, the shape will gradually have changed to that of a conventional glider airfoil, with no dips. Shape the dihedral joint, and glue the wing halves together. Do not glue the flaps together at the dihedral joint.

Two forms of carbon fiber are used on Slow Poker: carbon fiber tow on the wing and .003 carbon fiber sheet on the fuselage.



To achieve the best launch, the front portion of the Slow Poker wing must be C-grain for stiffness and the flap portion must be A-grain for flexibility.



Just two pieces of drafting tape hold the pylon to the fuselage during trim flights.

Slow Poker/Buddenbohm

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the top and bottom of the fuselage will help control splintering.

Assembly and Flying

Glue the pylon to the wing, not to the fuselage. Glue the stabilizer and rudder to the fuselage. Temporarily attach the pylon to the fuselage with two pieces of drafting tape. Add nose weight to achieve a level glide.

There are only two effective ways to turn this model—with rudder offset or with tip weight. The flight pattern for low-ceiling gliders is either left-left or right-right. If you're right-handed, I recommend left-left.

Do a test glide. Begin with a small amount of rudder turn. If the model doesn't circle tightly enough, add weight to the left wing.

The amount of wing incidence required depends upon the flexibility of the flaps. To test this, throw the model hard and straight ahead, so that it's neither angled upward or downward nor banked to the left or right. The craft should stay level, eventually slowing and turning into the glide circle. If it dives, remove the wing and sand more incidence into the bottom of the pylon. If it climbs as it slows, decrease the incidence in the wing. If it shows a tendency to barrel roll, reduce the rudder offset.

Keep the fuselage in line with the launch angle throughout the throwing motion—don't swing the model through an arc. The motion should be somewhat like throwing a dart. The idea is to throw as hard as you can while putting as little stress on the wings as possible. Otherwise, you'll likely be using a lot of instant glue for repairs.

For endurance flights, the best launch is about 70° upward, with no left or right bank. There should be enough rudder offset to initiate the glide circle just as the top of the climb is reached. Make sure you're completely satisfied with the incidence before gluing the pylon to the fuselage.

If you have any questions, I'll be happy to respond. Send a SASE to 5652 Meinhardt Rd., Westminster, CA 92683. Then again, you may simply want to share your experiences with low-ceiling gliders. I'd be pleased to hear about them. ✈

FF Duration/Murphy

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available for the same price. (I knew the U.S. Postal Service would soon be charging more for shipping than an item is worth. Progress?)

Hank further informs us that the early Tatone timers used a longer screw to retain the back cover; a 5mm-length black replacement (Part #21145-5) is also available for $.95 plus $1 for shipping. Hank says his KSB timers use this same screw to retain both the back cover and the faceplate. If you have a lot of timers to fix, you can get 100 screws bulk-packed in one

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