

# TRI-VALLEY

# TOP DAWG



Ann Doty with the Tri-Valley Top Dawg

**Some guys in Indiana have lots of fun with a low key sport racing event**

**By Jerry Smith and Walt Senour**

## TRI-VALLEY TOP DAWG

Designed By: Jerry Smith & Walt Senour

**TYPE AIRCRAFT**  
Sport  
**WINGSPAN**  
37 Inches  
**WING CHORD**  
9 Inches  
**TOTAL WING AREA**  
333 Sq. In.  
**WING LOCATION**  
Shoulder Wing  
**AIRFOIL**  
Flat Bottom  
**WING PLATFORM**  
Constant Chord

**DIHEDRAL EACH TIP**  
1 Inch  
**O.A. FUSELAGE LENGTH**  
28¾ Inches  
**RADIO COMPARTMENT AREA**  
(L) 9" x (W) 3" x (H) 2¾"  
**STABILIZER SPAN**  
14½ Inches  
**STABILIZER CHORD (incl. elev.)**  
5¼ Inches  
**STABILIZER AREA**  
76 Sq. In.  
**STAB. AIRFOIL SECTION**  
Flat  
**STABILIZER LOCATION**  
Top of Fuselage  
**VERTICAL FIN HEIGHT**  
4 Inches

**VERTICAL FIN WIDTH (incl. rudder)**  
4¾" (Avg.)  
**REC. ENGINE SIZE**  
.15 Cu. In.  
**FUEL TANK SIZE**  
4 Oz.  
**LANDING GEAR**  
Conventional  
**REC. NO. OF CHANNELS**  
3  
**CONTROL FUNCTIONS**  
Rud., Elev., & Throt.  
**BASIC MATERIALS USED IN CONSTRUCTION**  
Fuselage ..... Balsa and Ply  
Wing ..... Balsa and Ply  
Empennage ..... Balsa and Ply  
Wt. Ready To Fly ..... 36-40 Oz.  
Wing Loading ..... 15.6 Oz./Sq. Ft.

**W**e of the Tri-Valley R/C Club in South Bend, Indiana, have been having a great time sport racing. You haven't tried it yet? This is certainly not new, nor is it a rank beginner's sport. However, if you are able to get "it" up and down in one piece, you qualify.

Several years back our club kicked around the idea of sport racing. And, of course, the main idea was to promote the spirit of competition within the club as well as provide some club visibility in the way of entertainment for our local area. Several clubs from the surrounding area were invited to participate in those races. A racing committee, made up of several members from each club, was soon formed and a set of rules were agreed on. It takes some organization to keep the majority happy, as many of you know.

We chose two aircraft for racing --- the Top Flite "Top Dawg" designed by Ken Willard, RCM's Sunday Flier and the "Quickie" kitted by Michigan Hobby Hangar. It soon became apparent that building the Top Dawg, especially the fuselage, was really a dog. After all, it was designed some years back, in the days of escapements, and needed some building simplification. But, it did have good flying characteristics and proved quite groovy around the pylons. The Quickie, on the other hand, although easier and faster to build, didn't have the same agile ability to negotiate the course. Although, with a good pilot, it was certainly in competition with the Dawg.

Walt Senour, Tri-Valley Club president and one of those super competitive guys seemed to be cleaning up at every race. A closer examination of Walt's Dawg revealed some very subtle appearance and structural changes, though the basic form of the Top Flite Top Dawg was still eminent.

I became interested in Walt's version and built a prototype to fly. Feeling that this particular Dawg had good potential for racing and that our club would certainly adopt it as their basic racer, I drew up the plans. I must give Walt Senour credit for the original design, because without it there might not have been a "Tri-Valley Top Dawg."

Let me tell you about some of the most important features and attributes built into the "Tri-Valley Top Dawg," that do not exist in the Top Flite "Top Dawg." I don't mean to belittle the Top Flite "Top Dawg," however, in the interest of progress it's time for some changes.

The first consideration, as I said before, was a complete modernization of building technique which mainly involved the fuselage. Increased room in the forward section allows a 4 oz. Kraft fuel tank better placement with regard to the engine carb. The airborne radio equipment is installed through a hatch in the bottom while the wing is permanently fixed. The stab and vertical fin are made from 3/16" sheet balsa, and are more rigid giving better control response.

The nose moment was slightly increased.

Some dihedral was removed from the wing while the stab area was somewhat decreased. Rudder area was increased. Wing tip design was changed in favor of the polyhedral tip which helps considerably in the turns.

And, lastly, we changed the overall appearance by giving the Dawg a sleek and racy look. This is not a beginner's airplane and, assuming those interested in building it have some experience, I won't bore you with a piece by piece assembly commentary. But, rather, I'll cover the places where some additional explanation is required to ease your building problems. The plans are very straightforward and will give you no trouble.

#### Fuselage

After cutting out all the parts necessary to construct the fuselage, begin by bonding the 1/16" ply doublers to the sides. Make sure of a left hand and a right hand. These doublers may be bonded in place with contact cement, Hobby epoxy II or Crazy Tape. Next, and this is very important, build the fuselage upside down over the top view on the plans. Arrange the plans on your building board so that former F2 has clearance to hang over the edge. Pin down the 3/16" square cross braces and formers F3B, F5, and F7B. Next join the sides making sure the tail post falls on the fuselage centerline. The bottom sheeting and 1/4" ply support can be added next.

When the fuselage has cured, remove it from the plans and install formers F7A, F8 and F9 on the top side. The turtledeck is made from 1/64" ply which is quite flexible. You will find the pattern on the plans accurate with just a little trimming necessary. Test fit before installing. I found that pre-curling by wetting the ply and

placing it, bent in a U shape, between a table and the wall and allowing overnight drying made installation much easier. Make sure the 3/32" square balsa backing strips are positioned approximately 1/32" in from the fuselage side. They provide a gluing surface for the ply turtledeck.

Position the turtledeck and glue one side in place and allow to cure. Carl Goldberg's Super Jet does a fantastic job in this case. Next bend the ply over the formers and check evenness with the opposite fuselage side. If it is too long, strike a pencil line at the cut off point and trim with scissors. Now apply glue to formers and 3/32" square balsa backing and pin/tape rest of turtledeck in place.

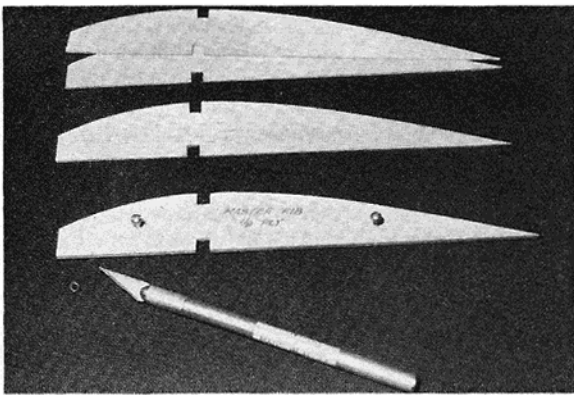
While we're talking about the rear top of the fuselage, let's finish it by forming the soft balsa blocks. The very best way of course, is to tack glue a scrap piece of 3/16" balsa sheet (simulating the vertical fin) between two balsa blocks. Tack glue the lamination in place on the fuselage making sure the 3/16" sheet balsa is centered on the fuselage centerline. Now form and sand it to shape. When complete, remove the 3/16" sheet from the center and you now have two perfect fitting filler blocks. Set them aside until installation of the vertical fin.

The 3/8" triangular balsa braces behind former F2 should be installed at this time. Do not leave them out. Also install the braces behind former F3B while you're in the brace installing mood.

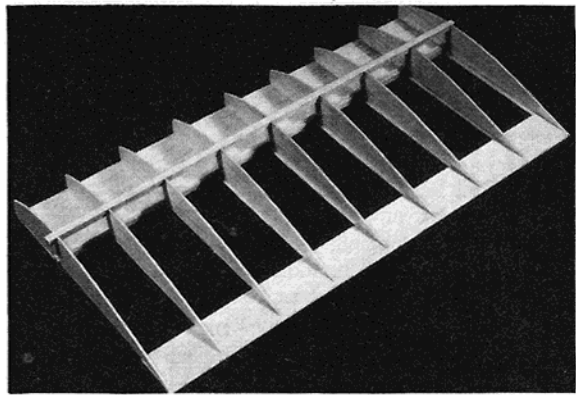
The upper forward part of the fuselage is planked with 1/4" sheet balsa. However, before proceeding it is a good idea to position and glue nose ring F1 in place on end of the fuselage sides. Temporarily mount the engine using a Tatone long beam mount. The long beam mount will enable

#### BILL OF MATERIALS

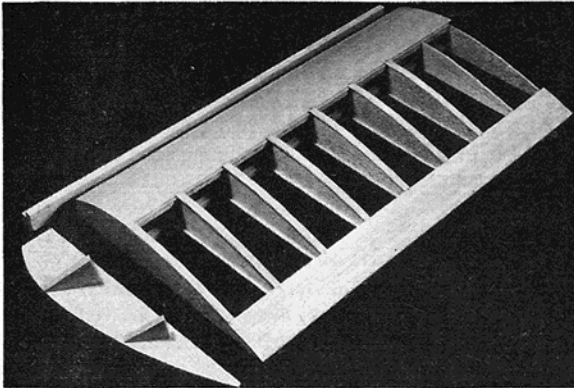
- (1) 3/32" x 3/32" x 36" balsa — Rear turtledeck backing.
- (1) 3/16" x 3/16" x 36" balsa — Fuselage cross bracing.
- (4) 1/16" x 1/4" x 36" balsa — Rib cap strips.
- (2) 1/4" x 1/4" x 36" balsa (hard) — Wing spars.
- (1) 1/4" x 5/8" x 36" balsa — Wing leading edge.
- (1) 1/4" x 3/4" x 36" balsa — Wing leading edge.
- (1) 3/8" x 36" Tri stock balsa — Bracing stab fillet.
- (6) 1/16" x 3" x 36" sheet balsa — Wing sheeting, ribs, rear fuselage bottom.
- (3) 1/8" x 3" x 36" sheet balsa — Fuselage sides, formers.
- (1) 3/16" x 4" x 36" sheet balsa — Vertical fin rudder, horizontal stab, elevator.
- (2) 1/4" x 2" x 36" sheet balsa — Wing tips, gussets, nose turtledeck, tail block fillers.
- (1) 1/64" x 6" x 12" plywood — Wing fairing TB2, rear turtledeck.
- (1) 1/16" x 12" x 12" plywood — Nose ring, fuselage doubler, front fuselage bottom, radio hatch, wing dihedral brace.
- (1) 1/4" x 6" x 12" plywood — Firewall F2, Landing gear support, servo rails.
- (1) 1/16" dia. x 36" music wire — Pushrods, tail wheel strut.
- (1) 1 3/4" dia. Goldberg spinner.
- (1) #2515 Tatone engine mount
- (1) 4 oz. Kraft fuel tank.
- (1) #B105-3 Hallco landing gear.
- (2) 2" dia. Kraft slim-line wheels.
- (1) 13" Sig canopy.
- (6) Du-Bro small hinges.
- (6) #2 x 1/4" sheet metal screws — Hatch retainer.
- (3) #4-40 blind nuts — Engine mount.
- (3) #4-40 x 1/2" round head machine screws — Engine mount.
- (3) #8-32 x 1/2" nylon screws — Landing gear retainer.
- (1) Roll MonoKote.



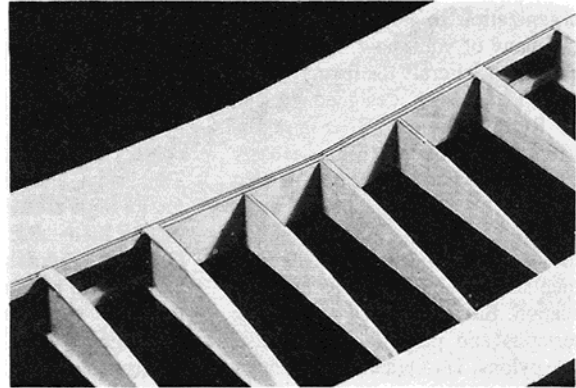
**Make a rib template out of 1/8" ply, insert two sheet metal screws to hold it on balsa sheet while rib is cut out with knife.**



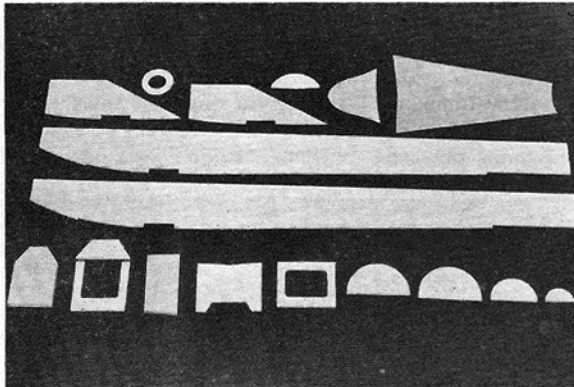
**Pin down leading and trailing edges, and capstrips, then add bottom spar and ribs. Finally, add top spar and top structure.**



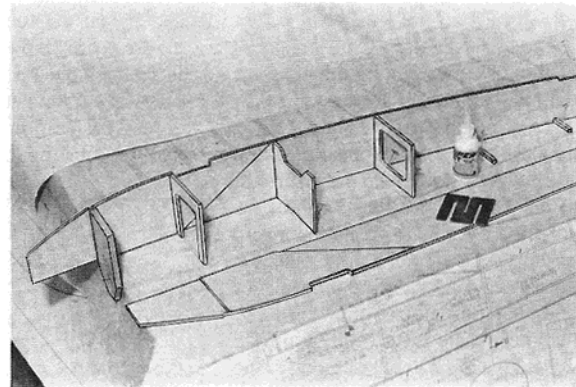
**After top sheeting is added, add leading edge and wing tips. Gussets on wing tip automatically set it at the proper design angle.**



**Plywood gusset at the wing center section sets the proper dihedral and gives the structure the necessary strength. Use Epoxy!**



**All fuselage parts should be pre-cut before any of the assembly is started, as you would receive them in a manufactured kit.**



**Fuselage is built right over the plans to insure straightness, with former F-2 hanging over the edge of the workbench.**

you to position the engine fore and aft for proper clearance between the prop spinner and nose ring F1. With the engine mounted, center the nose ring with the crankshaft and glue in place. Add former F3A above F3B. Now install TB1 on top of the nose. It does require a slight bend so pin/tape it down securely. Block sand the edges of TB1 and the fuselage side until flush with formers. Install 2" wide 1/4" sheet pieces on either side. When cured, form and sand to the shape shown on the plans.

#### **Wing**

The wing construction is quite typical. I had thought about a foam wing, but abandoned the idea in favor of the built-up version. The foam might be easier to repair,

however, there is no question that it would be somewhat heavier, and involves almost as much work to build. So, start cutting ribs.

Make a master rib of 1/8" plywood, and insert two 4 x 3/8" sheet metal screws through it. Turn the screws in just so that the point sticks through. These screw points keep the template from shifting by digging into the wood. Cut each rib using this template and you'll be surprised how uniform they are.

Do install the dihedral brace even though the wing is glued to the fuselage. It doesn't add much weight but adds tremendous strength where you need it.

The wing tip design is simple and easy to achieve. Gussets G1 and G2, when properly

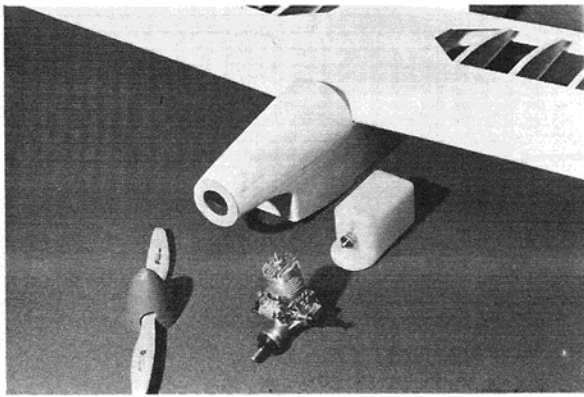
positioned, act as gauges locating the proper tip angle. You can't miss.

#### **Tail Group**

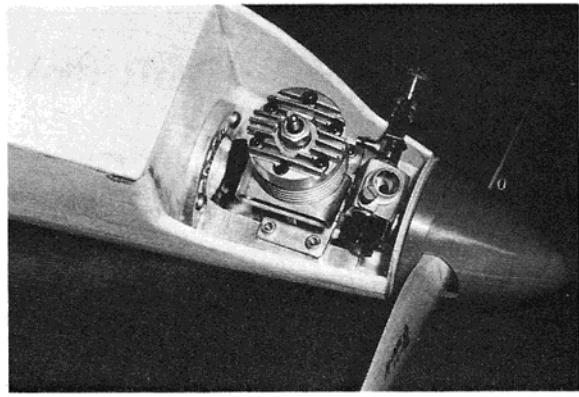
The entire tail group is made from 3/16" sheet balsa. It was chosen because of its added stiffness giving more responsive control surfaces. Because of its thickness it is also easier to hinge. By careful management, all the parts can be cut from a single 4" x 36" sheet. Select a medium hard balsa sheet, not too heavy, with straight grain.

#### **Covering**

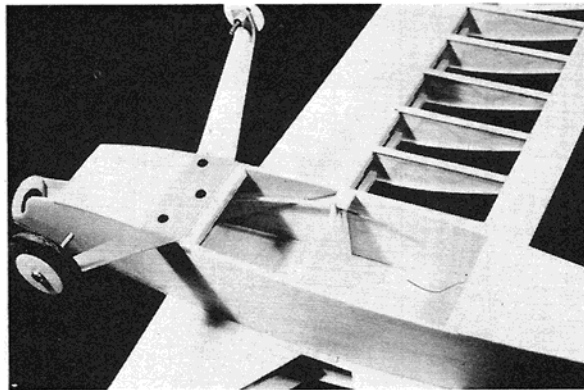
One roll of MonoKote, or your favorite plastic covering, will do the job. It is best to cover the wing, fuselage and tail separately and cut out the covering where attachment is



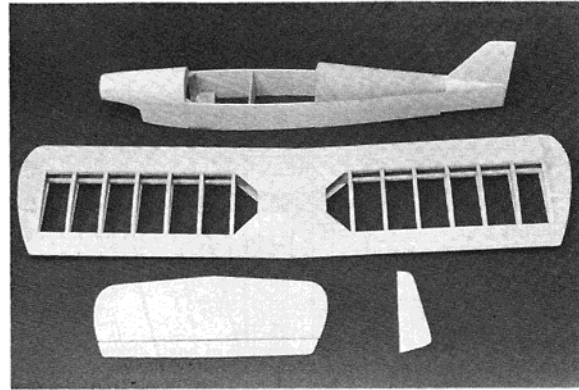
The design centers around an OS Max 15 and Kraft four ounce tank. Top Flite 8/4 prop and Goldberg 1 3/4" spinner recommended.



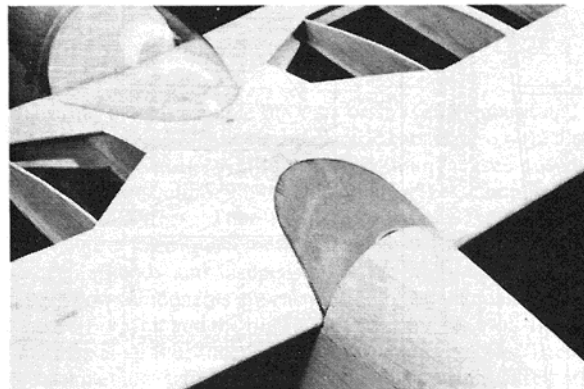
Tatone long engine mount is used. Contour top and side fuselage pieces to shape of nose ring, F1. No muffler is required.



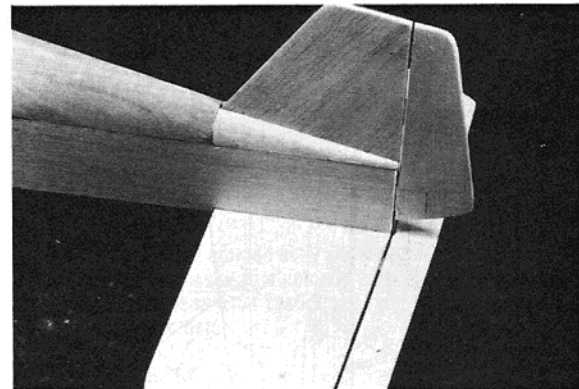
Hallco landing gear is fastened in place with No. 8 nylon screws. Kraft 2" Slim wheels used. Radio compartment is quite roomy.



Everything all built, sanded, and ready for covering. Join parts after covering is completed. One piece turtledeck goes on easily.



Wing is glued in place, adding some integral strength to the fuselage. Fairing TB2 can be film covered or painted, as desired.



Sheet tail surfaces of 3/16" balsa are rugged and stiff. Soft balsa blocks support vertical fin. Turtledeck is 1/64" plywood.

necessary. I did install the fin and included it with the fuselage covering.

There are four troublesome areas in covering that may cause you some concern. The rest is straightforward covering with no compound curves. Let's take each of these four areas and discuss them briefly.

First, the upper front nose piece has a compound configuration. If you are good at applying plastic films you might get by with one piece. If not, try two pieces and arrange some sort of trim to hide the seam.

Secondly, after the fuselage and wing are covered and joined, trial fit TB2, wing/fuselage fairing. Install former F4 so that the fairing, when positioned, is flush with the top of the fuselage. Next, using the

fairing as a pattern, remove the wing covering beneath it. Again, make sure that the fairing fits accurately by trial fitting. Next, cover the fairing, before installing, leaving an overlapping edge all the way around, approximately 1/16". Now install the fairing, bond in place, and gently iron down the overlapping edge all around. Sure beats covering after installation. Patience is a virtue.

Third, after sanding the stab/fuselage gussets, cover and install them in the following manner. Assuming the fuselage and stab are covered and joined, cut away the covering under the gusset on both fuselage and stab. Cover the gusset on the face side and trim it leaving approximately

1/16" overlap completely around the gusset. Do not iron this down. Now install the gusset with epoxy and carefully iron the tab down with the point of the iron. This is a super way of doing this and, if done with care, it almost looks as if no ironing is required.

And, finally, the last areas that may cause you trouble are the top sides of the wing tips. I found it more convenient to cover them separately because of the compound curve. Solarfilm might prove to work out better in this case but, if you are using MonoKote, take it from me and cover them separately.

#### Flying

The "Tri-Valley Top Dawg" is great fun

to fly. It is groovy and responsive but, when flown with reduced throttle, can be gentle and docile. Several of our club members have learned to fly with it and others sport fly it for a change of pace. For good performance keep the weight about 2¼ pounds ready to fly (less fuel). When racing, all our airplanes are required to use a O.S. Max .15 with an 8/4 prop. Everybody uses the same fuel and from there on it's simply a matter of pilot skill.

The "Dawg" performs better slightly nose heavy. With the Center of Gravity back too far it becomes elevator sensitive and difficult to hold in a groove. The rudder is very responsive and aerobatics such as rolls, loops, inverted flight (if you're good) and stalled turns are possible. Our club has been most pleased with the "Tri-Valley Top Dawg" and each year we see a few more enter the races. So grab on and join the fun and thrill of competition! □

**Editing By Hlsat.  
RCModeler  
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