



THUNDER PANZER

From Rhodesia, South Africa, and one of the world's best pattern fliers, comes this jet-like competition aircraft, designed to perform all FAI aerobatics with a great deal of finesse. Yet, it is an easy airplane to fly and can be handled by the novice. With an HP .61 and pressure carburetor it can really move out and perform the tough vertical maneuvers with ease. The slow speed characteristics are excellent with no tendency to drop a wing during a dead slow landing approach.



BY RICH BRAND

The "Thunder Panzer" was especially designed for my crack at the 1973 World Championships. Unfortunately, I was unable to attend the South African Team Selection Trials and, thus, lost my chance to represent South Africa at the World Championships.

Nevertheless the "Thunder Panzer" lived up to my highest expectations, being able to perform FAI aerobatics with a great deal of finesse. With a HP .61 fitted with pressure carburetor, the model really moves out with a jet-like appearance. The slow speed characteristics are good with no tendency, whatsoever, to drop a wing during a dead slow landing approach. Yet, flick maneuvers are possible and spinning comes natural when required, a good clean entry being achieved without the use of ailerons.

In designing the "Thunder Panzer" I attempted to capture some of the good points of my previous designs. One innovation, however, was the use of ailerons well outboard of where I thought they should be. The result provided truly axial rolls with minimum drag build-up.

I would like to point out that the "Thunder Panzer" is a very easy aircraft to fly, displaying no vicious characteristics whatsoever. In all sincerity I would recommend it to both Novice and Expert alike. Should you decide to build the "Thunder Panzer" I would appreciate your comments, and if possible a photo. Please feel free to write to me at P. Bag 7721, Causeway, Rhodesia, South Africa.

CONSTRUCTION

Start by building the wing. After cutting out the foam cores, glue the rear spar in place. Next, epoxy the plywood undercarriage mounts in position. When set, cut out the foam to accept the undercarriage unit. Coat the foam in the recess with epoxy to protect it from solvents which may later find their way in while you are painting. Next, cover the mount with soft 1/16" balsa sheeting and shape to the original airfoil contour.

The wing is now ready for sheeting. Cover the core with one piece of 1/16" prepared balsa sheeting. Apply the contact adhesive with a sponge to both the sheeting and the foam cores to prevent excess glue weight. Use Titebond glue on all areas where wood meets wood. The method I used when covering the cores is as follows: Wet only the leading edge portion of the sheeting with ammonia. Make the initial contact between the foam core and sheeting at right angles. Now, slowly roll the core until one side of the wing is covered. Trim the sheeting at the rear spar. Now roll the core over to make contact on the other side. Trim the sheeting at the rear spar, and use pins to insure that no warps develop while drying. Allow the wet leading edge to dry with the wing standing upright. Failure to do this — i.e. allowing the wing to dry

laying flat on the table — could result in a leading edge warp.

At this stage the two wing halves can be lightly sanded and trimmed. The sheeting can also be cut away to gain access to the undercarriage recess. The cut-outs to accept the servos and dihedral braces can now be made using the balsa sheeting as templates. Carefully sand each wing root to obtain the correct dihedral as indicated on the plan. Glue the two halves together and insert the oversize dihedral braces with epoxy glue. Insure perfect alignment at this stage by viewing the wing from the rear.

Next, shape the entire aileron/trailing edge to the desired section from a straight 1/2" sheet. You will find the small mini-plane a useful tool for this job. Now, lightly tack glue the aileron/trailing edge to the rear spar. The wing tip blocks are then glued to the wing. Shape and sand the entire wing and then remove the aileron/trailing edge. Now cut away the ailerons. Make up the aileron torque rod assembly as shown on the plan. Gouge out the rear spar and trailing edge to accept this assembly which is then glued into position onto the rear spar. The trailing edge is then glued in place as is the 1/16" plywood Camloc support. Fiberglass the entire center section, then fix in the locating dowel. Finish the wing by applying two coats of Talcum power and dope. Cover with lightweight tissue and continue applying thin coats of Talcum powder and dope, sanding between coats until the surface is prepared for spraying. The ailerons are finished with the "easy does it" method of scraped Hobby epoxy glue.

Fuselage:

Draw the basic fuselage outline on one sheet, then tape and pin this sheet to the other sheet. Cut out the fuselage with a jigsaw. This insures two perfectly matched sides. It is not necessary to cut out the slot to accept the tailplane at this stage, but make a good ball point pen mark along the center line for future reference. The fuselage belly sides can be cut away and put aside.

Glue the triangular fillet strips in place and fix the fuselage doublers in position. I use contact adhesive for the doublers. Now pin one side of the fuselage onto a straight building board. Glue bulkheads F2, F3, F5, F7 and the tank compartment floor in position. F2 should have been previously prepared and blind nuts fitted for both retract and engine mounts. When dry, glue on the other side of the fuselage, insuring proper alignment by the use of a square. Next glue the front top nose block in position. When dry, remove the fuselage from the building board.

Draw the top view of the fuselage on the 1" block and cut to shape. Pin this onto the building board and glue the fuselage sides onto it. Insure proper alignment by the use of a square. Glue the 1/2" bottom block in position. This should be cut out as indicated on the plan to accept the retract unit and



THUNDER PANZER

Designed By: Rich Brand

TYPE AIRCRAFT
Competition Pattern

WINGSPAN

60 Inches

WING CHORD

12½" Root — 9" Tip

TOTAL WING AREA

630 Square Inches

WING LOCATION

Low Wing

AIRFOIL

Symmetrical

WING PLANFORM

Double Taper

DIHEDRAL, EACH TIP

1 Inch

O.A. FUSELAGE LENGTH

53"

RADIO COMPARTMENT AREA

(L) 12" X (W) 2¾" X (H) 2"

STABILIZER SPAN

24 Inches

STABILIZER CHORD (incl. elev.)

6½ Inches (Avg.)

STABILIZER AREA

150 Square Inches

STAB AIRFOIL SECTION

Symmetrical

STABILIZER LOCATION

Top of Fuselage

VERTICAL FIN HEIGHT

6 Inches

VERTICAL FIN WIDTH (incl. rudder)

8" (Average)

REC. ENGINE SIZE

.60 to .61 Cu. In.

FUEL TANK SIZE

12 Ounce

LANDING GEAR

Tricycle

REC. NO. OF CHANNELS

Five

CONTROL FUNCTIONS

Rud., Elev., Ail., Throt., Retr.

BASIC MATERIALS USED IN CONSTRUCTION

Fuselage Balsa, and Ply

Wing Balsa, Foam, Ply

Empennage Balsa, Foam

Weight Ready-To-Fly 120 Oz.

Wing Loading 27.4 Oz./Sq. Ft.

wheel. Cover from F7 to the rear of the fuselage with 1/8" balsa, noting the direction of the grain.

Now fit the wing in position, insuring that the alignment is correct. At this stage, Camlocs or any suitable wing hold-down system should be installed. Line F3 and F7 with greaseproof paper. Glue the belly sides, F4 and F6 in position. Add the 1/2" triangular fillets, fit in the 1/4" fiberglass guides, and finish off by covering with 1/8" balsa. When dry, remove the wing from the fuselage. Fill in the engine compartment with balsa and cut out to accept the engine mount and engine. With the engine bolted in position, glue F1 in place. Remove the engine so that the shaping of the fuselage can begin. First cut the top of the fuselage to the side view outline. At this point cut the canopy so that it fits flush with the canopy floor. Mark the outline of the canopy floor with a ball point pen.

The entire top fuselage half can now be shaped, using a balsa plane. Be sure that the canopy floor outline is not transgressed. The bottom half of the fuselage is shaped with the wing in position. When the fuselage shaping is complete, apply two coats of Talcum powder and dope. Cover with silk and continue with thin coats of talc and dope, sanding between coats until the surface is ready for color spraying. At this stage it is advisable to paint the cockpit floor, fit the instruments, pilot, and ejector seat. Fix the canopy to the fuselage with epoxy glue, mask off, then fillet with Hobby epoxy Stuff. The cut-out to accept the tailplane can now be made, using the reference line previously marked.

Tailplane and Elevator:

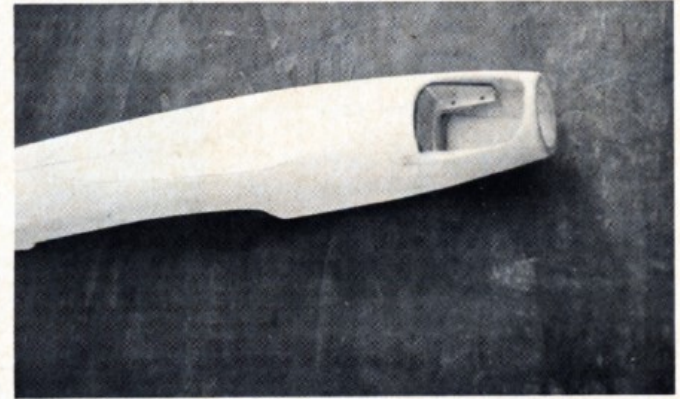
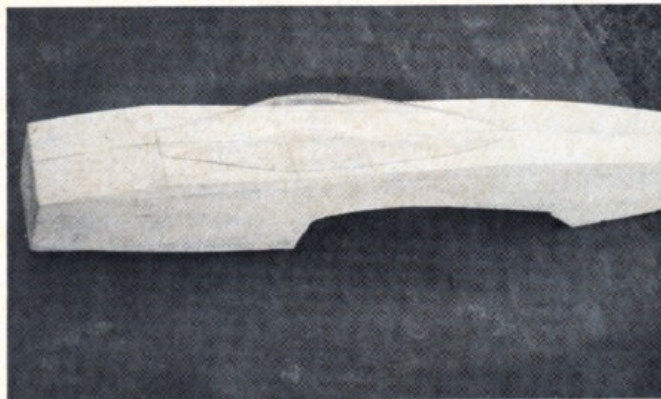
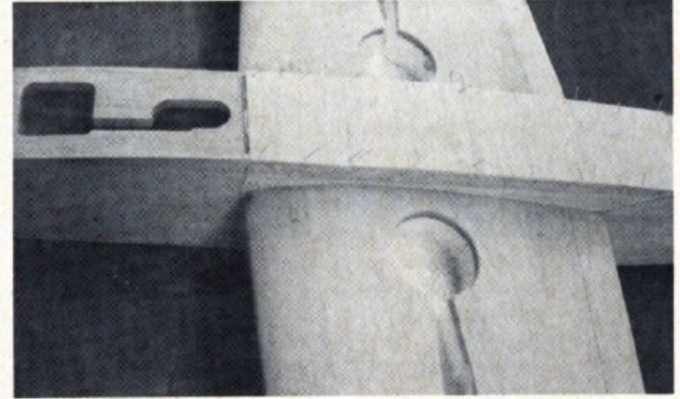
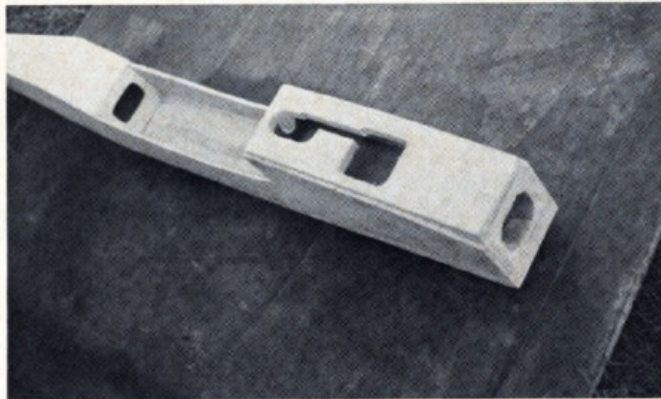
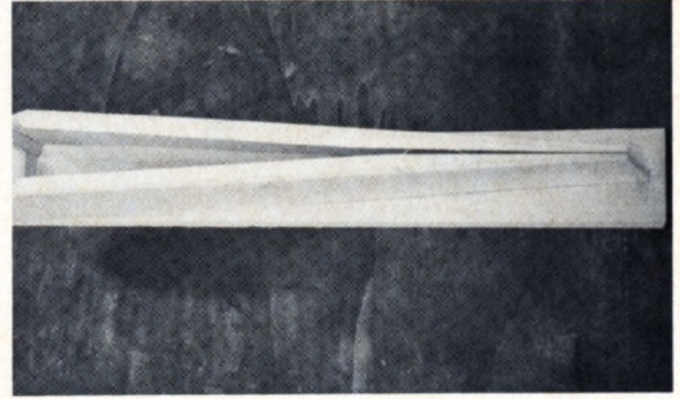
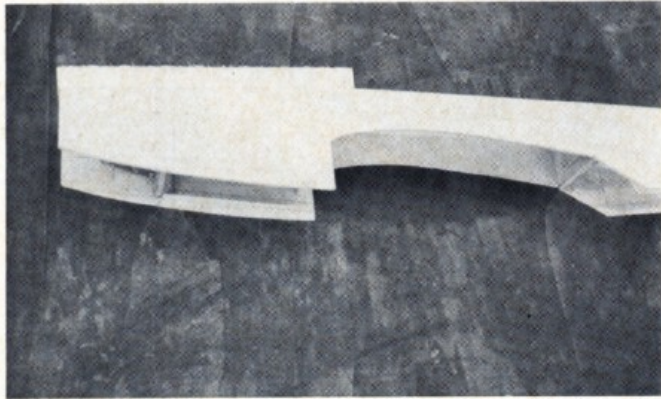
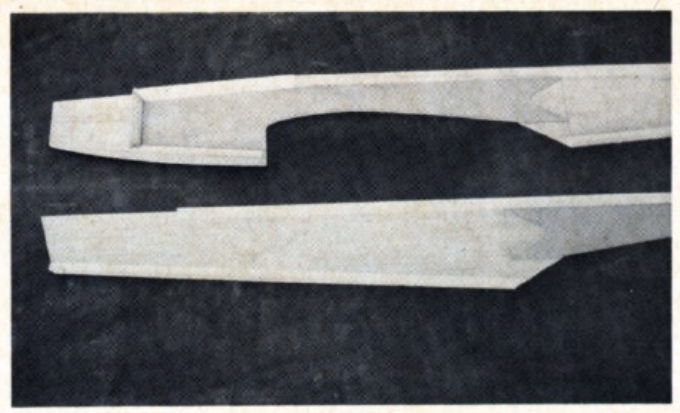
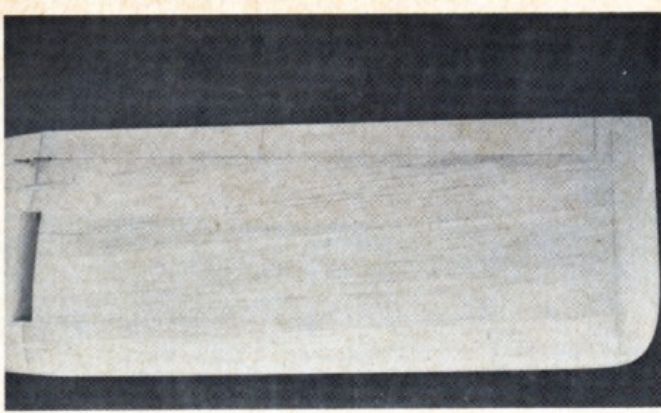
Cut the two halves out of foam. The rear cut line may be lined up with the edge of the foam block. Mark the front cut line on the foam cores and cut off using a sharp modeling knife. Glue the leading (oversize) and trailing edges to the cores. Shape the trailing edge to the foam contour. Cover the two halves with 1/16" sheet using contact adhesive and Titebond where applicable. Glue the two halves together with epoxy glue and insert the balsa braces as shown. Now shape the elevator from 1/2" balsa and tack glue onto the tailplane. Cut the tips from balsa and glue in place. Shape and sand the entire unit and cut away the elevator when complete. The tailplane is given two coats of Talcum powder and dope. Cover with lightweight tissue and apply thin coats of talc and dope, sanding between coats until the surface is ready for color spraying. The elevator is finished again, using the "easy does it" method.

Fin and Rudder:

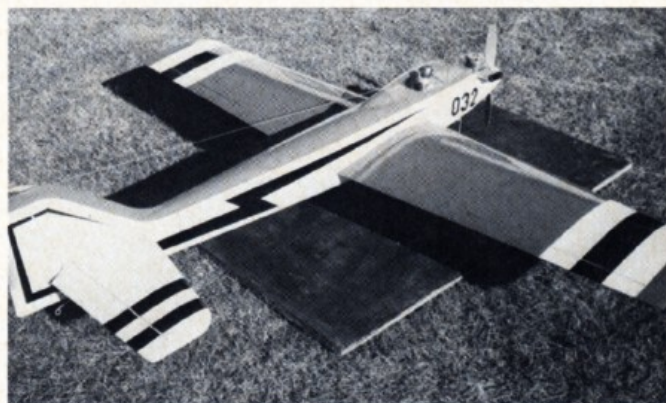
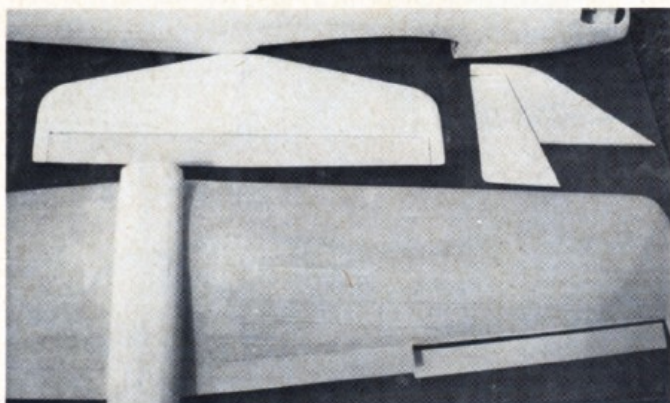
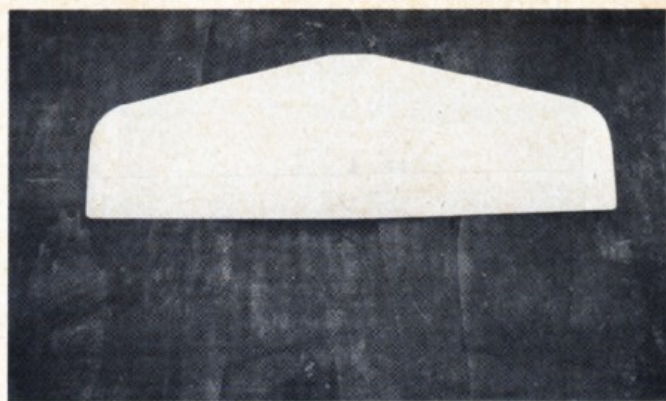
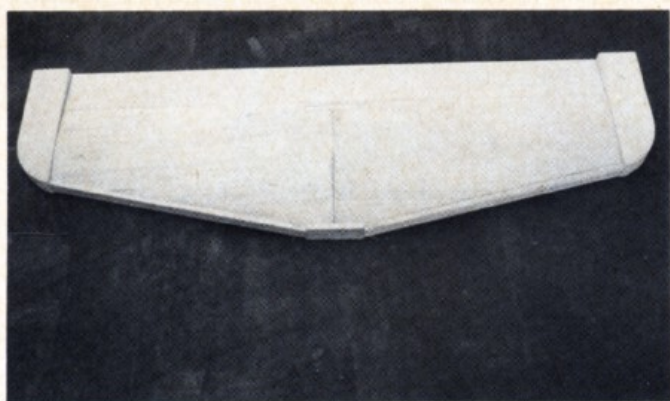
This is fairly straightforward as the plan will indicate; as with the tailplane and elevator, shape as a unit before cutting away the rudder. Both fin and rudder are finished with the "easy does it" method.

FINAL ASSEMBLY

When all components are ready for spraying, final assembly can take place. With the wing in position, trial-fit the tailplane in the fuselage slot and check for proper alignment. When aligned, epoxy in place. Attach the fin to the fuselage in a similar manner. Use Hobby epoxy Stuff to fillet the tailplane and fin as required. Be careful not to sand through the silk. At this



1ST ROW, LEFT: The wing shaped and sanded, ready to cut away the ailerons. **RIGHT:** The triangular fillet strips and doublers in position on the fuselage. **2ND ROW, LEFT:** The opposite side of the fuselage glued into place. The top block is also in position. **RIGHT:** The fuselage sides are being glued to the rear top block in this photo. **3RD ROW, LEFT:** The bottom block is in position and cut out to accept the nose gear retract unit and wheel. **RIGHT:** The bottom of the fuselage being completed. Note the retract wheel wells. **4TH ROW, LEFT:** The fuselage cut to side view outline and marked with ballpoint pen. **RIGHT:** The shaped fuselage.



1ST ROW, LEFT: The horizontal stabilizer and elevator parts glued together, ready for shaping and sanding. **RIGHT:** Then sand the horizontal tailplane with elevator marked for cut-out. The vertical tailplane is also cut, shaped, and sanded at this time. **2ND ROW, LEFT:** All of the Thunder Panzer parts just before final assembly, surfacing, and finishing in the materials of your choice. **RIGHT:** The Thunder Panzer with engine, tank, gear and radio installed, ready for flying. **BELOW:** A shot of the gear retracting immediately after take-off.

stage the ailerons, elevator, and rudder may be fitted. I use five minute epoxy on the hinges to speed things up. Once completed, carefully check the entire airframe for any dents or irregularities. If any, fill with Hobbyoxy Stuff, then give the model two final coats of clear dope. You are now ready to color-spray the model. I will not cover this procedure as the paints available in Rhodesia differ somewhat from those available elsewhere.

EQUIPMENT INSTALLATION

I prefer to fit in the radio once the model has been completely finished. I will not detail the radio equipment installation as this will vary accordingly. I will, however, attempt to describe the undercarriage installation, which may not be self-evident on the plan. First, insure that the 180° servo is in the "down" position. With the wing retracts extended connect the push-pull rods. The approximate measurements can be gauged from the plan. Once connected, operate the 180° servo and check the operation of the units. I would add here that the wheels should balance in the 45° position when disconnected. Now, with the 180° servo in the "up" position, ascertain and mark on the fuselage the position adjacent to the bellcrank arm. With the nose



retract fitted, the length of the push-pull rod can be gauged to this mark. Finally, give the entire undercarriage system a good work-out, insuring that the nose gear locks up and down, adjusting the Kwik-Link if necessary. A lock nut is essential on the Kwik-Link and once properly set up will seldom need adjustment.

For flying, connection should be made with the main gear up and nose gear out. Then, when the wing is fully in position, the nose gear will lock in.

FLYING

Set up the control movements and C.G. as indicated on the plan. Make sure the model balances laterally. The weight of the model can be up to 7½ lbs., possibly more. Once the roll rate has been adjusted to your requirement, set up the elevator movement. This is determined by increasing the elevator "up" movement until a spin is achieved. The rudder is very effective and should be adjusted to your requirements. Little or no change of trim will be noticeable when raising or lowering the undercarriage in flight. All in all, the "Thunder Panzer" is a delight to fly, and should give many hours of enjoyment. If you have any problems whatsoever, please feel free to write to me at the address given. □