**Here's a sports model that is definitely no turkey! As a next step up from a basic trainer, try this 54 in. span, .35 to .61 powered aerobatic bird, designed by Terry Badis.**

# CHICKEN TRAINER

## SATISFYING TO BUILD AND FUN TO FLY!

*Rugged built-up, traditional layout makes "Chicken Trainer" doubly useful - you'll learn a lot building it as well as flying it.*

IT IS INEVITABLE that R/C modellers like Designer Terry Badis who were balsa bashing in their youth, and who now return to their hobby some thirty years later, will have found it hard to come to terms with the modern quick build plastic and foam models of the 1980s.

Although the construction of built-up models takes a little longer, it is very satisfying to go through the process of fixing your drawing to the bench or building board and converting the balsa into a flying machine that will give you hours of flying pleasure.

*Chicken* was designed by Terry to be a strong, practical and versatile club model that could be built by most people who aim to move on from basic trainers to something more exciting, and visually stimulating. If you have not undertaken the structure of a built-up model before this is the model for your, as it will help you to acquire building sills that will enable you to construct the most complicated models.

### Development

Why *Chicken*? Most modellers ask this question as the *Chicken* is a bird that cannot fly. The first built did not fly well due to small ailerons and wings set up with a few degrees of positive angle of attack and it is easy to understand that these design faults resulted from vintage model habits where models were basically free flight with radio assist.

Pilot error provided the opportunity to construct another model(!) together with a third model being built by Terry's son Ian, and many experiments in aileron and rudder size have produced an aerobatic model that will perform most manoeuvres even with the standard flat bottom wing section. The model has survived many prangs and the undercarriage is very robust and has a nice wide track.

The *Chicken*, then, is much like its farmyard namesake in that it can be either a docile bird or a fighting cock and the choice is therefore yours in tailoring your model to fit your current flying ability, together with the advantage of converting to the symmetrical wing section as your flying experience grows.

*"Chicken Trainer" floats past on short final approach; pilot is Terry's son, Ian Badls, and the airfield is Croydon.*

## Construction

The photographs that are included with this feature will assist construction, but the following written notes will speed up the process of getting your *Chicken* airborn.

### Weight & Motors

Uncovered airframe only, including tank and wheels were as follows:-
With standard wings:- 1lb 15oz
With symetrical wings:- 2lb 2½oz
Model covered in 'Solartex', dry weight:
Standard model with Merco 35: 4lb 7oz
Symetrical wing model Merco 49: 4lb 11½oz
The standard wing model with Merco 35 is adequate and a 40 four stroke would be ideal. The symetrical wing version is under powered with a Merco 49 and a 61 would have been a better choice. A 60 four stroke would make an ideal partnership.

## Fuselage

Engine installation must be a priority on your list of tasks before you cut out ply formers 'A' & 'C' and adjustments to the engine bearer width will have to be made to suit your engine, together with holes for throttle cable, fuel lines and nicads for your RX.

After you have applied candle grease or hard soap to the drawing at places where adhesive will be used, locate with the rear u/c wire. Remove from longerons into place and glue all uprights and diagonals. The longerons finish at the tail end into a ¼in sheet plate, and the ¼in sheet wing mount is glued to the top of the longeron and pinned in place. Glue into place the ¼in sheet infills at the front between bulkhead positions 'A' & 'C' but remember that the piece that butts up to the bulkhead 'C' can only be fitted after the fuselage has been assembled with the rear u/c wire. Remove from the drawing when dry, and build a second side. Now glue the ply doublers to the wing mount area ensuring, of course, that you fix to the inside.

The next stage is the wire undercarriage assembly, and both front and rear 8swg wires are formed as detailed on the drawing to be bound with wire and soldered at the joint to each side. You will need to have access to a strong bench vice and a large hammer as it is difficult to bend this gauge of wire with pliers. If you view the drawing of the fuselage side, you will observe that the front wire sweeps backwards and outwards towards the wheels. The rear wire has to come forward and is bent downwards and outwards to meet the front wire and the simplest way devised to deal with this problem is to make a temporary pattern from 16swg wire and to copy it with the 8swg wire on the bench vice.

If you are now satisfied that you

*A brace of "Chickens"; two of the prototypes (photographed in 1983). Larger allerons (1⅛ in.) on Ian Badls' example proved better than narrower ones on Dad's.*

have an accurate assembly of engine bearers and u/c wires, either bind the wires to the bulkheads or fix with commercial components. Fix the engine to the bearers and slide into position temporarily, glue fuselage sides where contact with both bulkheads will take place, thread sides over rear wire to u/c and pin into position holding fuselage sides at rear with an elastic band or bulldog clip. When dry, withdraw engine bearers slightly to apply epoxy adhesive and re-locate. Bind and solder the u/c wires together.

The remainder of the fuselage assembly consists of fixing the ¼in × ¼in cross pieces, fixing into position all top and bottom triangle shape formers and stringers. Add ⅛in sheet balsa to the bottom of the front area together with 3/32nd in hard sheet to the sides as indicated remembering to blend in the side stringers to the front sheeting. Fit a suitable fuel tank and, if access is required, use commercial fixings to make up a removeable tank housing from ½in soft balsa sheet below the ply top plate. Glue the underfin into place after the wire skid has been fitted. The cowl to the engine is built up from ½in soft balsa sheet behind the ply disc fixed to the front of the engine bearers.

Using hardwood engine mounts allows conventional balsa fairings to the sharp end of the model, but a simple quick fit aluminium engine mounting plate was tried on the model illustrated on the cover. Silentblock type rubber mountings (as used on the Avicraft *Panic*) were used and this has the advantage of reduction in vibration transmission together with the ease of engine change options should you wish to fit a more powerful motor at a later date.

Other advantages are that you will have more space to fit a larger fuel tank, and adjustments for side or downthrust are achieved by adding washers behind the aluminium mounting plate as required. No detail of the simple aluminium mounting plate is shown on the drawing as this will vary according to the engine and

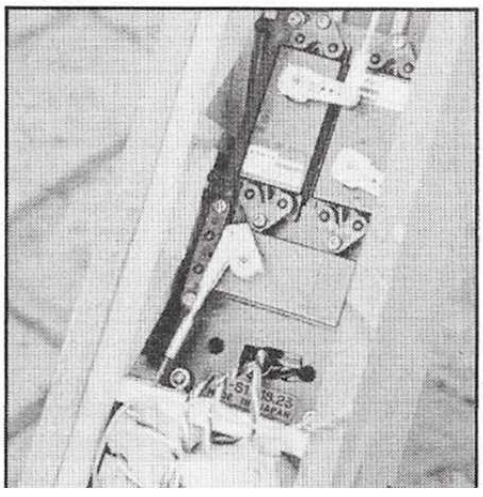
muffler you instal. You will, however, need to allow clearance for the muffler as adjustments for down or side thrust may make it foul the fuselage. For extra strength, the front fuselage ply former should be made from ¼ in ply if you decide to use this method of engine mounting.

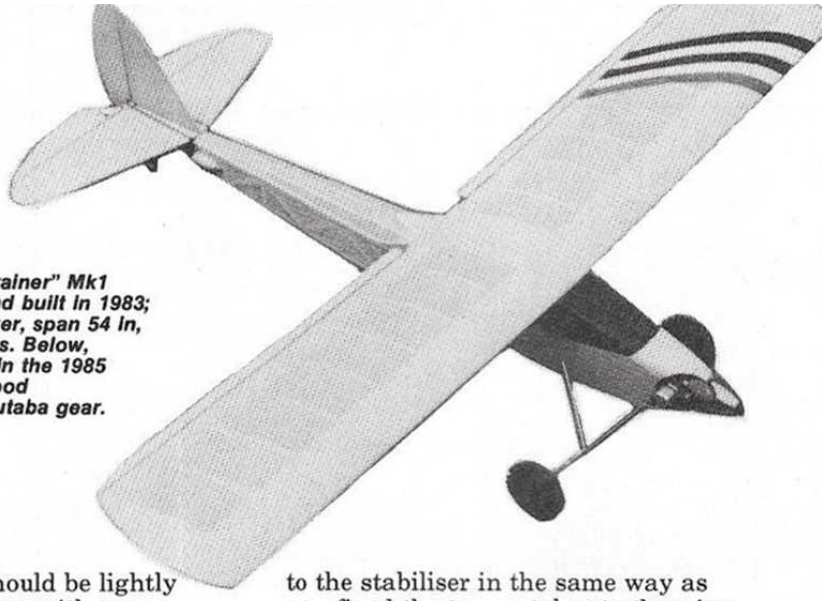
## Wings

Cut out from ⅛in ply the wing dihedral braces and a template of the wing rib. From ⅛in medium balsa, cut out using the ply template 20 wing ribs. The standard dihedral wing is built in two halves and joined with the ply wing braces after construction of each half. Pin 1½in × ¼in sheet lower trailing edge to the building board and also both of the lower wing spars. Glue all ribs into position using white glue setting the centre rib at the correct angle for the dihedral. Glue the top spars into place together with the hard balsa leading edge. Fix the ¼in sheet wing tips into position using the angle supports and, when dry, sandpaper the top edges to follow the contour of the rib profile. Remove wing halves from the drawing, fix ¼in sheet infill between spars as indicated on the drawing and cut out ribs to receive the ply wing braces. Assemble with white glue or epoxy and hold in place with clothes pegs or bulldog clips until dry.

You are now ready to sheet the front of the wings with 1/16in medium sheet balsa. To assist the balsa to follow the curve of the rib shape prior to fixing with white glue, steam the top surface over a kettle of boiling water and pin into place until adhesive has set. Fix the hardwood servo rails into position. Before the centre-section sheeting is completed, the torque rod tubes should be fixed to the trailing edge by sewing with thread and covering with epoxy. Make up each torque rod from cycle spokes and aluminium tubes so that the threaded ends bend inwards from bulkhead 'F' on the fuselage to avoid fouling this bulkhead as ailerons are operated.

Fix all capping strips to top wing surface only with pins until dry. Make up both ailerons from 3/16th hard balsa, drill holes for torque rods and cover prior to fixing with mylar hinges. The ailerons should not be rounded at the trailing edge as this will cause flutter at high speed.





***"Chicken Trainer" Mk1 designed and built in 1983; PAW19 power, span 54 in, ¾ in ailerons. Below, installation in the 1985 machine; good access to Futaba gear.***

Mylar hinges should be lightly sanded before fixing with cyano and you should try to leave as small a gap as possible between aileron and wing, also on the rudder and elevator.

## Symmetrical section wing only

Method of assembly is slightly different as there is no dihedral and the wing can be built in one piece on the building board with straight ply braces added after the wing is removed from the board. Splice over a miminum 3in length and join with epoxy all wing spars, leading and trailing edge. The joint should be at the centre of the wing where it will be strengthened by the wing braces.

Place 1/16in scrap packing under the lower spar positions and pin the spars to the board. Glue ribs in place after checking that the trailing edge will fit into all ribs. Glue both top spars into position and also the leading edge. When dry, offer the trailing edge into position fixing with white glue. The sheeting to the leading edge is applied to both top and bottom surfaces as are the rib cap strips. Wing tips are made up from laminations of ½in soft balsa and should be hollowed out to save weight.

The ailerons for the symmetrical wing are 3/16 × 1½in hard balsa and should not be rounded off at the trailing edge in order to prevent flutter at high speed. It is important for this wing version that a locating dowel is fitted as detailed as the response from the larger elevator is quite snappy and the wing may lift using elastic bands only. The fitting of torque tube and rod is as outlined for the standard section wing.

## Tailplane

Make up the tailplane from soft/medium ¼in sheet balsa and join as indicated. The fixing of the fin and tailplane to fuselage will be a wood to wood joint using Epoxy adhesive, and these joint positions should not be covered with covering material. The elevators are joined together using aluminium tube and wire prongs bent into the elevators. Fix aluminium tube to the stabiliser in the same way as you fixed the torque tubes to the wing trailing edge.

## Radio installation

A standard servo tray was fitted in the area indicated on the drawing and you should mount this as low as possible to avoid fouling the wing aileron servo. The receiver should be installed forward of the c/g and should be well protected from vibration and possible impact damage.

The nicad pack position will depend on the weight of your engine and, although provision should be made for inserting the nicads forward of bulkhead 'C', you must aim to balance the model on the indicated centre of gravity 3⅛in to the rear of the wing leading edge.

## Covering & finish

All models built were covered in Solartex and, although more costly than Solarfilm or similar heat-applied materials, two seasons' use has justified the extra expense as the models remain in as new condition if one coat of fuel proofer is used.

## Flying

The engine bearer position should provide you with adequate downthrust and sidethrust to counteract engine torque. A few degrees of right rudder trim may be required.

As with most tail-draggers, take off will tend to require the application of a little right rudder as speed builds up. The procedure is to allow the model to gain speed up the take off area holding the elevator at neutral until the tail unsticks and then feed in a little up elevator to climb away.

Flying characteristics are very forgiving if the sticks are treated with respect, but aerobatics are yours for the asking once you have the 'feel' of the model. Landings are no problem with a tail dragger, just flair out in time and three point landings are a doddle. With deadstick landings, the model only needs the right trim to the rudder centralised as the glide is very good.

So this is the *Chicken*; quite a tasty bird and, dare we say it - finger flicking good!