



DAVE PLATT MODELS

# WACO YMF-3

KIT REVIEW No 97

by DAVE DYER

**T**HERE I was at the R.C.M.&E. offices chatting to the Editor when he casually asked me if I would like to review a power model, perhaps even a scale model. Out came one large box containing a very large amount of wood, wire, and plastic mouldings and on the box label was the picture of a beautiful big biplane. How could I fail to be interested? Further perusal of the kit contents and plans completely sold me, here was a model, time or no time, I just had to build.

As stated in the instructions, the kit is to scale outline and consequently can be built to a full scale model, if desired. Limited scale detail is provided on the plans but to complement this I found an excellent set of plans, at Beaumont Aviation Literature. Further background information on Waco biplanes is also available in *U.S. Civil Aircraft* Vol. 6 which gives many interesting photographs.

The model is an all wood structure, and as such requires a fair amount of building effort. The fuselage is constructed on the balsa crutch with formers and stringers. Wings use a CLARK-Y aerofoil section (as did the full size) and are of conventional open frame construction. The tail group is basically an all sheet structure.

## The kit

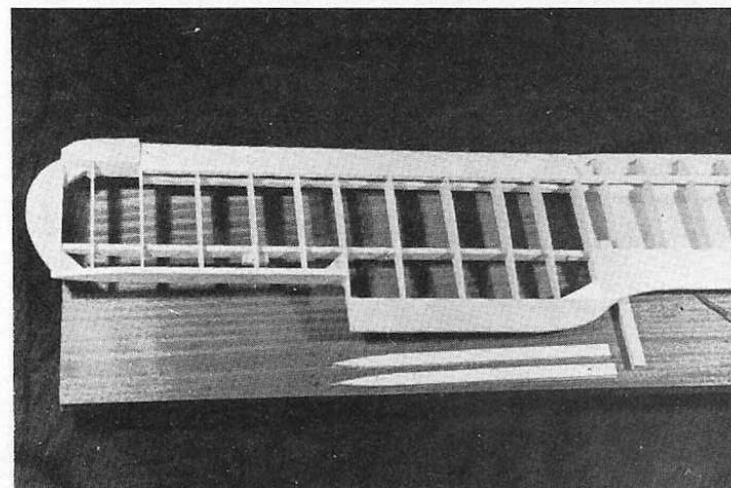
None of the die-cut sheets for formers, wing ribs, etc., are marked but have to be identified from layouts on the plans. An unusual feature of the kit is that where components of thicker sheet are required they are laminated up from  $\frac{1}{8}$ in. or  $\frac{3}{32}$ in. sheet, while the ply bulkheads are laminations of  $\frac{1}{16}$ in. ply. The plans are a well presented set of four rolled sheets and accompanying these is an illustrated instruction booklet which gives a detailed step by step building sequence.

Centrepiece of the kit must surely be the plastic mouldings which are used for the engine cowling, rocker arm fairings and wheel pants. These are not the more common ABS material, but injection moulded in a nylon-type material, altogether very nice components. All wire parts are ready shaped and included in the kit is a limited set of hardware, comprising bellcranks, horns and screws but not quicklinks, hinges, tank wheels, etc.

Something of special interest to me was what appeared to be two excellent transfer sheets of large numerals and all the striping and trim required, unfortunately they turned out to be very disappointing, but more on this later!

Shortly after starting to build the model, I was talking to Richard Nicholls of Henry J. Nicholls & Son Ltd, the importers, and he told me of a range of cockpit kits and accessories being produced by D & B models

**Below: conventional construction of wing panel clearly shown here. Wings have a flat bottom section and panels are quite easily assembled, over the plan, direct on the building board. Below right: ailerons are fully sheeted, shown here with top sheeting removed.**

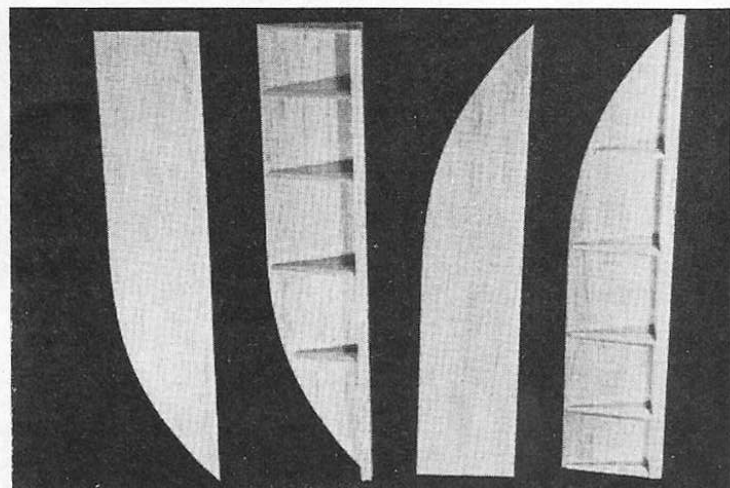


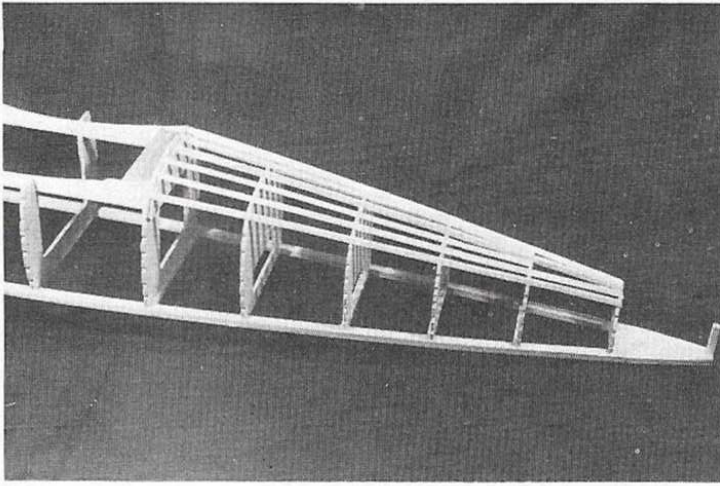
of Mentor, Ohio, U.S.A., of special interest was a set for the WACO. I contacted Norman Berger at D & B and some months later I received the cockpit kit and also a very nice dummy radial engine, albeit nine instead of seven cylinders. Both the items helped to really finish the model off and are apparently now available from '308' direct.

## Construction

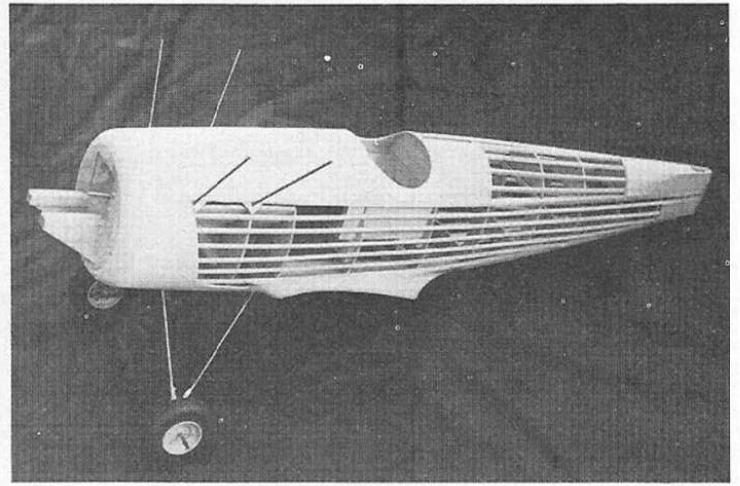
The wing panels, by virtue of their flat bottomed section, are easily built direct on the building board. The construction is straightforward and the wings assemble in a very short time to a light and rigid structure. A point of criticism here concerns the top wing mounting, a simple woodscrew in a wood block is specified but I thought that, as this would wear very quickly, I would replace it with 4BA nylon screws and blind nuts. Ailerons are of all sheet construction, sensible reinforcement being included for control linkage mounting. The ailerons are linked by a pushrod at their trailing edge and the kit details  $\frac{1}{16}$ in. ply horns to be used. I felt these would soon give rise to excessive backlash and replaced them with horns cut from standard nylon parts.

The fuselage is a highly interesting structure to build. All formers are supplied in left and right hand halves and require trimming before assembly. The fuselage crutch is constructed from  $\frac{1}{2}$  in.  $\times$   $\frac{1}{4}$  in. balsa and the formers added.





Above: partly completed rear fuselage showing formers which are supplied in left and right hand halves and require trimming before assembly. Above right: completed fuselage. Dave chose to fit carved balsa fairings in place of recommended micro-balloon method. Right: Dave has reinforced grooved hardwood undercarriage fixing blocks with  $\frac{1}{8}$  in. hardwood dowels, three to each block, which pass through blocks and former.



The undercarriage is fixed to the plywood formers by grooved hardwood blocks, but I chose to add  $\frac{1}{8}$  in. dowel pegging to reinforce this area as the only strength comes from a glue joint in sheer.

When all the basic structure is completed, the Cabane sub assembly is added into slots in the formers, making alignment of the top wing mounting a simple procedure. Strip balsa stringers and front sheeting are now added and then the whole assembly is inverted and the top formers, stringers and sheet fitted.

The instructions recommend using micro-balloons for forming the wing fillets, after covering. Here, I chose to use a carved balsa fairing and fitted it during fuselage construction. Certainly this makes covering more difficult but gives a much firmer wing seat.

As I was using the D & B cockpit kit, the fuselage internal structure had to be modified accordingly (detailed on the D & B sub-plan). All one has to do is build a simple balsa box and add to it the mouldings to simulate fittings, instrument panel, etc.

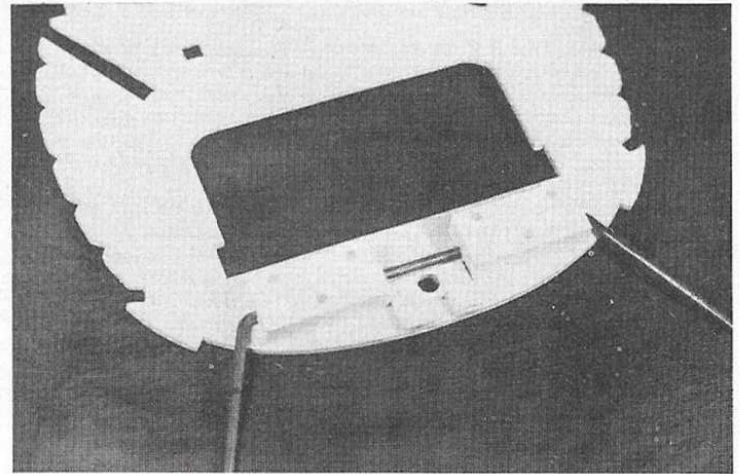
The plastic cowling is fitted to the front bulkhead by means of 90° angle brackets. Self-tap screws are specified for the purpose but as these provided very little hold in the bulkhead, I changed the mounting to 6 BA screws in steel bushes, epoxied in place. The rocker arm fairings, all 14 of them, have to be glued to the main cowl moulding. I used Bostik C.F. cyanoacrylate glue and only stuck my fingers on twice!!

The tail group is simply constructed flat on the plan and then the  $\frac{1}{8}$  in. simulated ribs added. A fair amount of trimming of the tail components was required to ensure satisfactory assembly.

### Final assembly

Being a biplane more consideration must be given to alignment than normal. A top wing incidence jig is provided which enables one to accurately set up the top wing relative to the fuselage. The wing N Struts are constructed from balsa and are fitted to the model with both wings in position. I used Proctor brass fittings, instead of the wire parts furnished in the kit.

The instructions suggest a '40' may be used to power the model but I decided that the drag inducing biplane configuration deserved a good '60'. I chose the Fox Eagle 60 which seemed to present very good value for money, and matched this to a silencer from the Semco range, im-



ported by G. K. Engineering which can be enclosed within the engine cowl. I found that the unit designed for the Pitts Special was excellent, those two stub exhausts giving a sporty appearance. In order to minimise the cut-outs in the front of the moulded cowl I used a Fox prop-shaft extension which enabled the Eagle .60 to be mounted further back on its bearers.

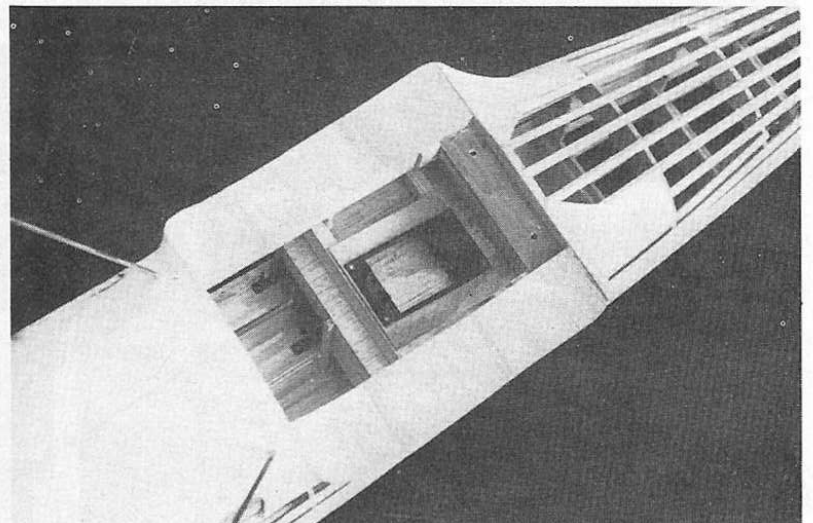
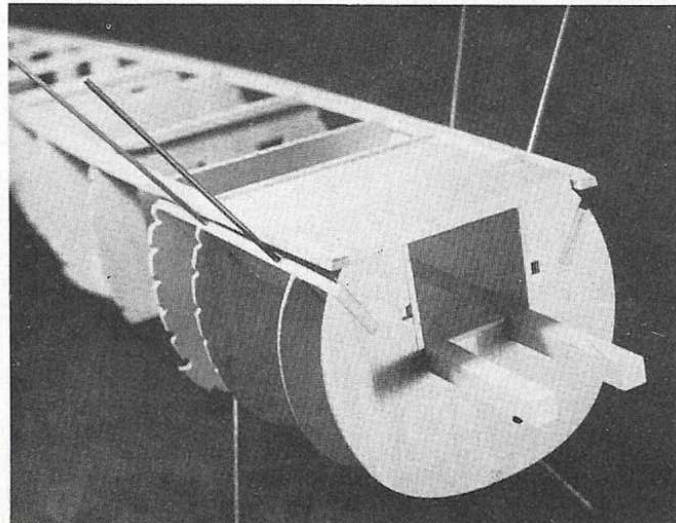
### Covering and finishing

A model of this type must of course be fabric covered and I chose Super-Shrink marketed by Air-Art Products. This material is applied dry with clear dope as the adhesive. After drying, the covering is heat shrunk and clear doped as normal.

I used a conventional colour cellulose sprayed finish and fuel proofed the complete structure with RipMax Tufcote.

The transfers supplied are rather large and consequently require careful handling. However despite extreme caution I found the fuselage trim impossible to use due to it breaking up into many pieces, also the cowling trim would not fit the compound curvature of the rocker arm fairings. To replace the transfers I used trim tape cut to the required shape.

Below left: lower front fuselage with engine bearers and cabane strut assembly fitted. Below: view from below, plenty of room in the radio compartment. Servo tray is 'angled' to facilitate a more direct run to rear control surfaces.





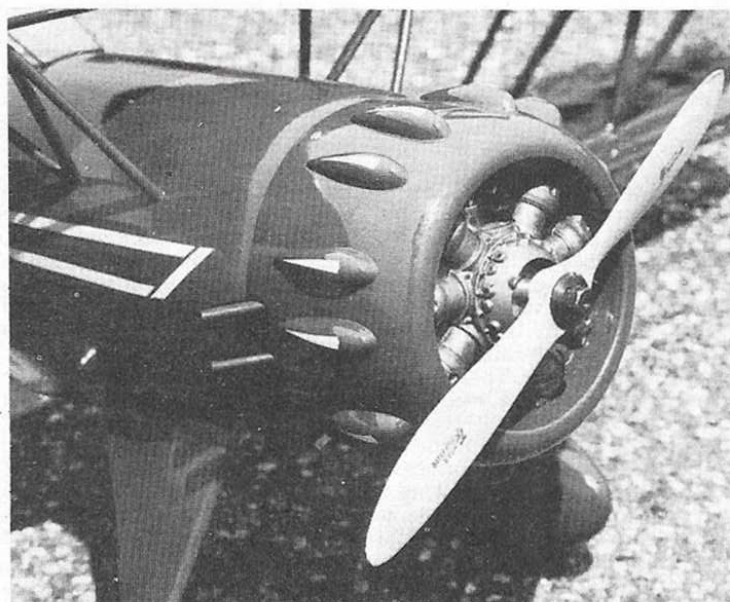
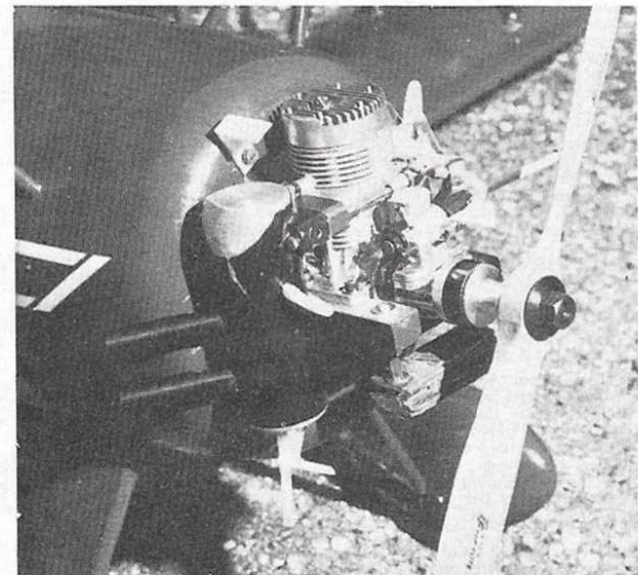
### Equipment installation

As might be imagined, fitting of the radio equipment is relatively easily accomplished with such a large fuselage volume. Due to the inclusion of the cockpit, the servo tray is angled to facilitate more direct control runs. I used a closed loop cable system for the rudder and also an internal elevator linkage. Rather than use a balsa pushrod I decided to use a glass fibre arrow-shaft as the elevator is a rather large surface. The receiver and battery are rather like the peas in a bucket situation and require pieces of foam to be cut to fit the internal shape of the fuselage to inhibit the radio moving around.

### Flying

After spending more time than necessary setting up the engine and taking photographs I found I could not delay flying any longer. Not having flown power for some years, I approached with trepidation. I firstly made several taxi runs to familiarise myself with the controls.

To say the first take-off was lucky would be an extreme understatement. The WACO lifted off at 90° to its original run just clearing the edge of the strip. Level flight required full up trim but otherwise the model flew well. Some way through the flight I handed the transmitter over to Paul Careless, our Club expert power pilot, for his opinion. Unfortunately, a few minutes later the motor ran out of fuel and Paul had to hurriedly bring the model in for a landing.



Above left: rear view of completed model, note aerodynamically balanced elevator, note also lower part of aileron interconnecting rod, joined via quicklink to horn on trailing edge of aileron. Above: very well detailed front end with dummy engine. Note twin pipes of Semco silencer at rear of cowl. Left: nicely finished and well detailed cockpit.

The throw control facility on the Skyleader transmitter system had certainly been helpful on this flight enabling me to initially use reduced throw and then to switch up to full control when necessary.

Further flying was required to give a valid flying assessment and so after some weeks of waiting for the weather, Geoff Dallimer and I met Tony Dowdeswell for a flying session. Tony to do the flying, Geoff the photography, and I to start the engine!!

Three flights were made during which Tony really put the model through a stringent test. Loops, both standard and hesitation rolls, inverted, stall turns, all were easily accomplished and after assessing slow flying characteristics at height, several low passes were made for the benefit of the camera. In Tony's words, "The Waco is a good aeroplane and is really aerobatic."

### Conclusions

Overall impressions of the Waco are that it is a really pleasing model to build and fly and is certainly a very attractive design. Only in a few areas does the general standard drop and these few points could easily be rectified with a small amount of effort by the manufacturer (and a slight cost increase). However when seeing the Waco flying one quickly forgets the small constructional problems encountered and sees the model for what it is, a really good flying scale model aeroplane.

### British supplier

Henry J. Nicholls & Son Ltd, 308, Holloway Rd, London, N.7. Price £44.95

Below left: engine bay, Semco 'Pitts Special' muffler fits neatly inside cowl. Motor is Fox Eagle .60, with prop. shaft extension. Below: the test pilot was very impressed by the model's flying performance, seen here on a low, slow flypast.

