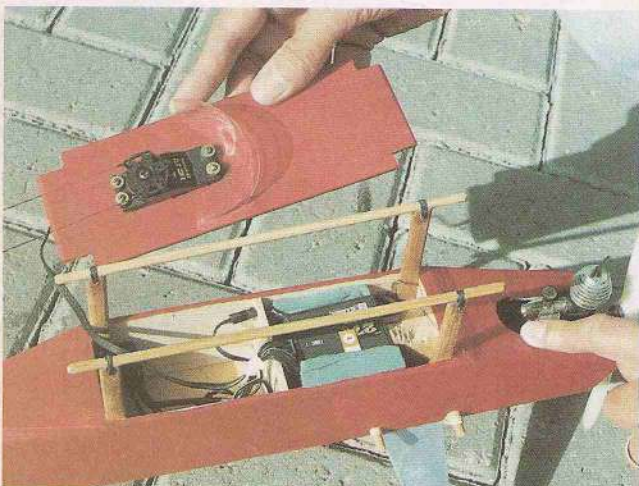


BIMBO



Cheap and very cheerful - that's Vic Smeed's friendly first-timer



Years ago most people learning to fly radio started off with rudder-only control and became proficient in such matters as attitude recognition, control application/heading and other such aspects before moving on to rudder/throttle of rudder/elevator, working their way towards full control. Often the first models were converted free-flight designs and control was a matter of interfering with the flight, letting things go for the model's inherent stability to restore it to normal flight if things went wrong. The main snag with this approach is that inherently stable models can lock into a spiral dive; opposite rudder will straighten the dive but the result is usually a zoom followed by a stall... Despite cavortings of this nature, rudder-only is still a useful first stage for modellers

who do not have the opportunity of training in a club scheme. A powered glider of relatively light wing-loading is undoubtedly best, since its flight will be slow and its reactions thus give more time for recognition and correction; very small power models tend to fly fast and flick at the slightest touch of control.

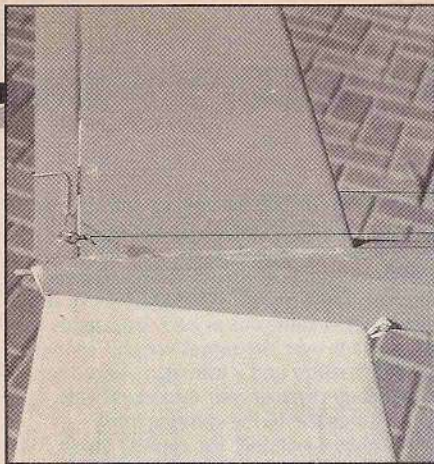
However, a lot of modellers trying radio for the first time run into trouble before they get to the flying field, in trying to install the radio equipment in an efficient manner. Those neatly tucked-in compact installations in slimline fuselages look superb, but they are simply not as easy as they look, and to a beginner connecting up a pushrod to provide free and frictionless movement is not quite as straightforward as it may seem when space is limited or the servo is sited two or three inches below the

'Bimbo' couldn't be more basic. It's just the sort of lightweight you should be able to teach yourself to fly on, given calm conditions.

access hatch.

General advice for a trainer model is to build reasonably large and have plenty of power. However, this is not always convenient or attractive - a great many power modellers prefer a small diesel in a moderate-size model, for reasons of familiarity, flying space and overall economy. Small models can produce cramped installations as well as comparatively high airspeeds; the challenge is therefore to produce an economical model using a smallish diesel, say 1cc, with good radio accessibility and modest flying speed which is also sufficiently well-behaved to

Your Full-Size FIRST R/C PLAN



Closed-loop rudder set-up.

allow flying hands-off for long periods and even to recover from many awkward positions if left to settle.

A logical approach would seem to be to have what is, in effect, a shallow box to contain the radio, with engine, wing and tail assembly attached. An external linkage for the rudder would avoid many problems; in the very early days of radio some models used a closed-looped system by mounting a clockwork escapement just behind the wing, sticking out of the top of the fuselage and connected to the rudder by two cords. It didn't look elegant but it was easy to set up and totally trouble-free; a modern application of the idea would produce two of the basic characteristics sought.

If we allow a generous 8oz for radio and can build a strong airframe for, say, 12ozs including engine a total flying weight of 20ozs is a realistic aim. To keep flying speed reasonable we should not exceed 10-12ozs per sq.ft wing loading so something between 240 and 288sq.ins should do. A low aspect ratio of 5-6 would keep things compact and allow a good strength/weight relationship. The formula for determining aspect ratio is span squared divided by area, so we can turn this round to $S^2 = \text{area} \times \text{AR}$, ie $S^2 = 260 \times 5$ (or 6), ie 1300 or 1560. By coincidence the former gives a span of near enough 1 yard and the latter 1 metre! Since a 36in wing allows use of stock lengths and no waste it is obviously economical to pick this, and we can round the chord off to 7in, which with square tips gives 252sq.ins, within our target.

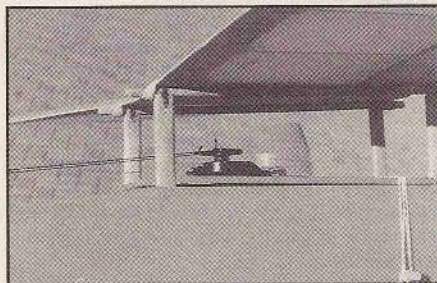
One of the hazards of rudder-only flying is the aforementioned locking into a spiral dive, and it has been shown that models with lifting section tails and rearward c.g.s are more prone to this. Any tail will lift in some circumstances, of course, but lift is likely to increase with speed with a 'thinned Clark Y' tailplane to a much greater extent than with a symmetrical section.

A flat plate is as good as any in this instance, especially as we can use sheet balsa, but to give a fairly powerful and quick response it can be made generous in area, about 30% of wing area, or in a round figure 75sq.ins, on an average sort of moment.

A high wing model provides more inherent stability and allows less dihedral with resulting improved rudder-only turns, but a shallow fuselage for easy radio access conflicts. The solution chosen is a parasol wing with simple vertical struts carrying runners, with a 'lid' fitting between the struts covering the radio area. The rudder servo is, in fact, mounted on this lid to enable the external closed loop linkage to be easily connected, and the linen threads (or

braided synthetic fishing lines) forming the closed loop are quickly detachable from the rudder horn by fitting two jewellers' bolt rings - those little gadgets with a sprung curved stem closing the ring, operated by the thumb-nail, used on necklaces and bracelets.

This is an adaptation of the clever use of one of these rings for disconnecting a freeflight DT line shown to us by Mik Mikkelson, one of the American SAM visitors in 1985/6. The advantage of the bolt ring is that it clips and unclips without significantly varying the length, whereas a hook, or a fishing or jewellery toggle, requires fore and aft movement to engage or



Wing supports and exposed rudder servo.

disengage. Bolt-rings can be found on bracelets and necklaces picked up for pennies at jumble sales and charity shops, incidentally.

The fuselage is basically a long thin tray formed by a deep section crutch with sheeted bottom, built a little higher into a box under the wing and the box faired with a light top structure. The motor plate glues to the crutch and the fin and tailplane are mounted on it, as is the undercarriage, if fitted. For freeflight use the crutch could be slightly softer, lighter balsa and it does not need to be sheeted underneath except at the nose, say back to B2. Use very light sheet for the tail surfaces if no undercarriage is to be fitted or you may need to bolt a little ballast under the engine. Also for free-flight use only one third of the rudder shown, attaching it to the fin with a couple of lengths cut off one of those paper-covered wire ties used on polythene food bags. The remaining rudder area shown should be left as part of the fin.

Even for radio flying the undercarriage



And there you have it! 21 ounces of forgiving first-timer all set to help you through those frightening first flights.

can be omitted. This may mean sliding the battery fully forward or adding a little weight in the nose, but since possible engines vary by 1.1/2ozs or so, some adjustment to produce a balance point close to that shown is likely to be needed. Leaving off the u/c can increase the chances of the initial landing shock being taken by the prop, so a relatively 'soft' plastic prop is desirable, both to cut down on breakages and to reduce the possibility of a bent crankshaft.

Construction

The wing is entirely conventional and needs no comment other than to point out the use of double ribs at the tips to strengthen them against tissue shrinkage and wing tip landings. The tailplane is simply sheet, butt joined and sanded to a fairly basic section; it needs to be light but it is possible to find light, softish balsa which has some strength as opposed to some soft stock which is pithy or brittle.

The same wood can be used for the fin and rudder, with thread, silk or plastic sheet hinges. If plastic sheet is used two small rectangles will be enough, glued in slits worked centrally in the balsa and retained with cut-off pins or stubs of cocktail stick glued into holes drilled through balsa and plastic. Whatever hinge form is used, ensure that movement is free up to about 45 degrees each side. Use 20g piano wire or a straightened paper clip to form the double horn if the control system is followed; make sure that the side loops are equally spaced and that their span slightly exceeds the diameter of the servo output disc. Sew and cement the horn in place.

The fuselage crutch is built over the plan and has a cross-member at every point indicated by an arrow on the plan. Where there is increased depth, bulkheads are cemented to the tops of the crossmembers and the box sides are added, followed by the vertical cabane struts. Cut these accurately

to length and groove the top ends with a round file before cementing securely in their corners. The Y-shaped spine can be added, using strips cut from 1/8in sheet, and the 1/8in ply motor plate can be cut to suit the motor and glued to the top of the crutch, followed by the triangular side-pieces.

It would be possible to incorporate a fixed (or even plug-in) single wire undercarriage, if preferred, at this stage, by facing the first crutch cross-piece with 1/16in ply and sewing the wire to this (or adding a box) before sheeting the bottom. The bottom sheeting should be 1/16in ply back to B2, thoroughly glued, with cross-grain 1/16in balsa back from B2, for radio. For free flight use 1/16in balsa back to B2 and feather the rear edge down to avoid too noticeable a stop when tissue or film covering is applied.

Mark and drill for the engine bolts, slide the bolts through and epoxy the heads under the plate, then fill in the front crosspiece, filing a clearance for the crankshaft bearing, after first brushing the space beneath the motor plate with fuel-proofer. Complete tank details, if a separate tank is to be used, then fuel-proof the engine bay and cover the top with hard 1/16in balsa to suit engine and access requirements.

The cabane runners were 3/16in diameter bamboo (garden cane) on the original, but 3/16in dowel could be used. A small hole drilled 1/4in or so down each strut enables a few turns of thread to be sewn round the joints. Dowels will also be needed through

the fuselage, near the bottom, for a knock-off undercarriage and one of these dowels is also used to anchor a rubber band holding the lid on the box. Smaller dowels are needed at the tail end to secure the tailplane; the fin is cemented to the spine and scraps of 1/8in sheet used to fill the gaps between spine and crutch in the fin region. The box lid on the original is a piece of lightweight 1/8in gaboon ply but a lamination of 1/32in ply and 1/16in balsa would be stiff enough. For free flight the top of the box can of course simply be sheeted with 1/16in balsa.

Lightweight modelspan was used for the wing and tailplane of the model photographed, and heavyweight would be suitable on the fuselage, although we used iron-on fabric. A narrow strip of thin acetate was glued across the fuselage top at B1, to deflect any exhaust oil away from the join of the box lid, and a curved windscreen, actually cut from the bubble packaging of paper fairy cake cases, was glued ahead of the servo so that the projecting top of the servo body, disc, etc., were also protected from oily deposits.

The servo simply mounts on its grommets in a cut-out in the box lid and the battery and receiver pack in foam rubber between B1 and B2; a notch is needed in B2 for the servo lead. Drill a hole in the box side just aft of B1 to pass the receiver aerial, which should be tucked through the tailplane mounting bands to reduce the amount dangling free. The switch is mounted close

to B3, near the box bottom, on the port side, where it is easy to see in a right-hand launch.

With a standard Sanwa GC2200 two-function radio using just the one servo the total weight came out at 21.1/2ozs ready to fly, a shade over the target weight. Using a smaller battery and a miniature servo could easily chop three or four ounces off this, but as it stands the flying speed is quite acceptable – certainly the slowest small R/C model we have seen – and control is positive. Only small amounts of stick-movement, or a series of gentle nudges, will provide sufficient directional control to steer round a small field on a calm evening.

The early problems with the original were that the Y-spine was cut from too soft a sheet and was cracked when a well-intentioned passer-by picked up the model; this didn't really weaken the structure to any extent but put a crease in the Solarfilm which we keep intending to remedy... The other snag was that the particular Indian Mills .75 replica originally fitted has very low power, not enough to climb the model when the radio is installed. A change of engine cured this.

As a reasonably easy model with which to pick up some of the rudiments of R/C flying, as a small field fun flier or as a cheap and quickly built flier to occupy a younger member of the family, 'Bimbo' has much to offer. There can't be many cheaper ways to get into powered radio flying!



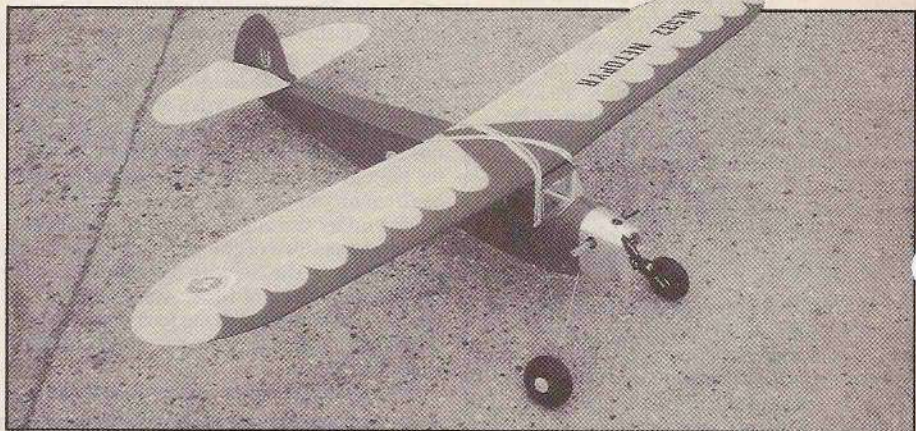
ON THE VINTAGE BEAT

Continued from page 49

Glenn has used a one-sided elevator, more successfully than my 'Porlock Puffin' he says. Two models I could not find owners for were a 'Bucks Duck' – a tricky subject to fly because of the nose down moment when the throttle is opened – and a superbly elegant gull-winged streamlined, PAW powered model which was a total mystery to me. Superbly finished and very pretty, can the owner enlighten me?

A pylon model made famous by Peter Russell was the 'Swayback', an enlarged version being brought from Sweden by Tomas Leijon. Built by his father, Gosta, it is decorated in an unusual green. One of the electric flyers, Jim Rose, has doubled up the Wally Simmons rubber model design 'Jabberwock', which looks very authentic with its folding propeller.

The pre-1963 Vintage aerobatics class has its devotees too, one of them being Mark Leriche, who was flying both a ST 60 powered 'Taurus' and the less well-known 'Altair' by Peter Waters. Another good weekend throughout although F/F was rather handicapped by the blustery wind, but C/L goes from strength to strength – the sight of no less than seven 'Yoicks' aerobatic biplanes performing really was a stirring sight.



Peter Miller's rendering of 'Netopyr' from the Czechoslovakian drawing.

Czech vintage models

In the October issue, the last of these Czech plans was published. To follow up the story, I have now received a letter from Peter Miller, who was the original source of the drawings. Peter has built and flown the 'Netopyr' as shown in the April 1989 *Flashback*, and sent me photographs and some comments.

Construction is as per the plan, except for the use of 3/16in square (spruce or balsa not stated) for fuselage and main spar, other spars being 1/8in spruce. Tips have been laminated from balsa strip, as cane wasn't locally available. (I think he might have had problems with cane, my efforts at bending it just produced a charred mess!)

The cowl, originally beaten metal, is balsa and ply, covered in the new Fibrafilm chrome from Solarfilm. This material also comes in red, orange, and yellow at the moment, but as Peter had used his samples, 'Netopyr' is covered in blue and white Solartex. Power is by PAW 1.49 R/C and he is very impressed with the throttling, even without the recommended 4% iso-propyl-nitrate fuel content.

The all-moving tailplane is incorporated but proved a bit tricky to set up and rudder is extended down to the top longeron. All up weight comes out to 2lbs and the model is a dream to fly. It is intended to publish plans in **Radio Modeller** at a later date...

