

Junkers JU-88

By ROLAND BALTES . . . This outstanding C/L Scale model won the author a place on the U.S. Scale Team in 1978. Also adaptable to R/C.

• Although this model is primarily designed and was built for control line scale, the experienced R/C modeler could easily adapt the model to an R/C version. With a wingspan of 65 in. and area of 540 sq. in., two .19 to .30's should be ample. My control line model with two S.T. .40's came out at a weight of 7-1/2 lbs. Only a small amount of weight was required in the engine nacelles to balance the model properly, since the Junkers with its long engine nacelles and good size tail surfaces has good features for model work. This has resulted in a very stable model that is really easy to fly.

The landing gear location is ideal without any noseover tendencies whatsoever. Retracts for this model, other than an overly simplified method for sport scale, would be a real challenge, since the prototype installation turned 90° to lie flat in the aft portion of the engine nacelles. To complicate matters, the large gear doors closed again after the wheels extended. Another complexity of the model is the large amount of window area in nose and canopy. While some may take the chicken way out by painting these on, others may opt for the simpler arrangements found on the nightfighter versions, for example. Only the die-hard scale types will find the will and the way to laboriously duplicate the real thing. Having the real airplane available made the canopy building and cockpit detailing somewhat easier, but still challenging and extremely rewarding. I also found in the museum files a set of German training slides (most of which I copied) that provided more info and details of various parts of the JU. Also in the files was a copy of the "Ersatzteil-Liste" or parts list for you non-German reading types, complete with illustrations.

By now the scale buffs should be drooling with envy, but as mentioned earlier, the lack of good 3-views put some damper on the project. Not even the museum could help. Sure, there is a variety of 3-views around, few even came close to being accurate, but not for the A-4/D-1 version. Again, having the real plane in front of me made it easy to find fault with the 3-views, and it also gave me the opportunity (or real need as a matter of fact) to measure the airplane. I finally settled on 3-views of a JU-88C-6 from the Japanese *Koku-Fan* magazine, which with supporting documentation was modified to provide a suitable presentation for judging. The 1977 Nats scale judges were sufficiently impressed to get me a spot on the scale team for the following year's World Championships in England.

Although my Junkers by now had been on the contest circuit for a couple of years, quite successfully by the way, it

was essentially mothballed, awaiting the trip to England. I even tried to build a new airplane in that hectic year, a DeHavilland Mosquito, in the hopes of better being able to represent the good ol' U.S. Got it about 99% done when we received word that the control line scale portion of the World Scale Champs was cancelled, due to lack of participation by other countries. This news was provided only three weeks prior to our departure for England! Too late to change travel plans, so with promises that some sort of control line scale event would be flown, we went anyway. To make a long story short, nothing ever materialized. My Junkers and the other two team members' models were only displayed, then packed and shipped back home. It's the only case on record where a Junkers 88 made a flight to England and back from the U.S., and it sort of "bombed out," eh!

While the above may somewhat digress from a pure construction article, it is offered in the hopes of kindling some interest in scale, whatever form that may take. I bet there are few modelers who never have had the urge to build a scale ship of some sort. While some will ultimately turn out museum quality ships, others will be quite content in slapping something together. Wherever you fit in, I suggest you try the Junkers and/or the various versions of it and participate in the rebirth of a miniature Luftwaffe. If that's not to your liking, just buy the plans anyway and help make this magazine rich.

While you are in the mood to buy things, I suggest you get yourself a plastic kit of the JU-88, which you don't really have to build, but which will surely come in handy to get an idea of the airplane's features and contours. Some are extremely hard to depict on drawings, such as the shape of the lower gun position, bulge underneath engine nacelles, and shape of the canopy. The Revell 1/72 plastic kit is one of the most accurate, but there are several other kits available which will do just as well. While at the hobby shop, pick up some of the reference material and decide which version and what markings to use. I'd hate to see a whole swarm of D-1's with the F 6 + A L markings at the next contest.

Earlier I made mention of a concession to transportability of the model. The thought about handling a 65 in. wingspan model in one piece did not appeal to me . . . besides, it wouldn't fit in the VW. I rejected the typical R/C method of removing the whole wing from the fuselage, since that would entail disconnecting the elevator pushrod, and besides, I wasn't too familiar with this approach. I elected for removing the outer wing panels outboard of

the flaps, which then retained the rest of the model as a unit. One bolt through the underside of the wing retains each panel. The method consists of a hardwood motor mount, permanently installed in each panel, that slips into a box-like structure in the inner wings. Dowels provide for wing alignment.

Now that I've touched on the construction of this thing, I will spare you the step-by-step details of what to cut and glue, since I suspect they are hardly ever followed anyway. Besides, a rank beginner should not be building this model without prior kit experience. I will also suggest that you not cut out all the parts first, which theoretically should yield a kit, but might quickly tire you of the whole project. Like many, I like to have instant results after starting a project, so in this case beginning with the fuselage is the way to go. Using 1/4-inch balsa fuselage sides and several formers, the basic fuselage outline comes quickly. Before adding the top fuselage block, build up the horizontal stabilizer first and mount to fuselage. Carve the top and sides to a somewhat rounded cross section, then run in to the Mrs. to show off your efforts. While still unrecognizable to her, it will reveal that you mean business. Another reason for starting the fuselage first is to allow you to get started putting in cockpit details. This seemingly endless task can become a hobby by itself. One of the better sources of information on what goes where is Squadron/Signal Publications Aircraft No. Sixteen, *Junkers Ju 88 in Action*. At \$3.95 it's quite a bargain, and is probably all you need for sport scale reference and documentation. Even has a good 3-view of a Ju-88A-14 bomber.

Build up and shape the fin next, then install on the fuselage. Elevator and rudder are shaped from 1/2-inch sheet balsa. By the way, I partially finish most components; that is, putting on the undercoat in preparation for final painting prior to installation. For example, the elevators and stabilizer can be sanded, sealed, and undercoated prior to hinging together.

Finishing off the bottom of the fuselage is sort of a sequencing problem which is best done as follows to minimize work or aggravation. It assumes you have the elevator installed and hinged to the stabilizer and a control horn on the elevators. Tack glue a balsa block aft of former 8 to bottom of fuselage sides and rough shape. Since the lower fuselage is not planked, make sure the block is slightly larger than the outline of former 8. Remove block and hollow out. The block will be final installed only after wing is mounted, since the elevator control rod will be fished through from the rear. Now bend the tail wheel strut from 1/8 music wire and install on former 8 with J-bolts or soft wire. Plank the lower part of fuselage with soft balsa strips from former F-2 to F-8. Ahead of F-2 use a small balsa block. Cut away the planking between formers F-4 and F-5 so that the wing can be installed.

By now your fuselage should look like a slick torpedo with fins. To fix that, it may be proper to work on some protrusions like the lower gun position, canopy, and nose windows. The results you hope to achieve or class of competition you have in mind will determine how you proceed. For fun or sport scale, carving the items out of block balsa or foam and then heat forming clear plastic over the parts may be the way to go. This is the way I made the lower gun position. Then just put tape where the windows are, paint the airplane, then remove the tape. Voila, almost instant windows. The canopy and nose on my model were built up with various thicknesses of plywood and styrene to make the frames, then covered with clear plastic, some pieces of which were heat formed. A lengthy process, obviously. By the way, I also made the canopy aft of former F-3 removable. This made building the canopy somewhat easier, plus allows access for detailing the cockpit. For the same reasons the nose window structure was made as a unit which then can be installed after the model is almost complete. If all of this sounds too complicated you may want to try some other versions of the JU-88, some of which didn't have the lower gun position, had a solid nose, and a simplified canopy.

Build the wing next. With these four words I wed thee to at least another six months of work. Nothing unique to the structure other than the removable panels which were described earlier. Although the plans show the 1/4-inch plywood front and rear spars in two pieces, it would be preferable to cut them out in one piece. Sure would aid in insuring proper wing and engine nacelle alignment. This is probably the most critical part of the project, so take your time. If you plan to use engines that require different motor mount spacing from that shown on the plans, make the necessary adjustments before cutting out the holes for the motor mounts in the nacelle formers. The engines to be used will also possibly affect the way the throttle cables are routed and the location of the tank. For engine compartment accessibility I made both the top hatch and front cowl removable. The latter from former 2 forward slides on and off from the motor mounts and is normally attached to them with two wood screws through former 1.

The bellcrank used can be either the Roberts or G & S units to provide for engine throttle control, which I think is essential for this type of model. How else could you get the pleasure of seeing your Junkers slowly accelerate for take-off as it lumbers down the runway, shoot touch-and-go landings, and taxi back from a mission? I know I'm way ahead of the construction sequence, but your mind does need to wander a little to keep you going.

The leadout wire is the flexible heavy-duty stuff sold by Perfect. I prefer it over the stiff music wire since it can be rolled up and out of the way during construc-

tion. They exit through aluminum tubing at about rib 6 underneath the wing. This is a good location, considering the amount of dihedral in the wing, which precludes running them through the removable outer wing panels. Once the basic wing structure is completed, it should be trial fitted to the fuselage. Final installation can be held off until essentially all wing work is done. I suggest that the landing gear installation be done very carefully and strong, since it is subjected to a lot of forward and lateral loads. I made mine so that it can be removed, having learned through experience that anything removable can be repaired easier. After planking the wing and engine nacelles, the wing can be finally installed to the fuselage. Accurate alignment is essential again, and so is a good glue joint. Use a slow drying epoxy. Don't forget to install the pushrod wire from the rear. Now plank over the lower fuselage where the wing was installed and add the tail fuselage block.

For final finishing I used an old technique which is still frequently used by many scale modelers, simply known as the "tissue and dope" method. Of course, for any type of good finish, the surface has to be properly prepared, meaning that all cracks, gouges, etc., have to be completely filled in. I use Aero-Gloss plastic balsa for this step. Progressively finer sandpaper is used to get the bare balsa to a very smooth feel. Several coats of thinned-down clear dope are then applied, slightly sanded to get the fuzz off, then two more coats of clear. While some modelers then apply what's known as Japanese tissue, primarily used when a lightweight finish is desired, I use a heavier material known as silkspan. This is applied wet with thinned-out dope. When dry, it usually looks like a mess, but things quickly get better after another couple of coats of clear and/or sanding sealer are applied. At this stage fine sandpaper is used between each coat. To find out how well you are doing, brush or spray on a coat of silver dope. The results may shock you. In that case, keep going with the clear or sanding sealer.

Duplicating the camouflage colors of WW-II ships is an art in itself that even the Air Museum has difficulty with. Their rendition of the JU-88 on display is far from being accurate, but probably good enough for the average museum goer. The two-tone green upper splinter scheme has a set or specified pattern for which I mixed up colors starting with the Aero-Gloss military flat olive drab. Flat black was added until I got the dark green (one of the colors), then more flat black was added to another bottle of olive drab to get the black green. Obviously, what you need to do is match whatever color reference source that you may be using. Since very few ever seem to match, good luck. For the lower surfaces, the aero blue flat by Aero-Gloss seem to be close enough. All markings were spray painted with an airbrush and stencils. The technique I use is to cut out the design with a sharp

X-acto knife from a plain piece of typing paper, then make the paper wet by placing it on water just briefly, then position it on the model. The wet stencil kind of clings to the surface sufficiently to allow airbrushing of the paint.

Now that you are finished admiring your project, the time comes to don the flying gear and head for your local aerodrome. Hopefully you have checked out the engines on a test stand sufficiently to know that they will start and idle reliably. Some engine check runs while installed in the model are OK. My procedure for starting engines for a flight is as follows. Fill up both tanks, then start the inboard (left) engine first. Get it adjusted both at high and idle rpm, then shut it down. Refill the tank. Start the right engine and adjust, then shut down. Refill the tank if it ran awhile. For flight, start the right engine first, then the left. Avoid twiddling the needle valve on one engine while the other is also running. By the way, I use the 3-bladed 10x6 Tornado props on my S.T. 40's and some old Hillcrest spinners. The first takeoff on my model was somewhat of a surprise, since I had expected it would take at least a lap to get off the ground. Ha! In less than a quarter of a lap it was airborne. Flight is steady and landings can be greased in.

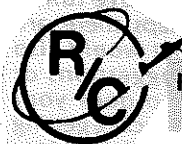
Hope yours provides the fun and satisfaction that I have experienced. Don't hesitate to write if you have questions or need help. My address is 1021 Bloomwood Rd., San Pedro, CA 90731.

JUNKERS JU-88 REFERENCES

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The Junkers sure looks realistic in flight... would be even better with retracts.



R/C MODEL BUILDER

#2802