

AICHI 99 VAL
 ma 349 CPG Wheldon 5/6
 LENGTH 28" SPAN 39"
 ENGINE 2.5-5cc
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AICHI 99 VAL

THE Aichi Navy 99 *Val* was first seen in action during the attack on Pearl Harbour on December 7th, 1941, and was thereafter used in large numbers by the Imperial Japanese Navy in most of the great battles of the Pacific including the Battle of Midway. *Val* was the Japanese counterpart of the *Dauntless* dive bomber which, at that time, was in use by the United States Navy. Aichi 99 *Val* 2s were powered by a Kinsei 44 14-cylinder motor of 1,060 h.p. and carried one 1,050 lb. bomb slung on a retractable crutch beneath the wing centre section. Two 7.7 mm. machine guns were mounted in the engine cowling and either one or two manually operated guns in the rear cockpit were operated by the second crew member.

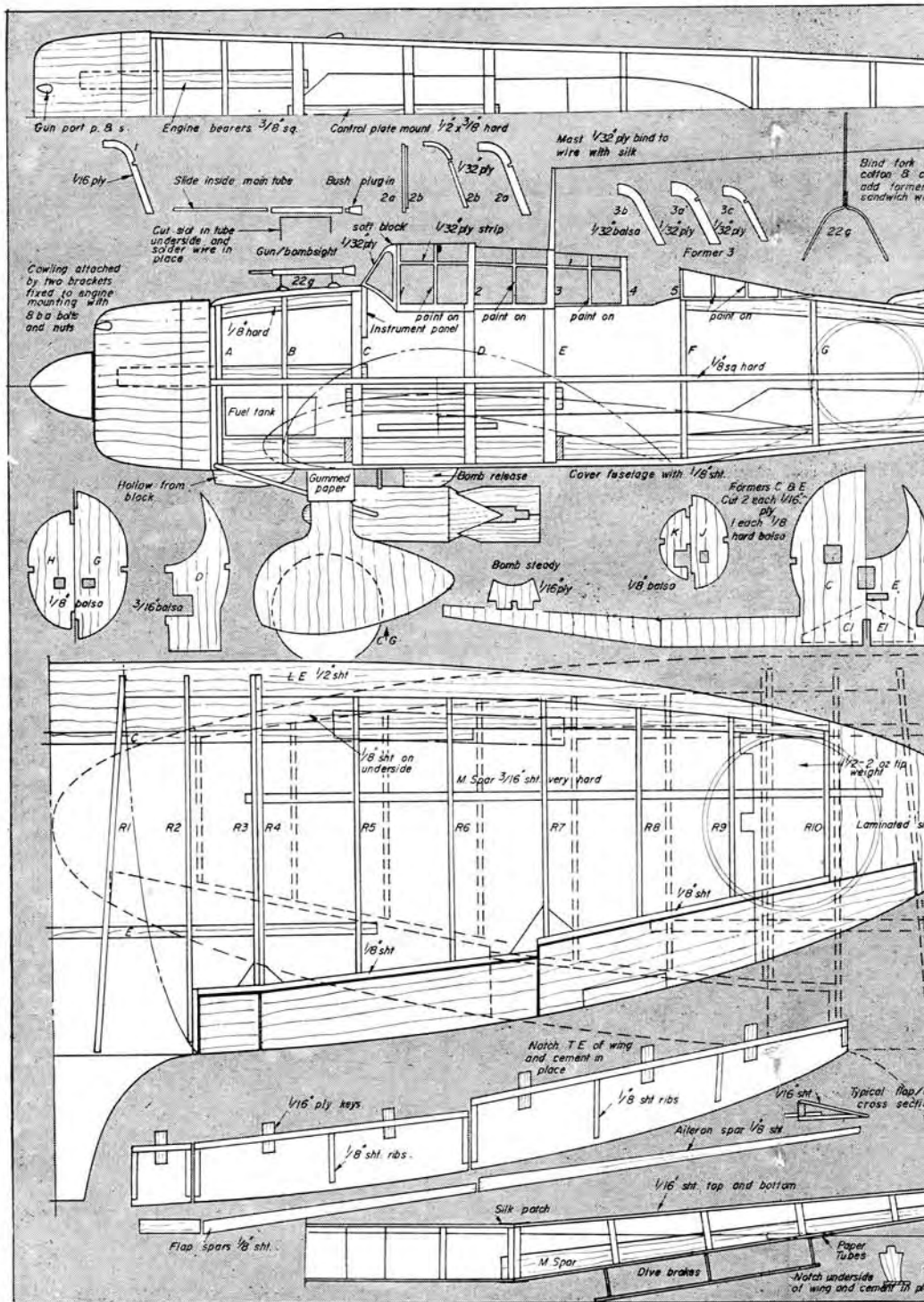
The Aichi 99 makes up into a very nice model, the fixed spatted undercarriage on a World War II warplane being a welcome change from the more usual storky "retractable" legs. The elliptical flying surfaces and long—typically Japanese—cockpit canopy, together with the authentic bomb release, make a model to be proud of. For the experienced the addition of motor control will enable realistic take-offs and landings to be accomplished.

Construction

The basic construction of the model is quite straightforward and, generally, follows normal practice. The motor control, however, and the bomb release gear, require a bit of "fiddling" with, and patience is needed to ensure successful operation. The construction falls into three main stages: (1) the completion of the fuselage, wing centre section, and tail unit; (2) the wing outer panels, and (3) the finish and final details. The notes that follow only cover general procedure and emphasise points that are considered to be of particular importance, it being assumed that the builder has previous experience.

Stage 1. Commence construction by cutting out the parts for formers (A), (C), (D), and (E) and bond together using "Bondfast" or similar adhesive. Set aside to dry and, meanwhile, cut out remaining formers, keel parts, engine bearers, etc. Pin lower keel to

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plan and cement parts together. Mark position of formers on lower keel, and cut two "jigs" from scrap sheet to slot over wing centre section spars. Bend undercarriage wire to shape and bind to former (C) and wing centre section spars (linen thread was used here).

Assemble all parts "dry," slipping jigs over centre section spars to hold formers (C) and (D) in correct alignment. If satisfied that everything "fits," assembly may be commenced. Cement formers (C) and (D) in position on keel, followed by (B). Cement engine bearers and control plate in place. Add former (E) and hold in position with the two jig pieces. Slip fuel tank in place and cement former (A). Set aside to dry.

(At this stage the motor control and/or bomb release mechanism, the construction of which is described later, should be fitted together with control plate, push-pull rod, and lead out wires. Detail drawings on plan show motor control and bomb release gear which should be built up by trial and error. The drawings show the layout adopted on the prototype but individual requirements will vary.)

Cement remaining formers in place followed by the $\frac{1}{8}$ in. sq. hard side longerons. Fabricate tailplane and elevator and cement to keel. Hook up push-pull rod. Laminate fin from two pieces of $\frac{1}{8}$ in. sheet and cement in position. The model may now be planked with $\frac{1}{8}$ in. medium sheet. [Note: do not plank bottom of fuselage between (C) and (E)—this is covered in $\frac{1}{16}$ in. sheet when sheeting bottom of wing centre section.] Bend tailwheel fork to shape, bind with thread, and cement in position. Roughly carve the tail fairing blocks to shape and cement in place.

The fuselage should now be given a thorough sanding and all cracks and bumps filled with a mixture of cement and balsa dust or talcum powder and dope "putty." Fillet fin/fuselage, tailplane/fuselage joints with silk patches using plenty of cement. Ensure that the patches also cover the block tail fairing/fuselage joints. Give the whole assembly one coat of dope and set aside to dry.

Cut out wing ribs (R1), (R2), and (R3), cement in place on the centre section spars and thread lead out wires through the three port ribs. It is most important at this stage to check that the elevator control linkage and motor control/bomb release mechanism work quite freely as this is the last time they will be seen. A drop of oil on all pivots, etc., will help.

Cut the wing centre section leading edges and cement in place—butt jointing to fuselage sides. Carve and sand leading edge to follow top contour of ribs (bottom surface should be perfectly flat at this point). Cover bottom of both port and starboard panels with $\frac{1}{16}$ in. sheet. These panels meet between formers (C) and (E) on the fuselage centre line. Now cover top surface of wing centre section. The leading edges (top and bottom) are carved to section and all wing/fuselage joints are covered with silk patches well cemented on.

The wing fillets can now be fitted—forward of former (C) they are carved from very soft block, and aft of this point are built up from $1/32$ in. sheet. After cutting to shape the sheet is silked on the outside surface and both surfaces well soaked with cement.

Below: the bomb is in the retracted position while, right, it has swung forward to release.

While all cement is still wet and sticky, fillet is firmly pressed into position.

At this point the fuselage, tail unit and most of the wing centre section can be covered in lightweight Modelspan and given one further coat of clear dope. This helps to harden the structure and prevents—or minimises—accidental damage during the remainder of the construction.

Stage 2. Cut out all wing ribs (R4) to (R10) from $\frac{1}{8}$ in. sheet, the bottom leading edge ($\frac{1}{8}$ in. sheet), and the leading edge itself ($\frac{1}{2}$ in. sheet). Also at this time cut out flap and aileron spars and mainspar—the latter from $\frac{3}{16}$ in. hard sheet. Assemble "dry" holding here and there with pins, and mate up with wing centre section. If all "fits," assembly may be commenced by cementing (R4), (R5), and (R6) to centre section spars. When dry, cement mainspar in place. Cement bottom leading edge sheet ($\frac{1}{8}$ in.) to (R4), (R5), and (R6) followed by the flap spars. Allow to dry, and then cement remaining ribs in place followed by aileron spars and leading edge ($\frac{1}{2}$ in.). Sheet under-surface of wing with $\frac{1}{16}$ in. sheet.

Add lead ballast to the starboard tip and the line guide to the port tip. Cement paper tubes through under-





sheeting for lead out wires to pass through. Carve leading edge to conform with top contours of ribs, cover top surface of wing with $\frac{1}{16}$ in. sheet and add sheet wing tips. Carve leading edge to shape and sand completed wing thoroughly. Reinforce wing centre section/wing outer panel joints (top and bottom) with silk. Give completed wing one coat of clear dope, fill up any cracks, etc., as for fuselage, and cover in lightweight Modelspan.

Stage 3. Cut out all cockpit canopy formers and laminate as necessary. Special attention should be paid to (3) which incorporates the radio mast. Notch fuselage at appropriate points (slots about $\frac{1}{8}$ in. deep) and cement formers in position. Complete canopy framework with ply and soft block as indicated on plan. Paint interior of cockpits and canopy formers pale matt grey. Carefully cover with acetate sheet in sections—remember that the canopy is a distinctive feature of this model and, as such, no pains should be spared to ensure a perfect job. Canopy framework is simulated by doping on thin strips of writing paper. Be careful here as a slip with the brush could ruin the job.

Construct the cowling on its jig. Use P.V.A. adhesive throughout—and plenty of it. Cut out lower portion to suit motor. Cover in silk. Note that the $\frac{1}{32}$ in. ply "gills" should not be fitted until cowling is finished. The cowling is held in position on the model by means of two small brass brackets. These are fitted under the engine mounting bolts and the cowling is fastened to them by means of two 8 B.A. nuts and bolts—one on each side.

Construct wing flaps and ailerons. Cut slots in wing flap and aileron spars to take the $\frac{1}{8}$ in. ply keys. Check for fit and then remove until model is completely finished. Cover in lightweight Modelspan.

Build up dive brakes and slot under-surface of wing to take the small keys on the dive brake support brackets. Check for fit and then remove until model is finished.

Motor Control and Bomb Release Mechanism

The original model was powered by a Veco 19 which incorporated a simple

rotary exhaust throttle, operated by means of an aluminium lever at the rear of the motor. The lever was split down its length to enable a crank to engage. The following system was designed with the view of simulating an authentic "operational" flight—taxi, a scale type take-off at *slightly* below full throttle, cruising (to the "target"), full throttle (combat boost) for the "attack" coming in from a shallow(?) wing over, full up-elevator over target—releasing bomb, and back to "base" for a controlled landing. A "safety" device is incorporated which prevents the bomb being released during "taxiing," and at low throttle openings.

The brass lever, safety lock, and main control operating lever must be "tailored" to permit correct operation. The tension of the two return springs must also be arrived at by trial and error.

Sequence of operation. Spring tension holds motor throttle in the fully closed position (slow running). Spring tension holds bomb release catch fully forward against a small hardwood stop, and in this position "safety bar" passes behind catch thus preventing it opening.

Assuming motor is "slow running," power is increased by pulling third line which, through the linkage, will rotate crank, thus opening exhaust throttle. At the same time "safety bar" is pulled slowly clear of bomb release trigger until, at full throttle, trigger is free to be pushed forward by brass lever on full "up" being applied. As tension on third line is released, spring will pull motor control crank vertically so closing throttle. Safety bar will then be pushed back behind bomb release trigger.

Two points require to be noted: (a) motor "slow runs" with *slack* third line, and (b) it is important that the length of the "safety bar" be adjusted so that at full throttle it *only* just clears "trigger."

Finishing

The model is finished in the following colour scheme. Upper surfaces and spats—dark forest green. All under-surfaces pale blue/grey. The national

insignia is, of course, red surrounded by a thin white line. Flashes on spats are red. The identification number on the fin is in white. The surface of the model, cowling, flaps, spats, etc., may be prepared by any of the well-known methods (talcum powder/dope filler was used on original), and when satisfied with basic finish (and not before) the whole model is painted with a "priming" coat of medium grey dope. This should be worked at until a good finish is obtained. When satisfied, final colour may be applied—upwards of four THIN coats being necessary. Rub down each coat with very fine wet or dry paper until a perfect finish is obtained, while the final coat should be "brought up" with metal polish. A bit of patience and hard work here is well rewarded in the end.

The flaps, ailerons, and dive brakes may now be cemented in position. The spats—which *should not have received any colour dope yet*—should be "split" and the halves cemented together round the wire undercarriage legs. The joints should be well smoothed down and "filled" before colour is applied. Here again, make a good job of these spats as they are a distinctive feature of the model.

The national insignia should now be applied (note that the red discs on the undersides of the wings are NOT outlined in white). A small tool was made up and used to cut rings from "Contact" for use as masks. The red discs are painted first and the mask removed. When *perfectly dry* (overnight) mask off with a "Contact" disc (centre of ring used to mask off red disc) and the mask for the white line is pressed into place. When dope is dry remove both masks.

Check over all paintwork for "faults" and details. If satisfied, fuel proof model, paying particular attention to the inside of the engine cowling and the areas around the motor.

Mount motor and check balance point of model. It should be near to that shown on the plan. Remember that the further aft the balance point is, the more sensitive the model is. Fly over a *smooth* surface on 40-50 ft. lines, and the best of luck. (Don't fly from the local pasture—the model isn't designed for it!)