One of the most distinctive shapes belonged to the Martin B-10 of the 1930s. Airplane served in 25 pre-war squadrons, finally saw action with Dutch Air Force.

Scanning By Hlsat

An unusual subject for CL scale, this pre World War II aircraft was a stepping stone to the bombers that won that conflict.

by Dick Hall

MARTIN B-10

MARTIN B-10
TYPE: CL Scale
WINGSPAN: 52 7/8 inches
WING AREA: 382 square inches
LENGTH: 33 7/16 inches
ENGINES: two .35s

• Born in the Depression years of the early 1930s and plagued with numerous initial developmental "teething" problems, the B-10 was off to a questionable existence. This could be said of other aircraft that also went on to become great planes, but the combined efforts of the Army Air Corps and Glenn L. Martin resulted in the Martin winning the Collier Trophy in 1933. The B-10 was a "between the wars" craft, serving in more than 25 squadrons. After a reasonable service life as a bomber, it went on to duties such as target tug, reconnaissance, and squadron taxi with pursuit and observation units. A memorable aircraft "for its day," the B-10 was referred to as the first "modern day" bomber. It did see some action with the Dutch in the Netherlands East Indies against the Japanese during the early part of World War II. Its greatest contribution may have been to prepare pilots and crews for the events that were to occur after December 7, 1941.

Thanks to the Air Force Reserve, Air National Guard, and U.S. Air Force, an example of the B-10 was restored and now resides at the USAF Museum near Dayton, Ohio. Prior to the discovery of this plane in Argentina, no B-10s were known to still exist.

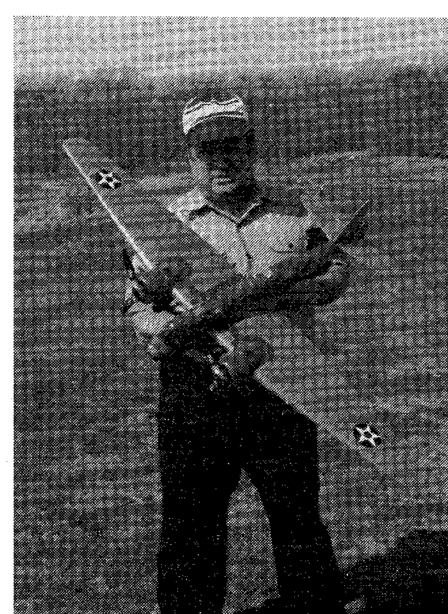
The full-size B-10 had a span of 70'6" and a length of 44'8½". The gross weight (B-10B) was 14,887 lb and the empty weight was 9,681 lb. Two Wright Cyclones, type SGR-1820G9, of 700 hp each pulled the B-10 to a high speed of 238 mph at an altitude of 11,900 ft. Cruising speed was 196 mph. Service ceiling was 25,000 ft. Defensive weapons consisted of three .30 caliber Browning machine guns: one in the forward turret, one in the rear cockpit, and one in the ventral (tunnel) position. Bomb load was 2,000 lb, carried internally. An additional set of flight controls was located in the rear cockpit, but this was really only an emergency station because the engine instruments were not duplicated in the rear panel. As a matter of fact, the engine instruments were mounted directly on each engine nacelle and could only be observed by the pilot (up forward) looking left or right toward a nacelle panel.

I first became acquainted with the B-10 in the late 1930s when it appeared at the local airport. A speedy bike trip to the field and a little luck, such as an aircrew of kid-loving soldiers, were the prerequisites to fulfill my boyhood wish—a talk with airmen who flew the popular bomber of that time. The exact words exchanged during my interrogation must have been "small talk" or "hangar flying." But I was an aviation buff, and the B-10 was high on my list of favorite aircraft. It has remained so, even after viewing the aftermath of a fatal crash.

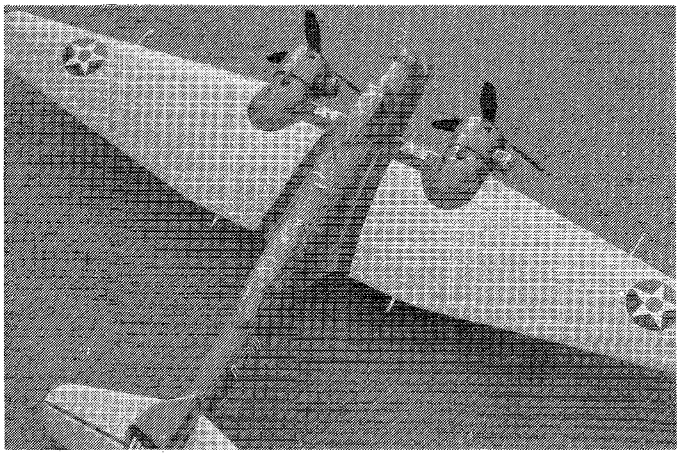
THE MODEL. Three-view drawings and photographs of the plane were received from the Martin Company in 1958, but the planning stage didn't begin until 1975 and the model was finally completed in 1979. During this "stretch-out" period, certain ideas and procedures had time to be developed:

(1) The canopies and turret were vacuum-formed over wood forms.

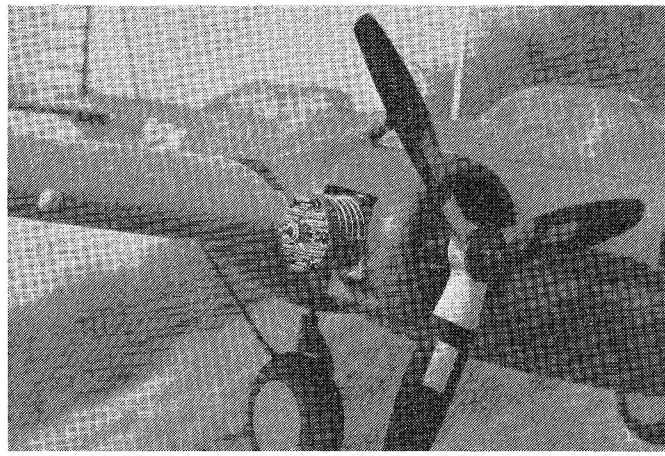
(2) A pressure-sensitive "Bootstripe Tape" (for boats) was used to make the canopy, turret, and window frame simulations.



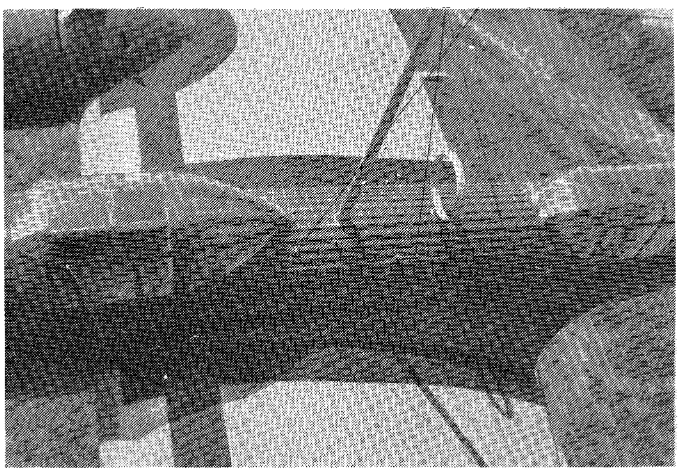
Author proudly displays his Martin B-10. Airplane makes a different scale project.



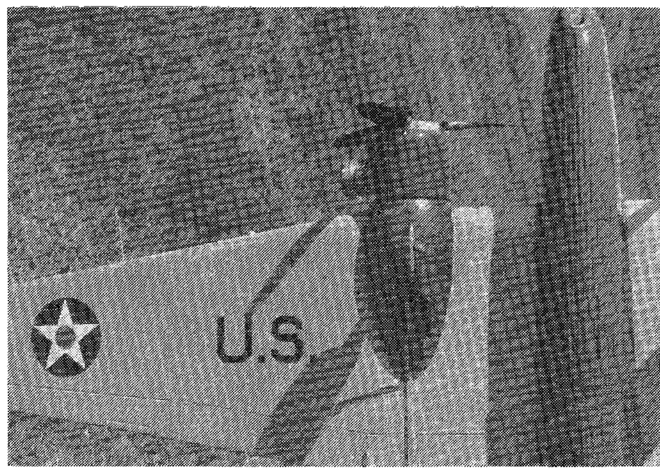
Close placement of engine nacelles is an asset to a twin model airplane. Two Fox 35s provide plenty of urge to the ship.



Nacelle cowls are built up of balsa and plywood. Tornado 9x7 three-bladed props proved a satisfactory airscrew.



Interesting fuselage top details; canopies and gun positions are vacuum-formed and not at all difficult to duplicate.



Numerals are painted but MonoKote trim sheets would also do a satisfactory job; aileron/flap detail scribed into wing.

(3) Standard purchased wheels were modified to scale size and appearance.

These specialized items should not deter the builder, as other substitutions may be made with equal, or possibly better, results.

The fuselage has standard construction—keel, former and planking. The wing design incorporates two, thick plywood spars that extend beyond each nacelle to insure strength.

The most important general tip that I can suggest before you start construction is that you keep the tail light. Avoid having to add nose trim weight. Nose weights may be necessary for gliders and biplanes with short nose moment arms, but many planes just don't need added weight if designed and built with this consideration in mind.

Wing construction. Because the wing must be completed before the fuselage is completed, we might as well work on the wing first. It has a flat bottom, which makes the job easy. Needless to say, you have to cut out the ribs, spars, and tip pieces. You probably won't be able to obtain the plywood spar material from your local hobby shop because of the spar's length. (I used plywood from an old bureau drawer bottom.) If you can't get suitable lengths of 1/4" plywood, then you may have to resort to 1/8" pieces laminated using epoxy cement. The plans show laminated leading and trailing edges, but solid one-piece construction will simplify the job. The wing is made in three panels: the center, which extends beyond the nacelles to the dihedral break, and the two outer panels. Make the center section first by laying down the center-section leading edge, bottom skin (3/32" sheet), spars, ribs, and trailing edge—in that order. The top skin is added later, after the fuel tanks and controls have been installed. Note that the fuel tanks have a tight fit between the ribs, leading edge, and front spar. Some cutting and fitting will have to be done later to jockey the tanks into position.

After suitable drying time, the center section may be lifted from the workbench. Now it's time for the left wing panel. Pin down the leading edge, bottom skin, and auxiliary leading edge pieces in order. The auxiliary leading edge piece (1/4" x 1/2") is located on top of the bottom skin. The center section is now butt-joined to the outer panel with the spar projections overlapping flat onto the outer panel's bottom skin. This establishes the proper dihedral. Add the outer panel ribs, trailing edge, and wing tip. The top skin will be added after the control leads have been put in place.

After the glue has dried, this entire assembly is removed from the work surface. We can proceed with the right panel just as we did with the left panel. The right one is built around the spar projections as was done previously. Don't forget that the center section and left wing portion should be blocked up to relieve stresses on the spar projections as they are mated to the right panel. The right wing top skin may now be added.

The wing assembly is removed from the workbench after plenty of time for glue drying. The left fuel tank must be low enough to clear the leadouts. Don't worry about trimming away some of the leading edge or bottom skin if necessary. The nacelles cover the bottom projection of the tanks below the wing. The engine fuel lines, which go through the leading edge, should be put on the tanks before the tanks are mounted. Check tank clearance with the area where the engine beams will be located. The fuel tanks can be put in place at this time.

Install bellcrank mounting base, control lead guides, control leads, bellcrank and elevator pushrod. The control line guides that I used were plastic tubes securely fastened by blocking and gluing. A control problem exists if a leadout slices and snags a rib during flight. The entire remaining open wing top can be covered.

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Fuselage. The keel is assembled on the side view using 1/4" sheet pieces K1 through K6 and 1/4" square strips. The top 1/4" square pieces run through the cockpit areas and are cut out later. The vertical 1/4" square piece forward of F13 can be removed later for pushrod clearance. The center stringer under the wing is pinned down, and the 1/4" vertical temporary tie piece, located between F8 and F9, is glued in place. This temporary piece offers strength during fuselage construction. Left halves of formers 1 through 14 should be glued and pinned to the keel parts being assembled. Formers 4A, 5A, 7A and 8A will be added after the wing is in place. Now add the stringer located under the wing that runs from former F2 to F9. Note that this stringer does not require bending; therefore the keel will not be distorted.

After the left side has dried, lift from the board and add right side formers F1 through F8. Add right side stringer under the wing. Insert the wing into the fuselage from the right side and position the elevator pushrod along the fuselage. Add the right halves of formers F9 through F14. Some of F9 must be trimmed to clear the pushrod. Add formers F0, F3A, F4A, F5A and F9A, and both left and right sides of F7A and F8A. Note that a slot must be made in the top wing skin to clear F4A. Add the rear cockpit stringers that run from F8A to F10. We will have to divert our attention to some of the tail parts before we do any more work on the fuselage.

Form tail wheel wire, mount on plywood base, then glue assembly to bottom keel. Mount tail wheel.

Construct the horizontal stabilizer and elevator assembly with its hinges and control horn. Part of the horizontal stabilizer becomes part of the tail cone, and it must be trimmed to clear the elevator horn and former F14. Add a piece of planking to each side of the fuselage to act as a seat for the stabilizer. Temporarily cut away the fuselage top keel piece aft of former 13 and then mount horizontal tail section in the fuselage, at the same time, connecting the elevator pushrod to the horn. Trim and replace the top keel piece. Check controls for freedom of movement. Add pushrod guides at various formers to suit. Now we'll go back to the fuselage.

Mount the horizontal 1/4" sheet and 1/8" sheet nose turret base parts located forward of F2. Plank the fuselage, including those areas over the cockpits. Note that the planking overhangs forward of former F2 to the nose turret. Let this planking extend about 1/2" forward of the line shown on the side view. Trim this planking back later—after trial-fitting with the turret. Add nose block. Hollow and trim tail cone pieces to clear controls, then glue cone in place. Check controls for freedom of movement. After glue has dried, pull all construction pins and sand body to a smooth finish. Repair any "divots" or planking irregularities. Cut cockpit openings, and side and bottom window openings. Add wing fillets. If this is a chore for you, try experimenting with heavy paper templates. After developing a suitable fillet shape, use the templates to make fillets from 1/32" sheet balsa backed with notebook paper for bending strength. A balsa or similar putty compound is used to finish the job.

Nacelles. Locate the firewall and motor mounts at the proper position on the wing. Lower mount is flush with the wing bottom; upper mount is notched into wing top surface. Make necessary extentions on fuel tank fill and drain lines. Add plywood landing gear mount and fasten wire gear in place. One end of the wire terminates in a "socket" hole drilled in the motor mount. One J-bolt and the nacelle blocking secures the gear in place. Complete the nacelles by building up with blocks, then form to the contours shown.

Cowls. If you can't obtain a pair of nice aluminum cowls, then use the idea proposed on the plans—turned balsa with plywood stiffener rings. This, of course, means that you will have to have access to a motor-driven arbor or similar device. To accomplish this task, rough-cut and glue together pieces N1 through N4. The inside cutout of N4 is not made until later. Drill a mounting hole of suitable size through the center of N4 and mount the cowl on an arbor shaft. Turn down the outside and inside to the contours shown. Do the final finish-sanding while the cowl is still on the arbor. Remove from arbor, then cut N4 and the portion to clear the motor and its exhaust. Drill three holes in N4 for mounting cowl to firewall. Access to the mounting screws is a bit tricky but worth the trouble for appearance. Drill the engine mount bolt holes; trial-mount the engine and cowl. Locate and drill the needle-valve access hole through the cowl. Slot the needle-valve end for adjustment with screwdriver.

Vertical tail. Build up the fin and rudder using the hollow core technique to achieve light assemblies. Shape parts and join to fuselage with a few hardwood dowels to insure joint strength. Add fillets at the fuselage and tail section joints.

Landing gear. Now that the main gear is in place, all that remains to be done is the mounting of the wheels and the details. Don't neglect the details, as these contribute a great deal to the scale appearance. The information is shown on the plans, but it should be noted that the landing gear strut (the retraction strut on the real plane) is a dummy. It is not expected to absorb any landing shock loads.

The wheels called for on the plans are perfect—with a little modification to scale size. I found that an even added feature is that they could be adjusted to various "rotational drag" values. This meant that the right wheel could be adjusted to provide a rolling drag to keep the plane toward the outside of the circle during its takeoff roll.

Canopies and turret. The fastest and least expensive method for this part of the project would be to use shaped balsa block components. The more professional approach was used—vacuum-forming over wood forms. Because this procedure is a science in itself, I will just mention a few important considerations. Allow extra depth to the form so that the plastic can be trimmed back to the proper edge locations. Make sure that the forms are smooth. The results are amazing; not only that, you will have the materials and "know-how" for your next projects.

Before the canopies can be mounted, the fuselage corrugation simulation strips must be put down and finished. In addition, painting under the canopies must be completed before these items are glued down. Paint behind and under the nose turret with flat black dope after the fuselage has been trimmed to match the turret contour. Now add the turret.

Painting and detailing. Recheck and repair construction dents, sand to a smooth finish, and apply three (or more) coats of sanding sealer. Sand between all coats except the last color coats. Colors for this plane, of the 31st Bomb Squadron, are Army Air Corps blue and yellow-orange. At least three color coats are required. Wing walks are made from very fine sandpaper, glued down then painted flat black. Add details, control outlines, and insignia.

Balance and flying. Make all balance checks with engines, props and cowlings in place. Fore-and-aft balance point can range from 2" aft of the wing leading edge to 3 1/4" aft of the leading edge. The right wing should be heavy due to the side-mounted engines. Recheck "roll balance" to make sure that the plane will roll to the outside. Add weight to right wing if necessary.

Make a pull test on the control lines and check for elevator travel.

Flush the fuel lines and tanks with fuel to clean out any foreign matter. Test-run the engines, first for single engine operation, then with both engines running simultaneously. An electric starter is recommended.

When starting the engines, make sure that you use the standard twin-engine procedure. Start the left engine first, then the right engine, then go back to top off the left tank before the plane is released for flight.

Use a bit of up-elevator on takeoff and let the plane fly itself off. This is not a stunt or combat model, so avoid loops or wing-overs. Hold relatively low altitudes to maintain the centrifugal force and tight lines.

This model was put to the ultimate test—takeoff and flight on one engine (the inboard, of course). Maybe it was the smooth flying surface with the slight downgrade that really did the trick. Intentional single-engine flights are *not* recommended. However, the test was made to guarantee sustained flight with the outboard engine stopped.

If you have a calm day, dependable engines, and "nerve," you will be rewarded with realistic flights. Good luck! ■