P-51 MUSTANG

P-51 Mustang

Trace the fuselage keel onto 3/16" sheet balsa and cut this to shape. Repeat this procedure for the formers and firewall. Cement these to the keel. The engine mounts are now liberally cemented to the keel and firewall. Install the stabilizer mount at this time and, while this is drying, cut the empennage surfaces to shape. Sand to a streamline shape and cement elevators to the spar.

Firmly attach the control horn and hinge the elevator to the stabilizer using fabric or crinoline (Band-Aid backing) for the hinges. Cement the stabilizer securely to the mount. Attach the lead-out lines to the bellcrank and bolt the bellcrank to the hardwood support. This assembly is cemented to the keel. The strength of this joint cannot be over-emphasized. Bend the control rod and slip the ends into the holes in the horn and bellcrank. Solder a washer to each end to prevent the rod from slipping off.

If your tank is not mounted on the engine, install a commercial tank at this time. Add plastic tube extensions to the vent, filling and feed lines, and plug these to prevent foreign matter from entering.

Install the tail wheel strut. Be certain it is firmly cemented to the keel.

We find that planking fuselages is cheaper, lighter and easier than carving them from solid blocks. It is also much easier to achieve more accurate sections and profiles with planking because once the formers and keel are assembled the fuselage automatically assumes the correct shape when planked.

The first step is to cement the uppermost strip in place running from the bulkhead to the end of the fuselage. Run this and subsequent strips directly across the fuselage ignoring the cockpit cut-out. Hold this strip in place with pins and then cement the lowermost strip in place. Now, attach a strip to each side of the keel. Follow this with eight more, one on each side of the first four. These should be well cemented to the formers as well as to each other. Continue in this fashion until the fuselage is complete. Taper and bevel the strips as required. Rub cement into any cracks.

The nose block is made from two medium balsa blocks cemented along the vertical center line. These are roughly cut to shape and hollowed in way of the engine mounts. Spot-cement the nose in place and carve smooth to fair into the fuselage and spinner. Cut the forward portion of the radiator scoop to rough outline, spot-cement in place and finish off. Carefully cut out the cockpit and cover the rear portion as shown. The entire fuselage is now thoroughly sanded with 1/0 and 3/0 sandpaper. Remove the nose block and hollow as plans illustrate. Re-cement to the bulkhead.

Begin the wing construction by cutting the spars to shape. Taper as shown. Cut the plywood spar joiner and cement it firmly to both spars. While this is drying, butt-cement 3/32" sheet together to form the correct width for the covering. Cut this out to the shape of the wing. Now cement the spar to the bottom covering and mark off the rib locations. Cement the ribs to this covering and to the spars. Complete one wing half at a time, laying the bottom covering flat on the work table. Bevel the leading and trailing edges of the lower covering to conform with the upper camber.

Bend the landing gear struts from 3/32" wire and bind them to the plywood supports with strong thread; smear with several coats of cement. Make a hole in the covering at the exact location that the strut emerges from the wing. Slip the strut through this hole, axle first, and cement the plywood support to the covering and ribs.

The upper covering is first cemented to the wing along the entire leading edge. Hold in place with pins. Apply liberal quantities of cement to the ribs and trailing edge of the lower covering and use pins to hold the upper covering to them until the cement is dry. Add the soft balsa wing tip at this time. The entire wing should be thoroughly sanded now.

Carefully fit the wing to the fuselage and then cement it in place, using plenty of the adhesive. Check the incidence angle carefully, add the fin and rudder. Offset the rudder as the plans illustrate. Only moderate filleting is required and this can be accomplished by using cement. This cement drys without the customary bubbles and creates beautiful fillets if applied several times quite liberally and smoothed in one stroke with the finger immediately after application.

We do not, however, recommend this formula for the ordinary construction of this type of model. Why not try Testors Formula "B" or extra-slow-drying cement for planking, etc.?

Brush on about three successive coats of sanding sealer and when dry sand the model thoroughly (down to the wood) using 1/0 sandpaper. Now, apply three more coats, sanding after each coat. This operation proved sufficient to produce a fine surface for painting. We applied our sealer quite liberally.

This late type of full-scale Mustang was finished in natural aluminum with a dark green or black anti-glare panel on the nose. Decorations varied widely and it is up to the builder's taste as to the trim; however, be sure it is authentic. We selected what we consider to be one of the most colorful schemes that is also easy to apply.

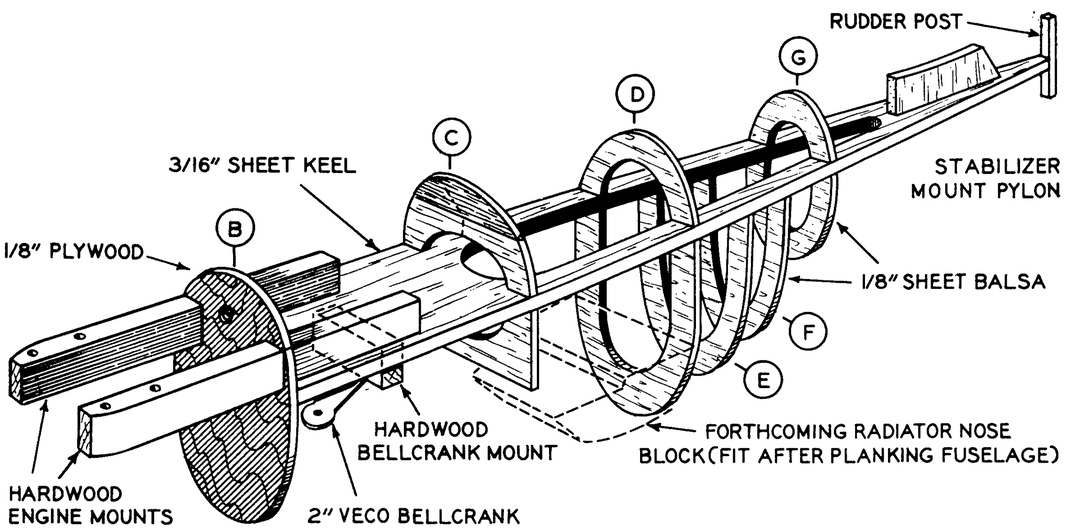
We brushed on six coats of aluminum dope, sanding lightly with finishing paper after each of the first three coats. When thoroughly dry the entire model should be rubbed with automotive type rubbing compound applied with absorbent cotton. Now wipe the model with a rag dampened with gasoline or other cleaner to remove all the wax from the rubbing compound. Paint the front of the cowl, anti-glare panel and cockpit rear deck black, use masking tape with clean edges or cut a clean edge yourself. The spinner nose is also painted black as well as the propeller. Tips are yellow. The tail and wing tip checkerboard is 1/2" red Trim Film checkerboard decals. This is put on in small sections rather than in one large piece for each side. Fuselage leader stripes are black Trim Film while insignia is standard blue and white. All lettering is black Trim Film and alphabet decals. Install guns, mast and black exhausts.

Add the headrest and a pilot if desired. The canopy was cut down from a large canopy and if fitted to the fuselage carefully almost any large canopy from a kit will do, like a Berkeley. The canopy frame is made from Trim Film strips. Using a very sharp razor blade or knife, carefully cut off the engine hatch and cut holes for the engine cylinder (3/32" clearance), exhaust opening, needle valve, etc. Now paint the cowl interior and apply two coats of fuel proofer when the paint is dry. Install the engine and then fuel-proof the entire model.

Musciano's Bill of Materials for P-51 Mustang

1pc. 1/8" x 2" 36" med. balsa, formers, ribs. 1 pc. 1/4" x 3" x 36" med. balsa, keel, empannage, wing tips, spar. 1 pc. 1/4" x 1" x 12" plywood, spar joiner. 1 pc. 1/8" x 2" x 6" plywood, bulkhd., l.g. support. 28 pcs. 1/32" x 1/16" x 36" soft balsa, planking. 2 pcs. 1/32" x 2" x 36" soft balsa, wing covering. 1 pc. 1/16", 18" lg. music wire, control rod. 1 pc. 1/16", 18" lg. music wire, landing gear. 2 2" x 3" shim brass wheel covers. 1 2" aluminum Veco bellcrank. 1 "A-B" aluminum Scientific control horn. 2 pcs. 1/16" x 5/8" x 5 3/4" hardwood, eng. mounts, bellcrank mount. 2 pcs. 1 1/2" x 4" 4" soft balsa, nose block. 1 1 3/4" dia. alum. Froom spinner. 1 3" standard canopy Berkeley kit cockpit cover. 1 plastic 1 1/2" high Scientific pilot. 4 oz. Testor aluminum dope, plane coloring. 6 oz. Testor Sanding Sealer, wood filler. 6 sheets 1/2" red checkerbd. Trim-Film, tail trim. 2 oz. Testor black dope, top of cowl color. 2 1 3/4" dia. wheels.

Needless to say the size of the control lines depends upon the engine you install. We recommend at least .012" lines for the .29 engine illustrated. If the model does not balance at the point shown a few lead weights in the extreme nose or tail will correct it. It is advisable to trim the ship for correct balance before the finish is applied. Original test flights were made with 40-ft. lines and when these proved satisfactory we lengthened our lines to 65 ft. and did some real flying.



Construction Notes "SPITFIRE"

Spitfire Mk. II

The fuselage utilizes the horizontal keel-formers planking type of construction. The keel and formers are the first items to be cut to shape. The formers are then cemented to the top and bottom of the keel. Now install the style of engine mounting you prefer, either beam or bulkhead. The engine can be mounted upright or inverted without any change in the model's performance.

Cut the stabilizer mount and cement it in place atop the keel. It is now suggested that the tail surfaces be cut to shape and sanded to a streamline cross-section. Cement the elevator jointer in place and install the control horn. Hinge the elevator to the stabilizer using fabric strips and then cement the stabilizer firmly to the vertical mount. Attach the lead-out lines to the bellcrank and bolt this to the hardwood support. The support is securely cemented to the airplane structure. Bend the control rod to shape and slip the ends through the bellcrank and control horn. Solder small washers to both ends of the control rod to prevent it from disengaging from the horn or bellcrank.

The installation of the fuel tank is next unless your engine has an attached tank. Be certain you attach vent and filling line extensions to reach beyond the fuselage contours. Also attach a plastic feed line of ample length to reach your engine without kinks. Plug all tank openings.

Now the fuselage is ready to plank. Begin by attaching the uppermost and lowermost strips to the formers. Cement well and hold in place with pins until dry. You need not wait for these to dry before applying the next strip. These next strips are cemented at 90 degrees from the first two, i.e. alongside the keel. The next eight planking strips are attached, one on each side of the four original strips. These should be well cemented to both the adjoining strip and the formers.

It will become necessary to bevel the edges slightly as well as taper the width of the strips in order to produce good fits. Continue planking by cementing the strips to opposite sides of the fuselage until the entire fuselage is covered. Smear cement into any open cracks. The nose block should be added before sanding fuselage.

Two pieces of medium balsa are joined with cement about the vertical centerline to form the nose block. Trace the side view onto the blocks and saw to shape. Repeat for the top view. Hollow this assembly roughly to make room for the mounts and for the fuel feed line, which is protruding from the plywood bulkhead, and spot-cement the blocks to this bulkhead.

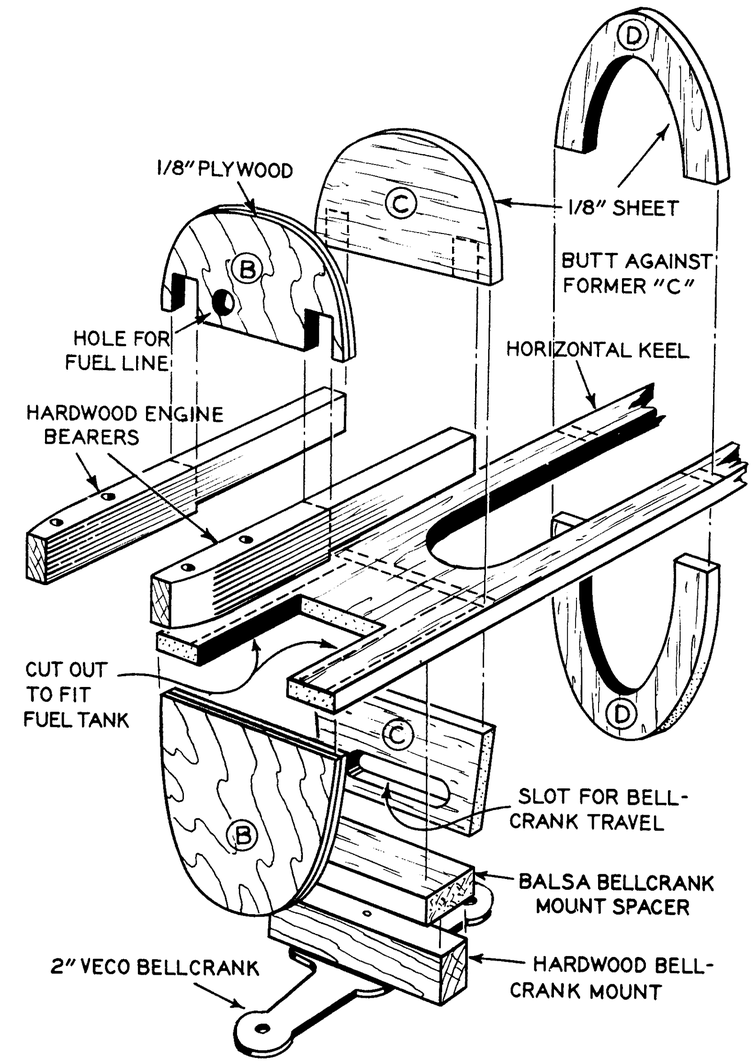
When dry, carve the blocks to the proper shape and sand roughly. Be sure the blocks fair into the spinner even if it means a sacrifice in fidelity to scale. Now carefully remove the nose and hollow the block as shown. Cement firmly in place on the fuselage. The entire fuselage is now thoroughly sandpapered, first with 1/0 and finally with 3/0. Add the fin and rudder.

The wing is made in three sections and then assembled. Cut all the ribs to shape with a razor blade or jigsaw. Taper the spars as shown. Cut out the wing covering and butt-cement it at the seams. It is also advisable to bend the wire landing gear at this time and saw the plywood wing joiner and landing mount to shape. Drill small holes into the joiner as the plans illustrate and then sew the landing gear to this plywood joiner several times and follow by smearing several coats of cement over the joint.

Cement the ribs to the joiner and add the bottom covering. Bevel the leading and trailing edges of this lower covering and then cement the upper covering in place, using plenty of slow-drying cement. Hold the covering in place with pins until cement is dry. After a sanding (using a block), this assembly can be fitted and cemented to the fuselage.

The outer wing panels are started by laying the bottom covering on the work table and marking the rib locations. Then cement the spar and correct ribs to it. Make certain you leave a space for the plywood joiner between the root rib and the spar. Now push the forward edge of the covering up to meet the rib contour and hold in place with pins while the cement dries.

Bevel the leading and trailing edges of the bottom covering to fair with the upper camber contours. Cement the upper covering in place beginning with the leading edge and, when the cement is dry, work towards the trailing edge. Try a slow-drying cement. It will hold better and give you more time to fit the covering in place before the cement dries fast. Bevel the root ribs to obtain the correct dihedral angle and then apply plenty of cement to the rib as well as the protruding plywood joiner. Now, slip the joiner into the cavity in the panel and hold the joint together with pins until dry. Saw the solid laminated soft balsa wing tips to shape and cement to the tip rib.



One of the most important items is the wing fillet. Cut very soft sheet balsa to the shape of the pattern shown. Soak this in water and mold with the fingers to cause it to form an arc. This can be wrapped to a piece of dowel if necessary until dry. Fitting it to the model may require a slight amount of shaving here and there, depending upon the variations between your model and the author's. Cement in place and fill in the bottom with scrap pieces of planking strips.

When you are certain that all cement joints are thoroughly dry, sand the entire ship until absolutely smooth. Our primary reason for using 3/32" thicknesses in the covering material was to insure adequate strength even if 1/32" of the wood was sanded away to produce a good finish. So sand away! Fillet tail and wing joints with several coats of cement.

At least four and preferably six coats of sanding sealer are required. Brush on three successive coats and, when dry, sand it down to the wood. Now, brush on the following coats, sanding lightly after each.

Cut the landing gear covers fom tincan metal and spot-solder them to the wire strut. The tail wheel fairing is optional and can be added at this time. This also is cut from tincan metal and bent around the strut and solder-sweated to it. Add the radiator, oil cooler and air scoop. These are cut from very soft balsa and are wood-filleted.

Three procedures are available to produce the green patches that complete the camouflage. One is to spray them on with a fine air gun or air brush. The second is to mask off the brown areas and brush on green dope. We selected the third method which was to cut these patches from green Trim-Film and slide these decal transfers in place. Care should be taken not to attempt to cover compound curvature areas in one piece. Follow the patterns shown on the plans and you won't have any difficulty. Rub the model with rubbing compound before any decals are applied. This will enhance the finish.

Using a sharp razor blade or knife, carefully cut away the engine hatch. Cut the holes for engine cylinder, intake choke hole, and needle valve hole. Touch up these portions and paint cowl interior. Fuel-proof cowl interior twice. Install the engine, spinner end cowl hatch.

Heavy celluloid sheet is used for the windshield and rear vision window while the sliding hatch is cut from a standard bubble canopy. The windshield is made in one piece, creased by folding and cemented in place. Frames are made from Trim-Film strips. Fuselage band is white.

Bull's-eye insignia is cut from Trim-Film. The rings are discs of varied sizes and colors as noted. The large disc is applied first and so on until the smallest one is added, one over the other. All lettering is cut from white Trim-Film. Fuel-proof the entire plane. Add the radio mast and antenna.

We used a three-bladed propeller for true scale appearance. This was made from 8" dia. 6" pitch props that were half lapped and glued under pressure. We thinned the blades slightly and painted the propeller black. A two-bladed 7" inch dia. 6" pitch propeller should be used on .09 engines.

The model should balance as the plans indicate. Correct balance is obtained through the addition of weight to the nose or tail. The mode handles beautifully on .010" steel lines 45 ft long. Do not fly from grassy sites. Choose a paved surface like a school yard, etc., for carefree flying pleasure.

Musciano's Bill of Materials for Spitfire Mk II

2 pcs. 3/32" x 3" x 36" soft balsa, wing covering. 26 pcs. 3/32" x 3/16" x 36" soft balsa, planking strips. 1 pc. 3/16" x 3/16" x 36" plywood, wing joiner. 1 pc. 1/8" x 3/16" x 36" plywood, bulkhead. 1 pc. 1/8" x 2" x 24" med. balsa, formers, ribs. 1 pc. 1/16" dia. x 18" music wire, landing gear. 1 pc. 1/16" dia. x 18" music wire, control rod, tail wheel strut. 1 pc. 3/16" x 2" x 36" med. balsa, wing tips, empannage, spars, keel. 2 2" x 2 1/2" tincan metal or brass wheel covers. 2 pcs. 1" x 3" x 3" soft balsa, nose block. 1 4" transparent bubble canopy, cockpit hatch. 1 .013" x 2" x 2" celluloid windshield. 1 .032" dia. 36" lg. music wire, lead-out line. 1 2" aluminum Veco bellcrank. 1 class "A-B" Scientific control horn. 2 pcs. 1/8" x 1/2" x 4" hardwood, eng. mounts, bellcrank mount. 1 1 1/2". Scientific high plastic pilot. 1 pc. 3/8" x 1/2" x 2" hardwood, bellcrank mount. 6 oz. Tester's Sanding Sealer, wood filler. 4 oz. Testor's sky blue dope, bottom coloring. 4 oz. Testor's brown dope, top coloring. 1 oz. Testor's white dope, spinner, fus. band. 2 oz. Comet fuel proofer, final coating. 1 1 1/4" dia. Froom alum. spinner. 6 sheets green Trim-Film, camouflage patches. 2 1 1/2" dia. wheels.

The entire bottom of the model is colored a very pale sky blue. Apply several coats until a good finish is achieved. Using masking tape of about 1/2" width, mask off the entire bottom consulting the photographs and plans. Now, the entire top of the model is colored sandy brown Continue to apply the dope until a satisfactor; finish has been obtained.

Construction Notes "109"

Messerschmitt 109E

The first item to be cut to shape is the vertical 3/16" balsa keel. Be sure to cut out for the wing. This is followed by the bulkhead engine mounts which are securely cemented to the keel. Either upright or inverted engines, mounted in beam or bulkhead fashion, can be used. Take your choice. The mounts are followed by the balsa sheet formers which are also cemented to the keel. Cut the stabilizer and elevators to shape and sand.

Cement the elevator halves to the hardwood spar and firmly attach the commercial type control horn. Hinge the elevator assembly to the stabilizer. Cement the stabilizer securely to the keel. Be sure the control horn can move freely. Bolt the bellcrank to the hardwood mount and cement the mount to the keel. Bend the wire control rod to shape and slip the ends into the bellcrank and horn. Solder a washer to each end of the control rod.

It is advisable to install the fuel tank now. Either cylindrical or rectangular tanks can be used. Commercial tanks are recommended such as Maeco, Acme, etc. Make certain that the filling and overflow lines extend beyond the fuselage covering. Also run the feed line through the bulkhead "B" and make sure it is long enough to reach the engine without kinking.

We are now ready to plank the fuselage sft of bulkhead "B." Begin by attaching the top and bottom strips to the fuselage first. Hold in place with pins until dry. Follow these with a strip on each side of the fuselage at the center line. Now cement another strip to each side of the strips that are in place. This means we now add eight strips. Repeat the last operation until the fuselage is covered. It will be necessary to taper the last few strips to make them fit perfectly. The sides will require beveling at times for a neat job.

Don't forget, the planking strips must be cemented to each other as well as to the formers. Use a relatively slow drying cement and use plenty of it.

Rough-cut the nose blocks and spot-cement in place. Carve and sand to shape and then carefully remove and hollow as shown. Re-cement in place. The fuselage is now sanded until very smooth. Rub cement into any large cracks. Cut out the upper portion of the fin and attach it to the stabilizer as shown on plan.

Taper the wing spars to shape from rather hard balsa. Cut bottom wing covering to shape and cement along the seams. Now cement the spars to the covering and add the ribs. Cut the plywood wing joiner and securely cement this to both spars. The correct dihedral angle will be formed automatically. Bend the landing gear struts to shape and bind to the plywood foundations with strong thread and cement liberally. Pierce the covering exactly where the strut will be located. Now slip the strut through this hole, axle first, and cement the plywood foundation to the wing structure.

Bevel the trailing and leading edge of the wing covering to fit the rib contours and then apply the upper covering. This should be cut to the approximate wing shape and butt-cemented along the leading edge first and when dry it is cemented to the remaining portion of the ribs and the trailing edges. Add the soft balsa tips and set aside to dry. Sandpaper the wing until smooth and then cement it firmly to the fuselage. Fillet wing and tail joints well with cement, using several coats.

Cut the wing and fuselage radiators from dead-soft balsa and cement in place. Fillet with cement. Add scoops as shown. The landing gear covers are cut from tincan metal and spot-soldered to the landing gear strut. Cut out and attach the rudder. Notice the offset required in the top view.

After going this far it would be a shame to ruin the model with a poor finish! Brush on two coats of sanding sealer and when thoroughly dry sand the model vigorously until no trace of the sealer is visible. Now apply five more coats. This time sand well between each coat. The entire underside of the airplane is grey, while the top is a dark bottle green, almost black. After applying about three coats of the light color, mask off the bottom and paint the top. Care should be taken in removing the tape. A brisk rubbing with rubbing compound applied with a wad of absorbent cotton will enhance the finish with a fine lustre. Our spinner was bright red.

The crosses are black with white outlines while the numeral is red with a white outline. Trim-Film was used for all the above markings. Heavy celluloid is used for the cockpit cover and hardwood for the mast. Fuselage band and wing tips are white.

Carefully cut off the engine hatch and cut holes for the engine cylinder (at least 3/32" clearance), a choke hole and a hole for the needle valve. Paint the cowl interior and fuel-proof twice. Install the engine. Wood screws are safe for the .09 size but be sure to use bolts for anything larger. Now fuel-proof the entire model.

Flying this job is a wing! Our replica Me-109E took off without hesitation with an .09 in the nose and flew without effort at the end of 40-ft. lines. Lines as short as 25 ft. have been used successfully. We flew on .008" steel lines; however, if larger engines are used (over .23"), .010" lines are recommended for safety. Be sure the model balances as shown before any flying is attempted. Any unbalanced condition can be remedied through the addition of lead weight to the nose or tail. You will find that this job lands with ease on the average field and will provide countless hours of flying enjoyment of both experienced and inexperienced builders.

Musciano's Bill of Materials for Messerschmitt 109E

1 pc. .025" dia., 36" long music wire, lead-out line. 1 pc. 1/4" x 2" x 36" med. balsa, keel, spar, empennage. 25 pcs. 1/32" x 1/4" x 36" soft balsa, planking strips. 2 pcs. 1" x 2" x 3" soft balsa, nose. 1 pc. 1/8" x 2" x 24" med. balsa, ribs, formers. 2 pcs. 1/4" x 2 1/2" x 1 1/2" soft balsa, wing tips. 1 pc. 1/8" x 3" x 9" plywood, bulkhd., l.g. support, wing joiner. 2 pcs. 3/32" dia. x 9" music wire, landing gear. 2 pcs. 1/32" x 3" x 36" soft balsa, wing covering. 1 pc. .015" x 3" x 4" celluloid, cockpit cover. 1 pc. 1/16" dia. x 18" music wire, control rod, tail wheel strut. 2 pcs. 2" x 2" tin can metal or sheet brass, wheel covers. 1 pc. 3/8" x 3/8" x 1 1/2" hardwood, bellcrank mount. 6 oz. Testor's Sanding Sealer, wood filler. 4 oz. black with 1 oz. green added Testor's dope, top coloring. 4 oz. grey with few drops of green added Testor's dope, bottom coloring. 1 sheet each red, white, black Trim-Film, trimming. 2 oz. Tuff fuel proofer, fuel-proof coating. 1 1/4" dia. Froom aluminum spinner. 2 1/2" rubber, alum. hub, Veco wheels. 1 2" Veco bellcrank. 1 1 1/2" high plastic Scientific pilot. 1 Class "A-B" Scientific control horn.

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