Hanriot HD-1

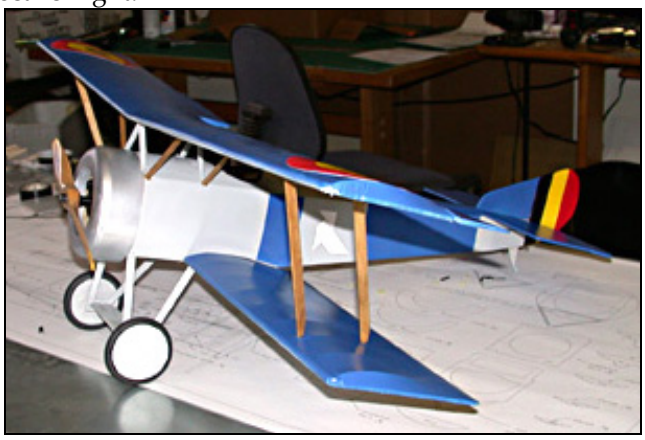
R/C Scale Model Instructions

CONTACT INFORMATION
The Hanriot HD-1 was designed by
M.K. Bengtson

Manufactured and Distributed by:
Bengtson Company
e-mail: sales@aerodromerc.com
Web Site: www.aerodromerc.com

Hanroit HD-1

Thank you for purchasing the Hanriot HD-1 model for electric flight.



Model Built By M.K. Bengtson

THE MODEL

A semi scale adaptation of the Hanroit HD-1, this model is designed to be easy to build and exciting to fly.

POWER SET UP

The model can be set up to be powered by the 6 v Speed 400 with the 2.33:1 Mini-Olympus gearbox and a 10x4.7 APC prop. Battery power pack is 8,600maH Nicads or an equivalent weight Nimh

R/C GEAR

A four function mini receiver and four micro servos are all that are required.

SPECIFICATIONS

More than 170 laser cut parts

Scale: ~1/9
Channels: R/E/A/T
Wing Area: 336 sq in
Wingspan: 38"
Weight: 24.5 oz ready to fly
Power System: AXI 2808 brushless outrunner R/E/A with in-wing servos
Prop: 10x6
Wheels: Balsa & plywood, Neoprene foam tires
Airfoil Type: Scale Top, Flat bottomed
Cowl: Built up balsa and plywood
Spinner: N/A
Covering: Balsa and Litespan or Polyspan
Decals: Available on the website
Designer: M.K. Bengtson
Prototype By: M.K. Bengtson

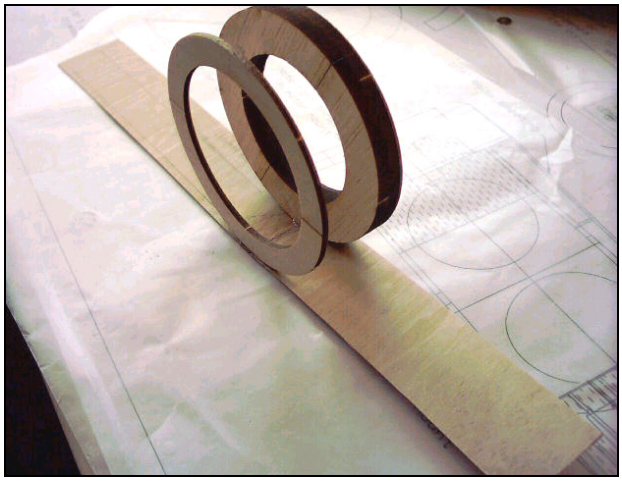
BUILDING THE MODEL

BEFORE STARTING

A note about the photos: The photos were taken of a prototype and the parts in the kit supplied may look slightly different from them. However, the concepts illustrated are the same.

COWLING

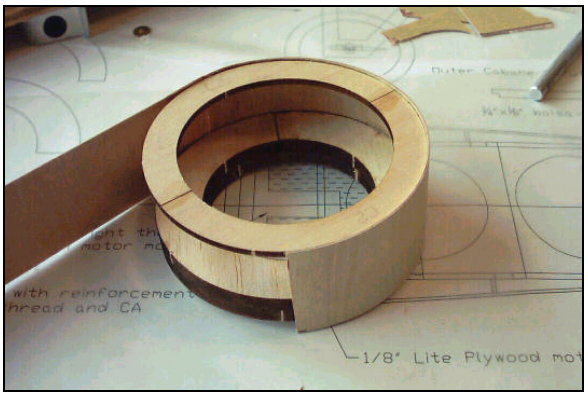
The cowling is of built up construction using C1 and C2.



Cowl Construction Detail

Assemble the Cowling

Construct front cowl ring by gluing 2 C1's making sure that they are overlapping completely. To reduce weight, the inner C1 may be shaved or sanded down after lamination. Maintain the inside of the part for proper construction. Glue 2 C2's in three pairs and laminate together.



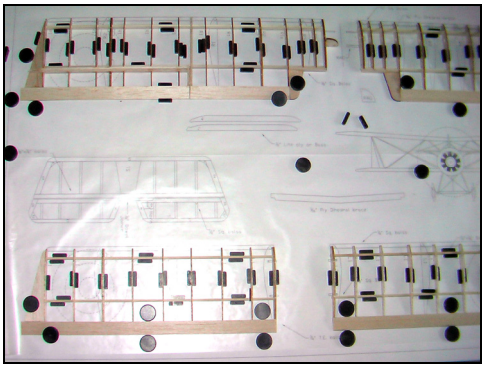
Cowl Construction Detail

The cowl should now be sealed, sanded and primed until no wood grain is left showing. Baby (Talcum) powder in clear dope makes an excellent balsa sealer. Talcum powder mixed in white glue makes excellent filler for gaps or gouges. Sand down after it dries.

WINGS

Wing Construction

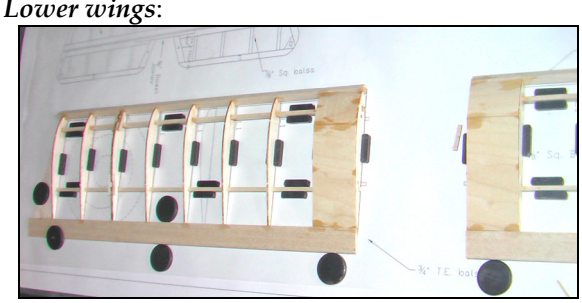
Pin down, over the plan, the t/e, spars and wing tip, gluing as required. Add the leading edge stock after the basic frame is done as the stock is inserted in a rotated fashion. Add the wing tips and align the front tip along the center of the leading edge. Sand the leading edge stock to be rounded and meet the ribs.



Wing Construction Detail on Magnetic Building Board

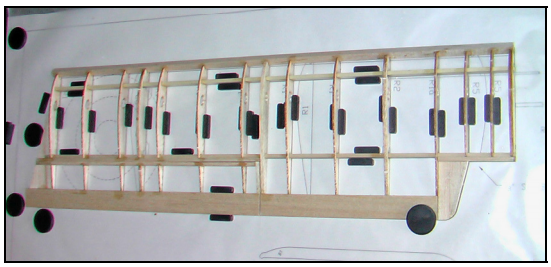
Leaning in the center ribs using the RAG:

The Lower wings:

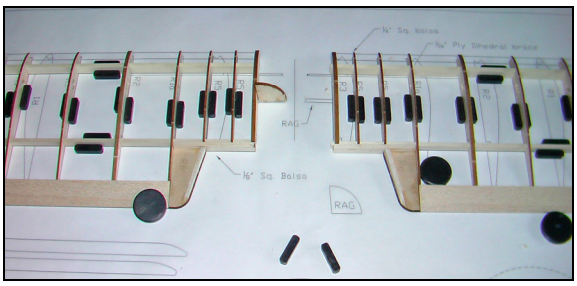


Wing Construction Detail

Ailerons:

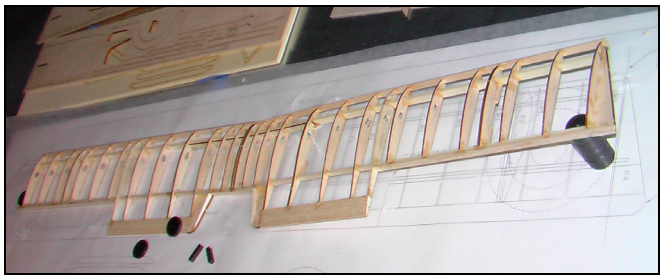


Wing Construction Detail



Wing Construction Detail

Dihedral:



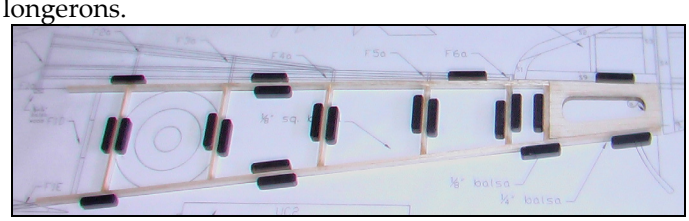
Wing Construction Detail

FUSELAGE CONSTRUCTION

The fuselage is built as two separate box structures, the front sheet area and the rear built up section, which are then joined over the plan. This system not only keeps each stage simple, but it also helps to ensure a straight fuselage.

Building of the Right Side of the Fuselage

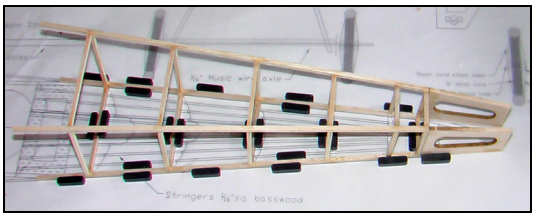
Begin by building two rear fuselage frames over the plan and allow to dry. Select hard balsa or basswood for the longerons.



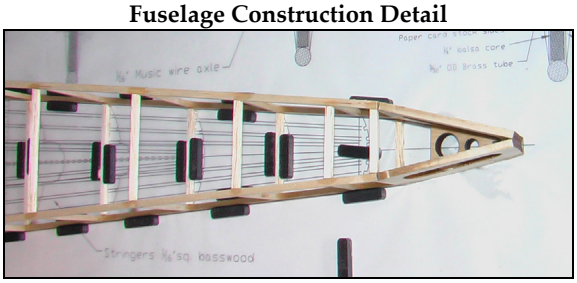
Fuselage Construction Detail

Join the two frames over the plan with cross braces and the tailskid mount. Check, check and check again that this and ALL other structures remain perfectly straight and square.

FUSILAGE CONSTRUCTION

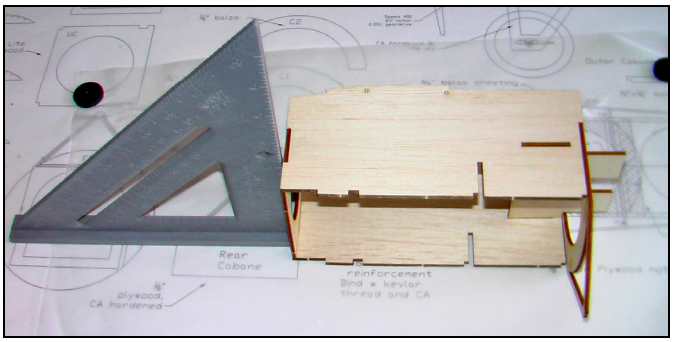


Fuselage Construction Detail



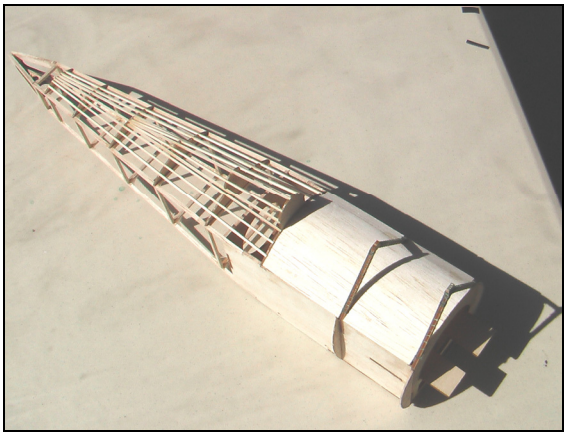
Fuselage Construction Detail

Front Side Panels



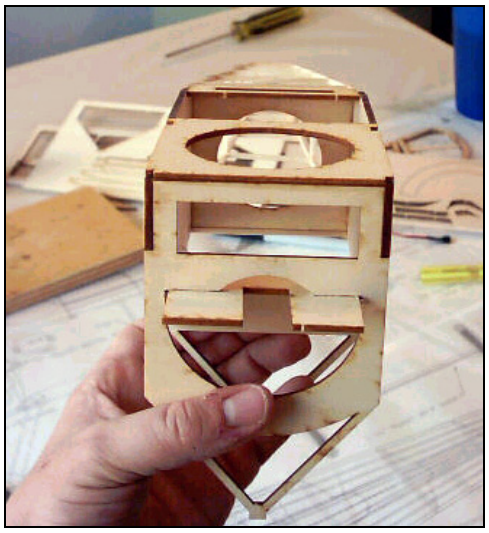
Front Side Panel Construction Detail

Construction Detail



Construction Detail

Adding The Undercarriage Plates

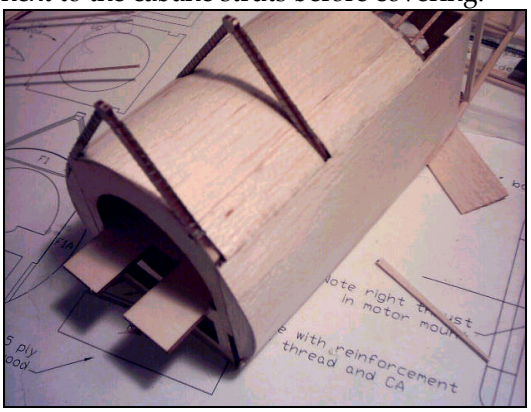


Undercarriage Plates

Remove from the board and add the plywood formers crosspieces that serve as u/c plates.

Adding the Decking

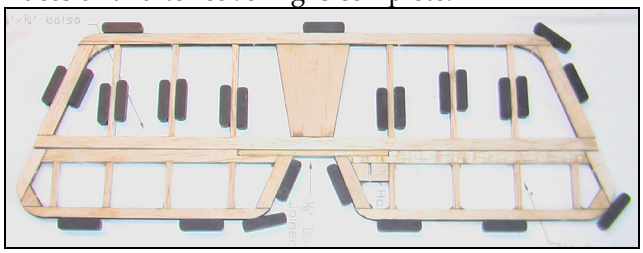
Add all the decking and formers, and carefully trim to size and fit 1/16″ sheeting. Small pieces of 1/8″ balsa are added next to the cabane struts before covering.



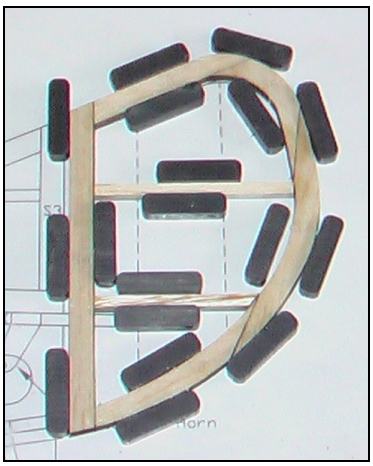
Decking Construction Detail

TAIL SURFACES

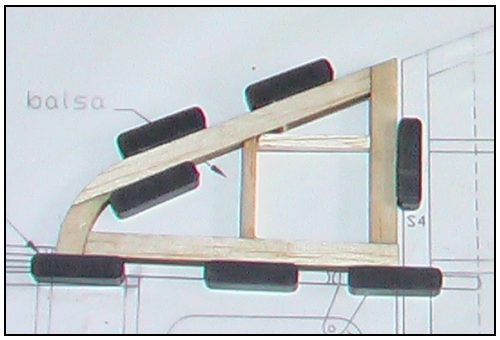
Lay out and glue parts of the tail surfaces on the plans. Join the elevators with the 1/8″ dowel joiner that is inserted into the carbon tube bearing. Sand the tail parts, rounding off all edges. Don't add the horns or hinge the surfaces until after covering is complete.



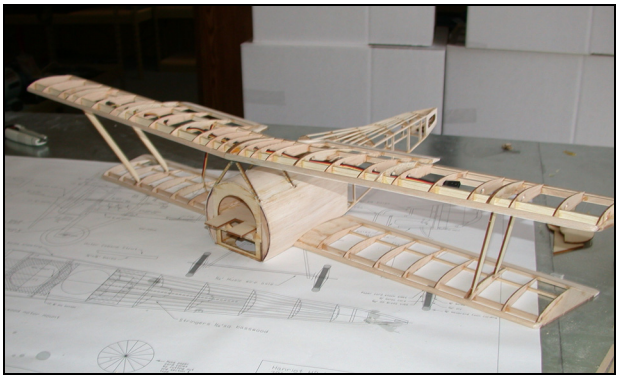
Tail Surface Construction Detail



Tail Surface Construction Detail



Tail Surface Construction Detail



Assembly

Sand and dry fit to make the interplane struts. Be sure to mirror the opposing struts for proper wing installation.

COVERING

Any lightweight covering material can be used. Polyspan makes a good choice Litespan is also popular.

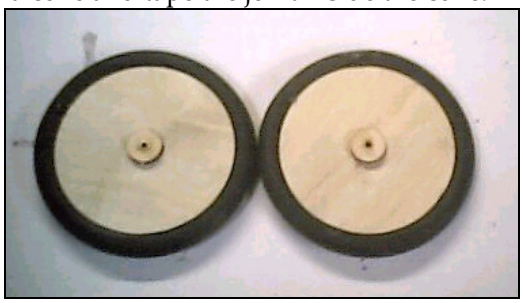
This prototype was covered in Polyspan and painted with Krylon spray paint. Decals were ink jet printed on self-adhesive vinyl label stock.

Downloadable decal outlines are being developed. Check on-line at http://www.aerodromerc.com/decals.htm to see if one is available for this model.

Finished Model

WHEELS

Gluing the ply sides on the ¼ "balsa core makes the basis for the wheels. Use the brass hub for alignment. Epoxy the hubs in place and add a sufficient amount of epoxy around the base of the hub to reinforce the connection of the hub to the ply. Plywood reinforcing hubs are provided that are to slip over the brass tubing as shown. Alternatively, gluing an additional ½" square piece of scrap 1/8" balsa with a hole drilled in the center can be substituted. Next, CA glue the neoprene cording together to from a "tire". Use thin CA sparingly as the CA bonds very aggressively to the rubber. Press the CA wetted ends together for an instant bond. The best way to align the ends is to glue them while they are in place on the wheel. Then attach the tires to the wheels and CA in place. A thin bead of CA around the rim makes for a secure tire. Paper cones are cut out. Use a ballpoint pen to score each line on the back to make an impression of "spokes". It is helpful to do this operation on a paper tablet so that the pen makes a good crease. Fold the paper along the crease lines to exaggerate the raised lines. One of the sections forming a wedge is cut out. Make cuts to the center of the circle along a pair of the spokes. Close the paper cut-out to form a cone and tape the joint inside the cone.



Wheel Construction Detail

The inside cones may now be attached to the wheels. The outside cones may be attached at this point if wheel collars are to be used. Alternatively, after installing the wheels on the landing gear, a washer may be soldered to

hold the wheel in place and then the cone is attached. This method makes a very nice scale appearance.

INSTALLING THE RADIO CONTROL GEAR

Servo Bay

It is as well to get the bulk of your R/C gear fitted at this stage, and also the motor. Mount all gear as far forward as possible to avoid C/G balance problems later.

Battery Tray

After all the above has been placed, mount the battery tray and use the battery position to balance the model as shown.

ASSEMBLY

Wing

The lower wings are added and the locating dowels are inserted into the fuselage. Apply epoxy to the wing rib that meets the fuselage. Attach the wings to the fuselage. Use the locating dowels to assist with aligning the wing panels. Use a flat surface and sand bags to hold fuselage and lower wings in proper relationship. Lower wings should not have any dihedral and be level with the bottom of the fuselage. Allow epoxy to set. Dry fit the top wing and make proper alignment using the interplane struts. Add epoxy in the sockets for the cabane and IP struts. Then attach the top wing using the cabane struts as a guide. Hold in top wing place securely but don't over do it as you might inadvertently put in a warp.

Fitting Tail Surfaces

Attach the rudder to the vertical stabilizer using 1/8″ strips of CA hinges. Similarly, attach the elevator to the horizontal stabilizer. Glue the horizontal stab/elevator assembly onto the fuselage. At this point, slip the elevator control horn onto the wire pushrod end and, with the servo and the elevator centered, glue the horn into the slot. Then glue the vertical stabilizer and rudder assembly into the slot in the horizontal stabilizer. In a similar fashion as the elevator, slip the rudder control horn onto the wire pushrod end and, with the servo and the rudder centered, glue the rudder control horn into the slot.

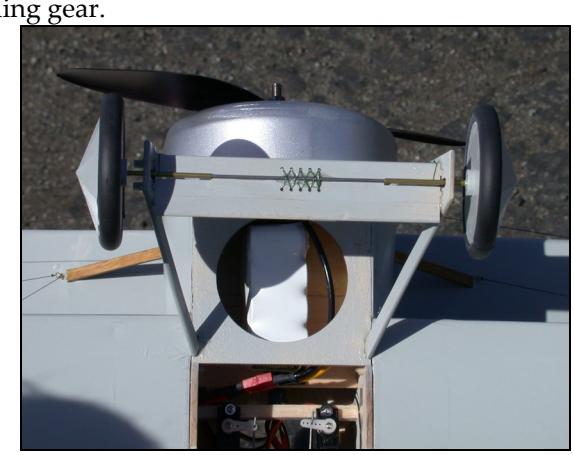
Aileron Servos

Aileron servos are mounted in wing and attached with short threaded rods to the ailerons. Use a "Y" wiring harness connector to wire the servos to a single radio connection. If differential aileron throws are desired, rotate the servo horn forward about 20 degrees, while maintaining the neutral position of the aileron. This should counter any adverse aileron yaw.

Top Wing Aileron Servo Installation Detail.

Landing Gear

The landing gear is fashioned from CA hardened 1/8″ plywood. Sand, soak with thin CA and then, securely, epoxy the gear to the model. 0.045″ music wire can be used to reinforce the gear but are not absolutely necessary. If applied, use Kevlar thread or strong carpet thread and secure the wire along the gear. CA in place. A shock absorbing mechanism has been designed to let the model have a little give when landing. Attach the 1/16″ music wire axle to the underside of the LG cross member with Kevlar thread and epoxy in place. Small holes are placed in this part to facilitate the lacing of this thread. Add short pieces of 3/32″ brass tubing as bearings/spacers for the wheels. Use rubber bands to act as shock absorbers but make each side exactly as the opposite site. Otherwise, the shock resistance is unequal and your model will cant to one side on every landing. Adding Kevlar cross rigging will dramatically strengthen the landing gear.



Landing Gear Detail

Rigging

Use strong thread or Kevlar fishing line to for rigging wires. Elastic beading cord also makes excellent rigging and always stays taut. Use small screws, fishing hook eyes, straight pinheads or small eyelets to attach the rigging. Alternately, brass wire (normally used for picture hanging) can be made into eyelets and CA'ed into the model. While not technically required, rigging can add a degree of strength to your model

Balancing the Model

Balance the model at the point shown. It is best to position the battery to do this operation.

Motor and Gearbox Tips

The Mini-Olympus gearbox is very durable and reliable but it does have a few weak points.

1) There is often flashing on the gears making rough spots or binding which robs power. Take a sharp Exacto knife and remove this until your gearbox turns smoothly.
2) Excess flashing also occurs where the motor is mounted that makes alignment poor and again robs power. Take the Exacto and carve away this excess until the motor fits easily.
3) Loose set screws on the main shaft and motor let power slip away. Tighten all these set screws carefully. TOO MUCH will distort the pinion gear and makes another binding. CA the pinion on the motor shaft if necessary. Recheck this after a nose over with power on.

FLYING

The model should ROG on pavement or hard surfaces. On grass, the model may require hand launching. Be careful that your hand or fingers do not catch on the lower rigging. Launch firmly and level. While the tail surfaces are small, they should not need excessive throws. Let the model gain altitude slowly off the runway. Applying too much up elevator at slow speeds asks for a stall. Make your turns gently as tight turns risk tip stalling in any model. Don't expect the elevator to make the model climb. Think of the elevator as a device to change the attitude of the model. The wing and airspeed ultimately make the model climb. Often down elevator applied at stalling can avoid a major crash. The most important details for proper flight operations are:

1) CG location. Tail-heavy models never fly well or at all.
2) Down and right thrust
3) Straight and non-warped wings.
4) Be sure you assemble and lube the gearbox so that it is not binding. A binding gearbox will rob most of your batteries power.

CONTACT INFORMATION

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