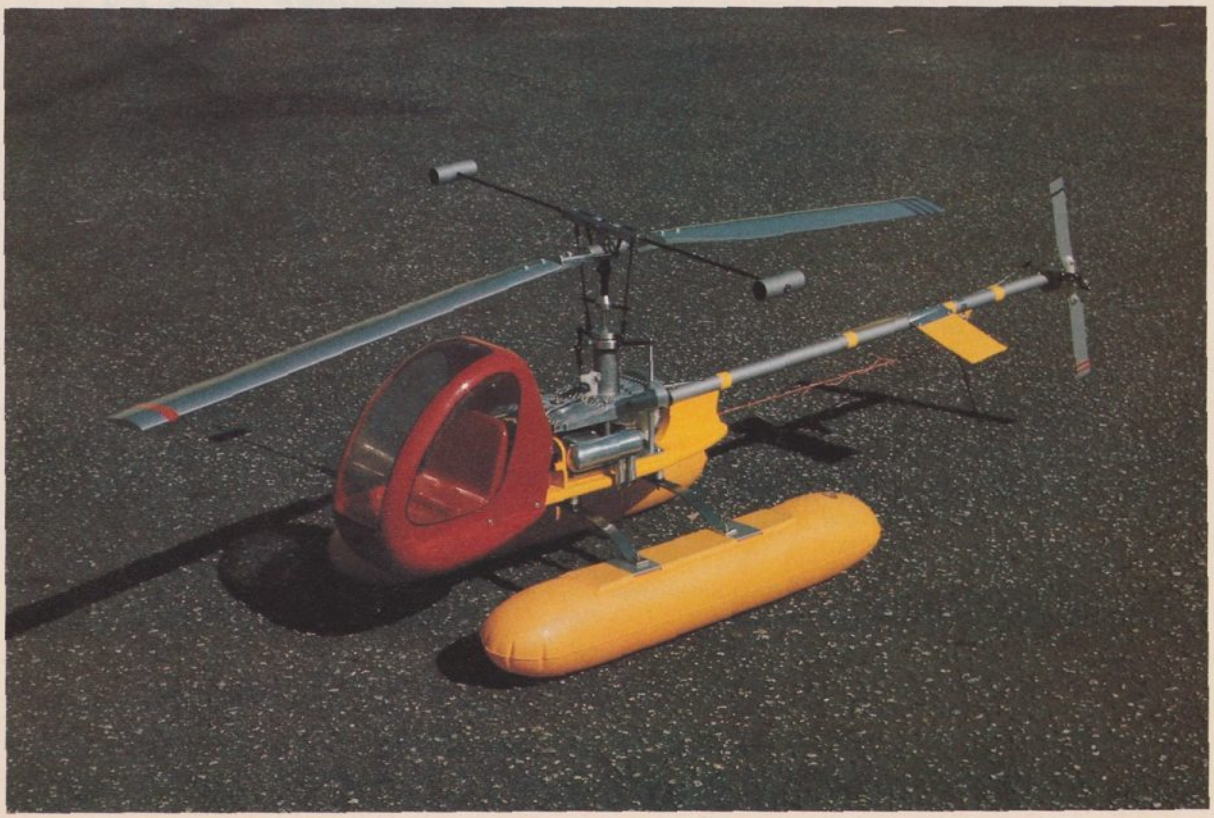
NOVA HUGHES 250

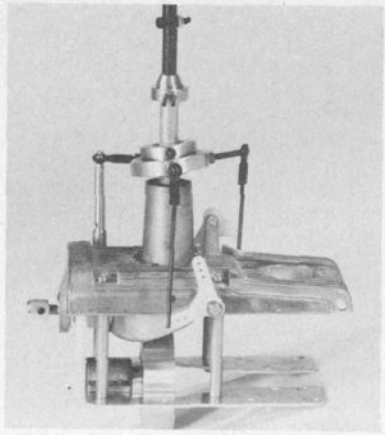
● The Nova Hughes 250, manufactured by Nova Limited, Tokyo, Japan, is a .19 to .25 powered helicopter with a length of 930mm, a rotor span of 1040mm and a gross weight of 2.1 killograms. The kit features a fully factory assembled main rotor head, main gear, and tail gear unit which results in an absolute minimum of building time. Precision ballbearings are used at all rotating parts and the Nova Hughes 250 utilizes a superbly efficient heat sink.

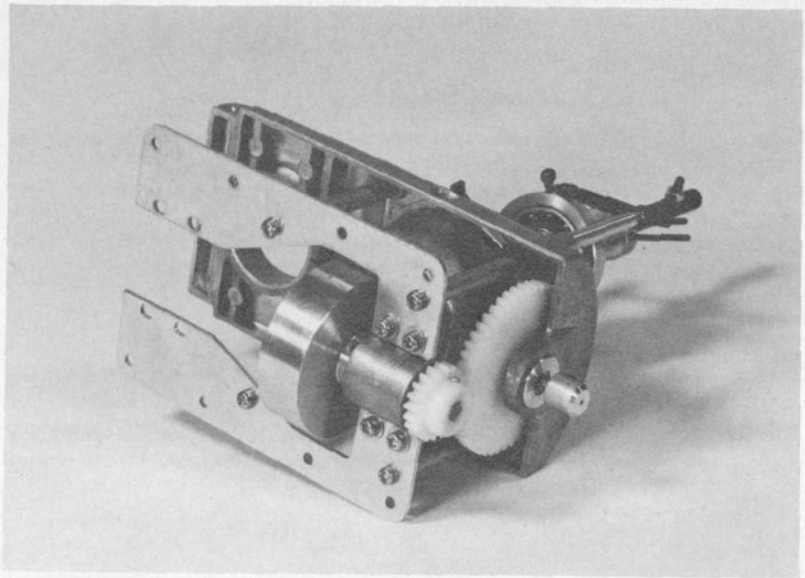
As previously mentioned, the Nova Hughes 250 kit is supplied in assembled form with regard to the main gear unit, the main rotor head and the tail rotor gear box. In addition, the necessary lubrication has been installed at the factory. All that is required is to first break-in your engine, construct the few factory pre-shaped wooden parts, install the engine in the main gear train, install the tail boom and gear box, head, and paint and install the body after your radio system is installed.

The recommended engine for the Nova Hughes 250 is the OS Max .25 with a castor based fuel containing 40% nitro. That's right — we said **40% nitro**. All of these small .19 size helicopters are marginal on power since the weight is not substantially less than that of a .40 size machine since the weight of the radio system is fixed and the helicopters weight can only be reduced a minimum amount while still retaining structural integrity. Thus, a standard 10% nitro fuel would mean that the helicopter would have to be at full throttle in order to achieve any degree of hover. Under these conditions the engine would constantly overheat. By using a hot plug and 40% nitro, as recommended by the manufacturer, the Nova Hughes 250 lifts off the ground in the mid throttle range and hovers between half and two-thirds throttle — thus the engine actually runs cooler on the higher nitro content fuel.

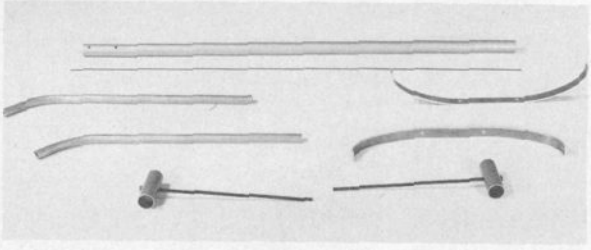
One of the first impressions upon opening the Nova Hughes 250 kit is the extreme high quality of the factory pre-assembled parts and the total freedom of movement of all the gears. Since a part of the power train must be disassembled in order to install your engine, remember to try your best to eliminate any power loss by making sure that you have no binding anywhere in the drive train. Be certain that your engine is completely broken-in before installing it in the Nova Hughes 250. By breaking in, we recommend following the engine manufacturers instructions for the specified period of time followed by installing a 9/4 prop on your O.S. .25 and, with the use of a tachometer, running it from 5000 to 7000 rpm for one minute, followed by a run of 30 seconds at 4000 to 5000 rpm, then another 60 seconds at 7000 to 9000 rpm, followed by 30 seconds at 6000 to 7000 rpm, followed by 60 seconds at 9000 to 11,000 rpm, followed by 30 seconds at 8000 to 9000 rpm. During this process, use 10 to 15% nitro in a castor based fuel and repeat several times. Follow this up by increasing the nitro content to 25 to 30%, again using a castor oil based fuel, and repeat the process several more times. In this fashion, you will break in your engine and ascertain that it is reliable at all throttle ranges. When installed in your helicopter, the floating rpm should be 4000 on the tail rotor, 890 rpm on the main rotor, while the engine itself turns 6700 rpm. The preceding does not mean that you are required to bench run your engine for several hours — the important thing is to make a **proper** break-in to match the purpose of which you intend to use the engine. Always



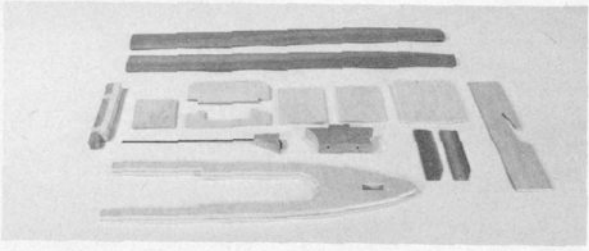




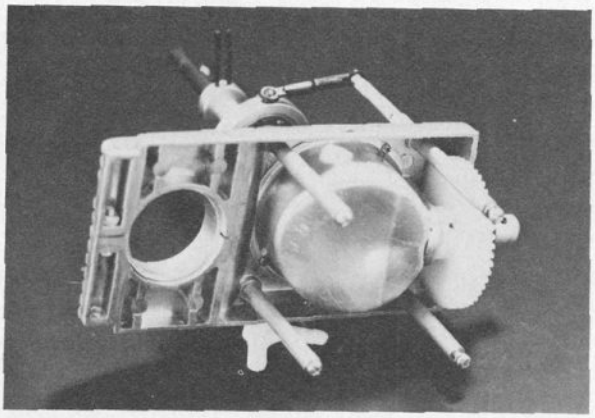
LEFT, AND ABOVE: The factory pre-assembled motor mount clutch housing and main gear train. Entire unit is exceptionally smooth and acts as a giant heat sink.



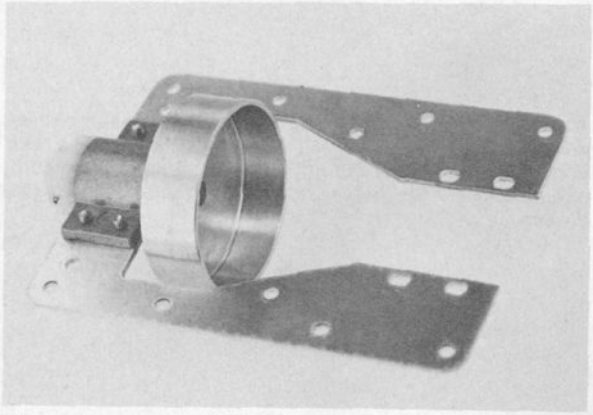
Aluminum tail boom, drive shaft, skid braces, skids, flybars and cans.



All of the wooden parts necessary for assembling the basic chassis.



The motor mount unit is removed for engine assembly. Unit in center is a gear housing with lubricant installed at factory.



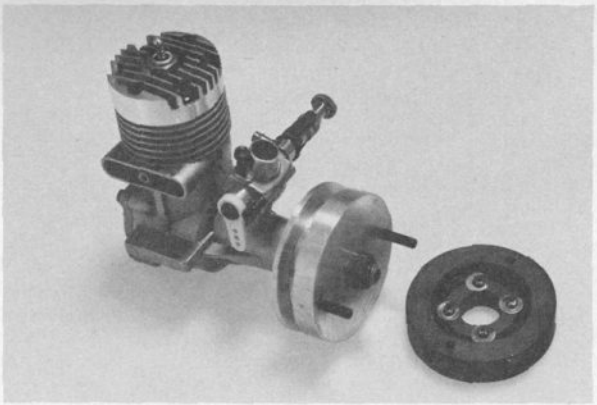
The motor mount with Bell housing is removed from main assembly by loosening four screws. Break-in engine before installation.

remember that the time and efforts spent in properly breaking-in your helicopter engine will not only go a long way towards a more successful helicopter, but may just save that machine from a disastrous end.

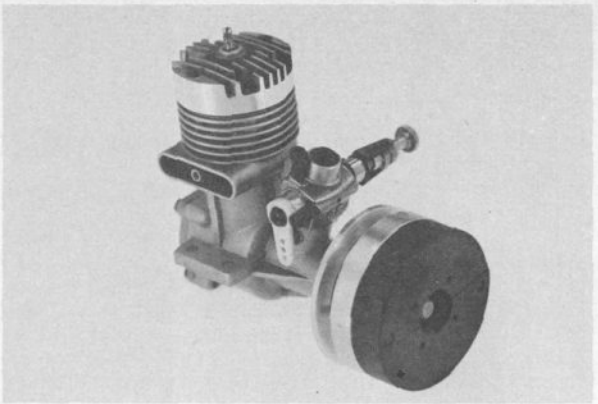
The assembly of the Nova Hughes 250, begins by removing the clutch from the flywheel on the factory pre-assembled main drive unit. Fasten the flywheel on the O.S. .25 shaft using the prop nut, then insert the clutch into the pins back to the original position. Next, remove the engine mounting bed from the main gear assembly and install it on the body by using the screws included in the kit. Insert a starting belt on to the flywheel and hold the engine temporarily on the bed, then insert the spacer ring on to the head of the engine. After unfastening the engine head screw on the main gear box, place it on the head of the engine and assemble both gear box and engine mounting bed back to the original condition. Put the clutch bell and center of the flywheel together and fasten the head fixing screws. If the center has not slipped, install the engine firmly on the mounting bed.

Insert the flexible tube into the tail pipe. Fix the piano wire drive shaft on the tail gear box joint and insert it into the flexible tube. After connecting the gear box and tail pipe, fasten in place with the screw provided. Rotate the drive shaft with your hand to see that the tail gear turns smoothly. **Do not** pour oil into the flexible tube as it will make the rotor reaction of the drive shaft difficult.

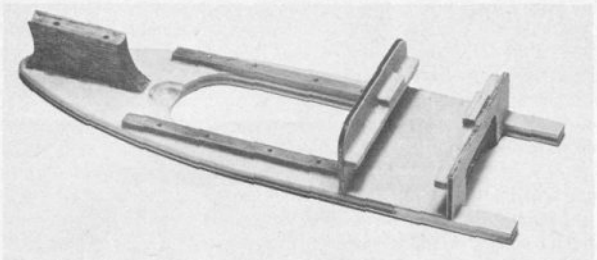
When the tail pipe is fixed on the mount-

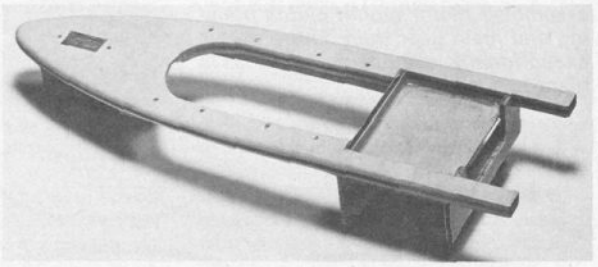


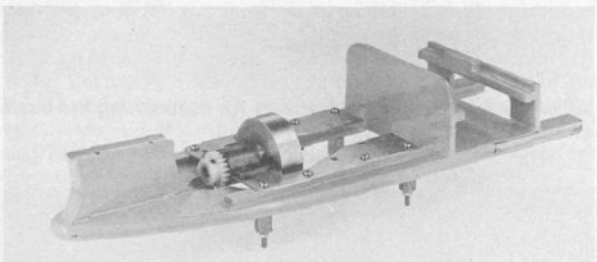
The O.S. .25 with flywheel installed.



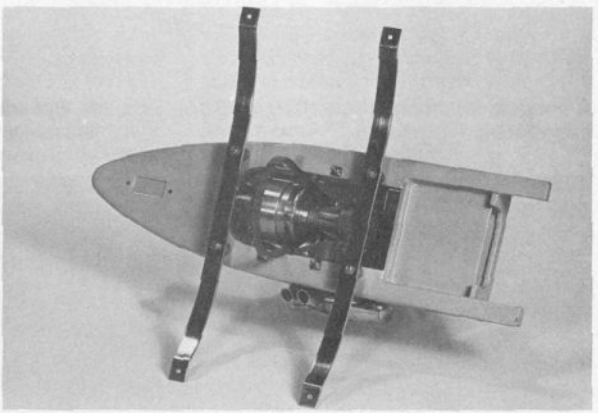
Clutch assembly mounted on flywheel.

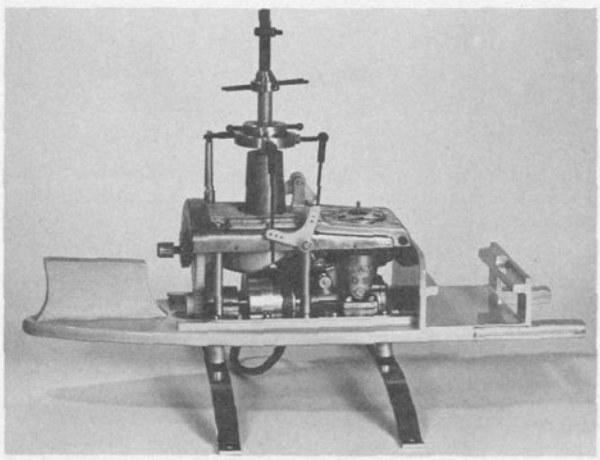




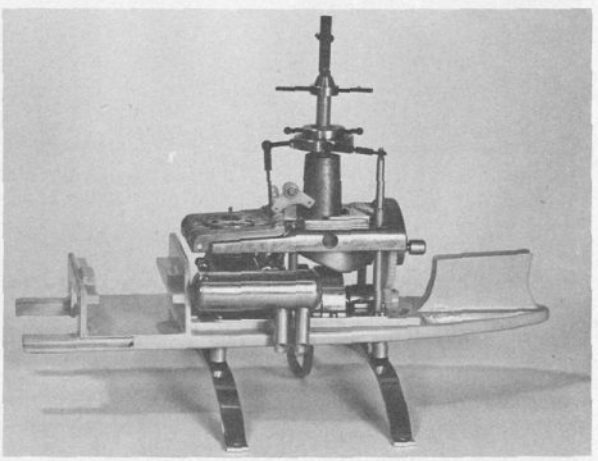


Top and bottom views of the assembled wooden chassis unit. Tail boom mount in rear, servo rails between two bulkheads in front. Motor mount is then installed, followed by engine and starter pulley, skid brace stand-offs, and skid braces.

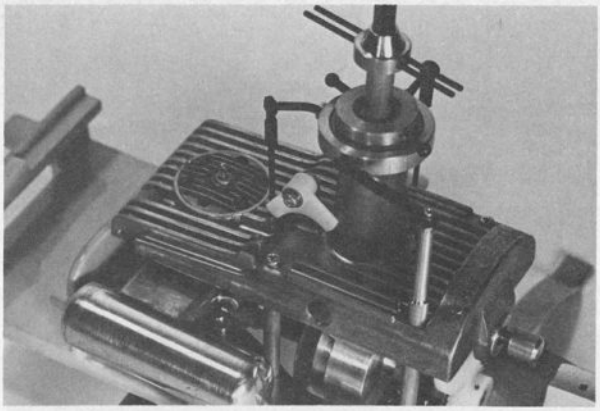




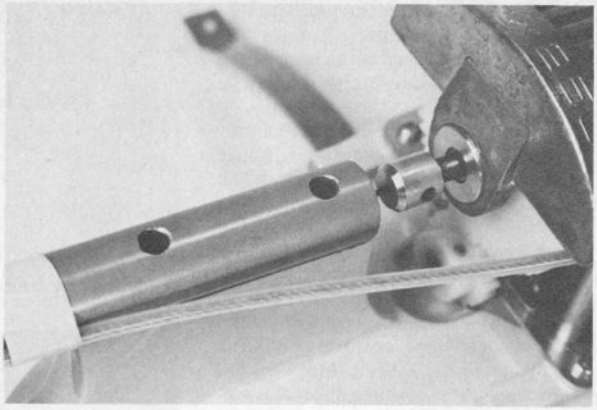
Side view of main drive train installed on chassis. Note head of O.S. .25 installed in built-in heat sink. Smoothness of drive train has to be felt to be believed!



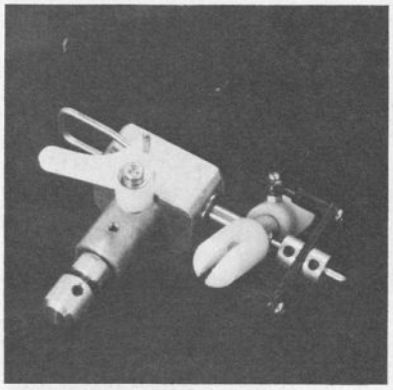
Opposite side view showing installation of Mac's Muffler. Servos fit between bulkhead at left. Tail boom fits in predrilled and angled mount at right. Linkages not connected.



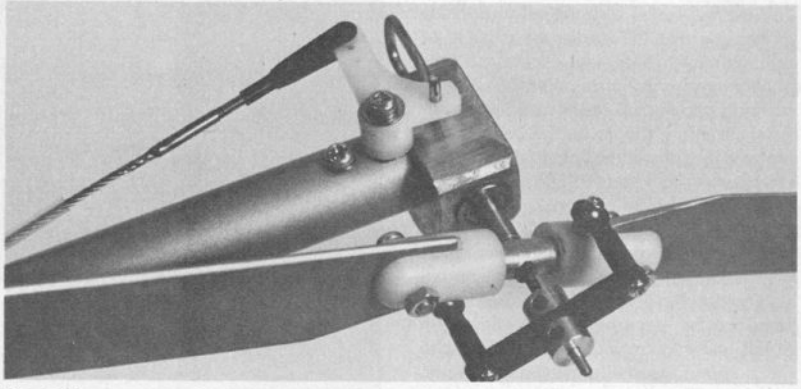
View of heat sink and swashplate. Note anti-rotation link to Stand-Off at right. Swashplate linkages not connected.



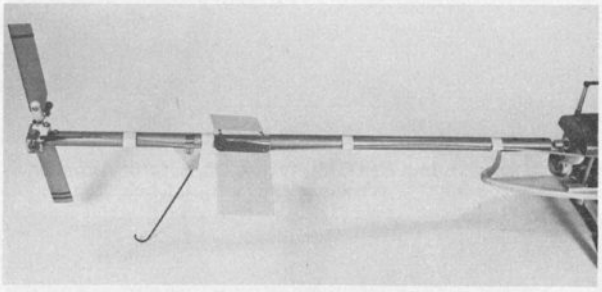
Tail boom mounted in place. Note drive shaft coupler. Tail rotor collective cable taped to boom.



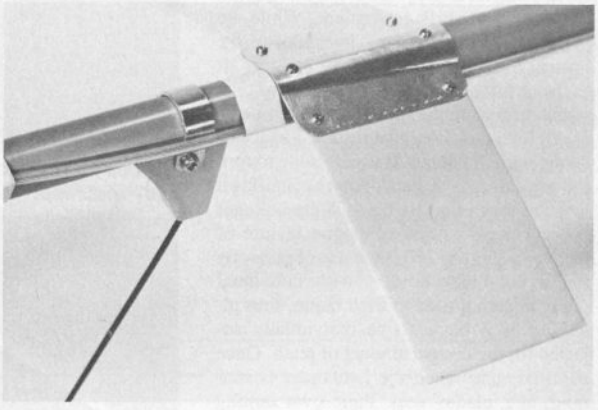
Factory assembled and lubricated tail rotor mechanism.

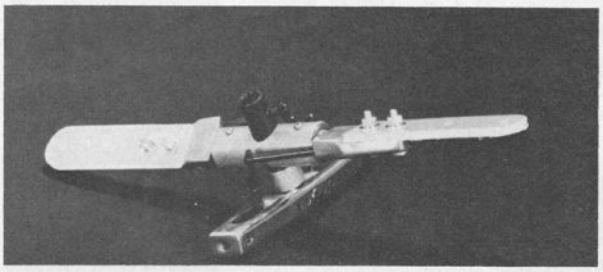


The tail rotor gear box, blade holders, collective pitch linkage, and blades are installed on the tail boom.

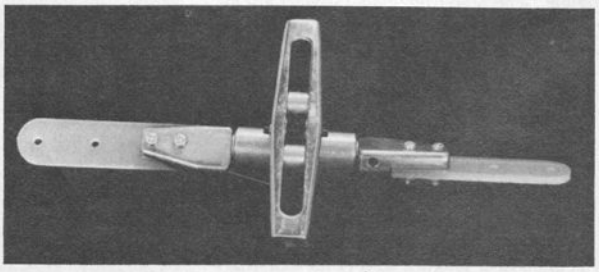


ABOVE: The entire tail boom with tail rotor collective, linkage skid, and stabilizers. RIGHT: Close-up of mounting arrangement for tail skid and stabilizers.





Factory pre-assembled head with nylon blade holders. Note pitch linkage.



Bottom view of head. Pitch of each blade adjusted with individual linkage.

ing bed of the body, be sure that it is installed directly in the center of the body. The tip of the tail pipe should not be less than the angle shown on the drawing nor should it be cocked to one side.

Next, insert the main drive shaft firmly into the joint of the main gear box. Rotate the main rotor shaft and, when the whole mechanism, including the tail gear box, operates smoothly, your mechanical assembly is now completed.

All that is required for the main rotor blades and the tail rotor blades is to sand lightly with 600 paper and coat with several coats of clear dope or cover with trim MonoKote or DJ's Wide Multi-Stripe. Make sure that the covering material is securely fastened over the entire surface of the blade, both top and bottom, by applying adequate heat with your MonoKote iron. Insert the tail rotor blades into the pitch housing and fasten with the tail rotor blade screws, so that the blades are capable of turning freely to both sides. Next, install the pitch control wire in its nylon housing by securing it to the tail boom with vinyl tape. After installing the tip on the bellcrank of the gear box, move the wire to the tail rotor pitch control back and forth. When a smooth change of pitch is observed, this step is completed.

The tail skid is positioned as shown on the plans and held in place with the metal tail skid holder. Finally, finish the balsa vertical stabilizer by painting, or covering with Solarfilm or MonoKote, and install it with the aluminum mounting plate as shown on the plans. The vertical stabilizers should be adjusted so that they are not twisted when viewed from the front and so that both are set at an equal angle. Install the fuel tank in any position that is convenient. While the prototypes had their tank installed on the bottom of the wooden fuselage bed just aft of the plastic canopy base, we installed ours with brackets on the side of the helicopter.

All linkages should be installed in accordance with the plans. It is advisable to turn the adjuster rods by hand, before installing it into the servo horns, to see if the linkages operate freely. Another unique feature of the Nova Hughes 250 is the use of perfectly flat nylon blade holders with individual pitch adjusting rods to each blade, thus allowing each blade to be individually adjusted for the correct amount of pitch. Once adjusted, and when the helicopter is running, the blades seek their own coning angle. The stabilizer cans provide instantaneous response to a given control and the novice helicopter pilot is advised to use minimum control throws at first to avoid over controlling this responsive machine.

Be sure that you have balanced your main rotor blades as shown in the instructions and adjusted the pitch with the pitch control adjuster provided in the kit. The pitch of the tail rotor blade should be set between three and four degrees as a good starting point.

The Nova Hughes 250 is an extremely well-made, high quality, small helicopter with most of the complex assembly work

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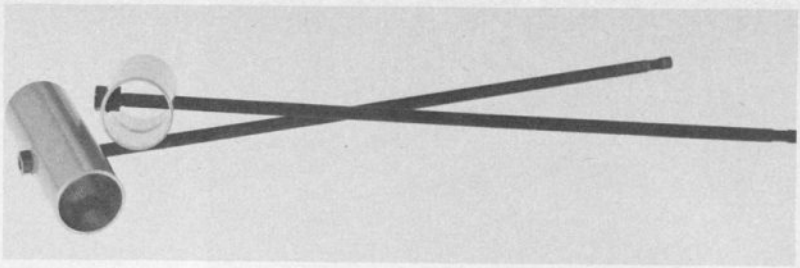
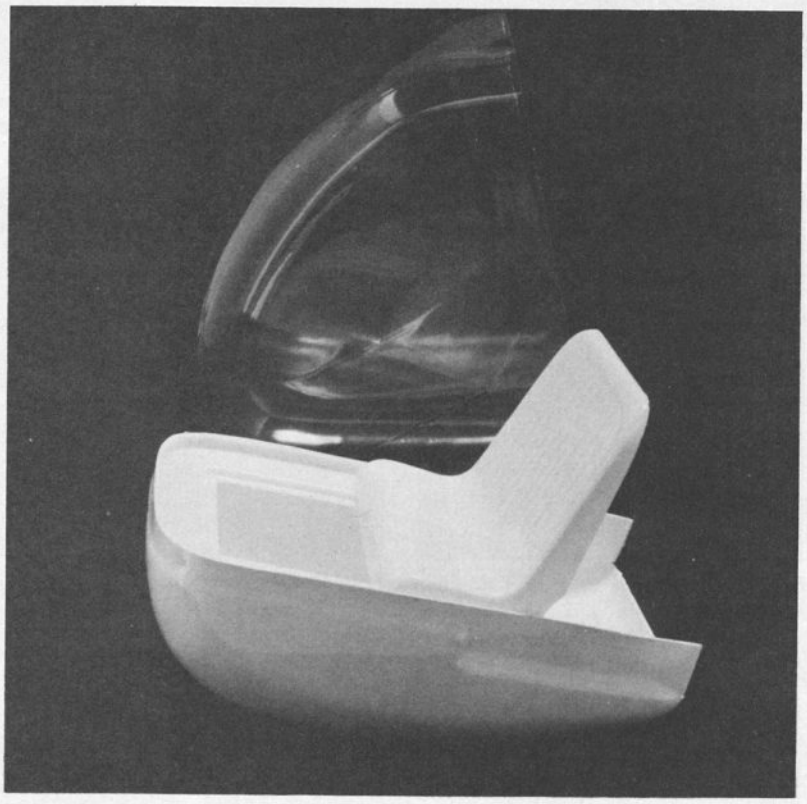
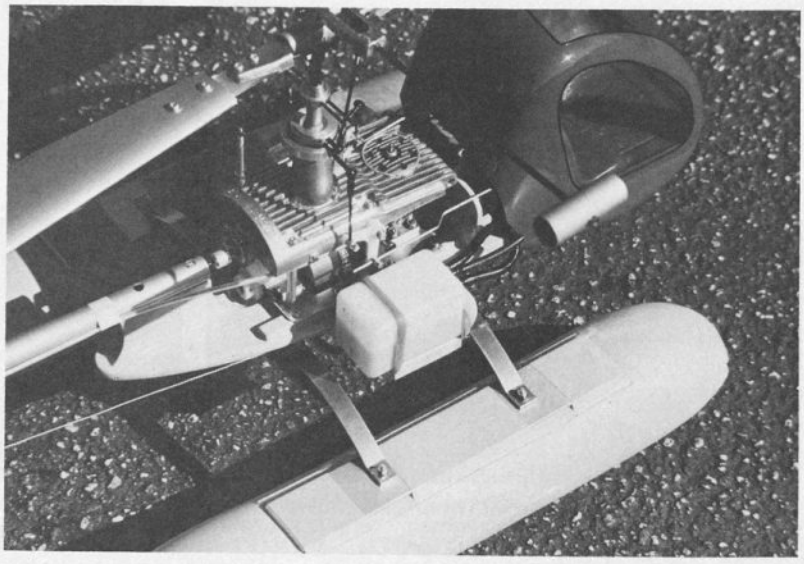
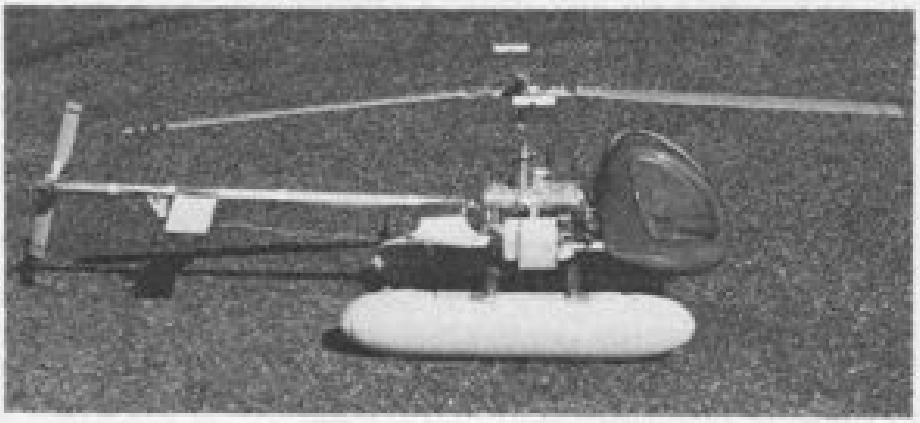


Individual fly bars and control cans.



The body and canopy, ready for painting. BELOW: Flybars, cans, tank, radio, and body installed.





NOVA HUGHES 250

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. . . . . done at the factory in Japan. It is extremely stable in the hover, yet highly responsible and maneuverable in forward flight. If you are a novice flier, we would recommend using the accessory Nova Hughes 250 float kit and strap a 36'' fiberglass arrow shaft across the floats and rubber banded to the float braces. A small, light weight, plastic Wiffle ball should be glued to each end of the arrow shaft, which will help you to avoid tipping the helicopter over.

At the present time, there is no U.S. distributor for the Nova Hughes 250, and it is available directly from Nova Limited in Tokyo, Japan. The price of the Hughes 250 kit, with basic fixed pitch rotor system, is $188.00 including sea postage, or $203.00 including air postage, — or with collective pitch rotor system for $210.00 including sea postage, or $225.00 by air. The collective pitch rotor system is also available as a separate optional accessory. If ordering the Hughes 250 kit from Nova Limited, P.O. Box 22, Adachi, Tokyo, 120-91 Japan, personal checks are not acceptable as they are difficult to negotiate. Send a postal Money Order or bank check when ordering.

In summary, we would rate the Nova Hughes 250 as the best and most advanced .19 to .25 powered helicopter we have built and tested to date. The quality of all parts in the kit are excellent. The price may seem somewhat high in comparison to other small helicopters of this size, but this is due to the factory pre-assembling and check-out of all drive train units prior to shipping, thus insuring the uniformity of quality control. The instructions supplied with our kit were in Japanese and in English, and we would recommend that the instructions on the kits exported to the United States be somewhat more detailed, since they would be difficult for a beginner or novice builder to follow. All in all, an excellent .19 to .25 size helicopter with truly outstanding flight performance. □