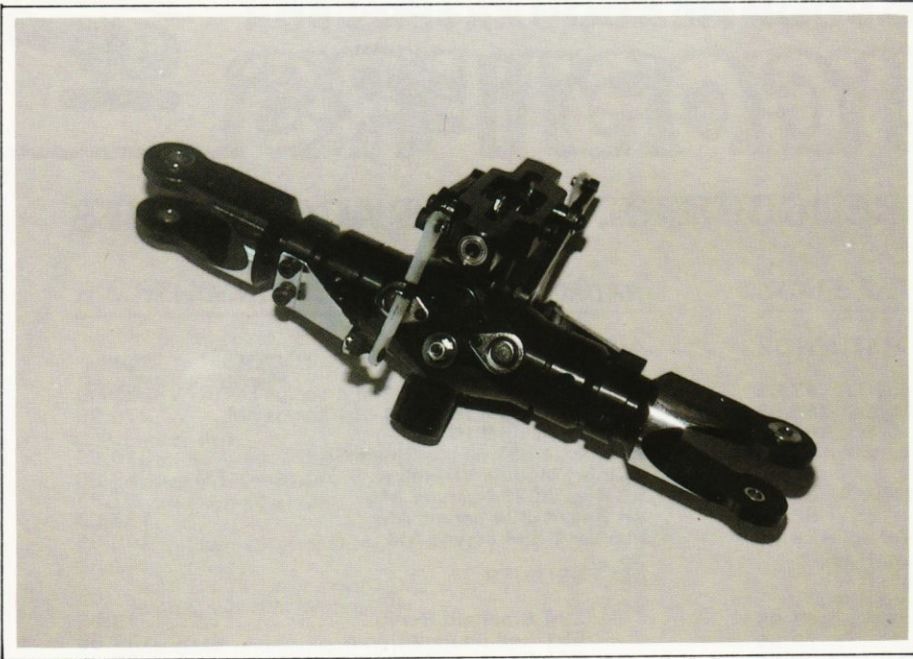


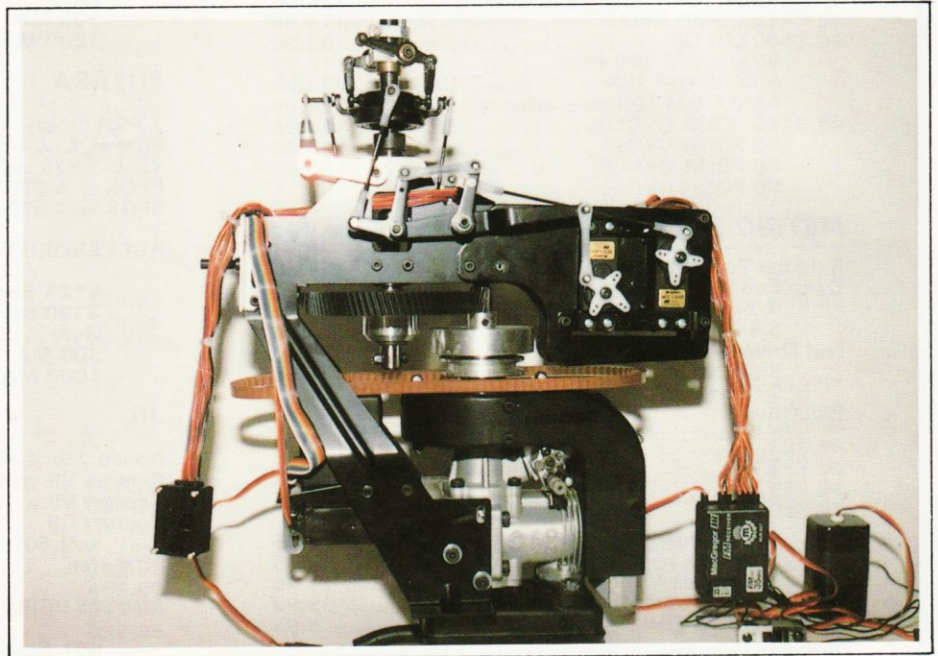
HIROBOS DDF SST

KIT REVIEW PREVIEW

Due to technical problems beyond our control the review meant for this Issue will now appear in the next Issue.



Above: *The height/head of the matter. Supreme craftsmanship certainly went into producing this rotor head. Not only does it look good, but certainly the Editor found his hovering skills to be very precise. Circuit flying is smooth and response can be adjusted for all conditions — weight of blades, body or/and weather conditions, i.e. wind. Full details in the next issue.*



Right: *The heart of the matter. Everything ready to be dropped into the fuselage body in one package. Link up to the tail drive shaft pre installed in the fuz. and you're ready to go. Removal or fitting of this little lot takes approx. a few minutes depending on how nimble you are. More details in next issue.*



Left: *The shape of the matter. The fuselage after receiving it's final coat of clear lacquer. Eventually the entire body will be scaled with rivets etc. and new U/C. More details in next issue.*

Photos: Editor.

In Pursuit of High Technical Flying

A Review of Hirobo's DDF SST Jet Ranger
by the Editor

HIROBO DDF SST JET RANGER REVIEW

When a manufacturer who produces a fine range of model helicopters for the novice to the expert comes out with a new model that is reported to surpass all the refinements available in a model helicopter today, then the expectations of that new model will be high indeed.

Hirobo have done just that. Known for their excellent range of scale helicopters and their pod and boom range, they have now produced a kit that as they rightly say in the instruction manual that accompanies each kit, „this is the cream of existing model helicopters“. I cannot doubt that comment after having built and flown the model. There are a few details that will be pointed out which I hope Hirobo will rectify with this particular model. These, of course as you will see, do not in any way detract from the model's precise and superb flying characteristics. They are only minor points which one would not expect in a kit of this precision, quality and value.

Acquainting Oneself

The instruction manual that is supplied with the kit is certainly the best that I have come across to date. Hirobo's previous instruction manuals were pretty good. Here however, they have excelled themselves by ensuring sketches, illustrations, schematic layouts and the accompanying instructions are highly legible and in correct English. The manual actually is printed in Japanese and English and the translation is excellent. In addition to the manual, you get a full scale blueprint and a separate manual on the rotor head (see later). Each assembly stage is well laid out with the corresponding list of parts required and which of the numbered bags to use. Each and every bag in the kit contained the exact amount of hardware required for the differing assemblies and no one should have any problems with finding out what to do with that little washer or grub screw at a later stage, as if this did happen, it only means you need spectacles.

Finding the Muscle

The power requirements for this model lead us into the .61 engine size. Here, there are different opinions on what type of engine is best suited for this, or indeed any model. Hirobo certainly seem to favour either Enya or O.S. Myself, I chose to use the O.S. 61 with rear exhaust and the 7H carburettor (even though I am utterly useless at knowing how to set up this carb properly). Well, I have always used O.S. engines and since opening the box and fitting the engine to the frame, I have never had to use muscle to start them or bother with altering the factory setting. (Maybe I have been lucky.)

As with any assembly associated with the engine, everything **MUST BE PERFECTLY ALLIGNED**. It is absolutely pointless installing the power-plant if it's not perfect, as vibration will be apparent right away and it will more than likely bind the clutch shoes on the clutch bell at some point. If you have to do it over and over again, do, as this will ensure the fan, clutch shoes and engineshaft all run true.

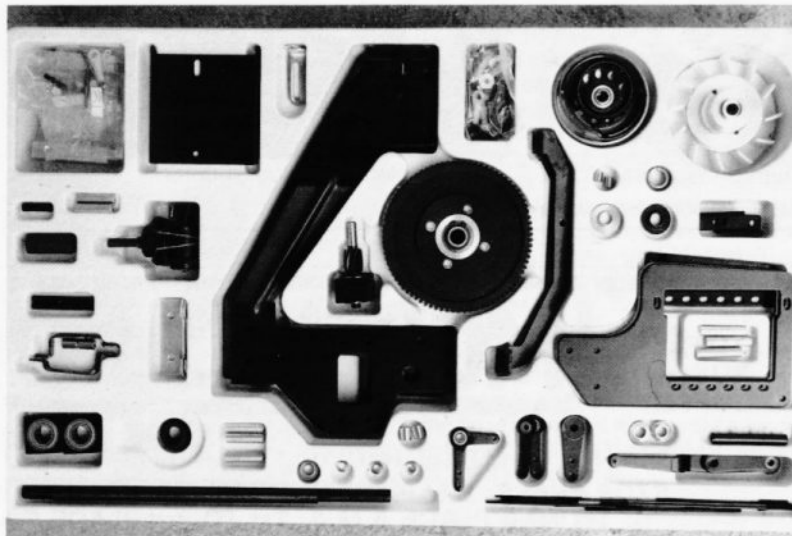
A Short Time Fitting

The schematic sketches and illustrations associated with the instructions for assembling the main frame, radius arm and collective pitch mechanism, are thorough and very well detailed. When

Upon fitting the engine unit into the main frame onto the pre-drilled mounting block, before tightening up everything, make sure the clearance between the gears is firm yet smooth. Takes a while to get this right.

The end result should be able to show the head freewheeling in either direction without friction, yet ensuring a good mesh on the gears. If you use a piece of paper 3"x 1/2" from the edge of a page of the instruction manual, this can be inserted between the gears and the gears rotated.

It should produce a perfect concertina in the paper. The fan housing is in two halves. It attaches to the side frames after being joined by five self-tapping



Typical Hirobo parts tray offers easy to find part for stage by stage construction.

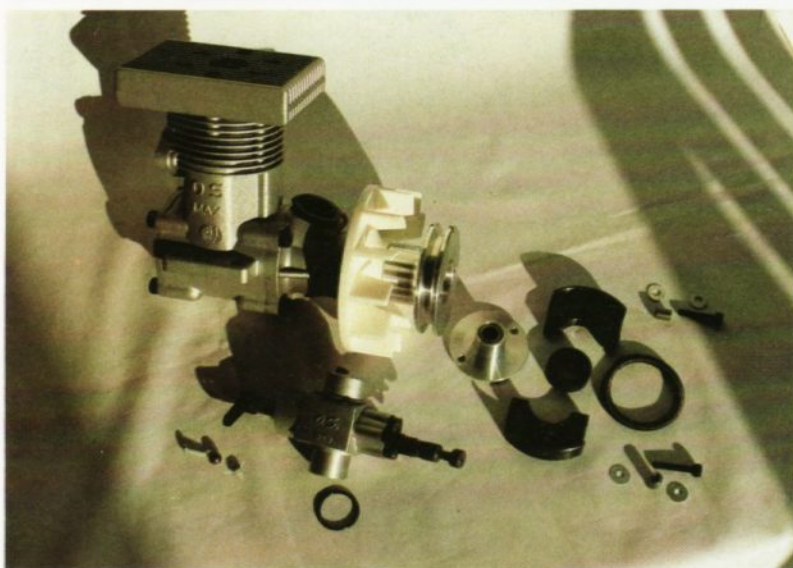
complete, the whole unit can be easily fitted into the fuselage in an incredibly short time with only eight bolts needed to be done up.

Prior to installing the counter gear (which is preassembled), it is advisable to strip it and regrease it after setting the bearings in a minute amount of cyno in the gear casing. This unit couples to the tail drive via a female tube housing which only requires the male end of the drive (with the flattened end) to be inserted for a snug fit. At the other end of the tail drive, a standard collet type arrangement is used for mating with the tail rotor hub assembly. The drive shaft runs through a brass tube which should be well greased. I find the ideal way to dot this is to use a hypodermic syringe with large needle. This can be inserted into the brass tube and the grease pumped in. When you insert the tail drive wire, it will then dissipate through the entire length of the brass tube, giving perfect lubrication.

screws. Oh yes! - don't forget to install the starting belt before meshing up the gears or you will be sorely sorry! While at this stage, my mind was elsewhere and I had to go through the whole procedure again.

Well, practice makes perfect!! It is here that Hirobo amazed me. All the trouble they have taken to produce this excellent model, yet there were no starting belt retaining clips on the fan housing or elsewhere. This is a pity as you have to be very careful otherwise (see flying stage). The tail rotor gearbox should be stripped down and the bearings epoxied into place and reassembled with fresh grease.

I was expecting a new type of gearbox with this model but as it is the only one they produce which is absolutely perfect, this was overlooked. The K-type radius arm assembly assures precise slop free movement on the swashplate. This is certainly one of the attributes towards precision flying.



O.S. Max .61 H rear exhaust with 7 H carb. Flywheel and clutch shoe assembly requires precise setting as do all other makes.

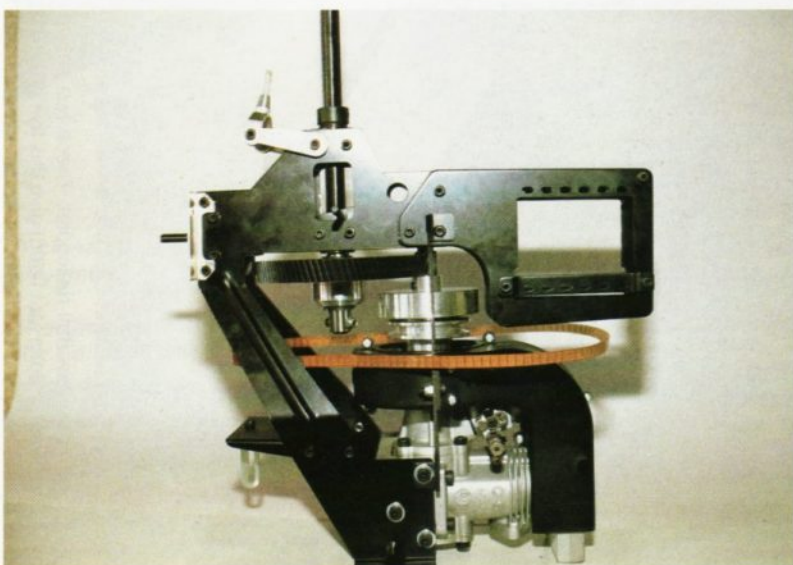


Figure seven type layout forms very neat unit, which is also exceedingly robust.

The co-axial swashplate is pre-assembled and connects to the W-type wash out which is made from alloy compared to the usual plastic. Here again, I found the movement to be much more precise and slop free.

sists of a new type pitch plate which is ball raced. Tail blade holders are supported on double bearings and if great care is taken in this assembly, the whole unit will be very smooth with little or no slop **before** being attached to the rod ends on the pitch plate.

Again, here too the instructions are

An Arm that Throws Well, Plays Well.

Mounting the servos is straightforward and again the instructions and drawings are clear. I followed everything to the letter and using the blueprint as a guide. I found that I managed to get all the distances of the rods (between rod ends) absolutely perfect. The throw on each servo arm is shown in intricate detail and after I had completed this assembly - and the rotor head was attached - I found all the necessary movements to be 95% correct. Subtle changes in rod length corrected any erratic movement and gave a set up which soon proved to be satisfactory beyond expectations. The tail assembly con-

cellent and in showing correct set up with servo for showing where the position lies for hovering position and plus and minus pitch.

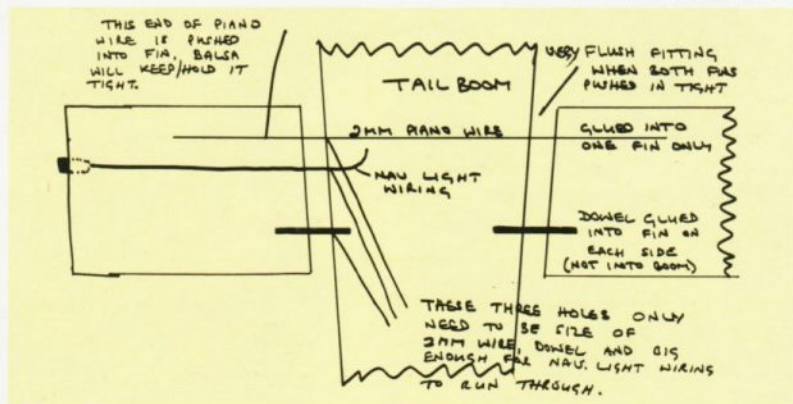
No Holes in this Body

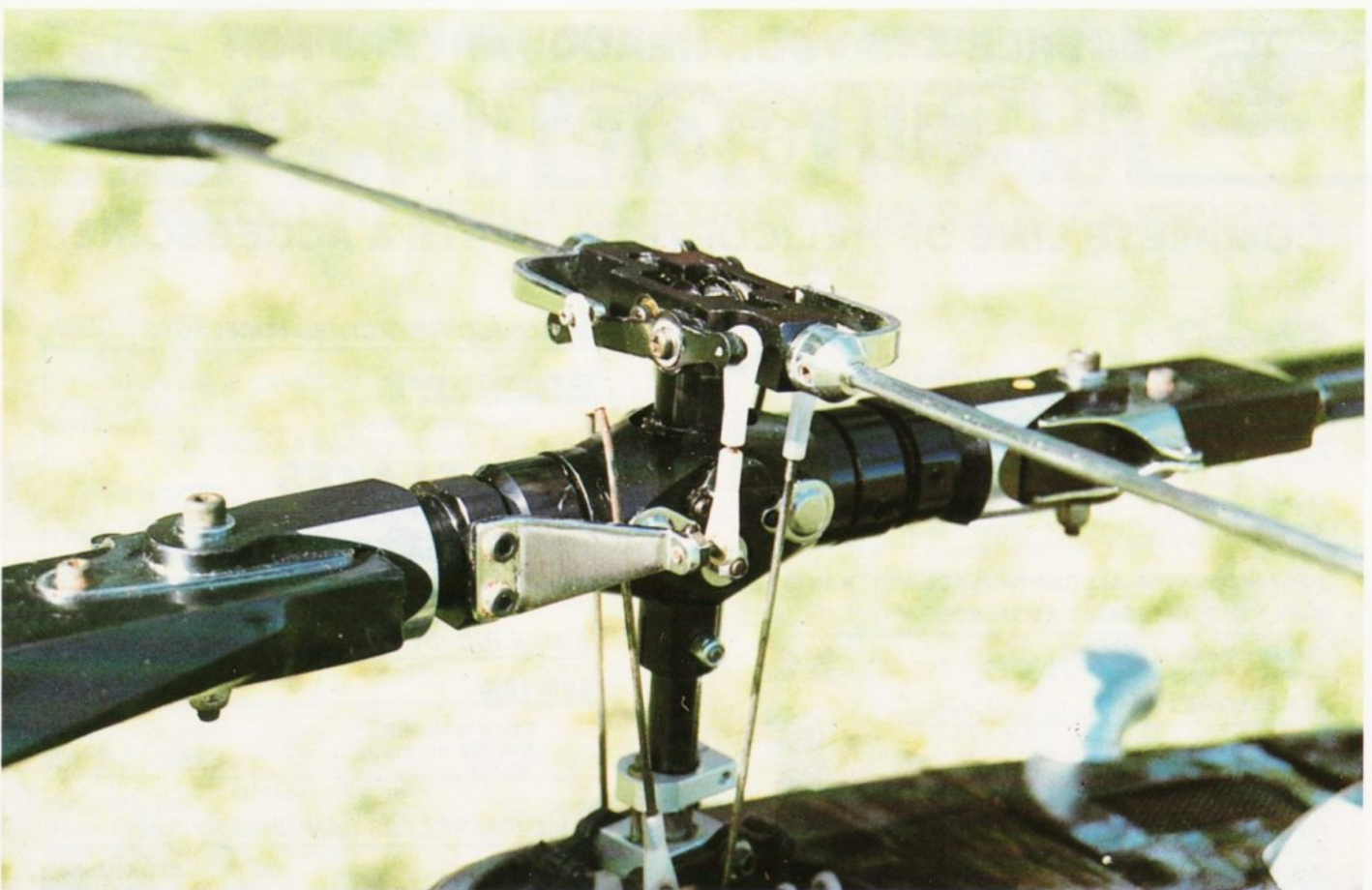
As was expected, the fuselage requires very little work in it except for cutting out all the necessary apertures, windows, etc. The moulding process which Hirobo have, provides you with a fuselage with absolutely no pinholes. Only the seam on this model required sanding and filling and then the entire body wet and dry sanded to remove all traces of release agent and to provide a smooth matt finish. I had gone to great lengths to install the woodwork (all pre-cut and shaped) in a clean and fuel proofed assembly. I used fast and slow acting cyanos for installation. The fast type to spot glue the frames in place and then using the slow type to fill gaps and edges. The body top opening needs a lot of care to ensure the finished area does not have a large panel gap.

The vertical and horizontal tail fins need to be shaped. As I was going to install a tail beacon and nav. lights, this process took a considerable time. For the horizontal fin, I first shaped it to the correct airfoil-like section and cut it in half. I then cut each piece to the correct length for either side of the fuselage. A groove was cut in the underside for the wire to follow to the fin end where the light fitting was semi-recessed. The groove was filled with epoxy filler and each piece covered in heat shrink main blade covering (the type used for the large petrol engine 47 G blades). This was sanded to remove the gloss so as to accept the paint. Each piece had a small dowel inserted (see diag.) and one piece a length of 2mm piano wire which when inserted through the tail boom would insert into the other half of the fin. This meant it was very easy to remove the tail fins in the event of an accident if it was needed to repair the tail boom.

The vertical tail fin process was similar except it required several coats of primer to obtain a smooth finish as one could not use the heat shrink method. Hirobo supply the exhaust stacks (although Dave Nieman Models now have pre-coloured plastic ones that don't require any preparation which the glass fibre ones do, supplied in the kit). A front windscreen is also provided and the end result, after painting in your favourite colour scheme, is an im-

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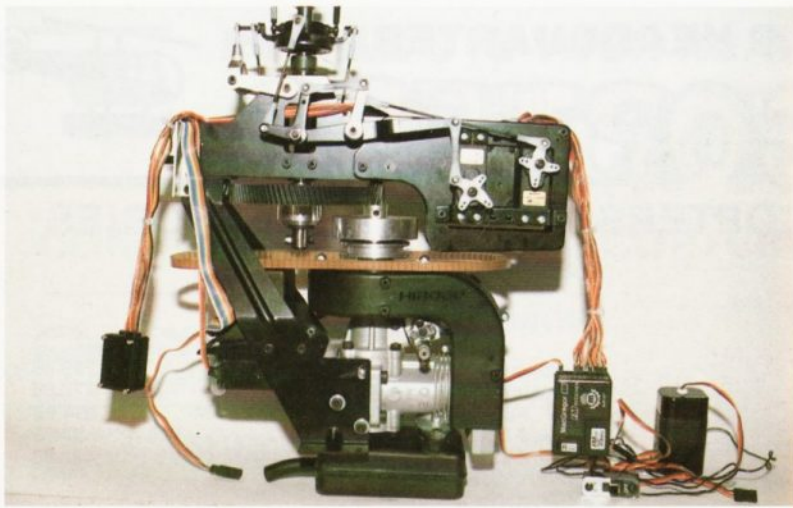


A close up of the DDF head. The lead lag adjusters are not fitted as are not necessary for general flying. Due to the salt air environment, the Editor found he had a lot of problems with corrosion and had to wash down and lube all parts regularly.

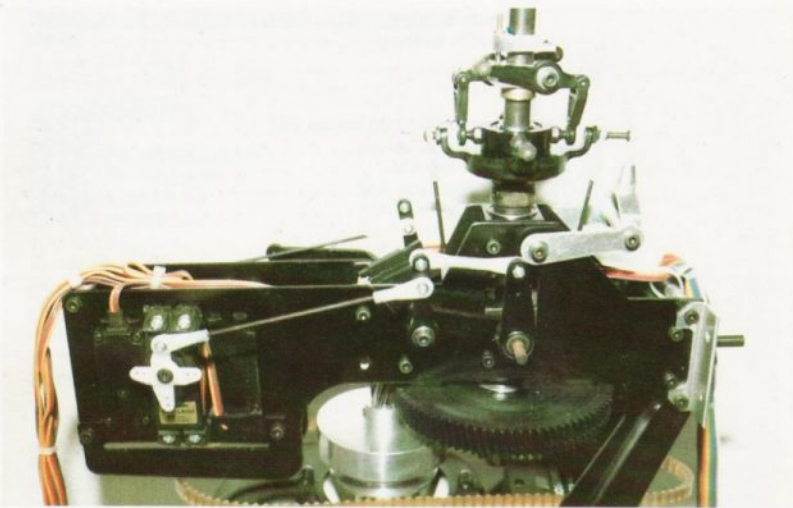
The Channel 7 chopper flying around a yacht Marina amongst the masts while filming a documentary! on B.V.I sailing, which the Editor is sorely going to miss!

Photos: Diana Cameron-Tough





Everything aboard ready to be installed in the fuselage. Gyro sits on platform behind engine. Bottom silencer/muffler is Hirobo type and is very quiet.



Collective and cyclic control set up is totally slop free. This positive set up ensures accurate stable hovering and perfect direct control to rotorhead.

pressive looking 1/9th scale model of a Jet Ranger II or III. The skids are not scale but can easily be made to look so. Lately, I have been using the low version MSK plastic skids. (I intend to rebuild the model with scale high skids and full rivet detail and interior detail.)

should be soft in a light helicopter and hard in a heavy one. However, the flapping damper may differ according to the revolution speed and weight of the blades.

For example, soft damping for heavy blades and high r.p.m. and hard damping for light blades and low r.p.m.

No Headaches with this Head

D.D.F. is short for dual damper flapping. What this means or comprises is a yoke damper on the main shaft with dampers on each of the flapping shafts/blade holders independent of each other. Made from very high grade aluminium, the quality of this rotor head, which gives precision and strength, makes it far superior to any other on the market (except possibly for the Kobe Kiko Robinson R22 rotor head). By being able to adjust the dampers, various degrees of coning angle can be achieved.

Also, by using different types of rotor blades, light, heavy, etc, various conditions of flight characteristic can be sought, depending upon the weight of the helicopter or the r.p.m. by adjusting accordingly. Thereby, one can set up the model/rotor head to favour hovering manoeuvres or for aerobatic flying. This is done by adjusting either or both dampers. Generally, the flapping damper

HIROBO DDF SST RANGER REVIEW

Additionally, it is possible to change the Bell and Hiller mixing rate. For differing conditions, you can change the Bell and Hiller rate without changing collective pitch volume. This is done by changing the fulcrum point of the mixing arm where it is mounted at the seesaw section. This can produce a large Bell rate if on the inside of the fulcrum and a large Hiller rate if on the outside of the fulcrum.

The head is supplied with the kit in its own box and with its own instruction manual. Read this very thoroughly to understand what can be achieved and follow the set up diagrams to the letter. This will ensure you get the best performance from it - no point in having it otherwise - which is what it is aimed at giving and it does.

Getting to Grips

The rotor blades supplied are of the standard hardwood leading edge, softwood trailing edge make up. The blade reinforcement plates (for root end) have to be shaped and cemented with epoxy to the blades.

This is the other point I feel Hirobo should look at. Not having this pre-done for you detracts from the quality. Having to do it yourself is not everyone's cup of tea and really is no longer a sign of one's capabilities of doing it right.

These blades should really be pre-drilled, made up and pre-balanced when supplied with this model/rotor head. Likewise, the tail rotor blades.

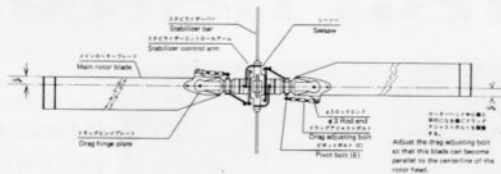
And So to the Ground Effect

Usually, a lot of people pre-test their model before going to great lengths in scale detail, paint jobs, etc, usually due to a fear that the model will not fly properly right away. This is certainly not my mode of thinking. After all, it is common knowledge that all model helicopters will fly - some better than others. I prefer to finish my model, knowing that I shall play the role of test pilot upon its leaving the building yard, so to speak, thereby taking time to ensure it all works well.

With this model, as mentioned earlier, all the linkages etc. were set as per the instructions and nothing was modified in the way of changes to the mechanics or layout of equipment in the fuselage. Due to having added the lighting system for the tail fins. I experienced a slight drop in the tail and added a few ounces of lead weight into the nose of the model. It then balanced by the flybar with



The Editor flying in a steady static hover in a 15 knot breeze with only small cyclic input. The Editor has hovered and flown slow forward flight/circuits virtually after circuits i.e. (circuits viertally totally hands off after trimming to the conditions).



skids level to a flat surface, how I like it to be. The engine had not been test run, yet fired after the third attempt on the starting belt. The blades that I received were fairly heavy and the model weighed 11 1/2 lbs. I had the flapping dampers fairly soft to medium, i.e. there was a noticeable droop in them when pointing fore and aft in a stationary position. I always fly hover techniques with the rates on my J.R. Apex in the slow position. I find this gives me smooth control, for scale speed, authenticity, etc.

With one turn on the pitch rod (after bringing up rotor speed to find slight tracking error) I found tracking to be totally precise. Now, as we all know, this can change in flight. The model was then put into ground effect in a one and half foot hover right away and a tank of gas used. The model hovered in a 12 knot breeze without moving. I was impressed. On the second tankful I was hovering at around four to five feet when the engine died abruptly with an almighty screech. I put full collective in to save the model, which it did and it landed precisely where it had taken off from. What caused the engine failure? Well, it was the

starting belt which had found it's way into the clutch/main gear (due to no retainer clips).

Fortunately, I experienced one and a half tank fulls so far of very precise hovering and no damage except one screwed up starting belt.

As I did not have a spare of the correct length and it would take a while to obtain one, I utilised a slightly small belt taken from the Hirobo 555. Yes, I had to dismantle everything to reinstall this. Was I ... off? You bet! Nonetheless, I fitted my own retainer device which is a simple alligator clip on the fan housing.

Why had I not done this to begin with? I was trusting Hirobo's judgement that one was not required!

Next flights I tightened the dampers a bit as I thought they were too loose and I may soon experience a boom strike if I flared too harshly on a landing. I have since flown the model in breezes of up to 20 knots, typical BVI conditions — that's why its great for sailing, without my becoming worried. Something I would not do with any other model that I have built and flown to date.

I do not wish to fly aerobatically so I cannot comment on its performance in that field, but I know several people who do and the model has proved to be a very precise and superb handling machine.

For general flying around it flies better than anything I have flown so far. For scale flying, i.e. scale speed, steady hovering, hover taxiing, etc. it is simply quite terrific. My third point that I will raise is that I think Hirobo should supply a few extra bags of ball links with each kit as I did experience some of the one's in the kit to be slack more so than others.

Fortunately, I always keep a stock of these and change them at the building stage. I have not had to change anything else through wear or tear. I do, due to living in a salt air environment, strip the model down and clean it with fresh water and then coat it with Teflon.

Final Comments

I cannot praise the model any higher than saying it will be an extremely good buy for the modeller who wants to build a scale model Jet Ranger and for it to fly scale very well, or for the modeller who is a proficient aerobatic pilot as it will provide precision second to none. However, I will say finally, that the flying characteristics are only as good as the job taken in building it and in setting up the rotor head.