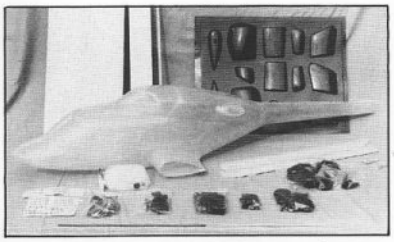


No pretty box to take home – just the raw ingredients – after all it's only the model that flies.

Heim's Bell 222h

by J. G. Swan

Since the arrival of Ewald Heim's *Star Ranger* in the late seventies, the model never seemed to gain great popularity in England as it did in Europe, this I feel due to being presented as the best ever aerobatic model available in a country which has very little in the way of aerobatic FAI type flying or competitions. So with the introduction of the new Heim Bell 222h, a fresh look at Heim's models for the sports and scale flyer seemed about time. A visit to the sole Importer of Heim's models and accessories namely Vago Nordigian of Watford Model Centre, Watford, proved very reassuring. Pretty boxes have never been Heim's scene and upon collection of the 222 kit, one leaves the shop after spending nearly £400 with an epoxy glass fuselage in one hand, a small brown box in the other, a set of windows under one arm and a printed pieces of plywood under the other. I have been informed the reason for this is purely cost (after all you don't fly those pretty boxes do you?). Inside the brown box are 6 poly bags each containing parts for each sub-assembly. Immediately noticeable is the very large amount of glass reinforced plastic parts, this obviously cuts model weight dramatically, a pair of fully symmetrical main and tail rotor blades, tail rotor drive and tube, fuel tank, balsa, decals, plans and instructions etc.

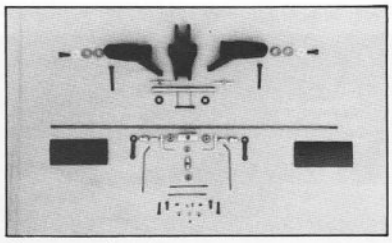
Mechanics

The mechanics are assembled in small sub assemblies each adding to the next forming the main mechanical basis, all go together very quickly. The main gearbox was first to be assembled, the only problem encountered here was what appeared to be a copper coating on the drive gear shaft, this prevented the 6mm bevel gear from sliding down into position. Sanding the shaft lightly rectified this problem. Both of the tail drive bevel gears are held in position by 3mm grub screws, after adjusting for running clearance the shafts they sit on were centre drilled and locktighted into position. Both side frames were now bolted into their relative positions along with the main gear (autorotation standard), main shaft, top bearing and plate. The anti-rotation bracket was filed slightly to clear the rear fore/aft steering rod, this completed the main assembly apart from the engine. Engine taper collar, clutch housing, clutch and cooling fan were fitted on to the engine's shaft (after removing both prop driver and washer) in this case I decided to use a OS 60 ABC FSR. With the aluminium engine bearers bolted to the main side frames, the engine assembly was offered up for marking out (leave about 25 to 35 thou running clearance between the drive gear and the clutch housing). After drilling the taping engine mounting holes, the engine assembly was then bolted into position and adjusted for proper mesh. A very large aluminium heat sink is supplied with the kit, this was fitted over the cylinder head and then tightened in position, this also doubles as the main mechanics to fuselage front mountings (the engine is used as a stressed member). The rotor head assembly combines the Bell/Hiller mixing and all moving swash plate for collective pitch. With the absence of coning angle the main blade axle is a single piece of 8mm steel passing straight through the centre hub (at least the centre yoke is not going to break every time you bang a blade). Both main blade holders are double ball raced and held in place by 6mm cap bolts with safety washers. Two 'O' rings made of rubber sit either side of the centre hub on the blade axle providing a small but very stiff teeter, also two 3mm cap bolts one either side of the hub at the bottom provide static coning adjustment. Bell/Hiller mixing arms fit directly on the pitch control arms with a 60/40 mix to the fly bar. The fly bar steering paddles are very slim and light (these obviously reduce following rate dramatically, so playing around with different types, you should be able to get what ever rate you like) before screwing in position I added a wheel collet one either side to increase paddle weight slightly (I had tried these paddles previously and found these collets necessary). This completes the head assembly which proved very simple in construction and appears to be very robust. The simplicity of Heim's head is staggering, this due to the very few number of parts and the beautiful injection moulded parts.

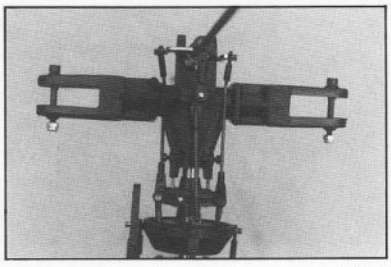
The tail rotor gearbox was put together without too much effort, the important point here is to get the right running clearance between the two bevel gears, then centre drilled the shafts for the 3mm grub screws. The 'C' clip which retains the ballraces proved to be extremely stubborn to locate properly. The problem here is the tail rotor drive coupling is very close to the casing not allowing a proper purchase to be obtained on the 'C' clip. The tail pitch plate and brass pitch slider have to be glued together after being passed through the pitch slider block, important point here to key both surfaces properly before gluing (I found Stablit Express best here). Both pitch slider and tail blade holders are double ballraced, and tail rotor hub has a type of delta hinge which all go to make a very smooth and crisp tail response. A retractable undercarriage is also included in the kit, again all parts are plastic including wheels, with the exception of the steel hinge pins and springs. Assembly again is very straightforward apart from the small coil springs which have to be compressed while inserting the hinge pin. These springs provide the suspension that makes for independent suspension all round (more set on these springs is needed before assembly, as finished model with gyro and full tank proved too much), retracts are purely mechanical and do require a 180° degree servo for proper operation.

Bodywork

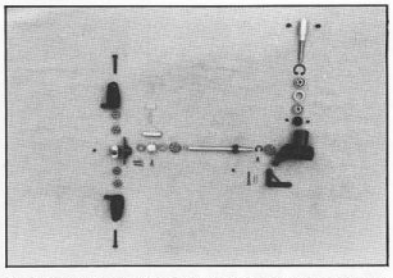
A 3mm plywood sheet with all the formers etc printed on it was first, cut out. This sheet takes about an hour. The epoxy glass fuselage was next, cutting out all the holes and window apertures save for the retracts. Window apertures were cut leaving on an extra 3mm all



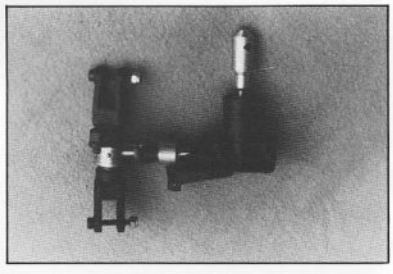
The rotor head components – success without being over elaborate – providing a solid powerful piece of equipment.



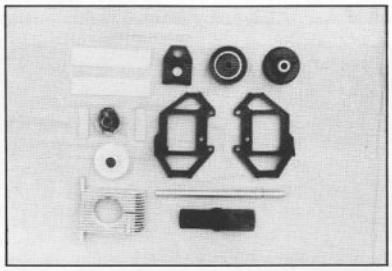
The rotor head seen here assembled with swashplate and scissors link assembly.



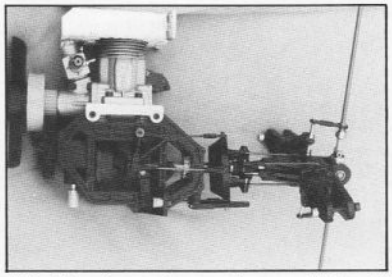
Tail rotor and gearbox assembly. Note all the ball races.



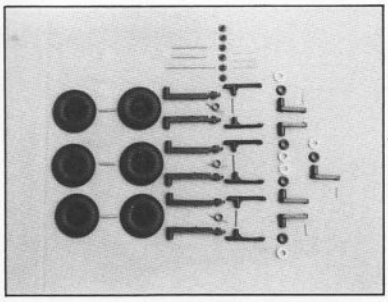
The assembled tail rotor unit. Very good design.



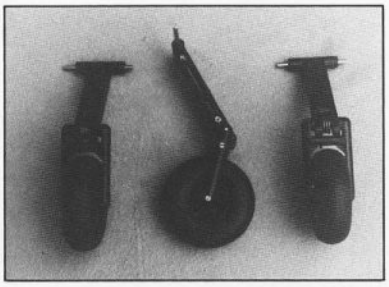
The side plates – yes that's them with heatsink and clutch assembly.



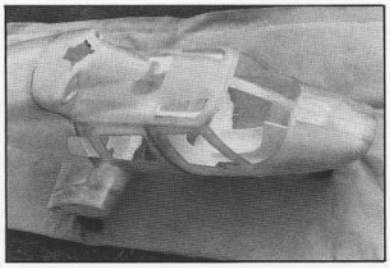
All this drops into place within 4/5 minutes. Maintenance is a joy and simple.



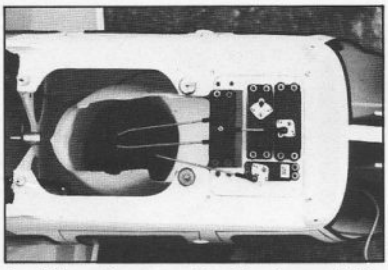
Components for the retract gear.



The assembled wheels and legs.



The fuselage with windows cut out and retracts fitted.



Looking down onto the top of the model and the attachment points for the mechanics assembly and servo installation.

The completed model takes to the air. What a pretty ship!

On a close fly past with retracts up – the model is very sleek.

round, this extra 3mm was required for the fitting of the KAVAN window rubber (I have found that this is by far the best method for fixing windows). The stub wings and undercarriage formers were first installed after installing the plastic bearings. The undercarriage was all fitted together with formers and then positioned into the stub wing, the wheel in the retracted position, and then glued. A small amount of work is required here in order to obtain a smooth free moving undercarriage. The two front formers next along with front retract and wheel. With all retracts in position and glue dry the apertures can now be cut out (this is quite easy now as you can see through the natural coloured body). The top plate former was located and glued, followed by the two main vertical formers, this apart from the tail drive supports and tail rotor gearbox mounting completes the bodywork.

The tail rotor gearbox mounting I always like to strengthen whatever the model, this I do by laminating a piece of ½ inch hard balsa to the ply former after the blind nuts have been glued in position thus more than tripling the gluing area (nothing worse than coming lose on the first flight). With the main mechanics in place the tail drive was slipped into position, the tail drive tube is fitted and glued into a slot in a piece of 9mm square balsa strip. The cooling fan housing takes a fair bit of time to position, positioning this right is very important, the gap around the cooling fan must be the same all round. After gluing in, wing joining tape was used to reinforce the joints. The vertical and horizontal stabilizers were cut out and finished off from the balsa supplied. After all parts were fitted and double checked, all woodwork was given a coat of fuel proof paint before wet flatting the fuselage with 320 grit wet and dry (this stops wood parts from getting soaked with water). After flatting of all the shine, the fuselage was given a coat of cellulose high build primer and allowed to dry. A small amount of cellulose paint stopper was required in ony a few areas (nothing drastic in fact, seems a very good moulding without the usual pulled seams). Primed and flatted again, two coats of white paint were applied and allowed to dry over night before final colours and striping.

Radio

Servo mounting is as plan apart from the tail rotor servo which was mounted to the rear main former bulkhead (out of the way). Collective pitch is achieved by making the whole of the right/left cyclic servo move backwards and forwards (servo is mounted directly into a mixer supplied) by connecting it to the collective servo via mixer. The gyro was installed in the front compartment along with the batteries and receiver, quite a lot of room.

Flying

After setting the engine for an idle position and keeping it on the rich side, a tank was run through. Being an ABC I find that this seems to be enough. With the main blades now fitted and a full tank of fuel, the engine was restarted and leaned slightly, opening up the engine to almost lift off the blades were checked for tracking. This was out slightly by about ¼ of an inch adjusting the high blade till tracking was correct. Opening up again all looked good so lift off, up she comes, a small amount of left cyclic and a touch of forward was all that was needed. Tail rotor required no adjustment at this time, after landing the rate gyro was then switched on (I like all the tail rotor movement I can get, and then use about 25% gyro, this dampens the tail slightly in the hover). Up again, motor running rich (just of two stroke controls were nice and responsive without being over the top). With the model set like that it was handed over to a friend to try (he was quite competent at hovering but still a relative newcomer) with a small amount of trepidation he lifted off and held it in the hover for a while getting used to it. After about five minutes he was moving left and right, landing and taking off without too many problems. His comments were "It was far more sensitive than his own model but quite manageable, the response rate was instant and you don't have to wait for it at all" (off he went with a pair of light paddles to make his own model the same, no chance). With the engine now leaned out well and truly on the pipe, up and away, a touch more tail trim was now required with the engine now revving, really responsive and fast in forward flight with plenty of penetration (no wonder why Heim can perform in all weathers). Low fast fly bys really look terrific, especially with the wheels up.

Mr J. G. Swan with his test model in the hover.

Another 222h by Heim – this one built by Vago Nordigian and coming in to land – what a lovely model this is, so elegant.

Collective response is terrific with a vertical climb that's unbelievable, stall turns and fast approaches, etc, are all great with the aid of engine idle up.

Conclusion

The kit seems good value for money considering the current trend and can be flown with either a medium or high rotor speed without losing too much response, so should be alright for someone who has learned to hover and who wishes to progress with the expense of buying more than one model. As far as maintenance is concerned it's an absolute dream, taking only 4 to 5 minutes to remove the whole of the mechanics, so service and adjustment is very simple. Spare parts situation has always been a very important criterion for me when buying a new model (nothing worse than having a model waiting for spares) and with Vago having all parts in stock this does not seem to be a problem. All in all a very good all round model and does seem suitable for the sports and scale flyers as well as the all out aerobatic pilots.