



HELICOPTER ELI-PAD

by John Heaton

DEMONSTRATION FLYING is one of the fortes of the helicopter, as not only it is interesting to spectators but additionally choppers are capable of being operated in very bad weather in confined areas. Throughout the Summer I do fetes and country fairs as well as the bigger events such as Cheltenham Helicopter Day and hope that my advice and reminiscences may be of interest.

Of course, any helicopter owner can get into things without any anxiety at all by participating in static displays, but if the model is to become airborne considerable care and forethought are necessary. Safety is of vital importance and I myself am probably as guilty as anyone of cutting things fine due to the situations I am asked to perform in, but in two years of intensive display flying I have not let anyone down yet.

I think there are two levels of display flying; 1, as a club demo including static display where you can opt out of things if it looks dodgy, and 2, a professional billed demonstration where you are a paid attraction when I think you are committed to some sort of show.

If we take the first instance, it is quite surprising how you can put on quite an entertaining show if conditions are right even at quite an early stage of learning, before you can do circuits for example. If you are not committed to a show and an airborne model would be a bonus, then the pressures are far less. In this situation the important things to check are; 1. Insurance cover. 2. Calm weather. 3. Adequate crown control. 4. Frequency clear. 5. (Most important) keep Schluter's new *Mini-Boy* is one of the latest models for the .25 to .40 motor range. Features include autorotation, adjustable fly-bar weights and starter cone. Soon to be reviewed.



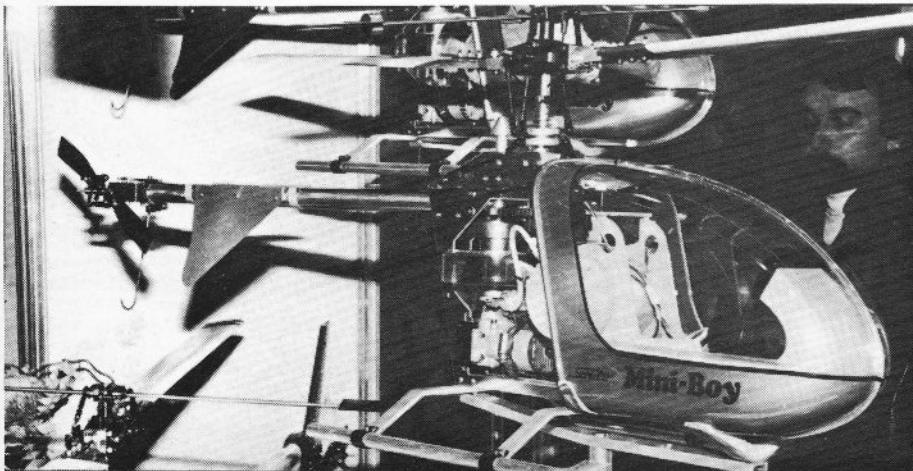
John Barrow's three-bladed rotor *Gazelle* flies as good as it looks.

within your capabilities. If you are a novice I would just lift your machine into a two to three foot hover and walk with it into the wind as far as is practical, and not try anything advanced. This way you need not get into a dangerous situation, any trouble and you can set the helicopter down quickly and nobody need know there was ever a problem. You may get a few comments like "Is that as high as it will go?", but that is better than risking more than you can handle. You can be assured that many people will marvel at a two foot altitude hover.

If you are amongst the second category i.e., paid for a billed display, then you are expected to perform on cue and this is the very time everything goes wrong. Considerable preparations are necessary and you have to be as sure of your machine's reliability as is humanly possible. I will first dwell on the

aspects of machine and flight box preparation, before the actual demo aspects. Firstly you must have have at least two machines, totally ready, tested with their own transmitters. This is because Sod's Law demands a breakdown out in front of the crowd, and if you have a problem you just switch to another machine. Individual machine preparation for total reliability is quite a subject, but in brief: radio I think must be away from 27MHz because of the danger of a lad in the crowd playing with a car on the same frequency. C.B. is, in my view, a secondary consideration. (Funny how the people who were 'shot down' on 27MHz with their five year old servos are still getting crashes on 35 MHz). You obviously cannot specify which type of radio is best and indeed there are many adequate types, but some important things are; at least an hours flying to 'burn in' the radio and thoroughly test the system, although the system should not be so old that it is likely to fail at the other end of the scale (worn out). My own view is that if a set has performed reliably for a long while, and in my case that is a year flying nearly every day, then you should exchange it for a new set. Mechanical reliability is equally important and it is vital that the whole machine has flown for a considerable number of flights, than dismantled and carefully checked before meticulous reassembly and bedding down with a flight or two. Then it can be considered fit for hazardous flight conditions where there is no margin for failure.

Engine performance is obviously vital and the first requirement is that it must start up to order every time. To this end I always test my models before loading them into the car, and stop the engine by squeezing the fuel line until the engine becomes dry, and then



pumping out the tank. That way you have no chance of flooding, it is then simply a case of filling the tank, applying the glow lead and turning over at a fast idle setting until it starts. If you have to mess about, priming or opening the throttle, then something is wrong. It goes without saying, of course, they you cannot risk using different fuels without thorough testing. The clutch must disengage completely with engine idling and blades stationary, and when called upon to transmit drive do so without slippage or snatch, anything else is unacceptable.

Of equal importance in the starting ritual is your ground equipment. I use a 12 volt battery for starter and a 2 volt battery for the glowplug, with a resistor so you can step down the 12 volt if the 2 volt goes flat. A spare fuel pump, a selection of glow plugs, and leads, and a variety of plain leads with miniature crocodile clips fitted. In other words have the capability of by-passing any failure. If your 12 volt battery goes duff use a car battery. Use of an ammeter is vital as a check on glowplug continuity. I don't favour electronic boxes for glow as they can go wrong and some tend to rob the plug of power when the starter is drawing current from the battery.

Adjustment of model is a very varied subject but it is wiser to opt for a slower revving machine and away from weighted blades in case things go wrong. Talking of things going wrong here is a list of maladies I have experienced over the years.

Tail drive failure — breakage on the bend has occurred several times and grub screws often slip. Tail rotor gear box once came loose and rotated in it's housing causing fin strike. One one occasion the tail control arm came off with loss of control.

Links off main head.

Engine failure — couple of times usually set too lean, but an unlucky occasion with the Bell 212 when the clunk tube came off, inside the tank, luckily only just off the ground.



Receiver battery drained after continual flying — silly mistake.

freewheel jammed in real autorotation.

Adjacent frequency interference — a couple of times, obviously a situation under your control.

Having collective correlated with throttle wrongly, and engine picking up slowly, causing rotor speed decay during descent and failure to pick up when pitched up.

One of the trickiest demonstrations I have made was this year at the Salisbury Model Engineers exhibition, it was really blowy, especially on the Sunday, and it was a very confined space in the centre of the city. The turbulence was so violent that at one stage I had the throttle shut right off and the model went up as high as a street lamp. At all times I was giving jabs of full control to maintain position. Another hard aspect of it was making hovering descents in between tall buildings, seventy five foot types, in strong winds. I used a gallon of fuel during the weekend and was well relieved at the end of it. This sort of situation demands absolute confidence of your ability and the machine's reliability. One of the more difficult decisions at a display is when you are cavorting inside a small arena with people all around you and you are bound to fly over some to do high flights. In this situation I usually take the machine well up to test systems, say about

Another of the increasing number of petrol engine choppers. Kalt's GS22 is essentially a *Baron 50* with a 22cc two stroke.

12 feet, and if everything looks OK, climb out, minimising time spent overflying the crowd. You have to realise that you are taking a calculated risk. It is nice to have an arena large enough to get into translational lift without going over the crowd. In my experience the onlookers are impressed by a quiet scale model flown in a realistic fashion. Another pleasing aspect is to pick on a child showing particular interest and hover directly in front of him or her and watch the delight in their face. I think it is nice to show a helicopter off in slow close quarters situations rather than at a high speed way off.

An aspect you must be constantly aware of is the wind strength and direction. A powerful tail rotor is a must because in confined areas you get nasty swirls effectively changing the wind direction up to 180° and hence experience violent tail swings, likewise you must be sure of your orientation. I would say that to be safe doing confined space circuits you must be capable of a nose in circle, i.e. be able to handle your helicopter with it facing you. On the face of it these new petrol driven helicopters would seem to be ideal for displays because of the ease of starting but against that is the extra weight involved should things go wrong.