HOVERING ABOUT with Jim Morley

DID ANYBODY tell you, back in the days when you were learning to ride a bicycle, to steer towards the way that you were falling off? And if they did, did it do any good?

It seems to me that learning to fly a model helicopter has similarities. Whilst thanking those few who did write to me in response to the question 'how did you learn to hover' it must be concluded there is no easy or right way. Tenacity seems to be a prime requirement unless you are exceptionally gifted. All agree that the effort is worth while whether it is the satisfaction, interest, or the potential of being able to fly in places that would be impractical to anything but a helicopter.

It is amazing that people still say: 'nobody flies helicopters in this area/club/country'. They do, of course, but tend to keep quiet about it. A pity in a way, except of course they are enjoying what they want, because learning to fly on a well behaved helicopter is much easier than on one that isn't, and until you can fly it, it is incredibly difficult to set it up correctly!

Having said that, it must be true that most of the flyers today did it all themselves the hard way, and setting up *can* come out first time absolutely right. Only this weekend I heard of a first-timer presenting his model to the expert who found it so right that the next stage was a couple of tankfuls on the string method and the fellow was over the moon about it all. Normally, at best, the odd tweak of collective or at least a tracking adjustment is necessary.

Finding an 'expert' is not only difficult sometimes, but critical. I have been told of those who are only too happy to trim out and fly the model, but then won't let the owner fly it! Training aids can help with one stage or another, but are seldom all they are hoped for, only the string method gives real value for money. Floats are useful if flying from rough ground or rough grass and do take the shock out of a heavy landing, but the bounce can cause problems sometimes. Extended undercarriages, particularly with wheels on, are of dubious value in my opinion, but some people reckon they helped.

Understanding the problem helps a lot, which means studying and thinking. There is now a choice of books on the subject and I am told that 'set up to the manufacturers' instructions' is a most annoying phrase. It seems that these are considered inadequate and in some cases non-existent.

I know why you cannot, with a helicopter, be emphatic about what movement or pitch change is correct. There are far too many variables. People want to know what incidence to set the tail blades and what range with stick movement. This has always puzzled me, since to me it seems it should be obvious that if the model rotates one way then a static adjustment to compensate, before another near lift-off is attempted, is easy. Perhaps the key is 'near lift-off'; never try the system of 'getting it up to sort it out'. On range of pitch change — if it's too touchy for you, reduce it. Simple.

When it comes to collective and main rotor settings, I have more than a little sympathy. Cyclic adjustments for tracking are usually straight-forward enough, increase pitch on the lower blade or decrease on the upper. Having first made sure that the static tracking is right, i.e., blades at same height above tail boom when rotated by hand.

The critical part, or difficult if it works out wrong, is setting collective with throttle. The first part is fairly easy, this is to get the model to lift off at the right sort of rotor speed. Simply a matter of adjusting collective and throttle relatively.

As a rough guide, if the rotor is screaming then more pitch is required. If lifting off like a drunken duck, then less pitch is required, you may also have a hot clutch and engine.

The second, and most important part, is getting the synchronisation of throttle and collective mix. Very often, putting the model together as instructed, this works out good enough for the model to fly quite well without alteration. If alteration is necessary, or you want to get the best from your model, then saying what to do to set it up is very difficult, which is why the manufacturers don't try. If attempted, it would be different for each make of engine, state of wear, weight of helicopter, type of rotor blade and even the weather.

What you aim at is a constant rotor speed throughout the flight which means matching the engine torque output with the pitch change. Once you leave the idle position on your carburettor and your clutch is biting, the rotor will speed up easily with little pitch on the blades. As pitch is put on to the blades the rotor will slow up unless the power is increased. If the power is increased too much so that the rotor speeds up to lift-off point, then when trying to descend, particularly in windy conditions, your rotor-speed will slow down too much, resulting in nodding and loss of control. Thus you need differential movements between collective and throttle, this is achieved by moving the connection point of your control rod on the servo output disc. When your control rod and radio arm is at a right angle you have max movement per degree rotation of servo. When control rod and radius arm are in line you have virtually no control rod movement per degree rotation of the servo.

Normally you require a lot of throttle movement to take the engine from idle to clutch in and rotor speed, so the control rod and radius arm should be near a right angle. At this point I always used to recommend that the collective movement was small so that max movement was available for when you really needed it for sensitivity at flight incidences. I still do, except that for autorotations and rapid descent you need a lot more movement in the early range.

At flight incidence range the power requirement change is small, so throttle movement is small. Sometimes if you have a lot of collective movement an increase will slow the engine up. This is very undesirable, so reduce the radius arm to reduce the throw.

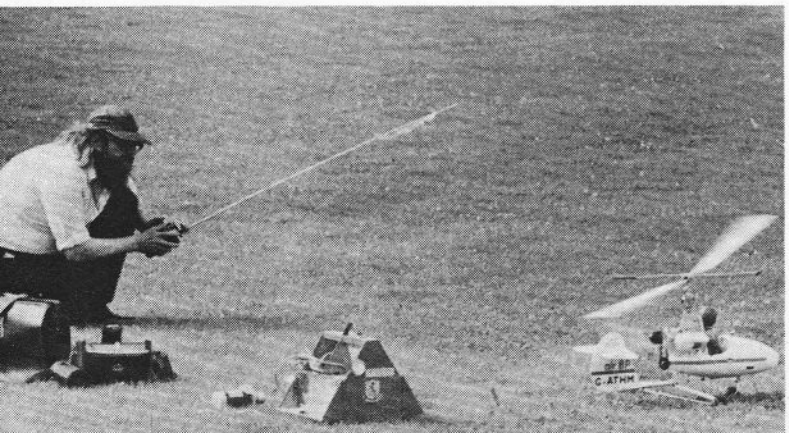
So you see, it cannot be said that x^0 is the correct incidence range while your throttle goes from closed to open. There is an optimum for your engine and helicopter and quite honestly it amazes me how often it all comes within the acceptable range and becomes flyable, so there is no need to be frightened off.

Of course, for the man with money, for some time now there have been sophisticated radio outfits that, given a separate servo for throttle and collective, you can vary the mix and shape from the transmitter. As an alternative to money, you can spend time and use the *Century Systems* kits. They are the gyro circuit kit people at Cheltenham and have accommodated all that sort of thing in their 'Master Series III', even an 'invert' switch, but that's not for beginners.

It is best to have the model so that it will lift off straight up, or slightly forwards, if any way at all. This means level ground and setting the trims, and having the model so that it will lift off straight. This last does not mean having the rotor disc exactly level with the ground, or the mast vertical, as because you are reacting a torque on the main rotor with a lever arm and side force (tail boom and tail rotor) there must be a side force component from the main rotor to compensate. So one skid may need to be lower than the other, the need for this is quite noticeable on some 'copters and barely so on others. Failure to get this right means your lift-off trim is different to your hover trim and it shouldn't be. When you can hover this doesn't matter, you compensate automatically.

This sort of rambling could go on for a long time, remember you're doing a helicopter because its interesting (aren't you?) so don't start thinking its too difficult. I'm sure it's better to have a few hops frequently rather than go out determined to master it in a few

Below left; RCM&E Assistant Editor, Dave Day, prepares the Micro-Mold Autogyro for test flight. Kit Review imminent! Right; echoes of Lark packaging evident in Micro-Mold Autogyro.



long sessions. Try and remember what you're doing to the sticks on each lift, and adjust the trims accordingly.

I'm told, although I've never done it, that to keep a log of flights and adjustments will help. I'm inclined to agree, but to me that sort of thing is hard work.

Keep the model skating on the ground, or very low, for a very long time before you risk any height. Get used to working both hands together. Did you ever master the challenge of patting your head and rubbing the tummy? I presume you *can* ride a bike.

The Meetings '82

Business commitments and the annual holiday booked back in the early part of the year have prevented me from attending meetings so far, but I look forward to going to Bretons on September 12th and John Griffiths and, yours truly, are sponsoring the Slough Helicopters Fly-in again at Upton Court Park on September 26th. Further details from John at Slough Radio Control. Highly successful mixture as before with scale and novelty events, with modifications to enable more than one thing to be happening at a time. Hope to see you all there.

I have a few notes from Maurice Tait who attended Woburn Abbey as a spectator. I gather it was the best meeting at the venue yet, they even managed to keep the high winds away this year.

Maurice writes: "Several impressions stick: the large number of models (I counted 96 and two autogyros) the attractiveness of the site and the quality of the flying. Not having been able to attend many competitions in recent years I could not help noticing the large number of obviously very good pilots.

Comments by others were to the effect that the general standard had risen, but that the top fliers were much the same as last year.

One of the most interesting models was a *Lockheed* 'Cheyenne' by Graham Swan of West Bromwich. Using 'Star Ranger' mechanics and powered by *Webra* Speed 61 it was built in nine months from 0.005in aluminium sheet. Three months were spent riveting the panels together. With working ailerons, flaps and suspension the model has *Powermax* retracts with air cylinders hidden in the rocket launching pods. Weight is around 12lbs. and rotor dia. 56in.

Graham said the maiden flight was imminent and he hoped to fly the model in the Nationals. Because of the SMAE rules it may be classified as a fixed wing and entered into Class 2 scale. Other anomalies at Woburn were two *Micro-Mold* 'Little Nellie' autogyros entered in scale by the designer Roy Sturman."

Above; new shape, or rather size of an existing shape. Andy Hopkins flew the 'Agusta' 109 fitted with Morley mechanics.

Guy Meech

It is with great sadness that I have to report that Guy, subject of the comment in the last Hovering About on the 1/1 scale model that he was building, was killed with his son Tim when the machine broke up in the air. It is something of a shock that such a tragedy should happen when tackling such an interesting project. Guy leaves a wife and daughter.

WOBURN CONTEST RESULTS

Experts			**Novelty**		
D. Nieman	*Hirobo* SST JR		1. A. Parris	*Hirobo* Lama	
2. G. Richardson	*Kalt* Baron 50		2. D. Nieman	*Hirobo* 808	
3. J. Heaton	*Hirobo* 707		3. L. Mount	*Heliboy*	
Scale			**Concourse**		
1. D. Nieman	*Hirobo* Bell 47G		1. J. Wells	Cus. Augusta 109	
2. J. Barrow	Cust. Gazelle		2. G. Swan	Custom Cheyenne	
3. J. Heaton	Graupner Bell 212		3. J. Barrow	Custom Gazelle	

Below; one of the most convincing, or fooling, photographs yet of John Barrow's 'Gazelle'. The ones on the ground are real. Below right; part of the line up at Woburn. Model in foreground is Graham Swan's Lockheed 'Cheyenne'. Scratch-built, very commendable.