



FLY-PAD

by John Heaton

HELD AT THE High Wycombe Model Aero Club's field on November 13, the Slough Fly-In was the last major helicopter event of the 1983 season and was blessed with pleasant weather for the time of year. A nice balance of competitions were arranged with FAI, scale and novelty events plus general off-the-peg flying. Trophies were donated by Fleet Control Systems, Hobby Poxy, Irvine Engines, Kalt, MacGregor JR, Ripmax and Skyline Helicopters, the latter being Dennis Kenyon's new full size helicopter company based at Booker airfield.

There were several eye catching models to be seen on the flight line. Trevor Butcher had a nice looking *Lynx* employing Morley mechanics and an Irvine 60 engine with built in silencer and fully concealed radio. It also had a custom made heavy duty clutch. It looked very good indeed and Trevor explained that flight testing is progressing well, good hovering being one of the highlights.

A couple of very realistic looking Augusta 109s were spotted, belonging to Mike Young and Andy Hopkins. Mike Young's is apparently a prototype for a new Morley kit. Complete with retracting undercarriage, it only weighs 6½lb and should be quite a lively performer. Maurice Tait had a standard Morley Hughes 300 flying and sounding very realistic on a Saito 45 four stroke. He says it lacks a bit of power and he was glad of a cool breeze to help things along.

The most interesting model on show was the new KKK Robinson R22HP. Very authentic looking and incorporating a scale flybarless head with teeter and flapping hinges, it was test flown by Dave Nieman. It had a toothed belt primary drive to a Micro-Mold Lark style of crownwheel and pinion and a very scale like swash plate assembly. The model flew most smoothly although of course weighted blades always seem to carry a model through the gusts. The Robinson is set up with quite a high rotor speed, about 12 or 13 hundred rpm, and had bags of everything, lifting power and tail power, the cyclic controls being powerful but having the usual flybarless trait of needing a lot of cyclic control applied into the direction of the wind, i.e. forward stick when hovering into wind and vice-versa. These characteristics are of course always noted with any head system, but they seem less apparent with a flybar equipped model. The Robinson was put through its paces with some very high speed circuits and very good it looked too. A noticeable feature of the flying on that day was that everyone seemed to have increased the rotor speed on their models, following the European Cup event when it was blowing a gale and the notable contenders were using exceedingly high rpm. One amusing incident occurred because of this as I had brought a couple of lads along from the

Middle Wallop Club, which is becoming helicopter orientated. (Quite rightly as Wallop is a helicopter training establishment). As they had got used to helicopters flying at my sort of rotor speeds, less than 1,000rpm, they legged it when some of the models started flying!

Your columnist's own entry for the day's flying was a Hirobo *Falcon* which has been reliably flying day in, day out with a rotor speed of 600rpm, using special high lift, forward centre of gravity blades. A lot of people are encouraged by the realism and quietness of this approach and intend to really pursue this aspect this winter. The target is to be competitive in an FAI competition using an ultra low speed rotor. To help to achieve this another batch of blades

incorporating a glass fibre main spar has been made, retaining the forward C of G, wider chord and flatter bottom section. The performance has to be seen to be believed and as they are not using metal weights are acceptable in FAI competitions.

Slough Fly-In competition results

FAI	Novelty
1st C. Ewter	1st L. Mount
2nd L. Mount	2nd C. Bliss
3rd V. Nordigan	3rd M. Coggar

Scale	Concours
1st C. Mount	1. L. Mount
2nd P. Kidson	
3rd J. Young	



Two views of the flight line at the Slough Fly-In held on November 13, showing the wide variety of models used. Photo right shows the general flight line, while the scale flight line is shown below.





Rotor head settings

Blade lead-lag adjustment is an important part of setting up a model helicopter. Most machines present the options of a loose single bolt fixing for completely free lead-lag adjustment, tightening the bolt sufficiently to give friction damping or of tightening the bolts completely so that the blade retains its position. Some machines have different set ups, for example the Morley has rubber pads giving the blade a form of spring centering, whilst Graupner Bell 212s and Hirobo Falcon 505s have rigid two or three bolt fixings. It appears that nearly everyone leaves the second bolt out of 505 blade holders so the blades can swivel in the lead-lag plane.

Experience will reveal that models are so varied that you just cannot categorically say which method is best. Many factors come into play and indeed, sometimes we may inadvertently increase the forces that the servos have to overcome. It seems that by fixing the blades in a leading (swept forward) position the collective pitch loads are increased whilst a trailing blade set up does the reverse. If you take a machine with free swinging blades and fix them tightly in a lead position the rotor rpm goes down, proving

that effectively more pitch has been applied. An interesting question is how much of this additional load is being transmitted to the collective servo. With a fullsize machine weighing 3,000lb with manual controls the stick force is only about 30lb at the most, i.e. one per cent of the total weight. The average model weighs about 10lb and the average servo pulls about 5lb, so the servo is powerful enough to overcome control forces equal to 50 per cent of the weight of the model, or in full size terms would be like having power controls with a pull of 1,500lb. I cannot see any sort of rotor blade maladjustment causing so great a resistance, so perhaps the servos work well within their limitations.

Rigidly refined blades may be aligned correctly by one of three distinct methods. One is to disconnect the collective pitch control rods and swivel the blades back and

forth until they rest level (at zero incidence) before the mounting bolt is tightened. Alternatively, the blades may be set to the zero or straight out position, radiating at 90° to the fly-bar before the bolts are tightened. The final alternative is to set the blades at a predetermined or recommended angle of sweep, 3° forward of the straight out position is often used as it reduces many helicopters' tendency to oscillate in forward flight. Basically setting up flexibly fixed blades is of course impossible and a disadvantage of the loose blade set-up is that the model wobbles violently until the rotor rpm builds up and centrifugal force straightens the blades out. However, flexibly fixed blades do present an advantage for they are easily folded for transporting the model and are less likely to be broken in a prang for similar reasons.

Large photo above shows the latest KKK helicopter from Dave Nieman Models, the *Robinson R22HP*. A 40-50 size chopper with a 1500mm dia. main rotor, the Robinson features a flybarless rotor as standard. Below: Trevor Butcher's impressive looking *Lynx*, built from a custom made fuselage around Morley mechanics. On the right is another Morley machine, this one being Maurice Tait's Hughes 300 flying with a Saito 45 four stroke.

