MORLEY MXA REPORT

Three models in one test of Morley's MXA by G.F. Booker and C. James.

Editorial Introduction

Have you ever wondered if inanimate objects gang up deliberately? This review almost convinced me of the fact that Paranoia is an occupational hazard. In point of face, not two, but three models are actually featured in this review. Unfortunately the photos of the model actually build for the review were not useable. By the time this was realised, neither of the two reviewers were keen to strip the models back into a kit! This is the reason for the unfortunate lack of component shots.

The model featured in the accompanying photos was kindly posed and loaned by John Starkins — it uses JR radio with Century systems gyro and OS40 motor.

Now over to Graham and Chris:–

In early 1987 I obtained a Morley MXA to build and review. I had previously been flying a much modified Kalt Baron and was looking forward to flying a more modern machine, especially as fellow club member, Jim Davey, had been enjoying considerable success with his Morley Hughes and Bell 47G.

However, getting married and a house move rather put this project in the background so I was very pleased when another club member, Chris James, who had also purchased an MXA, offered to build both machines. So over to Chris for the building review.

Description

On opening the box of the heli, one is greeted by a compact box crammed with parts bags and large plastic moulding from which to produce the front bubble. As always the kit comes very well packed with various areas of construction packed in plastic bags. These individual bags are then put into two plastic bubble bags that are found in or under the plastic mouldings.

The instructions consist of a plastic wallet of about 16 sheets of itemised instructions, each sheet covering one area of the helicopter. I would recommend that the prospective builders read through all the instruction sheets and then identify the parts in the plastic bags, but don't open these bags at this stage. In one corner of the bags you will find that the screws, nuts, bolts, set screws are sealed into one section. These are required to assemble the parts in the bag. A brief description of the helicopter may help at this stage.

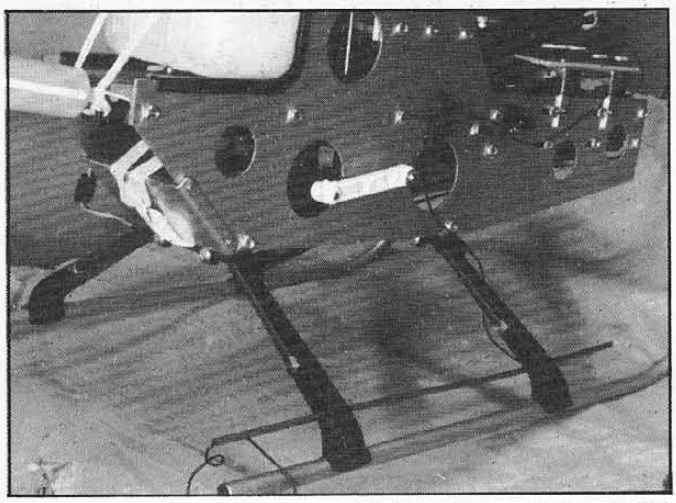
The MXA is a pod and boom machine powered by a 40-45 sized engine driving a 45 inch rotor and an 8 inch tail rotor, the helicopter consists of a strong space frame produced from a mixture of glass reinforced nylon and pre-shaped aluminium plates. Unusually the motor is found up at the top of the machine in front of the rotor mast, the radio, clutch and drive system are mounted in front of the engine. This in turn means all the radio is inside the canopy and the engine protrudes out of the top of the canopy. A fuel tank is mounted behind the mast in a cutout of the rear aluminium plates; Below this tank is a horizontal plate which holds the gearbox and tail rotor drive shafts. At the base of the side frames the undercarriage is mounted.

A little patience and a steady hand with the spray can produce a very smart and visible little model. Note unusual position of motor and silencer.

Construction

Back to the build, the first job is to mount the engine onto its engine mount plate. The cutout tends to be on the wide side for a normal forty. I usually cover the engine mount areas with masking tape and use a ground punch to mark the position of the mounting holes beneath the engine, the engine must be held in position during this process and I have used double sided tape over the masking tape on which to mount the engine for marking out. If you are mounting an OS engine then you may use the template from the engine box. To mark out the engine position fit the fly wheel onto the crankshaft — when I do this I mount the fan and the pulley on the shaft and tighten down with the propnut, to ensure that the fly wheel is firmly fixed in place. Check the clearance is as stated in the instructions, this is very important for a true running engine. With the engine mounted on its plate, mount it to the side frames. Turn now to the under subframe, this holds the main gear box assembly and tail mount. When putting the gear box together I tend to pack the box with grease before assembly then lubricate with oil afterwards. When tightening down the gearbox screws they must be eased down in sequence. If the box is too tight the gears will grind and chaff against each other making the gearbox very stiff. When you get the gearbox fitted and free, it may be bolted into the main frame work. At this time I like to fit the various fittings in this area. Such as the throttle lever, cabin mounts and the fan shroud — you must remove the redundant bearing holder from the top of the case, I found this an awful job and impossible to get a decent finish on the cut plastic, files leave marks, wet and dry just produces a fluffy finish. This spoilt the area on both machines.

Building the clutch is fun and a mixture of set screws, nuts, springs and shoes, however the



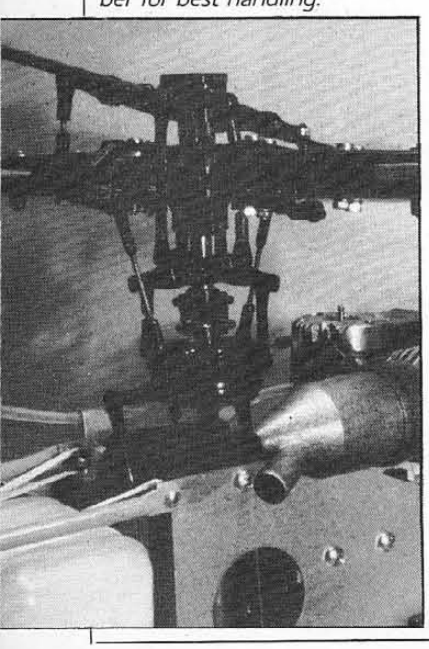
Undercarriage uses leg moulding from Hughes 300 fitted with piano-wire springs — they will take a beating — well! Ali plate below boom supports 1200 mAH ni-cad. White arm on side of model is pitch-up system side member. Cranks are carried on rod which join the arm to similar on left hand side of model.

instructions cover it well and the clutch has given no trouble at all, the lining will take a great deal of punishment in the hands of a novice, I know, I am one.

The next stage is to fit the mast and the joiner followed by the main top mount. The top mount holds the top bearing, this is a bronze bearing which is epoxied into place, I rough both the bearing and the case then use slow set epoxy. The work must be keyed.

Fit the servos at this stage and the collective pitch up system ready for the head, the push rods are very long but have seen little or no whip over the length. The really nasty one is the rudder, or tail rotor drive, it is very long and the instructions tell you to put a support half way along the lower chassis member, believe me you should put the support in before you fix the lower chassis into the model, it took me three hours to fix it after the chopper was nearly finished. With the servo links and collective bar in place, mount the undercarriage to the base of the main frame, this allows you to stand the model on the floor or workshop surface without scratching the surface.

Head is standard Morley item whose blade pitch control geometry is similar to that found on Heims. Teeter is controlled by two rubber plates and four 3 mm bolts. It is important not to over compress rubber for best handling.



The tail boom comes next on the assembly and is produced from two plastic sections, the longer of which goes inboard and the shorter, outboard, the one difficulty I have found is in the lining up of these sections, some form of locating key would make life a great deal easier. I haven't produced a lined up one yet!! Even marking out very carefully doesn't work if the slow set cyano goes off too quickly. Often I have found the fittings are very stiff on the tubes and have been known to spend a good deal of time sanding the inside of the tube with grinding paper to make an easier fit, not always with success. If you do arrive at a leaning tail box, careful use of a scalpel may correct the situation.

Assembly of the tail rotor box can prove a problem as you must ease the screws down very very slowly in sequence, if you over tighten the box will jam up.

All shafts must have flats for all set screws in the tail assembly. Ensure that tail gear box has gear grease and oil. I do this every flight through the rear hole. When assembling the tail drive it is very difficult to obtain the correct length, which should have about 3 mm float. The hex balls and sockets must be very well greased. One should also oil the gear box every flying session, I use triflow oil with teflon for all lubrication (thicker oil is a better idea in gearboxes — JD).

When bolting on the stay rods which go over the tail boom, ensure the bolts are long enough to take the tank strapping the fittings.

So remains the plastic parts and the head, plus final radio installation to do. The old head drawings are poor with the swash plate drawing a good last for quality, but new kits have new head drawings which are much clearer. In fact the whole of the graphics in the file could be improved with the professional treatment. Anyway to the head, follow the drawing process very carefully, ie. looks three times, check and check again before commiting spanner or allen key to job. If you have the new drawings then it will be so much easier to do. The swash plate drawing has also been given the treatment.

Rotor blades are balanced and fitted at this time, I personally don't fly with the lead/lag rubbers and in fact, remove the rubbers and the pins from the head assembly.

The cabin structure is very strong if glues with the correct glue. I advocate the use of plastic weld which welds the ABS together. Don't omit the strengthening plates from the structure. Colour may be applied with either enamels or car sprays. Do be aware that humbrol spray enamel can take up to 24 hours to dry. Take some care over colour selection as a bright colour aids orientation.

The location and fit of the canopy can cause some little head scratching, I used a pair of outsize calipers to locate the position of the mounting posts ready for drilling.

I will now hand over to Graham for the Setting Up and Flying Report.

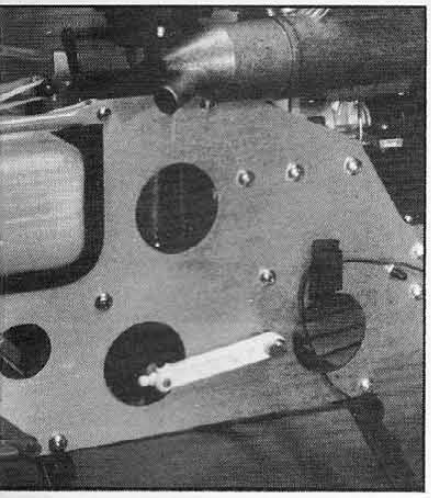
Setting Up

Initial attempts at setting up were not helped by the shortage of information in the instruction manual, no dimensions are given for push rod lengths or throws.

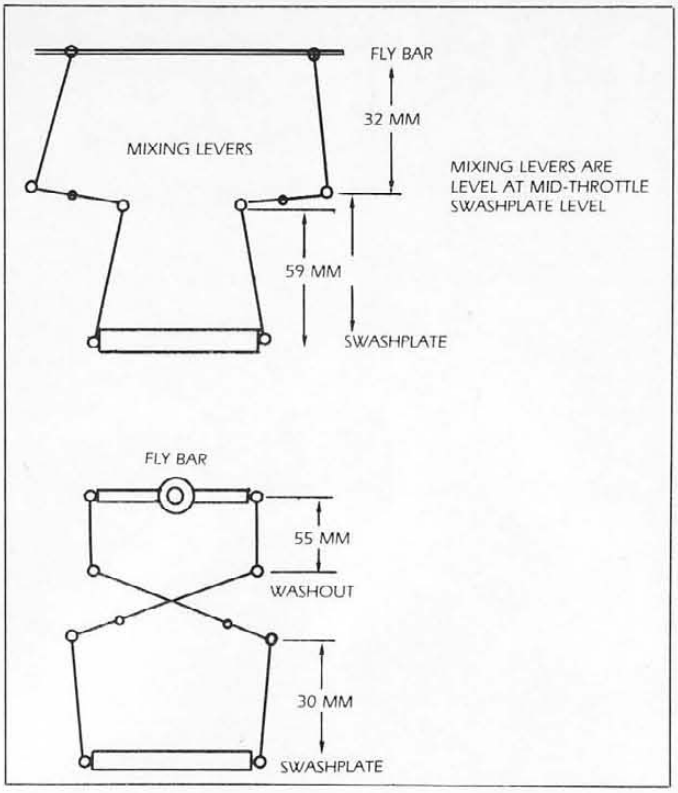
My helicopter was fitted with a Mk. 1 Irvine 40 engine, which was the only 40 size engine I had available. Chris had fitted his with an OS 40 FSR. Radio was a Century System 7 Chn. helicopter set with matching gyro, Chris used a JR Apex with a Century Systems' gyro. Both sets were fitted with 1200 mAH ni-cads, essential in my view as we both had 5 servos and a gyro.

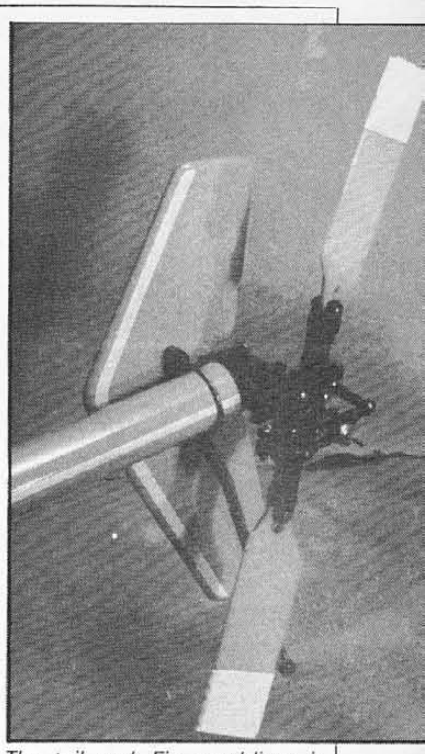
I must admit to a slight feeling of nerves on the maiden flight as I had not flown a helicopter for some time, plus the MXA has a narrow undercarriage and with the motor mounted at the top of the frame a fairly high C of G resulted. Which I felt could easily result in the machine rolling over, the fact that it didn't is more a tribute to the machine than the pilot in the early stages. In fact I soon settled in to hovering again, although I had it in the air and in touch, the controls were not well harmonized and did not feel very

Throttle and tail servos are at left of this shot. John chose to add a ply plate on ali brackets to carry Rx and gyro. He also added a vertical ali strip to anchor the swashplate anti-rotation link. Primary gear reduction by toothed-belt is clearly seen here.

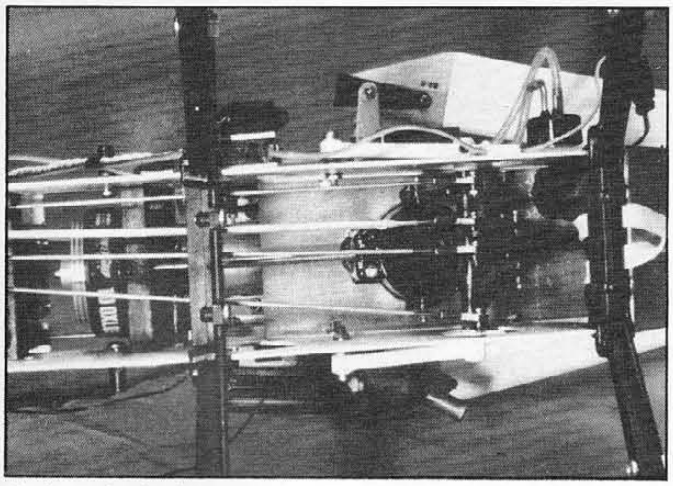


Fuel tank sits on rubber channel section and is retained by elastic bands. Twin ali tubes steady boom, fixing at the horizontal stabiliser position. No excuse for running out of fuel on this model!





The tail end. Fin mouldings is secured by U-bolt which also captures the fin. Mounting pegs gearbox into place and carries tail skid.



Cyclic and collective servos and push-rods are all accessed from underneath the machine. Long collective rod had been stiffened by the addition of an aluminium tube, araldited in place, to obviate whip and oscillation.

comfortable. I then consulted our resident club helicopter expert and columnist, par excellence (grovel, grovel), Jim Davey. Jim set to and spent an evening setting up the throws. Using his Morley Bell 47G dimensions for the push rod lengths and throws on the swash plate. He also used his considerable knowledge of Morley Helicopters and thoroughly check out both machines.

Back to the flying field and what a transformation, the little machine now flies as if glued to the stick and follows each command precisely, take offs are very easy, even from sloping ground. As the warmer weather has come along it became apparent that the Irvine 40 was not nearly powerful enough. So a Thunder Tiger 40 ABC was fitted, we took the opportunity to fit the longer blades from the Morley AGUSTA 109 and lengthened the tail boom by 4 inches to give clearance between the main blades and tail rotor. This gives more lift. The Morley likes to run fast, rotor speed around 1500 rpm is about right. An alternative gear pinion is available from Morley helicopters which lowers the engine revs, I have one and intend to fit it in due course.

I modified the engine plate to make replacement or servicing of the engine easier, the nuts on the six fixing bolts are very difficult to replace with the chassis fully assembled, so I epoxied these to the inside edge of the plate, removal or refitting now takes a few minutes.

I have been practising circuits and have found few problems (apart from a rusty pilot). You have to be careful not to get too far away as it is small and it is easy to get disorientated. The only thing we have found is that holding the helicopter cross wind in much more than a strong breeze, you tend to run out of tail authority and it will weather cock nose into the wind. Jim Davey and I feel that we have too much fin area, coupled with the lengthened boom. We plan to halve the fin area and re-mount it further forward under the tail plane.

To sum up, the MXA is excellent value for money, fairly easy to build although more fitting is needed than on some Japanese makes. Some areas of construction could have been helped with better instructions.

Flying performance is very good and will take the pilot from first steps through to expert level. Parts are cheap and easily available from Morley Helicopters and the range of bodies just announced to fit the MXA and others in the Morley range, should further extend the appeal of the MXA. The most serious negative point is the instruction manual. It needs improving with new drawings and a more professional appearance, the MXA certainly deserves it.

For anybody building the MXA I have set out below the dimensions and throw we arrived at, using these you should not be far out, do remember to balance the blades carefully, as with this size of machine out of balance soon makes itself apparent.

Swashplate collective – 14 mm.
Collective Low Blade Bottom Flat – 1° negative.
Collective high – 7° positive.
Swashplate fore/aft cyclic – 10 mm at ball joint.
Swashplate left/right cyclic – 12 mm at ball joint.
Tail throw as much as possible without binding.
Set the flat on tail blade bottom straight in line with the centre axis of the machine while holding full right on Tx with Lt trim.

Happy hovering — Chis James and Graham Booker. □