

# A Comedy of Errors

## (THE UH-1 FLYS)



This was supposed to be a short follow-up to our original Huey review, bringing you up to date on the model's flight performance, now that a sensible amount of flying has been performed. It has become rather more of a saga on what happens when you have too many unknowns in the same piece of new kit. It also illustrates that we here at MHW are most definitely human — if you ever doubted it — so it's offered, unabridged as it spilt onto the page!





*Dave Andrews' example has sliding doors, opening panels and rivet detail in true Andrews fashion.*

Most modellers have one or more favourite subjects. One of mine is the Huey, so when I set about building this model, I was in fact looking forward to the results with anticipation. I have always secretly coveted one of the big Hirobo Hueys but couldn't justify the cost to myself (or the wife!) and haven't built a full bodied scale machine for years so it all felt good.

As it turned out, the process reduced me to a jibbering heap in the corner of the workshop on numerous occasions — only the sound of ring pulls coming off strong Lager fetched me out. That none of the reasons for this could be laid at the door of the actual kit is a fact. However, this was of little consolation when the machine was spending more of the time standing on the ground laughing at me than it was in the air, and my blood pressure was giving a good impression of last year's Honda Turbo's boost gauge with Mansell in front of Senna.

I open with these words because I think it might be somewhat illuminating to appreciate what can go wrong when it does decide to go wrong. That

old saying "What will go wrong will go wrong" was never more true than with this build. The mechanics were out of the body more times in the first twenty flights than you would want in most model's life times — however....

First, a little bit of background. The standard Morley main reduction gearing is 9. something or other between crankshaft and head. Regular readers of this magazine and the sister magazine Radio Control Model World will know that the editors of MHW are much in favour of changing the gearing on Morleys to the .8 something or other which is achieved by changing the primary pulley from fourteen tooth to sixteen tooth — a standard part available from Morley. Later in this piece I will explain in detail how to do this on this machine and on the Hughes 300 but for the moment, bear in mind that this was one non standard feature which was built into the model from the word go.

The power train set up we chose to use for our Huey was the ASP 46 engine, the 8. something:1 gearing and PST PC muffler. I had been well pleased

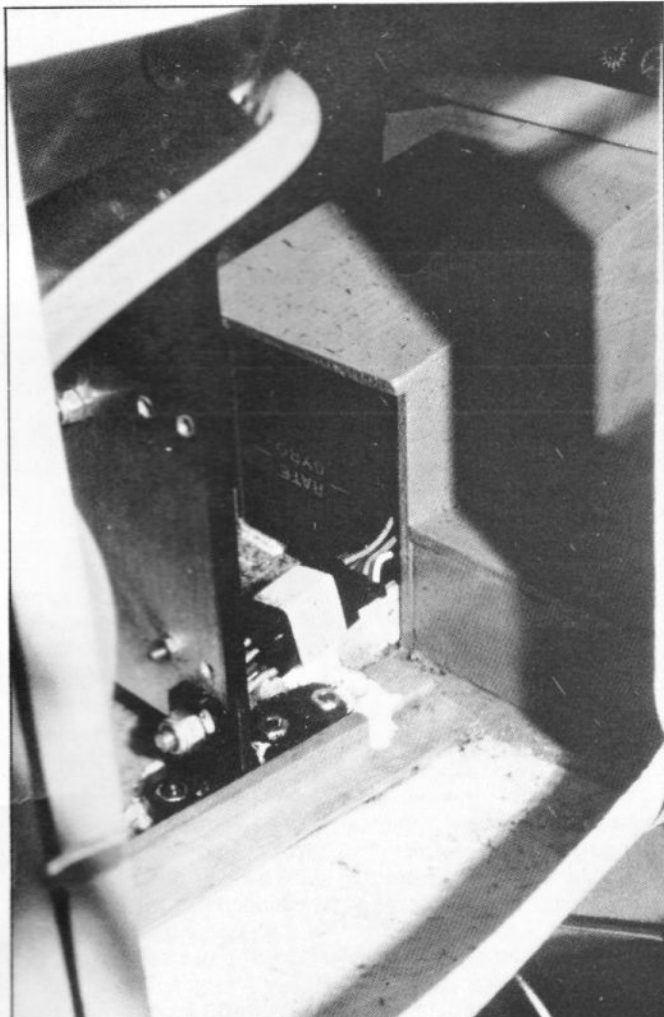
with the PSTPC sixty-ninety size muffler, which I have run on my Avant Garde for a long time. The only criticism I have of it is that it is a slip-together device and the entrails are held in with a circlip — it does tend to leak somewhat round this fitting. This hardly matters when it is externally mounted, but should it be internally mounted.... In the Huey I used the smaller size muffler which is said to be suitable for up to 40 size engines. Weston themselves warned me that it could be too small for use on a .46. I should have listened.

Initial flight trials indicated that the model would hover comfortably and run very quietly. However, this silencer leaked badly both top and bottom, it rapidly became clear that starting an ABC engine with a belt through the door is not the easiest of things to do, and the throttle response was extremely non linear.

Eventually the engine threw off its flywheel and I had increasing trouble getting drive through for starting purposes, without doing ungainly tricks like standing on the skids and bouncing the starter on the belt. At this point I decided that the

apparent lack of power above the hover — on a warm day it was almost impossible to get the model out of the hover — might be due to the fact that I had changed the gearing. Actually I did not really believe this, but I was getting desperate and there were just too many unknowns in the equation — I should have known!

I, therefore, removed the mechanics and put the gearing back to standard. This produced more engine rpm but no more lift — back to the Lager! At this point I also brazed up the bottom of the silencer and brazed a cap on the top to remove all leaks — successfully. However, as I have said, I did not get adequate flight performance — the model was still distinctly marginal. Neither Martin nor I really believed that the ASP 46 was down on power, but what else could it be? By now, I was getting pretty desperate, and cast around for alternatives. I was also aware the onset of winter was sure to make the starting problem even more acute. So, a ringed engine was the answer. The only alternative I had to hand was my OS46 H so that was dusted off. How-



*If doing it again, J.D. would move gyro further forward and make an air intake in the floor hereabouts. Note also stiffening added to side in case of grabbing by starting belt.*

*Look carefully and you can see the non-standard throttle bellcrank just above the silencer.*

ever, (there are a lot of "however" in this story) you can't fit an engine with a heat sink head in the model — at least not an OS46 you can't — because of the drive shaft into the gear box touching the heat sink.

A call to Mark Woods at Irvine produced an aircraft head for the engine, so I now have a hybrid OS46 H/2. This was then stuffed in and the gearing changed back to 8. something as I was sure that this was not the problem. Well it flew but it was still very marginal — frankly, I couldn't tell the difference except that it was easier to turn over — O.K. Doctor, give the ASP a clean bill of health. What's left, you ask yourself?

After consuming yet more Lager the thought drifted slowly into the protesting brain that perhaps that silencer did not let enough gas through it for the engine to behave as a 46. A new hole in the bottom of the fusel-

age (the one that's marked on the wood as it comes!) allowed the fitting of a standard Morley stack. Success! It was like fitting turbo. Clearly the PST PC muffler, and anyone who's looked inside it will see, is a very complex device, and it would appear that it does an excellent job — provided it's correctly matched to the engine size. An attempt to increase the gas flow through it, above what it is designed to take, seems to result in a choking effect.

My 46s were behaving like 46s up to half throttle, but beyond that they behaved like 40s, tired ones to boot — hence the weird throttle curve.

### **What Does It All Mean — Professor?**

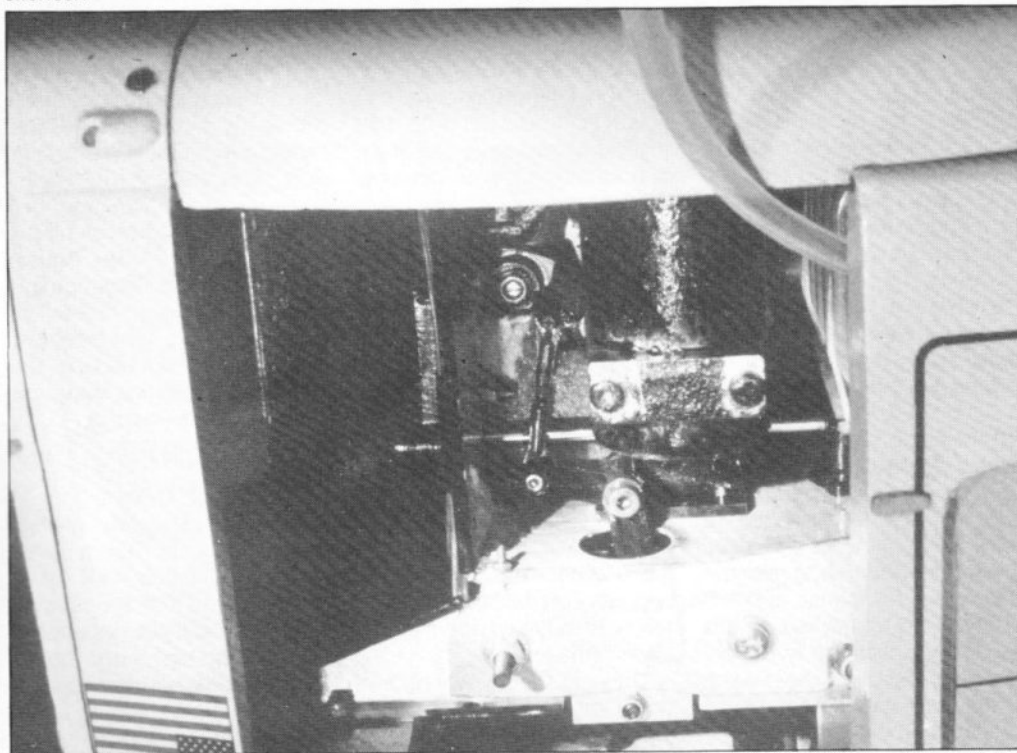
So, now the model is flying with a standard Morley silencer, an OS46 and the (modified) 8.15:1 gearing. In this form it has plenty of power and is very comfortable to fly. The pitch curve is set up a la Hirobo, that is to say pitch comes on strongly when you first move the stick, and tapers off towards the top. Total throw is something like — 2 to +10 with this set up, with the hover round the 6-7 mark. These pitches are approximate, because there is a certain amount of flex in the whole shooting match and the flying pitch is probably a bit different. Throttle is set up with a pretty high tick over to avoid rpm decay in a descent and then the hoverpoint is, I guess, just over

half barrel. This leaves enough power for a pretty solid climb out. It's no pocket rocket, but it does have plenty of performance, set up like this. Head rpm is between 1300 and 1400 depending how I feel, chosen by a turn of the hovering throttle knob.

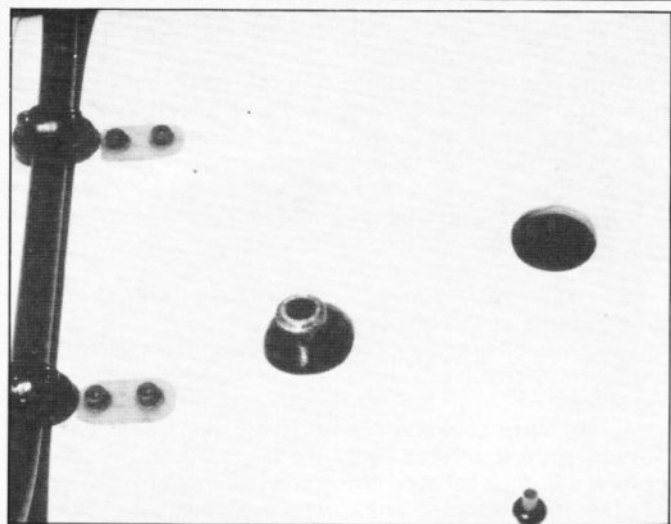
### **Handling Characteristics**

The general flight performance of the model is much like any other well set up Morley. That is to say the cyclic is solid and the hover stable. This machine comes with their new wider chord symmetrical blades, and these seem to provide a reasonable amount of lift, and are fairly low drag.

You have to remember, of course, that here you have a pretty fat fuselage hanging from that rotor disc, and this will tend to catch the wind rather more than the others in this range. For this reason, it is not a lot of fun to fly in windy or turbulent weather, it will handle it, but it gets untidy and I'd rather fly something with a bit more grunt and less body volume for comfort in these conditions. In smooth or calm conditions, the machine comes into its own and is very scale-like. Handling is comfortable the tail being very well matched to the rest of the controls. Hovering eights round goal posts are no trouble whatsoever in these conditions, and one can pose with the best of them.







*Not mentioned in test. J.D. moved front leg further forward using existing parts. Glass-fibre sheet spreads load for front chassis mounting bolts. They're all replaced by cap heads during rapid removal phase!*

## Modifications

In the opening part of this review, I mentioned that I had several modifications and I promised to detail them this time.

Perhaps the most significant modification is the gearing change. This is actually quite straightforward to perform, but since there are no written details anywhere, a lot of people fight shy of doing the mod themselves, even though they've been very impressed with the way modified machines run. In fact the Huey runs this way, my 47G runs this way and my now somewhat superannuated Hughes 300 with a three-bladed head was also set-up to run this way.

In all cases, the benefits are a much more relaxed engine run, motor speed between 1300 and 1400 rpm and solid hovering. The whole machine feels much more lively this way but does not become twitchy.

Proceed as follows:

First of all acquire a sixteen tooth pulley from Morleys. The engine fan, pulley and flywheel assembly is then assembled in precisely the same way as the standard instructions. However, you cannot get a longer belt, which would be required to keep the engine at the same level. The solution is to raise the engine in the frames approximately 1/10 to 1/8 in. I do this by simply making up two spacers from fibreglass sheet, with V shaped slots where the bolts would go. These can be slipped

in from the side then and any extra packing made up as necessary to get the belt tension correct. I just set up the belt tension so that when you squeeze the belt, any squeezing beyond 1mm or so starts to pull the engine head forward. This is a pretty simple test and seems to give reliable belt tension, without side loading the clutch.

I have found that with the engine installed this way, the flywheel is just touching the top of the flywheel cutout in the frame. You can relieve this now with a fine file or let it run itself in, if you're a gorilla! You will further find out that the fan is touching the fan shroud at the top. To solve this relieve the top of the fan shroud carefully with a sharp modelling knife, back to the underlying moulding. You don't have to remove very much material here — if in doubt, leave it touching — it will run in! Having done this, however, you will note that there is quite a large gap at the bottom of the shroud between the fan and the shroud. This is corrected by cutting the fan shroud on the left hand side looking backwards and redrilling the hole for the bottom mounting screw slightly higher in the aluminium — this allows you to pull the bottom of the shroud round to close the cut and match the fan closely. I round this off by making a small bracket on the right side looking back which stops the fan flapping against the front of the metal work. This will not be necessary on the 300 as the system is already tied down by the undercarriage.

The next thing you'll note at this point is that by raising the motor in the frame the cooling

duct does not line up well — in fact, if you are using a large headed 45 or 46 the cooling duct won't line up very well anyway. I am assured by Mike Young and others that the cooling will still work OK — in fact it certainly does for Martin in his machines. However I'm something of a nervous nelly and made up a new shroud using the lost foam method from glass to epoxy. I don't know if it was really necessary but the cooling in my machine is certainly adequate and the engine has never shown any signs of overheating. The simpler alternative is to redrill the mounting hole for the duct higher and move it.

## Throttle Servo

When I first built the machine, I mounted the throttle servo on the front metalwork to give me a very direct push rod to the carburettor. This was all very well with the original silencing where I certainly was not happy with the possible thermal mismanagement problems. Rather than go over to the instructions method of installing the throttle servo, which I was not very happy with, I chose to mount my throttle servo on the top of the mechanics adjacent to the collective servo. I used the same type of servo mount as is provided for the collective servo and simply mirrored the installation the other side of the machine. I then took a straight push rod forward from this servo to a bell crank which was mounted below the metalwork with with one arm up through the provided hole and the lower arm connected by a short push rod to the carburettor. For this I used a 4mm plain shank bolt as a pivot, one of the Morley cranked arm 90 degree bell cranks, and a piece of plastic angle cut from an Agusta mechanics mount, although this could be a bent piece of aluminium or whatever to mount the thing underneath. This assembly fits just above the silencer and works very smoothly and reliably.

## Plumbing

The fuel tank provided gives a pretty adequate run time or around 20 minutes with a well set-up engine. You are advised, in the instructions to mount the tank using thin elastic bands and soft foam onto rear part of the nylon engine mounts. Previous experience with the Hughes

300 from the Morley stable has shown that this can result in fuel foaming — the mounts tend to rather too faithfully reflect the meanderings of the single pot moise maker to which they are attached! A long time ago, one David (I think) Mellor wrote in to the Hoverpoint column in RCMW with the suggestion to mount the tank from an alloy plate attached to the gearbox, in that machine. This has always proved successful, so I went a similar route on the Huey from the word go. In this case I made up a plate, roughly the outline of the tank, from fibre glass sheet. This was drilled in four places and trapped between two thin 3mm nuts on each gearbox mounting bolt. Four notches, one at each corner, allow the use of four substantial bands to retain the tank — you could equally well use ty-wraps here. This set-up will allow the motor to drain the tank down the last drop and the fuel is always in sharp focus.

## One More Time

What would I do differently if I was building another? Well, I mentioned in the opening part of this review that my machine had come out somewhat nose heavy — something I hate. To avoid this, I would not mount the nicad on the main body extension, but would fit it farther aft — mine needs to be back near the main shaft, and I'm considering using a split pack, two cells each side, just above the rear edge of the main doors.

Having done this, I would move the gyro slightly forward and add a cooling hole in the floor, just in front of the fan. I would then have a clear conscience about removing the side windows in all the doors (fixed and moving) and running with these shut. You could probably arrange to start through the floor too.

I would also make provision to apply oil to the tail drive wire below the gearbox — Mike Young uses a small brass tube which is obtrusive if built in.

Finally, the review machine has now clocked up over 50 flights and is running very nicely thank you! I'm enjoying it and I'm looking forward to a happy association with it. It's big advantage over many other machines in the Morley range is it's size — that fat body makes it very easy to see in the circuit — especially with a bright colour scheme. □