Fury Extreme

Miniature Aircraft have been quick, possibly the quickest manufacturer, to take advantage of the new 80-90 size helicopter engines by producing the Fury Extreme. You may ask if we really need all the extra power a 90 provides and the glib answer is, "Yes, you can NEVER have enough power!" Let's be honest, we all push the limits of our model from time to time - it's the, 'That was close, wish I'd had more power...' moment when the engine runs out of grunt, the rotor disc slows down and things get out of shape. This scenario applies to all flying styles, from scale through to FAI and 3-D. Did I say scale? Yes, scale models are often very limited on the power to weight ratio making them difficult to fly well. FAI? Yes, the recent changes in the F3C rules allowing larger engines encouraged many R&D Departments into developing 80-90 engines and models. But what was the reasoning behind this rule change? I think it's fair to say that the new F3C flying schedules require models to be much more powerful and the limit had been reached with .60 engines. Add to this the environmental issues of using 30+% Nitro fuel along with the noise of an engine revving at some 16,000 rpm and you have a scenario rapidly approaching the unacceptable.

Enter 80-90 engines installed in models which, for F3C use, has the same maximum rotor disc area as the .60 powered models. The advantages of these larger engines is more to do with providing torque than horse power. To explain the difference, 'the torque of a force is a measure of the tendency of the force to rotate the body upon which it acts about an axis', so the more torque, the greater the ability to keep those blades turning. As a result, the full FAI permitted rotor diameter (1,765 mm) can be used resulting in a lighter loaded rotor disc which produces better flight performance.

Although 80-90 engines have a similar rev range to 60-size engines, and produce max. power high up that range (the OS 91SX-H Ring is rated at 2.9 hp @ 15,000 rpm, while the OS 61. SX-H ring W/C is rated at 2.2 @16,000 rpm), they produce much more torque at lower rpm allowing higher gear ratios to be used. Thus the OS 91 powered Fury Extreme we have here, uses a gear ratio of 8.18:1; so with a 3-D head speed of 1,670 rpm, the engine is running at 13,660. At these rpm, the model is noticeably quieter and yet there is so much torque, the engine seems hardly stressed at all and we can expect stunning performance without loss of rotor rpm. This is what these rule changes in FAI are all about; permitting larger engines provides maximum performance combined with quieter operation. An added benefit is the need to use 30+% Nitro fuel for extra power is reduced because 'extra' power is not required (but may well be wanted!). All this translates very nicely into 3-D flying which is what the Fury Extreme is all about.

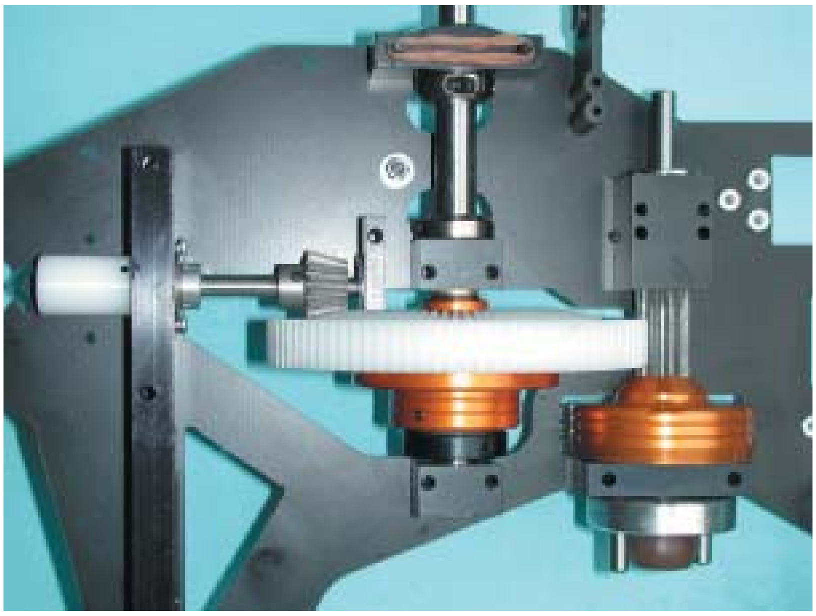
Extreme Fury

As the name suggests, Miniature Aircraft have taken their Fury mechanics and added special features to create a 90-powered model for extreme flying. The base mechanics are the Fury 60 Expert which is already a high spec. model (the Fury 50 Expert was reviewed in the Sept. 2001 issue of MHW).

To recap, the Fury uses the increasing popular 120° eCCPM (electronic Cyclic and Collective Pitch Mixing) control system.

QUICK SPEC

AUTHOR: Jon Tanner and Russ Deakin
PHOTOGRAPHER: Jon Tanner



Starting at the back, we see the aluminium channel with 'PEM' nuts pre-installed. This carries the tail drive shaft that is also supported at the front. Three main shaft bearing blocks are used with the upper one containing 2 bearings giving 10 mm of bearing support and 4 bearings in total. The auto hub on the split gear is now one piece making assembly easier. Note the clutch assembly has the 'UNI-ball' to centre the assembly on the fan hub - three bearings are in the upper block with a 4th in the lower that prevents gear misalignment.

The auto hub is a one piece unit, the upper bevel gear carrier has a hardened sleeve (factory assembled) which protrudes down through the Torrington bearings. Make sure the gears fit perfectly flush on their base and tighten the screws evenly for a true-running assembly.

Electronic 120° CCPM is simply a different method of raising/lowering and tilting the swashplate using 3 servos electronically mixed to provide the appropriate inputs. This control system offers a simplified control layout reducing the parts count and hence simplifying the build sequence. A close-set, flat frame assembly is used permitting 2 of the swashplate control rods to sit outside the frames and so further simplifying the layout. This layout allows the mechanics to be very narrow

'the Extreme gives an air of maturity and tends to deliver performance with a rather impeccable set of table manners'

'a 90-powered model for extreme flying'

making a more aerodynamic model as well as producing a very rigid assembly. The rigidity of the frame-set is paramount for a smooth running and reliable model and close-set frames (20 mm) offer less opportunity for twisting, provided the bracing is up to the job. The Fury uses aluminium extrusions which includes the various bearing blocks etc., to produce a very robust assembly. This intrinsic strength allows the use of G-10 for the frames which offers an excellent balance of strength and economy. The servo positioning and layout are optimised to minimise control slop and the servos are isolated from control feedback by using bellcranks. You will also see that the servo output control rods are in-line with the servos which gives the best support and the model features the servo support braces.

Special Features

Two versions of the Fury Extreme are available; the #1020-5 kit is designed for the OS 91 SX-H with a gear ratio of 8.18:1, while the #1021-5 kit is for the YS 80/Webra 75 with a gear ratio of 8.45:1. Now let's look at the special features in the Extreme which allow the mechanics to make full use of 80-90 power. First, a gear ratio of 8.18:1 was found to best suit the OS .91 which means that with a head speed of 1700 rpm, the engine is turning at 13,906 rpm, which is well within its peak power (15,000), but is just where all that extra torque can be found. Bear in mind that the Extreme uses 710/720 mm main blades giving a big 1585/1605 mm diameter rotor disc. Stiffer head damping is available and the through spindle now features the X-Cell Pro system whereby the dual damper 'O' rings and shims are pre-

OS 91 with the excellent CNC cooling fan. The engine mount is a 3-piece affair. Note the carbon base plate is used to provide clearance for the larger engine. The upper carbon frame doubler is repeated on the other side adding strength to the high stress area.

loaded in the CNC head block with circlips so the damping remains consistent and balanced. The new spindle also allows larger thrust bearings to be used in the blade grips (8 mm i/d) and 5 mm blade bolts are used.

A new double-bearing upper main-shaft block is used which gives 10 mm of shaft support, these are more than up to the job of taking the shaft end loads. An additional third main-shaft bearing block is used below the split gear which both further stiffens the frame assembly as well as providing a 4th bearing support for the shaft. The split gear uses machine cut Delrin gears and the split gear hub is now a one-piece item. The 11-tooth clutch pinion gear is supported in a triple bearing block. A CNC machined aluminium cooling fan is supplied plus an improved tail torque tube with a 33" 'Ultra' tail boom which is 40% stiffer than the standard graphite boom and yet is very light. The one-piece CNC machined tail gearbox uses hardened gears and the machined pitch plate/pitch links are fully ballraced and the pitch mechanism is geometrically centred for ultimate 3-D tail control.

Putting It Together

Miniature Aircraft Instruction Manuals are legendary for providing detailed assembly instructions and the Extreme manual is no exception. Each section begins with a list of tools and materials required and the parts for each building step are self contained in numbered bags. Each building step has its own list of components and instructions: you will be well advised to read ALL the steps BEFORE starting the assembly, as in some cases, important information appears later in the section which should be considered at the outset. Each section contains its own exploded diagram and identifying each part is easy as a full description is included in the parts list. In a few instances where special techniques are required, sub-assemblies are supplied factory assembled, but on the whole it is a full assembly kit and one you will enjoy building.

In view of the excellence of the instructions, the following is purely an overview of the build, highlighting some of the more interesting aspects.

First job is to build the rotor head which as mentioned, is the latest version with CNC machined head block and parallel ground 8 mm through spindle with dual 'O' ring damping each side. The

Here you can see the 8 mm parallel ground through spindle with 8 mm i/d thrust bearings. It has a piece of tube in the centre to provide centre support, with twin 'O' rings each side for teeter/feather damping. In the bearing line up, you see the 'O' rings, a selection of shims and then a circlip which locks into a groove on the spindle. This pre-loads the damping and allows the grips to rotate independently of the damping.

centre of the spindle is cushioned with neoprene tubing and the damping is pre-tensioned with circlips that lock into the spindle. A selection of shims are provided so you can adjust the amount of damping to suit your blades and flying style; we simply followed the recommendations. The bearing stack-up in the GRP grips is the usual 2 ball races with a new larger i/d thrust race. Note; make sure you fit the cup washers in the correct order! As you would expect, all rotating parts are fully ball raced and double ball ends are used for which offers options for the mixing ratios. When building the flybar assembly, I recommend angling the flybar control arms down 10° as shown, as this permits greater Hiller movement, the supplied flybar paddles are the new lightweight white 3-D Sport Paddles. The resulting rotorhead is superb, being free of slop and yet super smooth in operation.

Moving on to the G10 sideframes introduces you to the much simplified building sequence that is a feature of the Fury. By using tight tolerances and aluminium channel spacers with 'PEM' nuts pre-installed, the Fury is literally self-aligning. Simply clean the bolts, install them in the appropriate holes, tighten and you will have an accurately built frame assembly. The one exception we made was to leave the final tightening of the front transmission block until the shaft was in place. A carbon secondary clutch plate fits to the outside of the G-10 frames which further strengthens the area where the transmission forces are greatest. Also, note that when fitting the lower main shaft bearing block, the open face of the bearing faces down.

> *'a full assembly kit and one you will enjoy building'*

Assembling the new split gear auto hub is now far simpler and the only piece of advice we can give is to check that the faces of the Delrin gears are clean of any ridges left by the drilling and when securing these gears, progressively tighten the screws so the gear runs true. Take your time when installing the main shaft and split gear through the 4 bearings as optional shims may be needed. It is also worth noting that the split main shaft collars fit between the UPPER and MIDDLE bearing blocks and you will find a gap of approx. 2 mm between the lower bearing block and the auto unit - this is correct. Use the foremost position when fitting the radio tray as it helps to balance the model.

Adding the second side frame gives you the chance to see how rigid the assembly is - you'll have trouble twisting it! To cater for larger engines, the lower channel has been replaced with a carbon lower frame plate that is sandwiched between the u/c cross braces and aluminium u/c mounts. This provides sufficient clearance for the larger OS 91 engine, while maintaining strength.

This rotorhead works extremely well! The Flybar seesaw is machined aluminium as is the head block. Note the double ball ends used on the levers and flybar carrier so you can experiment with mixing ratios. 5 mm blade bolts are used. The washout hub is the GRP item as it's proven to be slop-free and as you would expect, all rotating parts are ball raced.

Engine etc.

It's important to buy the correct version of the Extreme for your choice of engine as the gear ratios and collet sets are different. Fitting the very nice high-efficiency CNC fan and hub to the OS is straightforward and tapered collets ensure alignment. Do make sure the moulded rubbers are fully inserted in the hub (the fan tool is useful for pressing them in). The clutch and clutch bell assemblies are factory assembled making life easy, just remember to fit the small 'O' ring over the start shaft before sliding it up through the bearing block. Also, if you are going to fit a Hex Starter Adapter (MA part #4686-3), grind a flat on the shaft before finally installing it in the bearing block. I particularly like the extra bearing block that sits below the clutch as, combined with the 4-bearing upper block, it locks the pinion gear in place so the mesh cannot shift. With the clutch assembly in place, the carbon clutch plate is fitted, all the bolts can be tightened and you'll find the gear mesh is automatically set. A substantial engine mount is used with a hefty centre piece located between the frames. Take your time when fitting the engine making sure the drive pins are properly engaged in the dampers and the clutch/hub faces are parallel using the special tool.

> *'the combination just kept delivering and delivering with the engine remaining sweet'*

With the engine installed, the cooling shroud (which needs trimming for the OS 91) is fitted and then the large fuel tank. You won't have any problems assembling and installing the swashplate, fully ball raced washout unit and rotorhead.

Mount the radio tray in the forward position to assist with the C of G. Velcro straps are supplied in the kit and the tank tray has self-adhesive strips already in place!

The Tail and Rest

M. A's excellent CNC aluminium tail rotor gearbox, pitch slider and ball raced pitch links look after the tail power. Take your time assembling the gearbox, it's worth double checking the gear mesh and being prepared to try different shimming.

The bevel gears are hardened and may feel a little rough for the first couple of flights, it's worth checking and re-shimming if necessary, after the first gallon of fuel.

A long (33") Ultra graphite boom is used which is remarkably light and yet very rigid, the graphite torque tube drive is factory assembled making installation very easy. Twin graphite boom supports use the 'moulded boom ends' which make alignment easier, the boom supports are pretty long and some have shortened these by a couple inches. If you do shorten the boom stays, bear in mind that the position of the rear Teflon Tube fitted to the tail control pushrod that runs through the support will have to be moved/replaced.

Fitting the radio gear is extensively covered in the manual and includes both mechanical and electronic set-up. The total collective pitch travel is ±10-11° depending on the mixing ratios you choose. Hovering rpm guide is 1500 and aerobatics/3-D is 1700-1800 rpm. The canopy is the usual high quality epoxy glass unit which we sent to Mike Drinkhill for one of his excellent paint-jobs.

All up weight came out at a remarkable 4,265 g (9 lb 6.5 oz) and that includes the Zimmermann muffler we used. We decided on SAB 223 blades along with SAB 442 tail blades and the radio gear was JR with DS 8231 servos for the CCPM and a G6000T with its dedicated servo for the tail.

First Flights

First flights were simply to run some fuel through the engine so it would be ready for a more extensive test with Russ Deakin. For such a big engine, the OS certainly starts easily and on 15% Nitro Cool Power ticked over very happily. With the engine running pretty rich, I tweaked the hovering throttle to give a hovering head speed of around 1500 rpm at which the Extreme felt very relaxed and easy to fly. At this point we were using a 60 size muffler, which felt a bit restrictive for the 90 engine, so we settled on simply getting as many tanks of fuel though as possible pending the arrival of a 90 muffler.

Later on and after Russ's testing (see below), I flew the Extreme some more and was very impressed. The performance takes your breath away and it is very easy to fly. I found the controls nicely balanced and progressive and despite the awesome vertical performance and speed it is easily contained and orienting was not a problem. Summing up, it's a pleasure to own and fly, the only drawback(?) is that it flies so well, you'll get carried away - it covers a lot of sky very quickly and manoeuvres can be as large as you wish - it's really very, very impressive.

In the meantime, I heard that Jamie Cole, who is also flying an Extreme with the OS 91, was having success with 5% Cool Power and a cooler plug so we decided to try this combination, so it's over to Russ...

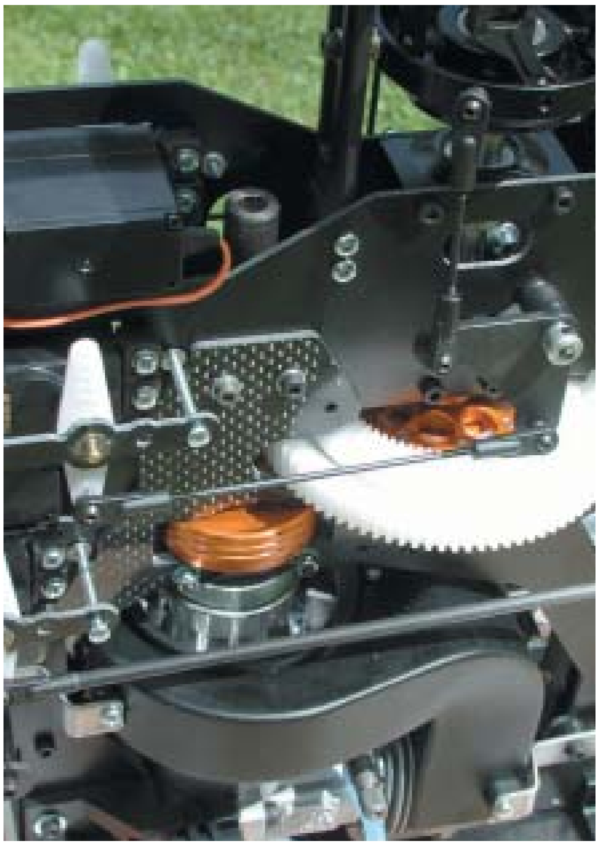
Flying To The Extreme!

As 3-D flying becomes evermore demanding, we are constantly looking towards more powerful engines that can deliver enough power and torque to cope. Indeed, a modern 61-size engine running on 30% Nitro, can produce good amounts of horsepower and respectable levels of torque over a broad rpm range. However, the power is by no means endless and burning this percentage of Nitro is not a cost-effective route for most of us (certainly not in the UK). So tuned pipes utilising lower levels of Nitro have become very popular. However, whilst tuned pipes can produce excellent levels of horsepower and torque, their 'power boosting' benefits are only effective over a relatively narrow rpm band. So a 61-size engine equipped with a 'tuned pipe' generally copes very well... until you work the model a little too hard! Then if the rpm drops too much, the engine will very quickly drop out of the 'effective power range' and produce surprisingly little performance until it is allowed to recover! So as a pilot, you have to ensure that you do not overwork the engine and keep it within the tuned-pipe power band. Overall, this is generally quite workable, but it is restrictive to a pilot's flying style and as I have personally experienced... can be potentially fatal if not addressed quickly enough at low altitude.

So as a solution to the above problems and in keeping with the current trend of larger lower revving engines, Miniature Aircraft have taken the Fury 60 model helicopter and re-designed it around the O.S. 91 SX power plant. The result is a model helicopter that is almost identical in weight to the Fury 60, but swings longer blades, has more tail power and a 50% increase in engine capacity! So it would

Super tail gearbox takes a bit of care to assemble accurately for correct gear mesh. Take a look at the CNC machined pitch slider with the ball raced pitch links - super quality.

Efficient aluminium cooling fan seen here with the shroud. You can also see the carbon frame doubler. If you use a 6 mm Hex start adapter, don't forget to grind a flat on the shaft before assembly! It's OK, we added the spacers to the servo supports before we flew it!



No slop and perfectly smooth operation with this tail gearbox. Note the ball raced pitch links and machined pitch slider, gearbox and bellcrank support.

'the Fury is literally self-aligning'

Neat and yet compact mechanical layout - no wasted space here. The Zimmermann 90-size muffler is an early example and has since been replaced with a later 2-piece version.

Right side and rear bellcranks seen here, all are double ball raced.

'it's a pleasure to own and fly'

Large fuel tank gives good flight times. Note how all the servos are in line with their control rods and all the rods/bellcranks are at 90°/perpendicular - just as they should be at centre stick/0°. The flybar weight are optional and fully out as shown, give a nice feel to the model - Russ Deakin moved them in!

certainly appear that the Fury 90 has been rather aptly named the 'Extreme' and this is where I enter this particular review. My objective was to assess just how well the Fury 90 Extreme performs in a modern 3-D aerobatic sense and as a by product of testing a well proven airframe, discover exactly what benefits are to be gained from utilising a larger, lower revving engine.

Setting Up

As mentioned above, we elected to use 5% Morgan Cool Power fuel and an Enya #4 glow plug in the O.S. 91 SX power plant. In general terms, setting up the carburettor and advised 1740 rpm rotor speed was not overly difficult... but care was needed to obtain good results. This generally evolved around the need to balance the main and low needles so that a clean engine run was achieved across the whole pitch range, whilst retaining a reliable tick-over.

Indeed, the first attempt at this achieved all of the above very swiftly, but there was a tendency for the engine to over-speed in prolonged vertical descents. Thus, the main needle was opened up to alleviate this tendency and as a result the low needle had to be leaned slightly to compensate. However, when fuel levels were low, this second set-up produced an audibly lean tick-over that was unacceptable. So after a minor re-adjustment and a further tank of fuel to check the mixture setting as the fuel level dropped, a successful compromise was achieved and retained for the rest of the day.

Apart from the usual care in setting up the carb/pitch/throttle curve for a constant rotor speed, very little in the way of additional setting up was required. The flybar weights were set about halfway down the flybar and a relatively low value of 10% cyclic to throttle was used to retain rotor speed in flips and rolls. After this, the gyro gain was maximised and once achieved, rudder ATV was adjusted to my liking, plus a 5% right tail rotor-throttle mix was added to help in pirouetting manoeuvres.

Settling In

Once set-up, I found myself settling in very quickly with the Fury 90 and began to explore the model's characteristics. In the hover, the model is noticeably quieter with the lower revving 91 engine and even at 1740 on the rotor head, it is genuinely unimposing! Hovering stability is also very good and the supplied white SAB blades gave a noticeably large rotor disc that required little in the way of pilot attention to keep perfectly stationary. In forward flight, the Fury gives away no hint of its real potential and tracks very predictably from slow to surprisingly fast! Over this wide speed range, little adjustment is required to retain a constant altitude and at no time did the model become unstable or give me the feeling that I was hanging on to the back end of a tiger's tail. When the forward speed is translated into a vertical climb, some very tall stall turns, 540's etc. were achieved with ease and the tail was found to be very positive throughout all examples. Moving on to the comparatively relaxed arena of conventional aerobatics, these were found to be accurate, stress-free and remarkably effortless. By the end of this, I certainly felt at home with the Extreme and was ready for the more aggressive flight-testing.

The Abusive Session!

When entering this section of flight testing, the conditions were not ideal and wind speed had risen dramatically. However, Jon was still brave enough to openly invite me to give the model a serious and constant barrage of 3-D abuse from start to finish! His reasoning for this particular invitation was not only to test the structural integrity of the Extreme, but to assess if a 90-size engine can deliver enough power/torque for sustained and very demanding 3-D flight?

So his request was duly accepted and we began by testing the ability of the engine to deliver consistent performance in the mid-range power band. For this particular onslaught, I performed a barrage of sustained and very aggressive flips, rolls and pirouetting manoeuvres. Here, the combination just kept delivering and delivering with the engine remaining sweet and well behaved throughout. Of some slight embarrassment, was my ability to concentrate faltered long before the models would and after a suitable session of dishing out the abuse... I had to relax for a little while!

Once the grey matter had been rested, attention was turned to just how far the engine could be pushed before it began to falter? My initial chosen manoeuvre for this was 'climbing metronomes'. However, after several attempts at furiously banging from full negative to full positive pitch, it became clear that both the head damping was stiff enough to avoid a boom-strike and that this was well within the realms of the available engine power. Thus a climbing 'pie-dish' manoeuvre was attempted next and the combination did power its way through it, and only when over controlled, could it be heard to lose rotor rpm. Therefore on the next attempt, the 'Extreme' was severely over-controlled on purpose and this was held as being the best I could do to see just how much loss of rotor rpm could be induced. Here the engine did eventually lose quite a lot of rpm, but there was a point at which the loss halted and the engine just kept hanging in there! Also of great worth was that when the 'over-control' situation was relaxed, the engine recovered almost immediately allowing the manoeuvre to be continued instead of aborted.

From here, performance in pirouetting manoeuvres was explored and if criticism could be applied to the engine, then this is where it appeared to suffer the most. When shoved around a conventionally sized pirouetting loop, the combination powered its way around with no difficulty whatsoever. However, when this scenario was over-stretched to include very fast airspeed, large values of collective, cyclic and tail-rotor pitch, the engine did begin to sound audibly loaded and lost rpm more quickly than I would have liked. However, just like the climbing 'pie-dish' manoeuvre, the O.S. 91's massive amount of low end torque held these abusive demands together very well and once again the manoeuvre was able to be completed in safety, rather than aborted. Indeed, with some after-thought, the scenario was extremely demanding, we were only using 5% Nitro and faltering was much more of an audible affair as opposed to a particularly visible one!

So with the O.S. 91 power-plant well and truly assessed, it was time to re-fuel and turn my attention to how well the actual model worked? However, thanks to our traditional British 'supposed' summer weather, this experience was much shorter than I would have liked due to the onset of streams of rain. Up to this continued downpour, we achieved a fair amount of flight-testing and in all the scenarios entered, the Fury Extreme worked extremely well. The model has a genuine light feel to it in the air and is stable, yet responsive and all controls felt very well balanced. When induced into the fastest of forward flight, the model retains excellent stability and even sharp jabs of fore/aft cyclic did not induce the slightest hint of pitching. The longer boom definitely


Continuous flips climbing all the way? No problem.


How about a nice flat climbing 'Pie Dish'? You won't run out of power with the Fury Extreme.


The model is so light, autos go on and on....

enhances tail-authority and the tail end of the model locks in very well at all times. Pirouetting flips were extremely consistent and keeping the model on line was found to be relatively easy for this type of manoeuvre. In those long drawn out Rippers, the rotation rate of the tail is very consistent and only after a good 80 metres, will the tail to show any hint of inconsistency. In all tumbling manoeuvres, the Extreme shows an excellent balance between cyclic and collective control and some very pleasing large diameter tumbling loops were easily achieved. Conditions and time did not allow any aerobatic autos to be investigated, but if the amount of reserve left at the bottom of a conventional auto is anything to go by, they should be excellent!

> 'Pirouetting flips were extremely consistent'

A General Conclusion

On an overall level I was very impressed with the O.S. 91 equipped Fury Extreme. High performance is certainly there on tap when required and the model has been rather aptly named! However, at no point did the package feel like a runaway whirlwind, thus the Extreme gives an air of maturity and tends to deliver performance with a rather impeccable set of table manners! The clear benefit of this 91 equipped Fury over its slightly smaller brother, is a noticeable increase in horsepower and torque, but much more important is the ability of the engine to call on its massive low end torque in the most demanding scenarios. As a by product of the lower revving O.S. 91, the Extreme is also much quieter and not only was the engine running on low cost fuel, but flight times were found to be excellent, indicating much better economy than a higher revving 61 size engine.

As a 3-D machine, the Fury certainly showed a very nice compromise of requirements and I could not find any area of flight that I was dissatisfied with! The model is genuinely light and with the stretched tail and main blades, it has a light feel to the rotor disc, with excellent tail authority at all times. Looking to any general improvements to the tested format, then a header tank would help smooth out the mixture as the fuel level drops, and some ultra-fine tuning of the CCPM control system would help to increase in-flight accuracy. So, as to a clear unequivocal answer to the original question, then yes I do feel that the Fury Extreme lives up to its name and is a very worthy addition in an increasingly competitive marketplace. MHW

SPEC CHECK

PRODUCT	X-Cell Fury Extreme
MARKET PLACE	Sports, 3-D and Competition Model
MANUFACTURER	Miniature Aircraft USA 3743 Silver Star Road, Orlando, Florida, USA 32808 Tel: +(407) 292-4267 Fax: (407) 292-4296
UK IMPORTER	Motors and Rotors, Unit 2, 13 Smith Street, Watford, Herts. Tel: +44 (0) 1923 465712 Fax: +44 (0) 1923 218840
MAIN ROTOR DIAMETER	
(with 720 mm blades)	1597 mm
TAIL ROTOR DIAMETER	285 mm
OVERALL LENGTH	1301 mm
OVERALL HEIGHT	447 mm
ALL-UP WEIGHT (No Blades)	3,924 g (8 lb 10 oz)
STD MAIN GEAR RATIO (OS 91)	8.18:1
STD MAIN GEAR RATIO (YS 80)	8.45:1
STANDARD TAIL GEAR RATIO	4.37:1
CONTROL REQUIREMENTS	5 servo heli radio and gyro
POWER REQUIREMENT	.80-91 cu ins Two Stroke Model Helicopter Engine
CURRENT UK RRP	
Fury Extreme 80-90	£1069.99 RRP
Zimmermann Z2691 Muffler	£84.99
MA #4009 90-Muffler Clamp	£22.99
SAB #223 carbon main blades	£64.99
SAB #442 carbon tail blades	£19.99

WE USED

JR PCM10X transmitter, JR G6000T gyro with dedicated tail servo, JR DS 8231 cyclic servos, JR NES 591 throttle servo, 3000 mAh Ni-Cad Pack, OS 91 SX-H Ring engine with Enya #4 glow plug and Zimmerman Muffler, running on 5% Coolpower fuel, SAB 223 carbon main blades and SAB #442 tail blades.

VERDICT

An extremely good model for extreme flying! It has a very high specification and builds very well indeed - it is everything you would expect from this stable. Despite the staggering performance, it is really easy to fly, is not intimidating which in a sense should act as a caution - the Fury Extreme is a model that encourages you to get carried away...

Choice of fuel, plug and exhaust system for the OS 91 SX is interesting and while the combo we tried worked well, it was difficult to find good 'all round' needle settings. We hear that others are successfully running this engine with 15% Nitro, while others are using 30% Nitro fuel and an OS #8 plug, which must be awesome, however for all flying styles, lower Nitro will produce more than enough power. Motors & Rotors have recently tried many combinations to find the optimum for the Fury, their findings are that 5% Nitro with an OS #8 plug on the Zimmermann muffler is good, 30% Nitro and Enya #4 is also successful, while 5%, 15% & 30% with a Zimmermann tuned pipe was not as good. The YS 80 version runs best on 30% Nitro, Enya #4 and Zimmermann muffler. For best all-round 3-D consistency a governor is needed to harness the power.