

## FIELD & BENCH REVIEW

# GMP COBRA

by STUART KAY



*A well-balanced, aerobatic, interchangeable craft that keeps you out on the flying field.*

**W**HAT THIS COUNTRY needs is a good five-cent cigar and a good 40-powered helicopter. Well, I don't know about the cigar but I think I've found a good 40-powered helicopter and it's the Cobra from Gorham Model Products\*.

**THE KIT.** The GMP Cobra kit came nicely arranged in a typical helicopter box. All the small parts were neatly packaged in plastic bags and protected against damage during shipment. Upon inspection of the instructions I found they were concise and to the point. All the small parts were top quality and the plastic rod ends were all the highest quality heavy-duty Rocket City units.

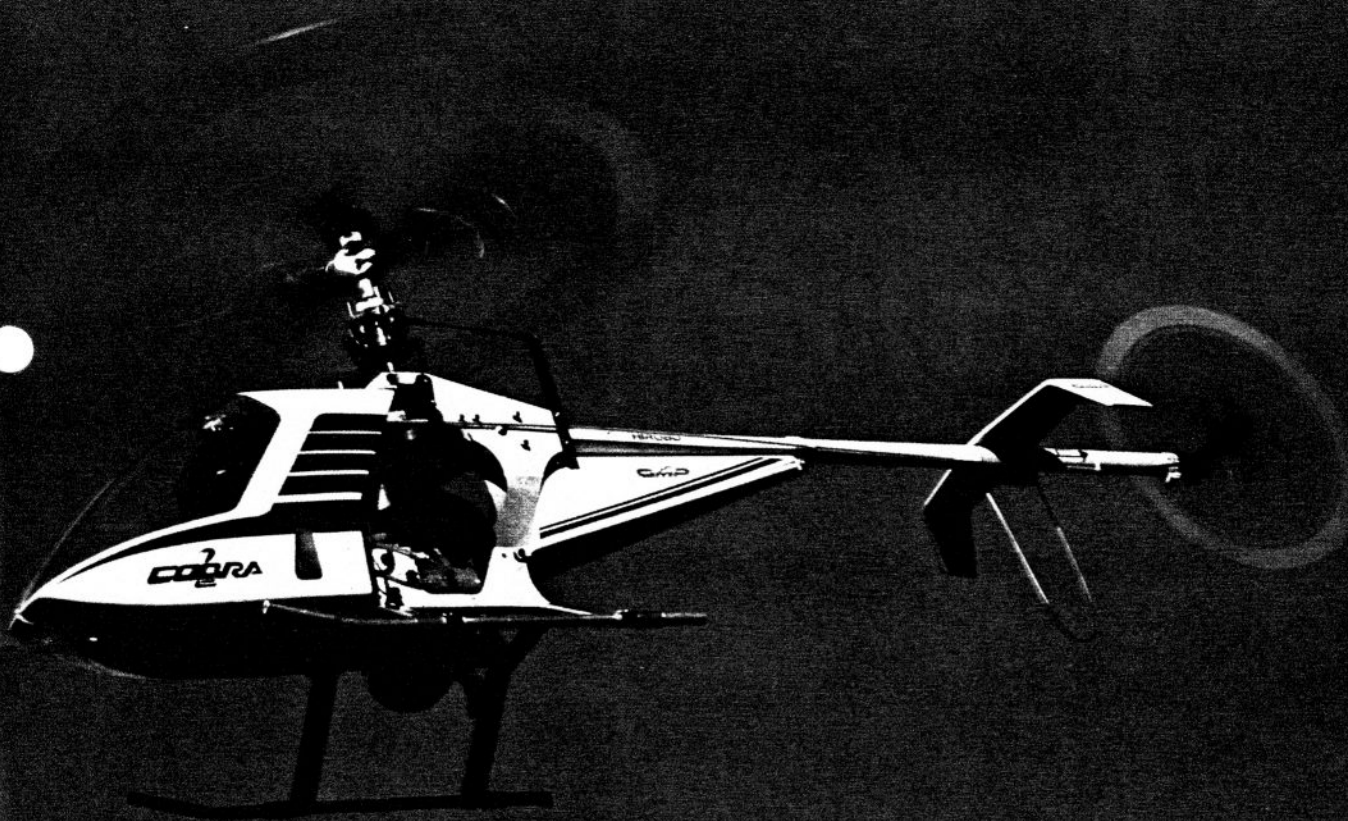
The main frame is a down-scaled version of its big brother the Competitor, finished in brushed aluminum. The frame is spread at the bottom and the engine fits up through it. This makes a nice tripod effect, which strengthens the helicopter without adding more weight.

In my helicopter I chose to use an O.S. 50 helicopter engine, from World Engines\*, which is the highest power recommended. When assembling the power unit, the most overlooked part of the assembly (according to people I've talked to) is to eliminate any runout on the start shaft mounted on the clutch, which could lead to fracturing of the structure

from vibration. When an engine vibrates excessively you can also get fuel foaming in the gas tank.

**CONSTRUCTION.** The first step to eliminate runout on the start shaft is to mount the fan and pulley square. This is hard to do because as you tighten the nut it throws the pulley off to one side. To eliminate this problem I used brass shim stock available at most hobby shops. I wrapped the brass shim stock around the crankshaft threads, thereby eliminating the gap between the crankshaft and the hole in the pulley. If this is done evenly, when you tighten the nut it should stay centered.

The next step is to bolt the clutch down to the pulley, and check the runout with a dial indicator or, if you don't have one, use a pointer very close to the shaft. Runout at the clutch end of the shaft should be set to be no more than 2 to 3 thousandths of an inch. If the shaft has runout at the top end, bend the shaft as close to the clutch as possible until the runout is gone. This is a *very* delicate procedure and if you don't feel capable of doing it you should get help from an experienced helicopter pilot or machinist friend. One advantage of the Cobra is that only one bearing is used on the start shaft instead



color photos by LOUIS DeFRANCESCO

of two, making it a lot more forgiving for runout.

When you bolt the engine to the aluminum mounts you have to make sure the engine sits flat. A nice addition to the Cobra is a new molded fan shroud. It was an absolute delight to work with. Mounted on top of the start shaft is the starter cone so that you can use one of the many starter adapters available. I'm currently using a Sure Start by JCM, which has a mechanical connection to the engine shaft. I prefer this idea, especially because the starter cannot slip off.

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**Robert Gorham can almost trim his mustache with this one.**

# F&B: COBRA

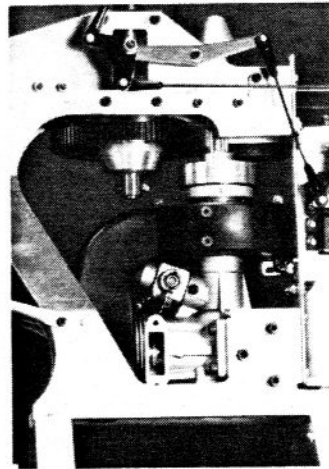
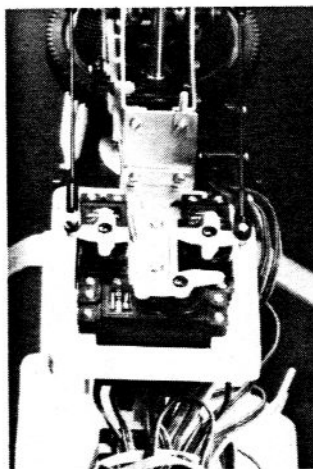
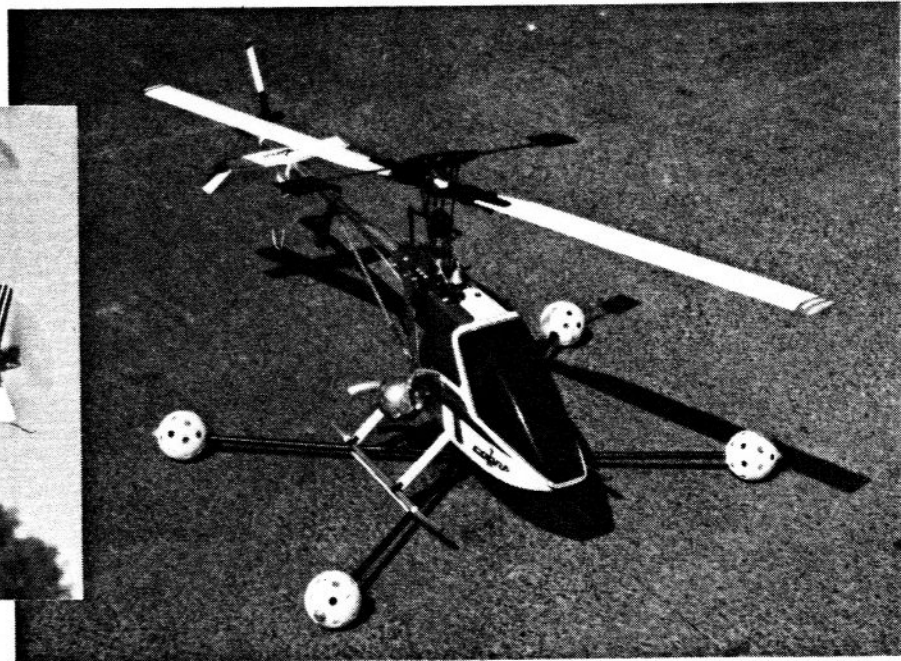
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The Cobra comes with a superbly engineered rotor head. My machine is fitted with the standard rotor head that has a positive coning angle.

While assembling the seesaw hub I found the assembly would bind up as I tightened the setscrew that holds the pivot pin in place. To correct this I took another setscrew and put it in from the bottom.

Below the rotor head sits the wash-out control on top of the swashplate. This keeps the flybar from changing pitch when the swashplate raises and lowers for collective pitch changes. The swashplate is a new design from Hirobo and is made to have all the controls in line, therefore eliminating most arcing movement and providing more useful up and down movement. The swashplate is heavy-duty in design, uses a much larger ball bearing, and should prove to be "bullet proof." The main rotor shaft is a shortened version of the one used in the Competitor. This makes the rotor height in scale with the size of the Cobra and also provides an unusually strong shaft for this size of helicopter. The auto



The leg extensions and training "wheels" save those rotor blades.

Versatility and adaptability are but a few of the desirable features of this great machine.

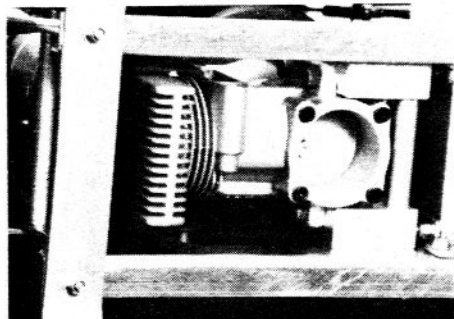
rotation clutch is the standard Hirobo unit.

I've found assembly of the tail boom to be straightforward and you should have absolutely no problem. The tail rotor box is an all-metal unit that is supplied in all GMP and Hirobo kits. The gear ratio is 1 to 1 and the gear teeth are helical, which provides lower friction but adds more strength to the gears. The

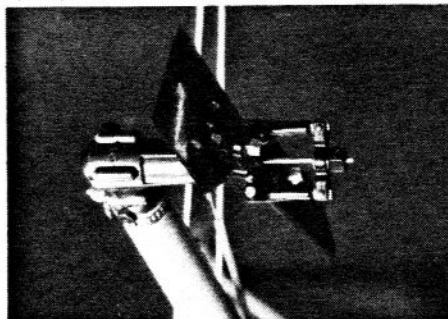
shafts are mounted in ball bearings and when everything is bolted in place there's no movement in any way for either shaft. It is one of the nicest gear boxes available.

The tail rotor blade holders are made out of a high-grade nylon composite and are supplied with one ball bearing, plus one thrust bearing per side. A word of caution: when making up the blades, the

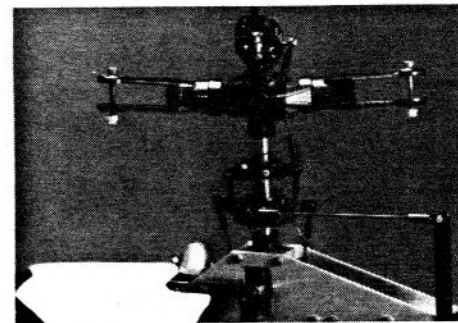
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Rugged engine mounting setup for Mr. O.S. is apparent here.



Tail rotor assembly is well engineered for easy adjustment.



Great engineering is seen in this shot of the rotor head assembly.

root has to be sanded down to form a radius so the blades will fold on impact. Failure to do so will cause the blade to fracture slightly on a light impact with the ground, and if not spotted right away the blade could fly off during a later flight while the machine is in the air!

The tail rotor pitch plate has a ball bearing center and the two rod ends are adjustable for setting static tracking. In the center of the pitch plate there is a new one-wheel collar design adjuster that is very nice for fine tuning the tail rotor pitch.

The landing gear is made of tempered aluminum and is of adequate strength for the average flier, but may tend to flatten if a novice lands the machine very hard.

Another very attractive feature of this helicopter is the linkage and servo arrangement. Five servos are used, therefore separating the collective pitch and the throttle. Although four servos *can* be used, using five is highly recommended because it makes setup a lot easier and it allows the more advanced pilot to practice auto rotation and inverted flying.

There is one modification that should be done when building the machine: notch the top bearing block on the main rotor shaft so that the linkage will not hit on extreme movements. This can be done with either a file or a Dremel tool.

All the wood parts come in a sheet of beautifully die-cut plywood. The individual parts just fall out of the sheet. One of the nice extras is that you don't have to cut the holes for the servos, they fit perfectly to the most popular Japanese servos. For gluing and sanding I use

Robart primer. It fills the wood grain very nicely without using resin. Then I spray it with Formula U.

The main rotor blades in this kit are the standard Hirobo blades. I finished my rotor blades by covering them with black heat-shrink tube with 3-inch white tips. This allows you to see the outline of the rotor disc and still be able to see through it.

When installing the fuel clunk I prefer to have it reach the center of the gas tank and not the extreme end, because when you are low on fuel and make a turn opposite the clunk, it will momentarily be out of fuel and suck air. This is not a good situation. It's not mentioned in the instructions how to mount the tank, so I used two-sided sticky tape and mounted it directly to the cabin floor.

When you set the collective pitch it should be as follows: 5° to 6° at a hover, 8° top end and about -2° for auto rotation. If you're just in the hovering stage you'll find the machine is touchy on the collective if you use -2° so you should adjust it to either 0 or +1°. It is not a good idea to go into forward flight unless you have some negative pitch, because you will have a hard time doing approaches. When you chop the throttle for an approach, the rotor blade will slow down to the point where there won't be any lift and the machine will fall backward out of the air. The instructions have proven to be excellent for setup and building, so read them thoroughly.

**FLYING.** Flying the Cobra was a pure delight. It was the most well-mannered smaller machine I've ever flown. The gear ratio on this machine is 8½ to 1, which is the same as the Competitor but the Competitor uses longer blades, so the Cobra has less tip velocity, making it less touchy. This

helicopter is a pleasure to fly, and should prove to be very airworthy in high winds.

Hovering was stable and small altitude changes were done with ease. In extreme high-speed forward flight the machine was very stable and tracked perfectly.

I am basically not a hot-dog pilot but the responsiveness and the stability of this machine will be a hot-dog pilot's delight. Yet for pilots like myself who go in for smoother, more precise, flying, the machine will also prove itself. This is one of the very few helicopters that flies superbly right out of the box.

All we need now is a good five-cent cigar.

*\*The following are the addresses of the companies mentioned in this article:*

*Gorham Model Products, 23961 Craftsman Rd., Calabasas, CA 91302.*

*World Engines, 8960 Rossash Ave., Cincinnati, OH 45236.*