Hirobo GPH 346 with belt-driven tail

Impressive performance in a midsize package

Well known for its high-quality, world-class helicopters, Hirobo now brings us the midsize GPH 346. Intended for budgetminded modelers, the GPH 346 fills the gap between the smaller, 30-size helis, such as the Shuttle, and the larger, more costly 60-size competition helis. In fact, the GPH 346 delivers the best of both worlds. Its high power output and beefed-up control system allow it to go from mild to wild performance, and you can set it up for anywhere in between; whatever suits your skills. The latest trend in helis is to use beltdriven tail rotors, and the GPH is now available with either a wire-driven or a belt-driven tail rotor. This review covers the belt-driven version of the GPH.

KIT CONTENTS

The moment you open the box, you'll see that this is not a run-of-the-mill helicopter. The heli's fine machining and well-designed components are evident. The GPH goes together easily and quickly because many of its subassemblies are factory assembled and ready to install. The factory-assembled parts include the main rotor head, the tail rotor, the washout unit, the main gear (with auto-rotation bearing), the counter-gear assembly and the swashplate. Other kit items include covered and weighted main blades, a tough, white plastic, wrap-around canopy, colorful decals and a formed windshield. The rest of the hardware parts are in numbered plastic bags that follow the instructions. The manual is thorough and has many numbered drawings to clarify the assemblies as you go along. So let's clear our workbench and start building!

ROTOR HEAD

Assembly starts with the main rotor head and, because it is factory assembled, all that needs to be done is to check the screws and nuts for tightness. I do recommend that you check all factoryassembled components for loose fasteners and that their assembly matches the manual. All the fasteners on the test heli were assembled correctly and tightly.

The seesaw assembly is next. I noticed that many of these parts are the same as those used on the Hirobo Shuttle, and since I had recently built a Shuttle, the assembly proceeded easily. The flybar should be centered in the rotor head and the seesaw assembly then secured into place. The flybar paddles are the same as those used on the Shuttle RG and give the model great performance; they are fully symmetrical and have removable weights so you can fine-tune the control response. Be sure each paddle is the same distance away from the seesaw assembly. To help with the dynamic balance later, I put an 1/8inch wheel collar on each side of the flybar before I installed the paddles. Moving these collars in or out can greatly help minimize rotor-head vibration.

A quick check on a Robart* HighPoint balancer showed that the rotor head was very close to being perfectly balanced, so I decided to leave well enough alone. The double-pinned radius block is now fastened to the main shaft followed by the swashplate, washout unit and the rotor head. The mast lock is also temporarily put on the main shaft; it will be set later, after the chassis has been built.

ENGINE, FAN AND CLUTCH

The fan/clutch assembly attaches directly to the engine crankshaft with industrystandard tapered collets. This system provides a quick and easy way to center the fan on the engine and produces a minimum of runout. The one-piece clutch/start shaft attaches directly to the fan hub and will require

the use of a dial indicator to check and minimize shaft runout. Make sure you add thread-lock to the clutch-shoe mounting bolts.

The engine of choice for the GPH is an Enya* SS .50. The engine mount that comes with the kit is drilled and tapped for an O.S. 46, so I slightly enlarged the holes in the Enya's mount tabs to make it fit. After I had enlarged the holes, the engine fit into the mount without any problems. An added benefit of enlarging the tab holes is that it permits the engine's alignment with the gear train to be tweaked somewhat; this helps get the gear mesh exactly right.

Next, slide the clutch bell over the clutch assembly. The top of the pinion gear in the clutch bell fits into a support bearing in the bottom of the clutch bearing block. To prevent the top of the pinion gear from wearing too quickly, I make sure to apply thread-lock to the end of the pinion gear standoff and the inner race of the support bearing. This prevents the pinion gear from moving in the bearing and greatly extends the life of the assembly.

CHASSIS ASSEMBLY

The main chassis frame on the GPH is made from flat, stacked, upper and lower aluminum plates separated by aluminum spacers and held together with metal bearing blocks. This type of construction makes it very easy to build a straight, rigid chassis with little fuss.

First, assemble the upper frames and use the main shaft to line up the upper and lower bearing blocks. Also, make sure to install the elevator lever before you bolt the two frame halves together. When the frames have been assembled, install the collective pitch arms, the X-type lever and the two aileron L-type levers. Be sure to add thread-lock to the elevator torque lever pivot setscrew, and attach the pivot lever to the elevator lever shaft. The instructions are well illustrated and will make assembly very clear.

The next step is to install the main shaft and gear assembly along with the factory-assembled swashplate. The main gear comes already assembled with the auto-rotation drive-shaft assembly and needs only to be slipped onto the bottom of the main shaft and bolted into place. Be sure to pull up on the shaft when you install the large mast-lock collar.

Assembly of the fuel tank is next, followed by the lower chassis frame and the engine/clutch. Note that rubber frame gaskets are used to isolate the tank from the lower framework. The lower chassis is comprised of the left and right frames, the horizontal RX and gyro mount plates, several aluminum spacers and two, lowerframe-stiffening angles. Assemble the lower chassis including the engine/clutch assembly, but do not completely tighten the bolts. Attach the upper and lower chassis frames to each other, and make sure that the upper part of the clutch housing is inserted property into its support bearing that has already been bolted to the top frame. After making sure that both frames are straight and squarely assembled, I removed each bolt and applied thread-lock to prevent them from vibrating loose later on. To provide a stable work base, I jumped ahead in the manual and installed the landing gear to the chassis.

TAIL BOOM AND DRIVE

As I mentioned earlier, this version of the GPH has a belt-driven tail rotor; this reduces the number of parts in the drive system and simplifies assembly and maintenance of the model. The large, 21mm-diameter tail boom is supported by two braces that are bolted to the bottom aft of the lower chassis and are attached to the boom with a molded bracket. This bracket is also used to install the horizontal stabilizer.

The tail-rotor gearbox is very similar to that of the tried-and-true Shuttle; the tailrotor blade-grips use two bearings for support, and the entire assembly is very tight and slop free. Assemble the gearbox and install the drive belt and the belt-pulley guide. The guide has a left and right side (as indicated in the manual); be certain to install it correctly. To complete the assembly, assemble the blade grips and attach them to the output shaft of the gearbox. Slide the drive belt through the tail boom and attach the boom to the chassis. Before you tighten the boom clamp bolts, slip the belt over the counter gear and pull the boom out to place tension on the belt. While installing the tail boom, make sure to twist the drive belt in the correct direction so that when you turn the main gear, the tail rotor turns in the correct direction. Finally, install the boom supports and screw the horizontal stab and vertical fin into place. Trim the openings in the one-piece plastic canopy and add the decals. I clearcoated the canopy with LustreKote* paint before I applied the graphics, then I sealed them into place with several additional coats of clear. The formed windshield attaches with several small screws.

FINAL ASSEMBLY AND SETUP

Final assembly consists of mounting the servos, RX, battery pack and switch harness, installing the gyro and gyro amplifier and making up and installing the control pushrods. All of Hirobo's construction manuals are laid out in great detail, and the GPH's manual is no exception. just follow the manual for pushrod lengths and radio setup, and you'll be rewarded with a hell that's ready for aerobatics.

I used a JR* 8103 computer radio and NES 531 servos on all the controls. Since I also installed a JR G900 piezo gyro, I used a 1400mAh battery pack. The gyro is located on its own shelf just aft of the main rotor shaft.

Because I installed an Enya SOX engine, I had to slightly modify the throttle linkage. I extended the throttle arm by using a long screw to bring the ball-link attachment ball outward. This eliminated having to bend the pushrod excessively. I also had to grind a little material off the fan shroud to provide clearance for the throttle arm; otherwise, it would have contacted the corner of the shroud. Not a big deal, just something to watch out for.

FINAL THOUGHTS

The Hirobo GPH 346 is a top-of-the-line, midsize heli that can do it all. The GPH handles general sport flying to outrageous 3D aerobatics and comes back for more. It builds quickly and easily, and its flight performance is solid and predictable. As far as I'm concerned, GPH stands for Great Performing Hell! I think you'll agree.