My Love of Helicopters Part V

by Walt Schoonard

So you want to fly a scale radio-controlled helicopter? That's great! Let me do all that I can to encourage you in this fine effort, but let me also warn you of some very serious mistakes that a lot of people make. Without a doubt, there is probably no greater thrill than seeing a well-detailed, scale-model helicopter gently lift off the ground into a rock-steady hover and then slowly make a rudder turn and climb up into the blue sky. I know it is a thrill because I have done it many, many times. What I wish to tell you is how you, too, can enjoy this thrill also. I want to tell you how to get there with as little frustration and disappointment as possible.

Scale model helicopters have some problems that are unique to themselves, but they can be overcome, providing you go at it with proper planning. To list these problems, they are as follows: overweight, under-power causing overheating, and poor flying characteristics. As you can see, that overloaded sentence could discourage the most avid modeller. But don't be discouraged, each one of these problems can be overcome.

First, let me ask you – can you comfortably fly an R/C helicopter? Can you make right and left-hand turns? Do you know how to tune a model engine? If your answer to any one of these questions is no then learn how to do so on a 'pod and boom' type helicopter. There are many on the market to choose from, and some are quite inexpensive – such as the Kalt Baron 20 or the Schlüter Super Mini-Boy. Choose one that is easy to build, one that has ready available parts and has collective, which is an absolute must! Build it yourself, set it up, get an expert to help you trim it for flight – then let him do the first trim flights and hopefully give you some basic flight instructions. Now, while you are learning to fly, keep your dream of a scale helicopter in its proper perspective, remembering that this is your goal. Learning to fly is going to take you some time. Here in the United States, we say 'You must burn a lot of fuel in order to become proficient.'

Back to your scale dream. Here are some helpful steps to follow: Once you have decided which one you are going to build, whether it be a kit or a scratch-built one, do some in-depth research. Find out who was the manufacturer of the prototype. Write to them, detailing just what you plan to do and ask their sales department or public relations department for all of the materials that you will need – such as three-view cockpit and interior details, instrumentation pictures, pictures or photographs of the head, tail-rotor landing gear, antennae finish and markings.

As long as you are going to build this beautiful model, you might as well plan to compete with it; and to do so, you will need good documentation. Now is the time to start accumulating this material. This magazine is an excellent source and will be even better when our esteemed editor does what I have asked him to do – namely, to start a series of three views and addresses of companies who produce the prototypes. He has assured me that he will be doing this in the very near future.

Even if you are going to build one of the fine scale kits on the market, you will need this documentation material.

The next thing you should look into is building materials to reduce weight. Remember, weight is a serious enemy and can only be taken off in small amounts, but each gramme or ounce removed is a plus, as far as power and performance are concerned. This factor must be a thought in each moment of building. There will be areas where you must weigh cost against weight. Don't let the cost factor win out. This is a hard lesson to learn, but it is worth the effort.

Let me tell you about an experience that I had a few years ago when I first went into business. A man from England, who owns a hobby shop there, came to visit me. He brought along a beautiful and very well-built, detailed model of a

Huey helicopter. I had the extreme pleasure of looking this model over inside and out. The owner had gone to great lengths to duplicate the prototype in every way. His workmanship was excellent, to say the least. The model looked as if it had taken a shrink pill down to this size. The man even offered to fly it for me. This is where the problems we have been discussing became apparent. It was heavy, under powered and overheated, which greatly reduced its performance and eventually caused it to crash! Fortunately, the damage was not too bad because it was in a low hover. However, it could have been disastrous, to say the very least. As I told you, the model was extremely well-built, including a welded and detailed land gear. It also had a nifty on-board electric starter, which worked well but was not worth the extra weight.

A very diligent effort must be made to research for lightweight building materials. Here in the USA, we have a space age material called 'Magna-lite' which is produced by Bob Violett in Orlando, Florida. This material is extremely light and strong. It is fuelproof and can be obtained in tubes, shafts, sheets, blocks, U-channels and angles. It works with normal resins and glues and will replace heavy plywood applications with weight similar to balsa wood. It is rather expensive – but well worth it. If you have money to blow, special shapes can be made for use where strength and lightweight are mandatory. A well-known European flyer, Ewald Heim, who is famous for winning, is also famous for showing up at contests with a model that (in most cases) weighs 1½ pounds less than anyone else. "Oh," you say, "but it is very fragile." Who cares? It was made to fly! That is why I have talked about flying first.

This 'Magna-lite' material can be bonded to vertical or horizontal-grain balsa wood for adding strength to tail fins or landing gear and tail skids. It can be used to mount the mechanics, or even the servos and gyro. With this material, the fuselage can now be truly used as a form to hold paint and not as a super-structure. If you wish to know more about 'Magna-lite', you may write to me, care of this magazine.

Let us now consider the finish for your scale model. At the moment, I won't talk about the texture of the finish but rather how to get a good finish that is easy to do and is lightweight. You would be surprised at how many otherwise, well-built scale models are ruined when the finish is applied. Primers and paint are heavy. Many primers contain clay as a filler; and if you want to see what clay weighs, just

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pick up a clay flower pot and imagine trying to make it fly! All epoxy-glass fuselages have a few pin holes in them, and some have a lot. The best method to fill these pin holes is to brush on thinned-out primer and then wash it off with thinner, thus leaving the primer in the pin holes. A couple of applications will fill all of the pin holes with no perceivable weight build-up. Now a light spray coat of primer will give you a smooth surface to paint on. Did you know that if you are going to have a base colour of let's say white, that the epoxy primer will do just great? "Oh", but you say, "it is flat and has no gloss." That's fine, it will have if you wish, when you add the final clear coats. There are many types of paint that can be used on models which were developed for commercial use on automobiles. They have about a 70 per cent weight loss through thinner evaporation and unlimited colour selection. They can be made flexible by adding flex agents, such as wintergreen oil and fuel-proofed by final coating of commercial Urethane. Our brand here in the United States is Ditzler Delthane. It is water clear and looks wet when dry, and it is also repairable.

Any time that you are going to paint over a primed surface, be sure that the sanded primer is still completely homogenious so that there are no light or dark spots to cover. This will assure that you do not have to keep adding more and more colour coats to make it all look uniform. If you are going to paint your model yellow or gold or red, use a white undercoat as these colours are bleed colours and would otherwise require many colour coats to cover uniformly. As you can see, with a little forethought and care, you can have a beautiful finish with minimal weight build-up!

The power plant for your beautiful scale model should be well selected, keeping in mind several important factors. First of all, you need reliable power output. The engine needs to start easily and run smoothly and produce excessive power. You can control excessive power, but you cannot fly with low power.

When you get your engine, put it on a test stand and break it in with a prop. Get acquainted with its carburettor and learn how to adjust it. Stay away from elaborate and highly technical carburettors as they will only fail when you need them most. What you learn about this engine now will pay off later for you will have it buried deep inside your model and difficult to get to.

A silencer should be chosen that is lightweight, quiet, and has minimal power loss.

The next important factor is engine cooling. The engine is going to produce heat, but we must be able to have a rapid air exchange to dissipate this heat build-up. To do this, intake areas must be provided and also air outlets must be larger than the intake area. The reason for this is heated air expands so we need larger outlets than intakes, keeping in mind that the aid exchange must be unrestricted.

There is nothing more frustrating than a baulky-starting engine, and one that overheats and loses power.

You will need to build in external connections to fuel your model and also overflows so that you won't flood the engine while fuelling. External glow-plug connectors are a must, as well as access to replace the glow-plug when needed. A fuel shut-off device is a good idea – also in case you have a 'hot start' and need to stop the engine.

My 'Twin Star', pictured in this article, is the result of many hours of planning and hard work. This model is the source for this article and flies as good as it looks! It receives maximum static points each time that it is judged and has won some trophies. You can do whatever you want to with a scale-model helicopter; for example, the three-bladed head is scale and functions in a scale manner. It is fully articulating, providing lead-lag and flapping. It has no bad flying characteristics. The fuselage is a Schlüter product and weighs 700grammes. The mechanics are Heli-Boy, the under carriage was handmade as was the head, using some Schlüter parts from his four-bladed head. The finish is Ditzler acrylic-lacquer, with a top coat of 'Delthane' urethane clear. The radio is a Kraft single-stick with KPS24 servos and a Kraft gyro.

You can see why I love helicopters!!

To be continued