

Training Corner

THE TRICKY FLIGHT CONTROLS

*The second in a series
of articles by:
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In my last article I discussed the gyroplane take-off. As we begin the take-off roll, the flight controls can get a bit tricky. Let's take a look at why that is and what is occurring.

In an airplane the wings are firmly attached and rigidly supported to the airframe. As we taxi around and make our take-off roll, they stay in place. Our rotating wings on the gyro are attached only by the teeter bolt and the blades can flop all over the place. You must hang on and position them correctly or you risk a blade flap. A blade flap is caused by a blade moving to the front, and not being stiff enough, is forced to flex up by the incoming air. As it goes up, the rear blade is forced down and can hit the propeller, the runway, or both. This can happen at many different speeds!

Correctly positioning and controlling the blades until getting into the air is the majority of gyroplane training. Once in the air, gyros handle and fly almost like airplanes. A couple of minor differences do exist, but are easily and quickly overcome.

First, we position the blades for pre-rotation. The blades bounce and flex so we hang on to the stick. Wings are firm and we don't have to worry in an airplane. Now we engage the pre-rotator. As it grinds away we wonder when to let go. You don't need to over do it. Notice that as the blades begin to spin the droop comes out and they start to stiffen. Ground clearance in the back increases.

With the blades nicely spinning, we find the stick more manageable.

Taxiing with the blades turning fast enough where we can no longer count the turns, just at a blur, is the correct blade speed. Turning slower can cause the blades to bounce and turning faster risks getting picked up by a gust of wind. Since the stick is positioned full aft for taxiing, the first trick [skill] is to keep the lateral cord of the rotor plane parallel to the ground. Keeping the stick aft and centered gets fairly close, but you must look up and keep checking the blades with your eyes. You must know where your rotor is and what it is doing.

The take-off roll is where all of your skills are required. You must be able to move the control stick fore and aft without moving it right or left and be able to move it right and left without moving it fore or aft. This is not easy to learn! A right-handed pilot tends to pull the stick toward the right shoulder as it moves aft. It is further complicated by the fact that the stick is very sensitive to input. You need only apply pressure. A deliberate movement will most likely result in an over control. Additionally, the faster you go, the more sensitive the controls become. In my experience it takes an individual about six hours to really learn this

control technique. It is very sensitive and very precise and will result in rock solid positive control at every point in the take-off roll. Remember from my first article, [The Gyroplane Take-off](#), you are actually flying the gyro off and thus the time you spend being quite light is longer than in an airplane. Minor errors in control positioning will cause you to skid and perhaps pitch as you begin to lift off.

This is a critical gyro skill because in an airplane not having the stick in the center only moves the ailerons, and they are a very small part of the wing. They are not very effective until you pick up speed and greatly increase the flow of air over them. In the gyro you are tilting the entire wing! As you pick up only modest speed, the tilted wing becomes increasingly effective. By letting the stick slip to the right only a little with no wind and a loaded rotor, you will be dragged to the right. The left rudder will not have enough effectiveness to overcome the right tilted rotor, and you will be dragged off the runway, probably rolling over, and trying to figure out where the cross wind came from!

Flying gyros takes more training than in airplanes because control coordination
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dination is more exacting and sensitivity changes with speed. Very small changes in the flight controls can result in major changes in the aircraft attitude. Minor pitch changes cause huge changes in drag and angle of attack resulting in airspeed losses and altitude gains. If you are near the ground you will have your hands full.

CAUTION: This all may sound easy, but it is not. Do not experiment on your own.

In my next article, THE CROSS-WIND, I will tell you why the precise coordination of the flight controls is an absolute must. Most of the mishaps I hear about occur during ground operations when the wind is blowing.

Remember, "the air, even more so than the sea, is most unforgiving for the slightest mistake." Get qualified

flight instruction before getting into a gyro. Skillful pilots make it look easy, but it is not. **R**

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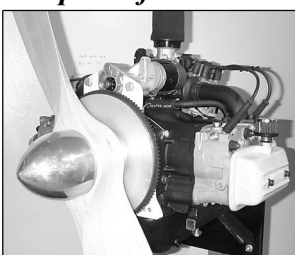
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