

Transitioning to Tailwheel: Part 1

Taxiing and takeoffs

BY STEVE KROG



I HAD THE RECENT opportunity to be part of an EAA webinar speaking on tailwheel transitions and training. We fielded questions for nearly an hour, bringing to my attention the shortage of good information available to pilots looking at or wanting to get some tailwheel training. (*Find the link at EAA.org/Extras. - Ed.)*

There are many significant differences between flying a Cessna 172 and a Piper J-3 Cub. I'll try to explain some of these differences using these two aircraft as an example.

Entering the cabin area of the 172 it is easy to see over the nose of the aircraft and recognize the wings are in a near neutral angle of attack attitude. If there is a 10-knot surface wind, the 172 is minimally affected. The center of gravity keeps the nose wheel on the ground, and the wings generate negligible lift. Adding power to begin the taxi, the 172 rolls forward.

Upon entering the Cub cabin, one first eyes the Spartan instrument panel. Can an airplane really fly with so few instruments? Then, one sees the forward visibility is nonexistent. Looking over the nose, there's a good view of the beautiful blue sky overhead. The Cub wings appear to be in a positive angle of attack attitude. No big deal, but the positive angle of attack means the wings can generate some lift with just a bit of wind — relative or regular.

Steering the 172 is easy. Step on the rudder pedal and the direct steering linkage instantly moves the nose wheel. There is no lag time between moving the rudder pedal and turning the airplane. Do the same in the Cub, and it will seem that nothing happens for several seconds. Only then will the aircraft begin to turn.

Stopping the turn in the 172 is also near instant. Depress the opposite rudder pedal, and the airplane comes out of the turn. Try that in the Cub, and again, it will take several seconds before recognizing a response. While waiting for the tailwheel steering to activate, the turn will have gone well beyond the point where you wanted the Cub to go. The Cub is equipped with a steerable tail wheel, but between the fixed rudder arm and the tail wheel steering arm, there is a combination of lightweight chain and a compression or tension spring. Depressing the rudder pedal requires the linkage

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to tighten before activating the steering arm on the tail wheel. Thus, the lag time.

If you want to make the Cub taxi where you want it to go, you must understand this and the need for lead and lag time before the tail wheel turns. Lead the desired turn by applying rudder pressure a second or two ahead of the turn. When approaching the desired heading on the ground, begin applying opposite rudder pressure a couple seconds before reaching the heading. The Cub stops turning as you relax on the rudder pedal, and you will have rolled out on the desired heading.

This procedure seems so simple when reading the words, but it takes taxi practice before mastering the needed lead and lag times for directing the Cub where you want it to go while on the ground. If you had an overhead view of this, it would look like an overserved person caught in a corn maze.

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A WORD OF CAUTION HERE

If you must apply significant brake pressure in addition to rudder pedal deflection to initiate or stop the turn, it would be wise to look closely at the tail leaf spring and the angle of the tail wheel attach point. Significant brake usage usually indicates a bent leaf spring or a worn tail wheel turning arm mechanism. There are other reasons for added braking, but these are the two most common areas that I have found needing attention when flying tailwheel aircraft.

Taxiing a 172 from the ramp to the desired departure runway is simple, even with a 10-knot partial surface crosswind. The airplane is stable, and the wind has little effect.

Doing the same thing for the first time in a tailwheel airplane can be an adventure. Remember, the wings are in a positive angle of attack position and will generate a small amount of lift when taxiing. Taxi speed can be critical for the novice. Here at Cub Air, we teach all tailwheel students to never taxi faster than the pace of a good brisk walk.



Adding 10 or more knots of crosswind while in the Cub taxi configuration presents several new challenges. Aileron deflection and elevator position become an issue. There is an age-old rule of thumb for taxiing a tailwheel aircraft with any amount of surface wind. If the wind is coming at you, climb into the wind. To do this, turn the yoke or stick into the wind and apply full back-pressure. The up aileron in the crosswind is now preventing the windward wing from generating enough lift to affect your ground track. That solves part of the challenge for remaining on the taxiway, but that crosswind is also hitting the horizontal tail and elevator as well as the vertical fin and rudder.

Taxiing the 172 with the same crosswind is not a problem. Just turn the yoke into the wind, positioning the windward aileron in the up position and leave the elevator in a neutral position.

In the Cub it is critical that the elevator is deflected in the full up position, using the wind to help push and keep the tail wheel firmly on the ground for positive steering. If the downward force is light, the steerable tail wheel is nearly ineffective, making the aircraft hard to steer. Additionally, the large vertical fin and rudder are getting a blast of the crosswind trying to push the tail away from the wind and forcing the aircraft to weathervane, meaning the airplane will try to turn into the wind. Keeping downward pressure on the tail wheel, then tapping and releasing the opposite rudder pedal, will keep the Cub taxiing where you want it to go as you proceed to the departure end of the runway. This is not at all difficult, but it does require the pilot to remain alert and to correct for the influence of the surface wind.

After reaching the departure end of the runway and preparing for the pretakeoff checklist, position the aircraft with the nose pointed into the wind if it can safely be done. Always keep the stick or yoke in the full aft position, which positions the elevator in the up position. The Cub is quite light in the tail. The prop blast aided by surface wind can raise the tail when you least expect it. I've observed several airplanes experiencing this situation. All needed a new prop.

THE TAKEOFF

Assuming the aircraft controls and systems checked out properly, taxi into position for the takeoff. Position the airplane on the runway centerline, or the middle of the turf runway if that is being used, and then come to a full stop. Note that in the Cub forward visibility is obscured.

The only means of directional control is via the steerable tail wheel. So, it is ideal to keep the tail wheel firmly planted for the first few seconds of the takeoff roll by having the relative wind over the elevator forcing a download on the tail wheel.

Taking off in the 172 allows forward visibility. The control yoke is held in the neutral position, and slight right rudder pressure is needed to keep the aircraft on the centerline as power is applied. Once the recommended rotation speed is reached, back-pressure is applied establishing a positive angle of attack. When generating enough lift, the 172 lifts off the runway. All that is required of the pilot now is to establish the proper climb attitude while applying slight but constant right rudder, offsetting torque and P-factor.

When taking off in the Cub you must establish a diagonal visual sight line because the nose obscures forward visibility. Look approximately 30 degrees to the left or right. Where that line intersects the runway edge, that is where you will want to focus. When power is applied and you move forward, your line of sight will move forward at the same rate.

Begin the takeoff roll by holding the stick or yoke in the full aft position. The only means of directional control is via the steerable tail wheel. So, it is ideal to keep the tail wheel firmly planted for the first few seconds of the takeoff roll by having the relative wind over the elevator forcing a download on the tail wheel.

Relying on the diagonal line of sight, you will see if the Cub is traveling to the left. Slight right rudder pressure is applied to offset this travel, keeping the aircraft moving straight forward.

Within a few seconds the relative wind pressure can be felt on the elevator. Slightly relax the back-pressure, allowing the tail to lift about a foot off the runway. A beginning tailwheel pilot will want to immediately apply more forward-pressure, raising the tail to see over the nose. Some tailwheel pilots like this form, but I prefer to keep the tail low. If the tail is raised too quickly, there is a period of 3 to 5 seconds where the rudder is ineffective. Keeping the tail low, the wing is in an ideal positive angle of attack. When the wing is generating enough lift, the Cub will just float into the air. Doing so will allow the Cub to use a lot less runway and quickly become an airborne aircraft. Establish the climb attitude desired and use slight but constant right rudder for the duration of the climb.

Raising the tail to see over the nose positions the wing in a neutral angle of attack, generating little or no lift. The takeoff roll will be longer, requiring the pilot to mechanically force the aircraft into the air rather than employing a smoother or fluid takeoff.

The above description assumes there is no crosswind affecting the takeoff movements.

Next month, Part 2 will describe crosswind takeoffs and regular no-wind approaches and landings when first flying a tailwheel aircraft. EAA

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