
CHAPTER 3

Taxiing



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INTRODUCTION

Hangar flying, that area of aviation where one can sit around and visit (or swap lies) with other pilots about flying, is a great way to gain additional knowledge about procedures and techniques.

Hangar flying can provide valuable lessons ... until you encounter and believe someone who talks, not about their experiences, but about what they have heard to be true. Thus the beginning of many rumors concerning taildraggers.

Not to be outdone at the next hangar session, the stories are embellished until they are blown out of proportion.

A journey of a thousand miles begins with a single step. – Confucius

The hard-to-handle reputation of many taildraggers is often exaggerated. For example, in comparing the Luscomb with the Aeronca you find the Luscomb stays on the runway for a longer takeoff distance. This requires, while maybe not greater concentration or skill by the pilot, at least concentration for a longer period of time. The Cessna 195 also has the reputation of being harder to handle than similar planes because of the extended time on the ground.

Although you should take these tall tales in stride, there must be some spark of truth in there somewhere. So regardless of the exaggerations, this type of information should serve as a warning to never let down your guard when flying a taildragger.

The taildragger presents the pilot with more of a challenge than flying an airplane with training wheels (tricycle gear). It requires knowledge and practice with some good old common sense thrown in. In other words, flying a taildragger is a full-time job requiring a full-time pilot.

TAIL WHEELS

Tail wheel airplanes use various configurations for the tail wheel assembly. Depending on the make and model, you might find:

- *Skid* - This is the configuration that created the name 'taildragger.' The skid is an effective brake when the stick is pulled back to your gut.
- *Non-steerable (free caster or swiveling)* - Control is with the use of the rudder and brakes.
- *Steerable* - There is an interconnect with the rudder so when the rudder is pushed, the tail wheel tracks to assist in the turn.
- *Steerable locking* - There is an interconnect with the rudders and a lock that can be engaged



Figure 1. Tail wheel assembly (Aviat Husky). Pulling the stick back to your gut makes steering more effective.



Figure 2. Pay particular attention to the springs during the walk-around inspection checking alignment and security.

in the cockpit prior to takeoff to cause the tail wheel to track straight.

➤ *Steerable retractable - Retractable tail wheels are generally found on the larger taildraggers.*

TAILDRAGGER ADVANTAGES

Compared with the tricycle-gear airplane, the conventional-gear airplane has some advantages:

➤ *More propeller clearance for operating on soft fields and rough fields without damage to the propeller.*

➤ *The tail wheel is not as susceptible to damage on a rough field compared to a nose wheel.*

➤ *Better maneuvering at backcountry and remote airstrips. The pilot can execute a turn around in a small space, pivoting on the main gear.*

➤ *Better takeoff performance from a rough field. The nose wheel plane will drop the nose to the surface increasing surface drag with every dip and bounce.*

➤ *Better acceleration from a rough field. The pilot can maintain level flight attitude while going over bumps; whereas the tricycle-gear airplane will have an increased angle of attack, becoming momentarily airborne, increasing induced drag.*

➤ *Faster cruise speed because it lacks the drag of the nose wheel.*

➤ *Reduced maintenance costs.*

TAILDRAGGER DISADVANTAGES

➤ *Weathervane tendency. The taildragger can easily turn into the wind. The tricycle gear has a nosewheel that prevents the weathervane from occurring.*

➤ *CG location. With the center of gravity located behind the main wheels, physics explains through*

Newton's Second Law that the object can easily rotate about the point of rotation.

► *Compare the tricycle-gear and conventional-gear planes with a garden cart operating over rough ground in a newly plowed area. The tricycle gear is like pulling the cart. The conventional gear is like pushing the cart. Any irregularity causes the taildragger to veer off track.*

CONTROLS

Under certain conditions the taildragger requires use of all the controls available. Control effectiveness is based on speed.

As the speed increases during takeoff, the order of gaining control effectiveness is R-E-A, that is, rudder, elevator and finally ailerons.

As the speed decreases the order of losing control effectiveness is A-E-R.

The ailerons, elevator and rudder are considered the controls, but don't leave out the brakes and throttle.

- *Ailerons*
- *Elevator*
- *Rudder*
- *Brakes*
- *Power (throttle)*



Figure 3. A side view of a tricycle-gear airplane reveals the cg (mass of the airplane) is ahead of the main gear.

TAXI AERODYNAMICS

The study of physics (that area of science that deals with matter and energy and how they interact) provides some insight that during takeoff the mass of the airplane wants to travel first down the runway.

Never let an airplane take you somewhere your
brain didn't get to five minutes earlier. — *Anony-
mous*

Tricycle gear airplanes, with the mass ahead of the main wheels, have no problem maintaining a straight track during the takeoff.

Taildragger airplanes, on the other hand, with the mass located behind the main gear, want to swap ends. This is called directional instability and it is a natural occurrence ... in physics, that is.

If the tail wheel is straight as the taildragger starts the taxi, it begins to track straight. The torque of power application, a slight weathercock,

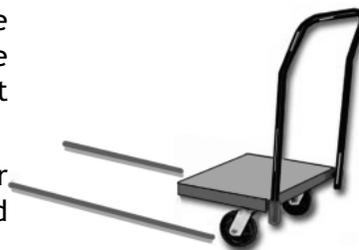


Figure 4. Tricycle-gear airplane comparison. With the mass ahead of the main wheels (this comparison has a person pulling the hand cart), the tricycle-gear airplane tracks straight during takeoff.



Figure 5. The side view of the taildragger reveals a lot of side area behind the main gear. The cg is behind the main gear.