

How to Avoid Prop and Tail Strikes in the Cirrus

by Nathan Zucker, CSIP, MCFI and Richard Bertoli, CSIP

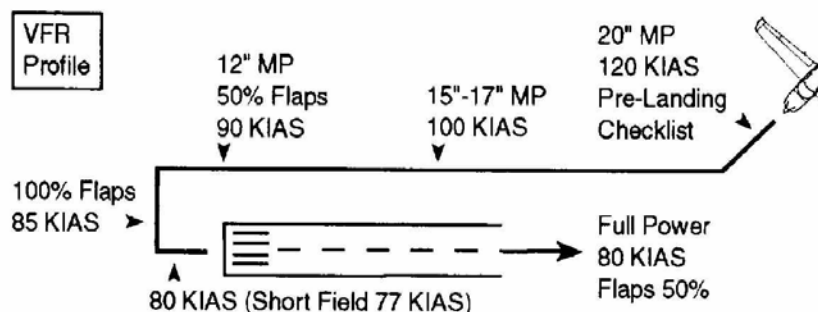
Most Cirrus pilots transitioned to the airplane after having been trained in the ubiquitous Cessna or Piper models that comprise the vast majority of the rental fleet. In both cases, the pilot was accustomed to flaring relatively high; a procedure that works well in these aircraft, but will not work in the Cirrus. If the pilot flares the Cirrus in the same way, elevator authority can be lost; the aircraft will pitch down, and land on the nose wheel first. This is a guaranteed prop strike. Teaching the pilot to *fly* the airplane to the runway, then bring the nose up slowly with the smooth application of back pressure, similar to the way one would land a light twin, should consistently result in a main wheel first landing with more than enough elevator authority left at touchdown.

Finesse is the key to avoiding tail or prop strikes in the Cirrus. With the strong prop wash and a very efficient elevator, the pilot is prone to over controlling the airplane. It is imperative that the new Cirrus pilot be taught to apply or release pressure, and not to make large movements of the stick. One of the most common mistakes we have witnessed is the pilot pulling the stick back an inch or two as the airplane hits rotation speed. Since the elevator is so efficient, the nose will rise quickly, the tail will drop, and, without correction, may contact the runway.

A similar scenario can occur on a poor approach and landing, especially without flaps. When the pilot starts to flare, the tendency is to yank back on the yoke to arrest the aircraft's sink rate. Unfortunately, this action will not overcome the inertia of a high sink rate and, coupled with a nose high attitude, will likely result in the tail making contact with the runway. To make matters worse, after the tail strike, the airplane may violently pitch down, panicked-pilot induced or simply a result of Newton's Third Law of Motion. The likely consequence: a prop strike. Ugh!

Many Cirrus pilots were taught early on that they should land the airplane in what appeared to be a flat attitude. They were told that this attitude was, in fact, not flat and that it would keep the tail well clear of the runway. The problem is that this attitude *is* flat. When an airplane is landed flat, touchdown speed will often be faster than necessary, requiring more runway, wearing on tires, and is more likely to lead to bounce, floating, and directional control problems due to the extra energy that *would* have been dissipated in a proper flare. If the airplane bounces off the nose wheel, then begins to porpoise as it oscillates between main and nose wheel contact, the risk of a prop strike is extremely high. If the airplane is bounced off the nose, an immediate Go-Around must be initiated.

There is no reason not to perform a proper flare in the Cirrus. The Cirrus can safely be flared to about 10° nose up without risking a tail strike, however, the flare must be flown smoothly with application of stick pressure, no pumping or yanking. Flying the pattern and approach in trim with positive airspeed control is absolutely necessary to perform consistently safe landings in the Cirrus. Remember: A good landing starts in the pattern!



Let's review the fundamentals as written in the FAA Airplane Flying Handbook:

Roundout (Flare)

The roundout is a slow, smooth transition from a normal approach attitude to a landing attitude. When the airplane, in a normal descent, approaches within what appears to be about 10 to 20 feet above the ground, the roundout or flare should be started, and once started should be a continuous process until the airplane touches down on the ground.

As the airplane reaches a height above the ground where a timely change can be made into the proper landing attitude, back elevator pressure should be gradually applied to slowly increase the pitch attitude and angle of attack. This will cause the airplane's nose to gradually rise toward the desired landing attitude. The angle of attack should be increased at a rate that will allow the airplane to continue settling slowly as forward speed decreases.

When the angle of attack is increased, the lift is momentarily increased, thereby decreasing the rate of descent (Fig. 9-6). Since power normally is reduced to idle during the roundout, the airspeed will also gradually decrease. This, in turn, causes lift to decrease again; it must be controlled by raising the nose and further increasing the angle of attack. During the roundout, then, the airspeed is being decreased to touchdown speed while the lift is being controlled so the airplane will settle gently onto the landing surface. The roundout should be executed at a rate that the proper landing attitude and the proper touchdown airspeed are attained simultaneously just as the wheels contact the landing surface.

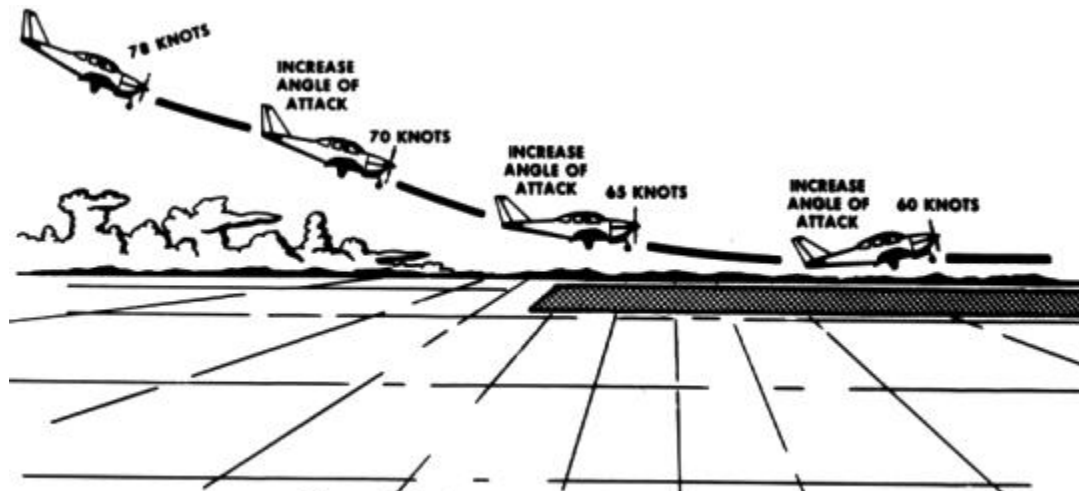


Figure 9-6 Changing Angle of Attack During Roundout

The rate at which the roundout is executed depends on the airplane's height above the ground, the rate of descent, and the pitch attitude. A roundout started excessively high must be executed more slowly than one from a lower height to allow the airplane to descend to the ground while the proper landing attitude is being established. The rate of rounding out must also be proportionate to the rate of closure with the ground; that is, when the airplane appears to be descending very slowly, the increase in pitch attitude must be made at a correspondingly slow rate.

The pitch attitude of the airplane in a full flap approach is considerably lower than in a no flap approach. Therefore, to attain the proper landing attitude before touching down, the nose must travel through a greater pitch change when flaps are fully extended. Since the roundout is usually started at approximately the same height above the ground regardless of the degree of flaps used, the pitch attitude must be increased at a faster rate when full flaps are used. However, the roundout should still be executed at a rate proportionate to the airplane's downward motion.

Once the actual process of rounding out is started, the elevator control should not be pushed forward. If too much back pressure has been exerted, this pressure should be either slightly relaxed or held constant, depending on the degree of the error. In some cases, it may be necessary to advance the throttle slightly to prevent an excessive rate of sink, or a stall, all of which would result in a hard drop in landing.

It is recommended, therefore, that the pilot form the habit of keeping one hand on the throttle throughout the approach and landing, should a sudden and unexpected hazardous situation require an immediate application of power.