

# Thoughts on landings-It's all about energy.

By Luke Lysen

This article is an email response to one of our clients who wrote us asking about the dangers of landing. We thought it would be good to share the content of that message with the rest of our COPA readership.

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Dear XXXXX,

This discussion on COPA regarding landings has caused quite a stir. It is not unwarranted because there have been a few recent fatal accidents while landing.

To be direct I feel that the Cirrus is a very safe aircraft and you do not need to be worried about flying it. We have flown with you enough to know that you are landing properly and are very safe. Recurrent training is always advised to make sure there are no bad habits forming and to refresh the basics, but you are a safe aviator who can land your craft.

## Energy

You asked, "is this just people landing with too much energy?" The answer is pretty much yes, though we must recognize that by "landing" we mean "attempting to touch down" with too much energy. For example: I have flown over the numbers at 150 kts before... as well as 72 kts... and have done both very safely. The issue is understanding the amount of energy that you have when you are close to the ground and what that energy will do. If you are too fast and you flare, the airplane will balloon and potentially stall well above the runway. The nose would drop and some bad things would happen. If you try to force the plane on the ground with too much energy, you will bounce which can cause pilot induced oscillation (PIO) which can result in a loss of control. At best the result would be some damage and at worst... much worse.

If you do not have enough energy when you start your flare, you will not be able to stop your aircraft from impacting the ground in a pretty painful way. If you do not have the proper airflow (i.e. speed) over the elevator, the rapidly sinking airplane will not flare because the elevator is less effective due to that lack of airflow.

## Managing Energy

With the long, low, efficient wing on the Cirrus we experience a more pronounced ground effect than a high wing Cessna. We often refer to this as float. Understanding the float is essential if you want to know how to dissipate the energy before touching down. Mastering the float will ensure a safe, stalled-on landing.

We have airspeed numbers: 100Kts on downwind, 90 on base, 80 on final, (75 over the mythical fence); along with standard flap deployment places (50% abeam the touch down spot, 100% on final) - but these are just guides. They aren't a magic formula to ensure perfect landings, but they do establish a manageable and consistent amount of energy.

The key is that in every landing we must assess the wind, density altitude, other traffic, runway environment (i.e. trees, length, etc), and our altitude... and adjust our energy accordingly. This isn't as hard as it sounds, it just goes back to the 3 places you can get energy: Altitude, Airspeed, or Power. Understand those and you approach mastery of landings. In teaching I encounter many pilots who in practice only use the throttle for energy on landing and are reluctant to lower the nose of the aircraft and use the energy stored in their altitude.

### Sight Picture

One issue we deal with in Cirrus transition trainings is the sight picture out the window. Most pilots have come out of a Cessna or Piper and have those sight pictures ingrained in their brain. A Cirrus and a Cessna will look very similar in terms of pitch angle and flare to a person looking at them from the outside. Inside the cockpit looking out the front window the picture is very different. A Cessna has a higher dash and will require the pilot to pull back on yoke such that during touchdown you can not see in front of you. The Cirrus has a lower dash and when you land your forward visibility is still there. If you try to bring the Cirrus dash up to the spot that the Cessna dash is on landing, you will balloon and stall or hit the tail of the airplane. Continuing a slow, smooth addition of back pressure will ensure that the aircraft stays level just a foot above the runway and will touch down when it finally runs out of energy. Using this method you can touch down with the stick all the way back and in a full stall.

### A Few General Thoughts On Landing

A good landing in any airplane is to touch down with the stall horn going off. This means that you have connected with the ground with the lowest amount of energy you could to maintain flight and will use the least amount of breaks and take up the least amount of runway. This also means the airplane can't become airborne again, which is a good thing.

When the main wheels touch down the pilot needs to continue to smoothly keep pulling the yoke back to the stop so as to have the nose wheel touch down at the slowest speed possible. A fast touchdown of the nose wheel could cause some pretty significant vibration - enough to damage the fairing.

The nose wheel will weathervane into the wind. Be aware of that and use the above technique to limit the impact of this. Expect some vibration as it touches initially but that should go away fairly quickly (one or two seconds).

I think of the landing as 3 phases: 1)Descent: where I am in a nose down attitude approaching the runway. 2)Level off: where I am about 1 foot or less over the runway in a level attitude, dissipating energy (in order to keep level as my energy dissipates I need to continue to pull the yoke aft). 3)Touchdown: when I have dissipated enough energy I will flare the aircraft so as to touchdown on the main wheels with the nose wheel still in the air. The airplane will stall onto the runway. I keep the yoke moving aft after i make contact with the runway with the main wheels and keep the nose wheel off as long as I can. **DO NOT RELEASE** the back pressure until well after the nose wheel has dropped to the runway on its own.

Fly safe,  
Luke

If any of these concepts seem odd, you should go fly with an instructor to learn more about them. As with any training, make sure the instructor knows how to land a Cirrus and uses the full stall landing technique. If you want to have one of our team come fly with you, we can certainly do that. John and I have flown with and continue to fly with all our instructors - they're some of the best in the industry. We can be reached at [www.theflightacademy.com](http://www.theflightacademy.com) or (866) 557-1501.

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