

Teaching Landings (published in AircraftOwner.com March 2012)

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Spring has arrived, and that always brings several thoughts to my pilot mind. No more icy runways and taxiways, and no more freezing pre-flight inspections (YEA!). But, it also means that it is time to look for bird nests under the cowling, and it is really time to dust off the cross-wind landing techniques (BOO, HISS!).

All of us had that cross-wind landing skill mastered at one time. And, if you fly a plane with the third wheel at the back end instead of the front end, you have never lost the skill. But I find from the flight reviews I conduct, that many pilots have let that skill drift away (similar to the way we let the centerline drift away on short final.) So here are some techniques that you might have heard and forgotten, or that you might have heard slightly differently, to help you get the plane aligned with the centerline of the runway, and to keep it on the centerline while on final and through and after touchdown.

First, let's back up to what you know: 1. There are a lot of things happening to the aircraft between the turn from downwind to base and the rollout after touchdown; and 2. Events seem to be changing more and more dramatically as the process continues.

In order to perform consistent, successful landings, we need to start from the same point in space at the same airspeed every time. We know that this point in space differs with airplanes and with the wind, and I will let you determine what works for you. For me, in an aircraft the size of a Cessna 172 or Piper Cherokee or smaller with light winds, that point in space is 800' – 1,000' AGL, about $\frac{3}{4}$ of mile offset from the

runway, and about $\frac{3}{4}$ of mile past the end of the runway. And the airspeed is roughly the top of the white arc. See what works for your situation. Some pilots like to plan to carry power through the entire approach, and adjust as necessary; some retard the power to idle in the turn to base, and then add it back in as necessary. There is nothing wrong with either approach, but consistency is the key. And while it is definitely possible to make bad landings after a perfect downwind-to-base turn, it is very difficult to make consistently good landings if this point in space is incorrect or inconsistent.

Now, let's think about the next couple of minutes of the pattern or so a bit differently. You as a pilot are continuously looking at two things from the time that you pull the power back to turn base until you touch down – the runway, and the airspeed indicator. And you are probably saying to yourself, "Runway, airspeed. Runway, airspeed." But what do you really mean? Here is what should be going through your own mind at this time.

When you say "airspeed" you should be asking yourself – What is the current airspeed, and how does that compare to what I want? What is the trend of that airspeed? Whether or not it matches my desired airspeed, is it increasing, decreasing, or stable? And if it is changing, how fast is it changing?

And "airspeed" is the easy word. When you say "runway", you are asking yourself three times as many questions. Are you on the glide slope you want, or are you above or below that angle? And what is the trend? And how fast are you changing from

desired glide slope? Are you lined up with the centerline, and what is the trend and speed of change? And is the airplane aligned with the runway, and what is the change and speed of change.

Even though you may have three of those four items stable, changing the fourth one is going to affect the other three. And then it is all going to change when you bring the nose up to flare. No wonder you say, "ARRGH!" as you come over the numbers.

So since this column is looking at crosswind landings, let's assume that you can figure out the glideslope and airspeed parts of the pattern, and look only at centerline placement, and aircraft alignment.

When I talk about looking at the runway, the runway picture I am talking about is the entire centerline. I want to visually line up the far of the runway with the near end of the runway. Then I want the point on the airplane nose that is in front of my eyes (not the center of the cowling) lined up with both the near end and far end of the runway. It is nonsensical to talk about lining up with the approach end of the runway. No matter where you are in space, if you are flying to a point, you are lined up with that point. You are only lined up with the centerline if you have all three points lined up.

Now, some pilots like to fly in a crab all of the way down the final approach course, and then align the aircraft with the runway at the last instant. And some pilots like to align the aircraft with the centerline as soon as they roll out of the turn from base to final. Both systems work, but both have some drawbacks.

Looking first at the "crab-on-final-and-kick-it-out-at-the-end" technique. Plus side – The airplane is in coordinated flight all the

way down the final approach course. No slips, no skids and therefore no extra power requirements. Also, this is the same technique that you used when flying rectangular courses. Down side – lots of changes to the airplane at the last minute to truly get the plane pitched correctly and on (and maintaining) centerline and maintaining the runway alignment. It can be done, and it is beautiful when it works well. But there is definitely some quick movement going on here.

Now let's look at the infamous "wing-low" method. Plus side - We can get the correct rudder and aileron figured out when still away from the runway. Down side – we are in a slip, which is drag producer, which requires an increase in power. But I generally teach my students to use this technique initially because I believe the pluses outweigh the minuses. From the time you roll out on final, if you are lining up the far and near ends of the runway over the point on the cowling, the changes in the flare will be minor. But yes, you will probably need a bit more power on final to overcome the drag. (And what happens when you add power in a low-speed situation? It's that nose-up-and-to-the-left thing again. More right ruder, and let the nose drop a touch to keep the sight picture.)

So you have all of this figured out, and you have this whole landing thing nailed, and then just before touchdown everything changes. And here you are with the nose aiming to the left of centerline, and the airplane off of the center line to the right. What happened?

Nothing, except a very common error. It is almost universal that as pilots begin to bring the nose up to the landing picture, they unconsciously make two additional

changes. They rotate the yoke (or move the stick) back to the neutral position. And, they move the rudder pedals back to their neutral position. But let's look at what is happening to the airplane during this ten-fifteen second period.

First, as the nose comes up with no increase in power, the airspeed will decrease. (Well, this was the whole point of the movement, right?) But as that airspeed decreases, the effectiveness of all of the controls is decreased as well. So, at the very time when we need more rudder and elevator, we have unconsciously reduced the both of them.. Secondly, because we have moved the nose upward and lessened the downward motion of the airplane, we have increased the angle of attack. Remember the slow flight that you handled so well for your checkride? It's back. This

increased angle of attack is also calling for additional right rudder, just at the point when you are neutralizing it.

So, as you are beginning to flare, continue to look all of the way down the runway, watching for the aircraft drift and for the nose to slowly turn (usually left). And consciously tell yourself that you will probably need more aileron and rudder at the end so you can be ready for it. Don't be nervous about touching down first on the up-wind main wheel. Count yourself as an expert the first time it happens. Just leave the controls in (and increasing) all the way through the rollout and you will start to see the centerline right in front of you, straight ahead.

Happy Landings - Fly Safe

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