

Landings: Three Point vs. Wheel

I have heard it said that, “Arguing with a pilot is a lot like wrestling with a pig in the mud... after a while you begin to think the pig likes it...”. And when two pilots start arguing with each other, it can start to rival the WWF. Especially when the subject happens to be that of wheel landings, vs. three point landings. I have been present at gatherings of tailwheel pilots, where the subject has led to what would be modestly described as an animated debate.

There are some pilots who adamantly stand by the position that a wheel landing is the only way to land a conventional geared (aka tailwheel) airplane. I know of one ex-Navy pilot who scornfully likened those pilots who chose the three point stance in their landings to the gender that “squats when urinating”. Obviously one can get the sense that arguing with that “old salt” about landing technique would quickly degrade to the barnyard.

Fortunately there are other pilots who are of a much more moderate position relative to “landing stance”, and understand that both the wheel landing as well as the three point landing each have their validity and conditions in which one might be preferable to the other. One such pilot recently wrote me a letter about the subject.

In it, he said: “I have been flying for over 52 years, ... When I retired I bought a Boeing PT 17 which I am enjoying immensely. During the preceding few years I have encountered quite a few pilots who insist that the only acceptable landing in the Stearman, or any other tail dragger for that matter, is a three point landing. Their argument is that the transition from tail high to the runway is dangerous. From talking to pilots who have gotten a tailwheel endorsement, only one was taught wheel landings.

“I have told them that wheel landings were required on my flight instructor check ride, taught during primary in Army flight training, and pointed out articles in my old flight instructor handbook describing the technique. It is not a landing intended to replace conventional landings but is a good tool to have in your toolbox when conditions warrant it. 95% of my landings are three points but every so often in gusty winds I revert to a wheel landing.

“If I am chasing windmills then thank you for at least taking the time to listen, but if I am making a valid point, could I talk you into writing a future article addressing wheel landings and their place in flying a conventional geared airplane?”

Well, I don't know what is more fun, chasing windmills, or wrestling with pigs in the mud, but the writer of the letter certainly brings up some valid points. To begin with, we both agree that whereas we might prefer one landing style to the other, there are definitely times when one might be preferable over the other. I too, find that the vast majority of my landings in my PA-12 are three point, but if the wind conditions warrant it, I will land on the main(s) only in a wheel landing.

For those who care to know, the wind conditions that have me favoring a wheel landing are when the winds are gusting. Regardless of whether the winds are a cross wind or straight down the runway, if they are gusting it means that I am going to have to approach with a little more airspeed (adding half the gust factor to my approach speed). This increased speed is what I would typically use when I want to wheel land. If the only issue with the wind is that they are cross winds I will usually land “two point” touching down on the windward mainwheel and tailwheel simultaneously.

Let us all please note, however, that there are certain aircraft that either by manufacturer stipulation, or by design limit, should only be landed one way. For example the folks who make the Maule recommend that you not only land, but takeoff as well, from a three point attitude. And I’m willing to bet that there are only a handful of readers who have ever witnessed a DC – 3 or Beech 18 landed in anything other than a wheel landing (This is not to say that they cannot be landed in a three point attitude... the fact is they can, but it takes an experienced pilot to do it.)

I think that the vast majority of pilots flying the lighter aircraft, such as the Cubs and Champs will prefer the three point landing, whereas those flying heavier aircraft such as Cessna 180s, or 195s will land on the wheels most of the time. And there are also pilots who prefer the wheel landing most of the time for no other reason than the sense of pride in the increased skill they have mastered. But as the writer of the letter points out, we need to be conversant in both types of landings.

His statement that only one of the pilots, out of all that he had spoken with holding a tailwheel endorsement, had been taught wheel landings, made me wince. In fact the regulations quite plainly state in part 61.31 (i) (the regulation governing additional training for the various endorsements) that the training for a tail wheel endorsement must include wheel landings (unless the manufacturer has recommended against such landings). So I guess that means that all the other tailwheel pilots the author of the letter knows had some rather negligent instructors.

Admittedly, learning (as well as teaching) how to make successful, safe, wheel landings can be quite frustrating. There are some pilots that have the hardest of times getting the eye – hand – foot coordination together. It is all rooted in a good sense of perception and timing, and there will probably be many go arounds logged before most pilots learn the requisite skills.

All landings (regardless of whether they will be in a nose dragger, or tailwheel airplane, on the wheels, or three point,) are a five stage event: One, the glide, on speed and on target; two, breaking the glide; three, dissipating the energy, four, the touchdown; and five, the rollout. If we are planning on landing on the “wheels” this doesn’t change, but there are a few modifications.

In stage one, the glide, we will carry just a wee bit more speed (2 – 5 knots, for most of our smaller, lighter airplanes.) Stage two remains the same, for regardless of airplane, if we don’t break the glide, we’ll probably break the airplane. The important thing here, is

to be sure that you don't flare too early, for if you are too high now it can have a drastic effect upon the next stage. The third stage, dissipating the energy, is where things begin to change.

In this stage, we have to allow the aircraft to continue in a slow descent to the runway, however we are not going to be slowly pulling back on the stick (or yoke) all the way to a full stall landing. Some pilots choose to carry a little bit of power in this stage (more so in the heavier airplanes) somewhat akin to the way a floatplane pilot might fly a glassy water landing, but I typically have power off in my Super Cruiser. I maintain a slightly tail low attitude, as the aircraft slowly settles to the runway.

The fourth stage, the touchdown, is where so many pilots get into trouble. We have to be prepared to allow/bring the stick/yoke to come forward in a smooth, coordinated fashion, to keep the tail from settling, just as the main wheels touch the runway. Knowing when this is about to happen is a matter of perception and timing as well as experience. If we bring the stick forward either too soon, or too late, we will get into a porpoise that would have those sea mammals in awe.

I do have to caution that if one allows the airspeed to get too slow while dissipating the energy while at the same time still being a little too high above the runway the likelihood of a successful wheel landing is not too good. The airplane will most likely run out of energy too quickly, and drop to the runway. There is nary a pilot that could convert the sudden drop into a wheel landing. So if that is the situation you find yourself in it's probably best to go around. Alternatively you might be able to convert to a three point landing, but it requires skills that should have prevented the situation from ever developing in the first place.

The typical scenario for a pilot learning a wheel landing goes as follows. The first two stages go pretty much as they should, but now, as the airplane dissipates the energy, the pilot gets a little bit behind, and the airplane touches down just a micro second before the pilot expects it to. The next thing to happen (due to the cg being behind the main gear) is for the tail to come down, but since the airplane has not slowed to a stall, the increase in angle of attack, as the tail comes down, has the airplane headed for the skies in a bounce.

Of course, just about this time, the pilot, who is behind the aircraft, now excitedly brings the stick forward, slamming the aircraft back onto the runway, and the cycle begins again, only this time with much more intensity. (Dolphins and Orcas now join in the awestruck audience.) Most pilots manage to realize the gravity (pun intended) of the situation, and apply full power in a go around before things get completely out of control and the aircraft still has all it's parts. (There are many instructors and tailwheel pilots who, when asked: "How many bounces do you ride through before executing the go around?" respond with the answer of ONE bounce.)

So on the next approach the aspiring tailwheel pilot-in-training is determined to not be behind the aircraft. The first two stages are impeccable. Even the third stage is going well, that is until the pilot, not wanting to be behind the airplane, brings the controls

forward, but, unfortunately, just a split second too soon. With the main wheels still just a smidgin above the runway, once again the pilot is not ready as the wheels touch the runway, and this time instead of holding some forward pressure on the controls, pulls back, aiding and abetting the tail's drop and the wing's increase in angle of attack as the airplane launches into the sky yet again.

As I said earlier, it's a matter of timing and perception. Once learned, it will be easy to bring the controls forward, just as the main wheels touch down, looking for the same attitude as was had in the tail high take off. Many pilots are worried that they'll strike the propeller in this attitude, but there are only a handful of aircraft where this might be the case, and if that is so, then the manufacturer has probably recommended against wheel landings.

As all tailwheel pilots know, though, the fun is just about to start, for "it's never over 'til it's over". We now have to deal with the final stage of the landing, the roll out. In this stage, in a wheel landing, we have to slowly come forward with the stick, as control effectiveness diminishes, to keep the tail up in the air. If we just quickly bring the stick back, after touching down, we'll still have too much energy, and the airplane will lift back up into the air, albeit briefly, and then stall, dropping back down onto the runway. We have to keep bringing the controls forward until they are all the way forward. Then, as the tail settles to the runway, we bring the controls all the way back, to keep the tailwheel firmly planted on the runway and thus giving us directional control. The only problem here is that just as the elevator was losing its effectiveness, so were the ailerons and rudder. Thus, if there is any crosswind, the need to keep increasing aileron into the wind remains (just as in any other crosswind landing). We will also find that the rudder deflections necessary to keep the airplane going straight will start to get bigger and bigger as we slow down. It's even possible that in some aircraft the lack of rudder effectiveness, just prior to the tail coming down, will be such that it might even require a little "stab" of brake to keep things tracking straight.

So as we see, there is quite a bit going on in a wheel landing. For some pilots, it's second nature, but for other pilots it might never have been mastered. If you fall in the latter group, it certainly would behoove you to find a competent instructor and go out and learn the technique. Thus, whether you prefer three point landings, or wheel landings, either way you'll be ready when blue skies and tailwinds beckon.

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