



# What the Examiner Sees: Stalls

by Larry Bothe, 12/31/2013

I usually start a Private Pilot checkride with the navigation/cross-country phase and then move on to the “high maneuvers”-- steep turns, slow flight and stalls. When I get to the point of “let’s do a couple of stalls,” some applicants become visibly agitated. Then I get ‘the question’; “how do you want me to do that”? My stock answer is: “However you were taught to do it by your instructor.” When an applicant comes to me for a practical test they are supposed to be trained to perform certain maneuvers in accordance with the Practical Test Standards. So please tell your students not to ask me how I want a maneuver accomplished. Rather they should just do it the way they were trained, hopefully meeting or exceeding PTS standards. That’s not to say an applicant shouldn’t ask a question to clarify an instruction, especially if safety is involved, but they should not be asking the details of how a maneuver is to be accomplished. That’s what the PTS and your training are for.

In the case of stalls for Private (and Sport) Pilot the PTS says the applicant shall demonstrate full stalls (VIII, B, 6 and C, 6), so I of course expect to see a full stall because that’s what the PTS requires. The applicant asks ‘the question’ because they are in hopes I will come up with a reply that indicates they don’t have to do a full stall; they can recover when the horn blows or there is some slight buffet. No, sorry, full stall please. What about the flaps? If it’s a power-off stall the PTS says “landing configuration”. Is the plane normally landed with flaps, as is the case with most trainers? Then do the stall with flaps. Power-on stalls are usually done without flaps because most trainers do normal takeoffs without flaps. What about the power setting? The PTS says “no less than 65% of available power.” In most trainers 65% is somewhere in the low 2000’s, so please don’t try to sandbag me with a power-on stall done at 1500 RPM. I won’t buy it. If a wing drops during the power-on stall I’ll accept it if the applicant applies opposite rudder and fixes it. If the applicant instead cranks the ailerons and pulls back on the yoke, thus wallowing around and threatening a spin, I won’t accept that.

The PTS also requires that the applicant demonstrate a *smooth transition* from entry attitude (landing or climb, depending on if power-off or power-on) to the pitch attitude that will induce a stall. What does ‘smooth transition’ mean? It means two things; don’t pump and don’t jerk. Applicants who are very apprehensive about stalls really don’t want the plane to stall, so they add back pressure and then release some, add more and then release some, add-release..... It

takes forever to get the stall done and is anything but smooth. How about one smooth, continuous application of back pressure until the wing stalls? That's what the examiner would like to see. The applicant is going to have to demonstrate a full stall so she might as well get on with it and not prolong the agony.

The flip side of the 'pump' error is the 'jerk' error, most often seen in the power-on stall demonstration. The applicant starts by (correctly) retarding the throttle and adding back pressure on the yoke to slow down to climb speed. But then when they get down to the proper speed, say 60 KTS in a Skyhawk, they suddenly jam in the throttle and jerk back on the yoke to induce a stall. What happened to smooth? And since they are doing all this in an instant they have no time to get the rudder correct so we often get a precipitous wing-drop. Can you say spin entry? If I have to help, the test is over. So, please don't teach jam and jerk for the power-on stall. Instead have your student smoothly apply full throttle, as he would in a normal takeoff, and smoothly and continuously add back pressure until the wing stalls. If your student will just look out the windscreen at the sky and apply enough rudder to prevent any yaw, as evidenced by the nose not moving left or right with respect to a convenient cloud, the nose will drop very nearly straight down at the break. Don't let your student stare at the ball in the panel; it's an outside maneuver. Then all that's required for a really nice recovery is to release enough back pressure such that the nose is "caught" just below level flight attitude. A bit of opposite rudder to pick up any errant wing drop, and fly away. The power-on stall is actually the easiest one to perform because it has the least actions required for recovery. The only reason we don't start new students with that stall is that the high deck angle and more abrupt break is disconcerting to the uninitiated.

I could in theory ask for 9 different stalls on a checkride. I can ask for power-off with or without flaps, and power on stalls. Each of those three can be done 3 different ways; left bank, right bank or straight ahead. Nobody, least of all me, wants to ride through 9 stalls, and the PTS calls just for power off and power on, so I usually ask for a power-off stall with full flaps in a shallow right turn, and a power-on straight ahead. Sometimes when I ask for the power-off stall in a turn (bank) I get told we can't do it. I ask why and am told the plane may spin. I ask if they have ever done a stall in a turn, and with an aghast look I am told emphatically NO! Since the PTS specifically states "in a specified angle of bank not to exceed 20°" (specified by the examiner) I then ask them to do the turning stall anyway because it's in the PTS. I usually get compliance, and the applicant sees that the turning stall is no big deal. If the applicant refuses then he needs more training. Be sure you do turning stalls with your students; they will likely get to do one on the checkride.

We have discussed the stall errors that I sometimes see during checkrides, but all this begs the question: Why these mistakes in the first place? Why are some applicants apprehensive, or

even fearful, of stalls? It has to do with the way they are taught, and I think there are two failings in that regard. The first is that some flight instructors don't take the time to do a ground session to explain angle of attack. If they did, and the student fully understood it, then they wouldn't be concerned about doing stalls because they would know that all there is to stall recovery is reducing the angle of attack a bit to allow the airflow to reattach to the wing. No power is required; all that's necessary is to reduce the angle of attack to allow the wing to fly once again. If you want to regain whatever altitude you might have lost the addition of power will be required, but the power has nothing to do with getting the wing to fly again. While I'm explaining to my student about angle of attack I make it a point to emphasize that a stall need not be an abrupt maneuver, and the airplane certainly remains in control at all times. It doesn't just fall out of the sky. Some students don't believe me, because of the misinformation they have received from others. My reply is to suggest that we go out and do some stalls and they will see for themselves. This angle-of-attack explanation and the assurance that stalls are benign are crucial to the student approaching stalls with the proper mindset. You can't just have your student show up at the airport and say "get in the plane; we're doing stalls today."

With the proper ground session completed we do go to the plane. After climbing to a safe altitude and doing a clearing turn, I have the student put the plane in a power-off glide. Then I say, "Let me demonstrate slowing the plane until the angle of attack exceeds the critical point, the wing stalls, and then I'll relax the back pressure, thus reducing the angle of attack and allowing the airflow to reattach to the wing, and we'll be flying again." In spite of my earlier explanation some students still stiffen with apprehension as I begin the demonstration. That's OK; they will see the truth of my assertions in just a moment. I do just what I said; apply back pressure to slow the plane, like an entry into slow flight (which the student has already done), pretty soon the stall horn begins to bleat, and finally the wing stalls, very softly because I added the back pressure very gradually (but did not pump). The nose drops, softly, and I move the yoke forward, catching the nose just below the horizon, and the wing flies again. No power addition; we have returned to gliding flight. I turn to my student and say "that was a power-off stall." Students usually look at me and say "that's it?" I reply, "Yes, just as I told you in the ground lesson." Then I do one more, but this time, after I pause once I have regained gliding flight, I add full power, explaining that we need the power to regain the altitude we lost, but not to get the wing to fly again. Then I have the student do the same thing I did, at first without power, and then later adding power to regain altitude.

One of the common errors in stall recovery is lowering the nose much further than necessary. The whole windscreen doesn't have to fill with dirt! If my student does that I calmly explain that all that is required to recover from a stall is to reduce the angle of attack below the critical point and the wing will fly again. Diving at the ground is not necessary. Moving the controls abruptly

isn't required either; in fact, it should be avoided. Take your time. The airplane isn't going anywhere, it just flies predictably as you would expect.

When students are introduced to stalls in this way, first by a thorough ground lesson and then in a non-threatening flight featuring glides and gentle stalls, they come to see stalls for what they really are, a non-event. After that you can build on the same base of knowledge to add turning stalls and flap stalls. By the time you get to power-on stalls they won't be threatening either. Just remember to have your student look outside and prevent yaw by using enough rudder to keep the nose stationary left-right with respect to a cloud. Then wing-drop will be minimal.

I believe that the errors I mentioned at the beginning of this article (pumping, throttle jamming, jerking, diving at the ground, improper rudder usage) all stem from apprehension, fear of the unknown. That apprehension comes from not having stalls (angle of attack) adequately explained at the outset, and from the initial stall demo by the instructor being overly aggressive. Some instructors think stalls have to be demo'd with a sharp break so the student can see just how bad a stall can be. Wrong place to start! Begin with the soft, gliding stall to gain confidence. You can work up to the more challenging sharper break and power-on versions as time progresses. Then when your student gets to the examiner he or she will be well prepared to do the two or three stalls the examiner will actually want to see.

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