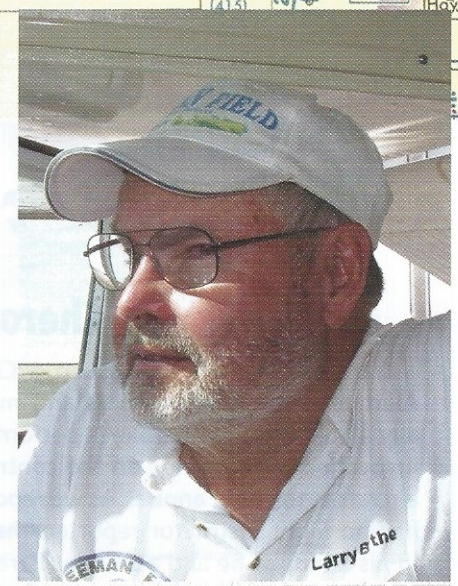
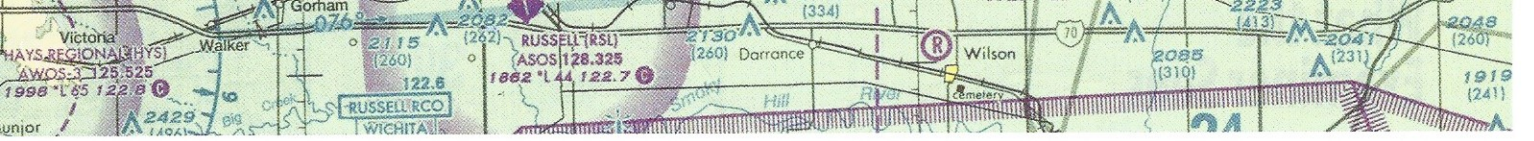
Pilots working way too hard



By Larry Bothe

Having done checkrides for the past 15 years, time and time again I see applicants just working their tails off to fly the plane. Most of them pass, but I can't help but think how much more enjoyable flying would be for them if they had been taught to do things the easy way. I also see the same thing when doing flight reviews. It's not just inexperienced pilots who have not yet learned the easy and efficient ways of accomplishing certain flying tasks. The sad thing about this is that when I talk to their instructors after the checkride, I find out they know these work-saving procedures but just hadn't told the student.

Sport and private pilots should not have to wait for advanced training to learn the efficient way to level off from a climb or descent.



Why not? I hear things like, "Oh, that's an advanced technique," or "I didn't think the student could do that," or "we teach that in the instrument program." It's almost like instructors are requiring students to pay their dues at the entry level of flying; the actual easier ways of doing things cannot be revealed to these lowly beginners. It's no wonder we have a significant dropout rate; we're making flying way more difficult than it needs to be.

Before I go any further, readers should know that besides being a flight instructor for 40 years and a designated pilot examiner for 15, I have also owned all or part of four airplanes spanning 22 years, was the operations manager of a large flying club for seven years and ran an FBO for five years. I have knowledge of owning, managing and maintaining small airplanes well beyond just teaching and examining in them. What follows is born of my experience in these endeavors.

Leveling Off From Climb to Cruise

The number one thing I see where pilots work needlessly is in the level-off after climb — the transition to cruise flight. Most pilots climb up to their desired altitude and simultaneously lower the nose and reduce power. The problem is that the airplane is initially still at climb airspeed, and with the power reduced it takes a relatively long time for it to accelerate to cruise. During this acceleration phase the pilot must repeatedly adjust pitch, power and trim over the two- or three-minute period it takes for the plane to get stabilized in cruise. The airplane flies through the air like a porpoise with the poor pilot making constant corrections. The better way to do the cruise transition is to climb about 50 feet *above* the desired cruise altitude, lower the nose all the way to level flight attitude, make a gross nose-down trim movement (one roll, bottom to top, works well in Cessnas), and *don't touch the throttle*! With the throttle still wide open and the airplane in level flight it will rapidly accelerate to cruise speed. Hold a little forward pressure on the control yoke; don't let the nose pop up! Once at the expected cruise airspeed, reduce the throttle to the desired cruise power setting. Other than perhaps a small trim refinement you're all done. It takes about 15 seconds. Don't forget to lean the mixture when time permits.

Leveling Off From a Cruise Descent

There are several other work-saving procedures related to trim. To perform a descent we usually reduce the power. The bottom of the green arc works well in Cessna trainers; 2000 rpm will do it in others. *Don't touch the trim!* "Let the nose seek its own attitude. (You may have to "catch" it if it initially tries to drop too low.) The result will be a 500- to 600-fpm descent. Whatever the descent rate, take 10 percent of it. If it's 600 fpm, then that's 60 feet. Initiate the level-off that 10 percent of rate above the desired ending altitude by promptly returning the throttle to its previous cruise power setting. Don't pull on the control wheel; the nose will come up by itself. The airplane will use that last bit of altitude to return to level flight at cruise speed. No trimming will be necessary because you didn't change it at the beginning. It's almost like having an autopilot with altitude capture. Enrich the mixture as necessary.

Trim Setting for Takeoff

For takeoff we teach students to make sure the trim is set for takeoff at the proper point marked on the trim indicator. This in fact may not be the best setting. Once you have taken off and trimmed for initial climb, note where the trim indicator is. That's the place to set it on the ground before takeoff in the future. Then once airborne the plane will settle into the desired climb with no trimming necessary. And if the seat ever comes unlatched and slides back and you have to let go of the control wheel, the airplane will fly itself until you can get your safety belt released and up on your knees to get control of things again.

Trim After an Engine Failure

The final trim tip that reduces workload comes into play in simulated (and real!) engine failures. We tell our students to first pitch for best glide speed, and then set the trim. That's good, but it takes a heck of a lot of trim to change from level-flight, power-on cruise to power-off best glide. Low-time pilots tend to move the trim a bit, see if it's enough (it never is), add some more, try again, etc. It takes a lot of time to get all this trial-and-error trimming done; time that could be better spent picking a landing site, declaring an emergency and attempting a restart. A better, much faster way is to simply move the trim to full nose-up. Don't stop to test to see if you have enough; just move the trim wheel or crank as far as it will go without forcing it. You'll find the resultant airspeed to be at or near best glide, maybe a couple knots slow, close enough. No, the airplane won't stall. It is a certification requirement that it not stall power-off with full nose-up trim. Try it on your next flight.

Set Up Radios on the Ground

It is much easier, and eliminates errors, to set up navigation radios on the ground rather than after taking off. If the student waits until airborne, then he or she has to fly the plane and look for traffic while doing the radio setup. This is something we are all taught for IFR operations but applies equally as well to VFR flight, and to GPS as well as VOR. And VOR setup includes setting the OBS. I often get told that VOR setup on the ground can't be done because they can't receive the station. If that's the case, then set in the VOR frequency and approximate the OBS setting. Use the magnetic course from where the course line on the chart passes through the blue compass rose, or just eyeball it. By the way, I often see a private pilot applicant set the OBS to the magnetic heading or compass heading, instead of setting it

correctly to the magnetic course, because the instructor hasn't bothered to explain that radio signals passing through the atmosphere are not affected by wind.

Set the DG to Agree With the Magnetic Compass

When students get lost on a cross-country it is almost always because they fail to set the DG to match the magnetic compass. Sure, they set it before takeoff, but that's it. Sometime later, when it's off by 20 to 30 degrees, nothing seems to work right anymore. Resetting the DG solves the problem. Students need to know that when navigation problems of any sort arise, the first thing to do is check the DG against the magnetic compass. They should be doing that every 10 minutes anyway.

Make Student Pilots Use the Rudder

More and more I see "flat-footed" turns with adverse yaw. Start in the beginning teaching and requiring proper rudder usage, and don't let it lapse. Then the student will use the rudder correctly throughout his or her flying career. As an instructor I watch for proper rudder usage when we are doing a lot of turns in the pattern while the student is learning to land. If necessary, we leave the pattern to revisit turns and rudder usage. Nobody solos until he/she uses the rudders correctly, every time. Don't accept using the rudder when rolling into a turn but not when rolling out. Finally, please don't tell your student that rudder is required if the ball is out. If the ball is out, the pilot already did it wrong. Instead, tell your student that rudder is required anytime the control wheel is turned. The ball should never be out. Proper rudder usage makes aircraft control and flying easier, more comfortable and safer.

Warm Engine Start

If you have flown the airplane somewhere and landed, perhaps for lunch, and then you come back an hour later, try this. With a carbureted engine, don't bother with the primer. Instead turn the mag switch to START, and as the prop begins to rotate briskly, stroke the throttle all the way to wide open, then quickly back to closed, and finally to ¼-inch open. The engine will likely start as the throttle is being retarded, but don't stop the throttle right then; the engine will start with a hell of a roar. Continue the throttle motion back to closed, then open it a little. The engine will start in two blades, with no fuss. This is because stroking the throttle (with the engine turning) causes the accelerator pump in the carburetor to squirt extra fuel into the passing intake air, and it's just the right amount to help start the partially cooled engine. *Note:* Never *stroke the throttle unless the engine is turning. Stroking the throttle when the propeller is not turning allows the squirted-out fuel to run down into the carburetor air box, forming a puddle. If you get a backfire as the engine first starts (not uncommon), an engine fire can result. I have personally seen three such engine fires caused by "priming" with the throttle when the engine wasn't turning. If the engine is cold, use the primer pump.*

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Ground Lean

After starting the engine, as soon as it runs smoothly you should ground lean to prevent spark plug fouling and valve sticking. In a plane that you regularly fly, set the power for 1000 rpm, then screw/pull the mixture control out until the engine falters, then enrich it enough to run smoothly. Note the mixture position; usually two fingers out. Then on subsequent starts just pull the mixture to that approximate position. Ground leaning, in conjunction with *setting the throttle at 1000 rpm whenever the plane is sitting still*, will go a long way toward eliminating bad mag checks and the need for spark plug cleaning in between 100-hour inspections. It's OK to do the run-up with the mixture leaned (if the engine runs smoothly), but don't forget to go to full-rich for takeoff. If Mixture Full-Rich isn't in your pre-takeoff checklist, add it.

Soft-Field Approach Speed

What is the appropriate soft-field final approach speed for the aircraft you usually use for teaching? Oh, you say it's not published in the POH? True! Using the published short-field speed is too slow and often results in a "thud" landing. That's OK for a short-field landing but not acceptable for a soft field. Try this: Add 5 knots (or mph) to the published short-field speed. That little bit of extra airspeed helps to cushion the landing without appreciably increasing float and landing distance. To ensure that your student gets a soft arrival every time without the necessity of perfect timing in the flare, have him/her carry a little power all the way to touchdown. Two hundred rpm above flight idle will do it; more than that and the plane won't land for a long time. Most trainers have a flight idle around 1000 rpm, so setting power at 1200 rpm will provide the needed cushion.

What the Examiner Sees

When the wheels touch, pull the throttle to idle to assure staying on the ground and to minimize ground roll.

Aim Point for Short-Field Landings

On short-field landings the Private ACS booklet (PA.IV.F.S9) says the applicant has to land not short of but within 200 feet past a selected landing point. You must tell your students that the airplane will actually touch down about 150 feet past the aim point they are using when on final approach. (The aim point is where the plane would hit the ground if it didn't flare.) If students want to touch down at the top of the numbers, then they have to aim for the very beginning of the pavement. Many applicants "aim" for their selected touchdown point and can't bring themselves to reduce power to idle until they get there. Then, if they are a little fast (typical), they flare and float way more than 200 feet past the point. Not good. Get them to aim short and use the float to get to the desired touchdown area.

Am I High, Or Am I Low?

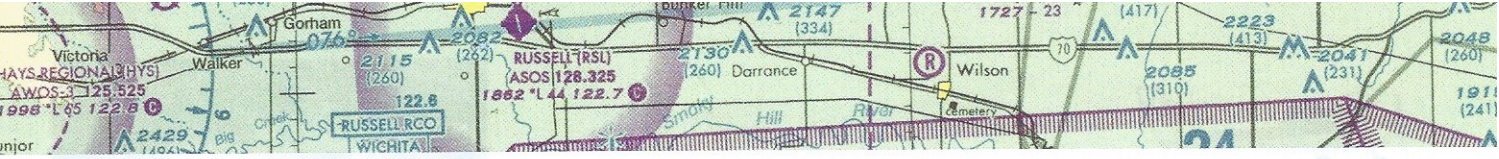
The aim point, as discussed above, is the point at which the plane would strike the ground if a flare was not initiated. Just exactly where on the ground is that point? Easy. It's the point that stays stationary in the windscreen; that is, it does not appear to move up or down as the airplane descends toward the runway. If the point you are aiming for is moving down in the windscreen, that means you are going to be high. Reduce power and/or add flaps. If you are also fast, then by all means add flaps; they act as speed brakes. If the aim point is moving up in the windscreen, then you will be short on landing. Add some power. Two hundred rpm will do it if you're tending to be just a little low; 400 rpm if you're a lot low; and consider going around if you find yourself so low that you need full throttle to make it to the runway. In either case, high or low, remember that once you get back on the proper approach path, you will have to remove whatever throttle correction you put in. Otherwise, you will go from being too low to being high with excess power, and if you were high and took off power, you will have to add it back at some point to make it to the runway.

Here are another nine "quick hits" that can make things easier for pilots, and some of them also save money for flight schools and aircraft owners:

Where to look when turning: When turning, we tell students to first look in the direction of the turn to check for other traffic. We need to also tell them to look back straight ahead while actually rolling into the turn. That's the only way they can set the correct amount of bank.

"Sawing" the ailerons: Don't let students get away with quickly sawing the ailerons back and forth in a vain attempt to compensate for each little bump they feel. Have them "fix" only a trend. Useless "sawing" tends to make matters worse. I can only imagine what their arm must feel like after a long flight. Demonstrate that when you fly, your hand on the control wheel is nearly still; then make them do the same.

Slips made easy: Slips are one of my pet peeves. I guess that's because they are so easy to do, and people make them so incredibly difficult. The best way to make them easy for students is to have them simply use all the rudder there is and hold it there until finished slipping. If they pin the rudder to the firewall and steer with the ailerons, they will get to the end of the runway with a minimum of fuss. And make sure they slip with the wing down on the side the crosswind is coming from. Doing it backward makes for a very difficult transition just prior to landing (and is cause for checkride failure, because it's unsafe).



Buckling safety belts: When you first get in the plane, especially in a Cessna 172 or 182, leave the door open and buckle the safety belts very loosely. Then shut/latch the door, move the seat forward, and snug up the safety belts last. Doing it in that order saves you from having to twist around in your seat to get the belts, leaves you maneuvering room to get them buckled and saves you from having to loosen the belts to get the seat far enough forward.

Shutting the door: Have a window (or vent) open when you shut the door. In a Cessna, hold the door by the bottom of the window frame, not the flimsy door handle. The open window, or vent in a Piper, relieves the pressure inside the plane just as the door comes shut, and allows the door latch to engage with much less "slamming" force. Repeated door slamming results in broken door latches and door handles.

Taxi with the control wheel back: We all teach students how to hold the controls when taxiing in a strong wind (dive away from a tailwind; climb into a headwind), but we don't tell them what to do with the controls when there is little-to-no wind. Hold the control wheel all the way back. That takes pressure off the nose strut and significantly prolongs the time between resealing the strut. You don't think it matters at taxi speed? Try moving the control wheel in and out the next time you're taxiing out to the runway. Note the nose moving up and down.

Lubricate the seat rollers, door latches and hinges yourself: It has been my experience that if you expect and wait for your A&P mechanic to do these necessary chores, your door latches will break, the doors will fall off the plane and you'll fight with the seats for the rest of your life. Just get a can of LPS-2 spray lubricant from the shop and do it yourself.

Leave the beacon on: Most airplane checklists say "All electrical switches off" before engine start, and they say the same thing again in the shutdown sequence. However, since March of 1996 it has been required to have the beacon on anytime the engine is running. Since, unlike the avionics, a transient electrical surge won't damage the beacon, it makes sense to just leave it on all the time. The added benefit is that if you forget to turn off the master switch (don't try to tell me you have never done that), the airplane flashes and tells you the master is on, rather than silently running down your battery.

We need to make things as easy as we can for our students. If a given task is more difficult and time-consuming than it needs to be, then that in turns spills over into the next task.

Hurrying the turn: In the IFR world we often must intercept radials or localizer courses. We know that we have to initiate the turn before the intercept, but sometimes we get a late/bad vector from ATC (my favorite excuse!), or more honestly, we're just behind the airplane. When that happens, and it's obvious that we are going to fly through the course and have to correct to come back, a good procedure is to "hurry the turn." That means to increase the bank greater than standard rate to get the turn done faster. That either fixes the problem or at least minimizes the amount of correction required later. Now, we're not talking about making a steep turn on instruments. We don't want to practice recovery from unusual attitude during an instrument approach. I'm suggesting that you increase the bank from around 15 degrees to perhaps 25 degrees to get the desired result. It works. When I went through instrument training at ATE of NY (now American Flyers) back in 1975, instructors specifically taught this procedure. The instrument applicants I examine today have never heard of it. Once again, pilots are working harder than necessary.

We need to make things as easy as we can for our students. If a given task is more difficult and time-consuming than it needs to be, then that in turns spills over into the next task. If the student is struggling for several minutes to get the airplane stabilized in level cruise flight, then he/she may fly past a checkpoint in the process. Now we have a navigation problem. I have found that flight instructors actually know most of the things I have mentioned in this article, and they do things that way when they fly for themselves. The problem is that they don't tell their students about these work-saving procedures. Flying is difficult enough without instructors withholding information from students. Sport and private pilots should not have to wait for advanced training to learn the efficient way to level off from a climb or descent. Often, during a flight review, I demonstrate some of these techniques and let the pilot try them. The reaction I usually get is, "Wow, that was easy! I've been doing it the hard way all these years. I wish my primary instructor had showed me that." Don't let me hear something like that from one of your students.

Larry Bothe is an FAA designated pilot examiner, FAASTeam representative and Gold Seal instructor in the Indianapolis, Indiana, FSDO area. He is also a Master Certified Flight Instructor and has more than 7,500 hours in more than 90 types of aircraft. Larry is part-owner of a 1961 7EC Champ and may be contacted at lbothe@comcast.net. He received the 2015 NAFI Greg Laslo Award for Excellence in Writing.