

# A SLOW-FLYING EPISTLE

PROFICIENCY AT SLOW FLIGHT IS THE KEY TO FLYING CONFIDENCE AND SAFETY

Van

The local FAA safety officer recently asked me to write an article for their safety newsletter about "slow flight." They had become increasingly aware that many pilots lack skills and confidence in the area of slow flight, or low speed control. I'm not sure why I was asked to write an article on this subject. I am not an active instructor or the head of any flight program, nor am I a recognized air show or test pilot, though I have done all of these at one time or another. I suppose it was because they were aware that I am sort of a surrogate "den mother" to about 2000 pilots flying RV kit planes. I agreed to write their article, even though I'd previously written on this topic in the *RVator*. I feel the subject it is so important that it bears repeating.

So I am going to:

I have often become involved consulting with or consoling pilots regarding their relationships with their new and different (than Cessna or Piper) airplanes. The topic is often landings, since landings are universally regarded as the most difficult phase of normal flight. Though many new RV pilots have little problem with landings and give reports like "as easy as landing a Cub", others lament "I've got 30 hours now and still can't seem to make a good landing". To the later, I normally

respond with a question.

"How much time have you spent practicing slow flight?" This is usually followed by a pause and then something like, "not much" or "what's that got to do with landing".

It's got EVERYTHING to do with landing.

I advise, "Practice slow flight for a half hour, two hours, or whatever it takes to master it, then call me back and let me know if you're landings have improved". A follow up call is really unnecessary; I KNOW that there will be a marked improvement.

Why? Consider this: During the last few seconds of a three point landing in a taildragger or a full flare landing in a tri-gear, you are flying within a few mph of stall speed. This is slow flight. Not only that, you are flying in close formation (with the ground) at the same time, so your pitch, roll, and yaw control must be very precise to avoid unplanned contact with your formation partner. Now, if you have not fully mastered control of this airplane in slow flight, is this really a good time to be learning? Of course not.

Slow flight is practiced at an altitude sufficient to recover from accidental stalls should they occur, at least 1500 ft. AGL. Slow flight consists primarily of stabilized flight within a narrow speed range above stall speed, usually 5-10 mph above stall at all of the various flap and landing gear extension possibilities for the airplane being flown. Mastery of slow flight is achieved when the pilot can hold the speed within this range, maintain altitude, and perform coordinated shallow turns with only occasional reference to flight instruments. Remember, we are practicing for the last few seconds of flight before landing; our eyes must be focused outside of the cockpit.

Personally, I feel that a pilot should be able to maintain slow flight within 5 mph of stall speed, and maintain altitude and

perform coordinated shallow turns at the same time. Once you master this and get feeling confident, try this. Starting at cruising speed, reduce power slowly while continually rolling into and out of shallow turns. Hold altitude as you continue to reduce speed, and change trim, flap, and landing gear positions appropriate to the reduced speeds. As you reach within 5 mph of stall, begin adding power and accelerating, reversing the sequence. Master that and then you can look forward to dazzling your examiner on your next BFR.

The flying finesse, or lack thereof, which slow flight demonstrates is manifest primarily in the arenas of rudder control and pitch/power coordination. The high angle of attack and the attendant high induced drag cause wing drag to increase while rudder authority diminishes. Thus, the asymmetric drag of deflected ailerons increase out of proportion to roll authority. This means that any roll input or roll correction will produce much more severe yawing than at higher speeds. Rudder control input requirements become much more necessary at low speeds than at high speeds. Failure to adequately compensate for adverse yaw with coordinating rudder inputs will result in an uncomfortable

wallowing at best, and asymmetric stalls, maybe even spins, in the worst case.

Pitch and power re-

lationships also be-

come more crucial during slow flight. Generally,

slow flight as addressed here is on the back side of the power curve. In other words, a speed below which induced drag is increasing so rapidly that more rather than less power is needed to maintain level flight without further speed loss. Small speed changes can have great effects on sink rates and power requirements. Since power requirements reverse as the speed transitions from front side to back side of the power curve, the throttle becomes your primary altitude controller during slow flight.

Aside from training a pilot to make better landings, what is the need for slow flight proficiency? Say for instance that you fly a modern tri-gear airplane and choose to make take-offs and landings at speeds 10-20 mph above stall speed. Just fly it off and back on again, and eliminate the need for slow flight skills by simply avoiding slow flight. I feel that many pilots practice this philosophy, and there is nothing inherently wrong with it other than increasing tire wear and runway length requirements. However, if a pilot uses this technique as a crutch to his handicap of poor slow flight skills, then his flying is truly handicapped. He will be poorly equipped to deal with situations where turbulence, crosswinds, or limited runway length demand better slow flight skills. He is putting himself, his passengers, and his aircraft at unnecessary risk.

A pilot who is not proficient at slow flight is an incomplete pilot. He is capable of pointing an airplane and flying from point A to point B, but is by no means the master of his craft. After all, even a non-pilot can take over the controls and keep an airplane reasonably straight and level.

The actual landings and take-offs themselves are not the only

**A pilot who is not proficient at slow flight is an incomplete pilot.**

flight regimes in which slow flight skills contribute to safety. On landing approaches, even base legs and before, finding yourself behind slow traffic, or when influenced by wind shear, lack of slow flight skills could leave you wanting. Pretending that slow flight skills are irrelevant is like burying your head in the sand. Compensating for poor slow flight skills simply by attempting to avoid this flight realm is risky. It works OK as long as you're able to fly in a perfect world. But, the time comes when gusty wind conditions or congested pattern traffic necessitates unplanned slow flight. These are occasions where ingrained slow flight skills permit the pilot to concentrate on these complications to the perfect flight world rather than experiencing overload because of the demands.

How about the times that you are on a sight seeing flight and are circling, at minimum legal altitude, an object of interest on the ground. Distraction can cause speed decay, inattention to control coordination, a stall, and potential disaster. Worse yet, should you choose to make an ill advised and illegal low pass over that ground object, with the obligatory steep pull up, you'd better be prepared to deal with the rapid speed decay and unusual attitude slow flight which follows. This is a classic prescription for trouble. Whether you are flying sanely or otherwise, mastery of slow flight is essential if a pilot is to be prepared for all eventualities.

While stall recognition and recovery were not listed as an ingredient of this paper, it is difficult not to mention them because they reside on the lower end of the slow flight speed range. Which reminds me of a story: Once when I was a 21 year old instructor, the FBO I was working for loaned me to a neighboring FBO which was temporarily short of instructors. My temporary boss explained one student to me as being ready to solo, and suggested that I could sign him off I wanted to. However, he said that any refresher maneuvers I gave this student should not include stalls because, "he doesn't like stalls, they bother him". I didn't openly question these instructions because of our employer/employee relationship, and because I knew that this FBO operator was inclined to pamper clients and students in hopes of selling them airplanes. However, there was no way on this side of heaven that I was going to endorse a student for solo if he wasn't proficient at stalls. So, I "entertained" this student for a hour, went back to my primary workplace, and never saw him again. I have often wondered what sort of pilot he eventually became given the "feel good" approach to flight training he appeared to be receiving.

While I trust that this was an isolated and extreme case, I wonder how many flight students are exposed to only a bare minimum of stalls and other near stall flight experiences? After all, instructing stalls and slow flight is very demanding of instructors as well as students. It is conceivable that some instructors might ease their workload by lowering their expectations of students. An instructor who does so is doing his student no favor- it's sort of like cheating in school--the student is the ultimate loser. Perhaps some instructors themselves have minimal skill at, and appreciation for, the value of thorough stall and slow flight training. Maybe we have witnessed several generations of "dumbing down" of some instructors as well as private pilots. Perhaps the increased emphasis on instrument flight and radio procedures, though also essential, has resulted in less emphasis on these more basic flight skills.

I venture to say that every pilot among us, if honest with himself, will admit that he could stand to brush up his slow flight skills. If you are uncertain of yourself or of the proper slow flight procedures, find a GOOD instructor and pay for a couple hours of his time. He may make you sweat for a while, but you are almost certain to be a "cooler" pilot when things get hot.

The purpose of mastering slow flight should not be an inducement to abandon the safety margins you apply to everyday flight, but rather to provide you with the skill and confidence to deal with reduced margins when they are thrown at you.

