



Full flaps? By Barry Schiff

One of my most enjoyable activities is checking out in new or unusual airplanes. So it was about 20 years ago when I was turning onto base leg at a general aviation airport near Rome, Italy. I was flying an Oscar P-64, an airplane so similar in appearance and handling qualities to a Cessna 172 that it makes any Skyhawk pilot feel immediately at ease. I reached down for the long handle between the seats and pulled it up to the first notch, just the way I did when flying an elder 172 with manual flaps.

The Italian instructor in the right seat gave me a quizzical look and asked, "Tell me, signor; why do you put on the parking brake?" Yes, it was the brake handle. The instructor explained that the flap handle was on the ceiling and needed to be pulled down to extend the flaps. He also suggested that the Oscar would be easier to land in the crosswind by using only partial flaps.

During the ensuing years, I have given considerable thought to the conventional wisdom of landing with full flaps. Everyone knows the advantages: reduced float in the flare, shorter landing distance, and reduced touchdown speed, which saves wear and tear on the tires and brakes.

But what about those times when landing distances are not critical? What about when landing on a 5,000-foot runway, with the destination on the airport at the far end of the field? Under these circumstances, there are several factors that favor landing with less than maximum flap deflection.

For starters, it is easier to land a tricycle-gear airplane (especially one with heavy elevator forces) when using partial flaps. This is true because extending full flaps creates a lower nose-down attitude, which makes it more difficult to hold the nosewheel off during touchdown. Some of the prettiest and smoothest nose-high landings I have ever made have been the result of using only partial flaps. (I won't comment on my ugly landings except to say that they have registered on the Richter scale.)

Some airplanes — such as the Piper Cherokee — are particularly difficult to land while holding off the nosewheel. This makes these and other such aircraft more vulnerable to wheelbarrowing and loss of directional control. A solution is to land with less than full flaps. One could argue that using partially extended flaps reduces the stall protection offered by the use of full flaps. That is hardly worth considering. The last 10-or-so degrees of flap deflection seldom reduce stall speed by more than a knot or two. For example, doubling the flap extension of a Cessna TR182 Skylane RG from 20 to 40 degrees reduces stall speed at maximum-allowable gross weight and maximum-allowable forward CG (the worst combination) from 43 to 41 KIAS.

There are several advantages to making a landing approach with less than full flaps. One is that go-arounds and missed approaches are simplified and result in improved initial climb performance. When the pilot is using partial flaps, the transition to a climb often can be initiated without having to retract flaps until reaching a safe altitude. On the other hand, some airplanes cannot climb at all with the flaps fully extended (depending on weight and density altitude). This requires that the pilot partially retract the flaps and cope with the attendant changes in elevator stick forces and pitch at a time when his workload is at a maximum.

A second advantage is that the reduced drag of a partial-flap approach makes the airplane less susceptible to wind shear; there is more excess power available with which to combat airspeed and altitude losses.

An inadvertent stall during an approach is much tamer when the pilot is using partial flaps instead of full flaps, because less power usually is being employed. A power-on stall with flaps fully extended typically produces the largest, quickest, and most unexpected attitude changes. It also requires the most altitude from which to effect a recovery.

Finally, the best (and my favorite) reason to use less than full flaps during an approach is that the airplane glides farther in the event of power loss. Yes, the flaps can and probably should be retracted at such a time, but some pilots might have difficulty coping with the unexpected trim change and momentary increase in sink rate that would occur at such a critical time.

With respect to crosswind landings, arguments can be made for and against the use of full flaps. With flaps fully deployed, the airplane has a greater surface area against which a strong wind can blow once the aircraft is on the ground, which denigrates directional controllability. This is why some pilots retract the flaps immediately after touchdown in a blustery crosswind. This serves the added benefit of increasing stall speed, which makes it less likely that the airplane will inadvertently become airborne because of a strong and sudden gust after landing.

Interestingly, the use of full flaps makes it easier to control roll during gusty approaches. With flaps extended, air "blocked" by a fully extended flap spills outboard toward the aileron, thus making this control more effective.

This shows that the use of the "air brakes" is not always cut- and-dried. The use of the parking brake, I concede, should be reserved until after coming to a stop.