

Flaps 20 or Flaps 40?

By Rick Wheldon

For years now, MU-2 pilots have been arguing about which flap setting is best for landing. Frankly, there are as many opinions on the subject as there are MU-2 pilots. That being said, let me add my 2¢ to the pot.

Like many of us who have been flying the airplane for a while, I learned to land with flaps 40. The technique was to approach to about 200 feet at flaps 20 and 110 knots, and then to drop the flaps to 40. I would enter the flare decelerating through 90 to 100 knots. Later in my career, I flew heavy Airbus 310s for Pan Am. Pan Am demanded that we use an entirely different landing procedure than I had learned in the MU-2. Like virtually all modern airlines, Pan Am used the concept of a stabilized approach. In a stabilized approach, configuration, speed and power changes were to be accomplished early in the approach so that the pilot only needed to maneuver to touchdown. At Pan Am, the definition of a stabilized approach was very specific. To be stabilized, an approach had to meet all of the following criteria by 500 feet above the ground (1000 feet in IMC):

1. The airplane was configured with gear down and landing flaps.
2. The airplane was established at approach speed on the proper glidepath.
3. The airplane was established at approach power settings.
4. The airplane was trimmed for approach.

If the approach was not stabilized, a missed approach was executed. This would minimize overshoots and undershoots.

The safety record of the major airlines attests to the success of the stabilized approach concept. Most of the landing accidents that I am aware of resulted from unstabilized approaches.

Stabilized approaches can be flown quite easily in the MU-2 at flaps 20. However, dropping flaps to 40 on short final, as I was trained to do many years ago, clearly destabilizes the approach, since configuration, speed, power setting and trim are all changing in the last 200 feet. Therefore, I have changed my technique to stabilize at flaps 20 and just continue through flare to touchdown at flaps 20. My target speeds are as published in the AFM, but I make corrections to the published airspeeds for steady state wind (I add all of it) and gusts (I add 50% of it). The maximum correction will never exceed 20 knots. Note that this technique requires that I calculate my landing weight, since the published approach speed varies by 11 knots from heavy landing weights to light weights. This technique minimizes all changes during the last phases of flight and contributes to a stabilized approach.

There is another reason that I have elected to land at flaps 20. The MU-2 Airplane Flight Manual clearly establishes approach speeds for the various flap configurations. At flaps 20, the approach speeds are 1.3 times the stall speed (1.3 Vs) for the landing weight. This results in approach speeds of 99 knots to 110 knots for the Marquise. However, for aerodynamic stability reasons, at flaps 40, AFM landing speeds are established at 1.5Vs (105 to 119 knots). Although 1.5 Vs delivers the required stability, it is faster than 1.3Vs at flaps 20. Landing distance is primarily a function of the airspeed squared, so landing distances at flaps 40 (if flown at the AFM speeds) are actually greater than landing distances at flaps 20.

A third reason that I choose to land at flaps 20 is that it offers a greater safety margin in the event of a flap malfunction. Selecting flaps 40 on short final exposes the pilot to the remote possibility of a split flap situation close to the ground. Although very rare, split flaps can happen. At 1000 feet, split flaps are easily managed, and I have done so many times in the simulator. At 200 feet with a split flap scenario, there is little time to react and the potential for dragging a wing greatly increases. It's not worth the risk, however remote.

Fourth, I must make the argument that flaps 20 landing distances are less than flaps 20 takeoff distances. Even though some pilots might elect to ignore the AFM speeds and land at flaps 40 using the slower 1.3 Vs airspeed (NOTE: MHI does not advocate this!!!!), the suitability of an airport will most often be restricted

by takeoff distances. Sure, you can land in a shorter distance, but so what? Why decrease your landing distance a few feet, and violate the flight manual as well, when you're not gaining anything operationally?

Many very experienced pilots argue that the decelerating approach at flaps 40 is the best setting. They believe that they have compelling reasons to do so. For many years, I also used flaps 40 successfully, but I have since decided that flaps 20 offers advantages which make it my preferred setting. It allows me to fly a stabilized approach, on the glideslope to touchdown. I emphasize speed control, and enter the flare at about 1.3 Vs. My flare is minimal, and I attempt to cut my sink rate in half as soon as I feel ground effect. This ensures that I don't float, and my softest touchdowns happen when I float the least. As I enter the flare, I reduce power approximately 10% to 12% by feel (this can be practiced at altitude). I judge a good landing when I land in "the box", on centerline, and I hit my aim point. Stabilized approaches are the key.