Landing Tips

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Pilots are usually judged on how well they land, which requires a special finesse that takes time to master. This finesse comes from developing a feel for the landing sequence. In part, developing this feel comes from better understanding the aerodynamics involved with landing. So in this section I'll go into a bit more detail about aerodynamics. Then I'll explore different techniques that will help you smooth out your landings, including how to correct common landing problems.

Ground Effect.
When an airplane approaches the ground a new aerodynamic factor comes into play. This new factor is called ground effect, and its location is within a wingspan above the ground. When an airplane flies in ground effect, two aerodynamic changes occur. The first is an increase in total lift. The second is a decrease in drag. Together these characteristics allow the airplane to fly farther at a given airspeed along the ground, decreasing tremendously the stall speed. This effect allows your airplane to continue to fly at speeds that would normally cause it to stall at higher altitudes.

Following a gentle descent on final approach, your model airplane will enter ground effect after you've begun a gradual round out to about one or two feet. You'll need to apply only a little up-elevator to maintain this altitude, probably less than you needed to begin the round out. If you apply too much up-elevator, the increase in lift that follows can launch your airplane into an area of less lift above ground effect. This phenomenon, called ballooning, can cause your plane to stall very quickly.

Enter the ground effect zone cautiously and at a lower airspeed. Once in it, remember that to continue flying at a level altitude you will need less lift, which means less up-elevator. As your plane begins to slow down, gradually increase the amount of up-elevator to provide just enough lift to maintain a level altitude. Your airplane will seem as if it can float forever, but don't forget to keep the wings level (More lift!). With the airplane slowing down even further, the effective airflow will decrease, making the controls feel "mushy." This is a signal that a stall is imminent, and you should prepare for the final descent of your airplane, which will occur shortly thereafter because of the anticipated stall, decreased elevator effectiveness, or both.

At this point, give immediate up-elevator to provide the final amount of lift needed to touch down softly on the runway. Since the controls are mushy, you may need a lot of up-elevator to obtain the proper angle of attack for a gentle flare. In some models, even full up-elevator doesn't provide enough control to soften the landing. In these cases, one or two notches of throttle above idle can provide for enough flow over the elevator to effectively raise the nose. Apply this throttle when the airplane begins its final and short descent. With practice, you can make smooth, mains-first landings. Once on the ground, hold up-elevator until the airplane slows down. The nosewheel will gradually come down and meet the runway. This really "wows" them at the airfield, and it will translate into more points at the pattern contests in your future.

Crosswind Landings
You'll need to make only slight changes when landing with a crosswind. As I discussed in the last chapter, you must first establish a crab angle to compensate for the wind. When you are landing any airplane that weighs less than six or seven

pounds, you may continue this crab angle all of the way to touchdown. You perform everything as you would on a normal landing as long as the crosswind is no more than five to 10 mph. With a high lift wing, land directly into the wind to prevent possible upsets.

If your airplane is equipped with ailerons, and if the wind permits, make an aileron turn into the wind upon touchdown. This is the same deflection that was used when practicing ground handling and crosswind takeoffs. For example, in fig. 6-21 the crosswind is blowing across the runway from left to right. The crab angle is adjusted to the left, into the wind. Once the airplane touches down and is rolling, give left aileron control to keep the wind from lifting the left wing. From then on, use the techniques I described in the ground handling section of chapter four to taxi your airplane safely to the pit area.

When flying heavier airplanes, you must employ a more difficult landing technique. When these airplanes touch down while you are holding a crab angle, their heavier weight can cause the landing gear to bend or even break because of the side loads that are generated. To prevent this you need to employ a slip or cross-control method that uses the ailerons and rudder together, but this is an advanced technique that goes beyond the scope of this book. For this reason, I recommend you stay away from heavier planes, not enough side loads are involved to cause damage to the landing gear. For further information, please consult one of my other books, RC Sport and Competition Aerobatics.

Dead-Stick Landings

When an airplane's engine quits, the airplane is referred to as being "dead-stick." You can use one of several techniques to land an airplane after its engine has stopped. Engines most frequently quit on takeoff, usually because of a lean mixture adjustment. When the airplane is level, there is enough fuel flow for the engine to continue running, even if it is lean. Once the nose is raised on takeoff, though, the effects of gravity and acceleration pull the fuel back toward the tank. Without this fuel, the engine can abruptly quit.

When this happens, immediately apply down elevator until the airplane is in a slight nose down attitude. This will avoid a stall and will get your plane into a nice glide. You should make a landing straight ahead if the airplane is still below 75 feet. Don't attempt a turn back to the runway if your airplane is at a lower altitude, instead keep the airplane directed into the wind for a slower touchdown. Perform the round out and flare as usual since there's little difference between the way a dead-stick airplane flies and one that is running at idle. You'll probably have to walk some distance to retrieve your plane, but at least it will unlikely be damaged.

Now let's assume your airplane has reached a high enough altitude (above 75 feet) to begin a turn to the crosswind leg. You can safely make a turn back toward the runway by using a 270-degree turn toward the landing pattern followed by a 90-degree turn in the opposite direction (this is called a procedure turn). When this turn is made properly, you can bring the airplane into good alignment with the runway. Because it's now flying with the wind, the actual ground speed at landing will be higher than usual, so stay alert.

Only use the procedure turn when you're sure your airplane is high enough to make the turn back to the runway safely. If you have even a shred of doubt, land the airplane straight ahead into the wind. In the next example, let's assume the engine quits on the downwind leg. The airplane is usually close to the proper

pattern altitude when a turn to the downwind leg is made. To make a dead stick landing from this point, fly the base leg sooner than usual. Then make a turn to final approach that is closer than usual to the touchdown point. Finally, perform a round out and flare into the wind. This will result in a safe dead-stick landing.

If the engine quits closer to the end of the downwind leg, make a turn directly to the end of the runway. Similarly, if the engine quits on base, make a small turn. If the engine stops while flying on final approach, land as usual. For the last example, let's assume the airplane is at a higher altitude when the engine stops. Fly the airplane in a large circle over the runway as it descends. When the pattern altitude is reached, fly the plane onto the downwind leg, base leg, and final approach, adjusting your course as needed.

The more you fly your airplane, the better your dead-stick landings will become, especially your ability to judge just how far you can fly your plane on the downwind leg before making a turn to base. With experience, and the use of the above techniques, you will eventually start making smooth dead-stick landings.