

VII.F2. Crosswind Approach and Landing

About: A landing which must be made while the wind is blowing across rather than parallel to the landing direction

How: The same basic principles and factors involved in a normal approach and landing apply to a crosswind approach and landing with additional procedures required for correcting for wind drift.

There are two usual methods of accomplishing a cross-wind approach and landing – the crab method and the wing-low (sideslip) method.

Procedure (Sideslip Method)

1. Before Landing Checklist (Procedures below for 1965 C172)
2. Verify crosswind component will not be exceeded
3. Complete normal traffic pattern

Final Approach

4. Track down extended runway centerline by heading into the wind (crab)
5. Flaps as needed (can use no flaps if winds are strong)
6. Align the airplane's heading with the centerline of the runway using rudder, then promptly apply drift correction by lowering the upwind wing.
7. The amount the wing must be lowered depends on the rate of drift.
8. Maintain constant decent rate (more power required -> drag)

Round Out

9. Slow the decent when we get over the runway (~10ft)
10. Power to idle
11. Hold the airplane off the runway as long as possible to bleed off speed.
12. Progressively raise the nose to hold the airplane just above runway as airspeed slows to approx. stalling speed.
13. Don't level the wings, hold upwind wing down, maintain track down the runway with opposite rudder.

Touchdown

14. Transition the weight of the airplane from the wings to the wheels at the slowest possible airspeed
15. Touchdown on the upwind main wheel first, followed by downwind main
16. To prevent swerving, the corrective rudder pressure must be promptly relaxed just as the nose wheel touches down
17. Hold full aileron into the wind to prevent skidding off runway.

Wing-low Approach Method (Preferred):

1. The wind-low (sideslip) method will compensate for a crosswind from any angle, but more important, it enables the pilot to simultaneously keep the airplane's ground track and longitudinal axis aligned with the runway centerline throughout the final approach, round out, touchdown and after-landing roll.
2. This prevents the airplane from touching down in a sideward motion and imposing damaging side loads on the landing gear.
3. Align the airplane's heading with the centerline of the runway using rudder, then promptly apply drift correction by lowering the upwind wing.
 - a. Drift is controlled with aileron, and heading with rudder
4. The amount the wing must be lowered depends on the rate of drift.



Crab Approach Method (Not recommended):

5. Easier to maintain during final approach, but requires a high degree of judgment and timing in removing the crab right before touchdown
6. How it Works
 - a. The pilot establishes a crab into the wind so that the airplane's ground track remains aligned with the centerline of the runway
 - b. The crab is maintained until just prior to touchdown, when the longitudinal axis of airplane is aligned with the runway using the rudder to avoid a sideward touchdown of the wheels/airplane



Discussion Points:

1. In the side slip, when the wing is lowered, the airplane tends to turn in that direction
 - a. To compensate for the turn, simultaneous opposite rudder pressure is necessary to keep the longitudinal axis of the airplane in aligned with the runway
 - b. The airplane will be side-slipping into the wind just enough so that the flight path and ground track are aligned with the runway
2. Because you are in a slip, drag is increased and more power will be necessary to maintain a given descent rate
3. Changes in the crosswind
 - a. Drift is controlled with aileron, and heading with rudder
 - i. Use ailerons to keep the airplane over the extended runway centerline
 - ii. Use rudder to keep the longitudinal axis aligned with the runway centerline
4. At some point, there will not be insufficient rudder available to overcome the turning tendency caused by the steepened bank
 - a. If the bank required is such that full opposite rudder does not prevent a turn, the wind is too strong to safely land the airplane on that runway, the pilot should find a more suitable runway

Evaluations/ Standards:

1. Consider the wind conditions, landing surface and obstructions, and select the most suitable touchdown point.
2. Establish the recommended approach and landing configuration and airspeed, and adjust pitch attitude and power as required.
3. Maintain a stabilized approach and the recommended approach airspeed, or in its absence, not more than 1.3V_{so} (+10 / -5 knots for Private, +-5 knots for commercial) with gust factor applied.
4. Make smooth, timely, and correct control application during the round out and touchdown
5. Touch down smoothly at the approximate stalling speed (at or within 400 feet of Private, at or within 200 feet for commercial) beyond a specified point, with no drift, and with the airplane's longitudinal axis aligned with and over the runway centerline
6. Maintain crosswind correction and directional control throughout the approach and landing
7. Complete the appropriate checklist

Common errors:

8. Failure to establish and maintain a stabilized approach:
 - a. Not establishing the correct airspeeds for downwind, base, and final segments.
 - b. Not adjusting power and pitch attitude as necessary to control airspeed and rate of descent.
 - c. Not using flaps as necessary to control speed and rate of descent.
 - d. Not correcting for wind drift on downwind, base, and final.
9. Improper procedure in use of power, wing flaps, and trim:
 - a. Not using pitch and power to control airspeed and rate of descent.
 - b. Not extending flaps as necessary.
 - c. Not trimming aircraft for appropriate airspeed.
10. Not keeping hand on throttle
11. Improper procedures during round out and touchdown:
 - a. Rounding out too late resulting in, if not corrected, a hard landing followed by a bounce and a stall and another hard landing.
 - b. Rounding out too high resulting in, if not corrected, an eventual loss of airspeed followed by a high sink rate and a hard landing.
 - c. Rounding out and "ballooning" down the runway; usually caused by misjudging the rate of descent and over-controlling.
 - d. Rounding out and "floating" down the runway; usually caused by excessive airspeed on final approach.
 - e. Touchdown followed by a bounce as a result of an excessive rate of descent on final.
12. Poor directional control after touchdown:
 - a. Allowing a wing to rise after touchdown.
 - b. Allowing touchdown while in a crab.
 - c. Over-controlling with rudder.
 - d. Ground loop – may be caused by a crosswind or over-controlling airplane; this problem can be significant in tailwheel aircraft.
13. Improper use of brakes:
 - a. Not using aerodynamic braking
 - b. Excessive use of brakes
 - c. Skidding the tires
14. Failure to ensure receipt and acknowledgement of landing clearance.
15. Failure to review airport diagram for runway exit situational awareness to avoid a runway incursion after landing.