Airborne Elite, LLC

Private Pilot Maneuvers

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Runway Incursion Avoidance

Runway incursion is any occurrence at an airport involving an aircraft, vehicle, person, or object on the ground that creates a collision hazard or results in loss of separation with an aircraft taking off, intending to take off, landing, or intending to land. In order to avoid runway incursions follow these guidelines (AC91-73).

- Study airport signs and markings.
- Write down ATC instructions.
- Verify ATC instructions if in doubt.
- Maintain situational awareness by listening to ATC instructions to other aircraft.
- While holding short, position aircraft to have the approach end in sight.
- Be vigilant when instructed to taxi into position and hold as well as when cleared to use the runway as a taxiway. Keep communication with ATC at all times.
- Use the other crewmember (if present) to verify ATC instructions.
- Maintain “sterile” cockpit. No non-essential conversations.
- Read back all runway related instructions.
- Use exterior lights.
- Visually clear the whole runway length as well as approach and departure paths before taxiing onto the runway.
- Decline take-off clearance or reject takeoff if unsafe condition exists.

Normal and Crosswind Takeoff

1. **Takeoff Briefing:**
   - For any problem on the takeoff roll: power to idle, apply brakes and exit the runway.
   - Power loss when airborne:
     - If sufficient runway remains – land on the runway
     - Below 1000 feet AGL – pitch for best glide speed and land straight ahead or slightly to the sides to avoid obstacle
     - At or above 1000 feet AGL – pitch for best glide speed, consider returning to the airport.
2. Review wind conditions. Calculate the cross-wind component.
3. Set mixture for best power for the current field elevation and weather conditions.
4. Chose rotation point or delay takeoff for wake turbulence avoidance.
5. Align the aircraft with the runway centerline. Select at least two ground references on the extended runway centerline for directional control.
6. Position ailerons with FULL deflection into the wind.
7. Smoothly apply FULL power. Anticipate and counteract the left turning tendency with simultaneous application of right rudder.
8. Keep a hand on the throttle throughout the takeoff roll.
9. As the aircraft accelerates, remove some of aileron deflection to control lateral drift in order to stay on the centerline.
10. Monitor engine instruments during the takeoff roll while maintaining directional control. Announce “ENGINE GREEN”. Abort takeoff for abnormal readings.
11. Call out airspeed “AIRSPEED ALIVE”. Abort if not alive.
12. Rotate at V_R by applying smooth elevator back pressure to establish liftoff attitude. Delay rotation in gusty conditions. Anticipate and counteract additional left turning forces with additional right rudder pressure.
13. Establish approximate attitude (the dashboard aligned with the horizon) to attain V_Y. The ideal liftoff attitude requires only minimum pitch adjustments shortly after the airplane lifts off to attain V_Y. Maintain a slip into the wind until the positive rate of climb is established.
14. Transition to crab after the liftoff to maintain straight ground track over the extended runway centerline. Pick new objects on the extended runway centerline for directional control.
15. Make pitch adjustments by outside references and by the airspeed indicator to maintain V_Y. Make only quick rough trim adjustments while below 500 feet AGL.
16. Keep a hand on the throttle throughout the initial climb to 500 feet AGL.
17. Complete the 500 foot AGL checklist.
18. Complete the 1,000 foot AGL checklist.
19. Perform the departure procedure as appropriate.

correction angle is removed completely and the wings become level as the 180º turn is completed at the moment the line is reached.
5. At the instant the line is crossed, a turn in the opposite direction should be started. Since the airplane is headed upwind, the groundspeed is slow, so the turn will be started with a shallow bank. Establish a crab angle to maintain the ground track.
6. Pick a reference on the ground lying at the desired distance from the line. Guide the airplane over that point by adjusting the bank angle and the crab angle.
7. After turning 90º, the airplane is flying from the upwind to the downwind. The groundspeed increases. The angle of bank and the rate of turn must be progressively increased, so that the airplane will have turned 180º at the time it reaches the line.
8. The rollout must be timed so that the airplane is in straight-and-level flight directly over and perpendicular to the line.
9. Throughout the maneuver, a constant altitude should be maintained, and the bank should be changing constantly.

- How to maintain desired altitude and airspeed.
  1. Increase the back-elevator pressure for steeper banks. Use outside visual references and the altimeter.
  2. Maintain entry airspeed.

- Turn reversal over the ground reference line. In this maneuver, the airplane should be rolled from one bank directly into the opposite just as the reference line is crossed.

- Coordination of flight controls. Remain coordinated at all times. Do not use rudder to turn the airplane in order to arrive perpendicular over the reference line.

S-Turns

- Select a suitable altitude between 600 and 1000 ft AGL. The higher the safer.

- Select a suitable ground reference with consideration given to emergency landing areas.
  1. Determine wind direction and speed by smoke, dust, waves or 360º turns.
  2. Select a straight reference line (a road, fence, or railroad) that lies perpendicular to the wind, and of sufficient length for making a series of turns.
  3. Due to low altitude, the options might be limited, so it is better to select potential emergency landing sites beforehand.

- Orientation, division of attention, and planning.
  1. Divide attention between following the ground track, aircraft control, wind correction, and watching for traffic.
  2. Don't become fixated on one task.

- Set normal cruise configuration and airspeed.

- Entry procedure.
  1. Approach the line from the upwind (on the downwind heading).
  2. When directly over the road, the first turn should be started immediately.

- Wind drift correction.
  1. The bank must be the steepest as the turn begins on the downwind heading and must be gradually shallowed as the turn progresses from the downwind to the upwind.
  2. On the upwind side, the turn is started with a relatively shallow bank gradually steepening as the airplanes flies from the upwind to the downwind.

- Tracking semicircles of equal radii on either side of the selected ground reference line.
  1. As the line is crossed, the roll into a steep bank must be fairly rapid to attain the proper wind correction angle.
  2. During the later portion of the first 90º of turn, the groundspeed decreases. The wind correction angle will be at the maximum when the airplane is headed directly crosswind.
  3. Note your distance from the line at this point. You will need to position the airplane exactly the same distance from the line on the other side.
  4. After turning 90º, the heading becomes more upwind, the groundspeed decreases. The bank must be gradually shallowed, so that the wind

Traffic Patterns

Traffic pattern is an orderly flow of traffic to ensure smooth and expeditious flow, and collision avoidance. Turns in a standard traffic pattern are to the left.

- Operations at airports with and without operating control towers.
  1. At controlled airports, the tower will direct when and where you should enter the pattern, the direction of departure and direction of turns.
  2. At uncontrolled fields, observe the pattern and conform to the pattern in use. If there are no other aircraft in the pattern, check wind and traffic indicators (L-shaped indicators in a segmented circle) at a distance **well away** from the pattern or by overflying the field at a **safe altitude well above the pattern altitude** (*500 – 1000 ft above the pattern altitude*). Descend to the pattern altitude outside the pattern and enter at a 45º angle to the downwind leg at the midpoint of the runway at traffic pattern altitude (TPA), normally 1,000 feet AGL.

- Traffic pattern procedures.
  1. Upwind. Maintain V_Y all the way to the TPA. Maintain direction over the extended runway centerline by reference to ground references and heading indicator. Too much drift may put you on the collision course with the downwind traffic.

  2. Turn to crosswind.
     - Make a turn to crosswind at 300 feet below TPA or above.
     - Do not exceed 30° of bank.
     - Use the heading indicator to complete a 90° turn. Continue the turn until the runway direction is on the left or right 90° mark. Lead the roll-out as necessary.
     - Level the wings and pick at least two objects aligned in front of you. Establish wind correction as necessary to maintain their visual alignment.
     - Continue climbing to TPA.

  3. Reaching TPA. Smoothly set power to 2,000 – 2,200 RPM and decrease pitch to a level attitude.

  4. Turn to downwind.
     - Start the turn when approaching ½ to 1 mile distance from the runway edge.
     - Do not exceed 30° of bank.
     - Use the heading indicator to complete a 90° turn. Continue the turn until the runway direction is on the 180° mark. Lead the roll-out as necessary.
     - Level the wings.