

## X.C. Turns Around a Point

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References: FAA-H-8083-3

Objectives	The student should exhibit knowledge regarding the performance of a turn around a point. Knowledge will include the elements listed below. Performance of the maneuver should be to PTS standards.
Key Elements	<ol style="list-style-type: none"><li>1. Increased Airspeed = Increased Bank</li><li>2. Decreased Airspeed = Decreased Bank</li><li>3. Coordination</li></ol>
Elements	<ol style="list-style-type: none"><li>1. Purpose of Turns Around a Point</li><li>2. Selecting a Suitable Altitude</li><li>3. Selecting a Suitable Reference Point</li><li>4. Prior to Entry</li><li>5. Entry Procedure</li><li>6. Wind Drift Correction</li><li>7. Exit</li><li>8. Division of Attention</li><li>9. Recap</li></ol>
Schedule	<ol style="list-style-type: none"><li>1. Discuss Objectives</li><li>2. Review material</li><li>3. Development</li><li>4. Conclusion</li></ol>
Equipment	<ol style="list-style-type: none"><li>1. White board and markers</li><li>2. References</li></ol>
IP's Actions	<ol style="list-style-type: none"><li>1. Discuss lesson objectives</li><li>2. Present Lecture</li><li>3. Ask and Answer Questions</li><li>4. Assign homework</li></ol>
SP's Actions	<ol style="list-style-type: none"><li>1. Participate in discussion</li><li>2. Take notes</li><li>3. Ask and respond to questions</li></ol>
Completion Standards	The lesson is complete when the student can demonstrate the knowledge of, and has shown proficiency in turns around a point. The student understands the effect of wind on an aircraft's course over the ground primarily during a turn.

**Instructors Notes:**

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**Introduction:**

**Attention**

Interesting fact or attention grabbing story

This exercise shows the difference between the aircraft's motion in the air, and its ground track. These are different because the aircraft is subject to the moving air mass in which it flies. If wind exists, a ground track with constant radius will require a constantly changing bank angle to correct for wind.

**Overview**

Review Objectives and Elements/Key ideas

**What**

Turns around a point, the airplane is flown in two or more complete circles of uniform radii or distance from a prominent ground reference point using a maximum bank of approximately 45° while maintaining a constant altitude.

**Why**

To develop division of attention between the flight path and ground references, to develop recognition of drift towards or away from a prominent ground reference point all while maintaining a constant altitude. This maneuver helps to further perfect the turning technique and the ability to correct for wind drift in turns.

**How:**

**1. Purpose of Turns Around a Point**

- A. (As mentioned above, in 'Why') Turns around a point develop the ability to:
  - i. Divide attention between the flight path and ground references
  - ii. Develop recognition of drift towards or away from a ground reference while maintaining altitude
  - iii. Further perfect the turning technique and the ability to correct for wind drift in turns
- B. All of these abilities are useful throughout your flying career and when practiced enough will become second nature, encouraging further development in more advanced maneuvers and safe, competent flying

**2. Selecting a Suitable Altitude**

- A. Entry altitude should be 800' AGL (600' - 1,000' AGL)
  - i. ± 100' restrictions
    - a. At 600' AGL, there is no room for error below; At 1,000' AGL, there is no room for error above

**3. Selecting a Suitable Reference Point**

- A. Very important as the maneuver is done in close proximity to the ground
- B. The point should be
  - i. Prominent and easily distinguishable by the pilot
  - ii. Small enough to present precise reference
    - a. EXs: Isolated trees, crossroads, etc.
    - b. Pond is too big
    - c. Intersections are very good
  - iii. Only use references clear of populated areas, obstructions, and anything that could pose a hazard
- C. Emergency Landing Area
  - i. The reference should allow for a nearby emergency landing area in case of an emergency
- D. **CE** - Selection of a reference point with no suitable emergency landing area within gliding distance

**4. Prior to Entry**

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- A. Pre-Maneuver Checklist
- B. Clearing Turns
- C. Airspeed
  - i.  $V_A$  - Trim the airplane for hands off level flight at  $V_A$  prior to entry

### 5. Entry Procedure

- A. Determine the direction of the wind
  - i. Smoke
  - ii. Dust
  - iii. Water
  - iv. Interpolating between surface wind and forecast winds aloft
  - v. Wind Drift Circle - Constant rate turn watching a point
    - a. Note the movement of the airplane in relation to it
- B. Position the aircraft to enter on the Downwind (Tailwind)
  - i. Abeam the point, be a  $\frac{1}{4}$  to  $\frac{1}{2}$  mile radius from the point
- C. Note the entry heading
  - i. Use it throughout the maneuver to maintain orientation and help in planning
- D. **CE** - Faulty entry procedure

### 6. Wind Drift Correction

- A. Once abeam the point
  - i. Initiate a coordinated roll in, maintaining the  $\frac{1}{4}$  mile reference with a steep bank angle ( $\leq 45^\circ$ )
    - a. The initial steepest bank angle is necessary due to the tailwind and the highest groundspeed
    - b. The faster the groundspeed, the steeper the bank angle needed to maintain the desired radius
    - c. The slower the groundspeed, the shallower the bank angle
- B. First Half of the Turn (Downwind Half)
  - i. Starts with the steepest bank and ends with the shallowest bank
  - ii. As the turn progresses the aircraft transitions from a tailwind to a headwind
    - a. The bank angle should be gradually reduced in order to maintain the constant turning radius
      - As bank angle is reduced, less back pressure is needed to maintain altitude
      - **CE** - Failure to maintain selected altitude or airspeed
        - a. Divide attention between the reference point, visual flight references and instrument flight references
  - iii. Keep the turn coordinated
    - a. As the bank is reduced, rudder pressure will reduce
    - b. **CE** - Uncoordinated use of flight controls
      - Divide attention between flying the aircraft and the maneuver
  - iv. Progressively point the nose into the wind (crab) to maintain the constant ground track
    - a. Downwind - The nose is turned toward the inside
      - As the turn progresses, the wind pushes the aircraft outside of the circle
        - a. Crab inside to maintain the arc
    - b. **CE** - Improper correction for wind drift
  - v. At the end of the first  $\frac{1}{2}$  of the turn, the bank angle should be at its most shallow point, and the crab should be entirely removed
    - a. Direct headwind, therefore lowest groundspeed
    - b. A direct headwind requires no crab
- C. The second half of the turn (Upwind Half)
  - i. Opposite of the first half - Slowly move from a shallow to steep bank
  - ii. As the turn progresses, the aircraft will experience a headwind transitioning to a tailwind
    - a. As groundspeed increases, bank will need to increase to maintain the desired turning radius

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- As the bank angle is increased, more back pressure is necessary to maintain altitude
- **CE** - Failure to maintain selected altitude or airspeed
- iii. Keep the plane coordinated
  - a. As the bank is increased, rudder pressure will increase
  - b. **CE** - Uncoordinated use of flight controls
- iv. Progressively point the nose into the wind (crab) to maintain the constant ground track
  - a. Upwind, the nose is turned toward the outside of the circle
    - The wind is pushing the aircraft toward the reference point
  - b. **CE** - Improper correction of wind drift
- v. At the end of the second half of the turn, the bank angle should return to the entry bank angle
  - a. The end of the second half of the turn places the aircraft at the starting point of the maneuver, with a tailwind
    - This requires the steepest bank and no crab

### 7. Exit

- A. Once at least 2 turns have been completed, initiate a smooth rollout on the initial entry heading

### 8. Division of Attention

- A. Maintain the outside reference by looking ahead of the aircraft's position and planning the entire turn
  - i. **CE** - Poor planning, orientation, or division of attention
- B. Divide attention inside/outside the cockpit with quick glances to verify altitude, airspeed, bank angle, and coordination
- C. Still need to scan for traffic while maintaining focus on the maneuver
  - i. As bank becomes more shallow use that time as an opportunity to check for other traffic
  - ii. **CE** - Poor planning, orientation, or division of attention

### 9. Recap

- A. The stronger the wind the more the bank angle will have to be varied throughout the maneuver
  - i. Max bank angle should be 45° at the steepest point
- B. Theoretically, if there were no wind, bank angle would be constant - no wind to correct for
  - i. There also would be no need to crab
- C. The steeper the bank, the more back pressure required to maintain altitude
- D. Helpful to pick out targets along the flight path
  - i. Such as barn, building, lake, etc. usually at ¼ intervals along the circle
    - a. 4 way intersection is a very useful reference point
  - ii. Helps to maintain the circle and ensures the airplane is in the right place at the right time

### Common Errors:

- Faulty entry procedure
- Poor planning, orientation, or division of attention
- Uncoordinated use of flight controls
- Improper correction for wind drift
- Failure to maintain selected altitude or airspeed
- Selection of a ground reference point where there is no suitable emergency landing area within gliding distance

### Conclusion:

Brief review of the main points

This maneuver works to establish a better understanding of the airplane's turning tendencies due to changing crosswinds while helping the pilot learn to divide attention between controlling the airplane and other traffic.

**PTS Requirements:**

To determine that the applicant:

1. Exhibits instructional knowledge of the elements of turns around a point by describing:
  - a. The purpose of turns around a point and their relationship to basic/advanced airmanship skills.
  - b. How to select a suitable altitude.
  - c. How to select a suitable ground reference point with consideration given to emergency landing areas.
  - d. Orientation, division of attention, and planning.
  - e. Configuration and airspeed prior to entry.
  - f. Entry procedure.
  - g. Wind drifts correction.
  - h. How to maintain desired altitude, airspeed, and distance from reference point.
  - i. Coordination of flight controls.
2. Exhibits instructional knowledge of common errors related to turns around a point by describing:
  - a. Faulty entry procedure.
  - b. Poor planning, orientation, or division of attention.
  - c. Uncoordinated use of flight controls.
  - d. Improper correction for wind drift.
  - e. Failure to maintain selected altitude or airspeed.
  - f. Selection of a ground reference point where there is no suitable emergency landing area within gliding distance.
3. Demonstrates and simultaneously explains turns around a point from an instructional standpoint.
4. Analyzes and corrects simulated common errors related to turns around a point.

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