

# Task VII.K: Power-Off 180 Degree Accuracy Approach and Landing

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## Lesson Overview

### Objective

The student should develop knowledge of the elements related to the power-off 180 degree accuracy approach and landing as required in the ACS/PTS.

### Reference

- Aircraft Flight Manual / Pilot's Operating Handbook
- Airplane Flying Handbook - Chapter 8-23

### Key Elements

1. Best Glide Airspeed
2. Wind Correction
3. Stabilized Approach

### Elements

1. General
2. Selecting a Touchdown Point
3. The Maneuver

### Instructor Actions

1. Discuss lesson objectives
2. Present Lecture
3. Ask and Answer Questions

4. Assign homework

### **Student Actions**

1. Participate in discussion
2. Take notes
3. Ask and respond to questions

### **Completion Standards**

The student can perform a power-off 180 degree accuracy approach and landing, landing within 200' beyond the selected landing point. The student will understand when corrections should be made, and will have the ability to make the necessary corrections in order to maintain a stabilized approach to landing.

## **Instructor Notes**

### **Introduction**

The power-off 180 is a challenging and very fun maneuver. Personally, it's one of my favorites as it's a blend of all aspects of flying and demonstrating good energy management.

Why - It instills judgment and procedures necessary for accurately flying the plane, without power, to a safe landing.

### **General Overview**

Executed by gliding with the power off from a given point on a downwind leg to a preselected landing spot

### **The basic Procedure**

Closing the throttle at a given altitude and gliding to key positions. The pilot is constant checking and adjusting the airplane's glide path to facilitate landing on the selected point

- The key positions are merely points in the air from which the pilot can judge whether the glide will safely terminate at the desired point

### **The key points in a power-off 180**

- The downwind key position
  - Abeam the intended point of landing
  - Where the pilot reduces the power to idle
- The base key position
  - On the base leg, 450 off of the intended landing point
  - Generally, where the pilot starts configuring the aircraft

- This will change depending on the aircraft, the Warrior will perform differently than a C172.

## Configuring the airplane

- Normal landing configuration, but flaps are used as necessary to control the glide path of the approach
- Trim the airplane for best glide airspeed

## Flying the Power Off Descent

- Pitch attitude is used to maintain the best glide airspeed

### □ Common Error

- - Extending the landing
  - Flying any airspeed other than best glide

- Attempt to fly a normal pattern, but also keep in mind that
  - Wind conditions and other factors can change the pattern size
  - This is not a mechanical maneuver - altitudes, the size of the pattern, when to configure, etc. will need to be adjusted daily and at different airports
  - Tools at the pilot's disposal to adjust the size of the pattern/rate of descent. Tools are:
    - Drag
      - Slips can be recovered, flap deploys are permanent features of the landing
      - Slips should be performed into the wind (lean into wind)
    - Airspeed
    - Size of pattern

## Coordination

- Like always, keep the airplane coordinated (exception is a slip)
- Don't attempt to increase the rate of turn with rudder; this could lead to a crossed-control stall

- □ Common Error - Improper use of power, wing flaps, or trim

- Correct for deviations from the glide path without power
- Always trim to relieve control pressures to help in stabilizing the approach
- Do what's necessary if the approach cannot be completed safely without the addition of power
- ABORT THE APPROACH IF LOOKING UNSAFE.

## Selecting the Touchdown Point

- The power will be reduced abeam the desired touchdown point

- Select an easily recognizable point on the runway, for example a specific centerline marking, the 500' or 1,000' markers, etc.
- Ensure there is ample space on both sides of the point
  - It should allow for landing in the touchdown zone (first 3k' or half, whichever is less)
  - It should not be so close to the beginning of the runway that it risks a landing in the dirt
    - Remember, the airplane will float prior to touchdown. The float and touchdown should both be guaranteed to be over the runway surface
    - Aiming for “the numbers” is likely too short
- Once a touchdown point has been selected, choose an aiming point

□ **Common Error**

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- Failure to consider the effect of wind and landing surface
- Adjust the aim point based on the wind
- The stronger the headwind, the less the aircraft will float, and the closer the aim point will need to be to the point of touchdown

## The Maneuver

### Downwind Leg

- 1,000' AGL
  - Complete the before landing checklist as normal
  - Abeam the selected touchdown point, reduce the throttle to idle
  - This is the Downwind Leg Key Position
  - Upon doing this, maintain altitude until reaching best glide speed
  - Trim the aircraft for best glide speed, and start the descent
  - Be aware of, and anticipate how the wind conditions will affect the pattern

□ **Common Error**

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- Failure to identify the key points in the pattern

### Turning to the Base Leg

- The base leg is positioned as needed based on the altitude and/or wind condition
- The turn to the base leg is a uniform turn with a medium or slightly steeper bank

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□ Common Error: Failure to consider the effect of wind

## Base Leg

- Continue the glide, evaluating the airplane's position in relation to the landing point
- Base Key Position — 450 to the landing point
- Aim Point
  - As in a normal approach to landing, use an aim point - watch the position of the landing point in relation to the window/windscreen

## Turning to Final

- Plan and accomplish the turn so that the airplane rolls out aligned with the runway centerline
- Although the pilot would like to fly a normal pattern, that is not always possible
  - If the airplane is too high or low, make corrections
  - Turn early/head directly to the runway from the base leg if necessary to make the landing point

## Final Approach

- Continue to evaluate the approach and make necessary adjustments to reach the aim point
- Maintain a Stabilized Approach
  - Aim Point - Do not allow movement in the window, and make adjustments to maintain the glide path as necessary
  - Slight adjustments help to maintain a stabilized approach and lead to an on target landing

### Common Errors

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- Do not wait for large aim point changes, be proactive in correcting changes
- Large, abrupt changes lead to inconsistent descent rates, large swings in airspeed, and an inability to maintain a stable, consistent approach

## Roundout and Touchdown

- It must be emphasized that, although accurate spot touchdowns are important, safe and properly executed approaches and landings are vital
- The Commercial ACS requires the pilot to touchdown at a proper pitch attitude, within 200' beyond or on the specified point with no side drift and with the airplane's longitudinal axis aligned with and over the runway centerline
- Maintain directional control with rudder, and while slowing the airplane, apply the necessary crosswind correction

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□ Common Error - Poor directional control after touchdown and Improper use of brakes

- Use minimum braking, and don't apply the brakes until firmly on the ground/under control

- Use equal pressure on both brakes to prevent swerving or loss of control

## ☐☐ Maneuver Common Errors ☐☐

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- Failure to establish approach and landing configuration at proper time or in proper sequence
- Failure to identify the key points in the pattern
- Failure to establish and maintain a stabilized approach
- Failure to consider the effect of wind and landing surface
- Improper use of power, wing flaps, or trim
- Improper procedure during roundout and touchdown
- Failure to hold back elevator pressure after touchdown
- Poor directional control after touchdown
- Improper use of brakes

## Conclusion

The power-off 180o accuracy approach and landing consists of constantly evaluating and adjusting the approach as necessary based on the wind, altitude, groundspeed, and other factors.

## ACS Requirements

### To determine that the applicant

1. Exhibits instructional knowledge of the elements of a 180o power-off accuracy approach and landing by describing:
  - a. Configuration and trim.
  - b. Effects of wind and selection of a touchdown area.
  - c. The key points in the pattern.
  - d. A stabilized approach at the recommended airspeed to the selected touchdown area.
  - e. Coordination of flight controls.
  - f. Timing, judgment, and control procedure during roundout and touchdown.
  - g. Directional control after touchdown.
  - h. Use of checklist.
  - i. After landing runway incursion avoidance procedures.
2. Exhibits instructional knowledge of common errors related to a 180o power-off accuracy approach and landing by describing:
  - a. Failure to establish approach and landing configuration at proper time or in proper sequence.

- b. Failure to identify the key points in the pattern.
  - c. Failure to establish and maintain a stabilized approach.
  - d. Failure to consider the effect of wind and landing surface.
  - e. Improper use of power, wing flaps, or trim.
  - f. Improper procedure during roundout and touchdown.
  - g. Failure to hold back elevator pressure after touchdown.
  - h. Poor directional control after touchdown.
    - i. Improper use of brakes.
3. Demonstrates and simultaneously explains a 180 o power-off accuracy approach and landing from an instructional standpoint.
  4. Analyzes and corrects simulated common errors related to a 180o power-off accuracy approach and landing.

## Commercial Pilot ACS Skills Standards

### **Complete the appropriate checklist.**

1. Make radio calls as appropriate.
2. Plan and follow a flightpath to the selected landing area considering altitude, wind, terrain, and obstructions. Scan the landing runway and adjoining area for traffic and obstructions
3. Position airplane on downwind leg, parallel to landing runway
4. Correctly configure the airplane
5. As necessary, correlate crosswind with direction of forward slip and transition to side slip for landing
6. Touch down within -0/+200 feet from the specified touchdown point with no side drift, minimum float, and with the airplane's longitudinal axis aligned with and over the runway centerline.