

Task VII.I: Short Field Approach and Landing

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Lesson Overview

Objective

The student should develop knowledge of the elements related to a short-field approach and landing. The student will understand the procedures involved and will have the ability to properly execute them as prescribed in the ACS/PTS.

Reference

- Aircraft Flight Manual / Pilot's Operating Handbook
- Airplane Flying Handbook Chapter 8-18

Key Elements

1. 4 degree Stabilized Approach
2. Region of Reverse Command
3. Minimal Float/Max Effective Braking

Elements

1. Landing Performance and Limitations
2. Obstructions and Other Hazards
3. Configuration and Trim
4. Downwind Leg
5. Base Leg

6. Final Approach
7. Roundout/Flare
8. Touchdown

Schedule

1. Discuss Objectives
2. Review material
3. Development
4. Conclusion

Equipment

1. White board and markers
2. References

IP Actions

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

SP Actions

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

Completion Standards

The student has the ability to perform a well-coordinated and stabilized short-field approach and landing as required in the ACS/PTS.

Instructor Notes

Attention

The short-field landing requires the airplane to be flown precisely while close to the ground in order to safely land in a confined area.

Overview

Review Objectives and Elements/Key ideas

What

Short-field approaches and landings require the use of procedures for approaches and landings at fields with a relatively short landing area or where an approach is made over obstacles limiting the available landing area. This low speed type of power-on approach is closely related to flight at minimum controllable airspeeds.

Why

As in short-field takeoffs, a short field approach and landing is one of the most critical of the maximum performance operations. It requires that the pilot fly the airplane at one of its crucial performance capabilities while close to the ground in order to safely land within confined areas. To land within a short-field, the pilot must have precise, positive control of the rate of descent and airspeed.

Lesson Details

Short fields require special care, and a high level of performance from both the aircraft and the pilot.

Short Field Considerations

1. Airplane Landing Performance and Limitations
 - a. Get landing performance metrics from POH / Chapter 5, to understand ground-roll limitations.
 - b. Do not attempt to land if landing distance isn't adequate.
 - c. Plan Ahead - Never fly into a short field without knowing all available information about runway and field.
 - i. Remember, it takes less distance to land than to take back off.
 - ii. Especially in Florida during the summer. ..Runway surface will effect landing roll.
 - iii. Is it raining?

Obstructions and Other Hazards

Short field approaches allow for approach and landing at fields where an approach is made over obstacles that limit the available landing area

- Be aware of the obstacles as well as other obstructions that might exist
- Be very familiar with the airplane's performance capabilities, as well as the obstructions and other potential hazards when making a short-field approach and landing

Configuration and Trim

1. The airplane should be configured for a normal landing (landing flaps)
2. Final Approach should be slower than normal to maintain a steeper glide path to clear any obstacles.
3. If possible, a good technique is to set up a wider than normal pattern so that the plane can be properly configured, trimmed and established in a stabilized approach
4. Coordinated Flight Controls
5. Trim as much as possible to relieve yourself of as much work as possible

Approach / Landing

Downwind Leg

1. At the midpoint of the downwind leg, complete the landing checklist.
2. Select a Touchdown and Aim Point.
3. Be prepared to go-around, plan that as the initial option and only land if the landing is looking assured.
4. Abeam the landing point or slightly beyond, reduce power to 1700 RPM, extend the first notch of flaps, and pitch for 85 knots
5. The downwind leg can be extended to allow time to properly configure and trim the airplane

Base Leg

Configure the airplane for the landing configuration

Try to get all the flaps out that are required and be done configuring the aircraft at this phase. Only slight trim and power adjustments should be needed once the base leg is stabilized.

- Trim for 70 knots IAS with full flaps out (3 notches/40 degrees)

Final Approach

1. Usually started at least 500' AGL to ensure approach is stabilized.
2. Establish and maintain a 4 degree glide path
3. Maintaining a Stabilized Approach
4. The landing is in reality an accuracy approach to a spot landing—a stabilized approach is essential
5. Pitch for Airspeed, Power for Altitude
 - Below L/D_{MAX}— In the Region of Reverse Command

Common Errors

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- Failure to establish and maintain a stabilized approach
- Improper procedure in use of power, wing flaps, and trim
- Inappropriate removal of hand from throttle

Roundout & Flare

1. The roundout and flare must be judged accurately to avoid flying into the ground or stalling prematurely and sinking rapidly
2. Minimum floating should occur. The airplane should settle relatively quickly onto the aiming point

Touchdown

1. Touchdown should occur at the minimum controllable airspeed with the airplane in the approximate pitch attitude that will result in a power off stall when the throttle is closed
2. The airplane should be stopped within the shortest possible distance
3. Directional Control using rudders

☐☐Short Field - Common Errors☐☐

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- Improper use of landing performance data and limitations
- Failure to establish approach and landing configuration at appropriate time or in proper sequence
- Failure to establish and maintain a stabilized approach
- Improper procedure in use of power, wing flaps, and trim
- Inappropriate removal of hand from throttle
- Improper procedure during roundout and touchdown
- Poor directional control after touchdown
- Improper use of brakes

Conclusion

A short-field approach and landing requires the airplane be flown at one of its critical performance capabilities while close to the ground in order to land safely in a confined area. You must have precise positive control of the airplane's rate of descent and as to produce an approach that will clear any obstacles, result in little or no floating during the roundout, and permit your airplane to be stopped in the shortest possible distance.

ACS Requirements

Exhibits instructional knowledge of the elements of a short-field approach and landing by describing

1. How to determine landing performance and limitations.
 - a. Configuration and trim.
 - b. Proper use of pitch and power to maintain desired approach angle.
 - c. Barriers and other hazards which should be considered.
 - d. Effect of wind.
 - e. Selection of touchdown and go-around points.
 - f. A stabilized approach at the recommended airspeed to the selected touchdown point.

- g. Coordination of flight controls.
 - h. A precise ground track.
 - i. Timing, judgment, and control procedure during roundout and touchdown.
 - j. Directional control after touchdown.
 - k. Use of brakes (landplane).
 - l. Use of checklist.
 - m. After landing runway incursion avoidance procedures.
2. Exhibits instructional knowledge of common errors related to a short-field approach and landing by describing:
 - a. Improper use of landing performance data and limitations.
 - b. Failure to establish approach and landing configuration at appropriate time or in proper sequence.
 - c. Failure to establish and maintain a stabilized approach.
 - d. Improper procedure in use of power, wing flaps, and trim.
 - e. Inappropriate removal of hand from throttles.
 - f. Improper procedure during roundout and touchdown.
 - g. Poor directional control after touchdown.
 - h. Improper use of brakes.
 3. Demonstrates and simultaneously explains a short-field approach and landing from an instructional standpoint.
 4. Analyzes and corrects simulated common errors related to a short-field approach and landing.

Private Pilot ACS Skills Standards

Complete the appropriate checklist

1. Make radio calls as appropriate.
2. Ensure the aircraft is aligned with the correct/assigned runway
3. Scan the landing runway and adjoining area for traffic and obstructions
4. Consider the wind conditions, landing surface, obstructions, and select a suitable touchdown point (ASES, AMES)
5. Establish the recommended approach and landing configuration and airspeed, and adjust pitch attitude and power as required to maintain a stabilized approach.
6. Maintain manufacturer's published airspeed, or in its absence, not more than 1.3 VSO, +10/-5 knots, with wind gust factor applied
7. Maintain crosswind correction and directional control throughout the approach and landing sequence.

8. Make smooth, timely, and correct control inputs during round out and touchdown.
9. Touch down at the recommended airspeed.
10. Touch down within 200 feet beyond the specified point, threshold markings or runway numbers, with no side drift, minimum float, and with the airplane's longitudinal axis aligned with and over runway centerline
11. Use manufacturer's recommended procedures for aircraft configuration and braking.
12. Execute a timely go-around if the approach cannot be made within the tolerances specified above or for any other condition that may result in an unsafe approach or landing.
13. Utilize runway incursion avoidance procedures

Commercial Pilot ACS Standards

Same as the Private Pilot, except

1. Maintain manufacturer's published airspeed, or in its absence, not more than 1.3 VSO, +10/-5 knots, with wind gust factor applied
2. Touch down within 100 feet beyond the specified point, threshold markings or runway numbers, with no side drift, minimum float, and with the airplane's longitudinal axis aligned with and over runway centerline.