Task VII.F: Normal and Crosswind Approach, and Landing

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Lesson Overview

Objective

The student should be able to perform a normal approach and landing as prescribed in ACS/PTS. The approach and landing should be performed satisfactorily with or without a crosswind, and with the necessary corrections based on the situation.

Reference

Aircraft Flight Manual / Pilot's Operating Handbook

Key Elements

1. Stabilized Approach
2. Smooth, Controlled Roundout
3. Hold the airplane inches above the ground before touching down
4. Don't Side Load the Aircraft

Elements

1. Determining Landing Performance and Limitations
2. The Downwind Leg
3. The Base Leg
4. The Final Approach
5. The Roundout
6. The Touchdown

7. The After-Landing Roll
8. The Crosswind Approach
9. The Go Around
10. Obstructions and Other Hazards to Consider
11. Wind Shear and Wake Turbulence

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 can fly a coordinated, stabilized approach, transitioning into a smooth roundout and touchdown without side loading the airplane, with or without a crosswind.

Instructor Notes

Attention

The landing is the most difficult and most fun part of flying.

Overview

Review Objectives and Elements/Key ideas

What

A normal approach and landing involves the use of procedures for what is considered a normal situation; that is, when engine power is available, the wind is light or the final approach is made directly into the wind, the final approach path has no obstacles, and the landing surface is firm and of ample length to gradually bring the airplane to a stop.

Why

It’s really a good skill to know when we decide we want to land the plane. Not only that, but, the factors involved and procedures used also have applications to the other-than-normal approaches and landings.

Lesson Details

The landing is about the most challenging, frequently frustrating, plateau inducing skill for any new pilot to learn. On the other hand, what goes up must come back down again, and the

preference is that it come down in a controlled and well orchestrated manner.

Normal Landing Elements

Universal items of the maneuver, those elements that aren't aircraft specific.

Runway

- Plan the first 1/3 for touchdown, the next 1/3 for touchdown and the final 1/3 for emergency.
  - At your home airport, often you might be landing on a 10k'+ runway, this rule should be adapted for the landing airport and local procedures. It might not be practicable to be on the runway that long, and often ATC might want you off the runway as fast as possible for other landing traffic.
- If the aircraft can't be landed in 1/3 the runway, the runway might be too short for a new pilot and an alternative should be considered.

Downwind Leg

- Complete Checklist
- Obtain landing clerance from ATC, if at controlled field.
  - Typically this is done without asking at our local airport. They will tell you you're cleared to land, but if they haven't, ask for clearance.
- Stabalize airspeed. Downwind should be flown at about 100kts.
- Abeam Numbers:
  - 1st notch flap
  - Reduce power to 1720 RPM (Should be 32% power, 1 notch flaps, 90 kts == 500fpm descent)

Base Leg

- Add 2nd notch flaps (80 kts, 32% power, 1720 RPM == 500fpm descent)
- Stabalize glide path.
- Scan and avoid traffic

Final Leg

- Give yourself permission to abort if approach is not stabalized. Never over-commit mentally to a landing.
- Deploy final notch of flap, 40deg. (70kts KIAS)

Touchdown

Four phases to a landing:

1. Fly: Descent

2. Float: Roundout
3. Flare: Touchdown
4. Finesse: Rollout

Descent Phase

- The aircraft is not yet over the runway, focus on the runway numbers or landing area.
- Consistent small power reductions - don't reduce power unless you believe you're too high.
  - Don't get Low!!
  - If you have to add power you might not of planned the descent well.
- Continuously re-evaluate, scan for traffic.

Round-Out phase

- Aircraft is over the runway (on centerline)
- Change to more of a level-flight attitude once ground effect is reached.
- Look to the far end of the runway.
- Reduce power to idle (See POH)
- The horizon is a better indicator of how fast to flare, than attempting to estimate your hight above the runway. Use the horizon as your guide. If you see the horizon is moving up to quickly, then you should change your attitude quickly; if the horizon is moving up slowly, then you should change attitude slowly.
- Be patient, don't rush it. Do NOT force the airplane on to the ground, let the airspeed bleed off and slowly settle to the ground.

Touchdown Phase

- Focus straight ahead - Be aware of periphreal but don't turn your head or stair at the ground below you.
- Beware of the change in handling characteristics as you enter ground effect.
- Aircraft is nearing the stall attitude - Stall warning horn should be coming on.
- May need slight right rudder during flare.
- Maintain longitudinal axis straight down the runway.
- Heels on the floor, do not land with your feet on the brakes.

Rollout Phase

- Your head should be up and your eyes outside.
- Steer with your feet to remain on centerline.
- Do nothing while on the urnway, don't change COM frequencies, don't start chit-chatting, don't fidget with equipment or start reading your after landing checklist. Continue to maintain the sterile cockpit until clear of the runway.

- To slow, apply brakes tenderly, do NOT lock up the brakes trying to make an early intersection to get off the runway.
- Taxi clear of the runway, usually at the earliest practical intersection.
    - Other traffic is likely landing behind you and ATC has sequenced spacing according to normal exits off a runway. If you doddle and not get off the runway in a timely manner, you could cause an airliner to go around, and possibly a call from the FAA.

How to judge your landing

- Plane is on the centerline.
- Touched down in the first 1/3 of the runway, or 1000-1500'.
- Touched down in a full stall, you didn't fly the plane onto the ground.
- No side load.
- Aerodynamically correct landing from transitioning the plane from being a flying machine to a ground machine.

Crosswind Considerations

- Anticipate and correct for wind drift, both in the pattern and at flare. The wind direction will slightly change the close your get to ground effect.
- Correct for drifting before touchdown.
    - Typically the Crab/Kick method is used in early stages of flying.
- Hold flight control inputs during the rollout to compensate for wind.

□□Common Errors□□

- Attempting to land in crosswinds that exceed the airplane's maximum demonstrated crosswind component
- Inadequate compensation for wind drift on the turn from base leg to final approach, resulting in undershooting or overshooting
- Inadequate compensation for wind drift on final approach
- Unstabilized approach
- Failure to compensate for increased drag during sideslip resulting in excessive sink rate and/or too low an airspeed
- Touchdown while drifting
- Excessive airspeed on touchdown
- Failure to apply appropriate flight control inputs during rollout
- Failure to maintain direction control on rollout
- Excessive braking

Conclusion

Leaving the ground into the sky is optional but returning to the earth is not.

As the old saying goes, a good landing is one you can walk away from, a great landing is one where you don't need to run. A supreme landing is one that lets the next student fly the plane again without repair.

Congradulations on getting back to the ground safely.

ACS Requirements

To determine that the applicant:

1. Exhibits instructional knowledge of the elements of a normal and a crosswind approach and landing by describing:
    a. How to determine landing performance and limitations.
    b. Configuration, power, and trim.
    c. Obstructions and other hazards which should be considered.
    d. A stabilized approach at the recommended airspeed to the selected touchdown area.
    e. Course of action if selected touchdown area is going to be missed.
    f. Coordination of flight controls.
    g. A precise ground track.
    h. Wind shear and wake turbulence avoidance procedures.
    i. Most suitable crosswind procedure.
    j. Timing, judgment, and control procedure during roundout and touchdown.
    k. Directional control after touchdown.
    l. Use of brakes (landplane).
    m. Use of checklist.
    n. After landing runway incursion procedures.
2. Exhibits instructional knowledge of common errors related to a normal and a crosswind 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. Inappropriate removal of hand from throttles.
    e. Improper procedure during roundout and touchdown.
    f. Poor directional control after touchdown.

g. Improper use of brakes (landplane).
h. Failure to ensure receipt and acknowledgement of landing clearance.
i. Failure to review airport diagram for runway exit situational awareness to avoid a runway incursion after landing.

3. Demonstrates and simultaneously explains a normal or a crosswind approach and landing from an instructional standpoint.
4. Analyzes and corrects simulated common errors related to a normal or crosswind 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 recommended approach airspeed, or in its absence, not more than 1.3 VSO, +10/-5 knots, or as recommended for the aircraft type and gust velocity.
7. Maintain crosswind correction and directional control throughout the approach and landing.
8. Make smooth, timely, and correct control inputs during round out and touchdown.
9. Touch down at speed recommended by manufacturer
10. 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.
11. Utilize runway incursion avoidance procedures

Commercial Pilot ACS Standards

Same as the Private Pilot, except:

1. Maintain manufacturer's recommended approach airspeed, or in its absence, not more than 1.3 VSO, +/-5 knots, or as recommended for the aircraft type and gust velocity.
2. Touch down at speed recommended by manufacturer, within 200 feet beyond a specified point on the runway (ASEL, AMEL). In addition, for AMEL, the touchdown will be within the first one-third of the available runway.