

Task XIII.A: Emergency Approach and Landing

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Lesson Overview

Objective

The student should develop knowledge of the elements related to performing an emergency approach and landing. The student will be able to perform the maneuver as required in the ACS/PTS.

Reference

- Aircraft Flight Manual / Pilot's Operating Handbook
- Airplane Flying Handbook (FAA-H-8083-3B, page(s) 8-26)

Key Elements

1. Best Glide Airspeed
2. Emergency Checklists
3. Soft Field Power Off Approach and Landing

Elements

1. ABC - Aviate, Best Landing Spot, Checklists
2. The Approach
3. Contact
4. The Landing

Equipment

1. White board and markers
2. References

3. iPad

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

Schedule

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

Completion Standards

The student has the ability to simulate an emergency approach and landing taking into account the landing area, and wind while accomplishing the necessary checklists and properly positioning the airplane to land safely on the desired landing spot.

Instructor Notes

Introduction

Attention

Understanding the elements behind a properly executed emergency approach and landing could be the difference between a safe soft field landing and a dangerous, poorly performed crash.

Overview

- Review Objectives and Elements/Key ideas

What

A simulated emergency landing occurs when the power is pulled, simulating a lost engine, and the pilot must attempt to restart the engine while properly configuring the airplane for an approach and landing usually in a field of some kind.

Why

To develop accuracy, judgment, planning, technique, and confidence when little or no power is available.

Lesson Details

An emergency situation can present the pilot with quite a shock. One of the many old sayings regarding an emergency is ... "First wind your watch". The point being that the situation should be responded to methodically and without panic. Once the initial shock is handled, the ABC rule is to be followed: Aviate, Best Landing Spot, and Checklists.

Airspeed/Aviate

The most important thing is to fly the plane. Everything else is secondary. Pitch for best glide speed (in the {aircraft-type} this is {airspeed-best-glide}). Strive to hold that speed exactly, as variations in airspeed can nullify any attempt to gain accuracy in judgment regarding gliding distance and landing spot. Resist the urge to get down, as this can result in a deviation from best glide speed which may result in a faster landing speed, and reduced glide distance.

Be aware that while performing checklists and taking other steps that tension may result in inadvertent back pressure. This can result in pulling the aircraft off of best glide speed. Stay relaxed, fly first.

Best Landing Spot

This may be obvious, but if there is an airport close by select that as the landing spot. If a GPS is available many have a "Nearest" function that can help identify close-by airports. The glide ratio for the PA28A is

Glide Ratio

- TODO

Select a field that is within glide distance, checking all around the aircraft as the best choice might be behind, or to the sides. prefer a hard packed, long, smooth surface with no obstacles on the approach end of the field. While asking for all this ask for the engine to restart, since you are asking! Remain aware of the wind velocity and direction, planning to land into the wind if at all possible. Factors (eg. insufficient altitude, obstacles which would shorten the available length, etc.) may dictate otherwise, of course.

Though tempting, use a road as a last resort. Roads can be too narrow, have traffic, and be crossed with wires.

Checklists (Emergency)

First, attempt a restart. Check mixture RICH, alternate air OPEN, fuel valve OPEN, fuel pump ON, and throttle 3/4 OPEN. If the prop is stopped (rare) ignition switch to START. If that fails, then troubleshoot.

Check all the above, and insure that everything is as it should be. Switch tanks if that is appropriate for the aircraft. Cycle the ignition left/right in case the issue is ignition related.

If the engine restarts it is important, if possible, to determine the reason for the original failure. For instance, if the engine restarts after the electric boost pump has been turned on then it is likely the

engine driven pump has failed.

If a restart occurs, take time to assess the wisdom of continuing on to the point of intended landing. Consider the possibility that the failure may reassert itself, potentially at the worst possible time. It may be best to land early, either in the field identified earlier or at the closest airport.

The Approach

Proceed directly to the selected landing area. Attempt to end up on downwind abeam the touchdown point at a normal pattern altitude for the area. If higher than the normal pattern altitude circle over the approach end down to pattern altitude. A complete turn will lose 500 to 600 feet, so adjust the turns to roll out on downwind abeam the touchdown point as close to pattern altitude as possible.

During this process you will need to divide your attention between running checklists and flying the plane. Flying the plane is the top priority, however. The approach should be similar to a soft-field power off approach. Fly as much of a normal approach as possible, and don't either rush the landing or try to stretch a glide.

If it looks like the aircraft may overshoot the landing area, the base leg can be lengthened or widened, flaps can be extended, or a forward slip employed. If it looks as if the aircraft may undershoot, shorten the base leg, turn toward the field early to shorten the final approach, delay using flaps, **but do NOT raise the nose to stretch the glide.**

Attempting to stretch the glide is an almost assured way to end the approach in tragedy. This importance of this point can't be over-stated.

Communicate

As time permits, contact ATC (if able) with the transmission "Mayday, Mayday, Mayday" as this is the universal call for emergencies. Provide ATC with the aircraft call sign, type, position, problem, and intentions. If unable to contact ATC tune the radio to 121.5 and declare an emergency there. Squawk 7700 on the transponder as this communicates the emergency to radar operators.

The Landing

Once committed complete the emergency checklist. A common checklist reads as follows.

1. Fuel Valve : OFF
2. Mixture : IDLE CUT OFF
3. Ignition : OFF

Those steps are to avoid a fire on impact. Keep the electrical on as long as possible to allow the ability to communicate, operate the flap, and other electrically driven devices in the aircraft.

The gear and flaps should only be deployed once landing is assured. Gear down can provide more protection against obstacles such as stumps and rocks. If the field is excessively soft or snow covered, a gear up landing may be safer. As in a soft field landing, hold the nose up as long as possible.

Common Errors

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- Improper airspeed control
- Poor judgment in the selection of an emergency landing area
- Failure to estimate the approximate wind speed and direction
- Failure to fly the most suitable pattern for existing situation
- Failure to accomplish the emergency checklist
- Undershooting or overshooting selected emergency landing area

Conclusion

During an emergency approach and landing, it is important that the pilot choose the most suitable landing area within gliding distance and properly configure the airplane to maintain the best glide airspeed and attempt to regain power. If regaining power is not possible, the airplane should be set up for an emergency landing and an emergency approach and landing should be executed into the wind as precisely as possible. The pilot should announce the emergency and squawk 7700 as practicable. Flying the aircraft is the number one priority.

ACS Requirements

CFI PTS Standards

To determine that the applicant

1. Exhibits instructional knowledge of the elements related to an emergency approach and landing by describing:
 - a. Prompt establishment of the best glide airspeed and the recommended configuration.
 - b. How to select a suitable emergency landing area.
 - c. Planning and execution of approach to the selected landing area.
 - d. Use of emergency checklist.
 - e. Importance of attempting to determine reason for the malfunction.
 - f. Importance of dividing attention between flying the approach and accomplishing emergency checklist.
 - g. Procedures that can be used to compensate for undershooting or overshooting selected emergency landing area.
2. Exhibits instructional knowledge of common errors related to an emergency approach and landing by describing:
 - a. Improper airspeed control.
 - b. Poor judgment in the selection of an emergency landing area.

- c. Failure to estimate the approximate wind speed and direction.
 - d. Failure to fly the most suitable pattern for existing situation.
 - e. Failure to accomplish the emergency checklist.
 - f. Undershooting or overshooting selected emergency landing area.
3. Demonstrates and simultaneously explains an emergency approach with a simulated engine failure from an instructional standpoint.
 4. Analyzes and corrects simulated common errors related to an emergency approach with a simulated engine failure.

Private and Commercial ACS Skills Standards

1. Establish and maintain the recommended best glide airspeed, ± 10 knots.
2. Configure the airplane in accordance with POH/AFM and existing circumstances.
3. Select a suitable landing area considering altitude, wind, terrain, obstructions, and available glide distance.
4. Plan and follow a flightpath to the selected landing area.
5. Prepare for landing as specified by the evaluator.
6. Complete the appropriate checklist.