Private Pilot Lesson Plan: Area of Operation IX, Task B. Emergency Approach and Landing (Simulated)

Lesson Objective

The objective of this lesson is to ensure the student pilot demonstrates satisfactory knowledge, risk management, and skills associated with emergency approach and landing procedures as outlined in FAA-S-ACS-6C, Task B under Area of Operation VI. Emergency Operations. The student will learn to handle simulated engine failure scenarios by establishing best glide airspeed, selecting a suitable landing site, planning the approach, and executing a safe power-off landing. Emphasis will be placed on maintaining aircraft control, prioritizing tasks, and mitigating risks using principles from FAA-H-8083-2 (Risk Management Handbook), FAA-H-8083-3 (Airplane Flying Handbook), and FAA-H-8083-25 (Pilot's Handbook of Aeronautical Knowledge).

Elements

- **Knowledge Elements** (from FAA-S-ACS-6C, PA.IX.B.K1–K6):
  - Immediate action items and emergency procedures.
  - Airspeed concepts, including the importance of best glide speed and its relationship to glide distance, the difference between best glide and minimum sink speed, and effects of wind on glide distance.
  - Effects of atmospheric conditions on emergency approach and landing.
  - Stabilized approach and energy management concepts.
  - Emergency Locator Transmitters (ELTs) and other emergency locating devices.
  - Air traffic control (ATC) services available to aircraft in distress.

  Supporting content from handbooks:

  - FAA-H-8083-25 (Chapter 17): Explains glide ratio as the distance an airplane travels forward relative to altitude lost (e.g., a 10:1 ratio means 10 feet forward per 1 foot descent). Best glide speed maximizes lift-to-drag ratio (L/D max) and is affected by weight (higher weight requires higher speed for best glide). Wind effects: Headwind reduces ground distance, tailwind increases it. Discuss ELTs activation (automatic at 5G impact or manual) and survival equipment.
  - FAA-H-8083-3 (Chapter 18): Covers engine failure causes (fuel starvation, mechanical issues) and immediate actions. Best glide speed is POH-specific (e.g., approximately 1.3 V_S for many light airplanes) and minimizes descent rate for maximum range.
- **Risk Management Elements** (from FAA-S-ACS-6C, PA.IX.B.R1–R6):
  - Altitude, wind, terrain, obstructions, gliding distance, and available landing distance considerations.
  - Following or changing the planned flightpath to the selected landing area.
  - Collision hazards.
  - Configuring the airplane.
  - Low altitude maneuvering, including stall, spin, or controlled flight into terrain (CFIT).

- Distractions, task prioritization, loss of situational awareness, or disorientation.

  Supporting content from handbooks:

  - FAA-H-8083-2 (Chapters on Risk Assessment): Use the PAVE checklist (Pilot, Aircraft, enVironment, External pressures) to assess risks pre-flight and in-flight. For engine failure, identify hazards like attempting impossible turns back to the runway (e.g., below 1,000 ft AGL increases spin risk). Apply the 3P model (Perceive, Process, Perform) for decision-making: Perceive the engine failure, process options (glide distance vs. terrain), perform actions (e.g., avoid low-altitude stalls). Mitigate CFIT by maintaining situational awareness and prioritizing aviating over troubleshooting.
  - FAA-H-8083-3 (Chapter 18): Highlights risks of delayed response to engine failure, such as loss of altitude while troubleshooting instead of immediately pitching for best glide.
  - FAA-H-8083-25 (Chapter 17): Discusses human factors like stress-induced disorientation during emergencies and the importance of task prioritization (aviate, navigate, communicate).
- **Skills Elements** (from FAA-S-ACS-6C, PA.IX.B.S1–S6):
  - Establish and maintain the recommended best glide airspeed, ±10 knots.
  - Configure the airplane in accordance with the POH/AFM and existing conditions.
  - Select a suitable landing area considering altitude, wind, terrain, obstructions, and available glide distance.
  - Plan and follow a flightpath to the selected landing area considering altitude, wind, terrain, and obstructions.
  - Prepare for landing as specified by the evaluator.
  - Complete the appropriate checklist(s).

  Supporting content from handbooks:

  - FAA-H-8083-3 (Chapter 18): Procedure for engine failure in flight: (1) Pitch for best glide speed to maintain control. (2) Trim the airplane. (3) Select landing site (prioritize open fields > roads > water; avoid power lines, trees). (4) Attempt restart (fuel selector both, mixture rich, carb heat on, ignition both). (5) If restart fails, secure engine (mixture idle cutoff, fuel off, ignition off). (6) Declare emergency on 121.5 MHz if able. (7) Approach: Use S-turns or slips to lose altitude if high; extend flaps on final for steeper descent. Touch down at minimum controllable speed with nose high to protect propeller.
  - FAA-H-8083-25 (Chapter 17): Emphasizes selecting a site within gliding range (calculate using altitude x glide ratio, e.g., 3,000 ft AGL with 9:1 ratio ≈ 4.5 NM range in no wind). Adjust for wind and use visual references for approach path.

Schedule

- Pre-flight Briefing/Ground Instruction: 45 minutes (review knowledge and risk management).

- Flight Instruction/Demonstration: 30 minutes (simulate engine failure at safe altitude, demonstrate procedure).
- Student Practice/Debrief: 45 minutes (student performs 2–3 simulated emergencies, followed by debrief).
- Total Lesson Time: 2 hours.

Equipment

- Airplane with dual controls (single-engine land or sea, as applicable).
- POH/AFM for the specific airplane.
- Charts/sectionals for area (to discuss terrain and potential landing sites).
- Whiteboard or tablet for diagramming glide paths and risk scenarios.
- Headset with push-to-talk for communication practice.

Instructor's Actions

- Pre-flight: Discuss objective, elements, and common errors. Use handbooks to explain concepts (e.g., draw glide ratio diagram from FAA-H-8083-25).
- In-flight: Simulate engine failure by reducing power to idle at 3,000+ ft AGL over suitable terrain. Demonstrate full procedure, emphasizing control and decision-making. Monitor student practice, provide corrective feedback, and ensure safety (e.g., recover if below 500 ft AGL).
- Post-flight: Debrief performance against ACS standards, review risks encountered, and assign homework (e.g., review Chapter 18 of FAA-H-8083-3).

Student's Actions

- Pre-flight: Review assigned handbook sections and ACS task. Participate in discussion, ask questions on unclear elements.
- In-flight: Verbalize actions during demonstration. Perform simulated emergencies: pitch for best glide, select site, plan approach, use checklist, and execute power-off landing (or go-around if unsafe).
- Post-flight: Self-assess performance, note areas for improvement, and discuss risk mitigation strategies.

Completion Standards

The student meets the standards when they:

- Demonstrate understanding of all knowledge elements through verbal explanation or quiz.
- Identify and mitigate risks using handbook principles (e.g., apply PAVE to a scenario).
- Perform skills to ACS tolerances: Maintain best glide ±10 knots, select appropriate site, follow logical flightpath, and complete checklist without prompting.
- Execute a safe simulated emergency landing, recovering no lower than 500 ft AGL unless at an airport.

- Reference FAA-S-ACS-6C for pass/fail: No unsatisfactory elements.

Common Errors

- Failing to immediately pitch for best glide, resulting in excessive altitude loss (address with FAA-H-8083-3 emphasis on control priority).
- Poor site selection (e.g., ignoring wind or obstacles; mitigate with FAA-H-8083-25 glide calculations).
- Distraction by troubleshooting before establishing glide (use FAA-H-8083-2 task prioritization).
- Improper configuration (e.g., forgetting flaps; review POH and FAA-H-8083-3 procedures).
- Loss of directional control during approach (practice power-off accuracy landings).

References

- FAA-S-ACS-6C: Private Pilot – Airplane Airman Certification Standards.
- FAA-H-8083-2: Risk Management Handbook.
- FAA-H-8083-3: Airplane Flying Handbook.
- FAA-H-8083-25: Pilot's Handbook of Aeronautical Knowledge.
- Airplane POH/AFM