Lesson Plan: Power-On Stalls (Task C, FAA-S-ACS-6C)

Overview

This lesson plan is designed for a private pilot student learning to perform power-on stalls in a Cessna 172N. The focus is on developing the knowledge, risk management skills, and flight proficiency required to recognize, enter, and recover from power-on stalls safely. The lesson integrates ground instruction, pre-flight briefing, in-flight practice, and post-flight debriefing. Total estimated time: 2.5 hours (1 hour ground, 1 hour flight, 0.5 hours debrief).

Objectives

By the end of this lesson, the student will:

- Demonstrate understanding of the aerodynamics, factors, and situations leading to power-on stalls.
- Identify and mitigate associated risks, including loss of control and spins.
- Perform power-on stalls and recoveries in accordance with ACS standards, completing the maneuver no lower than 1,500 feet AGL, with minimal altitude loss and coordinated control.

References

- AC 61-67C: Stall and Spin Awareness Training
- FAA-H-8083-2A: Risk Management Handbook
- FAA-H-8083-3C: Airplane Flying Handbook (Chapter 5: Slow Flight, Stalls, and Spins)
- FAA-H-8083-25C: Pilot's Handbook of Aeronautical Knowledge (Chapter 5: Aerodynamics of Flight)
- Cessna 172N Pilot's Operating Handbook (POH) (Section 5: Performance, including stall speeds)

Elements from FAA-S-ACS-6C Task C

Element Type	Key Details
Knowledge	- Aerodynamics of stalls in various configurations (e.g., relationship between angle of attack, airspeed, load factor, power, weight, CG, attitude, yaw). - Stall characteristics, recognition (sight, sound, feel), and prevention factors. - Fundamentals of stall recovery.
Risk Management	- Factors leading to inadvertent power-on stalls, spins, or loss of control. - Limitations of stall warnings; procedures for recovery. - Environmental effects (e.g., turbulence, high density altitude); collision hazards; distractions and disorientation.
Skills	- Clear area; entry altitude ≥1,500 ft AGL. - Establish takeoff/departure/cruise configuration; ≥65% power; smooth pitch to induce stall. - Maintain heading ±10° (straight) or bank ≤20° ±10° (turning). - Acknowledge stall cues; recover

Element Type	Key Details
	promptly after full stall. - Follow POH recovery; accelerate to Vx or Vy; return to specified altitude/heading/airspeed. - Use SRM/CRM as appropriate.

Ground Instruction (1 Hour)

Aerodynamic Principles (from FAA-H-8083-25C):

- A stall occurs when the wing exceeds its critical angle of attack (typically 16-20°), causing airflow separation and loss of lift, regardless of airspeed or attitude.
- Emphasis on power-on stalls: These simulate takeoff/climb scenarios with high power (e.g., ≥65%), where propeller thrust creates a nose-up moment and asymmetric effects (e.g., P-factor, slipstream), potentially yawing the aircraft left and increasing stall risk if uncoordinated.
- Factors affecting stall speed: Higher weight/CG forward/load factor/density altitude increase stall speed; power-on typically reduces it by 5-10 knots compared to power-off due to thrust-induced lift.
- Typical Cessna 172N stall speeds (power-off, 2,300 lbs gross weight, from POH Figure 5-3):

Configuration	Forward CG, 0° Bank (KIAS/KCAS)	Aft CG, 0° Bank (KIAS/KCAS)
Flaps Up	47/53	42/50
Flaps 10°	44/51	38/47
Flaps 40°	41/47	36/44

    - Note: Bank angles increase stall speed (e.g., +24 knots at 60° bank); max altitude loss during recovery ~180 feet.

Stall Recognition and Procedures (from FAA-H-8083-3C and AC 61-67C):

- Recognition: Decreasing airspeed, increasing pitch, buffeting, stall horn (sounds 5-10 knots above stall in Cessna 172N), mushy controls, or full stall (nose drop/wing drop).
- Entry: At safe altitude, clear area, set ≥65% power, pitch up smoothly to reduce airspeed until stall.
- Recovery: Reduce angle of attack (forward elevator to break stall), add full power if needed, level wings with coordinated rudder/ailerons (use ailerons sparingly until stall breaks), avoid secondary stalls.
- Common Errors: Failure to recognize early cues, uncoordinated controls leading to spin entry, excessive altitude loss, premature recovery, or over-reliance on airspeed instead of angle of attack.
- Spin Awareness (AC 61-67C): Power-on stalls can lead to incipient spins if yaw is present; recover by opposite rudder, neutralize ailerons, forward elevator. Train with distractions to simulate real scenarios.

Risk Management (from FAA-H-8083-2A):

- Use PAVE checklist: Pilot (proficiency/fatigue), Aircraft (performance limits), enVironment (turbulence/high DA), External pressures (rushed takeoff).
- Mitigate: Maintain proficiency, use IMSAFE self-assessment, avoid distractions, plan for adequate altitude/margins.
- Scenarios: Inadvertent stall during go-around due to nose-high trim; high DA reducing climb performance.

Pre-Flight Briefing (15 Minutes)

- Review weather, aircraft status (Cessna 172N: Ensure stall warning functional, weight/CG within limits).
- Maneuver Setup: Departure configuration (flaps up/10° as specified), straight or turning (≤20° bank).
- Student Role: Verbalize actions, monitor for stall cues.
- Safety: Recovery altitude ≥1,500 ft AGL; clear area; parachute not required per 14 CFR 91.307(d).
- Emergency Procedures: If spin develops, follow PARE (Power idle, Ailerons neutral, Rudder opposite, Elevator forward).

In-Flight Instruction (1 Hour)

- **Demonstration (Instructor):** Perform 2-3 power-on stalls (straight and turning), narrating cues, entry (pitch to ~20° nose-up, ~40-50 KIAS stall), and recovery (minimal loss <200 ft).
- **Student Practice:** 4-6 repetitions, alternating configurations; focus on coordination, prompt recovery, and acceleration to Vy (74 KIAS in Cessna 172N).
- **Variations:** Introduce distractions (e.g., simulated radio call) per AC 61-67C; practice accelerated stalls if ready.
- Monitor: Use SRM (e.g., prioritize stall recovery over heading).

Post-Flight Debrief (30 Minutes)

- Review: What went well? Errors (e.g., uncoordinated entry)? Compare to ACS skills.
- Log: Note maneuvers, Hobbs time, endorsements if met standards.
- Homework: Review ACS Task C; study spin recovery in AC 61-67C.
- Next Lesson: Build on to power-off stalls or spins if applicable.

Completion Standards

The student meets ACS Task C skills: Recovers promptly after full stall with ≤20° heading change, ≤200 ft altitude loss, and returns to specified parameters. If not met, assign additional practice.