PRIVATE PILOT

VIII. AREA OF OPERATION: SLOW FLIGHT AND STALLS
C. TASK: POWER-ON STALLS

OBJECTIVE

To determine that the applicant:

1. Exhibits knowledge of the elements related to power-on stalls.
2. Selects and entry altitude that allows the task to be completed no lower than 1,500 feet (460 meters) AGL.
3. Establishes the takeoff or departure configuration. Sets power to no less than 65 percent available power.
4. Transitions smoothly from the takeoff or departure attitude to the pitch attitude that will induce a stall.
5. Maintains a specified heading +/-10° in straight flight; maintains a specified angle of bank not to exceed 20° +/-10° in turning flight, while inducing the stall.
6. Recognizes and recovers promptly after the stall occurs by simultaneously reducing the angle of attack, increasing power as appropriate, and leveling the wings to return to a straight-and-level flight attitude with a minimum loss of altitude appropriate for the airplane.
7. Retracts the flaps to the recommended setting; retracts the landing gear, if retractable, after a positive rate of climb is established.
8. Accelerates to V_X or V_Y speed before the final flap retraction; returns to the altitude, heading, and airspeed specified by the examiner.

NOTE: In some high performance airplanes, the power setting may have to be reduced below the practical test standards guideline power setting to prevent excessively high pitch attitudes (greater than 30° nose up).

ELEMENTS

1. A stall occurs when the wing exceeds its critical angle of attack and the smooth airflow over the airplane's wing is disrupted, rapidly degenerating lift.
2. A stall can occur at any airspeed, in any attitude, and with any power setting.
3. Performing intentional stalls familiarizes the pilot with the conditions that produce stalls and develops the habit of taking prompt preventative or corrective action.
4. Intentional stalls should be performed at an altitude that will provide adequate height about the ground for recovery and return to normal level flight (no less than 1500' AGL).
5. Most training airplanes are designed so the wing roots will stall before the wingtips, allowing aileron control during the stall.
6. Depending on the airplane, stall indications can include stall lights, stall horns, full-up elevator, high descent rate, sudden nose-down pitching, or possible buffeting.
7. Setting up for a power-on stall:
    a. The practice area should be cleared of other traffic prior to practicing power-on stalls.
    b. Power-on stall recoveries are practiced to simulate an accidental stall occurring during takeoffs and climbs.
    c. After establishing the takeoff or climb configuration, the airplane should be slowed to the normal lift-off speed.
    d. Airspeed in excess of the normal lift-off speed should not be carried into a stall entry.
    e. Set the throttle to takeoff power for the takeoff configuration or climb power for the climb configuration (less if performed in a high performance airplane).
8. Performing a power-on stall:
    a. After the climb attitude is established, smoothly raise the nose to an attitude obviously impossible for the airplane to maintain.
    b. Maintain directional control with the rudder and wings level with the ailerons.
    c. Maintain a constant pitch attitude with the elevator until the stall occurs (as airspeed is reduced, more back-elevator pressure will be needed to maintain the pitch attitude).
    d. The stall can be recognized by clues such as full-up elevator, high descent rate, sudden nose-down pitching, or possible buffeting.

9. Recovering from a power-on stall:
    a. Simultaneously reduce the angle of attack (lower the nose) release back-elevator pressure, and advance the throttle to maximum.
    b. As full power is applied and the nose is lowered, overcome the engine torque effect with right rudder.
    c. Accelerate to the manufacturer's recommended speed for the given configuration.
    d. Maintaining the recommended speed, smoothly apply back-elevator pressure.
    e. After establishing a positive rate of climb at the recommended speed, gradually retract the flaps (if extended), and retract the landing gear (if extended) while accelerating to V_Y.
    f. Level off at the desired altitude and set the throttle to an appropriate cruise setting.
10. Recovery from power-on stalls during shallow turns (accelerated stalls) simulates an inadvertent stall during the turn from the upwind leg to the crosswind leg.
11. During accelerated stalls, ensure the turn continues at a uniform rate until the stall occurs.
12. If the airplane is in a skid during an accelerated stall, the inner wing may stall first and abruptly dip down further.
13. If the airplane is in a slip during an accelerated stall, the outer wing may stall first and whip downward abruptly.
14. After the accelerated stall occurs, the recovery should be made straight ahead as normal, with wings being leveled by coordinated use of ailerons.

COMMON ERRORS

a. Failure to adequately clear the area.
b. Failure to establish specified landing gear and flap configuration prior to entry.
c. Improper pitch, heading, and bank control during straight-ahead and turning stalls.
d. Improper pitch and bank control during turning stalls.
e. Rough or uncoordinated control technique.
f. Failure to recognize the first indications of a stall.
g. Failure to achieve a stall.
h. Excessive back-elevator pressure resulting in an exaggerated nose-up attitude during entry.
i. Over-reliance on the airspeed indicator while excluding other cues.
j. Inadequate scanning resulting in an unintentional wing-low condition during entry.
k. Premature recovery.
l. Improper torque correction.
m. Inadequate rudder control.
n. Failure to maintain a constant bank angle during turning stalls.
o. Poor stall recognition and delayed recovery.
p. Excessive forward-elevator pressure during recovery resulting in negative load on the wings.
q. Excessive airspeed buildup during recovery.
r. Excessive altitude loss or excessive airspeed during recovery.
s. Failure to take timely action to prevent a full stall during the conduct of imminent stalls.
t. Inadvertent secondary stall during recovery.

REFERENCES

1. FAA-H-8083-3A, Airplane Flying Handbook, Chapter 4.
2. AC 61-67, Stall and Spin Awareness Training.
3. POH / AFM, Pilot Operating Handbook / FAA-Approved Airplane Flight Manual.