

PRIVATE PILOT GROUND SCHOOL

MODULE 1-15 — ENGINE FAILURE DECISIONS (WHEN THE FAN STOPS)

Generated study guide — do not edit; the module page is the source.

FACTS TO REMEMBER

KNOW THESE COLD

- When the engine quits, the first act is airspeed: pitch for best glide and trim for it — altitude is spent buying time and distance, never speed above or below the number.

Source: PA-28-151 POH 4-2; AFH ch. 18

- The Warrior's best glide speed is 85 MPH; once the field is made, the book slows to 76.

Source: PA-28-151 POH 4-2

- Wind bends the glide: a headwind steepens the path over the ground and a tailwind stretches it — pick fields with the wind, not against it, when options are equal.

Source: AFH ch. 18

- Altitude is the option-maker: know the glide cone at pattern altitude versus cruise, and the practical consequence — climb-outs and low passes shrink the menu to what's ahead.

Source: PHAK ch. 11; AFH ch. 18

- The Warrior restart flow (POH 4-1, seven items): hold at least 85 MPH, fuel selector to a tank containing fuel, electric fuel pump on, mixture rich, carb heat on, engine gauges checked for cause, primer checked locked.

Source: PA-28-151 POH 4-1

- Fuel starvation (fuel aboard, not reaching the engine — wrong tank, selector between detents, pump failure) is a leading cause of power loss, and it is nearly always pilot-preventable.

Source: PHAK ch. 7; AFH ch. 18

- Fuel exhaustion (nothing left aboard) is a planning failure that begins on the ground — the gauge-versus-watch discipline starts at the preflight quantity check.

Source: PHAK ch. 7

- Carburetor ice forms in high humidity across a wide temperature band (roughly 20–70°F OAT), most readily at low power; in a fixed-pitch airplane it shows as a slow RPM decay and roughness.

Source: PHAK ch. 7; PA-28-151 POH sec. 4

- Carb heat response is full on and LEAVE IT ON: the melting ice will briefly worsen the roughness before power returns — pulling the heat back off at the stumble is the trap.

Source: PHAK ch. 7; PA-28-151 POH sec. 4

- Rough engine at altitude: fly airspeed first, pick the field second, run the checklist third — at 6,500 ft there is time, and the order is the answer.

Source: PA-28-151 POH 4-1, 4-2

- The same symptom at 1,000 ft in the pattern inverts the answer: land. Fuel-selector changes at low altitude are specifically warned against — an error costs the recovery time you no longer have.

Source: PA-28-151 POH Operating Tips 3

- Field selection priorities: wind direction, field length and surface, slope, obstacles on the approach, and proximity to help — decided high, held low.

Source: AFH ch. 18

- Commit to the chosen field: changing fields late is a leading way survivable forced landings become stall/spin

accidents — switch only for a clearly better option found early.

Source: AFH ch. 18

– The forced-landing pattern is energy management: arrive abeam the touchdown point at a planned altitude, fly a normal-looking base and final, and hold flaps until the field is assured.

Source: AFH ch. 18

– Engine failure on the takeoff roll: throttle idle, brake, stop straight ahead — every takeoff carries a briefed abort point where the numbers must be there.

Source: AFH ch. 5

– Engine failure after liftoff, low: lower the nose immediately and land within roughly 30 degrees either side of the nose — obstacles are accepted; stall/spin is not.

Source: AFH ch. 5, ch. 18

– Load factor in the gliding turnback is the killer mechanism: steepening the bank to make the runway raises stall speed exactly when airspeed is bleeding — the 1-5 math flown for real.

Source: PHAK ch. 5; AFH ch. 18

– Once down is assured, secure the airplane: fuel off, mixture cut, mags off, master off after flaps, door unlatched before touchdown per the POH — and belts tight, passengers braced.

Source: PA-28-151 POH 4-2; AFH ch. 18

– Mayday goes out when workload allows, on the working frequency or 121.5, squawk 7700, with position, souls, and intentions — ATC in turn clears the way and starts the rescue clock.

Source: AIM 6-3-1, 6-3-2

– After the stop: people out and clear, ELT confirmed on, stay with the airplane — the wreck is the biggest signal mirror you own.

Source: AIM 6-2-5; AFH ch. 18

GOING DEEPER

– Best glide maximizes distance per foot of altitude; minimum sink maximizes TIME aloft — slower, used when circling to be found beats gliding somewhere.

Source: AFH ch. 18; PHAK ch. 11

– If fuel pressure is absent after the flow, recheck the fuel selector position — the most common restart is the tank you should have been on.

Source: PA-28-151 POH 4-1

– Water and sediment contamination announce themselves at low power or the first tank switch — which is why sumping and a full-power runup check matter (and why tanks are switched over an airport when practical).

Source: PHAK ch. 7; AFH ch. 2

– Magneto or ignition failure shows as roughness that changes with the mag switch — troubleshooting is the runup check flown in the air, and the answer may be one mag and a precautionary landing.

Source: PHAK ch. 7

– Atmospheric conditions move the plan: density altitude stretches the glide's ground speed, gusts demand margin above 85, and into-sun or over-water picks change what a "good field" is.

Source: AFH ch. 18; PHAK ch. 11

– The "impossible turn" is a briefed number, not an instinct: below the pre-briefed turnback altitude the answer is ahead, because the 180-plus-realignment costs hundreds of feet and the gliding turn raises stall speed.

Source: AFH ch. 5; FAA-H-8083-2

– 91.3(b) is the legal floor under all of it: in the emergency, the PIC may deviate from any Part 91 rule to the extent required — altitude minimums included.

Source: 14 CFR 91.3(b); 14 CFR 91.119(a)

THE REGULATIONS BEHIND THIS MODULE

14 CFR 91.3(b) – Emergency authority

In an in-flight emergency requiring immediate action, the pilot in command may deviate from any rule of Part 91 to the extent required to meet that emergency, and sends a written report only if the Administrator requests one.

Where it goes deeper: This module, in the closing Leg.

14 CFR 91.119(a) – Minimum safe altitudes, anywhere

Except for takeoff and landing, no person may operate an aircraft below an altitude allowing, if a power unit fails, an emergency landing without undue hazard to persons or property on the surface.

Where it goes deeper: This module, in the altitude Leg: the rule assumes the engine will quit.