ENGINE FIRE IN FLIGHT P. 12

1. **Throttle – IDLE**
2. **Mixture – FULL LEAN**
3. **Fuel selector valve – OFF**
4. Primer – IN and LOCKED
5. Cabin heat and air – CLOSE (except wing root vents)
6. Radio – 121.5 MAYDAY
7. Master switch – OFF

If fire is not extinguished

8. Emergency descent – EXECUTE [p. 11]
9. DO NOT RESTART ENGINE
10. Forced landing – EXECUTE [p. 10]

ELECTRICAL FIRE IN FLIGHT

1. **Master switch – OFF**
2. **Avionics – OFF**
3. **Electrical switches – OFF**
4. Vents/cabin air/cabin heat – CLOSED
5. Fire extinguisher – ACTIVATE if needed
6. Cabin – VENTILATE after discharging extinguisher in closed cabin

If fire is out and power is needed:

7. Master switch – ON
8. Circuit breakers – CHECK for faulty circuit *(do not reset)*
9. Radios/Electrical – ON *(one at a time, looking for fire)*
10. Vents – OPEN *(only when fire is out)*

CABIN FIRE

1. **Master switch – OFF**
2. **Vents/cabin air/cabin heat – CLOSED (to avoid draft)**
3. **Fire extinguisher – ACTIVATE**
4. Cabin – VENTILATE after discharging extinguisher in closed cabin
5. Land the airplane as soon as practical to inspect for damage

WING FIRE

1. **Navigation light switch – OFF**
2. **Pitot heat switch – OFF**
3. **Landing/taxi light switch – OFF**
4. **Emergency descent – EXECUTE**

Sideslip to keep flames away from fuel tanks and cabin. Land as soon as possible, using flaps only as required for final approach and touchdown.

BEFORE EXTERIOR INSPECTION P. 1

1. A/P switch - Off; Traffic switch - On Gnd
2. Control wheel lock - Removed/stowed
3. Avionics Buss 1 and Avionics Buss 2 switches - Off
4. Master switch (right/battery half) - On
5. Check fuel quantity indicators, stall warning horn, (for IMC) pitot heat, and (for night flights) all interior & exterior lights
6. Flaps - extend 20^{o} for exterior inspection
7. Master switch (both battery and alternator halves) - Off
8. Ignition switch - Off
9. Fuel strainer drain knob - pull for 4 sec. (1^{st} flight of the day)
10. Ensure required papers (AROW) are aboard/stowed
11. Fuel selector - Fullest tank

EXTERIOR INSPECTION

1. Left instrument panel air vent and static port - unobstructed
2. Left wing & strut; air vents, pitot tube, fuel vent, lights, tip
   a. Left aileron and flap (tracks, rollers, nuts, and rod ends)
   b. Left wing sump drain - sample fuel
3. Left main gear strut, brake line, brake disk and pads, tire condition and inflation (35 psi), wheel halves, axle nut
4. Top of left wing, stall fence
5. Top of fuselage - 6 comm-nav antennas, ELT antenna
6. Left side of fuselage - static port unobstructed
7. Horizontal stabilizer top/underside; elevator hinge hardware
8. Vertical stabilizer, antennas, rotating beacon
9. Stinger secure; tail-light
10. Rudder and rudder hinges
11. Trim-tab hardware; elevator hardware; horizontal stabilizer
12. Static port unobstructed; fuselage bottom; antennas
13. Top of right wing, stall fence
14. Right main gear strut, brake line, brake disk and pads, tire condition and inflation (35 psi), wheel halves, axle nut
15. Right wing sump drain - sample fuel
    a. Right flap (tracks, rollers, nuts, rod ends) and aileron
    b. Right wingtip, lights, fuel vent, wing strut, and air vents
16. Right instrument panel air vent and static port - unobstructed
17. Right belly sump drain - sample fuel
18. Fuel strainer drain valve - closed (tube not dripping)
19. Cowling fasteners - secure
20. Exhaust pipe - secure; cowl flap - condition

21. Nose gear strut/scissors, shimmy dampener/linkage; tire condition and inflation (35 psi); axle nut cotter pin
22. Oil cooler; prop blades and spinner; cylinder cooling fins
23. Oil filler cap - secure; access door - closed/latched securely
24. Oil quantity - minimum 9 quarts, dipstick secured; oil dipstick access door - closed/latched securely
25. Cowling fasteners - secure
26. Exhaust pipe - secure; cowl flap - condition
27. Left belly sump drain - sample fuel
28. Flaps - Up
29. Fuel tanks - check fuel quantity sufficient for planned flight plus reserve; secure fuel caps
30. Windscreen - Clean

BEFORE STARTING ENGINE

1. Seats, seat belts, and shoulder harnesses - Adjust and lock
2. Pray
3. Brakes - Test hydraulic pressure (pedal resistance)
4. Fuel selector - Fullest tank
5. Cowl flaps - Open
6. Avionics Buss 1 and Avionics Buss 2 switches - Off

STARTING ENGINE

1. Mixture - Full rich
2. Propeller - High RPM
3. Throttle - Closed
4. Induction air - Cold
5. Master switch (right/battery half) - On
6. Auxiliary fuel pump switch Lo (yellow half) - On
7. Prop area - Clear
8. Brakes - Hold (parking brake - off/released)
9. Ignition key - Start (not longer than 30 seconds)
10. Throttle - slowly advance
11. Ignition key - release to Both when engine starts
12. Throttle - reset to desired idle speed
13. Auxiliary fuel pump switch (both halves) - Off
14. Master switch (left/alternator half) - On
15. Oil Pressure - Check
16. Avionics Buss 1 and Avionics Buss 2 switches - On
17. Rotating beacon - On
18. Transponder - Standby (Altitude at controlled airports)

PRECAUTIONARY LANDING (with power)

1. Radio – 121.5 PAN-PAN
2. Passengers – BRIEF
   a. Seat belts/harness – TIGHT
   b. Doors – OPEN and LOCKED (handles forward)
3. CHOOSE LANDING SITE and DRAG IT [p. 7]

On Final

4. Flaps – 40˚
5. Approach speed – 70 MPH
6. Touchdown – GENTLY WITH POWER
7. Throttle – IDLE
8. Yoke – FULL AFT
9. Electrical equipment – OFF
10. Avionics Buss 1 and Avionics Buss 2 switches – Off
11. Mixture – FULL LEAN
12. Master Switch – OFF
13. Ignition switch – OFF
14. Brakes – AS REQUIRED

DITCHING (as close as possible to land or boats)

1. Transponder – 7700
2. Radio – 121.5 MAYDAY
3. Passengers – BRIEF
   a. Heavy objects – SECURE or JETTISON
   b. Seat belts/harness – TIGHT
   c. Doors – OPEN and LOCKED (handles forward)
   d. Face – CUSHION
4. Establish glide
   a. With power – set approximately 1500 rpm, Flaps – 40˚, establish 300 ft/min descent at 70-75 MPH;
   b. Engine out – 80 MPH, flaps 10˚
5. Approach: PARALLEL TO SWELLS or ON BACKSIDE
6. Touchdown – as slowly (near stall) as possible
7. EVACUATE airplane
8. Life vest/raft – INFLATE (after exiting airplane)

EMERGENCY DESCENT

1. Throttle – IDLE
2. Bank – STEEP BANK will increase descent rate
3. Flaps – DOWN, LOWER NOSE for 110 mph; or
4. Flaps – UP, LOWER NOSE for the following airspeeds:
   a. 210 mph (V_{NE}) in smooth air
   b. 170 mph (V_{NO}) in light turbulence
   c. 138 mph (V_A) in moderate turbulence
5. Throttle – CLEAR ENGINE periodically (except for fire)

ROUGH-RUNNING ENGINE (no indication of engine damage)

1. Mixture – ADJUST

(If still rough, magneto or magneto timing may be a problem…)

2. Ignition – SELECT EACH MAGNETO INDIVIDUALLY
3. If roughness disappears, leave ignition on that magneto
4. Land as soon as practical

GRADUAL LOSS OF POWER (possibly induction ice)

1. Induction hot air knob – PULL OUT TO FULL HEAT

2. Mixture – ADJUST

SUDDEN LOSS OF POWER (usually fuel starvation)

1. Fuel selector valve – LEFT or RIGHT for 1 min., then switch to opposite side

2. Mixture – RICH

ENGINE FAILURE DURING FLIGHT

1. Pitch – SET FOR 100 MPH and TRIM

2. Fuel Selector Valve – LEFT or RIGHT for 1 min., then switch to opposite side

3. Mixture – RICH
4. Primer – IN and LOCKED
5. Landing field – SELECT and MANEUVER TOWARD IT
6. Ignition switch – BOTH (or START if propeller is stopped)
7. If power not restored – EXECUTE FORCED LANDING [below]

FORCED LANDING (without power)

1. Transponder – 7700
2. Radio – 121.5 MAYDAY
3. Passengers – BRIEF
   a. Seat belts/harness – TIGHT
   b. Doors – OPEN and LOCKED (handles forward)
4. Mixture – FULL LEAN
5. Fuel Selector Valve – OFF
6. Ignition switch – OFF
7. Flaps – AS REQUIRED (maneuvering)
8. Final approach speed – 70-75 MPH
9. Flaps – 40˚
10. Avionics Buss 1 and Avionics Buss 2 switches – Off
11. Master Switch – OFF
12. Touchdown – as slowly (near stall) as possible
13. Yoke – FULL AFT
14. Brakes – AS REQUIRED

BEFORE TAKEOFF

1. Flight controls - check
2. Fuel selector - Fullest tank
3. Cowl flaps - full Open
4. Elevator and rudder trim - Take-off settings
5. Induction air - Cold
6. Mixture - Full rich
7. Cabin doors and window - closed and locked
8. Set 1700 rpm; check mags (50 rpm max differential)
   a. Prop - cycle, then return to high rpm (full in)
   b. Engine instruments - within green arcs
   c. Ammeter - check
   d. Suction gauge - 3.75” to 5.0” Hg
9. Flight instruments and radios - Set
10. Wing flaps - 10º
11. Transponder - Code set; Altitude
12. Review takeoff data and engine failure procedures

NORMAL TAKEOFF

1. Align aircraft on centerline; set DG compass to rwy. heading
2. Check windsock, anticipate/set crosswind controls
3. Throttle - smoothly to full open (approximately 2700 rpm)
4. Lift nosewheel (rotate) at 50 mph, let aircraft fly off
5. Flaps - retract at 70 mph

NORMAL CLIMB or MAX PERFORMANCE CLIMB

1. Set pitch for 100 mph (-1 mph per 1,000’ MSL)
2. Power - 24.5” Hg and 2500 rpm **or** full throttle and 2700 rpm
3. Mixture - lean to 16.5 gph fuel flow **or** lean per placard
4. Cowl flaps - Open as required **or** Full open

CRUISE CLIMB

Set pitch for 110 to 120 mph

LEVEL OFF/CRUISE

1. Set pitch for level flight, accelerate to planned cruise airspeed
2. Power - for cruise (normal 22” - 24.5” Hg; 2200 to 2500 rpm)
3. Trim
4. Mixture - Lean for cruise fuel flow
5. Cowl flaps - Close or Open as required
6. Fuel selector - alternating Left or Right as required in cruise

DESCENT (LET-DOWN) **P. 4**

1. Plan a descent point (altitude to lose, distance to go)
2. Throttle - as required
3. Mixture - enrich periodically as necessary
4. Cowl flaps - Closed

BEFORE LANDING - DOWNWIND

1. Throttle - set for 100 mph (approximately 15" to 16" Hg)
2. Trim
3. Mixture - Rich
4. Fuel selector - Fullest tank

ABEAM TOUCHDOWN POINT

1. Throttle - set approximately 13" to 14" Hg
2. Lower nose to establish 90-mph glide; Flaps - 10°; Trim
3. Propeller - High rpm

BASE TURN	90 mph	Flaps - 20°
BASE	80 mph	Flaps - 30°
FINAL	70 mph	Flaps - 40° (landing assured)
	-1 mph/100 lbs below max gross weight	

Elevator and rudder trim - Adjust for landing

LANDING

1. Throttle - idle
2. Touchdown on main wheels, lower nose gently
3. Braking - minimum required

AFTER LANDING (clear of runway)

1. Cowl flaps - Open
2. Wing flaps - Retract
3. Pitot heat - Off

ENGINE SHUTDOWN

1. Throttle - Idle
2. Avionics Buss 1 and Buss 2 switches, and light switches - Off
3. Ignition switch - R, L, Off, back to Both (mag ground check)
5. Mixture - Full lean
6. Ignition switch - Off (after prop stops turning)
7. Master switch (both battery and alternator halves) - Off
8. Key - Remove from ignition

BASIC IN-FLIGHT EMERGENCY PROCEDURES **P. 9**

1. MAINTAIN AIRCRAFT CONTROL
2. ANALYZE THE SITUATION AND TAKE PROPER ACTION
3. LAND AS SOON AS PRACTICAL

ENGINE FIRE DURING START ON THE GROUND

1. **Ignition – START** (continuing cranking pulls flames into engine)

If engine starts:

2. Power – 1700 RPM for a few minutes
3. Engine – SHUTDOWN and inspect for damage

If engine fails to start:

4. Throttle – FULL OPEN
5. Mixture – FULL LEAN
6. Ignition – START (continuing cranking for another 30 seconds)
7. Engine – SECURE
   a. Fuel selector valve – OFF
   b. Ignition switch – OFF
8. Radio – CALL FOR ASSISTANCE
9. Master switch – OFF
10. Aircraft – EVACUATE
11. Fire extinguisher – USE TO EXTINGUISH FIRE
12. Aircraft – INSPECT for fire damage *(repair damage or replace damaged components or wiring before attempting another flight)*

ENGINE FAILURE DURING TAKEOFF RUN

1. **Throttle – IDLE**
2. **Brakes – APPLY**
3. **Yoke – FULL AFT**
4. **Wing Flaps – RETRACT (if stopping distance critical)**
5. Mixture – FULL LEAN
6. Ignition Switch – OFF
7. Radio – Inform tower/CTAF of aborted takeoff
8. Master switch – OFF (if departing runway surface)

ENGINE FAILURE IMMEDIATELY AFTER TAKEOFF

1. **Lower nose – MAINTAIN 95 to 100 MPH**
2. **Choose landing site STRAIGHT AHEAD**
3. Mixture – FULL LEAN
4. Fuel Selector Valve – OFF
5. Ignition switch – OFF
6. Doors – OPEN and LOCKED (handles forward)
7. Wing Flaps – AS REQUIRED
8. Radio – Make MAYDAY call if able
9. Master Switch – OFF
10. Approach speed – 70-75 MPH

SHORT-FIELD TAKEOFF **P. 6**

1. Elevator and rudder trim - Take-off settings
2. Flaps - 20º
3. Brakes - Hold (except for loose gravel)
4. Throttle - Smoothly to full open (approximately 2700 rpm); at higher elevations lean for max rpm
5. Brakes - Release
6. Rotate at 50 mph (max gross weight)
7. Set pitch for 70 mph with flaps 20º **until obstacles cleared**
8. Flaps - Retract above 70 mph and climb at 78 mph (Vx at S.L., +1 mph per 2,000' MSL) as necessary
9. Set pitch for normal Vy (100 mph -1 mph per 1,000' MSL)

SHORT-FIELD LANDING (Drag field first [P. 7])

1. Airspeed - 70 mph
2. Flaps - 40º
3. At touchdown - lower nosewheel to ground, retract flaps
4. Bring yoke to full aft as you apply heavy braking as required

SOFT-FIELD TAKEOFF

1. Elevator and rudder trim - Take-off settings
2. Flaps - 20º (prior to entering takeoff surface)
3. Yoke - full aft and hold it there
4. Taxi onto airstrip and align without stopping
5. Throttle - smoothly advance to full open as aircraft aligns
6. Aircraft will fly off at min airspeed (below 50 mph)
7. Ease yoke forward to level off in ground effect
8. Accelerate to 60 mph and begin normal climb
9. At 70 mph retract flaps and set pitch for normal climb speed

SOFT-FIELD LANDING (Drag field first [P. 7])

1. Airspeed - 70 mph
2. Flaps - 40º
3. Make a gentle touchdown with power
4. Bring yoke full aft
5. Leave flaps down
6. Use power as necessary to keep aircraft rolling

DRAGGING A FIELD **P. 7**

Assess the field suitability with **Wind LASSO**

Wind (strength and direction)
L - Length
A - Altitude (elevation to figure pattern altitude, density altitude)
S - Slope (upslope/downslope and sideslope)
S - Surface condition (grass [length], dirt, gravel, sand, ruts, etc.)
O - Obstructions (rocks, stumps, etc. on the field; also obstructions on the final approach and departure corridors)

1. Overfly the field along its length at a safe altitude
2. If the field is on a slope, fly from uphill to downhill
3. Airspeed - approximately (but not slower than) 80 mph IAS
4. Flaps - 20º
5. Estimate length of field (125 ft/sec times number of seconds):
   a. Fly GPS groundspeed of 75 kts (in calm or headwind)
   b. Time the pass over the field in seconds, multiply by 125
   c. The product is the approximate length of the field in feet
   d. If 75 kts GS is less than 80 mph IAS (in tailwind), fly 90 kt GS and use 150 ft/sec times number of seconds
6. Make low pass(es) at approx. 50' AGL to assess field slope, surface condition, and obstructions

TAKEOFF AND CLIMB
Full throttle = approximately 2700 rpm

V_{rot} = 50 mph

V_x = 70 mph 20^o flaps
78 mph (+1 mph per 2,000' MSL) @2700 rpm

V_y = 100 mph (-1 mph per 1,000' MSL) @2700 rpm

Climb power = 24.5" and 2500 rpm

Cruise climb = 100 to 120 mph @ 24.5" Hg and 2500 rpm

CRUISE **(NEED TO CONFIRM SPEEDS IN FLT)**

2,500'	66% BHP	23" Hg	2400 rpm	125 mph TAS 13.8 gph (120 mph IAS)
5,000'	64% BHP	22" Hg	2400 rpm	152 mph TAS 13.4 gph
7,500'	65% BHP	22" Hg	2400 rpm	157 mph TAS 13.7 gph
10,000'	63% BHP	20" Hg	2500 rpm	157 mph TAS 13.2 gph

MANEUVERING
V_a = 138 mph @ 3300 lbs

V_{so} approximately 45 mph @ 3300 lbs

Best glide approximately 100 mph @ 3300 lbs

PATTERN AND LANDING **(NEED TO CONFIRM IN FLT)**

Downwind	15" to 16" Hg	100 mph	clean
Glide	13" to 14" Hg	90 mph	10^o flaps
Base Turn	13" to 14" Hg	90 mph	20^o flaps
Base	13" to 14" Hg	80 mph	30^o flaps
Final	13" to 14" Hg	70 mph	40^o flaps

GO-AROUND/REJECTED LANDING **P. 5**
1. Throttle - smoothly to full open (check rpm not past redline)
2. Set pitch to takeoff attitude to climb and accelerate
3. Flaps - raise to approximately 20^o
4. Trim - nose down trim as necessary to help control pitch up
5. At 70 mph retract flaps and set pitch for V_y (100 mph) climb
6. Cowl flaps - Open

STOP-AND-GO AFTER LANDING/BEFORE TAKEOFF
1. Brake normally to a stop
2. Flaps - retract to 10^o
3. Trim - Takeoff
4. Cowl flaps - Open

NO-FLAP LANDING (NEED TO CONFIRM IN FLIGHT)
1. Base airspeed - 85 mph (max gross weight)
2. Final airspeed - 80 mph (max gross weight)
3. Braking - as necessary (do not plan to use normal turnoff)

SIMULATED ENGINE-OUT (S.E.O.) LANDING
ABEAM TOUCHDOWN POINT
1. Throttle - idle
2. Lower nose to establish 95-mph glide (max gross weight)
3. Trim

BASE
1. Fly tighter base to insure making runway
2. Momentarily throttle up slightly to clear engine

FINAL
1. Airspeed - 75 mph with flaps 15^o to 20^o (max gross weight)
2. Flaps - as required; do not select 40^o until landing assured
3. Trim

MISSION AVIATION TRAINING ACADEMY

C-U206

N39MP

OPERATING

CHECKLIST

JULY 2018