

Engine Fire at Ground Start

- **Ignition** continue cranking

¿Engine Starts?

- **Throttle** 1800 RPM allow fuel in lines to combust
- **Mixture** aft/cutoff shut off fuel source

¿Engine Doesn't Start?

- **Ignition** continue cranking
- **Throttle** forward/full
- **Mixture** aft/cutoff
- **Fuel Shutoff Valve** aft/closed
- **Fuel Pump** off

Short Field Takeoff

Short Field Takeoff

- Designate obstacle clearance height
- Flaps 10°
- Check approach end clear

Prepare

- Position for full length of runway
- Brakes apply
- Power full
- Check engine gauges

Take Off

- Brakes release
- Accelerate to Vr 50 KIAS

Clear Short Field

- Rotate
- Pitch down into ground effect, subtly
- Accelerate to Vx 62 KIAS

Clear Obstacle

- Climb to obstacle clearance

Normal Climb Speed

- Pitch down
- Accelerate to Vy 74 KIAS

Normal Climb Configuration

- Flaps retract slowly

Engine Fire at Takeoff

Stop on Ground

- **Throttle** aft/idle
 - **Brakes** apply
 - **Flaps** retract
-

Shut Down Engine

- **Mixture** aft/cutoff
- **Ignition** off
- **Alternator & Battery Master** off

Short Field Landing

- Designate point of intended landing

Short Field Landing

Approach

- Pattern normal approach to landing
- Decelerate to 61 KIAS add gust factor
- Touch down

Touchdown

- Nose lower assertively
- Flaps raise
- Braking heavy
- Elevator pull back force tail down
- Full stop

Engine Fire in Flight

Prepare for Forced Landing

- Identify point of landing evaluate properly
 - **Navigate** towards point of landing
-

Attempt to Extinguish

- **Mixture** aft/cutoff
 - **Fuel Shutoff Valve** aft/closed
 - **Auxiliary Fuel Pump** verify off
 - **Alternator & Battery Master** off
 - **Pitch** down for high airspeed > 100 KIAS
-

Time Permitting

- **Checklist** use
 - **Communicate** declare emergency
-

Land

- **Land** forced

Soft Field Takeoff

- Designate obstacle clearance height
- Flaps 10°
- Check approach end clear

No braking

Enter

- Elevator pull back fully
- Power full, smoothly
- Check engine gauges

Take Off

- Elevator relax but allow nose off ground
- Accelerate to Vr 50 KIAS

Clear Soft Field

- Rotate, then
- Pitch down into ground effect, subtly
- Accelerate to Vx 62 KIAS

Clear Obstacle

- Climb to obstacle clearance

Normal Climb Speed

- Pitch down
- Accelerate to Vy 74 KIAS

Normal Climb Configuration

- Flaps retract slowly

Engine Failure after Takeoff

Maximize Glide Range

- **Pitch** 70 KIAS
-

Land

- *<5 hft AGL?* **Land** ahead
- *<10 hft AGL?* **Land** ahead or return
- *Else?* **Land** return

Soft Field Landing

Approach

- Normal approach

No braking

Touchdown

- Land as long as necessary
- Power use to minimize sink
- Main gear down

Deceleration and Exit

- Elevator nose down gently and lightly
- Exit runway

Soft Field Landing

Engine Failure in Flight

Prepare for Forced Landing

- **Pitch** up for V_g 68 KIAS
 - **Identify** point of landing evaluate properly
 - **Navigate** towards point of landing
-

Attempt Engine Restart ('flow')

- **Fuel Selector** verify both
 - **Fuel Shutoff** verify forward/open
 - **Mixture** forward/rich
 - **Throttle** forward/open
 - **Auxiliary Fuel Pump** on
 - **Ignition** verify both
 - *¿Propeller still stopped?* **Ignition** start
 - **Auxiliary Fuel Pump** off
-

Time Permitting

- **Checklist** use
 - **Communicate** declare emergency
-

Land

- *¿Engine still failed?* **Land** forced
- *¿Engine restarted?* **Land** precautionary

Go Around

- **Throttle full**
- **Anticipate** pitching up
- **Anticipate** left-turning tendencies
- **Flaps retract 20°**
- **Climb** positive rate

Reconfigure

- **Flaps retract 10°**
- **Climb** positive rate

Reconfigure

- **Flaps retract 0°**

Electrical or Cabin Fire

Prepare for Forced Landing

- **Pitch** up roughly V_g attitude
-

Extinguish Fire

- **Alternator & Battery Master** off
 - ??? off
 - **Vents** close
 - **Fire Extinguisher** use
-

Prepare for Forced Landing

- **Pitch** up for V_g 68 KIAS
 - **Identify** point of landing evaluate properly
 - **Navigate** towards point of landing
-

Time Permitting

- **Checklist** use
-

Land

- **Land** forced

Slow Flight

- Pre-maneuver

Elevator & trim to maintain altitude

Entry

- Power reduce 1500 RPM
- Decelerate to Vfe10 110 KIAS
- Flaps lower 10°
- Decelerate to Vfe 85 KIAS
- Flaps lower 20°, then 30°
- Power increase in anticipation
- Decelerate to VS + 10 50 KIAS

Maintenance

- Power to maintain airspeed

Recovery

- Power full
- Flaps retract 20°
- Accelerate

Recovery

- Flaps retract 10°
- Accelerate

Recovery

- Flaps retract 0°
- Accelerate to cruise

Oil Pressure Low + Temperature High

Engine failure imminent presumed

Time Permitting

- **Checklist** use
 - **Communicate** declare emergency
-

Presumed Imminent Engine Failure

- **Land** forced

Oil Pressure Low + Temperature High

Power-On Stall

- Pre-maneuver

Heading maintain

Takeoff Configuration

Altitude maintain

- Power reduce
- Decelerate to Vr 55 KIAS

Entry

No aileron only rudder

- Power full
- Pitch increase smoothly; $\leq 30^\circ$
- Stall

Recovery

- Elevator relax to break stall
- Accelerate to Vy 74 KIAS

Power-On Stall

Oil Pressure Low

Temperature normal

Failed pressure sensor presumed, no emergency

Time Permitting

- **Checklist** use
-

Land

- **Land** precautionary

Oil Pressure Low

Power-Off Stall

- Pre-maneuver

Heading maintain

Landing Configuration

Altitude maintain

- Power reduce for approach
- Flaps full, in steps
- Decelerate to approach speed 65 KIAS
- Power idle
- Pitch landing attitude lose 200 ft

Entry

No aileron only rudder

- Pitch to hold altitude
- Stall

Recovery

- Elevator relax to break stall
- Power full
- Rudder right anticipate left-turning
- Elevator pull to stop descent
- Check positive climb; flaps 20°
- Check positive climb; flaps 10°
- Check positive climb; flaps 0°
- Accelerate to Vy 74 KIAS

Oil Temperature High

Pressure Normal

Engine overheating presumed

Cool Overheating Engine

- **Pitch** down
- **Throttle** minimum power

Oil Temperature High

Steep Turns

- Pre-maneuver

Altitude maintain ± 1 hft
Airspeed maintain ± 10 KIAS
Bank maintain $\pm 5^\circ$

Maneuver

- **Airspeed** $\leq V_a$ e.g. 90 KIAS 2300 RPM
- **Bank** 45°

Steep Turns

Electrical Discharge

*Ammeter discharge
Voltmeter low
Annunciator low volts*

Recover from Spurious Overcharge

¿Tripped Circuit Breaker ALT FLD?

- **Avionics Bus 1 & 2** switches off
- **Alternator & Battery Master** switches off
- **ALT FLD Circuit Breaker** push to reset
- **Alternator & Battery Master** on
- **Avionics Bus 1 & 2** on

Actual Discharge

¿Still discharging?

- **Alternator & Battery Master** off
- **Electrical Equipment Nonessential** off

Time Permitting?

- **Checklist** use
- **Communicate** declare emergency

Land

- **Land** precautionary

Ground Reference Maneuvers

Ground Reference Maneuvers

- Pre-maneuver

Altitude maintain ± 1 hft
Airspeed maintain ± 10 KIAS

Maneuver

- **Altitude** 6-10 hft AGL traffic pattern altitude
- **Airspeed** for traffic pattern e.g. 90 KIAS 2300 RPM
- *?Rectangular Course?* enter L or R downwind
- *?S-Turns?* enter perpendicular to reference line
- *?Turns Around a Point?*

Electrical Overcharge

Ammeter full scale deflection

Remove Overcharge Source

- **Alternator Master** off
- **Electrical Equipment Nonessential** off

Prepare for Precautionary Landing

- **Identify point of landing** evaluate properly
- **Navigate** towards point of landing

Time Permitting

- **Checklist** use
- **Communicate** declare emergency

Land

- **Land** precautionary

Pre-Maneuver

Prepare

- **Altitude** \geq 15 hft AGL
- Clearing turns
- Enter as appropriate see specific maneuver

Define

- **Declare** maneuver
- **Designate** altitude
- **Designate** reference point

Begin

- **Announce**

Pre-Maneuver

Preflight

Personal

- Illness
- Medication
- Stress
- Alcohol 8hr min, 24hr typical
- Fatigue
- Emotion

Currency

- Flight
- Review



Equipment

VFR Day

- Airspeed indicator
- Tachometer each engine
- Oil pressure gauge each engine using pressure system
- Manifold pressure gauge each altitude engine
- Altimeter
- Temperature gauge each engine
- Oil temperature gauge each air-cooled engine
- Fuel gauge indicating quantity
- Landing gear position indicator if applicable
- Anticollision light system
- Magnetic compass indicator
- Emergency locator transmitter
- Safety belts each occupant 2 years and older
- Shoulder harness or restraint each front seat
- Rotation gear readily available to each occupant
- Pyrotechnic signaling device beyond power-off gliding distance from shore

VFR Night

- Fuses
- Landing light
- Anticollision light system
- Position lights
- Source of electricity alternator or generator