Emergency Procedures

NOTE: Refer to your Pilot Operating Handbook for specifics on the aircraft you are training in.

Engine Failures

In Normal Flight: If your aircraft's engine fails in flight, it is probably the best place to be since you have one friend: *altitude*. In the case of cruise flight, you are probably at 4,000 or 5,000 feet, so you have time, which is the most important thing in a situation like this.

ENGINE FAILURE: HIGH-ALTITUDE

1. TRIM AIRCRAFT FOR THE BEST GLIDE SPEED.

2. FIND A SPOT TO LAND

3. CIRCLE AROUND THE LANDING SPOT.

4. FUEL-CHECK ON

5. MIXTURE: CHECK RICH (DEPENDING ON YOUR ALTITUDE)

6. CARBURETOR HEAT: ON

7. MAGNETOS: CHECK ON

8. PRIMER: CHECK LOCKED (Try to restart the engine after you have checked the engine.)

9. TRANSPONDER 7700

10. RADIO 121.5 OR LAST FREQUENCY USED

11. ABOUT 1,000 AGL, ENTER NORMAL TRAFFIC PATTERN

ONCE YOU ARE ON DOWNWIND (At this point, you **commit** to landing.)

A. FUEL SELECTOR OFF

B. MIXTURE LEAN OR OFF

C. MAGNETOS–" OFF

D. KEY OUT OF IGNITION SWITCH

E. DOORS OPEN

F. SEATBELTS TIGHT

G. FLAPS AS REQUIRED

TURNING BASE

A.GO TO 20 DEGREES FLAPS

B. CONTINUE GLIDE (Remember that the numbers or end of the runway is your reference.)

FINAL APPROACH

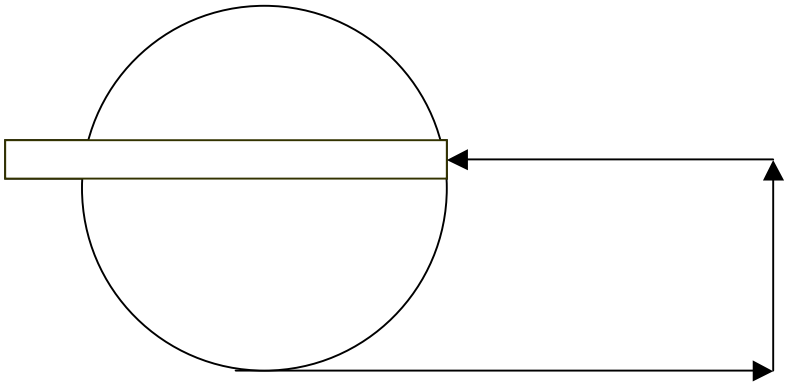
A. FUEL SELECTOR: OFF

B. –MIXTURE: LEAN

C. FLAPS TO FULL

D. MASTER SWITCH: OFF (Check the procedures for your specific airplane. If you have a plane with manual flaps, shut the master switch off when you commit to land.)

E. DOORS OPEN: VERIFY (This is **very** important. Open the doors, just in case you hit something. The door jams only need to move about ¼ of an inch, and if your doors are closed, you won't be able to get out of the plane. If a fire starts up for some reason, you now have an even bigger problem.)



1. First, get the aircraft trimmed for the best glide speed. This will give you the most time, which is most important in a situation like this. The next thing to do is find the landing spot and get directly on top of it.

2. Now circle. Since you are sitting in the left seat of the aircraft, you will want to circle to the left. While you are circling, try for a restart. Go through the checklist I have listed above.

3. When the aircraft is about 1,500-1,000 AGL, turn onto a downwind. Once you are established on downwind, you are committed to land. Go through the downwind checklist. Fly this pattern as we usually do. When you are abeam the numbers or end of your landing spot, do the abeam numbers checklist. Make sure you leave yourself an out. By this, I mean try to find a spot that has enough room to undershoot and overshoot. Aim for the middle of this spot. There may be some cases where there is not that much room.

4. Turn base like you usually would, and go to 20 degrees flaps.

5. Turn final, and perform the landing check. Make sure of two things: (1) Make sure you open the doors so you can get out if they get hit, and (2) make sure you put the flaps down before turning off the master switch. The flaps are electric in most planes.

Remember that some of this may be slightly different, depending on the plane you are flying.

During Takeoff Roll: If you ever lose the engine, this when it would be ideal. If you are rolling down the runway and the engine quits, there is probably at least 1,000 feet of runway left; there is time to stop the aircraft. Even if you are at a small private airport in the mountains, there will probably be enough dirt at the end of the runway to take care of the emergency safely. Use this three-part procedure to stop the aircraft as soon as possible:

1. Flaps: Up

2. Brakes: Apply (Do not slam the brakes on unless is necessary. Maximum braking is at the point just before the wheels lock up.)

3. Backpressure: Increase elevator pressure to full. (This is known as aerodynamic braking. You increase the angle of attack, and the drag increases so the aircraft will stop much faster.)

Once the Aircraft is Airborne: This situation will require a quick judgment call, depending on what is in front of you and your altitude. You probably will not have much altitude or much time. The first to worry about is what your altitude is. If you are still above the runway, there might be time to put the aircraft down on the runway, or at least get the aircraft stopped before the fence a few hundred yards at the end of the runway. In that situation, I would advise to get it down and stopped. If you have passed the end of the runway and do not have a lot of altitude, *go straight forward***!** Whatever is in front of you, it will not be as bad as stalling the aircraft. Whatever you do, *don't try to make it back to the runway.*

If you are about 1,000 feet above the ground, you could probably make it, but that will depend on where you are. In this section of the book, I have included three specific stories about actual emergencies so that you can learn from them. Again, learn the procedure outlined in your POH; there may be something different in there.

When You Feel the Engine Quit

1. Descent attitude
2. Fuel: Off
3. Mixture: Idle cut off
4. Doors open (I may even do this before I start to shut things off, depending on the situation.)
5. Flaps: As required
6. Master Switch: Off

1:FIRES: Probably the worst thing that can happen in an aircraft is a fire. There are many different types of fire that could occur but you should always remember that three things are required in order to start a fire. These things must be present or a fire cannot start.

Get on the Ground and Out of the Plane

1. Fuel: Fuel is needed for a fire. There are many different types of fuel, but in an aircraft, the main concern is the fuel for the engine. Oil can also be a concern if you have spilled any over the engine on a hot day.
2. Oxygen: It is impossible to have a fire without oxygen. Alternatively, in many cases, a fire will not occur if there is too much or too little oxygen. These scenarios will be discussed in this lesson.

3. A Source of Ignition: Once the fuel and oxygen combine, one more thing is needed to start a fire: a source of ignition. The source of ignition can be a spark, a flame, or excessive heat.

Once the three are together, we have a fire. Once the fire starts, we have a problem. We need to extinguish the fire. To extinguish a fire, you must eliminate one or more of these items. In most cases, a fire extinguisher will remove the oxygen. We will go over other cases.

A. Engine Fire on the Ground: An engine fire on the ground usually occurs when starting the engine, usually from over-priming the engine. If a fire starts while starting the engine, you should continue to crank the engine. If the fire does not extinguish:

1. Mixture: Lean (idle cut off). Shut the mixture off before the fuel selector because with an engine fire, shutting the mixture off first will probably stop the fuel to the fire sooner than turning off the fuel selector.
2. Fuel Selector: Off
3. Switches : Off

4. Brakes: On
5. Evacuate the Aircraft (*Take the fire extinguisher with you if you have time!*)
B. Engine Fire in Flight: In the event of an engine fire in flight, *shut down the engine.* If at this point the fire is still burning, increase the airspeed to increase the flow of air over the engine. What this will do is blow the fire out just as you blow out a candle.
C. Electrical Fire: An electrical fire is also a very dangerous situation. First, shut down the electrical system. This will stop the source of ignition. Most electrical fires are created by heat caused by a short circuit. Read My Story.

D. Cabin Fire: A cabin fire is also an urgent emergency.

Bottom Line is that you want to have the procedures for your plane memorized so you can execute them quickly.

Other Things

Carburetor Ice: Any aircraft with a float-type carburetor will always have the problem of carburetor ice forming. The signs of carburetor ice are simple. If you are flying along and you notice a loss in RPM, you might have carburetor ice. The first thing to do when you lose RPM is check the magnetos. If for some reason the key has moved position, then you may have solved the problem. If the key is in the proper position and you lose RPM, you probably have carburetor ice. Make sure you turn the carburetor heat on as soon as you notice this, or you might turn into a glider. When you fly a fuel-injected aircraft, you will not have to worry about it.

The next few emergencies are hard to simulate. I will always try my best to find information on the emergencies. Losing flight controls is very uncommon, but we must be aware that it could happen.

Loss of Ailerons: In this case, many things could happen. Look in the airplane system's description in the POH. The ailerons are connected to the control column by a set of cables. In case of an emergency, I would bet that one would break, and the other would be fine. Since we would be airborne, we would not know where the cable broke. By analyzing the diagram in your pilot operating handbook, you'll see that you would still have partial control. If you look at the example where both cables broke, there would be no control at all over the ailerons. In this case, the two ailerons would come fall into a position, seeking equilibrium. I would assume that this position would be in line with both control surfaces in the neutral position. This means that you would only be able to control turning the aircraft with the rudder. Now, if only one cable broke, then you would be able

to turn the aircraft in one direction or the other. If you find this is the case, declare an emergency to the closest field, and make your traffic pattern in the direction of the way you are able to turn. In case of a strong crosswind, make your landing in the direction you are able to turn into the wind.

Loss of Rudder: If a rudder cable broke, you would be able to use it to one side or the other. I would make turns in the direction of the side that is still usable. If there is a crosswind at landing, make sure you land in the opposite direction to counteract the weathervane effect.

Loss of Elevator: In this case, fly the aircraft with the trim. Since we always have the aircraft trimmed for hands-off flying, this should not be too bad. Just remember to increase the elevator up trim as the airspeed decreases when landing.

Inoperable Flaps: If the flaps are not operable, there is no need to panic. All you have to do is land the plane. It may sound simple, but it can be tricky. Remember that you should execute final approach at the same speed as you would on a normal landing. Once the aircraft is in ground effect, the plane will float much longer than with the flaps down, so make sure that you are not high on your final approach.

Flat Main Tire: It will be very difficult to know when this happens. If a tire goes out just before the takeoff, you might know about it depending on how fast the air goes out of the tire. If the tire is on your side, you may notice this. If the tire is on the passenger side, you probably will not know about it until the tire touches the ground. The only thing you can do is make sure you keep the plane straight when you land.

Loss of Vacuum System: Since we are flying VFR, I do not consider this a major problem. This is a system failure that will take awhile to notice unless you look at the suction gauge periodically. If you are just in the practice area, you may not notice at all. When a vacuum system failure occurs, you will lose the directional gyro and the attitude indicator. If you are on a cross-country, you will have to use the magnetic compass. It may take as long as fifteen minutes before you notice that the attitude indicator and directional gyro do not work. You must make sure you are aware of this if you are on a long cross-country and depending on the directional gyro for your heading.

Loss of Pitot/Static System: The three instruments this would affect are airspeed indicator, altimeter, and the vertical speed indicator. Depending on the part of the system that fails, there will be a few

different scenarios. There are three different holes in the system that could become clogged: the Pitot hole that measures ram air pressure, the drain hole on the Pitot tube, and the static port. If the Pitot tube is clogged, the airspeed indicator will not work. This will be the only instrument that is affected. If the pitot tube and the drain hole are plugged, the airspeed indicator will react like an altimeter. If the static port is clogged, the airspeed indicator will react a little differently. The indicated airspeed will decrease as the aircraft climbs, and it will increase as the aircraft descends. At the same time, the altimeter will not show a change in altitude, and the VSI will not show a rate of climb of descent.