

The Practice Forced Landing - 'PFL'



What is the purpose of the PFL?

The PFL, Practiced Forced Landing, is a training scenario to help you develop sufficient skills to cope with an emergency landing away from a suitable airfield. It is a core skill of the JAR-PPL syllabus and something that you will be assessed on during your skills test. It is important to practice this skill not only for the test but to ensure every takeoff can be followed with a safe landing back down on Earth.

When may a real forced Landing be required?

The scenario is meant to simulate an engine failure. This is effectively the main reason why the forced landing scenario is practiced. There could be a number of reasons why this has happened; fuel starvation? Mechanical failure of the engine? Carb Icing?

How do I pick an appropriate field to land in?

There are a few things to consider and with practice you will be able to pick out a good field quickly. The six 'S' checklist will help ensure you cover all the important factors.

1. Shape - Square? Ideally you want the field to be wide and long, giving you a good safety margin.
2. Size - Will there be a large enough landing distance?
3. Surface - We want to land in a cut grass field or a field which has a soft, shallow crop. Muddy fields and landing across the plough line of the field will only increase the risk of injury during landing.
4. Surroundings - Look around the field, not just the initial aiming area. Are there any telegraph poles? Electricity pylons? Walls or fences half way down the field?
5. Slope - Does the field slope downwards, increasing the landing distance that will be required. Is the land too undulating? Ideally we want to land in a field that is fairly flat.
6. Sun - You do not want to be flying directly into the sun on your final approach to the field as it could cause glare to the point where your view is very poor.

It goes without saying that you should not become fixated with trying to meet all of the 6 'S' checklist. It is merely a guide and in most cases some things will have to be a compromise.

Tip - When you are doing VFR navigation flights include it in part of your cruise checks. Ask yourself at appropriate intervals, if my engine fails now, where will I go? When it comes to your skills test your examiner may spring a simulated engine scenario on you during the cruise.

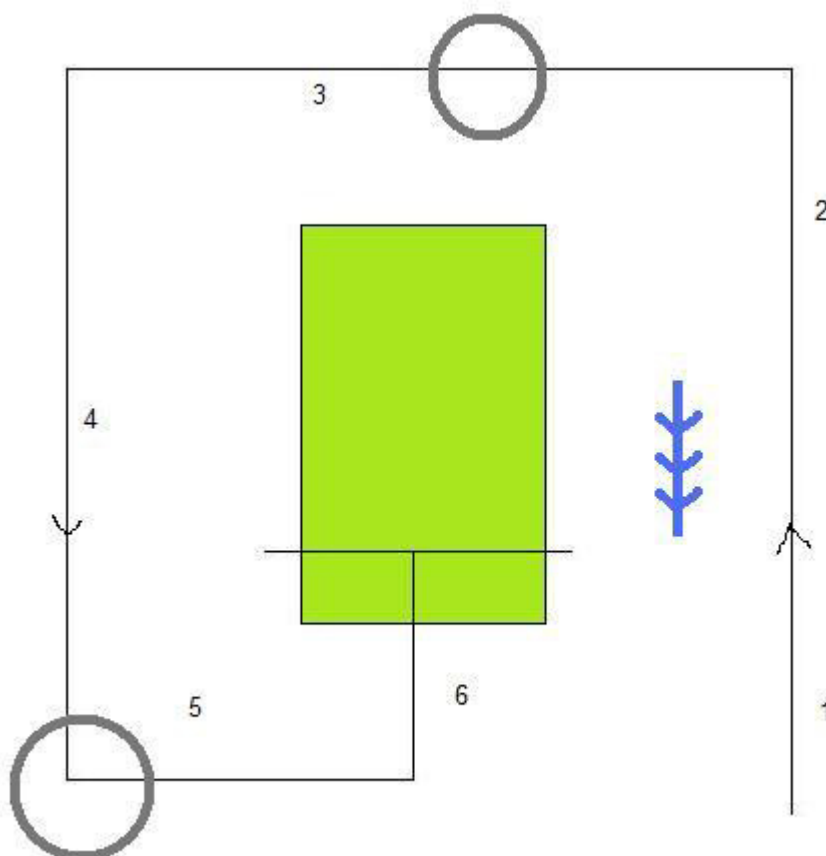
What is the layout of the PFL?

Below is a diagram of the standard PFL. As PIC in the left hand seat you will fly a left hand pattern. This allows you to have a unrestricted view of the landing site and to better assess your height in relation to the key points around the field that you wish to fly to.

The blue vector indicates the wind direction because if possible, we would like to land into wind. Remember that the wind on the ground can be significantly different to the wind aloft. So try to look for key indicators of wind direction on the ground. Direction of crop sway, dark edge around lakes and rivers, smoke and a check of what was in the forecast (if available).

The grey circles indicate firstly our 'High Key' and 'Low Key' points. The green box represents the field and the black bar represents an aiming point about 1/4-1/3 of the way into the field. All will be expanded on later.

Another key point during the PFL lesson is the use of engine warms. It is important every 500' that we smoothly move the throttle to full power for about 5 seconds and then back to idle to avoid shock cooling the engine and **carb icing!**



What are my initial actions (1)?

Your immediate actions will be to select the correct glide attitude and trim. We want to maintain as much height as we can and bringing the speed back to the minimum drag speed (V_{imd}) will help us achieve that.

Our other immediate actions will be to set the carb air to hot (if carburetted engine), set the mixture to rich, check fuel on and ignition to both. A useful way of remembering is the acronym FMI. Fuel, Mixture, Ignition.

Trouble Checks (2)

We want to try and figure why the engine has stopped and if possible get it started again. Here are some of the main checks and items that should be cycled. These are touch drills in a lesson and on test but would be tried in the event of a real engine failure.

1. Fuel - Is it on? Contents left? Try selecting one tank at a time. If there is a fuel pump run it for a few seconds to attempt a re-start.
2. Mixture - Exercise the mixture.
3. Throttle - Exercise the throttle
4. Carb Heat - Probably one of the most common causes of SEP aircraft engine failure. Cycle the heat to see if ice is present.
5. Magnetos - Check both magnetos are working by trying left, right and then back to both.
6. Gauges - Check oil temperature and oil pressure gauges for any indications of engine problems.
7. Primer - Should be in and locked

High Key point - First Grey Circle

This is our first reference point to check that we are positioning the aircraft correctly to ensure that we will make the field that we have selected. Normally at the high key point should be 2500ft AGL. So if we estimate the height of the land to be about 200ft our high key would be about 2700ft.

Mayday Call (3)

The Mayday call is very important as we want ATC to know about the emergency, to ensure that we receive help as soon as possible. It could be a remote area we are flying in, a long way from help, or there is the chance somebody could be injured. If you do have a transponder fitted you should also squawk 7700 before you radio call. This way you will show up on radar, diverting ATC attention to you straight away.

The following information should be passed in the Mayday call; Callsign, Nature, Location, Intention, Number of persons onboard. There is no need to get bogged down in excessive amounts of information or obscure details. Just the key information which will ensure that you can be located.

Here is an example call;

"MAYDAY MAYDAY MAYDAY, G-ABCD, CESSNA 152, ENGINE FAILURE, 4 MILES NORTH OF PERTH, FORCED LANDING, 3 POB, OVER"

If you still had a lot of height to loose then you could include your current height and position.

Passenger Brief (4)

Obviously in the event of a real engine failure your passenger/s will have noticed that perhaps something isn't as it should be. It is good then to take a few seconds to advise them that there is a problem, **reassure** them and inform them of our intentions.

It is also an appropriate time to ask them to check that their harness is tight, possibly unlatch their door and tell them that they should adopt the previously briefed brace position on your call. Once again emphasis should be placed on reassuring them as you instruct them.

Here is a typical example of something you could say.

"You may have noticed we have had an engine failure. Do not panic, everything is under control. We will simply be landing in this field down to my left, I have trained for this a lot. For your safety could you please check your harness is secure and as a precaution adopt the brace position on my call before landing."

Low Key point - Second Grey Circle

This is a reference point just like the high key point except now the check height is 1500ft AGL. To be clear if the land is 200ft then we should be at 1700ft at this point.

Shutdown Checks (5)

The FMI acronym can be applied here. **Touch Drills only for simulated engine failure!** We select the fuel to off. Pull the mixture back to ICO. Switch the ignition to the off position.

Final Positioning and checks (6)

At this point we should be in a position to definitely make the field. We can begin to bring our aiming point back by taking flap. Remember adding flap will increase drag and reduce our range. So only take it when you are happy that you are making your aiming point 1/3 of the way into the field.

If you have misjudged the 'base leg' and you are still too high you can try to increase your ground track by adding some shallow turns. Side-slipping is another good option in a real life situation to get down but some examiners look on it unfavourably.

One other factor to remember is wind. You have planned to land into wind so before you try to lose height, remember that your ground distance covered in a headwind will be lower. Do not be too hasty with selecting flap!

Judging height - Constant sightline angle



The above diagram is for demonstration purposes only as it is a very basic illustration of the technique. Imagine a point about 1/3 of the way up the strut, represented above by the red line. The green wing tips of the red bar indicate the location of the field that we are trying to keep a good height from.

If we get too far from the field or too low then our field would appear to be higher up above our red reference line. If you see this happening you should adjust your heading a bit to get tighter to the field to ensure you do not undershoot it.

The opposite is also true. If we are flying too tight a pattern and are getting too high and close to the field we are aiming for, the picture on the wing strut will change. The field will appear below the red reference line. If you see this happening you should adjust your heading a bit to ensure that you don't get too tight and high, possibly overshooting the field.

Some final words of 'wisdom'

- The golden rule; Aviate, Navigate, Communicate.
- Safety first and make sure you do not bust any of the low flying rules (in practice forced landings!)
- In an emergency a good landing is one which you and your passengers can walk away from.
- Enjoy it, after-all it should be fun!!!!!!!

Glossary of Abbreviations

AME	-	Aero Medical Examiner
CAA	-	Civil Aviation Authority
ICO	-	Idle Cut-off
NOTAM's	-	Notices to airmen
PFL	-	Practiced Forced Landing
PPL	-	Private Pilots Licence
RT	-	Radio Telephony
SEP	-	Single Engine Piston