

# The circuit

Everyone's learnt them, everyone did one or more on their first solo, and everyone has different ideas about what makes a good one. Here are some tips for making a circuit as good and consistent, and as easy as possible. It's based on rectangular circuits. Racetrack-shaped circuits work better than rectangular circuits in higher-performance aircraft, so if that's what you fly, some of this article doesn't apply to you.

## Upwind

Tracking straight after takeoff is vital at Jandakot, where you have parallel runways and the chance of infringing on another pilot's personal space if you don't maintain the centreline, but it's pretty useful anywhere. If you get airborne and you can still see some runway under the nose, you can glean a good idea of how much drift you need to allow for, and adjust before the runway disappears under you. After that, if you can see the ground ahead or you have a cloud you can aim at to stay straight, use it. Otherwise, if your climb attitude means you only have sky out the front, pick a reference point out to your side. For aeroplanes that need right rudder to stay straight in the climb, you'll know if you're not standing on the pedal hard enough because that reference point will disappear under the nose.

We teach FOL checks at 300 ft AGL – Flaps, Oil, Look back. Flaps may be useful for takeoff, but they're a hindrance to your climb, so you want to get them up as soon as practical. But within 300 ft of the ground you've got better things to do than to be reaching around in the cockpit for a flap lever, hence 300 ft. Check oil Ts and Ps, and look back if possible to check you're on centreline. This may be impossible due to not having a back window, or maybe due to the stiffness and inflexibility of your ageing body!

CASR 91.390 says you must maintain your takeoff track until at least 500 ft AGL. There's nothing stopping you from going a bit further before you turn crosswind. One reason you may choose to do that is so that you reach circuit height before you get to downwind, meaning you won't be trying to level off and turn at the same time.

## Crosswind

As with every leg, pick a reference point before you turn, which will make your circuit rectangular. Many of my debriefs on circuits over the years have included a refresher on the difference between a rectangle and a trapezoid.

15° is a good angle of bank for a climbing turn, as it stops your climb performance from completely going out the window. I typically tell students "no more than 20°." The other thing I often see that hurts climb performance is not maintaining the right speed. If you climb at 75 kt in PGL you'll probably get to circuit height on crosswind. If you don't set the right attitude and trim, and you climb at 80 or 85 kt, you'll almost certainly still be climbing when you get to downwind. The result is you may be so busy levelling off that you forget to turn when you should, and you end up with a cross-country circuit.

Your spacing for turning downwind is best judged by some point on the aeroplane. You don't turn when you get to circuit height; you turn when you get the right spacing from the runway. Also, you can't rely on a 45° (or some other) angle to the runway, because the distance you go upwind before turning can vary depending on factors such as your weight and the temperature. In a 172, the runway level with the leading edge of the tail is a good reference, and that works

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regardless of how far you've gone upwind before turning crosswind, and it works just as well on a midfield crosswind join. In an aeroplane where you can't see the tail, the wing is probably the only reference you can use. For instance, in Trevor Pipe's V-tail Bonanza, a good time to turn downwind is when the runway is one chord behind the trailing edge of the wing.

## Downwind

Once you're on downwind, fly the aeroplane before you worry about radio calls and checks. Check you're flying level and check your spacing, using a suitable reference point on the aeroplane. For a 172, it's about 2/3 of the way up the strut in a left circuit, and halfway up the strut in a right circuit. In a low-wing aeroplane there might be a fuel cap or a vortex generator that makes a good reference mark. To check you're tracking parallel to the runway, make sure the runway is staying at that same reference point on the wing or strut.

Once you're set up, make a call. It's requirement at Jandakot, and it's the best place to make your first call in a circuit. If you're mid- or late downwind by the time you get to the call, say that, as it gives everyone else a good idea of where to look for you.

Do your pre-landing checks after that. Don't think of them as downwind checks, because then you'll forget them one day when you're doing a straight-in approach or joining base as directed by Jandakot Tower. For someone like Damian O'Driscoll in his C182RG, that could mean a catastrophically short landing roll. (But of course you'd also have to ignore the noise when you reduce power below a certain setting, reminding you loud and clear that you've forgotten something important. That would be a go-round.)

## Base

Unlike your downwind turn, 45° does work as a reference point for turning base. It means your base and final will be the same length, which makes sense since you're planning to lose 500 ft on each of them.

The quicker you get the aeroplane configured on base, the easier it is to control your approach. There's no hard and fast rule about what power setting to use, but we teach 1500 RPM in PGL. That's low enough to allow you to slow down, get the speed in the white arc and use flaps. If students don't slow down quickly enough on base it's usually due to not reducing power enough, and not keeping the nose up. One of my mantras that students hear plenty of is "Lose speed not height" on early base.

The earlier you get set up, the earlier you start looking at the runway and judging your profile. The profile you're aiming for obviously depends on what you're flying, but you may need to vary that to conform with other aircraft in the circuit. The ideal profile for Dave Kerr's CT-4, with glide ratio marginally better than a crowbar, is quite different from the ideal profile for PGL, with glide ratio only slightly worse than a Blanik, with Dave Mac's Warrior being somewhere in between.

There's usually no need to make a call on base – a downwind and a finals call is plenty – but you may do it if there's traffic and everyone's keen to know where everyone else is.

To avoid a slow creeping turn onto final, visually extend the runway centreline and start your turn with about 20° of bank to roll out over your selected point on that extended centreline. If you start with 20° of bank, and you find you've misjudged and started a bit late, or a tailwind is

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getting hold of you and pushing you through the turn, you've got some latitude to tighten it up without turning it into a steep turn.

## **Final**

The ideal spot for the aim point in your windscreen depends on your aeroplane and your eye height. Once you've got that right, you're better off using power to control the speed, especially if you get windshear which, as we all know, is far from uncommon at Northam. If you've got the speed right as you cross the threshold, you know you can afford to stop looking at it and look up the runway.

I often see students not recognising that they're off centreline on final. The most likely cause is looking at just the aim point, rather than looking along the runway. If you're tracking properly, the runway centreline won't be moving in your vision.

A call turning final is a good idea, especially if there's someone at the holding point or on the runway having just landed.

As for the landing, which is a subject for an article of its own – you can make a bad landing from a good circuit, as you no doubt did a few times in your early training, but if you make a good landing from a bad circuit you should go and buy a lottery ticket!

Kevin

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