CluedUp

GA Update

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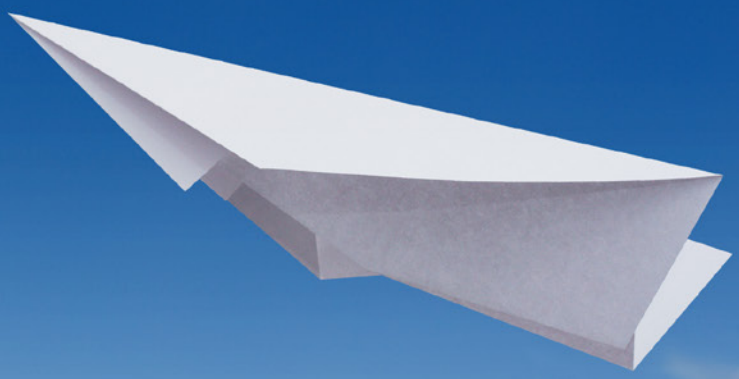

Civil Aviation Authority

HOW STABLE DO YOU FEEL?

We've all been there. Either too high, too fast or quite simply, too all-over-the-place. Here's how to stabilise your mind – and your aircraft

What do you do if the approach is going to worms – hang on and hope it will all sort itself out further down the line, or do you think 'nope, this isn't looking good, let's bin it and try again'? And if you do go around what order are your actions going to be in? I've seen the results of the former, and they aren't always pretty, while the latter has produced some interesting sequences of events…

In the commercial world there have been a number of high profile incidents and accidents that appear to have a common link – CFIT on final approach because the aircraft might not have been in the right steady state for landing.

Commercial operators have strict criteria that must be met to continue an approach. In simple terms these are based around a set of 'gates' that ordinarily prescribe **speed** range, maximum **rate of descent, aircraft configuration, position relative to desired flight path** (lateral and vertical) and minimum power settings.

If these 'gates' aren't achieved by a certain point, a go-around is mandatory. Failure to comply at best results in a chat with a Training Captain. But what relevance does this have to General Aviation? I reckon that some of these gate concepts are wholly applicable to us and we should never be afraid of throwing away an approach that doesn't meet some simple criteria.

The following thoughts are generic because there are many variables that contribute towards the decision on whether or not to continue an approach: pilot qualifications and experience, aircraft performance and the operating environment will all influence decision-making. The overwhelming requirement, though, is to make a decision. I have seen the outcome of 'botched' approaches that have been costly in both time and money.

Speed

In just short of 60 years there have been more than 43,000 Cessna 172s manufactured under various guises. We all know it's sturdy, relatively benign and simple to operate with good short-field performance and an undercarriage that will take a significant beating. So I find myself asking why I have observed so many bent C172 firewalls, written-off propellers and shock-loaded engines? I have also seen a few aircraft implanted in hedges at the far end of runways. Investigation always seems to point at landings that have been completed despite the aircraft being unstable on approach.

On certified aircraft the Aircraft Flight Manual (AFM) is usually well constructed, ➤

clearly describing the configuration options together with recommended approach speeds. However, chatting with pilots who have had such bad experiences, without exception they have all selected an approach speed at, or above, the highest speed quoted in the manual.

Many pilots on approach add a few knots for luck, not realising that these extra knots actually contribute towards them having to rely on luck. Sure, there are times where extra speed may help (gusty conditions) but, generally speaking, an aircraft should be flown within the speed range described in the AFM.

Importantly if there is a speed range quoted, the top end of this range applies to an aircraft at maximum weight, whereas 'lighter' aircraft should be flown towards the bottom end of this range. Once the desired speed is obtained pilots should trim to it and minimise the amount of control input necessary to maintain a stable approach.

Excessive speed (energy) brings all sorts of problems during landing. First, any landing distance performance calculations can be dismissed but, as importantly, the aircraft is going to spend more time losing energy in the flare before finally touching-down. During this extended time period, there is scope for the wind to create mischief and the pilot to relax back-pressure on the control column to try to expedite the landing. It's this last action that leads to bounced nosewheel landings, prop strikes and bent firewalls. My first top tip is to **ensure that the aircraft is trimmed at an appropriate approach speed.**

Rate of Descent and Power

While it's relatively easy to adjust the rate of descent in a light aircraft, some pilots forget to address the secondary effects of doing so. Whether rate of descent is actually controlled by power or pitch might be a common after-flying bar discussion, the reality is that adjustment of either requires a corresponding input from the other. I like to think of it like this: **Power + Pitch = Performance (P+P=P)**. So, if a pilot chooses to fly an approach with an excessive rate of descent, he or she needs to carefully plan energy management when finally reducing this rate of descent in order to achieve the required performance.

A low rate of descent or 'shallow' approach can also bring problems. It's likely that the engine will be developing significant power while the aircraft is being 'dragged in', followed by a tendency to cut or 'chop' the power over the runway threshold to complete the landing. At this point a 'stable' aircraft has just become unstable; the P+P=P equation has changed, slipstream effect over the empennage has reduced and there is a likelihood that increased control column back pressure is required due to the aircraft being out of trim.

Piece of advice number two – **plan and set a reasonable rate of descent**. In most GA aircraft, this is around 500-750ft/min.

Aircraft Configuration

This element largely relates to flap settings and ensuring the wheels are down (which is good). Again, the key element is setting-up the aircraft early enough that you do not need to reconfigure at the latter stages of the approach. Adding flap changes the performance of the wing so you have to adjust pitch and/or power to maintain the desired performance.

That said, for many GA aircraft the application of the last stage of flap merely reduces speed by a few knots and this can be used as part of the approach planning. However, I strongly believe that pilots shouldn't significantly adjust flap settings at low height and certainly not once in the flare. Make sure you are trimmed in your desired configuration.

Flight Path

There's little point in being stabilised speed, rate of descent and correct

A stable approach - nailed

Nose, prop and wing damage is most common

Be prepared to go around

configuration if the aircraft isn't pointing somewhere near the right direction. That probably sounds a tad obvious, but we still hear of, and read about, aircraft landing long/short or off the side of the runway. The art of flying a successful approach is being stabilised so that you only need to apply small adjustments to attain and maintain the ideal flight path.

Going Around

One of the first manoeuvres taught to students is the go-around. The rationale (in case no-one ever mentioned it during your training) is that there's an increased likelihood that early stage pilots won't achieve a stable approach and will inevitably have to decide to 'throw it away'.

Interestingly, as pilots become more proficient in landing, they tend to become less proficient in making go-around decisions, perhaps due to pride, economic factors or lack of confidence in completing the manoeuvre. Whatever the reason, there are numerous accident/incidents each month that wouldn't have happened if the pilot had chosen to go-around from an unstable approach and landing.

The manoeuvre should be instinctive, and while the required actions might require some urgency, they shouldn't be rushed. Again, keeping things generic, the go-around should have the following format:

'If you are thinking about going around, you probably should be going around'

- **Apply full power** – nothing less. Be aware of rich cuts and carb heat. Manage pitch – applying full power will result in a change of pitch if not managed. In some aircraft this change is significant and you need significant elevator force until you can trim out some of this effort. Fly the aircraft, don't let it fly you.
- **Arrest the descent** – we're not yet looking to climb away, we want to stop the aircraft from descending any further. Some aircraft simply will not climb until you have completed the next step.
- **Reconfigure if necessary** – any reconfiguration should be minimal and in accordance with the flight manual. Ordinarily, this only involves the removal of drag flap.
- **Ensure you have climb speed** – do not try to climb if there is not enough speed.
- **Pitch up to an appropriate climb attitude** – select a climb attitude that corresponds to the aircraft configuration. At reasonable height (a few hundred feet), remove flap, raise gear etc.

Note: I haven't mentioned RT transmissions. The "go-around" call is largely irrelevant and should take second place to all of the above.

Finally, make the go-around decision early. If you are thinking about going around, you probably should be going around.

Summary

I hope these thoughts stimulate discussion and encourage people to consider their approach profiles. If I were to be prescriptive, I'd offer that a pilot should have an aircraft correctly configured with a constant rate of descent and a steady approach speed in trim, by about 300ft when positioning to land. If this is achieved, the only challenge left is to achieve and maintain an ideal flight path.

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