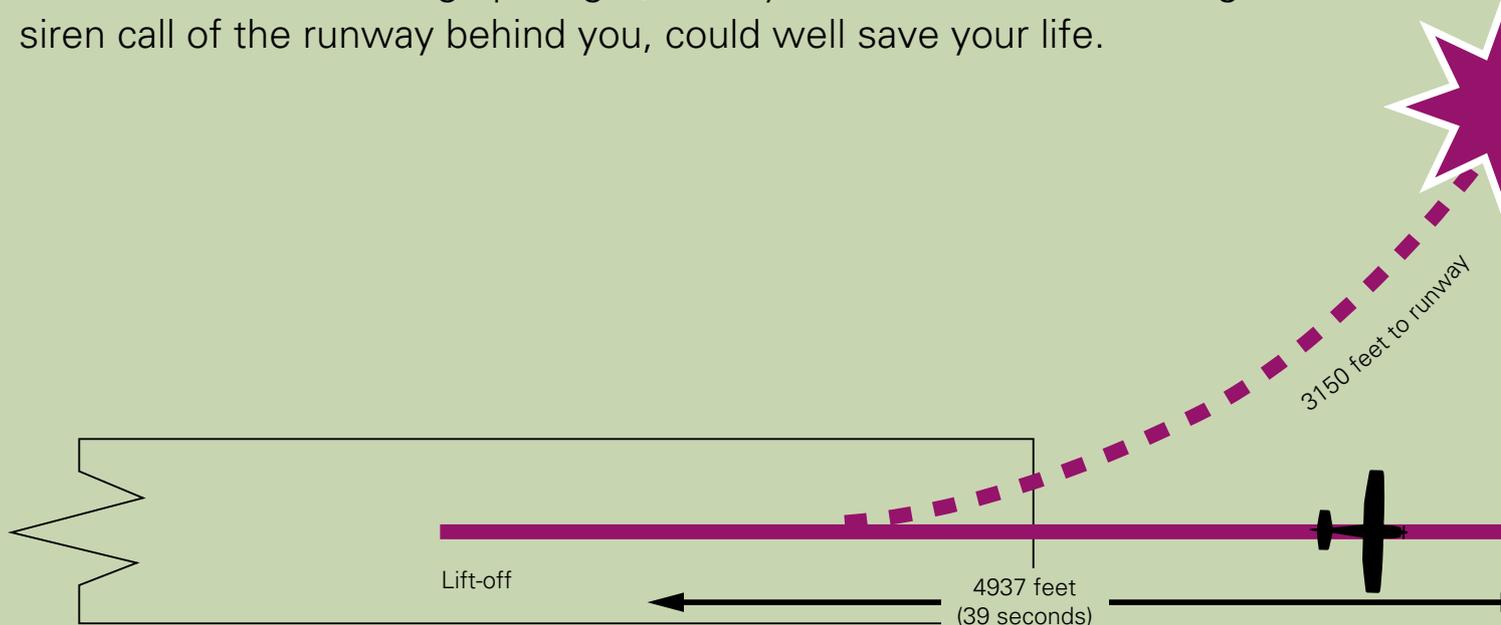


The Impossible Turn

Since 2001, there have been 18 accidents, eight of them fatal, following some kind of power loss after takeoff. The worst year for such occurrences was 2014. But a thorough preflight, fuel system check, and resisting the siren call of the runway behind you, could well save your life.



Talk to a long-time pilot and it's bound to emerge that they, or someone they know, has experienced a sickening encounter with a failing, or failed, engine after takeoff.

Long-time instructors believe the so-called 'startle effect' means it can take up to 10 seconds for the pilot to react in any meaningful way, as they try to get their head around the implications of the silence.

And then it is on – an explosion of activity as the pilot desperately tries to get themselves, passengers, and aircraft safely back on terra firma.

The overwhelming influence of what flight examiner Willie Sage calls 'get-back-itis' has many pilots trying to return to the safety of the runway 180 degrees behind them.

That, experienced aviators all say, is just about the worst thing to do.

They say if a pilot does make it back, they're landing downwind which means a longer landing distance. It also means they could be trying to land into oncoming traffic.

But the biggest reason not to attempt a 180 is the height lost in the turn.

Despite that, it appears many – even able – aviators try to do it. A-category instructor and general examiner, Penny Mackay, estimates up to 70 per cent of the C-category instructors she has checked, believed they could make at least a 90 degree turn toward something that looked safe, like a paddock.

"They had no idea that turning just that much could lose them between 300 and 400 ft in a Cessna 152. They were absolutely amazed when I showed them," she says.

"They wouldn't have even reached the paddock – that loss was just in doing the turn.

"You can tell people about this until you're blue in the face, and you think they get it. But when you pull the power on them at low level with few options, it's a different story. And these are instructors!"

Willie Sage, who's also chief pilot for Sounds Air and Tasman Aviation, has experienced power failure after taking off.

"About 18 years ago I took off out of Turangi in a 172. The engine just stopped dead. Straight ahead was really nasty country."

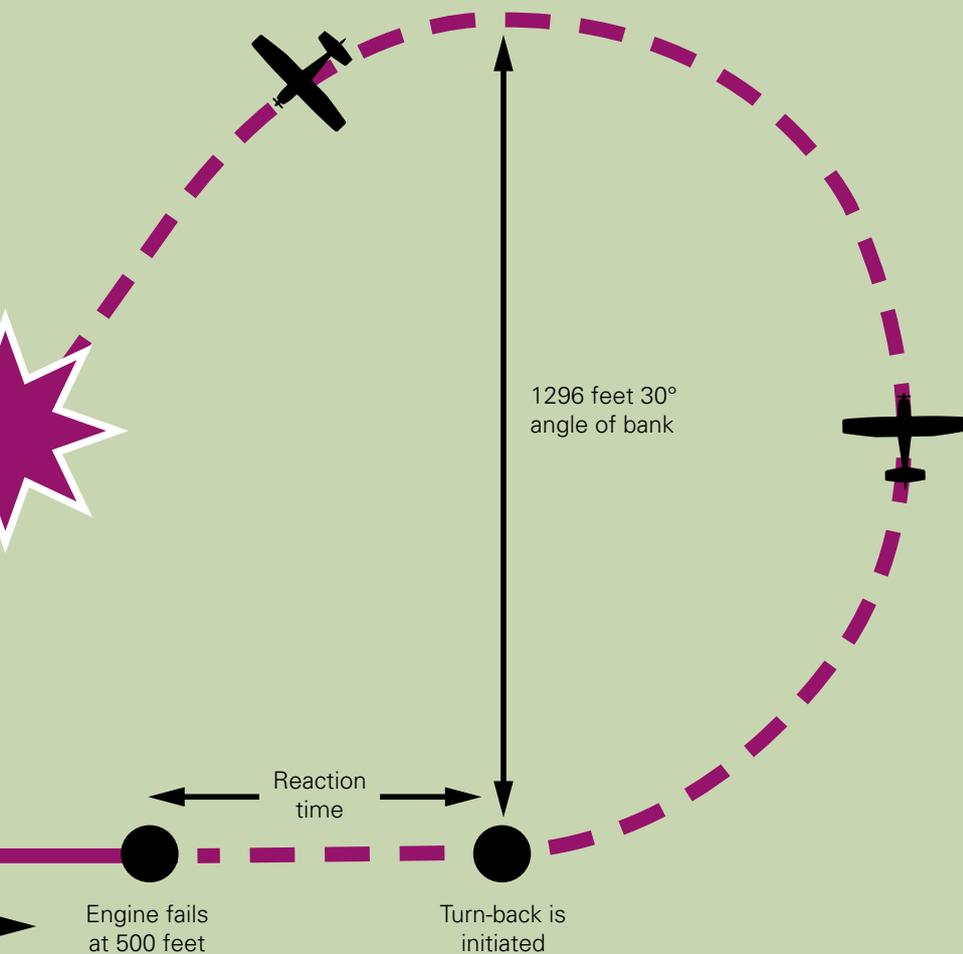
He did turn back but says it was a calculated move because he knew he had the height to do it.

"I've got quite a bit of low-level bush flying experience but really, I got away with it by the skin of my teeth.

"It was a fair bit of good luck to be honest, not skill. I didn't make it back to the airport, but was lucky enough to find a clearing nearby."

Willie says he now thoroughly preflights what he would do, at each particular aerodrome, should the engine fail at 500 and 800 ft.

"I actually look around, before taking off, and see what places exist for an emergency landing. Then as I climb,



Data for a Cessna 172 turning back after an engine failure at 500 feet agl

Conditions and Assumptions

Altitude	Sea Level
Temperature	ISA
Wind	Calm
Climb	75 KIAS
Rate of Climb	688 feet/minute
Glide Speed	65 KIAS
Glide Distance	0.75 NM/500 feet
Angle of Bank	30 degrees

Note that total distance back to the runway from failure point is 7711 feet whereas the aircraft glide capability is only 4560 feet. This means you would land 3150 feet short of the runway.

Data supplied by Transport Canada.

I say out loud '500 feet....800 feet' so I'm totally prepared should the worst happen."

"Some people make it part of their threat and error management," Penny says. "Some people call it an emergency briefing, but whatever it's called, it has to be done before you take off.

"You also have to be careful not to run through the briefing like it is rote learned. Really think about what is being checked.

"For that reason I always say, 'know what paddocks are available and what is in the area when you take off, and imagine those things as you go past them'."

"There's no point," says Willie, "waiting until the engine dies to start thinking 'now where is the wind blowing from, now where is a nice flat paddock or deserted straight road?' You won't have time for that!"

Willie also advises pilots to drill themselves on emergency procedures until they know them "inside out and upside down".

"Then they will be automatic.

"But you know, we're all taught to squawk 7700 on the transponder, and do a MAYDAY call and check everything, but if you have an engine cut out at 500 ft, you've really got no time for anything other than flying the aircraft until it touches down. It's a cliché but it really is aviate, navigate, communicate.

"In my case, I did not look in the cockpit for one second. I had my eyes out looking to where I was going and just kept it flying. If I'd looked inside the cockpit, we would never have made it.

"If you land in a reasonable spot, at the right speed, you're going to be OK."

Penny says the pilot should be looking out for any forced landing zone no more than 30 degrees either side of the aircraft nose.

"Of course that angle widens the higher you are.

"It also depends on other factors, like the angle of the bank, the aircraft, the pilot, whether the aircraft has even some power, and how well the pilot knows their aircraft. It's not always a blanket thing of 'never do this'."

Of course, the wind is always a significant factor in any decision-making in flight, no less in the event of power failure.

So the examiners encourage pilots to practise, so they are familiar with what their aircraft can do, and what they can do.

Penny says, "Go high, and see for yourself with different angles of bank how much height you lose in a turn."

Another potentially fatal tendency in the C-cats she has checked was for them to pull up the nose when they realised they weren't going to make that paddock.

"They raised it, and raised it and raised it. And would have stalled. I told them, 'you're better to keep that nose down and go in, under control, through a hedge or trees, than stall it'."

CAA aviation examiner, and A-category instructor, Marc Brogan agrees. "It should be automatic. Conserve the aircraft's energy. Get the nose down.

Continued over >>

Photo: Courtesy of Willie Sage



Willie Sage

Marc says it's important that instructors clearly understand what to do if the power fails, or partially fails, after takeoff.

"So when they teach it to their students, it's a nice clear exercise, and they, the instructors, don't jeopardise the safety of the flight."

Marc says there are two ways an instructor can teach a student, either: warn them during the briefing that they will be given a prompt that the engine has now 'failed'; or don't say anything prior to takeoff and just tell the student, at some point, 'If the engine failed now, what would you do?'

"It does affect their reaction – anywhere from five to ten seconds," he says, "which does make it more realistic."

Both Penny and Marc say what to do in a partial power loss also needs to be trained, because it is more common and in some ways more complex.

"In a complete shutdown," says Marc, "a forced landing is inevitable. With partial loss, there are more options to consider."

Marc says sometimes you're 'damned if you do, and damned if you don't' because the options to land ahead are terrible, but potentially, in turning too far, the results could be even worse.

"So in the end, all you have is practice, preparation and prevention." ■



Penny Mackay

Photo: Courtesy of Nelson Aviation College

The Fuel and Ice Factors

The two most likely causes of engine power loss are carburettor icing and fuel system issues – starvation, exhaustion, and contamination.

The need to check fuel quantities, and quality, during the preflight inspection cannot be emphasised enough. Check that the fuel dipstick is for your aircraft, it is clearly marked, and that you understand the difference between 'total' and 'useable' fuel, says CAA safety investigator and long-time instructor, Colin Grounsell.

"On aircraft with selectable fuel tanks – for instance, Cherokee PA28 and PA38 Tomahawk – start with fuel selected to one side, usually the tank with the lesser amount.

"Prior to run-up, change to the other, fuller, tank. That should ensure the engine is able to be fed from both fuel tanks, prior to takeoff.

"Once you have full power set, check the engine instruments to ensure the engine is developing the power that you expected. Listen to the engine during the takeoff roll. If it's running rough or sounds unusual, that should be enough to tell you it's in trouble before you even leave the ground."

Once airborne and faced with an engine power loss...

While lowering the nose and establishing the glide speed, apply carburettor heat to melt any accumulated ice, if that's the cause of the power loss. If that's the case, engine power should be restored, but be aware that the application of carb heat may momentarily make the situation worse as the ice melts.

Carburettor heat also provides an alternate source of air if for some reason the normal airflow to the carburettor has become restricted.

Turning the electric fuel pump on, and changing tanks should restore engine power after a few seconds, if there is an issue with the fuel system.

If engine power is not restored and prior to landing...

Make sure the throttle is closed. That will avoid any unexpected bursts of engine power which will undo your plans to land on the spot you've selected.

To reduce the chances of a post-landing fire, make sure fuel is off, that the mixture is fully lean, and that the ignition and master are both off. While carrying out the above don't forget rule #1...always fly the aeroplane: aviate!