



mission to share the skills acquired over thousands of hours which may one day save our lives. He is part-saint, part-rebel – a cross between Iggy Pop and Ghandi (he wears nothing but a small sarong when not in the cockpit). He is also a great communicator and raconteur, who loves to cook.

I'm with two other pilots on the three-day course, a young Swiss airline pilot and a retired gold-mining engineer, fresh from flight school. I'm somewhere in the middle. At the first briefing, we are told to clear our minds of nearly everything we've ever been taught. We learn that conventional flight training sends us out ill-equipped for that fatal day when the s**t hits the fan. We've been taught to fly by the numbers printed in the Pilot's Operating Handbook (POH) no matter what, but those instructions have been written by lawyers to protect the manufacturers – not us. They won't help us when we fail to control a stall, spin to the ground and die.

Many of us have no knowledge about how slowly we can safely fly, how to

control the aircraft in a full-flap full power stall, how to return to an airfield for a precautionary landing immediately after takeoff, how to execute an emergency landing in a built-up area (football field, anyone?) or fly back out of a dead-end valley, how to cope with severe turbulence and, most importantly, how to recognise when we are in the danger zone and do something about it before it's too late. He relates so many stories about fatal accidents caused by avoidable pilot error that I start to shake.

"It's better to check these things out," CC tells us, "with an experienced pilot by your side rather than face an emergency situation on your own, lose control and go into panic."

In our practical session on day one, we are due to explore the lower end of the aeroplane's performance limits and go beyond them... just a bit. I realise I am panicking – I'm up first.

Takeoffs and landings

CC guarantees that we will learn more about flying safely in our first 45-minute

session than many flying instructors can teach in a lifetime. Flying around our local circuit will not allow us to know our aeroplanes inside out. We will never feel like the wings of our planes are extensions of our own bodies. During the briefing, CC runs through how we are going to achieve this. It all makes sense on paper. We draw a grid with various flap settings where we will note down (among other things) when the stall warning sounds, to compare with the speed the aeroplane *actually* stops flying.

First, he wants us to master the optimum stabilised approach and discover the optimum approach speed. "Perfect landings are everything," he grins at us. Unfortunately, landings aren't my strong point. I have the club record for the student with most dual hours. But after (quite) a few circuits practising CC's technique, I am doing full flap controlled approaches with a virtually constant rate of descent, with hands off, flaring with just the tip of my finger. The plane is powering itself down to the numbers (at a steeper angle than I am used to) at 500fpm with

Bush and mountain flying master class

Signing up to learn all the get-out-of-trouble tricks they don't teach in flying school

Words Kat Thurston Tiefenthal Photos Kat Thurston Tiefenthal & CC Pocock

'Captain Crash' is not the best nickname for a flight instructor, even if it belongs to the infamous bush flying guru 'CC' Milne Pocock of Bush Air, a unique aviation academy specialising in bush and mountain flying. He tells me he is an autodidact and he's going to teach me how to fly.

I was fortunate to attend CC's last course in South Africa at the airfield he built himself between Swaziland and the Kruger National Park. Finally fed up with the lack

of support from the South African CAA, he has now relocated to Nevada where he continues to offer courses. Living a lifetime on the edge and surviving to tell the tale means CC knows what he's talking about. Pilots have been flocking to his academy from all over the world for nearly two decades and it was the end of an era – or maybe the start of a new one.

The course includes lots of technical stuff and detailed briefings, but the practical part covers:

- Optimum controlled landings and takeoffs

- Emergency and precautionary landings
- Emergency manoeuvres, and flying without primary controls – no instruments
- Short field takeoffs and landings
- Soft field takeoffs and landings
- Hot and high operations and density altitude
- Low-level flying and slow flying
- Exploring the low end of the performance envelope.

From his reputation I expected an eccentric maverick, but what I found was a deeply-focussed professional on a



Bush Air proprietor and instructor 'CC' Pocock and Kat with Bush Air's Cessna 172C flown by Kat at the academy's original location in SA



Landing up the slope and departing downhill from a 'one-way' mountain strip near CC's new US location

minimum input and no PIT (what CC calls 'pilot-induced-turbulence' – which I am forever correcting for). I am flying by feel. CC has taught me how to judge my height and speed by looking outside the cockpit, not inside, and to properly set up the approach with various exercise tools. I pass the first session with flying colours.

Next it's the takeoff. CC demonstrates how the aeroplane is going to do this by itself. He wants me to stop rotating at a fixed speed according to the manual. My POH tells me 'no flaps' but he explains the first stage 'optimum lift' produces more lift than drag so I should use them.

With aircraft weight and centre of gravity calculated, flaps down, elevator held in position with angle of attack just positive, a tad of right rudder, I don't rotate as such but suddenly we're flying. I note that we are airborne sooner than I expected. I keep the nose down in ground effect (just half a wing-span above the surface) to build up speed, then retract flaps and we're off, climbing high above the African bush. CC asks me what speed we lifted off at. I managed to note that the optimum takeoff speed is not the same as in the POH. After a few circuits to practice, we have time to run through steep turns and slow flight, CC always demonstrating first.

I retire to the pool by the control tower feeling rather pleased with myself, and sip an iced Coke while watching the other two go through their paces. I'm wondering who will get it first? Hundreds of veteran airline captains have been on these courses but CC claims weekend club pilots are often more receptive. I start to relax. My money is still on the Swiss pilot.

After lunch – which CC cooks for us, happily swapping his captain's cap for master chef's *toque blanche* – it's time for stalls. I'm stalling for time with seconds but

he reassures us again that the less we know the better.

"Planes don't just fall out of the sky by themselves," he tells us, "most crashes are pilot induced." He recalls the details of Air France flight 447 in which 288 passengers drowned in the Atlantic, needlessly. "No pilot on one of my courses would have failed to recognise that stall and recover the aeroplane."

My first stalls are good and, more importantly, I manage to keep lunch down. Controlling the aeroplane in the full-flap, full power setting is less successful. With one wing down we are about to spin before CC calmly takes control. "Stall-spin accidents are common," he sighs, "yet so few pilots recognise the causes and how to rectify them before it's too late." The second time I am ready to apply full right rudder and amaze myself by flying along in a fully developed stall. I'm even relaxed enough to look at the airspeed indicator which is showing zero (under-reading due to the pitot tube position on a wing with high angle of attack). This is the lowest possible stall speed of the aeroplane. I note this down on my graph. This figure does not appear in the POH. I'm hanging on the prop long enough to control the plane and get the nose down and recover normal flight. This technique is important as it is used in the extreme short distance (emergency) landings which CC will teach us tomorrow.

Emergency aborts and STOL

The next day I'm up early, sipping a coffee on the terrace with a few monkeys, listening to Africa waking up beneath a hazy sunrise. CC has been up for hours preparing for the day. After a quick recap on yesterday's lessons, he suggests we take to the air before breakfast. In the

cockpit, this former air display pilot with a penchant for verbal pyrotechnics could not be more patient or more determined that each and every one of his students masters his techniques, working to iron out individual issues and correct bad habits.

He demonstrates the low-level teardrop circuit which he teaches as an immediate abort and emergency approach back on to the end of the airstrip we just took off from. It requires a steep angle of bank at slow speed, close to the ground. Knowing the minimum stall speed is therefore critical. We will be dive-bombing in at high speed (with possible tail wind) but we learn a technique to force the plane down safely.

I point out (bravely) that at flight school we learn always to land ahead, within 45 degrees either side and never to turn back to the airfield. CC has numerous examples relevant for every exercise and relates his narrow escape from an engine fire by using this super-quick return-to-earth method. "If you still have power, a reverse turn back onto the runway may be useful one day. Don't forget it."

After breakfast and a thorough briefing, the other two pilots get to show off how little they have forgotten from yesterday, then we do the ground school for the next STOL exercises, the extreme short distance takeoffs and then the emergency short landings. The Swiss pilot has seen these techniques in numerous YouTube videos and is whooping with excitement. CC reminds us that he is teaching us precision flying to make us more proficient, safer pilots, not cowboy thrills. However, the short distance landing especially is quite a radical manoeuvre: flying just above the ground on the point of stall then cutting power, retracting flaps, flaring, dropping and stopping – all in a few hundred feet.

We start with the short-field takeoffs and learn how to use ground effect properly. CC corrects the Swiss pilot from



'I retire to the pool by the Control Tower, feeling rather pleased with myself' – Kat had mastered flying by feel

CC reminds us he is teaching us precision flying to make us safer pilots, not cowboys

referring to it as a cushion of air. It's not caused by air trapped between the bottom of the wings and the ground (I thought this too) but is created from wing downwash and wingtip vortices. Using it allows flight way below the true power-on stall speed. "A short-field ground effect takeoff is achieved by allowing or rather forcing the aircraft to become airborne well under normal lift-off speed whilst remaining only a few feet off the ground until the airplane has accelerated to a

safe out-of-ground-effect climb speed," CC explains.

Back in the bar, we are all flying high on the adrenaline rush of discovering new things in such an amazing place. CC debriefs our STOL session and takes another stab at flight school training. "In an emergency you are taught to set up for a long, low and slow approach into a big empty field – but what happens when you are trapped in a valley where the only place to land is a steep narrow sloping ledge? Or on a stretch of highway between two bridges? Or you have to land short because a herd of zebra and wildebeest have wandered across the airstrip?" We know he is speaking from experience. Only the first of these required a stay in hospital, and the injuries were sustained only by the lack of a shoulder strap. Always use your shoulder strap, guys!

The mining engineer points out that he had never realised that flaps were so useful in so many different manoeuvres, but worries that he has been taught never to retract flaps close to the ground. "Verboten," chips in the Swiss airline pilot. CC rolls his eyeballs. "That's Kindergarten crap. Flaps are a greatly underused tool in aviation." ➔



A view down Runway 17 at CC's original base in South Africa

STALL SPEEDS

Health warning: don't try this on your own first time!

Do you know what the slowest indicated stall speed is for your aircraft, wings level, full flap? Stall speeds are affected by: aircraft weight; positioning of weight inside the aircraft; flaps; and power. Unknown to most pilots there are in fact four stall speeds:

1. The highest stall speed is the V_{so} in the POH, which is usually based on wings level, full flap, power off, utility category with no weight in the rear of the aircraft.
2. The next lower stall speed is with

optimum rear C of G, weight or ballast in the rear of the aircraft.

3. The lower-still stall speed is with optimum rear C of G, weight or ballast in the rear of the aircraft, and power on (hanging on the prop).

4. The lowest stall speed is with optimum rear C of G, weight or ballast in the rear of the aircraft, power on (hanging on the prop), in ground effect.

Extract from *Bush & Mountain Flying: a comprehensive guide to advanced techniques and procedures* by CC Pocock

Mountain flying

The course highlight for me was the mountain flying as it offers the opportunity to practice all the skills learned so far with some thrilling (life-saving) new ones. The briefing is full of caution: we should expect abrupt changes in weather, wind direction and velocity, also severe turbulence and downdrafts. At high altitudes with high temperatures there will be air with less lift and there will be less power from the engine. We are also warned of false horizons, one-way-in-one-way-out airstrips with no go-around options, and passing the point of no return.

Looking at his hi-tech meteorology station (and out of the window), CC laments that there are many days when he decides not to fly in the mountains. He thinks today may be one of them. Number one of his list of rules is: don't go if the weather is bad, especially if clouds are obscuring the mountain tops. They are. And the wind is blowing.

CC's three students (he only takes three at a time) dutifully copy down the rest of the mountain flying checklist (see box), and then listen in stunned silence to a long list of totally avoidable disasters where no pilot survived to tell the tale. Many of them were known personally to CC, some of them professional pilots, scud-running in the surrounding mountainous area. To reduce the number of 'controlled flight into terrain' accidents (CFIT) is one of the reasons Bush Air was established at this location, because it offers the opportunity to practice all the manoeuvres within a short radius. Apparently, the new base in Nevada has been painstakingly selected with the same criteria. He also feels that this part of the course is one of his greatest contributions in his mission to save lives.

It's the last day of the course. Ladies first (again). The weather still looks



CC suggests I should fly under cables if taken by surprise rather than pulling up

CC's US operations are conducted using the 172 and this Cessna 170B taildragger

CC'S MOUNTAIN FLYING RULES

- Don't go if the weather is bad, especially if clouds are obscuring the mountain tops
- Always know what the wind direction is, so you don't fly into a downdraft or severe turbulence
- If you don't know the wind direction, you must determine it as soon as possible by using the turbulence and visualisation method
- Maintain situational awareness at all times. Be continuously aware of your aircraft direction and the direction of the wind with regards to the compass
- When operating at low level in confined spaces, always slow the airplane down to within the white arc and apply flaps. This will allow you to stay ahead of the aircraft and situation, and to perform a canyon turn instantly. Lower the gear if flying a high performance retractable
- Never fly in the middle of a canyon or gorge. You may not have sufficient room to turn around, and even if you do, you may fly into the downdraft side of the canyon as well as possibly being subjected to shear turbulence in the middle
- Always fly close to the updraft side of a canyon
- Always remain in a position from where you can easily and safely turn to lowering terrain
- Never place the aircraft in any position that could possibly lead to a crash
- Always cross a ridge at a 45 degree angle so that you are able to escape away from it in the event of being unable to clear the top due to turbulence or downdrafts
- If inadvertently flying into a downdraft, apply full power, lower the nose and turn away in the opposite direction. Never slow down or try to outclimb a downdraft
- Always try to choose routes that offer suitable forced or precautionary landing sites
- Always ensure you have sufficient fuel, water, first-aid and survival equipment
- Use the same indicated airspeed for takeoff and landing, whether at sea level or at a high elevation mountain strip
- Use your sixth sense: if you have a bad feeling, then immediately turn back or abort.



CC demonstrates the side-slipping method for crosswing landing. For soft-field operations in the USA the 170B is fitted with tundra tyres



ominous so CC opts to check it out in his Cessna 172. Within half an hour he is back to pick me up.

I've worked out the density altitude and am amazed at the difference it makes. At the Bush Air base it leaps to 4,669ft at the 35°C peak temperature predicted today, from 3,465ft at 25°C yesterday – but at the mountain airstrip where we will practice the one-way-in-one-way-out landing at 5,000ft it is 8,288ft. The takeoff run will increase roughly twelve per cent with every 1,000ft above sea level. All this is whizzing around in my head as we fly towards an impressive mountain range.

The first thing we do is determine wind direction. We approach with caution and fly close to the top of a ridge. It's really bumpy. I'm a sea-level flyer, based in the

Channel Islands, but used to paraglide cross-country so I know a thing or two about the rotor turbulence lurking on lee slopes. I cross to the other side of the valley to find smoother air.

Once the wind vector is assessed we keep it in mind. We head deeper into the mountains flying very close to the updraft side of the valley, to allow for a 180 degree retreat to lower ground if conditions deteriorate. We turn flat using rudder this close to terrain to keep the wings more level. CC casually points out the high-tension cable strung below us and suggests I should fly under the cables if taken by surprise rather than pulling up. I think he's joking, but I know now that he is always speaking from experience and wants us to learn from his mistakes. He →



Landing safely under power lines on a narrow bush track, the 172 has full flap and is tail-down for a positive touchdown at lowest possible speed

points out the lenticular clouds in the far distance, a smoke stack beneath us and a flock of thermalling birds in our path, (“pull up if colliding, as birds always dive”). He is constantly reading the landscape and building a picture. We cross a ridge, approaching at a 45 degree angle in case we meet a wall of turbulence and need to execute an abrupt dash for the safer ground behind us. “Always keep the back door open.”

We continue up to the end of another valley where CC will demonstrate a canyon turn. Another of CC’s mantras is “be ahead of the game”. I’m prepared. I’ve slowed up and the optimum flaps are down. Having determined power setting and airspeed, my eyes are out of the cockpit. I can’t pretend I’m not terrified flying such steep turns close to unforgiving terrain, but with CC’s calm voice in my headphones I manage to do one – eventually – that he’s satisfied with.

No time to relax though as we arrive at 1,000ft over a short, high dirt strip surrounded by very big hills. First, we assess the wind by feeling for turbulence and observing treetops for movement. I go

over some of the points covered at the briefing: the air is thinner up here so we must expect less lift on the wings, less propeller thrust and engine power. It occurs to me that we won’t need that for the go-around; this is a one-way-in-one-way-out strip so there isn’t one. While setting up for the approach, CC reminds me that we are going to need a longer run to land. I remember that there’s an increase in ground speed of roughly two per cent for every 1,000ft above sea level and we’re at 5,000ft. Continuing the approach, CC goes through the two different types of points of no return. The first is the abort point, when you are too high and still have choices; the other is the one where you don’t.

“Never, ever, go beyond the point of no return unless you are 100 per cent confident of a perfect landing.” Then he adds, grinning: “We’ve just passed it. If you’re unhappy, always turn back. Trust your instincts.” *Captain Cautious.*

At this point I sort of glaze over, information overload, and just enjoy watching a master of his profession at one with his craft, while generously sharing skills established over a lifetime flying in an environment in which he feels totally comfortable. We head back to the other two pilots, eager to have their last session before conditions close in.


Money-back guarantee

Not many flying courses come with a guarantee. We were promised that, after just three days, we would be “safer, more proficient and skilled pilots”. No-one has ever asked for their money back.

I cannot claim to be proficient but I do feel as though I have all the tools to practise. I am armed with a method and a check list of simple manoeuvres and tests that I can perform on the PA-28 I fly back home to explore the flight envelope and work towards becoming “one with the aeroplane”. I know I will feel safer in my own aircraft and have lowered the chances of having an accident. CC has shown me the limits so that I will recognise the danger zone and be prepared. That’s what it’s all about. It was also tremendous fun doing this type of flying.

At sunset on the last day, the removal container arrived. The three fledgling bush pilots watched as the Cessna 172 was dismantled ready for shipping. We wish Captain Crash all the best as he starts his new life in the States – but he may like to change his name to Captain Cautious – although he will always be just ‘CC’ to his many friends.

With my shiny certificate in my hand, I head back to Johannesburg to pick up a Cessna 182 which I have chartered from Bush Pilot Adventures (www.bushpilot.co.za) to begin a week-long flying trip around South Africa, Botswana, and Zambia, practising my new skills by landing in remote areas, spotting wildlife from the air. But that’s another story...

CC’s courses now run at Kidwell Airport, Cal-Nev-Ari, Nevada, USA, where a number of accommodation options exist, at varying costs. Open to all qualified pilots, the course is run over three days (plus two arrival/departure/briefing days), includes approx five flying hours and costs \$1,700 in the C172C or \$1,800 in the C170B. info@bush-air.com 



CC’s teaching brings the impossible within safe reach