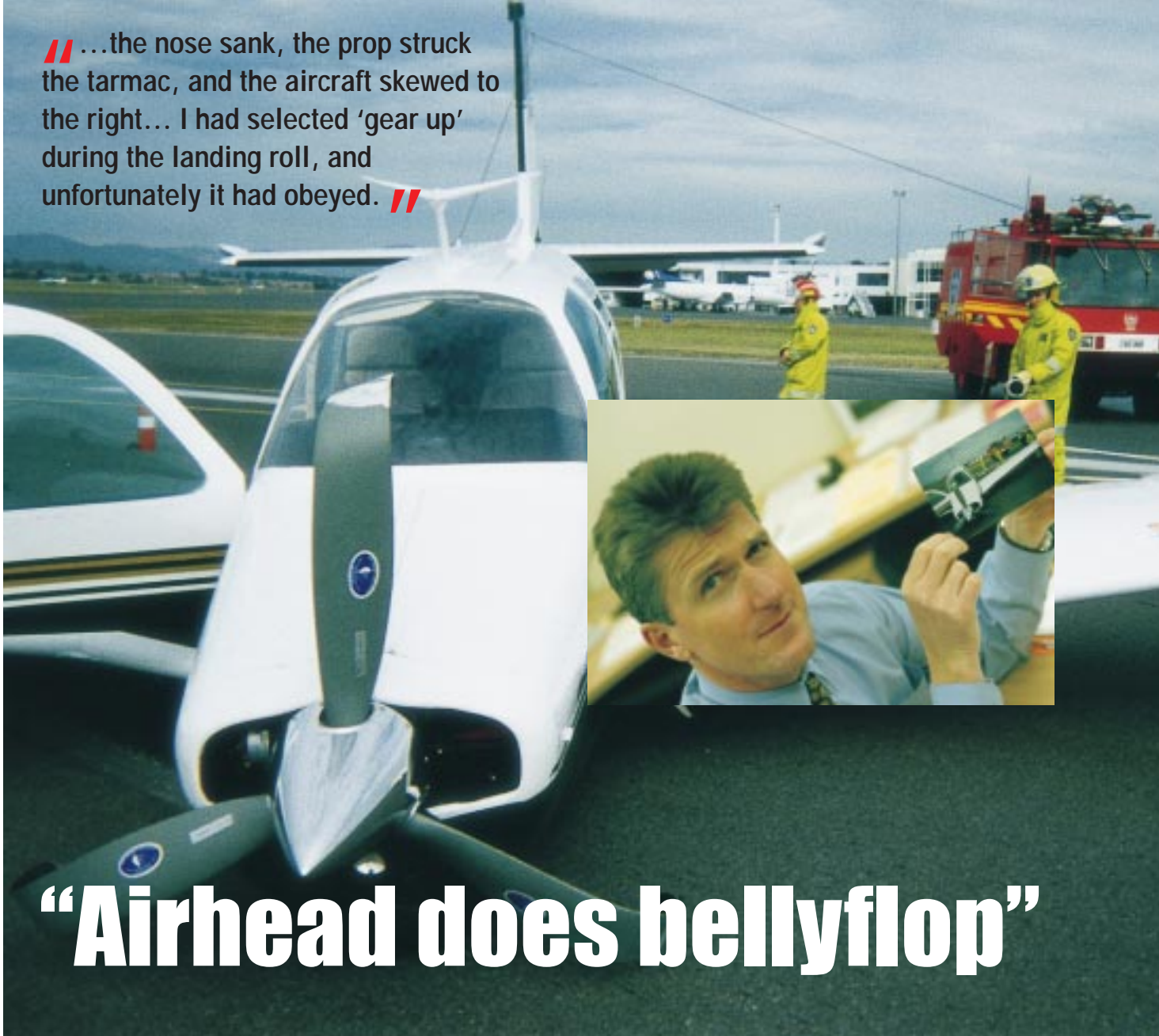


// ...the nose sank, the prop struck the tarmac, and the aircraft skewed to the right... I had selected 'gear up' during the landing roll, and unfortunately it had obeyed. //



“Airhead does bellyflop”

They say there are two types of pilots: those who have had a wheels-up incident and those who are going to. Little consolation for CASA's general manager of GA operations, Clinton McKenzie, who earlier this year inadvertently retracted his landing gear shortly after touch down at Canberra Airport.

Clinton McKenzie

THE HEADLINE “AIRHEAD DOES Bellyflop” appeared on page 13 of a national newspaper, followed by a report that Clinton McKenzie, the general manager of general aviation operations at the Civil Aviation Safety Authority, had done a wheels-up in a Bonanza.

Although the report was inaccurate, the truth was even more embarrassing: rather than having landed wheels-up as the report stated, I had landed the aircraft with the undercarriage down and locked, and then mistakenly retracted the undercarriage on the ground.

The flight that culminated in the accident

was my biennial flight review (BFR). As usual, I booked an aircraft with a retractable undercarriage and constant-speed, variable-pitch prop, and asked to do a flight that included some navigation and emergencies.

After obtaining met and NOTAMs from AVFAX I put together a flight plan in accordance with the instructor's requirements. The instructor reviewed the plan, then conducted a short question and answer session on the privileges of my licence, aircraft performance and the maintenance release. After refuelling the aircraft and conducting a fuel drain and daily inspection, we hopped on board.

The departure from controlled airspace was uneventful, and proceeded as planned.

I felt pretty confident, as I was keeping well ahead of the aircraft and accurately anticipating ATC instructions.

I arrived at Goulburn airport a little high, and as a consequence had to extend beyond the upwind end of the runway to get down to circuit height on the dead side. There were two other aircraft in the area: one departing the runway I wanted to use, and one doing circuits on the cross runway. We sighted both aircraft, and conducted a standard circuit.

I did two touch-and-go landings: one with full flap, and one flapless. After the second touch and go, I was told to proceed as planned, so I set a heading for home. Overhead the aerodrome, the instructor closed



I had selected gear up during the landing roll, and unfortunately it had obeyed.

The instructor immediately told me to turn the fuel and master switch off, which I did. He leapt out to see if there was any evidence of fire or fuel leaks, which fortunately there was not. The firefighters and ambulance arrived in seconds, but fortunately their services were not required.

I remained in the aircraft, silently swearing to myself and shaking my head in abject frustration. All around me aircraft continued to taxi, take-off and land. (At least I hadn't managed to close both runways.) I had a pretty good idea of the conversations that were going on in their cockpits.

So what went wrong? To answer that question, I first need to explain what I can remember of the landing roll.

The after-landing checks that I conduct from memory are: carby heat to cold; flaps (wing) identified and up; trim set for take off; and transponder set to standby (if a full stop landing). The aircraft did not have carby heat, so during the landing roll I reached straight for and identified the flap switch. I then heard

an ATC instruction about expediting through a taxiway. I paused for half a second to figure out that the instruction was not for me, during which time I took my hand off the flap switch and placed it back on the control column. (The instructor

recalls having seen me reach for the flap switch, whereupon he looked out of the cockpit.) I then reached back down for the flap switch while looking ahead, got the undercarriage switch, and the rest you already know.

The trap: Since the accident, numerous professional pilots and engineers have related stories to me about the trap that is set by the configuration of the flap and undercarriage switches in the Bonanza and similar aircraft: the switches are sometimes obscured by the horizontal control column, and transposed in comparison with those in other common aircraft types.

To me, the existence of the potential trap is no excuse. Rather, it merely accounts for the importance of the word "identified" in the check "flaps identified and up". I suspect that having negotiated the practice forced landing and diversion of the BFR, I allowed myself the luxury of relaxing a bit after a "normal" landing once home. The trouble is, of course, that the flight was far from over

while I was still rolling on the runway. Having allowed myself to be distracted, I should have been doubly careful to identify the flap switch.

The potential trap set by control configurations just makes it more important that pilots are current, and current on type. I reviewed my logbook and realised I had not been doing much flying at all, much less in a Bonanza. It had been six months since I had flown a Bonanza, and four since I had flown as pilot in command.

On reflection I realised that an indication of my lack of currency, particularly in relation to flap selection during after-landing checks, had occurred during the flight. After the first touch-and-go, I was completing my after-take-off checks and discovered that the flaps were still extended. So, I had not completed my after-landing checks properly while rolling on the runway.

The next touch-and-go was flapless, so I did not have to go through the process of retracting the flaps. During the practice forced landing I was about to extend the flaps on short final, when I was instructed

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to "go around", so again I did not have to go through the process of retracting the flaps. Therefore, as I approached to land at the end of the BFR, approximately six months had passed since the last time I had correctly completed after-landing checks in a Bonanza.

What about the "squat" switch? Why didn't it say, in effect, "Sorry idiot, you're on the ground so you can't retract the undercarriage"? During the landing roll, the lift generated by the wings (and, of course, the extended flaps) and undulations in the runway resulted in the struts extending and the squat switch "telling" the undercarriage that the aircraft was in the air. This illustrates the prudence of never relying upon a squat switch.

High risk: But why retract the flaps on the runway? This question was put to me by the CASA investigating officer. My response was that I had got into the habit of completing after-landing checks during the landing roll, simply because I, like most pilots, did a lot of touch-and-go landings during training. I had never distinguished between touch-and-go and full-stop landings, when carrying out after-landing checks. The investigating officer convinced me that I should make a distinction.

I now realise that provided there is no

the throttle to simulate an engine failure. I conducted a practice forced landing down to short final on runway 04 followed by a "go around". I was then asked to divert and enter controlled airspace via an obscure checkpoint selected by the instructor.

I remained in G airspace, found the checkpoint, asked for and obtained an airways clearance, and headed for home. I was cleared for a straight-in approach, given a landing clearance, and the subsequent approach and landing were by the numbers.

Slip-up: During the landing roll I commenced my after-landing checks. Suddenly, what I thought was the stall warning horn began to blare. My first response was to ask myself, "Why on earth is the stall warning going off?" The answer soon came when the nose sank, the prop struck the tarmac, and the aircraft skewed to the right. The horn wasn't the stall warning: it was the undercarriage warning.

// Unless you are conducting a touch-and-go or a short-field landing, after-landing checks can wait until you have taxied clear of the runway. //

imperative to stop in a very short distance, after-landing checks on the runway create risks without any appreciable benefit. Having been given a clearance to conduct a full-stop landing on a runway that was about three times the length that I needed, all I had to do was keep my eyes outside the cockpit, my hands on the control column and throttle, and the aircraft in the centre of the runway. I had the luxury of waiting until off the runway to concentrate more closely on conducting after-landing checks, at a speed at which the squat switch might have placed a barrier between my mistake and the retraction of the undercarriage.

What rules did I break? I can't identify any regulatory provision that prohibits the kind

of mistake that I made. Nonetheless, good airmanship does not merely require compliance with the rules. The best definition of good airmanship I know is, "the safe and efficient operation of aircraft in the air and on the ground".

Lessons learned: I suppose the most frustrating part is that I thought I had already learned some of these lessons from other people's mistakes. Properly identifying flaps and undercarriage switches, remaining current, being doubly careful to properly complete partially completed checklists after a distraction, and remaining vigilant throughout all phases of an operation, are common themes in many accident reports.

The new lesson I learned is that after-landing checks are in many cases more safely conducted off the runway. Unless I need to stop in a very short distance or I'm doing a touch and go, I intend to concentrate on landing and getting off the runway before worrying about after-landing checks.

Clinton McKenzie, General Manager, General Aviation Operations, CASA. (As a CASA staff member, this author is ineligible for a prize. - Ed.)

ANALYSIS

Links in the chain

John Chesterfield

After the understandable wry smile we should remember that this pilot, despite his position within CASA, is just as susceptible to human error as the rest of us. I commend the detailed account of the incident and Clinton's "up front" acceptance of responsibility. He has also made a fairly detailed self-analysis, leaving little to add.

I assume his BFR instructor determined the extent of Clinton's recency on the Bonanza. If this assumption is correct, I am surprised he didn't place particular emphasis on the "abnormal" positioning of the gear and flap levers in the aircraft during the pre-flight discussions.

Also, both of these controls has a unique feel code – the flap lever is shaped like a wedge, and the gear lever is shaped like a wheel. If the pilot had consciously identified the lever by feel, the incident would not have occurred.

Flaps identified: The Australian Bonanza Society's pilot proficiency program (BPPP)



The flap and undercarriage switches in the Beech Bonanza are partially obscured by the horizontal central column, and transposed in comparison to other aircraft types.

stresses that the after-landing checks should be delayed until the aircraft has taxied clear of the flight strip, and preferably stopped moving. The exception to the rule occurs during touch-and-go landings and short-field operations where the maximum weight of the aircraft should be placed on the main wheels as early as possible to optimise braking.

In both of these cases, we emphasise that the pilot (and instructor, if it is a training flight) must be acutely aware of the added gear-up risk in Bonanzas (the same risk also exists in Barons), and the spoken check “flaps identified” must be completed before the flap lever is moved. In addition, BPPP instructors are reminded before every training session to watch the pilot’s hands like a hawk during intended flap retraction after landing.

The incident is a classic “links in the chain” event with at least six factors contributing to the unfortunate outcome:

- The flight was fairly intensive with an understandable, but potentially dangerous, end-of-flight relaxation.
- The Bonanza “dual-pole” cross-member obscures both gear and flap levers from view unless the column is held fully aft. This fact does not appear to have been emphasised during the pre-flight briefing.

// A BFR is not a test in the classic sense – it is an opportunity to receive recurrent training, and to demonstrate competence in critical aspects of aircraft operations. //

- The radio caused a distraction at a critical moment of cockpit activity.
- The pilot was not current on the aircraft type, and post-landing flap retraction was a procedure only practiced once during this flight (and then when airborne).
- The instructor did not adequately monitor the student during the post-landing phase of the flight.

Squat switch: The “squat switch”, which is supposed to isolate the gear-motor circuit when the oleo is compressed after landing, failed to operate. This is the absolute last line of defence against inadvertent gear retraction though it should never be trusted. In this case the switch was either unserviceable, or the undercarriage was retracted while the wings were still producing significant lift at high speed. I hope the former is the case.

The following suggestions may help

Lady Luck is waiting for the opportunity to hit you in two of your most vulnerable places – your wallet and your ego.

Damage to the Bonanza exceeded \$50,000.



others avoid a similar experience:

- Before flying an unfamiliar aircraft ask an instructor/pilot who is current on the type to brief or re-brief you on any unusual features. Take the time to familiarise yourself with the cockpit layout before the flight and memorise the location of critical control and switch positions.
- A BFR is not a test in the classic sense – it is an opportunity to receive recurrent training, and to demonstrate competence in critical aspects of aircraft operations like forced landings and short-field operations. You should actively participate in the planning of any BFR, making clear to the instructor any specific aspects of flying that you feel need evaluation and revision.
- Don’t be distracted by radio transmissions during critical cockpit activity –

“aviate, navigate, communicate” applies from engine start to engine stop.

- Unless you are conducting a touch-and-go or a short-field landing, after-landing checks can wait until you have taxied clear of the runway – preferably after the aircraft has stopped, to minimise distractions.
- Lady Luck is waiting for the opportunity to hit you in two of your most vulnerable places – your wallet and your ego. You are especially vulnerable at the end of a long or tiring flight – consciously think about potential hazards in the terminal phase and take extra care to recognise and avoid them.

John Chesterfield is a test officer for instrument and instructor ratings, and director of training for the Australian Bonanza Society.