Flap foolery

An instructor ignores his flight manual and nearly pays the ultimate price.

DURING A NORMAL touch-and-go procedure most pilots would agree that the general order of things, after the wheels touch tarmac, is for the pilot to identify the flap lever, retract the flaps, apply full power and lift off. Right? Not according to a chief flying instructor I once worked for. He insisted on the unusual practice of retracting full flaps when airborne in ground effect.

This exercise was often accompanied by a demonstration that a Cessna 172 could perform a complete circuit on full flaps. The argument went that a time could come when, having touched down at a short strip with full flaps, a go around might be needed. Instead of waiting for the flaps to retract, losing momentum in the ground roll, why not apply full power, get airborne into ground effect and then retract the flaps judiciously while accelerating? Waiting for the flaps to retract costs precious seconds but most pilots tend to think a C-172 on full flap will not leave the ground, especially the older models with 40 degrees of flap. Even if they were to try, they would probably not be familiar enough with how the aircraft flies to handle it correctly, and so regular practice would be essential. There's also the issue that the flaps could fail to retract after landing.

That seemed reasonable until this unusual technique, combined with a few unforeseen circumstances, nearly killed me. Afterwards it was a lot clearer to me that the flight manual had been prepared by people who should be trusted.

The school used Cessna 172s by preference but also had Piper Tomahawks and Cherokee 140s available at various times. The 172s and Cherokees have enough power to spare when used as trainers with just two people on board, and get along quite well when asked to climb on full flap.

The Tomahawk has rather less-effective flaps that allow even a low-time student to be reasonably safe in the same circumstances. Of course, flown solo, the risk factor diminishes in all three cases. In fact, in my time under this regime, I have flown Cessna 152s and even a Cessna 150 around a complete circuit with full flaps and two people on board.

To the credit of the instructor, my experience probably did get me safely home one day when a Cessna 150 had a flap-switch failure and the flaps stayed down during a touch-and-go with a C-Cat student. However, that incident was also a result of the intended full-flap take-off putting us off guard about whether the flaps had retracted, which should be a normal check while rolling in any touch-and-go.

My near miss happened at a little-used aerodrome with an 850 m tar-sealed runway and a small sporadically active club of fairly laid back, low-time aviators. I was the instructor and they did what I said and accepted the full-flap business in good faith. I wasn't all that experienced myself and believed every word spoken by the chief instructor.

The student on this particular day had flown Cherokees and was converting to the Cessna 172 by the normal type-rating procedure. He had done a number of circuits with me and performed several full-flap touch-and-gos without problems.

When it came time to do three circuits at all-up weight, I invited two other pilots to fill the back seats. These two were short but made up for it in weight, particularly one who must have been struggling to get a medical to fly.

We were all good friends and our style was casual to the point that no-one checked the weight-and-balance. I didn't and I couldn't honestly say if we were overweight or not, which was not good since I was responsible for the flight. I just knew that four adult males and half-full fuel tanks worked out at about maximum all-up weight and I expected the aircraft to perform accordingly.

At any rate, we headed away with a normal take-off using no flap at all since the C-172 is happy that way. We did one normal approach with a full-flap touch-and-go and it worked out okay, partly because the student made a low approach, touched down near the threshold, immediately applied full power, and got away without slowing down too much. Further, 850 m of tar-sealed runway is ample, even for a heavily-loaded Cessna 172 accelerating slowly.

My next demand was a glide approach and the student complied but he was cautious because of the previous low approach and turned rather too early. No problem – just apply flaps. Even so, we were still high when we turned onto final, even with full flap. I just advised him to continue his approach, sure that we had plenty of space, just as we did on previous landings.

This time, however, things were different. We touched down well along the runway and he let the machine settle, though I wanted a touch-and-go. I urged him to power up again and he didn't react until the runway was mostly behind us.

The 172 lifted off with just a few metres to spare before the end of the tar and clawed away in ground effect over the 100 m of clearway beyond the boundary fence without climbing appreciably. Now we were heading into gently rising ground. A line of trees cut across our path at sixty degrees, obliging us to turn towards more trees that offered no escape at all.

I took control, and for what seemed an eternity, I played for all the height I could get, not letting the airspeed fall below about 55 kt. I couldn't reach 60 kt without feeling that the aircraft was sinking, but I was sure it wouldn't climb below 55 kt. We turned along the line of poplars and I began to imagine how the crash would happen.

By chance, the last two or three trees in the row had not thrived and the gap was just wide enough for us to slip through. The land beyond was still rising but there was sufficient space for us to ease our way out with careful retraction of the flaps at 5 -10 degrees at a time.

Nobody said much as we climbed away and by the time we were downwind we had relaxed. But I had learned a lesson: forgiving aeroplanes and foolish pilots are a very bad combination, particularly when the latter has developed procedures that are not in line with what is approved in the flight manual.

Clearly it wasn't just the full-flap trick that caused problems that day. Slackness and inexperience put us in a position in which faulty technique nearly finished us off.

The full-flap business became known and when I came up for my instructor renewal, I was told in no uncertain terms that such a practice was illegal because it was not approved in the flight manual.

-Highly commended, awarded $500

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ANALYSIS:
A lesson for management

By Maurie Lewis

A well described lesson! But why would an experienced instructor conduct an operation contrary to published operating procedures?

A key objective of any flying school is the inculcation of a systemic approach to flight preparation in students. This is best achieved by establishing effective operating procedures, limitations and information. Procedures must be documented and diligently followed by instructors. (We all know that students learn more by observing their instructors than listening to them.) In this case, it seems unlikely that the school had effective procedures in place, and if it did, it certainly did not observe them.

Before any flight, all the mandatory pre-flight activities, including flight planning, load calculation, performance calculations, have to be done. In some cases, such as regular operation of the same aircraft, at the same weight to and from the same aerodrome, some information might be pre-calculated.

Training operations, such as dual and solo circuit flights, can sometimes be in this category. Training flights with four people on board were not regular operations, but what was this school's policy on pre-flight performance calculations? There didn't seem to be any, none that the pilot referred to anyway.

The loading system was not complied

with before the circuits with four on board, as the instructor "knew" the aircraft was "about" maximum take-off weight. As a supervising instructor he should have completed a load sheet or made a load calculation in accordance with the approved loading system. As it was, the aircraft might have been overweight and he really didn't know.

The take-off and landing distances required had not been calculated. In the training environment, what better lesson in the effect of aircraft weight on performance than to compare the distances required at dual or solo weights versus those needed at maximum take-off weight.

Another performance aspect not checked was the landing climb (baulked approach) performance. For a Cessna 172N operating at a pressure altitude greater than 500 feet, its weight must be reduced to meet the climb performance requirement in the landing configuration; perhaps the aerodrome altitude and a heavy aircraft were factors in this event. Most significantly, no one checked to see if they would be!

Did the flying school have a clearly described policy on the conduct of touch-and-goes on the 850 m runway? Did the school specify weight limits for each aircraft type and minimum headwind requirements, and were "go-round by" points on the runway specified for each aircraft type, etc? If not, why not?

For a Cessna 172N, at sea-level maximum weight, it requires approximately 650 m for take-off and 500 m for landing. To make a touch-and-go on an 850 m runway, the power must be applied, and the take-off started, with at least 650 m remaining (as a rough estimate only). Therefore if the aircraft has not touched down within the first 200 m of runway, then a baulked approach or "go round" is the only option. If some sort of go round point had been calculated (by the school or the instructor) and applied, we would not be discussing this frightening event.

The author in his self-analysis says that his slack attitude and inexperience were the main contributors to this occurrence. However, the flying school and the chief flying instructor (CFI) also played a part in the incident.

The school should have had adequate information, instructions and limits specific to the safe operation of its aircraft during training activities. This information should have been available to instructors and students; preferably in written or published documents.

Most importantly, the CFI must regularly assess instructor and student operations to ensure that procedures are being followed. There was no sign of any of these processes at this school.

This occurrence was mainly due to inadequate operational management of flying training operations. Although the CFI was not on board the aircraft, he cannot resile from the outcome.

Maurie Lewis is a CASA GA flying operations inspector

When enough's ENOUGH!

Pilots are sometimes pressured to break rules

Peter (not his real name) wants to keep his job, but he fears it won't be long before there's an accident with the long hours he's been asked to work.

Peter called the confidential CASA hotline to report his concerns. His identity was protected, and CASA took action.

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