Not Necessarily **Twice**

When one of two engines dies after takeoff, and an unseasoned pilot makes a couple of crucial errors, it takes all the experience of the training pilot to get everyone back down safely.

In March 2012 I was conducting command training with a new line pilot in a twin engine Piper Aztec aircraft on scheduled IFR passenger services.

It was a mild morning with a 6 am sign-on. The first sector from Gisborne to Rotorua was uneventful. The airport at Rotorua is some 950 ft amsl and surrounded by high terrain and lakes. The second sector was from Rotorua to Hamilton with the trainee pilot in the left seat, me in the right and two passengers in the rear.

We lined up on runway 18 at Rotorua about 8 am and began the takeoff roll. All indications during the takeoff were normal.

Once airborne the landing gear was retracted. Part way through the gear retraction at a height of approximately 150 ft agl the left engine failed.

The trainee pilot immediately identified which engine had failed, and began her initial response.

> *With the left engine shut down and secured, we had no hydraulics… We were going to have to manually lower the landing gear.*

However, when she got to the pitch lever for the propeller, she did a touch check rather than actually feathering the propeller.

I saw this and immediately feathered the propeller as soon as she had removed her hand from the lever.

I did a MAYDAY call to the tower advising that we had suffered an engine failure.

Typically, the Aztec will fly very well on one engine, achieving around 400 ft per minute climb. However, we were still accelerating between the red line and blue line. Red line indicates V_{MCA}, or minimum air speed that control of the aircraft can be maintained with one engine on full power and the other inoperative; blue line is best rate of climb airspeed with one engine operating.

The high angle of attack on takeoff, coupled with the initial delay in feathering the propeller, resulted in the propeller taking some time to feather as the propeller RPM was low.

There were houses and trees directly ahead of us. The trainee pilot pulled back on the controls to try to climb over them.

At that point I took control of the aircraft as our airspeed was now within 5–10 knots of V_{MCA}, and decaying. We were descending.

I lowered the nose to try to gain airspeed, and began manoeuvring around the trees and houses, aiming towards Lake Rotorua.

I was convinced, however, that we were going to hit the ground before we reached the lake. In my mind I was thinking 'better to impact under control than out of control'.

It was an extremely anxious time to have maximum power on the remaining engine, correct engine-out technique applied, and yet to still be descending.

As I was manoeuvring, the tops of the trees were above us, and I was thinking of what actions I would take immediately prior to impact. We were so low, the air traffic controller had lost sight of the aircraft below the tree line, and we were not showing up on radar. He transmitted, "confirm that you can return to the airfield," to which I replied, "I don't know".

At this stage, we were only about 40 feet above the ground.

Finally, the aircraft stopped descending and slowly started to accelerate. Once over the lake, and now starting to slowly climb, I relaxed somewhat, believing we were going to make it.

There was a floatplane circling over the top of us in case we ditched.

I asked the trainee to explain to the passengers that the aircraft will fly on one engine, and that we were returning to land at Rotorua. I asked her to remind them to put on life jackets and to ensure their seat belts were secure.

I circled wide around Lake Rotorua in an attempt to gain more altitude, as there was some low terrain that we would have to pass over as we came into land.

The next issue was that, with the left engine shut down and secured, we had no hydraulics. That meant no flaps or undercarriage. We were going to have to manually lower the

as Safe

A twin-engine aircraft, such as this Seneca III, is not always twice as safe as a single engine aircraft.

landing gear. I explained to the trainee that we had only one attempt at this, and that I would select the gear down and would tell her when to start pumping the manual hydraulic pump.

We managed to attain only about 300 ft agl by the time we lined up on final. But we worked well as a team and got three green lights on the undercarriage before landing safely back on runway 18.

We taxied off the runway escorted by airport fire rescue, completed our checklist, and shut down.

I escorted the passengers into the terminal and explained to them in more detail about what I thought had happened. They did say that they had been concerned that the wingtip was going to hit the ground at one point, because we were so low.

I returned to the aircraft; checking the fuel quantity and doing a fuel drain told me we had plenty of fuel and it was free of contaminants.

After dealing with the passengers and the aircraft, the trainee and I went up to the control tower.

The controller said that he'd completely lost sight of us for a time and had feared the worst.

It's fair to say the three of us were pretty shaken, but a coffee and a good chat helped calm our rattled nerves.

The engineers traced the source of the crisis to the fuel control unit (FCU), which contained a fine orange sludge that had built up and corroded the inside of the unit. The aircraft had been imported from Australia and it was thought that fine dirt had got into the fuel system from drum refuelling.

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The FCU on the right engine was found to be in a similar state.

During the debrief, I asked the trainee why she had not feathered the propeller, initially doing only a touch check. She explained she thought we were doing a simulated exercise, and therefore she did only the touch check.

I explained that we never do simulated engine failures with fare-paying passengers, and certainly not at that height.

> *In a twin, correct speed control is everything to maintain control.*

She also explained she'd pulled back on the control column, approaching the houses, because she didn't want to hit them or the nearby trees.

I described for her the relationship between airspeed, and controllability, and stress. The reason the aircraft was not performing was because we were still accelerating at the time of the failure, and on the back of the drag curve, whereas during simulated emergency training, the aircraft is already at climb or cruise speeds.

In a twin, correct speed control is everything to maintain control.

On the Aztec, the left engine is the critical engine for two reasons. Firstly, due to the direction of the propeller's rotation and the offset forces involved in that, and secondly, the engine-driven hydraulic pump is connected to the left engine.

The flaps and undercarriage on the Aztec are both hydraulic. So a consequence of a failure of the left engine is the loss of the engine-driven hydraulic pump.

This was a particularly sobering experience. The company had come extremely close to losing an aircraft and possibly, four lives.

But I believe that my hours of multi-engine instructing and flight examining had set me up well to deal with this emergency, and that had an inexperienced pilot been involved, the outcome could well have been very different.

Twin engine aircraft are not necessarily twice as safe. In the wrong hands, they can be twice as dangerous. ■

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