

TAIL WAGGING TAILDRAGGER



Terry Killow had landed his new Stinson many times without trouble earlier that day. He thought the next landing would be “just one more of the same”. It wasn’t.

While in the US I flew to an airport in North Carolina to purchase and conduct a final inspection of a Stinson 108 – which I now own. I left home at about 5 am and arrived at the airport in North Carolina by 8 am. By 8.30 am the transaction had been completed.

I then started some type training that had previously been arranged with the seller, who was a flying instructor. We spent about 7 hours in the air doing high work, low work, and many, many takeoffs and landings (three-point and wheeler landings as well as cross-wind circuits). I found the Stinson quite docile to land (for a taildragger) and did some of the best landings that day that I have ever done. I even received some compliments from spectators on the ground on my wheel landings.

Takeoffs, however, did require careful and gradual application of power, as well as a quick right foot to keep the nose straight.

Hurry to get home: It was after 4.30 pm when we finished, and I was in a hurry

to get home before dark. I refuelled and took off at about 4.30 pm for a two-and-a-half hour flight to Northern Virginia. The flight home proved no problem. The weather was good and I was assisted by a hand-held GPS.

Finally, Warrenton Airport, Virginia (home base at the time) was in sight. By now it was after 6.30 pm. I had been up since about 4.30 am (roughly 14 hours) and had spent about 9 hours flying the Stinson. I was tired, I needed to go to the toilet, and a cup of coffee sounded like heaven. I had also landed the aeroplane many times earlier that day without any trouble, and I thought the next landing would be just one more of the same. Weather conditions were good with clear skies, good visibility and no significant wind. I entered the pattern and turned on final, impatient to get onto the ground and relax.

As I commenced the flare for a three-point landing, I realised that the tail was still high (because I was going a bit too fast) and decided to do a wheel landing instead. At about this time the main wheels

touched, and I nudged the control wheel forward to “pin” the wheels on. What happened next came without warning, and happened very, very quickly.

The aircraft veered sharply to the right. I applied lots of left rudder with the right edge of the runway almost under the wheels. I then sharply veered to the left, and the left main wheel was actually off the side of the runway. After applying the right rudder it started another sharp turn and I was back at the right hand edge. At that point I recalled my taildragger instructor saying “if in doubt, apply power” – I did, and the engine responded.

Before I knew it, I was almost off the left edge of the runway again. I then cut the power and regained control with a combination of rudder and a little gentle braking. I had, amazingly, come to rest in the centre of the runway, pointing down the centreline, fortunately without a ground loop occurring. I was lucky. The aeroplane was undamaged. I taxied to the ramp, secured the aeroplane and then sat down to a cup of coffee with hands that were still shaking.

ANALYSIS

Prevention of the dreaded swing

After swinging wildly to the left and right, the pilot, amazingly, came to rest in the centre of the runway.

While some unknown elements – such as wind speed and direction – prevent a detailed analysis, some causative factors for this incident could include: fatigue, inexperience, the endorsement technique, unfamiliarity with a new type and aerodrome, a split-second decision to change the landing style and a non standard approach.

It is clear that this pilot was suffering from fatigue, which would have degraded his skills and decision making ability. While the duty times of civil aviation order (CAO) 48 apply to commercial operations, they also provide some guidance on what is a reasonable duty period to ensure a well-rested pilot.

This pilot had been awake for 14 hours, had flown 7 hours of training in an unfamiliar aircraft in an unfamiliar environment, and then flew cross-country for two more hours. Fatigue and loss of concentration were highly likely (see cover story).

Because their centre of gravity is behind the main wheels, tailwheel aircraft have a tendency to swing (yaw). Once a swing starts, the aeroplane will continue to swing, often at an increasing rate. A crosswind can result in a reduction or worsening of this tendency to swing, whereas a tail wind will reduce rudder effectiveness during ground roll. An inexperienced tailwheel pilot is more likely to suffer a ground loop.

One Australian study has found one-third of ground looping incidents involved pilots with less than 12 hours experience on type. All taildragger pilots with more than a few landings to their credit have been through one or more moments where the aircraft has swung to the runway edge, despite the best efforts of the pilot. Prevention of the swing depends on quick reflexes (tired pilots have slower than normal reflexes).

Now let us consider that a big swing has developed on landing. We have tried full rudder, and perhaps a touch of brake – should we use power? If you crave excitement by all means add lots of power. This will immediately multiply rudder effectiveness through the slipstream effect, so the big rudder input you have just made will suddenly become

much more effective, and will increase the probability that you will over-correct. With most clockwise rotating propellers, the added power will immediately cause the aeroplane to tend to roll left, placing a downward force on the left tyre, the effect of which is like having partial left brake applied. This may or may not help the situation.

Finally, the added power will increase speed – which is not usually welcome on landing, especially if you have lost control. An inexperienced taildragger pilot is more likely to increase the severity of a ground loop in a single-engine aeroplane if his or her final line of defence during landing is the application of power to correct a swing. However that does not mean that you should never add power – just that if you do, you need to be very careful.

The main lessons from this incident are:

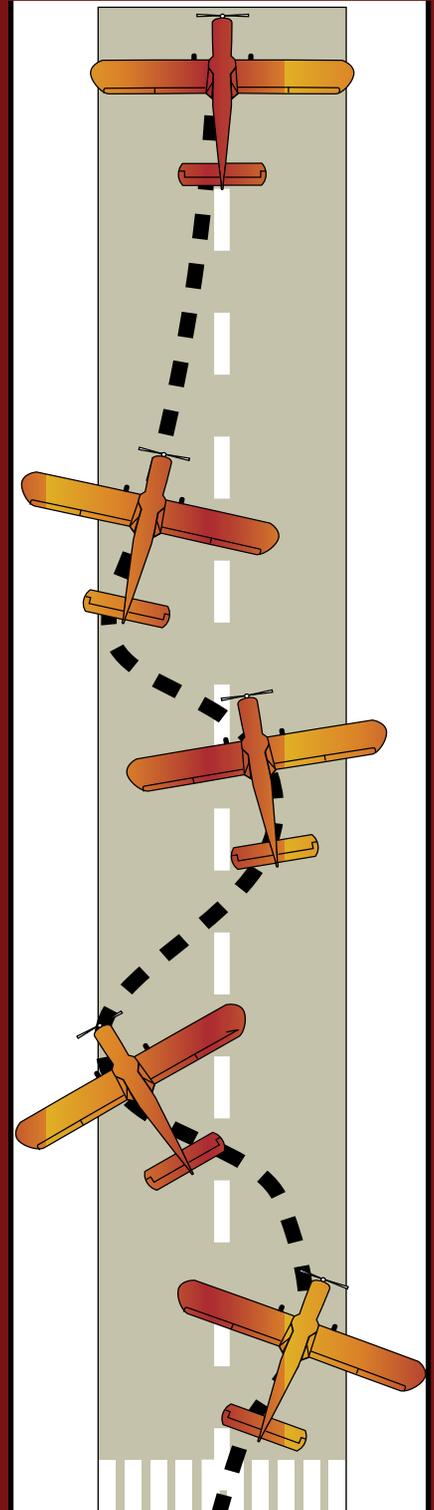
- Do not fly when you are tired.
- Quick reactions to stop a swing developing are the best form of defence against ground looping.
- Do not over control.
- Adding power following a loss of control on landing may only speed you to the accident site.
- As speed reduces on landing there is also a reduction in rudder effectiveness.
- Ground loops on landing often occur when there is a quartering tail wind.

Right swing: – For most modern aeroplanes (with propellers rotating clockwise when viewed from the cockpit), there are four factors that may cause the aeroplane to swing to the left on takeoff:

- Torque reaction – an increase in power causes the aeroplane to roll to the left and places a downward force on the left tyre; decrease in power has the opposite effect.
- Slipstream effect – the rotation of airflow striking the left-hand side of the fuselage behind the centre of gravity as well as on the left hand side of the fin and rudder also tends to make the aeroplane swing to the left.
- Asymmetric blade effect – the blade moving downwards has a higher angle of attack, so more thrust is coming from the right hand side of the propeller disk, which causes the aeroplane to swing to the left.
- Gyroscopic effect – when the tail is raised this effect is manifest at 90 degrees to the direction of the rotation of the propeller, causing the aeroplane to swing to the left. If

there is no strong cross wind, it is usual to takeoff leading with some right rudder.

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After swinging wildly left and right, the aircraft came to rest in the centre of the runway