Interagency Aviation Lessons Learned

Subject: Accident Lessons Learned

Area of Concern: Human Factors

Distribution: All Aviation Activities

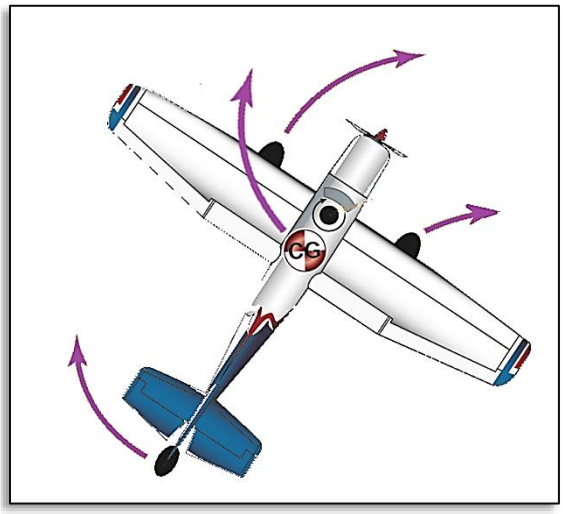
Discussion: An Air Tractor AT-802, often referred to as a Single Engine Air Tanker (SEAT) departed the runway and significantly damaged the aircraft in benign conditions – but how? Here's the rest of the story:

The SEAT finished the first drop of the day and proceeded to the airport to reload with retardant. The PIC entered a standard left-hand traffic pattern for runway 26. He observed the windsocks and estimated the wind to be approximately 5-10 mph from the north, resulting in a right crosswind. The PIC performed a wheel landing, touching the main gear first. As the PIC was slowing during the after landing roll and just before the tailwheel settled, the aircraft turned abruptly to the right. The PIC applied full left rudder, but was unable to arrest the turn. As the aircraft veered to the right side of the runway apron, the left main wheel hit a small pot hole and caused the aircraft to pivot nearly 180°. During this sequence, the left main landing gear separated from the aircraft and contacted the propeller and the underside of the fuselage.

The pilot described the events leading up to the accident as completely normal; that is, right up to the point where the aircraft abruptly turned and he lost control. Let's review the findings and see what might have gone wrong.

Crosswind. The pilot estimated the winds to be nearly 90° right crosswind of the landing runway at about 7 mph. At this airport, summer conditions make the winds quite variable in speed and direction and they could change from moment to moment. It is also important to note that there is another runway, albeit a dirt/gravel runway, that would have put the airplane directly into the wind. A 7 mph wind is certainly well within the capabilities of a pilot with his experience level and well under the Pilot Handbook limitation of 20 mph. Gusty wind conditions do require the pilot to react quickly to make

adjustments to ensure that the plane does not drift during touchdown. Even a 7 mph wind will require a crosswind correction.



Center of Gravity. For those who are not familiar with the AT-802, it has conventional landing gear. This means that it has two main wheels forward of the wing spar and a tailwheel in the back. The center of gravity (CG) in this aircraft is behind the main wheels which negatively impacts directional stability on rollout. Any difference between the direction the airplane is traveling and the direction it is headed will produce a moment about the pivot point of the wheels, and the airplane will lose directional stability (swerve). The aft CG will aggravate this swerve and if not controlled quickly, may develop in to a complete loss of directional control otherwise known as a "ground loop".

Landing Long. The AT-802 aircraft does not require a lengthy landing distance. Many pilots try to avoid a long taxi down the runway by landing long. This decreases the amount of runway available. In this case, the pilot touched down approximately 2150 feet from the approach end of the runway, which is approximately 1000 feet past the runway aiming point markings. It's conceivable that the PIC may have rushed the landing sequence in order to make the desired taxiway turnoff at midfield. This self-imposed urgency may have contributed to the loss of directional control – most likely as a rush to touch down resulted in a drift or pilot induced oscillation. Rushing places one in an adverse mental state that increases the likelihood of skill-based errors.

SEAT pilot's desire to land long most probably originate from their experience as agricultural aerial applicators. This segment of the industry often emphasizes minimizing time on the ground as much as possible – sometimes to the extreme. The latest federal SEAT contract mitigates that issue by using actual flight time to compensate contractors. This means that there is no incentive for rushing or reducing taxi time in the manner they have been accustomed.

Tail wheel Lock. The pilot confirmed that the tail wheel lock pin was in place and locked prior to takeoff and checked again prior to landing. During the swerve, he said that he unlocked it in order to try to regain directional control. He used full rudder to attempt to counteract the turn, but it was ineffective. He didn't use differential wheel brakes fearing that might make the situation worse. The pilot should have applied aileron toward the upwind wing and the rudder to stop the swerve along with careful use of differential braking. Although the tail wheel lock may have added some stability, there was no measureable benefit to unlocking it and may have distracted the pilot from regaining control.

The contributing factors of landing long, a 90° crosswind, aft CG, and perhaps a complacent attitude culminated in to a situation that took advantage of a pilot who may have been unprepared for the rate and magnitude of the oscillations encountered during a rushed landing sequence. A lapse in attention during a critical phase of flight with little margin for error resulted in an undesirable and significant outcome.

There are many repetitious and dull moments in aviation. Some key factors that contribute to our success such as experience, standardization of tasks, and familiarity with the environment can also contribute to complacency. It is during these routine moments that pilots can let their guard down. The FAA calls "complacency" one of their "dirty dozen" of human factor error causes. They define it as, "a feeling of self-satisfaction accompanied by a loss of awareness of potential dangers."

Choose to attack complacency before it begins. When you're feeling like everything is the same and nothing could go wrong is exactly the moment where you need to catch yourself and make sure that you are fully engaged in order to be ready to respond.

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