Birds never land downwind. Should we?

BY GUNNAR FAHLGREN

Tail Wind Traps

Although the great majority of landings are made into the wind, many airport operating procedures permit runway use with tail wind components up to 10 kt. This could give a false impression that a tail wind won't cause any problems. Actually, tail winds regularly contribute to approach and landing accidents.

A recent example appears to be the BAe 146 that crashed while landing at Stord, Norway, the morning of Oct. 10, 2006. Preliminary reports say that the surface winds were from 110 degrees at 6 kt when the aircraft touched down on Runway 33, which was 1,200 m (3,937 ft) long and damp. Four of the 16 people aboard were killed when the aircraft overran the runway, continued down a rocky, wooded slope and caught fire.

A tail wind component of 3 kt might seem harmless. A key factor to consider, however, is that wind velocity normally is higher at the initial approach altitude than over the runway. For example, at 2,000 ft above ground, your tail wind component might be 24 kt. The greatest change of wind velocity usually can be expected about 400 ft above ground. If the aircraft is stabilized on glide path, the following might take place during the approach:

- Initially, you notice a much higher rate of descent than normal because of the increased groundspeed;
- With full flaps and gear down, you have throttled back to a much lower power setting than normal to stabilize airspeed on your desired value — let us agree on 140

kt. When the tail wind rapidly decreases at 400 ft, your airspeed indicator shows a *higher* speed, and you respond by reducing power to get back to the desired speed; and,

- A few seconds later, with the aircraft still on glide path, your airspeed rapidly drops through 140 kt to 130 kt. Angle-of-attack is increasing. Drag is increasing. Now, you must increase power quickly and decisively — you might even end up with takeoff power — to reach the runway.

'Extra Engine'

Few pilots who experience a scenario like this will scrutinize what actually happened. The fact is that you acted improperly when you reduced power. As the pushing wind — your "extra engine" — stops, you must *increase* power to compensate for that effective power loss. Otherwise, you might not reach the runway.

The underlying issue is that, for years, pilots have been taught to reduce power when airspeed increases above the desired value on approach. It has been stored in our motor memory, which will act automatically, like autothrottles. This erroneous action is a contributing factor in one or two controlled flight into terrain (CFIT) accidents every year.

Some new-generation autothrottle systems have been modified so that they increase power instead of reducing power. They get information not only from airspeed but also from groundspeed. This reduces the risk of hitting the ground before the runway but might cause an overrun on a wet or slippery runway.

These types of accidents can be avoided by the following:

- Avoid tail wind landings. Request another runway;
- If you have to make a tail wind approach, do not accept an initial altitude below 2,500 ft. A longer final approach will give you more time for preparation;
- Be prepared to manually override your autothrottles; and,
- Train your brain to respond with more power when airspeed is increasing.

One should also keep in mind that because of the longer landing distances associated with tail winds, the preceding aircraft might still be on the runway when you are ready to land.

Internal Timing

All those approaches we typically make into head winds create an unconscious "timing" that makes it possible for professional pilots to conduct safe landings several times a day in all types of weather conditions without undue stress.

This unconscious or instinctive timing, which I call *internal timing*, is activated for a brief period during the final stage of the approach and landing. We automatically start this internal timing, as well as communication and action synchronized to that timing. At specific points in time, we make callouts, select flap settings, select and check gear down, check final approach fix altitude and decision altitude, check speed and sink rate, and evaluate braking action.

With training and experience, internal timing produces a rhythm — and skill — in conducting approaches and landings. A tail wind can disrupt that rhythm. You start the internal timing and communication the usual way. Everything seems normal for a while. But, gradually, you get a feeling that something is not correct. A disrupted rhythm can cause a cognitive disruption or even a cognitive breakdown, depending on the level of stress that has developed, and could lead to an accident.

Tail wind landings increase the risk of a runway overrun or CFIT accident. They can't be avoided all the time, but they should be avoided whenever possible.●

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