MASTERING Takeoffs & Landings

If there's one thing that student pilots, CFIs, and hightime veterans all have in common, it's a susceptibility to takeoff and landing mishaps.

Why do pilots have so much trouble with these two most fundamental flying skills? It's simple: Takeoffs and landings require us to operate fast, relatively fragile machines in close proximity to the ground. There's not much room for error, even under ideal circumstances. Throw in wind, obstructions, and short/soft fields and things just get worse.

Mastering takeoffs and landings requires attention to detail and a healthy respect for the limitations of airplane and pilot. What's the field elevation? The temperature? How long is the runway, and what's the wind speed/direction? Is the airplane heavy? Will you really be able to squeeze "book" performance out of a tired, 30-year-old trainer?

The "simple" act of taking off or landing accounts for 50 percent of all general aviation accidents.

THE 50/50 SOLUTION

ASI recommends adding 50 percent to the POH takeoff or landing distance over a 50-foot obstacle. For example: If the distance over the obstacle requires 1,600 feet, add 800 feet (50 percent) for a safety distance of 2,400 feet.

The two checklists in this safety advisor are full of tips for mitigating the numerous risks associated with takeoffs and landings. As you read them, remember that the root cause of most accidents is poor judgment. Know the aircraft, the airport, and the environment… but most importantly, know when it's time for you to divert, go around, or stay on the ground.

TAKEOFF & CLIMB

The "Impossible Turn": If the engine fails shortly after takeoff, should you try to turn around and land on the departure runway? The viability of the so-called "impossible turn" depends on the circumstances, but there are plenty of reasons to be wary. The maneuver requires substantial altitude and involves relatively aggressive maneuvering. Taken by surprise, pilots often fail to maintain airspeed and end up having stall/spin accidents. Unless you're close to pattern altitude, or have already started a turn when the engine fails, it's safer to land straight ahead—i.e., within the area you can see out the windshield.

FLIGHT ENVIRONMENT	RISK FACTOR	RISK MANAGEMENT
☑ **Runway Length**	"Short" runway.	· 50/50 solution (see pg. 1). · Use all available runway.
☑ **Density Altitude**	High density altitude.	· Fly in cooler temperatures. · Decrease fuel and/or cargo. · Use longer runways. · Avoid runways with obstacles.
☑ **Obstructions**	Increased climb angle. Obstructions may cause turbulence.	· Maintain **Vx** until clear of obstacles. · Then maintain **Vy**.
☑ **Wind**	Loss of control. Tailwind will increase runway length needed.	· Deflect ailerons into the wind. · Too much wind? Use another runway. · Use a higher rotation speed. · Avoid tailwinds unless you have no other option (example: one-way runway)
☑ **Runway Slope**	Taking off uphill.	· Usually best to takeoff downhill. · Risks vary with wind, runway slope, terrain. · Generally requires more runway. · Acceleration will be slower. · May be difficult to out-climb terrain. · Talk to local pilots or airport manager.
☑ **Soft or Contaminated**	Soft. Slush or snow.	· Perform a soft-field takeoff. · Keep weight off the nosewheel. · Transition from taxi to takeoff without stopping. · Once airborne, accelerate in ground effect before climb out.
☑ **Heavy Aircraft**	Increased takeoff roll and reduced climb.	· Use a longer runway, especially with high density altitude.
☑ **Night**	Decreased visibility. Disorientation.	· Stay night proficient. · Avoid short runways at night.

APPROACH & LANDING

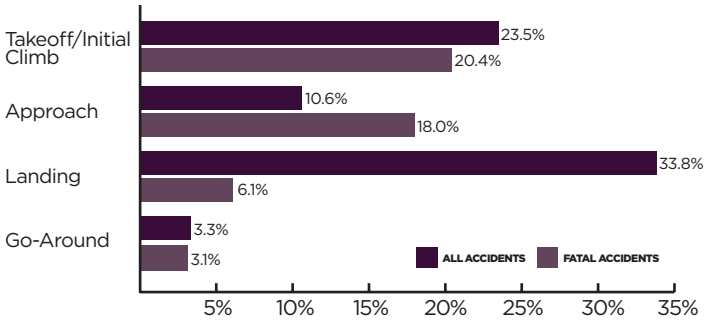
Going Around: If you have a problem during approach or landing, there's almost always a simple solution: Go around! It's far better to make another trip around the pattern than to push ahead and risk a runway overshoot or loss of control. Unfortunately, a lot of pilots seem to forget that it's an option, and end up having accidents they could easily have avoided. That said, there are some risks involved with go-arounds. Especially at low altitudes and airspeeds, with flaps down, going around can be a "touchy" maneuver: If you don't feel comfortable, get some practice with a CFI in the right seat.

FLIGHT ENVIRONMENT	RISK FACTOR	RISK MANAGEMENT
☑ **Runway Length**	"Short" runway.	· 50/50 solution (see pg. 1). · Configure the aircraft for a short-field landing. · Use aggressive braking.
☑ **Density Altitude**	High density altitude.	· Decreases performance during a go-around. · Increases landing distance.
☑ **Obstructions**	Short runway.	· 50/50 solution (see page 1). · Maintain target speed. · Use short-field configuration.
☑ **Wind**	Loss of control. Gusty conditions. Tailwind.	· Deflect ailerons into the wind. · Crab or slip on approach. · Too much wind? Use another runway. · Add 1/2 the gust factor to your airspeed. · Avoid tailwinds unless you have no other option (example: one-way runway.) · Under some conditions, airport may be unusable.
☑ **Runway Slope**	Landing downhill.	· Usually best to land uphill. · Risks vary with wind and runway slope. · Generally requires more runway. · Under some conditions, airports may be unusable. · Talk to local pilots or airport manager.
☑ **Soft or Contaminated**	Soft. Slush or snow.	· Keep weight off the nosewheel. · Keep moving until clear of the runway.
☑ **Heavy Aircraft**	Increased landing distance.	· Use a longer runway, especially with high density altitude.
☑ **Night**	Decreased visibility. Disorientation. Optical illusions.	· Stay night proficient. · Avoid short runways at night. · Use runways equipped with visual or electronic glideslope indicators.

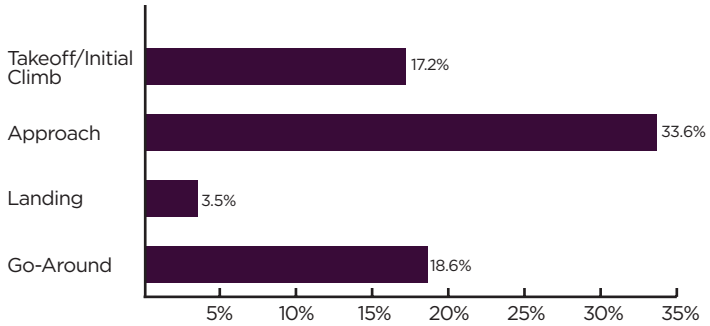
TAKEOFF & LANDING ACCIDENTS

2000-2009

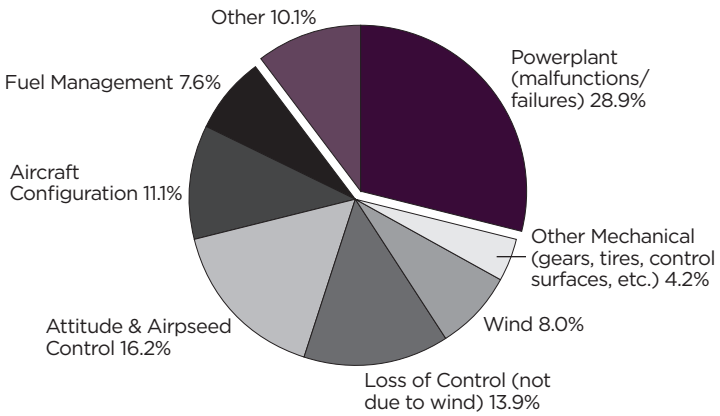
ACCIDENTS BY CATEGORY



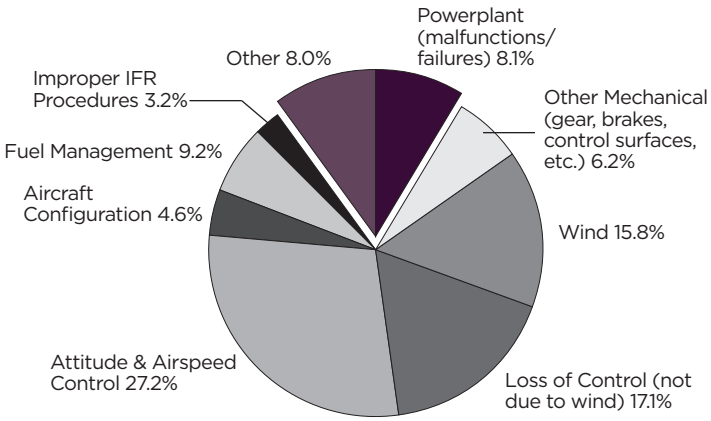
LETHALITY INDEX



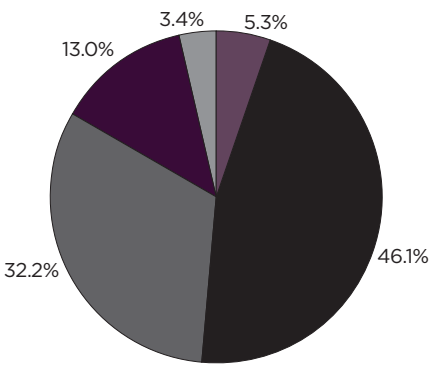
TAKEOFF & INITIAL CLIMB ACCIDENT CAUSES



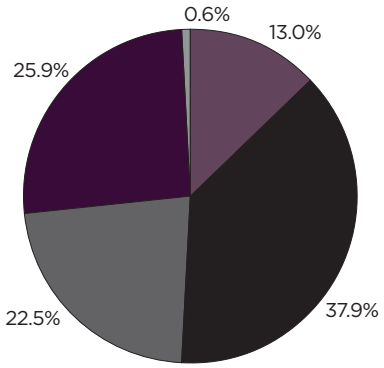
APPROACH, LANDING, & GO-AROUND ACCIDENT CAUSES



TAKEOFF & INITIAL CLIMB
PIC'S HIGHEST CERTIFICATE LEVEL



DISTRIBUTION OF CERTIFICATE LEVELS
ALL ACTIVE PILOTS (2009)



APPROACH, LANDING & GO-AROUND
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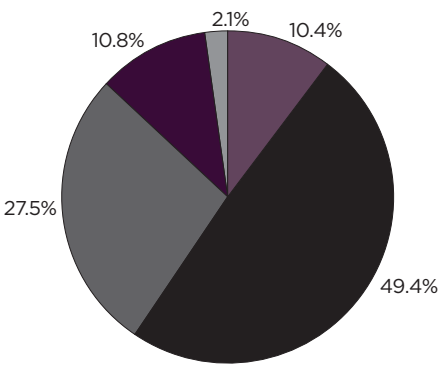

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