Ups and Downs
of Takeoffs and Landings

If there's one thing that student pilots, CFIs, and high-time 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 aviation 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 50/50 Solution
ASF 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.

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

Takeoffs

Accident Report: A private pilot flying a BE-23 departed a 4,251-foot runway at an intersection, leaving roughly 2,700 feet for takeoff. A tailwind of 10-15 knots compounded the problem. Once airborne the pilot decided to abort the takeoff, but insufficient runway remained for landing, so he initiated a go-around. The aircraft struck the chain-link fence at the departure end of the runway, tearing off the landing gear. The pilot then circled and landed on the opposite runway. Selecting the correct runway and using the full length would have prevented this accident.

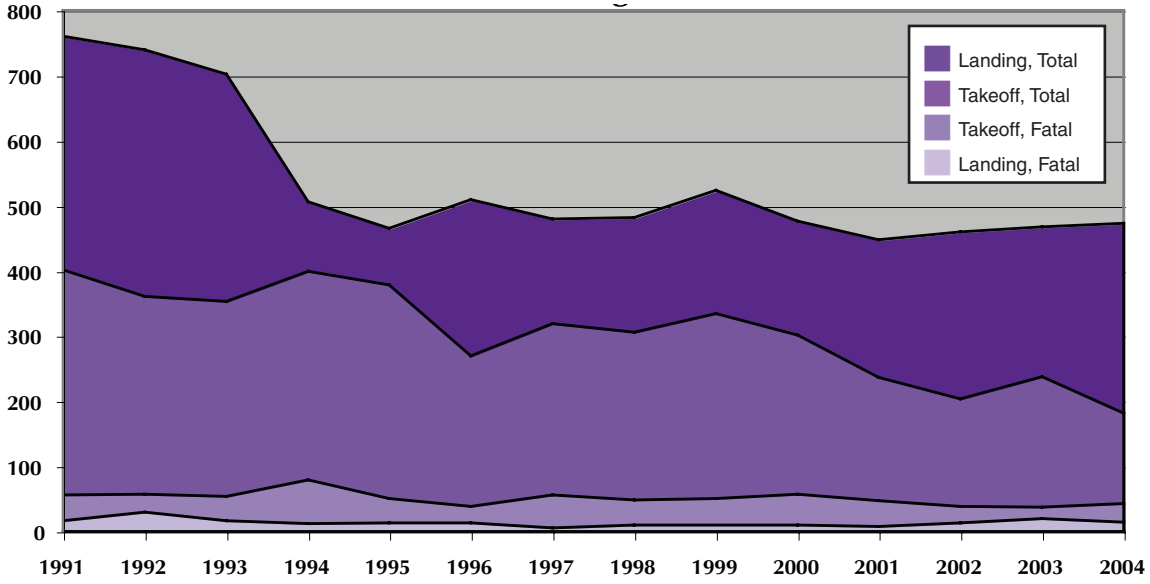
Flight Environment	Risk Factor	Risk Management
☑ Runway length	"Short" runway.	• 50/50 solution (see page 1). • Use all available runway.
☑ Density altitude	High density altitude.	• Fly in cooler temperatures. • Decrease fuel and cargo. • Use longer runways. • Avoid runways with obstacles.
☑ Obstructions	Increased climb angle. Obstructions may cause turbulence.	• Maintain **Vx** until clear of obstacles. • Then maintain **Vy**.
☑ Wind	Loss of control.	• Deflect ailerons into the wind. • Too much wind? Use another runway. • Use higher rotation speed.
	Tailwind will increase runway length needed.	• Avoid tailwinds unless you have no other option (example: one-way runway).
☑ Runway slope		• Refer to local pilots or airport manager.
	Down with the wind.	• More runway is required.
	Up into the wind.	• Acceleration to Vr will be slower. If the nose is too high, it could cause a stall.
☑ Soft or contaminated	Soft. Slush or snow.	• Perform a soft-field takeoff. • Keep nosewheel light. • Transition from taxi to takeoff without stopping. • Once airborne, accelerate in ground effect before climbout.
☑ Heavy	Increased takeoff roll and reduced climb.	• Use a longer runway, especially with high density altitude.
☑ Night	Decreased visibility. Disorientation.	• Be night proficient. • Avoid short runways at night.

Landings

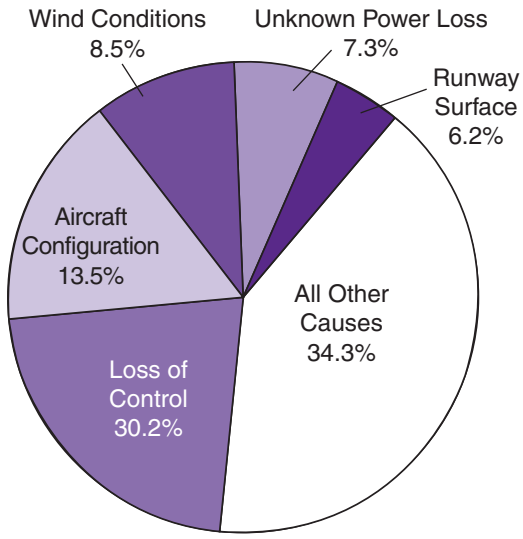
Accident Report: A student pilot practicing takeoffs and landings in a Cessna 172, with an instructor on board, flared the aircraft too high, and held the flare. The flight instructor told the student to go around, but the student hesitated prior to adding full power. The aircraft yawed 90 degrees to the left and struck a wind sock before the flight instructor gained control of the aircraft. Both occupants were uninjured. The student failed to correct for left turning tendency and the CFI failed to properly supervise the flight.

Flight Environment	Risk Factor	Risk Management
☑ Runway length	"Short" runway.	• 50/50 solution (see page 1). • Configure the aircraft for a short-field landing. • Use aggressive braking.
☑ Density altitude	High density altitude.	• This will affect the aircraft during a go-around (see "takeoff" list on page 2).
☑ Obstructions	Short runway.	• 50/50 solution (see page 1). • Maintain target airspeed. • Use short-field configuration.
☑ Wind	Loss of control.	• Deflect ailerons into the wind. • Crab or slip on approach. • Too much wind? Use another runway.
	Gusty conditions.	• Add the gust factor to your airspeed.
	Tailwind.	• Avoid tailwinds unless you have no other option (example: one-way runway). • Under some conditions, airport may be unusable.
☑ Runway slope	Down with the wind.	• More runway is required. • Talk to local pilots or airport manager before landing. • Under some conditions, airport may be unusable.
☑ Soft or contaminated	Soft. Slush or snow.	• Keep nosewheel light. • Keep moving until clear of the runway.
☑ Heavy	Increased landing distance.	• Use a longer runway, especially with high density altitude.
☑ Night	Decreased visibility. Disorientation. Optical illusions.	• Be night proficient. • Avoid short runways at night. • Use runways equipped with visual or electronic glideslope indicators.

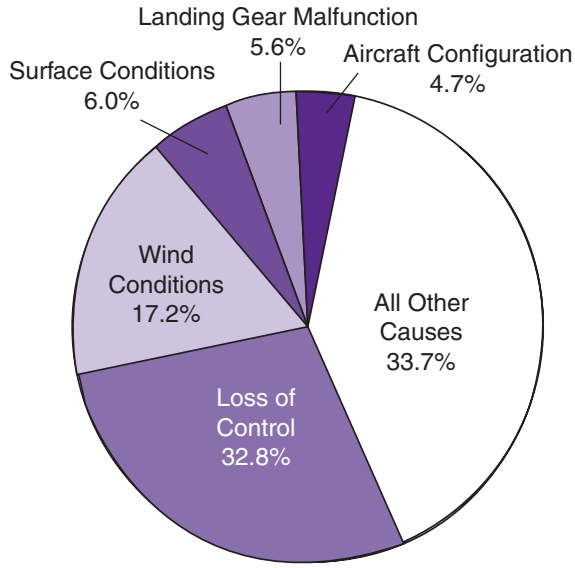
Takeoff and Landing Accidents



Leading Takeoff Accident Causes



Leading Landing Accident Causes



www.asf.org

421 Aviation Way • Frederick, MD 21701 • Phone: 800/638-3101 • E-mail: asf@aopa.org

Publisher: Bruce Landsberg Editor: Brian Peterson Statistician: Kristen Hummel

SA18-08/06