Ups and Downs
of Takeoffs and Landings

The "simple" act of taking off or landing accounts for 50 percent of general aviation accidents. It affects students, CFIs, and veterans alike.

The leading accident factor for both phases is loss of control (30.2 percent of takeoff accidents and 32.8 percent of landing accidents). Other factors include obstructions, night operations, short fields, and soft fields.

Success with normal takeoffs and landings is the foundation for more complex operations. Pilots should consider runway length, direction, and condition, as well as aircraft configuration. The *Pilot's Operating Handbook* (POH) determines the runway length needed for your aircraft under certain conditions. POH distances are based on new aircraft flown by test pilots. In actual flight operations, most of us won't achieve those ideal numbers.

Conventional wisdom says, "Any landing you can walk away from is a good one."

Not so!

A good landing is better described as one where the aircraft can be used again.

50/50 Solution
ASF recommends adding **50 percent** to the POH takeoff or landing distance over the **50-foot** obstacle. 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 recommended for all pilots. Risk is based on multiple factors, including pilot, aircraft, airport and environmental conditions.

Do you have less than 100 hours total time or time in type? Then statistically you have a greater risk of a takeoff or landing accident.

Note: Under certain conditions, safe flight may not be possible. Postpone the takeoff, or divert to an alternate if landing.

TAKEOFF

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.

A private pilot flying a BE-23 departed a 4,251-foot runway at an intersection, leaving approximately 2,700 feet for takeoff. A direct tailwind of 10-15 knots compounded the problem. After the airplane became airborne, the pilot decided to abort the takeoff. There was not enough runway remaining to complete a landing, so a go-around was initiated. The aircraft struck the chain-link fence at the departure end of the runway, which removed 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.

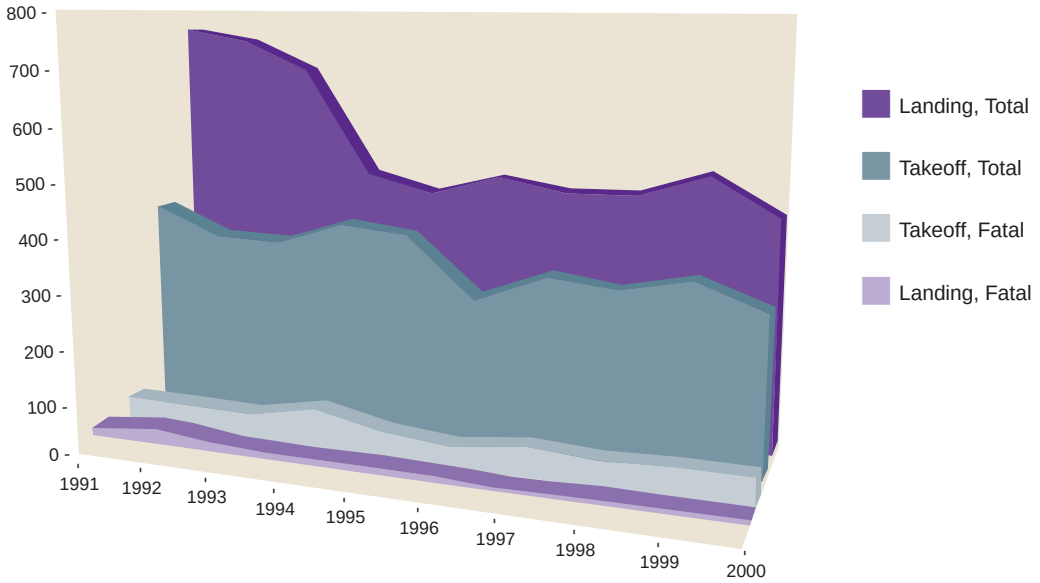
LANDING

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.

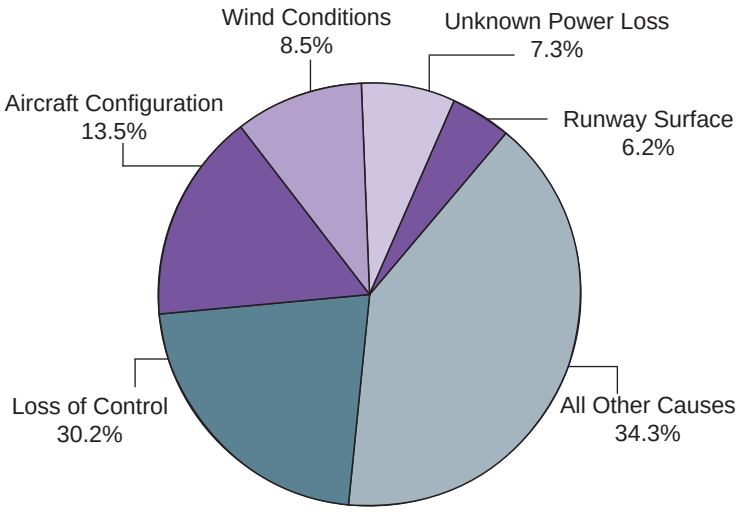
A student pilot practicing takeoffs and landings in a Cessna 172, with an instructor on board, flared the aircraft too high, and held the flare. The flight instructor told the student to go around, but the student hesitated prior to adding full power. The aircraft yawed 90 degrees to the left and struck 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.

Takeoff and Landing Accidents

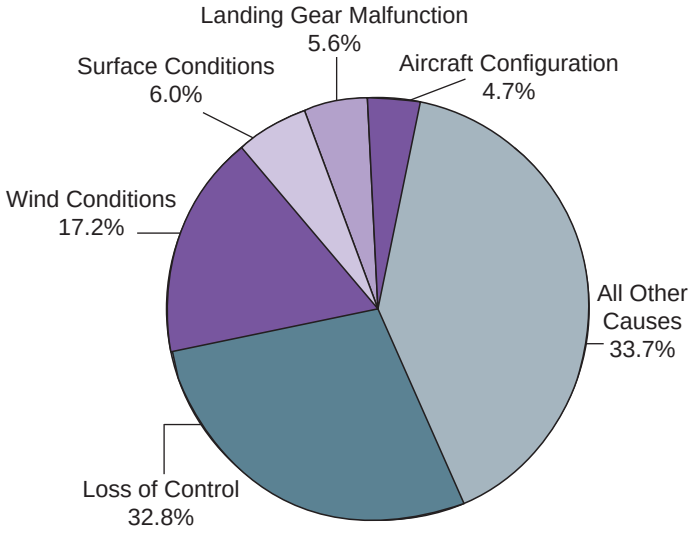
Fifty percent of all accidents occur during takeoff and landing.



Leading Takeoff Accident Causes



Leading Landing Accident Causes



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