



NTSB

SAFETY ALERT

National Transportation Safety Board



Mastering Mountain Flying



Training is essential for mountain flying safety

The problem

- Pilots with limited or no training in mountain flying can be surprised about their aircraft's different performance at high density altitude, often leading to serious or fatal accidents.
- Wind and other weather phenomena interacting with mountainous terrain often lead unsuspecting pilots into situations that are beyond their capabilities.
- Should a crash occur, a pilot who survives the crash but does not have emergency or survival gear immediately accessible may not survive the harsh environment until rescuers are able to reach the location.

Related accidents

The NTSB has investigated numerous accidents in which limited or no training resulted in accidents in mountainous terrain.

- A pilot and two passengers of a Piper Cherokee 235 were fatally injured when trying to follow an interstate highway over a high mountain pass. Employees of the fixed base operator (FBO) at the departure airport reported that the pilot had asked about routes across the mountains. Based on the conditions at the time of the accident, the airplane's climb rate would have been reduced by more than 90 percent. It is likely that, as the pilot attempted to cross over the mountainous terrain near the pass, he raised the airplane's nose to the point that he exceeded the airplane's critical angle of attack. With the airplane's decreased performance, this led to an aerodynamic stall and loss of control. ([CEN14FA328](#))
- A private pilot and three passengers of a Mooney M20E were fatally injured during takeoff in gusty wind conditions from an airport located at an elevation of 8,380 feet. The pilot had no prior experience flying out of the accident airport and limited experience flying in mountainous terrain. Witnesses reported that the pilot seemed confident about his ability to fly the airplane and he was not concerned with the wind conditions. As the airplane departed, the reported wind was 33 knots, gusting to 47 knots. Later review of weather data showed mountain wave activity in the area. After the airplane lifted from the runway, it crabbed into the wind, and then rose and fell repeatedly as its wings rocked, before coming to rest inverted. ([CEN13FA183](#))

- The pilot and two passengers of a Cessna U206G were fatally injured and two passengers sustained serious injuries when the airplane collided with mountainous terrain. The pilot was transporting the passengers to a remote back country airstrip. As the airplane proceeded on the flight, ridgetops on both sides of the valley became obscured with an overcast cloud layer at 7,000 feet, and ragged clouds with mist were probably present beneath the overcast. Local pilots reported that in these types of weather conditions, numerous drainages can be similar in appearance. Radar data showed that the airplane was well short of the position reported by the pilot. Because of this, the pilot misidentified the drainage he intended to reach and instead turned into a drainage that ended in a box canyon. After impact, all communication, survival, and foul-weather gear aboard the airplane were destroyed in a postimpact fire. Although the pilot's logbook indicated that the pilot had 2,723 hours total flight time, it showed minimal back country or mountain flying experience. ([SEA04GA192](#))

What can pilots and flight instructors do?

Through training, pilots can develop skills and techniques that will allow them to safely fly in mountainous terrain. When planning flights in mountainous terrain, pilots and flight instructors should do the following to enhance safety:

- Flight instructors should encourage their students to attend a quality mountain flying course before attempting flight in mountainous terrain or at high density altitudes.
- Pilots should consult with local flight instructors before planning a flight into mountainous terrain. Even experienced mountain pilots may not be familiar with local conditions and procedures for safe operations.
- Pilots should be aware that weather interacting with mountainous terrain can cause dangerous wind, severe turbulence, and other conditions that may be unsafe for aircraft, especially light GA aircraft.
- Pilots should consider specialized emergency and survival equipment (such as personal locator beacons in addition to a 406 emergency locator transmitter) before flying in mountainous terrain, and develop a plan for immediate access to the equipment in the event of a postaccident fire.
- FBO staff should be alert for customers who appear to be planning flight into mountainous terrain who could benefit from mountain flying instruction.

Interested in more information?

The reports for the accidents referenced in this safety alert are accessible by NTSB accident number from the Aviation Accident Database and Synopses web page at <http://www.nts.gov/layouts/nts.aviation/index.aspx>. Each accident's public docket is accessible from the NTSB's Docket Management System web page at <http://dms.nts.gov/pubdms/>.

For an overview of mountain flying and techniques, the Federal Aviation Administration (FAA) published [Tips on Mountain Flying](#) (FAA-P-8740-60). Additionally, the May/June 2012

issue of FAA Safety Briefing contains an article, [Rocky Mountain High: The Zen of Mountain Flying](#) that discusses both the beauty and dangers of mountain flying. The publications can be accessed from www.faa.gov.

Additionally, the Aircraft Owners and Pilots Association (AOPA) Air Safety Foundation provides a [Mountain Flying safety advisor](#) that highlights important considerations for mountain flying, [A Pilot's Guide to Mountain Flying](#) that discusses weather factors and mountain flying techniques, and the [ASF - Mountain Flying resources](#) web page that lists preferred routes over mountainous terrain in addition to other resources. AOPA also offers a [Mountain Flying](#) online course. These resources can be accessed from www.aopa.org.

The Colorado Pilots Association provides [mountain flying resources](#) to assist pilots when flying in Colorado. These include mountain pass locations and names, certified flight instructors, and available training. These can be accessed from <http://coloradopilots.org/>.

This NTSB safety alert and others can be accessed from the NTSB's Safety Alerts web page at <http://www.nts.gov/safety/safety-alerts/Pages/default.aspx> or searched from the NTSB home page at <http://www.nts.gov/Pages/default.aspx>.