



NTSB

SAFETY ALERT

National Transportation Safety Board



Safety Through Helicopter Simulators



Use of simulators can prepare helicopter pilots for emergencies and prevent accidents

The problem

- Improperly performed emergency procedures have led to numerous helicopter accidents.
- Although pilots practice emergency procedures during flight training, safety considerations (such as deteriorating weather conditions, helicopter limitations, and autorotation performance characteristics) restrict what scenarios can be performed in a helicopter.
- During flight training, it is difficult to recreate the element of surprise and the realistic, complex scenarios that pilots may experience during an emergency. Without simulators, viable lesson components may be limited.

Related accidents

The NTSB has investigated numerous helicopter accidents in which training in approved simulators could have provided pilots with additional knowledge and skills to handle in-flight emergencies and avoid maneuvering errors. Although the accidents below all involve Eurocopter (now Airbus Helicopters), this safety alert promotes simulator training in all helicopters.

- A pilot failed to successfully enter an autorotation in a Eurocopter AS350B2 following a loss of engine power as a result of fuel exhaustion, resulting in four fatalities. The pilot's autorotation training was not representative of an actual engine failure at cruise airspeed. ([CEN11FA599](#))
- The pilot of a Eurocopter AS350B2 lost situation awareness at night, resulting in a collision with the ground and three fatalities. The pilot was using night vision goggles (NVGs). Although he had received NVG training on nights with high moon illumination and in populated areas, he did not have NVG simulator training for the dark night conditions present in the remote area at the time of the accident. ([CEN10FA113](#))
- The pilot of a Eurocopter AS350B2 experienced spatial disorientation and lost control of the helicopter in instrument meteorological conditions (IMC), resulting in a collision with terrain and three fatalities. The pilot had previously flown helicopters in IMC but did not have a current instrument rating at the time of the accident. ([ERA09FA537](#))

What can operators and pilots do?

Through simulator training, operators can provide pilots a valuable tool to ensure proficiency in emergency procedures, including autorotations, use of NVGs, recognition of degraded visual conditions, and recovery from unusual attitudes. Consistent, standardized simulator training will

help prepare pilots for the unexpected and will decrease the risk of an accident. Simulators can be a helpful tool for operators to provide pilot training on the following:

- Autorotations during any phase of flight, which reinforces the immediate responses required during actual emergencies.
- Scenario-based training tailored to the mission, including NVG missions in low-light situations and site-specific training that considers obstacles and terrain.
- Degraded visual conditions, safe decision-making skills, and inadvertent IMC encounters. By practicing potential emergencies, pilots will be better equipped to handle emergency situations.

Interested in more information?

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

Regarding helicopter simulators, the European Aviation Safety Agency's (EASA) training leaflet, "[Advantages of Simulators \(FSTDs\) in Helicopter Flight Training](http://easa.europa.eu/essi/)," provides an overview of simulators and how to use them in training and can be accessed from <http://easa.europa.eu/essi/>. Bell Helicopter's publication *Heliprops* contains an article, "[Flight Training Simulation: The Flight Safety Multiplier](http://www.bellhelicopter.com)" (vol. 21, no. 4, 2010), discussing the value of simulator use in training and can be accessed from www.bellhelicopter.com.

More information about situations that can be trained in simulators can be found at the following websites:

- Regarding autorotations, the Federal Aviation Administration's (FAA) safety publication, "[Planning Autorotations](http://www.faasafety.gov)," discusses autorotations and how to avoid accidents while training the maneuver and can be accessed from www.faasafety.gov. The International Helicopter Safety Team (IHST) released a training fact sheet, "[Energy in Autorotations](http://www.ihst.org)," highlighting the various energies available during the different phases of autorotations, which can be accessed from www.ihst.org.
- Regarding visual conditions, the Flight Safety Foundation's article, "[EMS Helicopter LOFT Study Shows Experience Influences Pilot Performance During Inadvertent Flight into IMC](http://flightsafety.org/archives-and-resources/publications/helicopter-safety)" (vol. 22, no. 1, Jan.-Feb. 1996), describes how training can help pilots when encountering IMC and can be accessed from <http://flightsafety.org/archives-and-resources/publications/helicopter-safety>. IHST has also released a training fact sheet, "[Visibility](http://www.ihst.org)," which can be accessed from www.ihst.org. EASA has produced a video, "[Degraded Visual Environment and Loss of Control](http://easa.europa.eu/essi/)," highlighting recognition of degraded visual environments, which can be accessed from <http://easa.europa.eu/essi/>.

A September 24, 2009, NTSB safety recommendation letter provides Safety Recommendations [A-09-87](http://www.ntsbt.gov/safety/safety-recs/_layouts/ntsbt.recsearch/RecTabs.aspx) and [-88](http://www.ntsbt.gov/safety/safety-recs/_layouts/ntsbt.recsearch/RecTabs.aspx) to the FAA regarding helicopter simulator training and can be accessed from http://www.ntsbt.gov/safety/safety-recs/_layouts/ntsbt.recsearch/RecTabs.aspx.

This NTSB safety alert and others can be accessed from the NTSB's [Safety Alerts](http://www.ntsbt.gov/safety/safety-alerts/Pages/default.aspx) web page at <http://www.ntsbt.gov/safety/safety-alerts/Pages/default.aspx>.