# Recommended Practice

## Simulation Training for Aviation Decision Making

*Helicopter Safety Enhancement 123*

### 1. PURPOSE.

The purpose of this Recommended Practice (RP) is to suggest training scenarios, based upon factual data harvested from recent US fatal helicopter accidents by the United States Helicopter Safety Team (USHST) Safety Analysis Team (SAT). Simulator training providers in Evidence Based Training (EBT) or other syllabi may use these scenario guidelines as the basis to improve Aviation Decision Making (ADM). The USHST has found a need to raise awareness of the risks inherent with operating helicopters in situations that have resulted in fatal accidents and encourages scenario based training to mitigate those risks by studying the provided accidents, their causes and develop proper pre-flight methods to prevent a repeat of the actual results. This RP recommends procedures that will mitigate risk and improve ADM. This information is intended to supplement information found in the Helicopter Flying Handbook (HFH) FAA-H-8083-21, as amended.

This RP describes an acceptable means, but not the only means, of training applicants for a rotorcraft airman certificate to meet the qualifications for various helicopter ratings under 14 Code of Federal Regulations (14 CFR) Part 61. You may use alternate methods for training if you determine that other methods are adequate.

This RP is an output from USHST Helicopter Safety Enhancement 123 – Increased Simulation to Develop Safe Aeronautical Decision Making (ADM).

### 2. AUDIENCE.

This RP applies to all persons conducting helicopter flight training or private and commercial helicopter operations, including certificated airman, Certified Flight Instructors (CFIs), Designated Pilot Examiners (DPEs), Training Center Evaluators (TCE's) and FAA Aviation Safety Inspectors (ASIs). The USHST recommends all training providers and airman involved in training and helicopter operations review the information contained within this RP and shall apply the techniques, as appropriate.

### 3. BACKGROUND.

Training continues to be one of the top operational categories of helicopter accidents in the U.S., representing 17.9% of all accidents based on the US Joint Helicopter Safety Analysis Team (US JHSAT) Compendium Report (2000, 2001

and 2006). Further analysis by the USHST Safety Analysis Team (SAT) of 104 US fatal helicopter accidents over the period 2009-2013 revealed that 52 accidents fell into the top 3 occurrence categories as defined by the CAST/ICAO Common Taxonomy Team (CICTT), namely Loss of Control In Flight (LOC-I), Unintended Flight in Instrument Metrological Conditions (UIMC) and Low Altitude (LALT) operations. Of these 52 fatal accidents, 21 fatal accidents were identified and linked to USHST Helicopter-Safety Enhancement (H-SE) 123 *Increased Simulation/Education to Develop Safe Decision Making,* which aims to increase the use of simulation and education to develop awareness and safe decision making. The 21 accidents were distributed as follows: 8 LOC-I, 12 UIMC, and 1 LALT. In each of these cases, the SAT working group determined H-SE 123 could have changed the outcome. All involved some aspect of pilot's poor judgement or lack of aeronautical decision making (ADM) that placed the aircraft in an "at risk" situation. The "at risk" situation either caused or was a contributing factor to the fatal accident. The USHST recommends greater use of simulation at all levels of fidelity in an Aviation Training device (ATD), Flight Training Device (FTD) and Full Flight Simulators (FFS) in both initial helicopter training and recurrent training sessions. This will allow pilots to learn from their mistakes in a safe environment and will make them less likely to repeat the error during actual flight. ATDs are very popular and affordable for many part 61 and 141 pilot schools. However, part 142 training centers are most likely to use a FTD or FFS.

For additional information regarding FAA approval of an ATD see AC 61-136 *FAA Approval of Aviation Training Devices and Their Use for Training and Experience* and 14 CFR part 60 for the qualification of a FTD or FSS.

*The USHST supports a vision of zero fatal accidents. By including training in "at risk" scenarios, training providers can create increased awareness resulting in accident prevention. This promotion effort applies to the full spectrum of simulation.*

## 4. FATAL ACCIDENTS.

The following fatal accidents (identified by National Transportation Safety Board (NTSB) designation) all involved some aspect of a lack of sound ADM that placed the aircraft in an "at risk" situation. The "at risk" situation either caused or was a contributing factor to the fatal accident.

- **Loss of Control in Flight (LOC-I):**
  - o Loss of Rotor RPM in Autorotation
    - ▪ CEN12FA621 LOC-I Houston, TX - Robinson Helicopter Co R22 Beta
    - ▪ WPR09FA459 LOC-I Forest Grove, OR - Robinson Helicopter Co R22 Beta
    - ▪ WPR10FA277 LOC-I Spokane, WA Robinson Helicopter Co R22 Beta
  - o Loss of Tail Rotor Effectiveness (LTE)
    - ▪ ERA12MA005 LOC-I New York, NY Bell 206B
    - ▪ ERA11FA272 LOC-I Indiana, PA Robinson Helicopter Co R44 II
    - ▪ WPR13FA343 LOC-I Thompson Falls, MT Robinson Helicopter Co - R44 II
  - o Spatial Disorientation
    - ▪ CEN13FA010 LOC-I Blanco, TX Robinson Helicopter Co - R44 II
    - ▪ WPR10FA055 LOC-I Doyle, CA Aerospatiale AS350BA

- **Unintended Flight in IMC (UIMC):**
  - o CEN09PA348 UIMC Santa Fe, NM, Agusta SpA A109E
  - o ERA09FA537 UIMC Georgetown, SC Eurocopter AS-350
  - o CEN10FA019 UIMC Tahlequah, OK Robinson Helicopter Co - R22 Beta

- ERA10FA403 UIMC Blairsville, GA Robinson Helicopter Co - R44 II
- CEN10FA509 UIMC Walnut Grove, AR Bell 206L-1
- CEN11FA468 UIMC Rising Sun, IN Robinson Helicopter Co - R44 II
- ERA12MA122 UIMC Green Cove Springs, FL Bell 206B
- ERA13FA014 UIMC Coolbaugh Township, PA Bell 407
- CEN13FA096 UIMC Compton, IL MBB BK 117 A-3
- ANC13GA036 UIMC Talkeetna, AK Eurocopter AS350
- ERA13FA273 UIMC Manchester, KY Bell 206L-1
- ERA13FA336 UIMC Noxen, PA Robinson Helicopter Co - R66

- **Low Altitude (LALT):**
  - ERA13LA057 LALT Corning, NY Hughes 369D
  - ERA10FA283 LALT Boxborough, MA Schweizer 269C-1

Simulator training should include scenarios from fatal accidents found in Annex A. Further details of each fatal accident and the full NTSB docket can be found at: https://www.ntsb.gov

## 5. SCENARIO BUILDING

Training providers should include the following details from each fatal accident when building each scenario.

**a)** Discuss the details of the accident scenario in a classroom environment allowing the student through self-discovery and if required, guided discussion points to identify errors made and how the accident could have been avoided.

**b)** Set the scenario before the preflight brief. Set up the flight training event based on the accident scenario.

**c)** Adapt accident aircraft specific parameters to relevant aircraft make and model.

**d)** Set accident matching parameters. For example: weather, time of day, passengers, fuel, weight, balance and performance allowing the student to determine the performance parameters.

**e)** Witness and assist with scenario setting during the preflight brief.

**f)** Allow the scenario to develop along the same lines as the matching accident.

**g)** Be prepared to use regression to “wind back” the scenario to emphasize actions taken or not completed based on the outcome of the exercise.

**h)** Debrief and discuss the scenario in detail to ensure maximum learning.

Note: Flight Simulator Training Devices (FSTD) provide the appropriate level of fidelity based on programing from actual flight test data, wind tunnel testing results, or engineering data. Flight outside these known regions may result in unrepresentative aircraft response.

In addition, FSTDs may not allow programming of specific conditions that may fall outside normal parameters, e.g., center of gravity, over weight aircraft. Even if programmable, training providers should note there might be no corresponding performance verification since the FAA may not require such data for simulator qualification.

## 6. SUMMARY

Human Factor (HF) studies have proven that people learn from their mistakes. A thorough discussion of selected accidents, their causes and sound preventative measures establishes the need for careful preflight planning. The USHST recommends that the scenarios listed in this RP be included in all phases of flight training conducted under the various 14 CFR Parts.

## 7. Are there any related documents I should look at?

The FAA's principal guidance on helicopter operations may be found in the Helicopter Flying Handbook (HFH) FAA-H-8083-21, as amended.

## 8. Does this RP cancel any prior RPs?

This RP does not cancel or amend any previous USHST publications.

## 9. How can I get this and other USHST publications?

YOU CAN VIEW A LIST OF ALL USHST PUBLICATIONS AT

http://www.ushst.org

28 April 2020

Annexes:

A. LOC-I Loss of Rotor RPM At Risk Scenarios Listed by Fatal Accident and Lesson Plan

B. LOC-I Loss of Tail Rotor Effectiveness (LTE) At Risk Scenarios by Fatal Accident and Lesson Plan

C. LOC-I Spatial Disorientation At Risk Scenarios by Fatal Accident and Lesson Plan

D. UIMC At Risk Scenarios by Fatal Accident and Lesson Plan

E. LALT Wire Strike At Risk Scenarios by Fatal Accident and Lesson Plan

F. LALT Engine Failure At Risk Scenarios by Fatal Accident and Lesson Plan

**DISCLOSURE:** Recommended Practices (RP) are published under the direction of the United States Helicopter Safety Team (USHST) Steering Committee (SC). RPs are a medium for discussion of aviation safety pertinent to the general rotorcraft industry in the United States. RPs are not intended to replace individual engineering or corporate judgment or to replace instructions in company manuals or government regulations. Adoption of this USHST RP as a company or personal standard is the responsibility of each individual company or person and is highly recommended. In this USHST RP the word 'shall' is used to indicate high value safety practices not an imperative command. Companies or persons choosing to adopt practices recommended in this document should be aware that substitution of "shall" to "should" would likely diminish the effectiveness of the practice. USHST encourages and welcomes suggestions for subject matter relating to this document intended to improve or update practices contained within.

ANNEX A TO
USHST RP123
DATED 28 APRIL 2020

# SCENARIO-BASED TRAINING LESSON PLAN

## LOSS OF ROTOR RPM IN AUTOROTATION

### ACCIDENT – SUMMARY

On September 10, 2012, about 1545 CDT, N281RG, a Robinson R22 Beta helicopter, was substantially damaged when it impacted terrain during a low-level aerial photography operation when the engine stopped producing power. Several witnesses observed the helicopter descend vertically to the ground as the body of the helicopter spun to the left around the main rotor blades. The commercial pilot and the passenger were fatally injured. Day visual meteorological conditions (VMC) prevailed at the time of the accident.

Weather reported at Ellington Field (EFD), Houston, Texas, approximately 16 miles southwest of the accident site, at 1550, was wind 130 degrees at 8 knots, visibility 10 miles, scattered clouds at 8,000 feet, temperature 93 degrees F, dewpoint 62 degrees F.

The cause of the power loss could not be determined.

The National Transportation Safety Board determined the probable cause(s) of this accident (CEN12FA621) to be: the pilot's failure to maintain control of the helicopter after a loss of engine power.

**ACCIDENT – SUMMARY**

On September 20, 2009, at 1309 PDT, a Robinson R22 Beta, N956SH, collided with terrain near Forest Grove, Oregon. The pilot under instruction was preparing for a certified flight instructor (CFI) check ride The CFI and pilot under instruction were going to practice autorotations with power recoveries.

Investigators examined the wreckage and observed signatures indicating that the engine and main rotor blades were rotating at a low speed at impact. The main rotor blades were also coned upward, indicative of a low main rotor rpm state. A safety notice issued by the helicopter's manufacturer notes that main rotor blade stall due to low main rotor rpm causes a high percentage of helicopter accidents. The stall causes the main rotor rpm to rapidly decrease, and leads to an immediate uncontrolled descent. Both airmen sustained fatal injuries.

The National Transportation Safety Board determines the probable cause(s) of this accident (WPR09FA459) to be: The flight crew's failure to maintain adequate main rotor speed while maneuvering, which resulted in a main rotor blade stall and an uncontrolled descent into terrain.

**ACCIDENT SUMMARY**

On June 2, 2010 at 1630 PDT, a Robinson R22 Beta, N522SA, experienced a loss of engine power and subsequent main rotor blade strike, which separated the tail boom in flight.

The student pilot flew in the traffic pattern with a certified flight instructor and made a full stop landing. The instructor determined that the student was competent to continue flying solo and exited the helicopter. This was the student pilot's fourth solo flight. The student completed about five more touch-and-go landings prior to the loss of engine power.

Spokane (KGEG) issued an aviation routine weather report (METAR) at 1653 PDT. It stated: wind from 190 degrees at 12 knots gusting to 18 knots; visibility 10 miles; sky 1,700 feet scattered, 3,000 feet broken, 5,000 feet overcast; temperature 15/59 degrees Celsius/Fahrenheit; dew point 12/54 degrees Celsius/Fahrenheit; altimeter 29.70 inches of mercury; and relative humidity 83%. The conditions encountered in this accident were in the area of serious icing at cruise power.

The National Transportation Safety Board determines the probable cause(s) of this accident (WPR10FA277) to be: A loss of engine power for reasons that could not be determined and the student pilot's failure to maintain main rotor rpm.

**SCENARIO-BASED TRAINING LESSON PLAN**

**Type of Training**
Initial/Recurrent/etc.

**Training Objective**

- Identify, mitigate and respond to factors that contribute to loss of control in flight, specifically loss of main rotor RPM in an autorotation
- Identify, understand and mitigate risks associated with operating in the low level environment
- Recognize and respond to carburetor icing conditions (if applicable)
- Identify key decision points associated with the flight
    - Refer to Postflight Review section for details

**Equipment and Materials**

- Applicable simulator or basic aircrew training device
- Applicable pilot operating handbook/rotorcraft flight manual
- Applicable preflight information and/or tools
- Applicable flight risk assessment tools (FRATs) and/or check lists
- Applicable regulations such as the FAR, AIM, SOPs, FOMs etc.

**Scenario Requirements:**

- Mission Purpose:
    - As appropriate for the organization based on provided accident summary
        - Personal flight
        - Passenger transport (can include personal, commercial, HAA, etc)
        - Search and rescue
        - Utility
        - Etc.
- Mission Characteristics (select all that apply):
    - Engine failure and autorotation training
    - Low level operations
    - Etc.
- Mindset/External Pressures (select all that apply):
    - Organizational safety culture
    - Desire to meet customer's needs
    - Lack of familiarity with operation
    - Fatigue
    - Etc.
- Route of flight:
    - As appropriate for the organization's location and mission
    - Low-level
- Environmental conditions:
    - Visual Meteorological Conditions
    - Environmental conditions conducive to carburetor icing (if applicable)

| |
|---|
| **Device Configuration**<br>• As needed to complete the scenario |
| **Fly the Scenario** |
| **Postflight Review**<br>• Discuss relevant decision points and how outcome for the actual accident may have changed had the pilot made different decisions. Highlight available mitigation strategies and resources a pilot could use to affect the risk and the decision<br>• Discuss the importance of maintaining main rotor RPM in an autorotation<br>• Review the factors contributing to the onset of blade stall<br>• Discuss the hazards of operating outside of the flight envelope<br>• Discuss hazards of operating at low altitude and low airspeed, specifically height/velocity diagram and altitude selection based on mode of flight<br>• Discuss recognition and response to carburetor icing conditions (if applicable) |
| **Completion Standards**<br>• Pilot Under Instruction will demonstrate proficiency in maintaining main rotor RPM in a variety of flight profiles<br>• Pilot Under Instruction will demonstrate understanding of the conditions and risks associated with blade stall<br>• Pilot Under Instruction will successfully recognize and mitigate risks associated with operating in the low level environment specifically at low airspeed and choose an appropriate altitude based on specific mode of flight<br>• Pilot Under Instruction will successfully maneuver the aircraft to avoid hazardous flight profiles.<br>• Pilot Under Instruction will successfully recognize and respond to conditions conducive to carburetor icing (if applicable) |

ANNEX B TO
USHST RP123
DATED 28 April 2020

# SCENARIO-BASED TRAINING LESSON PLAN

## LOC-I LOSS OF TAIL ROTOR EFFECTIVENESS

### ACCIDENT – SUMMARY

On October 4, 2011, at 1525 EDT, a Bell 206B, N63Q, crashed into the East River during takeoff from East 34th Street Heliport (6N5), New York City, New York. Visual meteorological conditions prevailed. The pilot had initially anticipated taking two passengers on the flight, but the two passengers brought two additional adults with them who also boarded the helicopter. The pilot did not conduct a safety briefing or mention life vests available on board the helicopter, complete performance planning, or perform weight-and-balance calculations before takeoff. The helicopter departed 6N5 in a rearward hover and transitioned over the shoreline from an in ground-effect condition to an out-of-ground-effect (OGE) condition while climbing to about 60 feet above the water. As the pilot completed a pedal turn into the wind, the helicopter yawed, and what was likely the low rotor rpm audio warning sounded. The pilot believed that he heard an engine-out warning and responded by turning back toward 6N5, which oriented the tail into an adverse (tail) wind condition. He then confirmed normal engine operation by the N1 gas tachometer and concluded that the initial yaw was “weathervaning” as opposed to an engine malfunction. After the pilot increased collective pitch, the helicopter entered an uncommanded right yaw that accelerated into a spin around the main rotor mast that could not be corrected by application of full left pedal. At this point, the pilot believed that the helicopter had tail rotor drive failure or encountered a loss of tail rotor effectiveness (LTE). Witnesses described the helicopter as descending in an uncontrolled spin before it contacted the water, where it then rolled inverted and sank. The pilot and one passenger were not injured; one passenger sustained serious injuries, 2 passengers were fatally injured and the helicopter sustained substantial damage to the airframe.

The National Transportation Safety Board determined the probable cause(s) of this accident (ERA12MA005) to be: the pilot's failure to anticipate and correct for conditions (high gross weight, low indicated airspeed, and a right downwind turn) conducive to loss of tail rotor effectiveness (LTE), which resulted in LTE and an uncontrolled spin. Contributing to the accident was the pilot’s inadequate preflight planning, which resulted in the helicopter being in excess of its maximum allowable gross weight at takeoff.

**ACCIDENT – SUMMARY**

On April 30, 2011, about 2030 EDT, a Robinson R-44 II helicopter, N445AB, was substantially damaged following a collision with buildings in an urban section of Indiana, Pennsylvania. The commercial pilot sustained serious injuries, 1 passenger sustained serious injuries, and 1 passenger sustained fatal injuries.

The single-engine helicopter was operating in an urban area with a three-person film crew onboard who were following the movements of police vehicles. Witnesses report that the helicopter was making 180-degree flat turns (without a banking attitude) and with no forward movement.

The National Transportation Safety Board determines the probable cause(s) of this accident (ERA11FA272) to be: The pilot's operation of the helicopter at a low-forward airspeed out of ground effect, which resulted in the helicopter's loss of translational lift and tail rotor authority and the pilot's subsequent loss of helicopter control.

**ACCIDENT SUMMARY**

On July 27, 2013, about 1255 MDT, a Robinson R44 II helicopter, N25WH, was substantially damaged following a loss of control and subsequent impact with terrain near Thompson Falls, Montana during an aerial survey flight. At the time of the accident, the helicopter was about 200 lbs below its maximum gross weight. Wind was calculated to be between 2 and 16 knots from the southwest with maximum gusts of about 20 knots near the accident site, which would have resulted in a tailwind condition. The commercial pilot received fatal injuries; one passenger sustained serious injuries, and a second passenger suffered minor injuries.

View of wreckage at rest on a heading of 178 degrees

Video footage recorded by a passenger showed the helicopter traveling about 39 knots on a northeasterly heading and at an altitude of about 200 ft above ground level. The groundspeed then began to decay to about 30 knots over a period of about 30 seconds. The helicopter then yawed right, and the groundspeed dropped to 22.6 knots. The helicopter then appeared to develop an uncontrollable right spin, and crashed into the forest below. It is likely that the combination of the helicopter's high gross weight, the reduction in airspeed, and the tailwind condition led to a loss of tail rotor effectiveness, which resulted in the right yaw from which the pilot did not recover control.

The National Transportation Safety Board determines the probable cause(s) of this accident (WPR13FA343) to be: The pilot's failure to maintain helicopter control while operating in conditions conducive to a loss of tail rotor effectiveness.

**SCENARIO-BASED TRAINING LESSON PLAN**

**Type of Training**
Initial/Recurrent/etc.

**Training Objective**

- Identify, mitigate and respond to factors that contribute to loss of control in flight, specifically loss of tail rotor effectiveness (LTE)
- Identify, understand and mitigate risks associated with operating in the low level environment
- Emphasize the risks associated with operating near aircraft performance limitations
- Identify key decision points associated with the flight
    - Refer to Postflight Review section for details

**Equipment and Materials**

- Applicable simulator or basic aircrew training device
- Applicable pilot operating handbook/rotorcraft flight manual
- Applicable preflight information and/or tools
- Applicable flight risk assessment tools (FRATs) and/or check lists
- Applicable regulations such as the FAR, AIM, SOPs, FOMs etc.

**Scenario Requirements:**

- Mission Purpose:
    - As appropriate for the organization based on provided accident summary
        - Personal flight
        - Passenger transport (can include personal, commercial, HAA, etc)
        - Search and rescue
        - Utility
        - Etc.
- Mission Characteristics (select all that apply):
    - Low level operations
    - Mountainous terrain
    - Operations at or near aircraft limitations
    - Etc.
- Mindset/External Pressures (select all that apply):
    - Organizational safety culture
    - Desire to meet customer's needs
    - Lack of familiarity with operation
    - Fatigue
    - Etc.

- Route of flight:
    - As appropriate for the organization's location and mission
    - Low-level
- Environmental conditions:
    - Visual Meteorological Conditions
    - What winds are present in the current scenario – specifically as it relates to winds conducive to LTE for specific aircraft

**Device Configuration**

- As needed to complete the scenario

**Fly the Scenario**

**Postflight Review**

- Discuss relevant decision points and how the outcome for the actual accident may have changed had the pilot made different decisions. Highlight available mitigation strategies and resources a pilot could use to affect the risk and the decision
    - Decision to fly
        - Elaborate based on provided accident summary
    - Decision to continue flight
        - Elaborate based on provided accident summary
    - Selection of mitigation strategy
        - Select based on provided accident summary
- Discuss hazards of operating at low altitude and low airspeed, specifically height/velocity diagram and altitude selection based on mode of flight
- Discuss importance of performance planning
- Discuss hazards of operating outside of the flight envelope
- Review maneuver training for LTE recognition and recovery
- Discuss any significant actions taken by the pilot and assess their judgment

**Completion Standards**

- Pilot Under Instruction will successfully recognize, mitigate and respond to the following critical risk factors:
    - Situations that may lead to LTE at altitude
    - Operating at or near aircraft performance limitations, specifically out-of-ground effect, that contribute to loss of control in flight
    - Factors that contribute to loss of control in flight, specifically LTE at altitude.
- Pilot Under Instruction will successfully recognize and mitigate risks associated with operating in the low level environment specifically at low airspeed and choose an appropriate altitude based on specific mode of flight
- Pilot Under Instruction will successfully maneuver the aircraft to avoid hazardous flight profiles.
- Pilot will make a conservative go/no-go decision given the applicable risk assessment tools

ANNEX C TO
USHST RP123
DATED 28 APRIL 2020

# SCENARIO-BASED TRAINING LESSON PLAN

## LOC-I SPATIAL DISORIENTATION

### ACCIDENT – SUMMARY

On October 11, 2012, about 1958 CDT, a Robinson Helicopter Company model R44 II, N474FA, was substantially damaged when it collided with terrain during the final leg of a cross-country flight near Blanco, Texas. The pilot and two passengers were fatally injured.

According to the GPS data, while enroute, about 600 feet above ground level (AGL), the helicopter entered a descending left turn to an east-northeast course. About 30 seconds later, after descending about 100 feet, the helicopter entered a climb while on a northeast heading. During the climb, the helicopter's groundspeed decreased from 73 knots to 27 knots. The final GPS data point, recorded about 1 minute after the initial turn from the intended course, showed the helicopter about 800 feet AGL at 27 knots groundspeed and about 0.2 mile north-northwest of the accident site. The length and distribution of the debris path were consistent with the helicopter impacting rising terrain at cruise speed. At the time of departure, the helicopter likely exceeded the maximum gross weight limitation of 2,500 lbs and had a center-of-gravity located forward of the allowable limit.

A review of meteorological data established that marginal visual flight rules conditions likely existed in the vicinity of the accident site. Weather data supported increasing low-level cloud development and scattered rain showers. The flight was conducted in dark nighttime conditions with minimal illumination from ground light sources. The helicopter's flight path during the last minute of GPS data was consistent with the pilot becoming spatially disoriented due to the lack of a discernible horizon that he could use to maintain control of the helicopter. Although the helicopter was equipped with basic attitude instrumentation and avionics, it was not certified for flight under instrument flight rules (IFR).

The National Transportation Safety Board determines the probable cause(s) of this accident (CEN13FA010) to be: The pilot's loss of helicopter control as a result of spatial disorientation due to dark night conditions and marginal visual flight rules weather conditions.

NOTE: This accident that will also be a featured accident on the FAA's Accidents Lessons Learned website.

**ACCIDENT – SUMMARY**

On November 14, 2009, about 0201 PST, an Aerospatiale AS350BA, N5793P, collided with terrain near Doyle, California. The commercial pilot and two passengers sustained fatal injuries; the helicopter was substantially damaged by impact forces and post-crash fire. The cross-country positioning flight departed Reno, Nevada, about 0143 with a planned destination of Susanville, California.

Ten minutes after dropping off a patient at the local hospital and while returning to home base in dark night conditions, the flight crew made a routine position report. About 8 minutes later, the flight crew transmitted that the helicopter was going down.

Radar data indicated that after departure from the hospital, the helicopter initiated a climb from about 4,500 feet mean sea level (MSL) and established a northwesterly course. In the vicinity of the accident site, the target indicated a climbing turn to the northeast followed by a turn to the southwest, and then a climbing turn back to the northeast. The last two targets indicated a turn to the right. The last recorded altitude was at 10,200 feet MSL. On-site documentation of the wreckage suggested that the helicopter was in a nose-low attitude and about a 90-degree bank angle when it contacted the ground..

A study of the weather conditions in the vicinity of the accident site indicated clouds were present with tops reaching about 13,000 feet MSL. Light clear icing was present with the potential for moderate clear icing in or near clouds. Visibility was at or greater than 10 statute miles. Given the helicopter's flight path shortly before the accident, it is likely that the pilot was maneuvering to avoid clouds and became disorientated in the dark night conditions, which resulted in a loss of helicopter control.

The National Transportation Safety Board determines the probable cause(s) of this accident (WPR10FA055 to be: The pilot became spatially disoriented while maneuvering on a dark night, which resulted in a loss of helicopter control.

**SCENARIO-BASED TRAINING LESSON PLAN**

**Type of Training**
Initial/Recurrent/etc.

**Training Objective**

- Identify, mitigate and respond to factors that contribute to loss of control in flight, specifically spatial disorientation
- Recognize and respond to changing weather conditions in flight
- Identify, mitigate and respond to hazards associated with night operations
- Identify key decision points associated with the flight
    - Refer to Postflight Review section for details

**Equipment and Materials**

- Applicable simulator or basic aircrew training device
- Applicable pilot operating handbook/rotorcraft flight manual
- Applicable preflight information and/or tools
- Applicable flight risk assessment tools (FRATs) and/or check lists
- Applicable regulations such as the FAR, AIM, SOPs, FOMs etc.

**Scenario Requirements:**

- Mission Purpose:
    - As appropriate for the organization based on provided accident summary
        - Personal flight
        - Passenger transport (can include personal, commercial, HAA, etc)
        - Search and rescue
        - Utility
        - Etc.
- Mission Characteristics (select all that apply):
    - Low level operations
    - Mountainous terrain
    - Operations at or near aircraft limitations
    - Changing weather conditions
    - Routine cross-country flight
    - Etc.
- Mindset/External Pressures (select all that apply):
    - Organizational safety culture
    - Desire to meet customer's needs
    - Lack of familiarity with operation
    - Fatigue
    - Etc.
- Route of flight:
    - As appropriate for the organization's location and mission
- Environmental conditions:
    - Visual Meteorological Conditions
    - Night or near dark

**Device Configuration**

- As needed to complete the scenario

**Fly the Scenario**

**Postflight Review**

- Discuss relevant decision points and how the outcome for the actual accident may have changed had the pilot made different decisions. Highlight available mitigation strategies and resources a pilot could use to affect the risk and the decision
    - Decision to fly
        - Elaborate based on provided accident summary
    - Decision to continue flight
        - Elaborate based on provided accident summary
    - Selection of mitigation strategy
        - Select based on provided accident summary
- Discuss scenario cues that should have led to termination of the course of action
    - At which point should the pilot have altered the mission to maintain safety of flight
    - What options did the pilot at have the decision point to continue in a safe manner
    - Changing weather ("Land and Live")
    - Lack of ground references due to low illumination and marginal VFR conditions
- Discuss hazards of operating outside the flight envelope
- Discuss importance of performance planning
- Discuss importance of other operation highlights associated with scenario (if applicable)
    - Loss of control procedures
    - Spatial disorientation recovery
    - Pilot situational awareness
- Discuss any significant actions taken by the pilot and assess their judgment

**Completion Standards**

- Pilot Under Instruction will recognize, mitigate and respond to risk factors associated with night flying and marginal VFR
- Pilot Under Instruction will establish and apply personal minimums to flight scenario
- Pilot Under Instruction will recognize and respond to changing inflight conditions
- Pilot Under Instruction will demonstrate thorough performance planning prior to flight
- Pilot Under Instruction will make a conservative go/no-go decision given the applicable risk assessment tools
- Pilot Under Instruction will successfully maneuver the aircraft to avoid hazardous flight profiles

# AT RISK SCENARIOS LISTED BY FATAL ACCIDENT

**ACCIDENT SUMMARIES**

ACCIDENT CEN09PA348 – SUMMARY

On June 9, 2009, an Agusta SPA A-109E helicopter owned by the New Mexico Department of Public Safety (DPS) undertook a flight for the New Mexico State Police (NMSP) for a public Search and Rescue (SAR) operation. The flight was undertaken without a flight plan. Instrument Meteorological Conditions (IMC) prevailed at the remote landing site near which the pilot became spatially disoriented, resulting in the helicopter impacting terrain. The pilot and one passenger were fatally injured in the accident, and one highway patrol officer was seriously injured.

The National Transportation Safety Board (NTSB) determined the probable cause of the accident to be the pilot's decision to take off from a remote, mountainous landing site in unilluminated nighttime conditions with IMC conditions prevailing as well. Also causal was the New Mexico DPS's organizational culture that prioritized mission execution over aviation safety causing situational stress on those involved. The NMSP was additionally found to have deficiencies in safety culture, including the lack of risk assessment, inadequate staffing of pilots, inadequate fatigue management policies, and inadequate communication equipment.

ACCIDENT ERA09FA537 – SUMMARY

On September 25th, 2009, a Eurocopter AS-350 embarked on a flight to return to its base airport following a Helicopter Air Ambulance (HAA) interfacility patient transfer near Georgetown, SC. The flight was undertaken under Visual Flight Rules (VFR). Nighttime Instrument Meteorological Conditions (IMC) prevailed for the entirety of the flight, despite the company's VFR flight plan. The pilot radioed the destination airport with his estimated time of arrival and was never heard from again. The helicopter was found a few hours later by Georgetown County sheriff's deputies approximately 2 miles south of the destination airport. The pilot and two crew members were fatally injured in the flight.

The National Transportation Safety Board (NTSB) determined the probable cause of the accident to be the pilot's decision to continue VFR flight into IMC conditions, resulting in the pilot's spatial disorientation and subsequent loss of control of the aircraft. Also causal was the inadequate oversight of the flight by the provider's Operational Control Center (OCC).

ACCIDENT CEN10FA019 – SUMMARY

Photograph 02 - Main Wreckage - Cabin Area

On October 14, 2009, a Robinson R22 helicopter impacted terrain near Tahlequah, OK. The flight was undertaken without a flight plan in nighttime Instrument Meteorological Conditions (IMC) despite the pilot's lack of instrument rating or any instrument experience. The aircraft was found in a field just south of the departure site. The pilot and a passenger were fatally injured in the crash.

The National Transportation Safety Board (NTSB) determined the probable cause of the accident to be the pilot's impairment due to recent heavy use of methamphetamine, recent use of a prescribed pain reliever, and fatigue.

ACCIDENT ERA10FA403 – SUMMARY

On August 2, 2010, a Robinson R44 helicopter departed on a multi-leg cross-country trip from West Palm Beach, FL. The pilot, who was a non-instrument-rated private pilot, did not file a flight plan or obtain a weather briefing. The flight was undertaken over mountainous terrain, with which the pilot had no flying experience. The pilot encountered Instrument Meteorological Conditions (IMC) near Blood Mountain, GA, and was later found to have impacted terrain. No evidence of mechanical malfunctions were found. The pilot and one passenger were fatally injured in the accident.

The National Transportation Safety Board (NTSB) determined the probable cause of the accident to be the non-instrument-rated pilot's decision to continue into IMC conditions. Potentially causal were the pilot's use of FAA unapproved medications, including anti-depressants and amphetamines.

ACCIDENT CEN10FA509 – SUMMARY

On August 31st, 2010, a Bell 206 helicopter undertook a Helicopter Air Ambulance (HAA) flight to pick up a patient for transfer near Crabtree, AK. Dark night Instrument Meteorological Conditions (IMC) persisted in the flight path at the time of the accident. GPS showed the helicopter reversing course several times prior the accident, indicating a loss of spatial awareness on the part of the pilot. The pilot and two crew members were fatally injured in the accident.

The National Transportation Safety Board (NTSB) determined the probable cause of the accident to be the pilot's spatial disorientation and loss of control of the aircraft, which resulted in the in-flight separation of the main rotor and tail boom.

ACCIDENT CEN11FA468 – SUMMARY

Photo 6. View of main wreckage from the right side.

Photo 1. Helicopter empennage in the top of trees.

On July 9th, 2011, a Robinson R44 helicopter embarked on a personal flight under Visual Flight Rules (VFR) near Georgetown, KY. After some time, the pilot reported to a controller near Cincinnati that he needed to descend because he was encountering too many clouds. The controller approved the VFR descent, but 6 minutes later all contact was lost. The helicopter was later found to have impacted trees near the top of a ridgeline. The pilot was fatally injured in the accident.

The National Transportation Safety Board (NTSB) determined the probable cause of the accident to be the pilot's decision to continue VFR flight into IMC. This resulted in the pilot's subsequent spatial disorientation and failure to maintain clearance from terrain.

ACCIDENT ERA12MA122 – SUMMARY

Photo 4) View of Engine Among the Burnt Wreckage Debris and Trees. Photo by the Florida Department of Environmental Protection.

On December 26, 2011 at approximately 05:53, a Bell 206B collided with terrain near Green Cove Springs, FL during an on-demand air taxi flight. The purpose of the flight was to transport a doctor and medical technician for the procurement of a transplant organ. The flight was undertaken under Visual Flight Rules (VFR), and the vehicle was not certified for Instrument Flight Rules (IFR) flight. After diverting the flightpath due to heavy mist and fog, the pilot decided to decrease altitude for cruise. During the low altitude cruise segment of the flight, the vehicle encountered IMC conditions and terrain and was downed by a tree strike, fatally injuring all three passengers.

The National Transportation Safety Board (NTSB) determined that the probable cause of the accident was the pilot's improper decision to continue visual flight into night instrument meteorological conditions, which resulted in controlled flight into terrain.

ACCIDENT ERA13FA014 – SUMMARY

On October 9, 2012 at 20:03, a Bell 407 collided with trees and impacted the ground near Pocono Mountains Regional Airport (MPO) during a corporate personnel transport flight in which there were four passengers. The flight was undertaken under Visual Flight Rules (VFR) and the pilot was not rated for Instrument Flight Rules (IFR) missions in helicopters. The pilot was rated for IFR in fixed-wing aircraft, however. After dropping off two of the original four passengers, the pilot and the two remaining passengers departed Elmira/Corning Regional Airport (ELM) toward Westchester County Airport (HPN), which was to be the final flight segment. While headed to HPN, the pilot encountered rapidly deteriorating weather conditions instigating a diversion toward MPO. The pilot subsequently lost control and impacted a tree before falling to the ground. The pilot and one passenger were fatally injured, and one passenger survived but was critically injured.

The National Transportation Safety Board determined that the probable cause of the accident was the pilot's decision to continue visual flight rules flight into instrument meteorological conditions due to self-imposed pressure to complete the trip, which resulted in impact with trees and terrain.

ACCIDENT CEN13FA096 – SUMMARY

On December 12, 2012 at 20:16, an MBB BK 117A-3 collided with agricultural land near Compton, Illinois during an Emergency Medical Services (EMS) repositioning flight. The flight was undertaken under Visual Flight Rules (VFR) and the pilot was assigned to VFR operation only. During the repositioning flight, the pilot encountered night IMC conditions that likely led to spatial disorientation. All three passengers, the pilot, flight nurse, and flight paramedic, were fatally injured.

The National Transportation Safety Board (NTSB) determined the probable cause of the accident to be the inadvertent encounter with inclement weather, including snow, freezing rain, and reduced visibility conditions, which led to the pilot's spatial disorientation and loss of aircraft control.

ACCIDENT ANC13GA036 – SUMMARY

On March 30, 2013, a Eurocopter AS350 B3 owned by the Alaska Department of Public Safety (DPS) embarked on a Search and Rescue (SAR) mission near Talkeetna, Alaska to rescue a stranded and hypothermic snowmobiler. The flight was undertaken under Visual Flight Rules (VFR), and the pilot was not Instrument Flight Rules (IFR) current. Instrument Meteorological Conditions (IMC) were encountered shortly after the snowmobiler was loaded into the aircraft, causing the pilot to become spatially disoriented and lose control of the aircraft. All three passengers, the pilot, an Alaska state trooper, and the rescued snowmobiler, were fatally injured.

The National Transportation Safety Board (NTSB) determined the probable cause of the accident to be the pilot's decision to continue flight under VFR into deteriorating weather conditions, resulting in the pilot's spatial disorientation and eventual loss of control. Also causal was the Alaska Department of Public Safety's punitive safety culture and inadequate safety management, which prevented the organization from identifying and correcting latent deficiencies in risk management and pilot training.

ACCIDENT ERA13FA273 – SUMMARY

On June 6th, 2013 at 23:15, a Bell 206L-1 impacted ground in a school parking lot near Manchester, Kentucky during an air ambulance repositioning flight following a patient transfer. The flight was undertaken under Visual Flight Rules (VFR), but subsequently encountered Instrument Meteorological Conditions (IMC) during the flight. While attempting to land the helicopter, the pilot inadvertently entered a spin while in low visibility conditions, resulting in spatial disorientation. The helicopter then impacted trees and subsequently impacted the ground in a nose-down attitude, resulting in the explosion of the vehicle. The pilot and both passengers were fatally injured in the accident

The National Transportation Safety Board (NTSB) determined that the probable cause of the accident was the pilot's loss of helicopter control due to spatial disorientation when he inadvertently encountered night, instrument meteorological conditions, which resulted in the in-flight separation of the main rotor and tail boom.

ACCIDENT ERA13FA336 – SUMMARY

On July 27th, 2013 at 22:20, a Robinson R66 collided with trees and ground while on a personal flight from Tri-Cities Airport (CZG) in New York to Jake Arner Memorial Airport (22N). The flight was conducted under Visual Flight Rules (VFR), but encountered inclement weather during the flight. The pilot, a CFI who was not instrument rated, likely encountered mountain obscuration and lost spatial awareness due to low light conditions with precipitation and mist. The pilot in command, along with a student pilot and three additional passengers were all fatally injured in the accident.

The National Transportation Safety Board (NTSB) determined that the probable cause of the accident was the pilot's decision to continue VFR flight into night instrument meteorological conditions, which resulted in spatial disorientation and a loss of control.

**UIMC SCENARIO-BASED TRAINING LESSON PLAN**

**Type of Training**

- Initial/Recurrent/etc.

**Training Objective**

- Identify, mitigate and respond to factors that contribute to loss of control in flight
  - Select all that apply based on Scenario Requirements section
- Recognize and respond to changing weather conditions in flight
- Identify, mitigate and respond to hazards associated with night operations
- Identify, understand and mitigate risks associated with operating in the low-level environment
- Identify key decision points associated with flight
  - Refer to Postflight Review section for details

**Equipment and Materials**

- Applicable simulator or basic aircrew training device
- Applicable pilot operating handbook/rotorcraft flight manual
- Applicable preflight information and/or tools
- Applicable flight risk assessment tools (FRATs) and/or check lists
- Applicable regulations such as the FAR, AIM, SOPs, FOMs etc.

**Scenario Requirements:**

- Mission Purpose:
  - Select based on provided accident summary
    - Personal flight
    - Passenger transport (can include personal, commercial, and HAA)
    - Search and rescue
- Mission Characteristics (select all that apply)
  - Low level operations (including presence of terrain)
  - Mountainous terrain or mountain obscuration
  - Night flight
  - Unintended VMC into IMC
  - Urban environment
  - Unprepared landing site
  - Significant external pressure
- Mindset/External Pressures (select all that apply)
  - Organizational safety culture
  - Time pressure
  - Fatigue
  - Use of unapproved medications/substances

- Route of flight
    - Select appropriate VFR departure location
    - Define any changes made to original flight plan
    - Define unintended encounter with IMC
        - Flight segment of encounter
        - Pilot workload and mindset during flight segment
        - Type of IMC present
    - Define loss of spatial awareness based on encounter with IMC
- Environmental conditions
    - What weather conditions are present in the current scenario?
        - Define weather at origin, along flightpath, and at destination
        - Implement these weather conditions at relevant times in the scenario
    - What indications for these environmental conditions are given to the pilot?
        - AIRMET issued for areas of flight path
        - METAR indications of IMC in flight path
        - Witness description of inclement weather in flight path

**Device Configuration**

- As needed to complete the scenario

**Fly the Scenario**

**Postflight Review**

- Discuss relevant decision points and how outcome for the actual accident may have changed had the pilot made different decisions. Highlight available mitigation strategies and resources a pilot could use to affect the risk and the decision
    - Decision to fly
        - Elaborate based on provided accident summary
    - Decision to continue the flight
        - Elaborate based on provided accident summary
    - Selection of mitigation strategy
        - Select based on provided accident summary
- Discuss hazards of operating outside the flight envelope
- Discuss importance of performance planning
- Discuss importance of other operation highlights associated with identified flight (if applicable), including but not limited to:
    - Loss of control procedures
    - Spatial disorientation
    - Pilot situational awareness
- Review maneuver training for applicable maneuvers from identified flight

- Discuss any additional problems and contributing factors involved in the incident that were not included in the flight scenario.
    - It is difficult to incorporate external pressures into a training scenario in a realistic or representative way but note that it is a very important factor in a pilot's willingness to take risks.
    - Discuss any significant actions taken by the pilot and assess their judgement.
- Discuss scenario cues that should have led to termination of the course of action
    - Using decision points provided, identify at which point the pilot should have altered their mission to maintain safety in flight
    - Discuss the options that the pilot has and identify a best course of action going forward from that decision point

**Completion Standards**

- Pilot Under Instruction will make a conservative go/no-go decision given the applicable risk assessment tools
- Pilot Under Instruction will successfully recognize, mitigate and respond to the following critical risk factors:
    - As applicable per training objectives (from above section regarding indicators for decision points)
- Pilot Under Instruction will demonstrate appropriate performance planning prior to flight
- Pilot Under Instruction will successfully maneuver the aircraft to avoid hazardous flight profiles.
- Pilot Under Instruction will recognize and respond to changing inflight conditions

**References:**

Focused on the USHST Fatal Accident Analysis Scoring data categories of:

- Intervention strategy = Training
- Problem statement = Pilot
- Problem = What
- Contributing Factors = Why

FAA-H-8083-9A, Aviation Instructor's Handbook. 2008. Pp 6-9-6-11

FAA FITS Scenario Based Training Course Developers Guide

PEGASAS Project No.30. Scenario Based Training for Rotorcraft. February 2019.

# AT RISK SCENARIOS LISTED BY FATAL ACCIDENT

**LALT ACCIDENT SUMMARY**

LALT WIRES ACCIDENT ERA13LA057 – SUMMARY

Photograph # 2 – View of helicopter as it came to rest (provided by FAA)

On November 15, 2012 at 12:11, a Hughes 369D collided with power lines in the Horseheads, NY area during a power line inspection. The pilot, who was on their 2nd day of work as a power line patrol pilot, flew well below the power lines and struck the lines. The pilot and a utility company employee, who was the lone passenger, were fatally injured in the accident.

The National Transportation Safety Board determined that the probable cause of the accident was the pilot's failure to maintain adequate altitude while conducting a power line aerial observation flight, which resulted in an in-flight collision with wires.

| **LOW ALTITUDE SCENARIO-BASED TRAINING LESSON PLAN** |
|---|
| **Type of Training**<br>• Initial/Recurrent/etc. |
| **Training Objective**<br>• Identify, mitigate and respond to factors that contribute to loss of control in flight<br>  o Unfamiliarity with operational environment<br>  o Obstacles in flight path<br>• Identify, understand and mitigate risks associated with operating in the low-level environment<br>• Identify key decision points associated with flight<br>  o Refer to Postflight Review section for details |
| **Equipment and Materials**<br>• Applicable simulator or basic aircrew training device<br>• Applicable pilot operating handbook/rotorcraft flight manual<br>• Applicable preflight information and/or tools<br>• Applicable flight risk assessment tools (FRATs) and/or check lists<br>• Applicable regulations such as the FAR, AIM, SOPs, FOMs etc. |
| **Scenario Requirements:**<br>• Mission Purpose:<br>  o Low altitude flight with VIP passenger<br>• Mission Characteristics:<br>  o Restrictive environment (airspace, terrain, etc)<br>  o Low level operations<br>  o Urban environment<br>• Mindset/External Pressures:<br>  o Organizational safety culture<br>  o No previous experience with operational environment<br>  o Carrying VIP in helicopter<br>• Route of flight<br>  o Takeoff from conventional airport or helipad<br>  o Close proximity flight to low altitude obstacles<br>• Environmental conditions<br>  o Power lines and electrical equipment present as obstacles for duration of flight |
| **Device Configuration**<br>• As needed to complete the scenario |

**Fly the Scenario**

**Postflight Review**

- Discuss relevant decision points and how outcome for the actual accident may have changed had the pilot made different decisions. Highlight available mitigation strategies and resources a pilot could use to affect the risk and the decision
    - Decision to fly
        - Unfamiliarity with operational environment
    - Decision to continue the flight
        - Necessity to conduct low altitude operation
    - Selection of mitigation strategy
- Discuss hazards of operating outside the flight envelope
- Discuss importance of performance planning
- Discuss importance of other operation highlights associated with identified flight
    - Pressure to perform on the second day of the new job is a significant external pressure
    - It is difficult to incorporate external pressures into a training scenario in a realistic or representative way but note that it is a very important factor in a pilot's willingness to take risks.
- Review maneuver training for applicable maneuvers from identified flight
    - Low-altitude operations require extensive training and understanding of hazards specific to the operational area
- Discuss any additional problems and contributing factors involved in the incident that were not included in the flight scenario.
- Discuss scenario cues that should have led to termination of the course of action
    - Using decision points provided, identify at which point the pilot should have altered their mission to maintain safety in flight
    - Discuss the options that the pilot has and identify a best course of action going forward from that decision point

**Completion Standards**

- Pilot Under Instruction will make a conservative go/no-go decision given the applicable risk assessment tools
- Pilot Under Instruction will successfully recognize, mitigate and respond to the following critical risk factors:
    - As applicable per training objectives (from above section regarding indicators for decision points)
- Pilot Under Instruction will demonstrate appropriate performance planning prior to flight
- Pilot Under Instruction will successfully maneuver the aircraft to avoid hazardous flight profiles.
- Pilot Under Instruction will recognize and respond to changing inflight conditions

**References:**

Focused on the USHST Fatal Accident Analysis Scoring data categories of

- Intervention strategy = Training
- Problem statement = Pilot
- Problem = What
- Contributing Factors = Why

FAA-H-8083-9A, Aviation Instructor's Handbook. 2008. Pp 6-9-6-11

FAA FITS Scenario Based Training Course Developers Guide

PEGASAS Project No.30. Scenario Based Training for Rotorcraft. February 2019.

ANNEX F TO
RP123
DATED DAY MONTH 2020

# SCENARIO-BASED TRAINING LESSON PLAN

## LALT ENGINE FAILURE

**ACCIDENT – SUMMARY**

On May 26, 2010 at 1645 EDT, a Schweizer 269C-1, N73SJ, was substantially damaged when it collided with terrain during a certified flight instructor (CFI) checkride near Boxborough, MA resulting in 1 fatal and 1 serious injury.

The purpose of the flight was for the commercial pilot to complete her certified flight instructor (CFI) checkride with a Federal Aviation Administration (FAA) inspector. According to the commercial pilot, they were returning to the departure airport after satisfactorily completing all of the required maneuvers when the FAA inspector unexpectedly announced he was simulating an engine failure and chopped the throttle. As the commercial pilot attempted to recover the helicopter from the maneuver, she realized the helicopter had experienced an actual power loss. The FAA inspector attempted to troubleshoot the power loss and the commercial pilot prepared for a straight-ahead forced landing to a road. As she prepared for the landing on the road, the FAA check pilot asked, “where are you going?” The commercial pilot told him she was going to the road and he responded, “we need to turn right to be into the wind.” The commercial pilot thought to herself that there was little/no wind and the landing surface was a more important factor. The FAA check pilot came on the controls to initiate a turn which resulted in a flight path toward wooded terrain, and away from the road. Shortly after, the helicopter impacted trees and terrain in an upright attitude.

At 1656, weather reported at BED, at 133 feet elevation, included wind from 340 degrees at 6 knots, 10 miles visibility, clear skies, temperature 34 degrees Celsius (C), dew point 17 degrees C, and an altimeter setting of 29.66 inches of mercury. The estimated density altitude at BED was 2,869 feet.

The National Transportation Safety Board determines the probable cause(s) of this accident (ERA10FA283) to be: The FAA inspector's rapid reduction of power which resulted in a loss of engine power and his decision to initiate a turn during the autorotation without sufficient altitude to clear obstacles.

**Type of Training**

- Initial/Recurrent/etc.

**Training Objective**

- Identify, mitigate and respond to factors that contribute to collision with obstacles/objects/terrain while intentionally operating near the surface
- Identify, understand and mitigate risks associated with operating in the low level environment
- Demonstrate safe initiation and training for single engine failure (if applicable)
- Identify key decision points associated with the flight
    - Refer to Postflight Review section for details

**Equipment and Materials**

- Applicable simulator or basic aircrew training device
- Applicable pilot operating handbook/rotorcraft flight manual
- Applicable preflight information and/or tools
- Applicable flight risk assessment tools (FRATs) and/or check lists
- Applicable regulations such as the FAR, AIM, SOPs, FOMs etc.

**Scenario Requirements:**

- Mission Purpose:
    - As appropriate for the organization based on provided accident summary
        - Personal flight
        - Passenger transport (can include personal, commercial, HAA, etc)
        - Search and rescue
        - Utility
        - Etc.
- Mission Characteristics (select all that apply):
    - Low level operations
    - Mountainous terrain
    - Operations at or near aircraft limitations
    - Changing weather conditions
    - Routine cross-country flight
    - Etc.
- Mindset/External Pressures (select all that apply):
    - Organizational safety culture
    - Desire to meet customer's needs
    - Lack of familiarity with operation
    - Fatigue
    - Etc.
- Route of flight:
    - As appropriate for the organization's location and mission
- Environmental conditions:
    - As applicable to operation

**Device Configuration**

- As needed to complete the scenario

**Fly the Scenario**

**Postflight Review**

| |
|---|
| • Discuss relevant decision points and how the outcome for the actual accident may have changed had the pilot made different decisions. Highlight available mitigation strategies and resources a pilot could use to affect the risk and the decision<br>• Discuss scenario cues that should have led to termination of the course of action<br>• Discuss importance of crew resource management and effective communication<br>• Discuss the importance of pilot situational awareness<br>• Discuss any significant actions taken by the pilot and assess their judgment<br>• Discuss appropriate setup, initiation and execution of single engine failure training (if applicable) |
| **Completion Standards**<br>• Pilot Under Instruction will successfully recognize and mitigate risks associated with operating in the low level environment specifically at low airspeed and choose an appropriate altitude based on specific mode of flight<br>• Pilot Under Instruction will demonstrate safe setup, initiation and execution of single engine failure training (if applicable) |