



Federal Aviation Administration

Helicopter Training Accidents

- Autorotation
- Dynamic Rollover

Even the Best Pilots Make Mistakes.
Minimize the Number and Break the Chain.

www.FAASafety.gov

FAASTeam

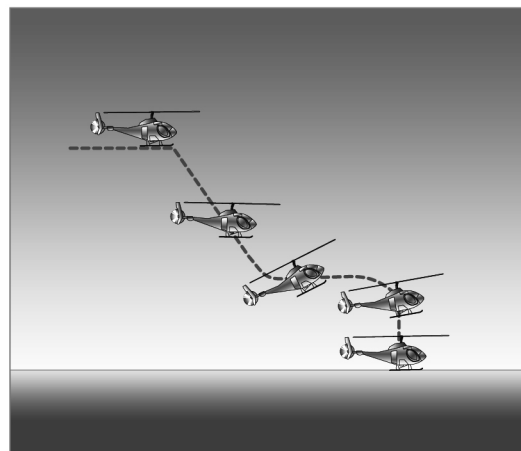
CFI Defensive “Best Practices”

- Unless you are “taking control” of the flight controls, avoid interfering with the controls while the student is “hands on.” This practice may cause negative knowledge transfer regarding the correct “feel” of control input.

Autorotation—Common Errors

Straight-In Autorotation

- Failing to use sufficient antitorque pedal when power is reduced.
- Lowering the nose too abruptly when power is reduced, thus placing the helicopter in a dive.
- Failing to maintain proper rotor r.p.m. during the descent.
- Application of up-collective pitch at an excessive altitude, resulting in a hard landing, loss of heading control, and possible damage to the tail rotor and the main rotor blade stops.
- Failing to level the helicopter.



Power Recovery From Practice Autorotation

- Initiating recovery too late, requiring a rapid application of controls, resulting in overcontrolling.
- Failing to obtain and maintain a level attitude near the surface.
- Failing to coordinate throttle & collective pitch properly, resulting in either an engine overspeed or a loss of r.p.m.
- Failing to coordinate proper antitorque pedal with the increase in power.
- Failing to level the helicopter.

FAA Safety Team Mission Statement

Improve the Nation’s aviation safety record by conveying safety principles and practices through training, outreach, and education, while establishing partnerships and encouraging the continual growth of a positive safety culture within the aviation community.

Many programs and products are available on the FAASTeam Web site: A partial list includes—

- WINGS—Pilot Proficiency Program
- Pilot Resources and Training
- AMT Award Program
- New online courses

FAAS Team Safety Information

Cockpit Resource Management and Personal Readiness

- Know your limits and observe them.
- Develop and use good habits (e.g., checklists).
- Rectify a “getting away” scenario. Do not amplify it.
- Be constructively critical of each flight.
- Even the best pilots make mistakes—minimize the number and break the chain.
- Always think about the possible error.
- If intuition tells you something is wrong, prove the intuition to be wrong before proceeding. Intuition is mostly right.
- Ground yourself voluntarily for any medical reason if you need to.
- Improve technique. Periodically practice safe flight with an instructor.
- If flying a different aircraft, become thoroughly familiar with it before flight.
- Do not violate the rules. They are the products of previous tragedies.
- Good decisions are born of good judgments and of prepared, rested, and alert minds.

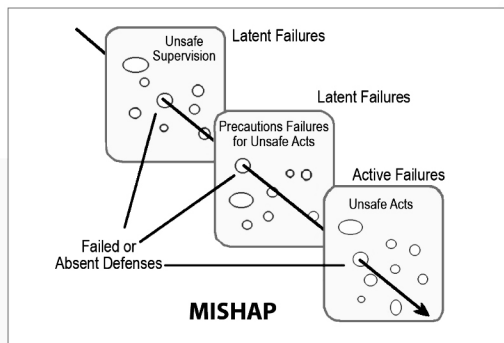
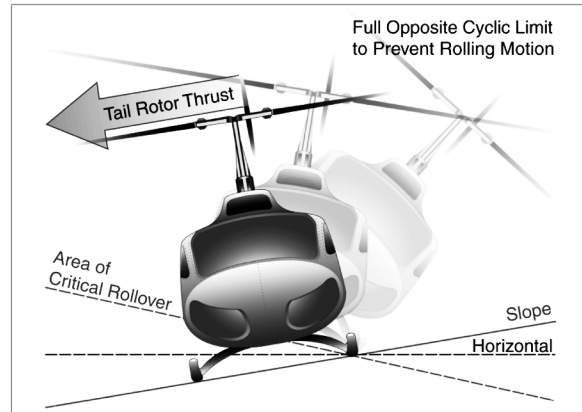


Figure 1. The “Swiss Cheese” model of human error (causation Shappell & Wiegmann, 2000).



Dynamic Rollover Precautions

- Always practice hovering autorotations into the wind, but never when the wind is gusty or over 10 knots.
- When hovering close to fences, sprinklers, bushes, runway/taxi lights, or other obstacles that could catch a skid, use extreme caution.
- Always use a two-step liftoff. Pull in just enough collective pitch control to be light on the skids and feel for equilibrium, then gently lift the helicopter into the air.
- When practicing hovering maneuvers close to the ground, make sure you hover high enough to have adequate skid clearance with any obstacles, especially when practicing sideways or reward flight.
- When the wind is coming from the upslope direction, less lateral cyclic control will be available.
- Tailwind conditions should be avoided when conducting slope operations.
- Pilots should remember to correct for translating tendencies of the tail rotor during upslope operations.
- If passengers or cargo are loaded or unloaded, the lateral cyclic requirement changes.

- If the helicopter uses interconnecting fuel lines that allow fuel to automatically transfer from one side of the helicopter to the other, the gravitational flow of fuel to the downslope tank could change the center of gravity, resulting in a different amount of cyclic control application to obtain the same lateral result.
- Do not allow the cyclic limits to be reached. If the cyclic control limit is reached, further lowering of the collective may cause mast bumping. If this condition occurs, return to a hover and select a landing point with a lesser degree slope.
- During a takeoff from a slope, if the upslope skid/wheel starts to leave the ground before the downslope skid/wheel, smoothly and gently lower the collective and check to see if the downslope skid/wheel is caught on something. Under these conditions, vertical ascent is the only acceptable method of liftoff.
- During flight operations on a floating platform, if the platform is pitching/rolling while attempting to land or take off, the result could be dynamic rollover.

Performance Factors

- Density Altitude
- Atmospheric Pressure
- Altitude
- Temperature
- Moisture (Humidity)
- High- and Low-Density Altitude Conditions
- Weight
- Winds
- Follow a curriculum that introduces maneuvers to the student, “simple to complex,” with the student satisfactorily completing phase checks before receiving training or attempting more complex maneuvers.
- Constantly monitor or “guard” the flight controls. Reaction time is short.