ACS HELICOPTER MANEUVER SERIES · 22 OF 24

Dynamic Rollover

Area of Operation VIII — Emergency Operations

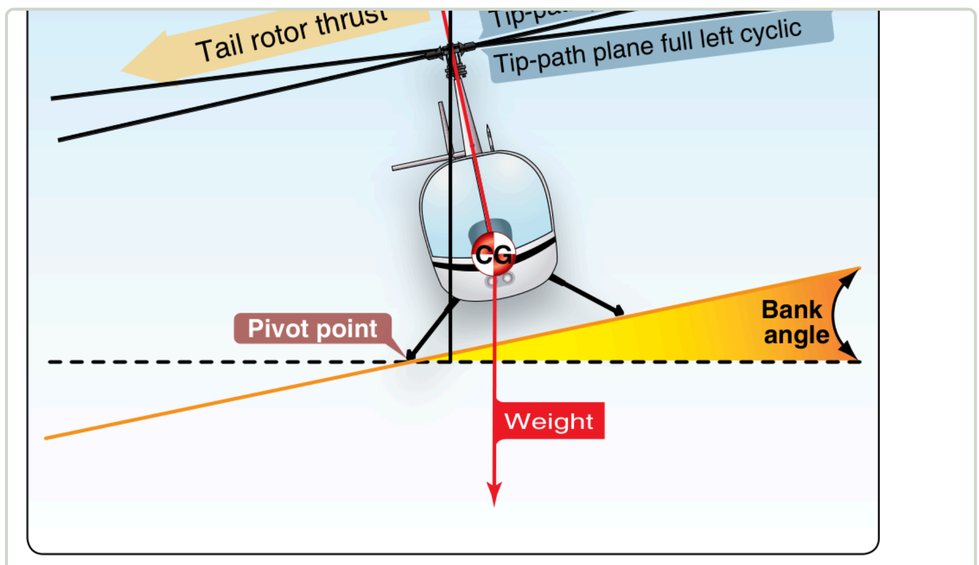
Private Pilot task PH.VIII.H **Commercial Pilot task** CH.VIII.H

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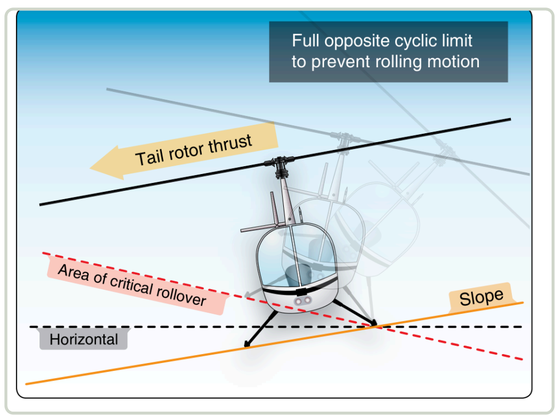
Objective. To determine the applicant exhibits satisfactory knowledge and risk management associated with dynamic rollover.

HOW IT IS FLOWN

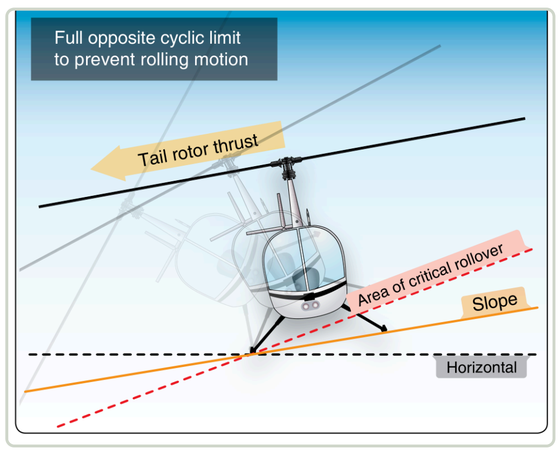
condensed from the FAA Helicopter Flying Handbook, Chapter 11 — Dynamic Rollover



HFH Figure 11-5. *Forces acting on a helicopter with right skid on the ground.*



HFH Figure 11-6. *Upslope rolling motion.*



HFH Figure 11-7. *Downslope rolling motion.*

1. Dynamic rollover: a lateral rolling tendency when in contact with the surface. Three factors must be present: a rolling moment, a pivot point other than the CG (a skid), and thrust greater than weight. Beyond the critical rollover angle, main rotor thrust continues the roll and no cyclic can stop it (Figure 11-5).
2. Causes: tie-down or skid-securing device left on; a skid catching an object while hovering sideward; skid stuck in ice, soft asphalt or mud; improper takeoff/landing technique; slope operations.
3. Most critical (counterclockwise rotor): right skid down (translating tendency adds to the roll), right lateral CG, crosswind from the left, left yaw inputs; also high gross weight with thrust about equal to weight. A faster roll rate reduces the angle from which recovery is still possible.
4. Recovery: quickly reduce collective — the only effective way to remove the thrust. A smooth, moderate reduction (slower than full-up-to-full-down in about two seconds) is usually enough; dumping it can drive a blade into the fuselage or, on a slope, bounce the helicopter into a roll the other way (Figure 11-7). If the bank reaches about 5°–8° and full cyclic does not reduce it, lower the collective.
5. Prevention: two-step lift-off (light on the skids, feel for equilibrium, then lift gently); keep roll, pitch and yaw rates small; hover high enough for skid clearance near obstacles; hovering autorotations into the wind, wary above 10 kt or gusty; avoid tailwinds on slopes; do not let the cyclic reach its limit — if it does, return to a hover and pick a lesser slope.

WATCH FOR — DRAWN FROM THE HFH DISCUSSION

- Trying to stop the roll with opposite cyclic alone.
- Pulling collective suddenly to get airborne on a slope.
- Excessive cyclic into the slope with excessive collective (upslope rolling motion, Figure 11-6).
- Hovering close to fences, lights, cables or nets that can catch a skid.
- Forgetting that lateral cyclic needs change as passengers or fuel shift.

SKILLS — THE STANDARD

the applicant exhibits the skill to:

NO FLIGHT SKILL ELEMENTS

The ACS lists no Skill elements for this Task — it is evaluated through the Knowledge and Risk Management elements below (oral questioning and scenario discussion), for both the Private and the Commercial certificate.

KNOWLEDGE

PH.VIII.H.K1–K3 · the applicant demonstrates understanding of:

- Elements related to dynamic rollover.
- Interactions between thrust, crosswind, slope, lateral CG, aircraft weight, and flight controls that contribute to dynamic rollover.
- Preventive flight technique and recovery during flight operations, including slope operations.

RISK MANAGEMENT

PH.VIII.H.R1–R7 · identify, assess and mitigate risk associated with:

- Surface conditions conducive to dynamic rollover.
- Landing gear proximity to obstructions on the ground during low altitude hover.
- Flight control inputs during takeoff or landing.
- Sideward hover.
- Aircraft slope limitations.
- Critical rollover angle and rolling moment.
- Translating tendency.

Standards: FAA-S-ACS-15 Private Pilot Helicopter and FAA-S-ACS-16 Commercial Pilot Helicopter (text reproduced from the current ACS). **References:** FAA-H-8083-2, FAA-H-8083-21, FAA-H-8083-25; POH/RFM; SAFO 16016. **Figures and technique:** FAA Helicopter Flying Handbook, FAA-H-8083-21B — figures reproduced unmodified. Always confirm tolerances against the ACS in force on your checkride date and procedures against the R44 POH/RFM.

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