ACS HELICOPTER MANEUVER SERIES · 21 OF 24

Antitorque System Failure

Area of Operation VIII — Emergency Operations

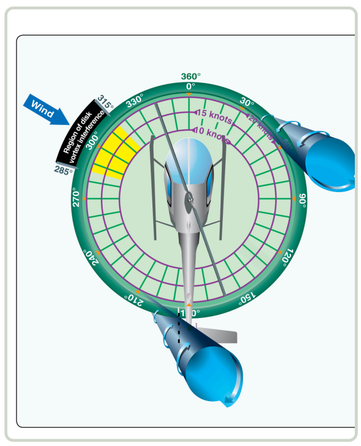
Private Pilot task PH.VIII.G **Commercial Pilot task** CH.VIII.G

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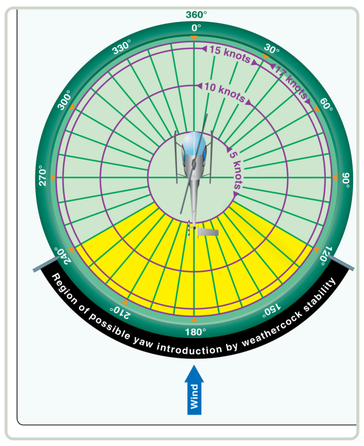
Objective. To determine the applicant exhibits satisfactory knowledge and risk management associated with an antitorque system failure.

HOW IT IS FLOWN

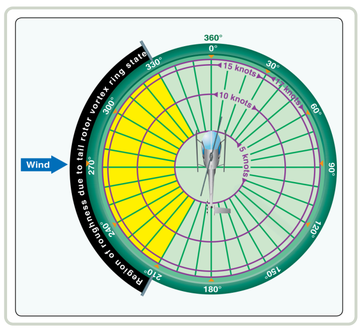
condensed from the FAA Helicopter Flying Handbook, Chapter 11 — Antitorque System Failure, Loss of Tail Rotor Effectiveness



HFH Figure 11-9. *Main rotor disk vortex interference.*



HFH Figure 11-10. *Weathercock stability.*



HFH Figure 11-11. *Tail rotor vortex ring state.*

1. Two categories: loss of the tail rotor drive (driveshaft, gearbox, or the tail rotor itself) = complete loss of antitorque; or a control failure where the tail rotor still thrusts but the pedals no longer change it.
2. Drive failure: the nose spins right immediately (counterclockwise rotor). Severity grows with power and falls with airspeed. Power must be reduced to reduce torque — the end result is an autorotation.
3. At a hover: enter a hovering autorotation by rolling off the throttle. In forward flight: lower collective and roll off the throttle into a normal autorotation. Near cruise speed the vertical fin may give enough directional control to reach a better landing site; slight cyclic opposite the yaw helps.
4. Stuck pedals: fly to an area for a running/roll-on landing; use a normal-to-steep approach so a lower power setting keeps the nose to the right, arriving at 2–3 ft skid height as ETL is lost; increase collective smoothly to align the nose and cushion; a little forward cyclic stops the nose continuing right.
5. LTE (unanticipated right yaw, below about 30 kt): main-rotor disk vortex interference (wind 285°–315°), weathercock stability (120°–240°), tail rotor vortex ring state (210°–330°), plus high power, slow airspeed, high density altitude and low rpm. Recover with full left pedal and forward cyclic to gain airspeed; reduce power if altitude permits.
6. Reduce the onset of LTE: maximum power-on rotor rpm; avoid tailwinds below 30 kt; avoid OGE hovers and high-power demand at low airspeed in the critical wind azimuths; stay alert to any uncommanded right yaw and stop it immediately.

WATCH FOR — DRAWN FROM THE HFH DISCUSSION

- Not reducing power/entering autorotation after a drive failure.
- Letting a right yaw rate build in a left crosswind.
- Landing with the nose still turning.
- Low rotor rpm reducing tail rotor thrust.
- Ignoring wind azimuth at a hover in high-power conditions.

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.G.K1–K5 · the applicant demonstrates understanding of:

- Elements related to antitorque system failure by describing:
  - a. Indications of an antitorque system failure(s)
  - b. Differences between complete loss of antitorque and mechanical flight control failures
  - c. RFM procedures for antitorque system(s) failure
- Wind conditions that favor a landing with an antitorque failure.

RISK MANAGEMENT

PH.VIII.G.R1–R3 · identify, assess and mitigate risk associated with:

- Preflight inspection of the antitorque system.
- Antitorque failure(s) for the aircraft supplied for the practical test.
- Use of antitorque failure procedures.

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.
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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