

Sunday, May 10, 2026

Vortex Ring State

Purpose and Objective

Vortex Ring State recovery is a recovery maneuver taught to increase a student's ability to recognize and safely recover from Vortex Ring State (VRS). VRS is a dangerous flight condition in which the helicopter settles in its own downwash vortices, causing it to enter a descent where applying more power will only worsen the descent rate.

Three conditions are needed to enter VRS:

1. Power applied. (>20% throttle)
2. Below ETL.
3. A descent rate of more than 300 feet per minute.

With these conditions in mind, we can see that VRS can be encountered easily enough when attempting to come in for an approach if say wind direction is not accounted for.

Maneuver

1. Setup at with at least 2000 feet AGL to remain within recommended safety margins.
2. Complete a 360 degree clearing turn and setup with a tailwind.
3. Complete a gauge check and apply carb heat.
4. Begin slowing the helicopter down by applying a slight aft cyclic pressure.
5. Once at 40 KTS airspeed, set the collective power to 18" MAP.
6. Keeping your eyes outside, feel the vibrations of the main rotor vortices re-entering the main rotor. These vibrations can be felt in the back of the seat, coming from the tail. Call out "*ETL vibrations.*"
7. Keep giving aft cyclic to further slow the helicopter down. Vibrations will further build from the tail of the helicopter, and now into the seat. These vibrations have a lower frequency and are the onset of VRS. Call out "*Onset Vortex Ring State vibrations.*"
8. Recover from VRS.
 1. Lower collective slightly.
 2. Apply slight forward cyclic pressure.
 3. Maintain heading with pedals.
 4. Once the airspeed comes alive, raise collective to 5 min takeoff power and gain 53 knots or best rate of climb.



Common Errors

- Not identifying the onset of VRS.
 - Not identifying the wind direction.
 - Not maintaining the heading during the maneuver.
 - Larger than necessary control inputs.
 - Raising collective above 18" in the setup.
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Performance Standards

*Private Pilot for Rotorcraft Category Helicopter Rating ACS, Area of Operation VIII, Task E**

Highlights

- Select an altitude that allows for a recovery to be completed no lower than 1000 feet AGL.
- Promptly recognize, announce, and recover at the first indications of VRS.

