

Safety Notice SN-22

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VORTEX RING STATE AVOIDANCE, RECOGNITION, AND RECOVERY

A vertical descent or steep approach, particularly downwind, can cause the rotor to fly into its own downwash. At certain descent rates, large vortices develop as the downwash is recirculated through the rotor disk. This condition is known as vortex ring state (VRS). Once VRS exists, adding power (raising collective) can unexpectedly increase descent rate due to the increase in downwash recirculating through the rotor. Recovery can only be accomplished by moving the rotor disk out of its own downwash.

To avoid VRS, reduce rate of descent before reducing airspeed. A good rule to follow is never allow your airspeed to be less than 30 knots until your rate of descent is less than 300 feet per minute.

Signs that VRS is developing include increased vibration levels, decreased control authority ("mushy controls"), and a rapid increase in sink rate. Pilots should always be aware of wind conditions and plan descents to avoid VRS. Pilots should be particularly alert to the possibility of VRS during OGE hover operations or steep approaches.

A recovery should be initiated as soon as VRS is suspected. Early recognition and immediate recovery by moving the rotor out of its own downwash is essential. Large control inputs are not necessary and should be avoided. After recovery, increasing collective and/or airspeed will help to avoid re-entering VRS.