



## Safety recommendation no. 525

<b>Date of the publication</b>	08.06.2017
<b>Number of the final report</b>	2298
<b>Safety deficit</b>	<p>During the approach to the operations base, the pilot of an AgustaWestland AW109SP helicopter reduced the helicopter's forward speed whilst maintaining the rate of descent. The pilot continuously raised the collective to reduce the rate of descent. However, it did not reduce. During the transition from forward flight to hover, the helicopter's power requirement increased. At a forward speed of less than 20 kt, the rate of descent increased from 1,100 ft/min to more than 1,300 ft/min in the final seconds before impact and could no longer be controlled. Eventually, the helicopter hit the ground in a meadow next to the operations base. Three of the four occupants were injured and had to be admitted to hospital.</p> <p>It was determined that a causal factor for the accident was the pilot failing to notice that the rate of descent was too high during the final approach to the operations base.</p>
<b>Safety recommendation</b>	<p>The Federal Office of Civil Aviation (FOCA) and the European Aviation Safety Agency (EASA) should take measures to ensure that helicopter crews are alerted to the danger of an impending or developing vortex ring state close to the ground by an acoustic warning.</p>
<b>Addressees</b>	EASA Europäische Agentur für Flugsicherheit; BAZL Bundesamt für Zivilluftfahrt
<b>Stage of the implementation</b>	<p>Partially implemented – The European Union Aviation Safety Agency (EASA) responded to the safety recommendation in a letter dated 24 August 2023, stating, among other things, that the sensors and technologies currently available are not capable of measuring all the parameters required to reliably detect a vortex ring state (VRS).</p> <p>For this reason, EASA is of the opinion that there is currently no suitable technical solution for the accurate and error-free detection of VRS flight conditions and that it would therefore be premature to regulate the installation of VRS detectors in helicopters given the current state of the art. However, EASA has recently certified a new heavy rotorcraft equipped with modern avionics featuring a novel function that predicts and warns of VRS. Pilots are traditionally trained to avoid high sink rates at low speeds in order to prevent inadvertent entry into VRS. In this respect, this new system is not a VRS detector and cannot provide a definitive warning for all conceivable VRS conditions. It is instead a means of creating situational awareness to warn the crew when they are approaching a potentially dangerous combination of descent rate and airspeed. It should also not be misunderstood as a novel function that provides a universal solution for all helicopters, as it is based on the specific hardware and software of a particular helicopter type.</p>

For this first application, EASA has already developed its own certification test points in the form of interpretative material (i.e. means of compliance), which will serve as specific certification material in the future if other helicopter manufacturers apply for approval of similar innovations.

In addition, EASA has launched an experimental VRS research programme for helicopters. The details are published at: <https://www.easa.europa.eu/en/research-projects/vrs-helicoptervorte-x-ring-state-experimental-research>

This research aims to provide a better understanding of the complex VRS phenomenon in different types of helicopter rotor designs, the analytical and simulation prediction methods, and flight test methods for its determination. It will also provide information on best practices for regaining control of the aircraft in a fully developed VRS. The outcome is intended to provide EASA with crucial information when assessing the need for potential future changes to certification specifications, pilot training requirements and related guidance. To summarise: While EASA believes it is premature to introduce regulation concerning VRS, it is already supporting and evaluating industry innovation. It is also investing in research into potential future regulatory developments that might bring a proportionate safety advantage.

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**Investigation report concerning  
the safety recommendation**

Schlussbericht

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