

Summary and recommendations – RL 2014:09e

Summary

An autorotation landing was performed during an OPC.

Shortly after touchdown the helicopter began to vibrate and a heavy scraping sound was heard accompanied by vibrations of a frequency corresponding to the rotor speed. The vibrations continued when the main rotor speed decreased and they then increased sharply, after which the entire main rotor separated from the helicopter and ended up about 10 metres to the left of the helicopter.

Those on board, who were uninjured, were able to exit the helicopter unassisted.

The technical investigation concluded that the mast had failed due to torsional overload. Furthermore a contaminant was found in the oil system which supplies the free wheel assembly with lubricant. The contaminant was found in a designed restrictor in the oil system. The failed lubrication resulted in a free wheel malfunction.

It is likely that the free wheel released as intended during previous autorotations, but did not engage when the free turbine speed was to meet the rotor speed at the same time as the rotor geared down. If the speed of the free turbine was significantly higher than that of the rotor when the sprags engaged, possibly faster than normal, an additional dynamic moment arose. The energy that was stored up in the engine and transmission was braked by the inertia of the main rotor, whereby the moment on the mast exceeded the fracture strength.

The accident was caused by the design of the free wheel's lubrication system allowing a contaminant of a size that can occur in a Part-145 shop to block the oil flow to the freewheel.

Recommendations

EASA is recommended to:

- act for a reduction in the oil system's sensitivity to contaminants. (*RL 2014:09 R1*).
- act so that operators of the helicopter type are provided with information and suggestions for preventive measures regarding the risk of contamination of the free wheel's lubrication system. (*RL 2014:09 R2*)

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