

Follow-up Action on Occurrence Report

**ACCIDENT TO AS355F1, G-XCEL, AT HURSTBOURNE TARRANT, HANTS ON 2 DECEMBER 2003
(FREEWHEEL SLIPPAGE LEADING TO STRUCTURAL FAILURE DURING FLIGHT)**

CAA FACTOR NUMBER : F26/2006
FACTOR PUBLICATION DATE : 11 August 2006
OPERATOR : Private
CAA OCCURRENCE NUMBER : 2003/08370
AAIB REPORT : Bulletin 7/2006

SYNOPSIS

(From AAIB Report)

The helicopter was engaged on a post-maintenance test-flight following the fitment of a newly-overhauled main rotor gearbox and combining gearbox. Eyewitnesses heard unusual noises coming from the helicopter before the tail boom apparently folded forward around the cabin. The helicopter then fell to the ground, catching fire on impact. All three occupants received fatal injuries. Examination showed that the two gearboxes and the main rotor had detached before impact. Subsequent investigation showed that the left freewheel showed clear evidence of slippage under load; the right freewheel also showed signs of slippage but not to the same extent.

It is concluded that a series of freewheel slippages followed by aggressive re-engagements led to the structural failure. The reasons for the slippage however, cannot be proven conclusively. Although it was found that the rollers forming part of the freewheel mechanism had come from a manufactured batch that had been coated using an incorrect process, no laboratory testing could reproduce any greater tendency for such a coating to cause slippage. The helicopter manufacturer recorded five incidents of slippage under load, coinciding with the introduction of rollers from this batch. Satisfactory performance of the freewheels resumed following the removal from service of the incorrectly coated batch of rollers.

FOLLOW UP ACTION

The two Safety Recommendations, made by the AAIB following their investigation, are reproduced below, together with the CAA's responses.

Recommendation 2006-70

It is recommended that the European Aviation Safety Agency, together with Eurocopter, review the design of the AS355 helicopter freewheel to ascertain whether it can be made more tolerant of variations in dimension or tribological performance of its components.

CAA Response

This Recommendation is not addressed to the CAA.

CAA Status - Closed

Recommendation 2006-71

It is recommended that the European Aviation Safety Agency ensure that manufacturers and those responsible for regulatory oversight of manufacturers, document the decision-making process resulting from identification of an in-service problem through to issuing airworthiness action.

CAA Response

This Recommendation is not addressed to the CAA.

CAA Status - Closed