

## In-flight failure of a drag damper, loss of control, collision with trees

<b>Aircraft</b>	Schweizer 269 C helicopter registered F-GJGQ
<b>Date and time</b>	Sunday 25 July 2010 at 10 h 00 <sup>(1)</sup>
<b>Operator</b>	Aerial work company
<b>Place</b>	Coullons (45)
<b>Consequences</b>	Pilot and passenger killed, aircraft destroyed

<sup>(1)</sup>Local time.

### CIRCUMSTANCES

The pilot, accompanied by a female passenger, took off to ferry the helicopter from the Saint-Aignan (45) helipad to that at Breuil (03) in order to undertake initiation flights in the context of an air show. After about 10 minutes flight, in meteorological conditions favourable for visual flight, the helicopter struck the tops of some trees in a wood and crashed underneath.

Examination of the accident site showed that the final flight path of the helicopter was virtually vertical.

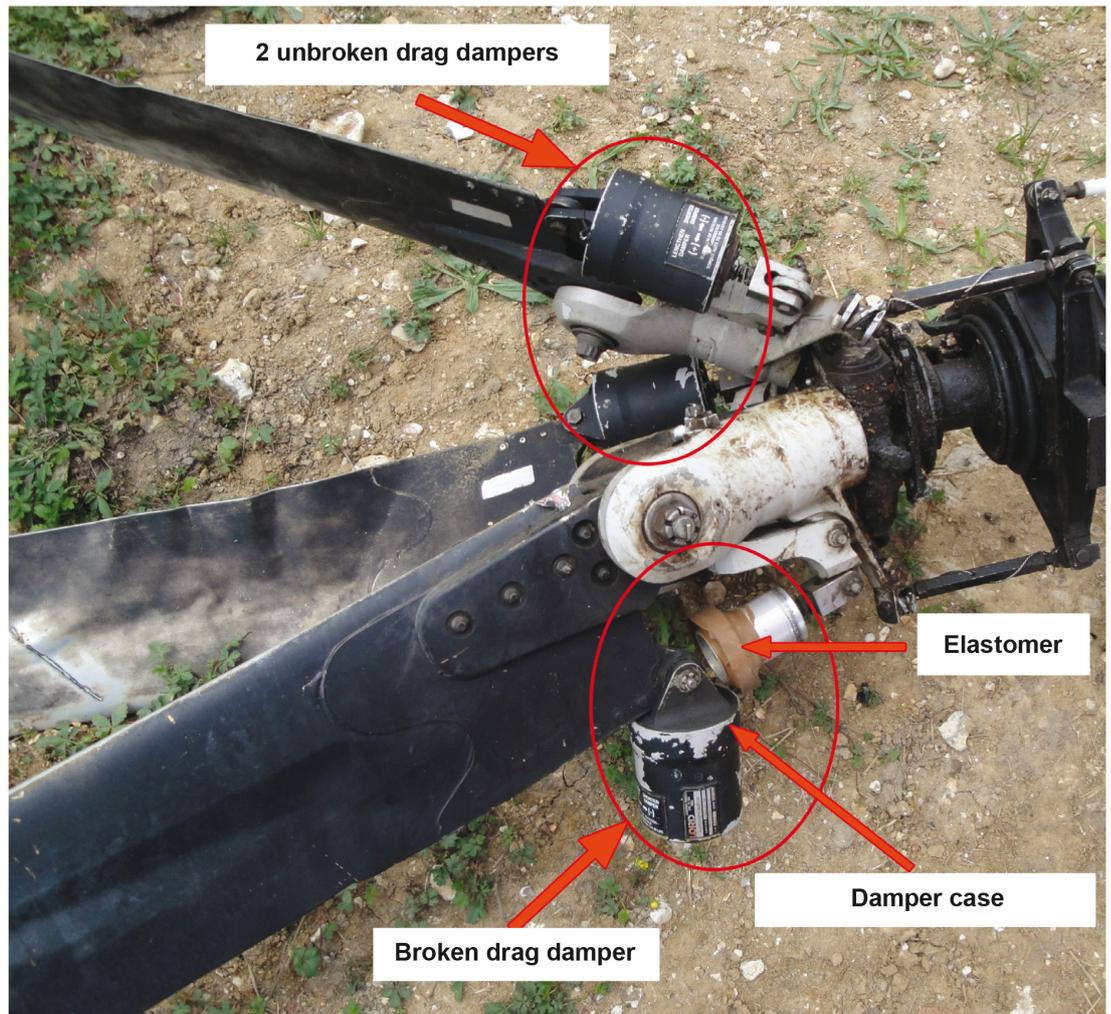
Around forty litres of fuel was found in the tanks, despite the damage to them. The low level of damage to the rotors and the marks on the vegetation indicated low rotor energy level on impact.

The pilot, aged 26 and holder of a CPL(H) issued in 2009, had performed a total of about 335 flying hours, of which 220 on type.

The helicopter was being operated in the context of an aerial work company without an AOC. The owner, who was also a pilot and approved mechanic (Individual maintenance declaration issued by the GSAC in 2006), undertook alone, and in complete compliance, the maintenance of the helicopter following the TRANS HELI maintenance programme validated by the GSAC on 29 January 2003. He stated that he had himself, on 4 July 2010, undertaken the 300 hour check (65 hours before the accident), in accordance with the manufacturer's documentation. This check included, in addition to a check on the correct external condition of the drag dampers<sup>(2)</sup>, a stretch test of the latter so as to check that they responded correctly to dynamic loading in flight. The owner stated that the results of the test were in accordance with specifications and so he re-installed the drag dampers on the helicopter, and then signed the approval for re-entry into service of the helicopter.

Observations on the wreckage showed that one of the three drag dampers had broken (see photo below).

<sup>(2)</sup>The drag damper that is present on each main blade root is classified as a critical part by the type certificate. It allows the level of vibration due to horizontal oscillation of each blade around a mid-position to be contained. This allows the vibrations due to cyclic speed variations on the main blades to be damped relative to the effect of the Coriolis force when the helicopter is in translation.



The technical examinations performed on the 3 drag dampers brought to light the following points:

- ❑ The first, found broken after the accident, showed partial degraded adhesion prior to the accident between the elastomer and the damper case, as well as traces of internal corrosion.
- ❑ An aqueous liquid was found in the second damper. This is incompatible with the sealing performed on a new damper. In addition, it had some adhesion and corrosion characteristics that were identical to those on the first one.
- ❑ During the tests on the second and the third dampers, they exceeded the maximum allowable tensile stretch length<sup>(3)</sup>.

The 3 drag dampers were thus likely not in an airworthy condition before the accident. During the flight, the adhesion of the elastomer on the damper that broke continued to degrade to a level that was incompatible with the nominal absorption of the normal vibration levels in translation flight. The excessive movements of the associated rotor blade generated a sudden imbalance in the main rotor, which resulted in an unbalance incompatible with control of the helicopter and continued flight.

The pilot then likely undertook an autorotation to try to make an emergency landing. The helicopter being over some woods at that moment, it struck the tree canopy and fell a dozen or so metres to the ground.

The technical examinations performed on the engine and its controls, the flight controls and the power transmission system did not show any evidence of a malfunction that may have contributed to the accident.

<sup>(3)</sup>Since at impact the dampers were mainly acting in compression, the accident likely did not modify the stretch characteristics of the elastomer. This confirms the results of the stretch tests performed after the accident.

## CONCLUSION

The accident was likely due to the degradation of the adhesion of the elastomer on the drag dampers that was not detected during the 300-hour maintenance check. This led to the sudden malfunction in flight of the first damper and to the pilot's loss of control of the helicopter. This maintenance operation on a critical part performed by a lone mechanic and without approval by another person or an organisation independent of the operator could have contributed to the accident.

Overflying a wooded area contributed to the seriousness of the event.

## SAFETY RECOMMENDATION

Note: In accordance with Article 17.3 of European Regulation (EU) 996/2010 of the European Parliament and Council of 20 October 2010 on the investigation and prevention of accidents and incidents in civil aviation, a safety recommendation shall in no case create a presumption of blame or liability for an accident, a serious incident or an incident. The addressee of a safety recommendation shall inform the safety investigation authority which issued the recommendation of the actions taken or under consideration, under the conditions described in Article 18 of the aforementioned Regulation.

The investigation showed that:

- The operator was also the mechanic responsible for the maintenance and re-entry into service approvals of his helicopter, in accordance with the regulations in force;
- The regulation in general allows maintenance, specifically of critical parts, to be undertaken then approved for re-entry into service by a single individual without any approval by another person or an organisation independent of the operator;
- The malfunction of critical parts in flight caused the loss of control by the pilot.

Consequently, the BEA recommends:

- That EASA modify, for companies without an AOC in the context of their specific commercial activities, the approval procedure for re-entry into service of an aircraft. This procedure must ensure that the approval be performed by a different person from the one that performed the work or by organisation independent of the operator. [Recommendation FRAN-2012-013]**