



## Summary report

A summary investigation, in accordance with article 46 of the Ordinance on the Safety Investigation of Transport Incidents from 17th December 2014 (OSITI), as of 1st February 2015 (SR 742.161) was carried out with regards to the following accident / serious incident. This report was prepared to ensure that lessons can be learned from the incident in question.

<b>Aircraft</b>	Schweizer 269C-1	HB-ZLB	
<b>Operator</b>	Heli-Lausanne SA, avenue du Théâtre 7, CH-1005 Lausanne		
<b>Owner</b>	Heli-Lausanne SA, avenue du Théâtre 7, CH-1005 Lausanne		
<b>Pupil</b>	Swiss citizen, born 1987		
<b>Licence</b>	Private pilot licence, aeroplane – PPL(A) according to the European Aviation Safety Agency – EASA, issued by the Federal Office of Civil Aviation (FOCA)		
<b>Flight hours</b>	<b>Total</b> 46:30 h	<b>In the last 90 days</b> 12:20 h	
	<b>On the aircraft type in question</b> 44:15 h	<b>In the last 90 days</b> 11:10 h	
<b>Examiner</b>	Swiss citizen, born 1956		
<b>Licence</b>	<i>Commercial pilot licence helicopter</i> – CPL(H) according to the European Aviation Safety Agency – EASA, issued by the FOCA		
<b>Flight hours</b>	<b>Total</b> 14 795 h	<b>In the last 90 days</b> 62:30 h	
	<b>On the aircraft type in question</b> 1420 h	<b>In the last 90 days</b> 3:40 h	
<b>Place</b>	Botterens / FR		
<b>Coordinates</b>	574 900 / 163 100	<b>Altitude</b> 777 m above sea level	
<b>Date and time</b>	13 September 2016, 15:10 local time (LT = UTC + 2 h) All times indicated are local		
<b>Type of operation</b>	Training		
<b>Flight rules</b>	Visual flight rules (VFR)		
<b>Phase of flight</b>	Landing		
<b>Nature of incident</b>	Precautionary landing		
<b>Departure point</b>	Lausanne, La-Blécherette (LSGL)		
<b>Destination point</b>	Gruyère Aerodrome (LSGT)		
<b>Injuries to persons</b>	<b>Crew</b>	<b>Passengers</b>	<b>Third parties</b>
Minor	0	0	0
None	2	0	0
<b>Damage to aircraft</b>	None		
<b>Third-party damage</b>	None		

### Sequence of flight events

The purpose of the flight was to conduct an examination for a private pilot's licence, helicopter. The examiner and the pilot candidate met in Lausanne and completed the theoretical portion of the examination, the briefing and the mass and balance calculations. Total flight duration was estimated at 2 hours and 15 minutes, with a planned landing on completion of the navigation flight at Gruyère. The pre-flight inspection and fluid checks did not reveal any deficiencies, and the aircraft took off at 1:51 p.m. from the Blécherette aerodrome.

The navigation flight, with the destination Prez-vers-Noréaz, continued without any problems, and other exercises were then performed above the region, including hovering, autorotation and square patterns. At this point the examiner drew the pupil's attention to the fact that the helicopter's performance had not improved since the start of the flight, even though half of the embarked fuel had been expended. A check of instruments and magnetos failed to reveal any problem, and the examination flight was resumed in the direction of the Gruyère aerodrome.

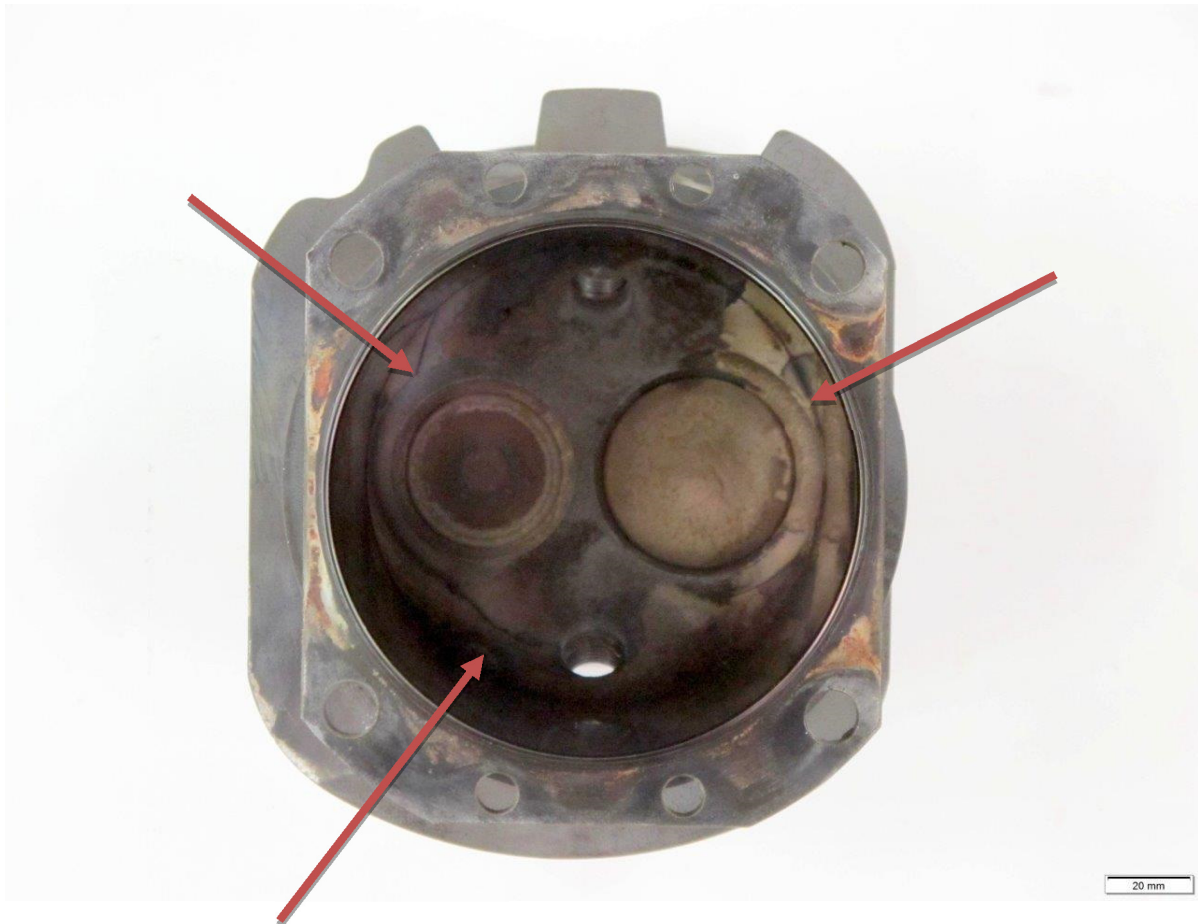
During the overflight, the examiner confirmed a noticeable loss of power and took a photograph of the flight parameters in order to discuss the matter with the operator after landing. As the helicopter approached the village of Botterens, the alarm lamps remained off even as the engine noise increased. The examiner decided to terminate the flight with a precautionary landing in a field near Botterens.

On short final, the engine's remaining performance was only sufficient for a running landing, and the helicopter came to a stop without any damage

No signs of any leak or other deficiency were observed on the spot, apart from the intense heat radiating from the engine, which singed the grass in the field where the landing took place.

### Engine removal and inspection

To determine the problem with the engine, the helicopter was transported to a Swiss Transportation Safety Investigation Board site. Qualified staff proceeded to remove the engine, which had accumulated 869 hours since overhaul. A visual inspection revealed a long crack in the head of cylinder 4, starting at the lower spark-plug hole (see figure 1). This crack had caused a loss of compression on cylinder 4, explaining the partial loss of engine power.



**Fig. 1:** The crack in the head of cylinder 4

An examination of the crack showed that its origin was fatigue, and that the surfaces showed signs of overheating.

### **Conclusions**

In the absence of compression measurements from recent periodic inspections, it is impossible to state the precise point at which the crack began to affect engine power. The examiner's decision to interrupt the examination flight short of the destination was considered appropriate.

Bern, 22 February 2018

Swiss Transportation Safety Investigation Board