BEA
Bureau d'Enquêtes et d'Analyses
pour la sécurité de l'aviation civile

www.bea.aero

REPORT
ACCIDENT

Nose gear failure on landing roll, during instruction flight

Aircraft	Robin DR400-120 registered F-GABB
Date and time	Monday 4 April 2011 at 18 h 10[(1)]
Operator	Club
Place	Le Touquet Paris-Plage aerodrome (62)
Consequences	Aeroplane severely damaged

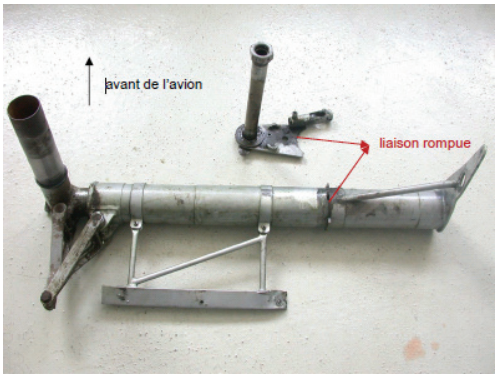
[(1)] Local time.

CIRCUMSTANCES

The student was undertaking a dual-control instruction flight between Dunkirk (59) and Le Touquet aerodromes. On arrival, he flew the downwind leg for a landing on runway 32. The flare and main landing gear touchdown occurred without any problems. When the nose gear touched down, the aeroplane was subject to strong vibrations. The instructor pushed the control column forwards and braked. The nose gear collapsed and the aeroplane came to a stop on the runway.

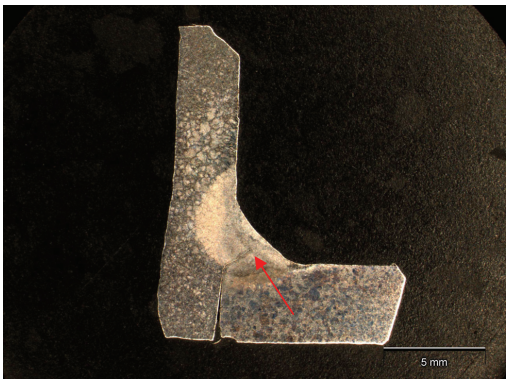
The nose gear, manufactured by Robin, failed at the weld seam linking the strut and the lower plate (see photos below). The examinations undertaken showed that:

- There were several welding defects in the failed seam: penetration defects all around the circumference, porosity-type blowholes, local hole in the strut;
- The weld seam cracks propagated progressively from the existing defects, from the root to the weld surface;
- The final failure occurred when the remaining section succumbed to the loads exerted during the landing.



General view of failed nose gear (left side)

General view of failed weld seam (from below)



Example of crack propagation from the root
of the weld seam (plate not broken on F-BOZM)

The aeroplane was manufactured in 1976. The various airframe logbooks make no mention of any change of nose gear. At the time of the accident, it had flown 14,718 hours.

Several failures of the same type have occurred on nose gear lower and upper plates manufactured by SAB or Robin. Defects in the welding were observed in all cases. EASA issued Airworthiness Directive EU-2010-0231 on 5 November 2010, specifically to make mandatory dye penetrant inspections intended to detect fatigue cracks in nose gear lower and upper plates. This Directive relates to aeroplanes in the HR series 100, DR 253, DR 300 and DR 400.

Since this AD was issued, the BEA has investigated the accident to the Robin DR253 registered F-BOZM that occurred on 11 April 2011[2]. The nose gear failure mode was identical to that observed on F-GABB. The inspections required by the AD had been carried out.

[2]The BEA report on this accident is available at: www.bea.aero/docspa/2011/f-zm110411/pdf/f-zm110411.pdf.

Since the fatigue cracks observed in the weld seams propagated from the root of the seam towards the exterior, a dye penetrant inspection of the surface did not allow such cracks to be detected.

CONCLUSION AND 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 accident was caused by defects in the welding on the landing gear, which the inspections made mandatory by Airworthiness Directive EU-2010-0231 did not make it possible to detect. These defects led to fatigue cracking in the weld seam between the lower plate and the strut, from the root towards the exterior, thus making it non-detectable through a surface inspection.

Consequently, the BEA recommends that:

- **EASA, in collaboration with the DGAC, implement a technical solution in order to prevent the appearance of new failures of this type and, consequently, modify Airworthiness Directive EU-2010-0231. [Recommendation FRAN-2012-031]**