



Investigation report

D9/2010L

Ultralight aircraft emergency landing in Ruukki on 29 August 2010

Translation of the original Finnish report

OH-U482

FK9 MK IV

According to Annex 13 to the Convention on International Civil Aviation, paragraph 3.1, the purpose of aircraft accident and incident investigation is the prevention of accidents. It is not the purpose of aircraft accident investigation or the investigation report to apportion blame or to assign responsibility. This basic rule is also contained in the Safety Investigation Act (525/2011) and European Union Regulation No 996/2010. Use of the report for reasons other than improvement of safety should be avoided.

Due to the nature of this incident the format of this investigation report diverges from that defined in Annex 13 to the Convention on International Civil Aviation. Accident Investigation Board Finland uses the ICAO Annex 13 format in its A, B and C investigation reports.

Time:	29 August 2010 at 19:30 (Finnish time)
Place:	Siikajoki at Ruukki
Type of aircraft:	FK9 MK IV
Registration:	OH-U482
Engines:	Rotax 912 ULS
Year of manufacture:	2005
Type of flight:	Private
Damage to aircraft:	The amphibian aircraft floats were badly damaged. More detailed explanation in text.
Number of persons onboard:	1
Pilot:	Pilot in-command: Age 54
Licences:	The pilot's Ultralight Pilot Licence and medical certificate were valid.
Flying experience:	Total flight hours: 450 Flight hours with this type: 230
Meteorological information:	Good flying weather prevailed at the time of the accident.

Translation: R&J Language Service

SYNOPSIS

An accident happened at Siikajoki in Ruukki on Sunday, 29 August 2010 at approximately 19:30 Finnish time (UTC+3 h), in which a FK9 MK IV ultralight aircraft, registration OH- U482, was seriously damaged. The pilot, the sole occupant in the aircraft, did not sustain any serious injuries.

On 3 September 2010 Accident Investigation Board Finland appointed and tasked Investigators Markku Koivurova, Juhani Mäkelä and Esko Lähteenmäki to carry out a D-level investigation on this emergency landing.

The investigation report was translated into English. The material used in the investigation is stored at Accident Investigation Board of Finland.

1 FACTUAL INFORMATION

1.1 History of the flight

The pilot took off from Ahmosuo airfield at approximately 18:00. He then flew to Raahe aerodrome, which he flew above for some time, and thence continued, without landing, heading north.

At Siikajoki the engine began to run rough and lose RPMs. When the pilot increased power the engine died, forcing him to land in a field where the aircraft ran into a cross-wise ditch at the end of the landing roll. As a result of this the aircraft nosed over, causing serious damage to the aircraft floats. In addition, the wings, the propeller, the engine mount and the tip of the vertical stabiliser were damaged.



Figure1. The aircraft at the site of the emergency landing

The pilot reported the emergency landing to the Emergency Response Centre at 19:31. A police unit, a rescue unit and an ambulance were dispatched to the site. The pilot was taken to Oulu University Hospital for a medical check-up. He sustained abrasions on his hand and leg. A breathalyzer test was performed on the pilot using a handheld blood alcohol screening device, the result of which showed zero blood alcohol.

1.2 Technical inspections

The aircraft was transported to Ahmosuo airfield where the AIB investigators conducted the technical inspections.

The carburettors were removed from the engine and the float chamber covers were opened. At this time several metal flakes were found on the bottom of the right carburettor pins, which had clogged the main jet nozzle. As the float was being disassembled it was detected that the flakes had come off of the surface of the carburettor pin. The left carburettor pin was intact.



Figure 2.. Metal flakes in the main jet nozzle

The investigators sent the carburettor pin to the Austrian Air Accident Investigation Bureau who, in turn, forwarded it on to BRP-Powertrain Inc, the engine manufacturer, for laboratory testing. The pin was inspected with a scanning electron microscope. Results showed that the steel pin had a 2 µm copper coating covered by a 4 µm-thick layer of nickel. The pins (part no. 929700) for which the manufacturer published the Service Bulletin are constructed in this manner. The replacement pins (part no. 929701) are not copper coated. There is no visible difference between said pins.



Figure 3. The carburettor pin exhibiting some flaking on its nickel surface coating

1.3 Service Bulletin

On 23 Sept 2005 the engine manufacturer published Service Bulletin SB-912-048 regarding the possibility of flaking on the surface coating of the carburettor pin. The Service Bulletin relates to engines with serial numbers 912 ULS 5643752-5645438 and whose carburettor pin serial number is 929700.

The Service Bulletin provides detailed instructions for changing the pin. The old pins were to be returned to the manufacturer or to a designated service centre.

1.4 Engine repair

On 2 Nov 2007 the engine was repaired following an instance when the propeller made contact with the ground. The repair included total disassembly of the engine, crank case and a gearbox cover dye penetrant check, a magnetic particle inspection of the propeller axle as well as reassembly and replacement of defective parts.

The damage repair report included the following statement: "On 01 Nov 97 the engine was inspected, repaired and accepted in accordance with the manufacturer's *Reparaturhandbuch* and Airworthiness Regulation AIR M8-3. All of the SBs and ASBs received from the manufacturer by 2 Nov 2007 have been completed." At this time it was not noticed that the SB-912-048, regarding the replacing of the carburettor pin, had not been completed.

2 ANALYSIS

2.1 Signing off on Service Bulletin SB-912-048 without completing the actions described therein

The person who performed the engine repair said that he had checked all engine repair-related Service Bulletins. However, since the carburettors were in perfect working order and intact, he missed the Service Bulletin SB-912-048.

The maintainer said that he had inadvertently copied the overhaul form from the database for writing the repair report. The overhaul form contains the following statement: "On 01 Nov 97 the engine was inspected, repaired and accepted in accordance with the manufacturer's *Reparaturhandbuch* and Airworthiness Regulation AIR M8-3. All of the SBs and ASBs received from the manufacturer by 2 Nov 2007 have been completed." The person who performed the repair, however, had altered the date in the statement to correspond to the completion of the work, i.e. 2 Nov 2007. The investigators believe that he then should have realised the comprehensive nature of the statement and double-checked the SBs and ASBs (Alert Service Bulletin). Had the carburettor pin been replaced at an earlier date, it should have been recorded in the journey logbook.

The investigators do not recommend using the expression "All of the SBs and ASBs received from the manufacturer by xx.xx.xxxx have been completed" in repair reports because then the person who signs off on the work may not necessarily focus on distinct modifications. The investigators prefer a manner in which each completed SB and ASB is separately itemised.

SB-912-048 should have been completed no later than 1 Dec 2005. It is the responsibility of the owner to maintain an ultralight aircraft, including the supervision and completion of Service Bulletins. The engine manufacturer's designated service centre believes that several aircraft are presently flying in Finland on which the SB-912-048-mandated carburettor pin modification has not been done. This belief is supported by the fact that the carburettor pins from only two engines have been returned to the engine manufacturer. Moreover, no carburettor pins have been returned to the engine manufacturer's designated service centre in Finland.

Technical logbooks are not required in ultralight aircraft. Rather, completed maintenance actions and work prescribed by Service Bulletins are recorded into journey logbooks. The investigators believe that dedicated technical logbooks would be much better than journey logbooks in assessing the maintenance status of an aircraft.

3 CONCLUSIONS

3.1 Findings

1. The pilot had a valid Ultralight Pilot Licence and medical certificate.
2. The aircraft had a certificate of registration. The permit to fly and the certificate of inspection were valid.
3. The engine misfire was caused by metal flakes from the carburettor pin which ended up in the main jet nozzle, ultimately clogging it.
4. In view of possible flaking on the surface coating of the carburettor pin the engine manufacturer had published a Service Bulletin for the engine and carburettors in question.
5. The engine manufacturer's designated service centre believes that several aircraft are presently flying in Finland on which the SB-912-048-mandated carburettor pin modification has not been done.
6. It is the responsibility of the owner to maintain an ultralight aircraft, including the supervision and completion of Service Bulletins.
7. Even though the modification was again omitted during the engine repair work which was completed on 2 Nov 2007, the verbiage used in the repair report gives the impression that the modification had been done.

3.2 Probable cause and contributing factors

The engine misfire was caused by metal flakes from the carburettor pin ending up in the main jet nozzle, ultimately clogging it. The carburettor pins have a manufacturing flaw which prompted the engine manufacture to publish a Service Bulletin. The carburettor pins should have been replaced with the new types no later than 1 Dec 2005.

4 SAFETY RECOMMENDATIONS

4.1 Action taken during the investigation

On 27 Apr 2011 the investigators e-mailed the results of the investigation to the Finnish aviation authority, expressing their concern over the fact that several such ultralight aircraft which have not had the new type of carburettor pins installed may still be flying in Finland. This process spawned a new Airworthiness Regulation which entered into force on 15 May 2011.

4.2 Safety recommendations

1. Aviation Regulation AIR M5-10 does not require technical logbooks in ultralight aircraft. Rather, completed maintenance actions and work prescribed by Service Bulletins are recorded into journey logbooks. The investigators believe that dedicated technical logbooks would be much better than journey logbooks in assessing the maintenance status of an aircraft.

The investigators recommend that the Finnish Transport Safety Agency (Trafi) require the use of technical logbooks for ultralight aircraft as well.

4.3 Additional observations and recommendations

The investigators do not recommend using the expression “All of the Airworthiness Directives and Service Bulletins received from the manufacturer by xx.xx.xxxx have been completed” in repair reports because then the person who signs off on the work may not necessarily focus on distinct modifications within the allotted timeframe. For the sake of clarity each completed Airworthiness Directive and Service Bulletin ought to be separately itemised.

APPENDIX 1

Summary of the comments received on the draft investigation report

The Aviation Sector of the Finnish Transport Safety Agency (Trafi Aviation) issues no statements regarding the safety recommendation included in the investigation report and states that decisions on any possible related measures will be taken separately.

The Finnish Aeronautical Association's Experimental and Ultralight Commission did not provide any comments on the draft investigation report. The commission concurs with the views presented in the safety recommendation. In addition, the Commission would provide regulations for maintainers regarding entries in the technical logbook. Entries should be itemised in a manner making each SB and ASB easily identifiable.

No comments were provided by the Austrian Air Accident Investigation Bureau (Flugunfalluntersuchungsstelle FUS), The German Federal Bureau of Aircraft Accident Investigation (Bundesstelle für Flugunfalluntersuchung BFU), the manufacturer of the aircraft nor the engine manufacturer on the draft investigation report.