



TO WHOM IT MAY CONCERN

Official Position of the Light Aircraft Association of the Czech Republic to the BFU final report regarding the accident of the EV-97 Eurostar aircraft SN 20021416 in Switzerland

In 2006, following the announcement of the accident of the EV-97 Eurostar aircraft SN 20021416 in Switzerland on 24. June 2006, where destruction of wing took place, the LAA CR has undertaken on 14. 9. 2006 an inspection at the Evektor-Aerotechnik – the manufacturer, with an aim to check out the registration, acceptance and check of the materials used for building the EV-97 aircraft, with an especial accent on maintaining the limits of the mechanical qualities of the material use for primary (critical) parts and structures.

During this check the manufacturer submitted the required/necessary attests as well as the results of the company strength tests of the materials involved. The LAA CR has not carried out any physical test. This check/inspection did not reveal any shortcomings.

In August 2006 the LAA CR received from the manufacturer an information that a negotiation took place with the Swiss Aviation Authority (FOCA), with the result that the export of the EV-97 into Switzerland may continue. According to the opinion of the investigator of the BFU (Aircraft Accident Investigation Bureau) at that time, the probable cause of the accident was destruction of the wing due to exceeding of the strength limits in turbulence. The investigation of the accident was, however, not concluded.

Due to the above mentioned facts the LAA CR considered the case concluded for the time being.

In the end of March 2009 the LAA CR was informed by the manufacturer, that the BFU prepared the preliminary final report which, to our surprise, stated that the wing is not strong enough (has insufficient strength) and that there were found deviations from the mechanical values of one part of the wing spar cap strip of another machine that suffered an accident due to a pilot's error.

Following that, on 25. 5. 2009 we were invited by the manufacturer to participate at the meeting in Switzerland, whereby we were informed in detail by the representatives of the BFU and FOCA about the results of the accident investigation they have arrived at.

The investigators ordered the calculation of the wing loads, arriving at the conclusion that the wing does not have sufficient structural strength even if the correct mechanical values of the material used were taken into account.

Based on the results of this meeting the LAA CR ordered the manufacturer:

- to carry out an independent proof calculation of the wing loads by Prof. Píštěk of the Aviation Institute of the Brno University of Technology.



- to approach some specialised facility, possessing relevant practical experience, and ask for the opinion of experts on the difference of the metal structure with eventual effects on the tensile strength of the material (at the Let factory, the Aviation Research and Test Institute of Prague - VZLÚ, at the technical University of Brno, and at the Czech Technical University of Prague)
- to carry out immediately the strength tests of the spar caps as supplied and to carry out a comparative check of these values with those listed/declared in the appropriate certificate(s).
- to ask the Swiss investigators for providing the relevant pieces of the spar cap strips from the wings of both aircraft under consideration/test, and, upon receiving of these samples, carry out the tests of their mechanical properties at an independent test facility.
- to discuss the strength issues of the material concerned with its supplier and provide the details thereof to the LAA CR.
- to ascertain which machines (c/ns) produced were manufactured using strips from the batch that might have been affected by the lower mechanical strength values.
- to carry out the strength tests of the metal wings as required by the LAA CR, then to carry out a proof of the mechanical strength values of the spar's lower cap strips. This shall be done under formal instruction of the Chief Technical Officer of the LAA CR.
- to ascertain whether the original wing tested during the LAA CR certification tests could be found, and to authorize checks be carried out regarding the mechanical strength of the material used for the main spar cap strips. The LAA CR shall ask all manufacturers of the metal wings to carry out the same procedures.
- The Chief Technical Officer of the LAA CR shall summon the Technical Commission of the LAA CR and shall discuss the whole issue with its experts.

The independent proof of the EV-97 aircraft strength and load calculations at the Brno University of Technology has proved that the manufacturer designed the aircraft in accordance to the valid regulations.

The loading/strength tests of the wing of the EV-97 has proved that the strength requirements of the regulation are/were fulfilled.

The machine SN 20021416 that suffered an accident in Switzerland had a rougher metallographic structure in the metal of one of the two lower cap strips, but there was no proof of a reduction of mechanical strength of the main spar cap strip compared to the strength value used in the calculations. **According to our opinion the failure was caused by exceeding the flight envelope limits of the aeroplane.**

With the other machine SN 20062721, that suffered an accident for other causes, it was found that one of the strips that made up the lower main spar cap strip had lower value of strength than that considered in the calculation.



The manufacturer, Evektor-Aerotechnik Inc. purchased the duraluminium strips from a reputed ISO certified manufacturer and has the certificates that guarantee both the chemical setup of the alloy, and the specific values for the given batch of the strips, assuring the minimum prescribed strength.

The manufacturer tested the actual mechanical strength values using the electric resistance method that did not suggest any deviation from the required strength.

Following the findings of the Swiss side about existence of material with reduced strength values on the aircraft SN 20062721 that suffered an accident due to a pilot error, the company immediately tested the mechanical values of the main spar cap strips admitting that there are individual strips that have a reduced strength.

The manufacturer purchased a specialised hardness tester and developed a method, enabling to carry out the non-destructive strength measurement of the spar cap strips directly on the airplane.

The manufacturer shall test the strength of the cap strips on all machines having these trips from the producer concerned.

Until these tests are carried out, the manufacturer with the LAA issued the Mandatory Bulletin EV-97-013a with the following limitations:

The maximum speed is limited thusly:

$V_A \dots 140 \text{ km/h IAS.}$

$V_{NE} \dots 240 \text{ km/h IAS}$

$V_{RA} \dots 170 \text{ km/h IAS}$

Strictly observe the MTOW

Avoid places with presumed strong turbulence.

- Evektor-Aerotechnik produced so far over 700 machines.
- With exception of the machine that suffered an accident in Switzerland (where there has to be stressed that no proof positive exists that the eventual cap strip strength issue caused or contributed in any way to the accident), there was only one accident concerning a wing failure – it was a case of a blatant violation of rules – the owner in his ultralight EV-97 flew aerobatics, expressly forbidden both by the UL regulations and by the operating manual, damaging his aircraft's airframe in the process. Despite a written warning (!) by the dealer and the manufacturer that his wings are already damaged (permanent overstraining wrinkles on the upper wing skin at the main spar), the owner continued to fly the machine and then, during an aerobatic figure, the wing finally failed

The LAA CR as the responsible authority insists that the issued Type certificate of the EV-97 aircraft is completely valid in full.

The LAA fully refutes the conclusions of the investigation committee concerning the insufficient structural strength of the wing.



The LAA has a proof positive, based on further independent calculations of the design, that the wing is correctly and sufficiently designed to provide for the loads as stipulated by the applicable ultralight aircraft airworthiness rules.

The manufacturer shall address the variations in the mechanical properties of the main spar cap strips according to the proposed procedure, see www.evektor.com

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