

**Republic of Lebanon**  
**Ministry of Public Works & Transport**

**Investigation Progress Report**

**Ethiopian 409 Accident – Boeing 737-800**

**25<sup>th</sup> January 2010**

**Beirut - Lebanon**

**Presented by the IIC on 24<sup>th</sup> August 2011**

## FOREWORD

*This document presents an update on the progress of the technical investigation as of 31<sup>st</sup> July 2011. It is considered as an up-date on the information presented in the report presented to HE the Minister of Public Works & Transportation in Lebanon on the 29<sup>th</sup> January 2011 and on the progress report issued 10th February 2011 and has been prepared on the basis of the information gathered during the investigation, which is not yet complete, and analysis work done on some aircraft components to verify consistency with recorded data; therefore, some of the points covered may evolve with time.*

*In accordance with Annex 13 to the Convention on International Civil Aviation, of which Lebanon is a signatory, and with the Lebanese Air Regulations (LAR), the investigation has not been conducted so as to apportion blame, nor to assess individual or collective responsibility. The sole objective of this investigation is to establish the cause(s) of the accident, draw lessons from what happened and come with appropriate recommendations that may help to prevent future accidents.*

*Consequently, nothing in the presentation of this report or the points that are raised herein should be interpreted as an indication of the orientation or conclusions of the investigation. Furthermore, the use of this report for any purpose other than for the prevention of future accidents could lead to erroneous interpretations.*

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## **1- Up-date on the Trim-Tab Analysis:**

The investigation committee had decided to send the Trim Tabs of flight ET 409 Boeing 737-800 aircraft to the NTSB for analysis in order to verify consistency with DFDR recorded data with specific emphasis on the inspections recommended by Boeing Service Bulletin 737-27A1297 issued at a later date from the accident and not related to it (original release 16 April 2010; revision 1 released 2 August 2010).

The Right Trim Tab was sent to the NTSB and an examination was carried out on March 21<sup>st</sup> at the Boeing facilities in Seattle under the supervision of the IIC and technical advisors from the investigation committee. The Left Trim Tab was then sent and an examination was conducted at the same facilities on May 11<sup>th</sup> at the Boeing facilities under the supervision of technical advisors from the investigation committee.

The analysis was then carried out by Boeing. An initial draft report on the *“Investigation of Left Hand (LH) Elevator Tab Mechanism Assembly of Airplane YC490 (737-800)”* was received on July 18, 2011 and up-dated by the US Accredited Representative on July 27, 2011.

The final report was completed on August 9, sent to the US Accredited Representative on August 11, circulated to all Investigation Committee members on August 15<sup>th</sup>. The reports will be analyzed and included in the final investigation report.

No related safety recommendation is required at this stage.

## **2- Up-date on the CVR memory chip recovery attempt**

The Investigation Committee had agreed to perform a recovery attempt of the U16 memory chip. In line with Honeywell documentations and procedures, the CVR board examination was performed in February 2011 at the BEA Labs in Le Bourget based on the agreed test plan referenced *“ET-ANB CVR action plan / Date of issue November 2nd 2010”*.

The test report was issued by the BEA on 5 March 2011 and confirmed what was mentioned in the Investigation Progress report on 10 February 2011 that *“All the memory chips were correctly read out except U16 (also referred as CE#19 memory chip in Honeywell documentation) which could not be read out at all.”*

The BEA report concludes that: *“Based on the external visual inspection and the asymmetrical results of the electrical characterization, it is very probable that the internal die is cracked and the data from U16 cannot be retrieved.”*

That issue will be addressed in the final investigation report and the BEA test report will be included as an appendix to the final investigation report.

No related safety recommendation is required at this stage.

### **3- Up-date on the Black Soot Analysis**

Upon the request of the investigation committee, a section of fuselage skin from the APU compartment was submitted to the Materials Laboratory of the NTSB for examination. The reason was to determine whether the “black soot” identified in that area was heat related and to determine its origin. The section of fuselage was 16 inches (in) long, 2.5 in wide at the narrowest end and 5 in at the widest end.

A NTSB report was received from the US Accredited Representative on July 29, 2011. The report specifies that *“There was no discoloration to the primer paint and the surface was uniformly covered with a light coating of sand or dirt. Zinc chromate primer paint changes color when exposed to heat.”* It goes to conclude that *“Since there was no change in the color of the paint on the primer side, there was no indication that this section of fuselage was exposed to heat/high temperatures.”*

As for the origin of the black soot it determines after examining the material associated with the black soot that *“The spectrum obtained from the submitted unknown sample suggests that the material was organic as evidenced by the presence of characteristic carbon-hydrogen bonding peaks between ~3000 cm-1 and ~2800 cm-1 as well as a small group of peaks between 2300 and 1400 cm-1. This peak configuration is indicative of a straight chained, aliphatic hydrocarbon. When compared to the spectra of known materials, the unknown material most closely matched spectra from lubricating oils.”*

That report will also be addressed in the analysis phase and included as an appendix to the final investigation report.

No related safety recommendation is required at this stage.

### **4- Investigation schedule**

The original schedule published in the investigation progress report issued 10 February 2011 considered holding a Technical Review meeting before 15 April 2011 in order to evaluate and validate all factual information that is found necessary for the analysis phase.

That meeting had been adjourned three times due mainly to the amount of work that was required during the analysis of the Trim Tab and Black Soot and the finalization of the associated reports. It was finally held in Beirut August 19<sup>th</sup> and should be completed by the 27<sup>th</sup>.

Following that Technical Review meeting the analysis phase will start immediately and the final draft report should be ready for review by all participating States by September 10th.

In accordance to ICAO requirements, participating States shall then have 60 days to comment on the final report, which should then be submitted to H.E. the Lebanese Minister of Public Works and Transportation and released to the public.