BEA

Information sheet IV

SAFETY RECOMMENDATIONS

Note: a safety recommendation shall in no case create a presumption of blame or liability for an accident or incident

1. Non-Revenue Flight

There is a great diversity in the description made by operators of non-revenue flights, in the context that they establish for the preparation and execution of these flights, and in the selection and training of pilots. This diversity, along with the almost total absence of any indications or standards on non-revenue flights, can also lead to more or less improvising the performance of tests or to performing tests or checks in inappropriate parts of airspace and/or during flight phases with a high workload.

Consequently, **the BEA recommends[1]:**

- **that EASA detail in the EU-OPS the various types of non-revenue flights that an operator from a EU state is authorised to perform,**

- **that EASA require that non-revenue flights be described precisely in the approved parts of the operations manual, this description specifically determining their preparation, programme and operational framework as well as the qualifications and training of crews,**

and

- **that as a temporary measure, EASA require that such flights be subject to an authorisation, or a declaration by the operator, on a case-by-case basis.**

2. Equipment Qualification

During the investigation it was noted that, for the impermeability tests, the installation conditions for the angle of attack sensors applied during the qualification tests were different from those on the aeroplane installation. Even if this difference did not contribute to the accident, it nevertheless constitutes a safety loophole.

This is why **the BEA recommends**:

- **that EASA, in liaison with the other regulatory authorities, ensure that, in order to certify the adequacy of an item of equipment in relation to the regulatory requirements as well as to the specifications defined by a manufacturer, the equipment installation conditions during tests performed by equipment manufacturers be representative of those on the aeroplane.**

[1] This initial safety recommendation was issued on the basis of the initial findings of the investigation in February 2009. EASA confirmed reception of this recommendation on 6 July 2009 and indicated that it was being studied. The DGAC supported this recommendation and drew EASA's attention to this by issuing comments on the Notice of Proposed Amendment (NPA) 2009-02C, propositions, issued by EASA, for evolutions in the regulations relating to aviation operations in the European Union.

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3. Consequences of Reconfigurations of Flight Control Laws

The change in the flight control law after triggering of the stall warning inhibited autotrim operations. Despite the amber USE MAN PITCH TRIM message initially displayed on the PFD, the crew did not modify the position of the stabilizer, which remained in full pitch-up position until the end of the flight. After the passage into *abnormal attitudes law* this message disappeared. During this phase, the time for the crew to analyze the situation and react was very short. Finally, the stabilizer position and the pitch-up moment generated by the engines at maximum thrust made it impossible for the crew to recover control of the aeroplane.

Consequently, **the BEA recommends**:

that EASA undertake a safety study with a view to improving:

- **the certification standards of warning systems for crews during reconfigurations of flight control systems,**
- **or the training of crews in identifying these reconfigurations and determining the immediate operational consequences.**

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4. Approach-to-Stall Recovery Technique and Procedure

When the stall warning sounded, the crew reacted in accordance with the procedure for recovering from an approach-to-stall by applying full thrust to the engines and by trying to decrease the pitch angle. The moment generated by the application of full thrust to the engines and the pitch-up position of the stabilizer made it impossible for the crew to be aware of the situation and to recover control of the aeroplane. In addition, the manual use of pitch trim, which is not included as a reminder in the approach-to-stall procedures, only occurs very rarely in operation and occasionally in training. Several investigations undertaken following accidents and incidents tend to call into question the procedures relating to approach-to-stall techniques for all types of modern aeroplanes and studies are currently under way with a view to improving these procedures.

Consequently, **the BEA recommends**:

- **that EASA, in cooperation with manufacturers, improve training exercises and techniques relating to approach-to-stall to ensure control of the aeroplane in the pitch axis.**