



## REASSESSMENT OF THE RESPONSES FROM THE DIRECTION GÉNÉRALE DE L'AVIATION CIVILE TO AVIATION SAFETY RECOMMENDATION A07-04

### PILOT DECISION MAKING

#### Background

The Air France Airbus A340-313 aircraft (registration F-GLZQ, serial number 0289) departed Paris, France, at 1153 Coordinated Universal Time (UTC) as Air France Flight 358 on a scheduled flight to Toronto, Ontario, with 297 passengers and 12 crew members on board. Before departure, the flight crew members obtained their arrival weather forecast, which included the possibility of thunderstorms. On final approach, they were advised that the crew of an aircraft landing ahead of them had reported poor braking action, and Air France Flight 358's aircraft weather radar was displaying heavy precipitation encroaching on the runway from the northwest. At about 200 feet above the runway threshold, while on the instrument landing system approach to Runway 24L with autopilot and autothrust disconnected, the aircraft deviated above the glideslope and the groundspeed began to increase. The aircraft crossed the runway threshold about 40 feet above the glideslope.

During the flare, the aircraft travelled through an area of heavy rain, and visual contact with the runway environment was significantly reduced. The crew elected to continue with the landing. The aircraft touched down about 3800 feet down the 9000-foot runway; it was not able to stop on the runway and departed the far end at a groundspeed of about 80 knots. The aircraft stopped in a ravine at 2002 UTC (1602 eastern daylight time) and caught fire. All passengers and crew members were able to evacuate the aircraft before the fire reached the escape routes. A total of 2 crew members and 10 passengers were seriously injured during the crash and the ensuing evacuation.

The Board concluded its investigation and released report A05H0002 on 12 December 2007.

#### Board Recommendation A07-04 (12 December 2007)

Based on cues perceived or understood, cockpit decisions can be described as having two components: situation assessment and selection of a course of action. Cues, or information about the situation, can vary between clear and ambiguous. Clear cues allow for an easy decision-making process. Ambiguous cues are much more difficult to capture, understand, and assimilate. Therefore, the more ambiguous or complex a cue is, the greater the likelihood of a decision that is less than ideal.

Much has been written on the issue of pilot decision-making processes regarding landing. Nevertheless, this occurrence and others give a clear indication that there are still risks associated with this task. The Board believes that the ability to capture and interpret cues that are essential in the decision-to-land process is inadequate, especially when the cues are ambiguous or not immediately compelling. Consequently, pilots will continue to land in

deteriorating weather once the landing decision has been made, in spite of cues that indicate that a go-around or balked approach should be executed. Therefore, the Board recommended that:

France's Direction Générale de l'Aviation Civile and other civil aviation authorities mandate training for air transport pilots to better enable them to make landing decisions in deteriorating weather.

A07-04

## **Direction Générale de l'Aviation Civile's Response to A07-04**

In its response, the Direction Générale de l'Aviation Civile (DGAC) indicates that, for optimum decision making, the crew must mainly have the most accurate information at the right time, and thinks that improvements are possible in that field, as indicated in its response to Recommendation A07-02.

The gathering of pertinent information and decision making are at the heart of initial and recurrent training principles of the flight crew. Today, it is accepted that classroom training on cockpit resource management, threat and error management, and skills development are effective additions allowing crew members to better manage situations for which decision making is critical.

The DGAC intends to extend these widely used concepts in multi-pilot licence training to other types of training for instructor licensing and qualifications so that pilots be aware of that information at different stages of the training. The DGAC is also making the examiners aware of these concepts. Similar action in Europe is expected.

The DGAC pointed out that the technical decision elements needed by crews when conditions deteriorate are a better awareness of precautionary landings and a better understanding of actual braking performance. Consequently, the DGAC intends to make these drills mandatory in the training and routine inspections.

It is also generally appropriate to talk about the desirable and positive aspect of the go-around decision, as did the DGAC in its work and publications relating to unstabilized approaches.

## **Board Assessment of the Response to A07-04**

The DGAC response to this recommendation is a clear indication that a better training of flight crews is at the basis of action needed if we want to enhance their decision making. The DGAC therefore intends to extend concepts such as cockpit resource management, threat and error management and skills development to other types of training for instructor licensing and qualifications so that pilots be aware of that information at different stages of the training. The DGAC is also making the examiners aware of these concepts. It also indicates that similar action in Europe is expected. The DGAC points out that it is appropriate to talk about the desirable and positive aspect of the go-around decision, as did the DGAC in its work and publications relating to unstabilized approaches.

Consequently, the Board considers that the action taken by the DGAC will reduce the deficiencies raised in Recommendation A07-04. Therefore, DGAC's response is assessed as **Satisfactory Intent**.

### **Next TSB Action**

TSB staff will continue to monitor accidents in which the causes and safety deficiencies were raised in this recommendation in order to determine if the action taken to date and the proposed action by the DGAC will have a positive impact on the reduction of this type of accident in the short and long term.

### **Direction Générale de l'Aviation Civile's Response to A07-04 (28 October 2010)**

DGAC advises that in order to optimize decision-making, the crew must first have the most accurate information in a timely manner. The DGAC believes that improvements are possible in this area.

The collection of relevant information and decision-making are at the heart of the principles of initial and continuing training of flight deck crew. It is now accepted that theoretical training on crew resource management, threat and error management, and computer-based training, are effective adjuncts to assist crew to better handle situations in which decision-making is critical. DGAC plans to apply these concepts to multi-crew licence training and instructor licence training. The intent would be to raise awareness at different stages of training. The DGAC also plans to expose its flight examiners to these concepts. Similar actions are expected at the European level.

Additionally, the DGAC believes that a greater awareness of recommended landing techniques and actual performance braking are among the more technical elements necessary to optimize crew decision-making when conditions deteriorate. Accordingly, the DGAC plans to make these topics compulsory pilot training exercises and examinations.

In general, as it has done with respect to dealing with unstabilized approaches, the DGAC plans to promote the fact that the decision to "go around" during deteriorating weather can be desirable.

### **Board Reassessment of the Response to A07-04 (09 March 2011)**

The Board notes that the DGAC intends to introduce crew resource management, threat and error management, and computer-based training, which are effective adjuncts to assist crew to better handle situations in which decision-making is critical. The Board notes that DGAC plans to apply these concepts to multi-crew licence training and instructor licence training. The indication of intention is encouraging, but the Board is disappointed by the lack of timely action to reduce the risks identified by Board Recommendation A07-04.

Therefore, DGAC's response is assessed as **Satisfactory Intent**.

## **Next TSB Action (09 March 2011)**

The TSB staff will liaise with DGAC to follow-up on their intended actions and determine if these actions will have a positive impact on the reduction of this type of accident in the short and long term.

## **Direction Générale de l'Aviation Civile's Response to A07-04 (08 November 2011)**

The DGAC provided links to its website pages describing the work completed in response to Recommendation A07-04. It also indicated that it would not be taking any further action regarding Recommendation A07-04.

*"La DGAC a bien reçu la lettre du 21 octobre relative aux recommandations de l'accident de l'A340 à Toronto*

*Voici le lien qui donne l'état d'avancement de ce dossier sur le site internet de la DGAC*

*Vous pourrez constater sur cette page qu'elles ont été closes (pour la DGAC) suite au symposium DSAC de 2010*

*<http://www.developpement-durable.gouv.fr/25-novembre-2010-Conditions.html> "*

## **Board Reassessment of the Response to A07-04 (07 March 2012)**

The Board is pleased to see that a best practice guide entitled "*Approaches and Landings in Adverse Weather Conditions*" was published for distribution to operators and is available on its website. This guide is based on the conclusions of its working group and aims to better assist the crew in decision-making. It will most likely assist pilots in the short and medium term.

In its October 2010 response, the DGAC indicated that it intended to introduce crew resource management, threat and error management, and computer-based training, which are effective adjuncts to assist crews to better handle situations in which decision-making is critical. The DGAC planned to apply these concepts to multi-crew licence training and instructor licence training. However, in its latest response, the DGAC did not provide information on the progress of this initiative.

The Board is disappointed that the DGAC indicated that they would not be taking any further action in regards to mandating training for air transport pilots to better enable them to make landing decisions in deteriorating weather as per Recommendation A07-04. The DGAC considers this case file closed.

The response is considered **Satisfactory in Part**.

### **Next TSB Action (07 March 2012)**

The DGAC indicated that it would not be taking any further action regarding Recommendation A07-04 and that it considered this case file closed. Therefore, continued reassessments will not likely yield further results.

The deficiency file is assigned a **Dormant** status.