



## REASSESSMENT OF THE RESPONSE TO AVIATION SAFETY RECOMMENDATION A09-01

### **Bounced landing training**

#### **Background**

On 22 July 2008, a Kelowna Flightcraft Air Charter Ltd. Boeing 727-227 (registration C-GLKF, serial number 21118), with three crew members on board, was being operated as KFA281 on a cargo flight from Moncton, New Brunswick, to Hamilton, Ontario. The aircraft was vectored for an approach to Runway 06 at Hamilton Airport. At 2216 eastern daylight time, the aircraft touched down hard and bounced before touching down hard a second time. Immediately after the second touchdown, a go-around was initiated. During rotation, the tailskid made contact with the runway. The thrust reverser actuator fairing and the number 2 engine tailpipe made contact with the ground off the departure end of the runway. The aircraft climbed away and then returned for a normal landing on Runway 12. There were no injuries; the aircraft sustained minor damage.

The Board concluded its investigation and released report A08O0189 on 09 September 2009.

#### **Board Recommendation A09-01 (September 2009)**

The Commercial Air Service Standards require that crews practice the rejected landing procedure and the normal go-around procedure. These procedures are all initiated before main wheel touchdown.

In this occurrence, the crew had to react to a bounced landing. While the manufacturer's manual contains guidance on how to respond to such an event, crews do not receive training for these manoeuvres. While the crew was able to conduct a go-around and return for a safe landing, the aircraft sustained some damage.

Accident data show that other crews throughout the aviation industry have also experienced problems when manoeuvring following a bounced landing.

Action has been taken in the United States to mitigate the risks associated with bounced landings through crew training. Canadian operators, however, are not required to train their crews for bounced landings. Without training to improve crew skills and awareness of the risks associated with this manoeuvre, there continues to be an unacceptable level of risk to crews and the travelling public.

Therefore, the Board recommended that:

The Department of Transport require air carriers to incorporate bounced landing recovery techniques in their flight manuals and to teach these techniques during initial and recurrent training.

**TSB Recommendation A09-01**

### **Transport Canada's response to Recommendation A09-01 (December 2009)**

To address the issue of bounced landing training, Transport Canada (TC) will prepare an Advisory Circular (AC) to air carriers that will raise awareness of the hazards and means of reducing the risks through a Safety Management System (SMS) approach. TC will seek voluntary compliance in addressing the identified operational hazard similar to the approach taken by the Federal Aviation Administration (FAA). TC will review the voluntary implementation of any identified mitigation and, one year after the release of the AC, TC will assess the approach taken by the operators. The results shall be made public in accordance with the *Canadian Transportation Accident Investigation and Safety Board Act*, section 24(6) (b), which states in part, "... the Minister shall make that reply available to the public."

On 01 January 2010, TC issued AC 705-007, titled Bounced Landing Training for 705 Air Operators. The AC stated in part:

The purpose of this document is to encourage Canadian Subpart 705 air operators to institute bounced landing recovery training into their flight crew training syllabus, and to provide bounced landing information in their company operations manual (COM).

This document is applicable to all Transport Canada Civil Aviation (TCCA) employees, to individuals and organizations when they are exercising privileges granted to them under an External Ministerial Delegation of Authority. This information is also available to the aviation industry for information purposes.

### **Board assessment of Transport Canada's response to Recommendation A09-01 (March 2010)**

Recommendation A09-01 proposed that the Department of Transport require air carriers to incorporate bounced landing recovery techniques in their flight manuals and to teach these techniques during initial and recurrent training. However, in AC 705-007, TC indicated that it will not make this a mandatory requirement; instead it will seek voluntary compliance in addressing the identified operational hazard. Furthermore, AC 705-007 is only directed at Canadian Subpart 705 air operators, rather than being directed at all air carriers.

AC 705-007 promotes flight crew member awareness of the factors contributing to bounced landings and the proper use of bounced landing recovery techniques. However, only Canadian Subpart 705 air operators that choose to institute this training into their flight crew training syllabus will benefit. Without training being required for all air carriers, to improve crew skills and awareness of the risks associated with this manoeuvre, there continues to be a substantial level of risk to crews and the travelling public.

The response is assessed as **Satisfactory in Part**.

### **Transport Canada's response to Recommendation A09-01 (January 2011)**

In its response, TC only indicates that it will review the approach taken by operators in the third quarter of 2011.

### **Board reassessment of Transport Canada's response to Recommendation A09-01 (March 2011)**

The Board remains concerned that, without training being required for all air carriers to improve crew skills and awareness of the risks associated with the bounced landing manoeuvre, there continues to be a risk to crews and the travelling public.

The assessment remains **Satisfactory in Part**.

### **Transport Canada's response to Recommendation A09-01 (May and September 2011)**

#### **May 2011**

Transport Canada is in the process of gathering the data required to determine the efficiency of our approach and expects to produce a report in third quarter of 2011.

#### **September 2011 update**

No change

### **Board reassessment of Transport Canada's response to Recommendation A09-01 (March 2012)**

No new information has been made available since TC's response, dated 21 January 2011. Therefore, the assessment remains unchanged. Because the action taken will reduce but not substantially reduce or eliminate the deficiency the Board remains concerned that, without training being required for all air carriers to improve crew skills and awareness of the risks associated with the bounced landing manoeuvre, there continues to be a risk to crews and the travelling public.

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

### **Transport Canada's response to Recommendation A09-01 (December 2012)**

Transport Canada is currently gathering data to measure the effectiveness of Advisory Circular (AC) No. 705-007. TCCA will advise the TSB when an update is available.

### **Board reassessment of Transport Canada's response to Recommendation A09-01 (March 2013)**

No new information has been made available since TC's response, dated 21 January 2011. Therefore, the assessment remains unchanged. Because the action taken will reduce but not substantially reduce or eliminate the deficiency, the Board remains concerned that, without training being required for all air carriers to improve crew skills and awareness of the risks

associated with the bounced landing manoeuvre, there continues to be a risk to crews and the travelling public.

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

### **Transport Canada's response to Recommendation A09-01 (November 2013)**

Transport Canada completed the data gathering in early fall 2013 and the analysis is expected to be completed by the end of fiscal year 2013/2014.

### **Board reassessment of Transport Canada's response to Recommendation A09-01 (April 2014)**

No new information has been made available since TC's response, dated 04 December 2012. Because the action taken will reduce but not substantially reduce or eliminate the deficiency, the Board remains concerned that, without training being required for all air carriers to improve crew skills and awareness of the risks associated with the bounced landing manoeuvre, there continues to be a risk to crews and the travelling public. In order to determine to what extent the actions taken have mitigated the risks associated with bounced landings additional information will be required.

Therefore, the assessment remains unchanged and is considered **Satisfactory in Part**.

### **Transport Canada's response to Recommendation A09-01 (January 2015)**

Transport Canada agrees with the intent of the recommendation.

Advisory Circular (AC) 705-007 - Bounced Landing Training for 705 Air Operators was intended to raise awareness of the various hazards associated with bounced landings, provide guidance on conducting bounced landing avoidance and recovery training as a recommended risk mitigation strategy and a means to encourage voluntary implementation of a formalized training program on that topic within the Subpart 705 air operator's community.

Eighteen months after the publication of AC 705-007, Transport Canada utilized a questionnaire as an initial assessment of the level of awareness of the bounced landing hazard and to measure the level of implementation of the recommended risk mitigation methodologies within the Subpart 705 Canadian operator population.

As a result of the data gathering and analysis of this initial assessment, AC 705-007 was found to be a highly effective tool at raising awareness of the hazards associated with bounced landings by improving operators' understanding of the hazards and means to mitigate the associated risks of bounced landings. The AC was not as effective at encouraging operators to formalize training in bounced landing avoidance and recovery. However, air operators have other programs such as Stabilized Constant Descent Angle (SCDA), training with and use of Enhanced Ground Proximity Warning System (EGPWS) equipment, highlighting stabilized approach criteria, and introducing bounced landings into Crew Resource Management (CRM) training scenarios to address this issue and further reduce such incidents.

In addition to issuing AC 705-007, Transport Canada will continue to assess the effectiveness of the various measures undertaken by airlines in terms of preventing, and recovering where necessary, from bounced landings, including how airlines track, analyze and implement corrective measures related to bounced landings within the context of normal surveillance activities.

Through the actions described above, Transport Canada has implemented the intent of TSB Recommendation A09-01, and no further updates will be provided.

### **Board reassessment of Transport Canada's response to Recommendation A09-01 (March 2015)**

Recommendation A09-01 proposed that the Department of Transport require air carriers to incorporate bounced landing recovery techniques in their flight manuals and to teach these techniques during initial and recurrent training. However, in AC 705-007, which is only directed at Canadian Subpart 705 air operators, rather than being directed at all air carriers, TC indicated that it will not make this a mandatory requirement; instead it will seek voluntary compliance in addressing the identified operational hazard.

The Board is concerned that AC 705-007 was not as effective at encouraging operators to formalize training in bounced landing avoidance and recovery.

Because the action taken will reduce but not substantially reduce or eliminate the deficiency, the Board remains concerned that, without training being required for all air carriers to improve crew skills and awareness of the risks associated with the bounced landing manoeuvre, there continues to be a risk to crews and the travelling public.

Therefore, the assessment remains unchanged and is considered **Satisfactory in Part**.

### **Transport Canada's response to Recommendation A09-01 (November 2015)**

As per the 2014 update, Transport Canada agrees with the intent of the recommendation and believes that the issue has been addressed. TC has no further activities planned on this recommendation.

2014 update:

Advisory Circular (AC) 705-007 - Bounced Landing Training for 705 Air Operators was intended to raise awareness of the various hazards associated with bounced landings, provide guidance on conducting bounced landing avoidance and recovery training as a recommended risk mitigation strategy and a means to encourage voluntary implementation of a formalized training program on that topic within the 705 air operator's community.

Eighteen months after the publication of AC 705-007, Transport Canada utilized a questionnaire as an initial assessment of the level of awareness of the bounced landing hazard and to measure the level of implementation of the recommended risk mitigation methodologies within the Subpart 705 Canadian operator population.

As a result of the data gathering and analysis of this initial assessment, AC 705-007 was found to be a highly effective tool at raising awareness of the hazards associated with bounced

landings by improving Operators' understanding of the hazards and means to mitigate the associated risks of bounced landings. The AC was not as effective at encouraging Operators to formalize training in bounced landing avoidance and recovery. However, Air operators have other programs such as Stabilized Constant Descent Angle (SCDA), training with and use of Enhanced Ground Proximity Warning System (EGPWS) equipment, highlighting stabilized approach criteria, and introducing bounced landings into Crew Resource Management (CRM) training scenarios to address this issue and further reduce such incidents.

In addition to issuing AC 705-007, Transport Canada, within the context of normal surveillance activities, will continue to assess the effectiveness of the various measures undertaken by airlines in terms of preventing, and recovering where necessary, from bounced landings, including how airlines track, analyze and implement corrective measures related to bounced landings.

Through the actions described above, Transport Canada has implemented the intent of TSB Recommendation A09-01.

### **Board reassessment of Transport Canada's response to Recommendation A09-01 (March 2016)**

Recommendation A09-01 proposed that the Department of Transport require all air carriers to incorporate bounced landing recovery techniques in their flight manuals and to teach these techniques during initial and recurrent training. However, in AC 705-007, which is only directed at Canadian Subpart 705 air operators, TC indicated that it will not make this a mandatory requirement; instead it will seek voluntary compliance in addressing the identified operational hazard.

The Board is concerned that although AC 705-007 promotes flight crew awareness of the factors contributing to bounced landings and the proper use of bounced landing recovery techniques in 705 operators, it has not been presented to other commercial operators and is therefore not effective at encouraging all other operators to formalize training and increase awareness in bounced landing avoidance and recovery.

Because the action taken will reduce but not substantially reduce or eliminate the deficiency, the Board remains concerned that, without training being required for all air carriers to improve crew skills and awareness of the risks associated with the bounced landing manoeuvre, there continues to be a risk to crews and the travelling public.

Therefore, the assessment remains unchanged and is considered **Satisfactory in Part**.

### **Next TSB action**

The Board concludes that, as no further action is planned by TC to address the risks identified in Recommendation A09-01, continued reassessment is unlikely to yield results.

The TSB will continue to monitor and investigate bounced landing occurrences and communicate its findings to Transport Canada.

This recommendation will not be reassessed on a regular basis.

This deficiency file is **Dormant**.