REASSESSMENT OF THE RESPONSE TO TSB RECOMMENDATION A99-07

Flammability of thermal acoustic insulation cover material

Background

On 02 September 1998, Swissair Flight 111, a McDonnell Douglas MD-11 aircraft, departed John F. Kennedy Airport in New York, New York, en route to Geneva, Switzerland. Approximately one hour after take-off, the crew diverted the flight to Halifax, Nova Scotia, because of smoke in the cockpit. While the aircraft was manoeuvring in preparation for landing in Halifax, it struck the water near Peggy's Cove, Nova Scotia, fatally injuring all 229 occupants on board. The investigation revealed that the flight crew had lost control of the aircraft as a result of a fire in the aircraft's ceiling area, forward and aft of the cockpit bulkhead.

On 11 August 1999, the Board released interim safety recommendations as part of its investigation (A98H0003) into this occurrence.

TSB Recommendation A99-07 (August 1999)

With the in-service history and the demonstrated flammability of the metallized PET (MPET-type) cover material, it is the Board's view that the operation of aircraft outfitted with thermal acoustical insulation blankets incorporating MPET-type cover material constitutes an unnecessary risk. Therefore, the Board recommended to Transport Canada (TC), the United States Federal Aviation Administration (FAA) and the European Joint Aviation Authorities (JAA) that

> Regulatory authorities confirm that sufficient action is being taken, on an urgent basis, to reduce or eliminate the risk associated with the use of metallized PET-covered insulation blankets in aircraft.
>
> **TSB Recommendation A99-07**

Transport Canada's response to Recommendation A99-07 (November 1999) and Federal Aviation Administration (September 1999)

In its reply, TC indicates that it is monitoring the progress of the FAA's Notices of Proposed Rule Making (NPRM), which deal with the removal of MPET-type cover material from a variety of McDonnell Douglas aircraft including certain models of the DC-9, DC-10, MD 90, and MD 88. TC states that, although there are two operators of McDonnell Douglas aircraft in Canada, none of the Canadian-registered aircraft are affected by the proposed Airworthiness Directives (ADs).

TC also states that Bombardier has confirmed that MPET cover material was not installed in the de Havilland DHC-6, DHC-7, DHC-8, or the Canadair Regional Jet (RJ) series 100 or the Global Express aircraft. However, TC has determined that reinforced MPET tape has been specified in

the RJ series 700 aircraft. Bombardier is taking steps to alter the design, to remove the MPET-type tape from the aircraft currently being assembled and to dispose of the production supplies.

TC also raised the concern that some aircraft, not produced with MPET-type cover material, may have had some insulation blankets that use MPET-type cover material installed during routine maintenance. This issue is being discussed with the FAA, and TC is conducting its own survey to determine if this issue warrants corrective action.

Meanwhile, the FAA issued two NPRMs that call for the total removal of insulation blankets with MPET-type cover material from all "N" registered aircraft within four years of the effective date of any consequent AD. The compliance time was chosen to allow the removal during a normal maintenance visit, thereby minimizing the risk of damaging critical electrical systems and wiring during the replacement program. The FAA indicates that the four years will be an aggressive schedule for the airlines most affected.

TSB assessment of the response to Recommendation A99-07 (March 2000)

The responses of both TC and the FAA acknowledge that MPET-covered insulation blanket material constitutes a safety deficiency. Their proposed actions, if implemented in full, will substantially reduce the safety deficiency. However, for the present, the actions have not been sufficiently advanced to reduce the risks for transportation safety.

Therefore, the responses are considered to be **Satisfactory Intent.**

TSB reassessment of Transport Canada’s response to A99-07 (July 2006)

TC's response received 02 November 1999 advised that a survey of Canadian aircraft revealed that none were manufactured or repaired with insulation blankets that use MPET-type cover material. Subsequently, TC issued Airworthiness Notice B066 dated 25 March 2003 to advise of the hazards of MPET and adopted the FAA's ADs mandating the removal of insulation blankets that use MPET-type cover material. Subsequently, an FAA-approved Alternative Means of Compliance (AMOC) was issued that may allow substantial quantities of MPET-type cover material to remain in aircraft.

In its 14 December 2005 letter, TC did not provide an update with respect to the deficiency associated with Recommendation A99-07.

It is the Board's understanding that TC remains committed to providing an update that, if fully implemented, will substantially reduce or eliminate the safety deficiency as described in Recommendation A99-07.

Therefore, the assessment remains at **Satisfactory Intent.**

Transport Canada’s response to Recommendation A99-07 (February 2007)

TC's response outlines its efforts to establish the extent to which MPET-covered insulation blanket material was used in Canadian-manufactured and operated aircraft. TC is confident that Canadian-manufactured and operated aircraft are free of MPET-covered insulation blanket material. Additionally, TC states that the necessary airworthiness authorities have issued airworthiness directives against their respective aircraft, which are known to have MPET installed at production.

TC also states that revised design standards for insulation blanket cover material are being adopted through its Notice of Proposed Amendment (NPA) process. The operational rule to address newly manufactured aircraft and for the routine replacement of existing insulation blanket cover materials are still in progress.

TC states that it intends no further action required in support of this recommendation.

TSB reassessment of the response to Recommendation A99-07 (July 2007)

The Board believes that the actions taken by TC and other regulatory authorities have reduced the risks associated with the deficiency identified in Recommendation A99-07. However, the Board is concerned that the risks associated with this deficiency will not be substantially reduced because the FAA-approved AMOC allows substantial quantities of MPET-type cover material to remain in affected aircraft.

Therefore, the assessment is assigned **Satisfactory in Part.**

Transport Canada's response to Recommendation A99-07 (March 2008)

In its response of 11 March 2008, TC reviews previously known FAA and TC regulatory action taken with respect to the deficiency identified in Recommendation A99-07. TC addresses TSB's concern with respect to the FAA-approved AMOC by stating that the FAA ensures an acceptable level of safety when it approves an AMOC. TC further states that the vast majority of MPET-covered insulation material has been taken out of service by virtue of the FAA and Direction Générale de l'Aviation Civile (DGAC) ADs, and TC's acceptance of these ADs.

TC considers this recommendation closed because:

- there is no longer a safety deficiency; and
- no further action will take place or needs to take place.

TSB reassessment of Transport Canada's response to Recommendation A99-07 (August 2008)

TC's response states that the level of safety achieved by ADs 2000-11-01 and -02 is assured because the FAA ensures an "acceptable level of safety" before approving any AMOC. TC, without providing details, also states that the vast majority of MPET-covered material has been removed in accordance with ADs 2000-11-01 and -02.

The response neither explains how the risk assessment used to confirm that the AMOC in question would provide an "acceptable level of safety" nor does it provide particulars with respect to the "vast majority" of aircraft that have had the MPET-covered insulation material removed in accordance with ADs 2000-11-01 and -02. Consequently, the Board remains concerned that the risks associated with this deficiency have not been substantially reduced.

Therefore, the assessment is assigned **Satisfactory in Part.**

Transport Canada's review of Recommendation A99-07 deficiency file status (September 2009)

In its latest position statement regarding the deficiency identified in Recommendation A99-07 TC states that it considers this recommendation closed and plans no further action.

Therefore, the assessment remains at **Satisfactory-in-Part**.

The Board also concludes that, as no further action is planned by TC, continued reassessment will not likely yield further results.

TSB review of Recommendation A99-07 deficiency file status (May 2017)

The Board requested that A99-07 be reviewed to determine if the deficiency file status was appropriate. After an initial evaluation, it was determined that the safety deficiency addressed by Recommendation A99-07 still needed to be reassessed.

A request for further information was sent to Transport Canada and a reassessment will be conducted upon receipt of Transport Canada's response.

Therefore, the assessment remains as **Satisfactory in Part**.

Consequently, the status of Recommendation A99-07 is changed to **Active.**

Transport Canada's response to Recommendation A99-07 (November 2017)

TC agrees in principle with the recommendation.

Regulatory authorities confirm that sufficient action is being taken, on an urgent basis, to reduce or eliminate the risk associated with the use of Metallized Polyethylene Terephthalate (MPET) - covered insulation blankets in aircraft.

In May 2000, the Federal Aviation Administration (FAA) issued two Airworthiness Directives (ADs) (AD 2000-11-01[1] and AD 2000-11-02[2]), which required the removal of all MPET- covered insulation blankets. These ADs were based on existing McDonnell Douglas (MD) Service Bulletins (SBs), which call for the replacement of the MPET-covered insulation blankets.

Until 1994, when they were removed, three DC10-30 aircraft were registered in Canada. In 1999, none of the aircraft affected by AD 2000-11-01 or AD 2000-11-02 were registered in Canada. However, many Canadian registered aircraft go elsewhere for heavy maintenance.

Therefore, to ensure that MPET materials were not in Canadian aircraft, TC issued Airworthiness Notice - B066, Edition 1 - 25 March 2003.[3] The notice informed aircraft owners and operators of the fire hazard associated with the insulation material and recommended action to address this issue.

> Transport Canada recommends that owners/operators
>
> 1. take the opportunity to verify the type of insulation covering installed in their aircraft when fuselage interior liners are removed, particularly for aircraft that have not been continually owned or operated since the date of manufacture.

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[1] http://rgl.faa.gov/Regulatory_and_Guidance_Library/rgAD.nsf/AOCADSearch/7157A2905D2A3E7286256A0800694EA9

[2] http://rgl.faa.gov/Regulatory_and_Guidance_Library/rgAD.nsf/AOCADSearch/A99201817440026886256A0800695043

[3] https://www.tc.gc.ca/eng/civilaviation/standards/maintenance-aarpc-ans-b066-2637.htm

> Where it is determined that MPET covered insulation blankets or tape is installed, TCCA recommend its removal;
>
> 2. ensure that when contracting maintenance services, the maintenance organization is made aware that MPET-covered insulation blankets and reinforcing tape is not to be installed as replacement material;
>
> 3. check their stocks of insulation blankets and reinforcing tape to confirm that there are no MPET-covered insulation blankets or reinforcing tape with MPET, and purge such stocks if found; and,
>
> 4. inform maintenance personnel of the potential fire hazard associated with MPET.
>
> Transport Canada also recommends that individuals and design organizations approving aircraft modifications or repairs ensure that MPET materials are not included in any list of parts, materials or specifications that comprise the modification or repair.

Thermal-acoustic insulation with MPET covering is no longer manufactured or used in aircraft construction or maintenance. TC believes that the risk associated with these materials has been reduced by removing the material for service and the cessation of manufacture of MPET cover insulation.

TSB reassessment of Transport Canada's response to Recommendation A99-07 (March 2018)

In its response, TC indicates that a number of actions have been taken to address the safety deficiency identified in Recommendation A99-07, regarding the risks associated with the use of Metallized Polyethylene Terephthalate (MPET)-covered insulation blankets in aircraft. These include the following:

- In 2004, TC upgraded its flammability standards for thermal and acoustic insulation materials under CARs Standard 525.856 - *Thermal/Acoustic Insulation Materials*. These standards require insulation materials to undergo a more stringent flammability test. As a result, Canadian-manufactured and registered aircraft are no longer manufactured, nor repaired, with MPET-covered insulation blankets; and
- TC issued Airworthiness Notice - B066, Edition 1 - 25 March 2003 - *Insulation blanket covers and Tapes Metallized Polyethylene Terephthylene (MPET)*, informing Canadian aircraft owners and operators about the fire hazards associated with MPET-covered insulation materials, and recommending measures to eliminate the use of such materials in all aircraft types.

For aircraft manufactured and/or registered in other countries, a number of foreign regulatory authorities, such as the Federal Aviation Administration (FAA) and the European Aviation Safety Agency (EASA), have issued airworthiness directives prohibiting the use of MPET-covered insulation blankets in their aircraft. In addition, the FAA and EASA have also upgraded their flammability standards.

In response to A98H0003, the flammability standards issued by the FAA (14 CFR Part 25.856) in 2003, by TC (CARs Standard 525.856) in 2004, and EASA (*Certification Specifications, Including Airworthiness Code and Acceptable Means of Compliance, for Large Aeroplanes*, CS 25.856) in 2009

preclude the presence of MPET-covered insulation blankets for aircraft manufactured and/or registered in Canada, the United States and Europe.

For McDonnell Douglas aircraft subject to Airworthiness Directives (AD) 2000-11-01 or AD 2000-11-02, the mandatory removal and replacement of all MPET-covered insulation blankets, in accordance with the applicable McDonnell Douglas service bulletins, was required no later than 30 June 2005. As a result, all current and future McDonnell Douglas aircraft registered in Canada are, or will have to be, in compliance with the requirements of these ADs. While an Alternative Means of Compliance (AMOC) authorizes McDonnell Douglas aircraft to retain certain quantities of MPET-covered insulation materials, only 2 McDonnell Douglas aircraft targeted by AD 2000-11-01 or AD 2000-11-02, and the associated AMOC, are still commercially operated in Canada, in a cargo configuration.

The Board considers that the actions taken by TC, and other regulatory authorities, have substantially reduced the risks associated with the safety deficiency identified in Recommendation A99-07.

Therefore, the response to Recommendation A99-07 is assessed as **Fully Satisfactory.**

Next TSB action

This deficiency file is **Closed**.