



## REASSESSMENT OF THE RESPONSE TO TSB RECOMMENDATION A94-13

### Knowledge of aircraft flight manuals

#### Background

On 19 March 1992, a Norontair de Havilland DHC-6-300 Twin Otter (registration C-GQKZ, serial number 532), was operating a scheduled flight from Red Lake to Kenora, and then to Thunder Bay, Ontario. The flight crew arrived at the airport after a seven hour lay-over at Red Lake and prepared for departure. There were no passengers for the leg to Kenora, but there were passengers scheduled to fly out of Kenora to Thunder Bay.

During the taxi to the runway, the pre-take-off checks were completed and the captain conducted the briefing for a standard ten degree flap take-off. He then decided to practice a short take-off and landing (STOL) type take-off. He informed the first officer, and selected the flaps to 30 degrees. The captain lined up on the button of runway 08. The engines were set to take-off power and after approximately 300 feet of ground roll, the aircraft became airborne.

Initially the aircraft climbed, and then it began to descend. The aircraft then climbed again, more steeply than before, and then suddenly descended in a steep nose-down attitude, crashing half-way down the runway. The captain received minor injuries; the first officer was seriously injured. The aircraft sustained substantial damage. The Board determined that inappropriate short take-off and landing (STOL) take-off procedures were applied, which placed the aircraft in a flight regime outside of the aircraft performance envelope for sustained flight. The aircraft stalled at an altitude from which recovery was not possible.

Contributing to the occurrence was the general acceptance of the use of STOL techniques as an approved procedure.

The Board concluded its investigation and released report A92C0048 on 08 April 1994.

#### TSB Recommendation A94-13 (April 1994)

A single binder was used by the air carrier to hold the approved Aircraft Flight Manual (PSM 1-63-1A) and the non-approved Supplementary Operating Data Manual (PSM 1-63-1). This is an accepted practice in the aviation industry, and the combination binder is commonly referred to as the "Aircraft Flight Manual." Generally, a tab divider separates the two portions of the binder; in practice, little distinction is made between the "approved" and "non-approved" contents. It is not uncommon to find flight manual binders with the two categories of information inter-mixed, most likely as a result of years of local reproduction of the original manuals.

The mandatory or “approved” portion of the flight manual binder is generally comprised of the aircraft certification information relating to airspeeds, power plant and weight limitations, normal and emergency operating procedures, aircraft performance data, and loading parameters. The flight manual binder may contain supplemental operating procedures. Since this additional material has not necessarily been reviewed by the certification authority, it is referred to as “non-approved” information. Typically, this section includes acceleration-stop distances, specific range and cruise power charts, some climb and descent performance, system descriptions, maintenance procedures, and other handling characteristics. It often holds manufacturer-issued safety bulletins or communiqués covering topics from product enhancements to revised recommended operating procedures. However, at times, this “non-approved” information from the manufacturer goes beyond the “nice-to-know” category, by providing information essential for flight safety.

“Non-approved” material can generally be divided into two types: information which was not required for the certification of the aircraft, and information that did not meet the safety/performance level required during certification of the aircraft. The STOL procedures for the Twin Otter aircraft belong to the latter category.

The operator involved in this occurrence had separated the two categories of information in the flight manual binder. The company SOPs included duties for a 20-degree STOL take-off based on the “non-approved” procedure. Apparently, the company pilots considered this procedure as a “normal” training sequence, most likely unaware that the STOL procedure did not meet the safety criteria for commercial flight operations.

While there are guidelines on the use of “approved” information, there is no direction as to how the “non-approved” portion of the flight manual binder may be used by pilots and operators. Explanation of the differences between “approved” and “non-approved” information in flight manual binders is not required in initial or recurrent pilot training, nor is it found in commonly used flight publications. Hence, many in the aviation community are unaware of the differences. This lack of understanding regarding the proper use of the “non-approved” information contained in aircraft flight manual binders could result in pilots employing unsafe procedures.

Therefore, the Board recommended that

the Department of Transport promulgate guidelines regarding the use of “non-approved” material contained in aircraft flight manuals, including related operational information issued by aircraft manufacturers.

**TSB Recommendation A94-13**

### **Transport Canada’s response to Recommendation A94-13 (September 1994)**

Transport Canada Aviation agrees with this recommendation. An Aeronautical Information Circular (AIC) will be issued with the earliest available amendment cycle of the Aeronautical Information Publication (AIP) Canada. This AIC will go to all pilots and will explain the differences in the basis and use of approved and unapproved information.

### **TSB assessment of Transport Canada's response to Recommendation A94-13 (October 1994)**

A lack of understanding regarding the proper use of the "non-approved" information contained in aircraft flight manual binders could result in pilots employing unsafe procedures. Therefore, the Board recommended that: The Department of Transport promulgate guidelines regarding the use of "non-approved" material contained in aircraft flight manuals, including related operational information issued by aircraft manufacturers; and, the Department of Transport incorporate the subject of "approved" and "non-approved" aircraft flight information in the syllabus for initial pilot training (A94-13 & 14).

Transport Canada (TC) intends to publish an Aeronautical Information Circular explaining the differences in the basis and use of approved and non-approved information; this should increase awareness in the short term on this issue. With respect to addressing long term understanding, the subject of "approved" and "non-approved" aircraft flight information will be incorporated into the syllabus for training of all pilot-licence candidates and applicable examinations.

The intended action by TC should address the lack of understanding by aircrew regarding "approved" and "non-approved" information.

Therefore, the Board considers the response to Recommendation A94-13 to show **Satisfactory Intent**.

### **TSB reassessment of Recommendation A94-13 (November 1996)**

An Aviation Notice (AN) was released on 13 October 1994 on the subject. However, unlike an Aeronautical Information Circular (AIC), an AN is not part of the Aeronautical Information Publication (AIP) Canada and is not catalogued, the lesson will be eventually lost unless it is part of the AIP.

Therefore, the Board considers the response to Recommendation A94-13 to be **Satisfactory in Part**.

### **TSB reassessment of Recommendation A94-13 (November 1997)**

No change to the regulations since the previous reassessment.

No change of status from the previous reassessment.

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

As such, **Further Action is Unwarranted** with respect to Recommendation A94-13 and the status is changed to **Inactive**.

### **TSB review of Recommendation A94-13 deficiency file status (April 2014)**

The Board requested that A94-13 be reviewed to determine if the deficiency file status was appropriate. After an initial evaluation, it was determined that the safety deficiency addressed by Recommendations A94-13 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 A94-13 is changed to **Active**.

### **Transport Canada's response to Recommendation A94-13 (October 2018)**

TC agrees with the recommendation.

Aircraft flight manuals already contain some information on unapproved material and TC will provide additional information to aircraft operators. The guidance will be published as part of Transport Canada's amendment to Transport Canada Publication (TP) 4711 – *Air Operator Certification Manual*. Transport Canada is aiming to publish a revised TP 4711 before Fall 2019. TC had planned to communicate the information via the Aviation Safety Letter; however, the department determined that TP 4711 will be more effective.

### **TSB reassessment of Transport Canada's response to Recommendation A94-13 (January 2019)**

To date, the following actions have been proposed by Transport Canada (TC) to address the safety deficiency identified in Recommendation A94-13, regarding guidelines on the use of "non-approved" material contained in aircraft flight manuals, including related operational information issued by aircraft manufacturers:

- In its 1994 response to Recommendation A94-13, TC indicated its intent to publish an aeronautical information circular explaining the differences in the basis and use of approved and non-approved information. TC also indicated its intent to incorporate this topic into the syllabus for training of all pilot-licence candidates, as well as applicable examinations; and
- In its 1996 response to Recommendation A94-13, TC indicated that, instead of the aeronautical information circular, it published an aviation notice, which, unlike the circular, was not part of the aeronautical information publication Canada, and was not catalogued. Therefore, the information was likely lost over time.

In its latest response, TC indicates that it intends to provide additional information on the subject, through guidance that will be published in the Transport Canada Publication TP 4711 – *Air Operator Certification Manual*, before Fall 2019.

This recommendation was issued more than 24 years ago. The Board is concerned with the protracted delays in addressing the safety deficiency identified in Recommendation A94-13. Although the promulgation of the information in TP 4711 may address the safety deficiency identified in Recommendation A94-13, until it is fully implemented, the risks to transportation safety remain.

Therefore, the Board considers the response to Recommendation A94-13 to show **Satisfactory Intent**.

### **Transport Canada's response to Recommendation A94-13 (December 2019)**

TC agrees with the recommendation.

On occasion, aircraft manufacturers will publish information and material that has not been approved during aircraft certification. “Non-approved” material can generally be divided into two types: information which was not required for the certification of the aircraft, and information that did not meet the safety/performance level required during certification of the aircraft. Operators should only follow non-approved material with caution.

In December 2019, TC plans to publish updated versions of Volumes 1 and 3 of the Air Operator Certification Manual (TP4711). This will replace a large volume of existing TC documentation and will provide operators with expanded guidance on the expected contents of manuals, including how approved and non-approved content will be handled. Examples of how the revised manual will address the use of non-approved material are outlined below.

- Volume 1 – General Matters<sup>1</sup> – contains information for all operators, and addresses manual content. Specifically, in chapter 6, the volume will cover the methodology used to approve manuals. The issue of “approved” versus “non-approved” comes up throughout the chapter.
- Volume 3 – Domestic Air Carrier Operations<sup>2</sup> – is specific to domestic commercial operators, and details expected contents of manuals including approved and non-approved material. This volume covers a variety of subject which are related to “approved” reference material. For example, sections 4 and 5 covers: Aeroplanes with and without Certified Engine-Out Performance, Narrow Runway Operations, Aerodrome Operating Minima, Maintenance Schedule, Resetting Tripped Circuit Breakers, Ground De-Icing/Anti-Icing of Aircraft with the Main Engines Running, etc.

Further volumes of TP4711 will be published over the next year. These volumes will cover foreign operations, flight training operations and private operations. All volumes are expected to contain guidance on manual content (including provision for non-approved material) and will be on a regular revision cycle, so as to allow the material to be kept up-to-date.

### **Update to Transport Canada’s response to Recommendation A94-13 (February 2021)**

TC published the revised Air Operator Certification Manual (TP 4711), which includes Volumes 1, 2 and 3.<sup>3</sup> The official publication date was December 23, 2020.

### **TSB reassessment of Transport Canada’s response to Recommendation A94-13 (March 2021)**

In its responses, Transport Canada indicates that it agrees with Recommendation A94-13, and recently advised the TSB that volumes 1, 2 and 3 of the *Air Operator Certification Manual* (TP 4711) were updated and published in December 2020. These updates include additional guidance on manual contents, including the provision for non-approved material.

The Board believes that the published updates have addressed the safety deficiency identified in Recommendation A94-13.

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<sup>1</sup> Transport Canada (2019), TP4177 – Air Operator Certification Manual – Volume 1 – General Matters. RDIMS - #13872408-NAOC-TP 4711 VOL 1 – GENERAL MATTERS.

<sup>2</sup> Transport Canada (2019), TP4177 – Air Operator Certification Manual – Volume 4 Domestic Air Carrier Operations. RDIMS-#12483135-NAOC - TP 4711 - VOL 3 - DOMESTIC AIR CARRIER OPERATIONS

<sup>3</sup> Originally, the volumes were to be labelled as “Volume 1”, “Volume 3”, and “Volume 5”. Due to the cancellation of volumes 2 and 4, TC re-labelled Volume 3 as Volume 2, and Volume 5 as Volume 3.

Therefore, the Board considers the response to Recommendation A94-13 to be **Fully Satisfactory**.

**Next TSB action**

This deficiency file is **Closed**.