



TSB Recommendation A21-01

NOTAM publishing procedures

The Transportation Safety Board of Canada recommends that NAV CANADA make available, in a timely manner, graphic depictions of closures and other significant changes related to aerodrome or runway operations to accompany the associated NOTAMs so that the information communicated on these hazards is more easily understood.

Air transportation safety investigation report	A18Q0140
Date the recommendation was issued	15 December 2021
Date of the latest response	June 2023
Date of the latest assessment	March 2024
Rating of the latest response	Fully Satisfactory
File status	Closed

Summary of the occurrence

Further to the investigation of an occurrence that took place in June 2018, when runway rehabilitation work was being carried out at the Baie-Comeau Airport, Quebec, it was discovered that another 14 similar occurrences had taken place at other airports in Quebec and at an airport in Nunavut since 2013. A summary review of these occurrences revealed a particularity in the method used to carry out the construction: the width of the runway was reduced rather than the length. In all but 2 cases, aircraft had manoeuvred on the closed portion of the runway during takeoff or landing.

Considering this a matter of concern, the TSB issued Aviation Safety Advisory A18Q0094-D1-A1, addressed to Transport Canada Civil Aviation (TCCA), on 12 July 2018. However, when 2 more similar occurrences took place shortly after the advisory was released, the TSB launched Air Transportation Safety Issue Investigation A18Q0140 to highlight any systemic underlying causes or contributing factors, and assess the risk they pose. Information obtained during this investigation determined that an additional occurrence had taken place in Quebec, at the Schefferville Airport in August 2015, but had not been reported.

The construction method most frequently used for runway rehabilitation in Canada and abroad consists of reducing the runway length rather than the width. A review of international

standards and recommended practices and of Canada's regulatory framework for construction revealed the absence of information on which method should be used for runway rehabilitation, and the absence of Canadian standards for airport construction. Neither International Civil Aviation Organization (ICAO) documents nor the *Canadian Aviation Regulations* (CARs) and related standards authorize or prohibit either method. The decision lies entirely with the airport operator.

Given that reducing the width of a runway does not require the runway to be closed completely, this method provides a decisive advantage for operators of airports that have operational requirements or specific economic pressures, which was the case for the 4 airports reviewed in this investigation. However, this uncommon method requires that appropriate precautions be taken to ensure the safety of flight operations.

This method of runway rehabilitation requires a new configuration for runway markings. Without specific construction-related standards at their disposal, airport operators complied with regulations relating to airports. It was clear from reviewing these regulations that the various requirements and cases are complex and some concepts not detailed enough. If the wording used in airport standards and regulations is complex and lends itself to several interpretations, these standards and regulations could lead to different measures and solutions that all appear to comply with the requirements, but in reality, may not reflect the regulator's intention with respect to safety.

Furthermore, given the absence of standards related to the safety of operations during airport construction, including standards related to required visual aids, the visual aids used on the reduced-width runways reviewed in this investigation were insufficient for pilots to be able to clearly distinguish the closed portions. The runway markings used for construction at the airports under review were not clear, convincing, and consistent; consequently, the pilots were not able to distinguish the open portion of each runway and manoeuvred the aircraft on the closed portion, which, in some cases, resulted in damage to the aircraft.

The Board concluded its investigation and released report A18Q0140 on 15 December 2021.

Rationale for the recommendation

If an airport operator plans to carry out construction activities at their airport, they must communicate the necessary information to pilots by having a NOTAM issued by NAV CANADA. However, information pertaining to airport construction, which is temporary and may be complex, can be difficult to communicate clearly and effectively in a NOTAM. Over the years, the way these notices are presented and how they are provided to flight crews have not only been called into question several times, but have also been considered to be contributing factors in a number of aviation occurrences.

The investigations into those occurrences highlighted certain deficiencies that make these notices inadequate and could hinder the communication of the information. In addition to being written entirely in capital letters and consisting primarily of abbreviations and acronyms, these

notices are published in a text format only, which limits how clearly a pilot can visualize areas that are closed due to construction. Currently, NOTAMs in Canada cannot include graphics and only include text, the format and style of which can hinder the effective communication of information. Consequently, even though the pilots involved in the occurrences under review had all read the available NOTAMs related to the partial runway closures, their mental models were inaccurate and they were not able to identify which portions were closed.

Therefore, the Board recommended that

NAV CANADA make available, in a timely manner, graphic depictions of closures and other significant changes related to aerodrome or runway operations to accompany the associated NOTAMs so that the information communicated on these hazards is more easily understood.

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Previous responses and assessments

March 2022: response from NAV CANADA

NAV CANADA acknowledges Recommendation A21-01 from the Transportation Safety Board. As an organization with safety at the centre of its operations and as the state Aeronautical Information Service provider, NAV CANADA understands the importance of promulgating aeronautical information in the appropriate manner and in an adequate timeframe to support the aviation community.

In response to Recommendation A21-01:

- NAV CANADA will improve the efficiency of the process to publish AIP [aeronautical information publication] Supplements and standardize the requirements for leveraging this publication mechanism to include the graphical depiction of closures and other significant changes related to aerodrome or runway operations to accompany the associated NOTAMs.
- NAV CANADA will execute a communication campaign with its stakeholders, including Transport Canada, to specifically increase awareness of the proper use of AIP Supplements in communicating information related to runway closures and other significant changes related to aerodrome or runway operations to accompany the associated NOTAM.
- NAV CANADA will continue to actively work with its stakeholders, including Transport Canada, to increase awareness of the obligation of aerodrome operators to engage with NAV CANADA in advance of airport construction plans and activities.

Additionally, NAV CANADA has taken the following safety actions that we believe contribute to mitigating the risk associated with the specific types of construction activities referenced in the TSB report and increasing awareness of NAV CANADA requirements related to general construction activities:

- In January 2019, NOTAM wording was changed in support of initial TSB inquiries related to the occurrences captured in the report. The NOTAMs clearly indicate the words “USABLE WIDTH REDUCED...” “USABLE LENGTH REDUCED...”. Although there are approved abbreviations for ‘length’ and ‘width’, these words are no longer abbreviated in Canadian NOTAMs due to the importance of creating an accurate mental model.
- In September 2021, NAV CANADA established a unit that is responsible for expanding the proactive outreach program with airports in relation to planned airport construction activities.

Recommendation A21-01 highlights some fundamental, cultural challenges in the Canadian aviation community, and as such the response and associated actions will need an appropriate amount of time to realize a positive outcome. The activities associated with the NAV CANADA response will be completed by December 31, 2023. Throughout this timeframe, incremental improvements may be realized as knowledge and awareness build within the Canadian aviation community. We believe these activities will sufficiently address the concerns related to the Recommendation in the TSB report (A18Q0140).

June 2022: TSB assessment of the response to Recommendation A21-01 (Satisfactory Intent)

In its response, NAV CANADA indicated it recognizes the importance of promulgating aeronautical information in a timely and appropriate manner to support the aviation community.

To address the safety deficiency identified in Recommendation A21-01, NAV CANADA is planning to:

- improve the efficiency of the process for publishing aeronautical information publication (AIP) Canada Supplements to include the graphical depiction of closures and other significant changes related to aerodrome or runway operations to accompany the associated NOTAMs;
- execute a communication campaign with its stakeholders to increase awareness of the proper use of Supplements; and
- increase awareness of aerodrome operators’ obligation to engage with NAV CANADA before initiating airport construction plans and activities.

In addition, NAV CANADA has taken the following safety action to mitigate the risk associated with the specific types of construction activities referenced in investigation report A18Q0140:

- In January 2019, NOTAM wording was changed to “USABLE WIDTH REDUCED...” and “USABLE LENGTH REDUCED...”. The words length and width are no longer abbreviated in Canadian NOTAMs given the importance of creating an accurate mental model.

- In September 2021, NAV CANADA established a unit that will expand the proactive outreach program with airports in relation to planned airport construction activities.

The Board is encouraged by NAV CANADA's planned actions to address the safety deficiency associated with NOTAM publishing procedures in Canada. These actions, when fully implemented, have the potential to substantially mitigate the risks associated with the safety deficiency identified in Recommendation A21-01.

Therefore, the Board considers the response to Recommendation A21-01 to show **Satisfactory Intent**.

Latest response and assessment

June 2023: response from NAV CANADA

In our initial response to Recommendation A21-01, NAV CANADA advised the Transportation Safety Board of the following planned actions:

1. NAV CANADA will improve the efficiency of the process to publish AIP [aeronautical information publication] Supplements and standardize the requirements for leveraging this publication mechanism to include the graphical depiction of closures and other significant changes related to aerodrome or runway operations to accompany the associated NOTAMs.
2. NAV CANADA will execute a communication campaign with its stakeholders, including Transport Canada, to specifically increase awareness of the proper use of AIP Supplements in communicating information related to runway closures and other significant changes related to aerodrome or runway operations to accompany the associated NOTAM.
3. NAV CANADA will continue to actively work with its stakeholders, including Transport Canada, to increase awareness of the obligation of aerodrome operators to engage with NAV CANADA in advance of airport construction plans and activities.¹

NAV CANADA is pleased to provide the Transportation Safety Board with the following update regarding these planned activities:

1. The process to enable AIP Supplements to include graphical depiction of closures and other significant changes related to aerodrome or runway operations is complete. As of June 2023, AIP Supplements are able to be published with the mentioned graphical depictions.
2. The communication campaign to increase awareness of the proper use of AIP Supplements in communicating information related to runway closures and other significant changes related to aerodrome or runway operations is underway and is expected to be concluded by the end of November 2023.

¹ All responses are those of the stakeholders to the TSB in written communications and are reproduced in full. The TSB corrects typographical errors and accessibility issues in the material it reproduces without indication but uses brackets [] to show other changes or to show that part of the response was omitted because it was not pertinent.

3. The campaign to increase awareness of the obligation of aerodrome operators to engage with NAV CANADA in advance of airport construction plans and activities is currently in development. It is expected to commence in July 2023 and is expected to conclude by the end of November 2023.

In addition to the above update, NAV CANADA has previously advised the Transportation Safety Board of the following completed activities in support of Recommendation A21-01:

1. In January 2019, NOTAM wording was changed in support of initial TSB inquiries related to the occurrences captured in the Report. The NOTAMs clearly indicate the words “USABLE WIDTH REDUCED...” “USABLE LENGTH REDUCED...”. Although there are approved abbreviations for ‘length’ and ‘width’, these words are no longer abbreviated in Canadian NOTAMs due to the importance of creating an accurate mental model.
2. In September 2021, NAV CANADA established a unit that is responsible for expanding the proactive outreach program with airports in relation to planned airport construction activities.

March 2024: TSB assessment of the response (Fully Satisfactory)

In its June 2023 response and a follow-up response, NAV CANADA provided updates on its planned activities to address Recommendation A21-01. Notably, the Aeronautical Information Publication (AIP) Canada Supplements (AIP SUP) are now published with standardized graphical depictions of closures and other significant changes related to aerodrome or runway operations.

In addition, NAV CANADA has launched a campaign to increase awareness of the proper use of AIP SUP when communicating information related to runway closures and other significant changes related to aerodrome or runway operations. The campaign was expected to continue until the end of November 2023.

Finally, NAV CANADA is developing a campaign to increase awareness of the obligation of aerodrome operators to engage with NAV CANADA in advance of airport construction plans and activities. This campaign was expected to take place from July 2023 to the end of November 2023.

Since its June 2023 response, NAV CANADA has confirmed that both campaigns concluded in November 2023.

Although it was not detailed in its June 2023 response and a follow up response, NAV CANADA has since clarified that it is actively modernizing and enhancing the efficiency of publishing the AIP SUP by making the following changes:

- **Update Frequency.** To allow for information changes to be relayed in a timelier manner, AIP SUP will be updated on the website every 14 days, instead of every 28 days. [...]

- **Website Updates.** To improve the overall user experience when accessing AIP SUP, the website will undergo a number of updates, including improvements to search functionality.[...]
- **Standardization.** To ensure consistency and improve usefulness, all AIP SUP will be standardized in content, layout, and graphics. An improved AIP SUP template for Aerodrome Construction is now available, featuring a standard format and chronological order of information, and graphical depictions of closures, making it intuitive and quick to find information.
- **Visual Support for Situational Awareness.** To help mitigate the risks of complex closures or changes that could easily be misunderstood in a NOTAM, AIP SUP related to construction will include graphics to provide a clear visual depiction of the situation.[...]
- **Introduction of trigger NOTAM.**² To inform users of the existence of AIP SUPs, trigger NOTAMs will be introduced.³

The publication frequency changes, website updates, and introduction of trigger NOTAMs are underway. Once these changes are well-established, NAV CANADA's transition to 14-day trigger NOTAMs is anticipated for late 2024.

The Board is pleased with NAV CANADA's comprehensive and timely actions to improve NOTAM publishing procedures in Canada and believes that these changes have substantially reduced the risk associated with the safety deficiency identified in Recommendation A21-01.

Therefore, the Board considers NAV CANADA's response to Recommendation A21-01 to be **Fully Satisfactory**.

File status

This deficiency file is **Closed**.

² Unlike regular NOTAMs, which provide information on various aeronautical matters such as changes in facilities, services, procedures, or hazards, trigger NOTAMs specifically alert users to the publication of a new AIP SUP. They serve as a prompt for individuals to refer to the updated aeronautical information provided in the AIP SUP for their flight planning and operations.

³ NAV CANADA, "Frequently Asked Questions: AIP Supplements and AIC – Modernization Questions," at navcanada.ca/en/aip-sup-user-faqs.pdf (last accessed on 18 April 2024).