



RUNWAY OVERRUNS

Despite the millions of successful movements on Canadian runways each year, runway overrun accidents sometimes occur during landings or rejected takeoffs. In fact, since 2013, on average 9 overrun accidents and incidents occur annually. These can result in aircraft damage, injuries, and even loss of life—and the consequences can be particularly serious when there is no adequate runway end safety area (RESA) or suitable arresting material.

The situation

When a runway overrun occurs during landing or a rejected takeoff, it is important that an aircraft have an adequate safety area beyond the end of the runway to reduce adverse consequences. There is currently no requirement in Canada for runways to meet international standards and recommended practices for RESAs.

Many Canadian airports do not yet meet the Transport Canada (TC) RESA guideline of 150 m, and most large airports do not meet the International Civil Aviation Organization (ICAO) recommended practice of 300 m RESAs for runways over 1200 m in length.¹ As a result, the terrain beyond the end of many runways in Canada could contribute to aircraft damage and injuries to passengers and crew in the event of an accident.

The issue gained significant attention in Canada following a runway overrun involving a large passenger aircraft at Toronto Pearson International Airport in 2005.² Since then, 135 runway overrun accidents and incidents were recorded in Canada up until the beginning of October 2018. Of these, the Transportation Safety Board of Canada (TSB) has investigated 19 and issued 4 recommendations to Canadian authorities.³

There has been some progress since this issue was first included on the Watchlist in 2010. In 2016, TC published a proposal⁴ to introduce measures that will address the risk of runway overruns at

¹ ICAO Annex 14 – Aerodromes.

² TSB Aviation Investigation Report A05H0002.

³ TSB recommendations A07-01, A07-03, A07-05, and A07-06. In February 2018, Recommendation A07-03 was closed as Fully Satisfactory.

⁴ Transport Canada, “Notice of Proposed Amendment 2016-007 – Runway End Safety Areas,” at <http://wwwapps.tc.gc.ca/Saf-Sec-Sur/2/NPA-APM/npaapmr.aspx?id=2924&lang=eng>



selected airports. However, the TSB remains concerned that these measures will not fully address the underlying safety deficiency that gave rise to its recommendation on RESAs.⁵

The risks to people, property and the environment

Some major Canadian airports have implemented 300 m RESAs. Until all airports assess the risk of runway overruns on each of their runways and take mitigating actions, the risk to Canadian travellers remains elevated.

The TSB acknowledges that TC has conducted a risk assessment⁶ and will propose new regulations for the implementation of 150 m RESAs at some airports. This will meet the minimum ICAO standards, but not its recommendation for 300 m RESAs for runways over 1200 m in length. Furthermore, TC's risk assessment has only identified airports that will require the 150 m RESA based on passenger volumes and does not consider other factors, such as non-passenger air traffic or local terrain. Therefore, the risk assessment focuses only on the risk to most passengers, and does not adequately consider the risks to property and the environment. The TSB remains concerned that without further action, risks to people, property, and the environment remain.

Lastly, airport operators are required to have a safety management system in place to actively manage safety by identifying and mitigating risks, regardless of existing or planned regulations that address a specific risk area. Given that runway overruns continue to occur, the TSB remains concerned that airport operators have not fully assessed their individual runways for the risks to people, property, and the environment in the event of an overrun, and that they continue to operate with unmitigated risks posed by runway overruns.

Actions taken

The House of Commons Standing Committee on Transport, Infrastructure and Communities has reviewed issues related to equipment and infrastructure in aviation in Canada. In 2017, the committee recommended the implementation of 300 m RESAs, as supported by the TSB and ICAO.⁷

TC will be proposing regulations that

- require a 150 m RESA at airports with over 325 000 commercial passengers annually;
- are limited to runways serving commercial passenger services (air operators governed by subparts 701, 703, 704, and 705 of the *Canadian Aviation Regulations*);
- apply to airports that reach the passenger threshold over 3 consecutive years;
- allow 2 years to meet the new requirements for existing runways; and
- would require RESAs at future planned runways at airports that meet the application criteria before coming into service.

⁵ TSB Recommendation A07-06.

⁶ Transport Canada commissioned a third party to produce an independent risk assessment to establish implementation criteria for RESAs in Canada. The risk assessment focused on the exposure of overruns to commercial air travellers only.

⁷ Canada, Parliament, House of Commons. Standing Committee on Transport, Infrastructure and Communities. (2017). Aviation Safety in Canada. 42nd Parl., 1st sess. Rept. 14, at <http://www.ourcommons.ca/DocumentViewer/en/42-1/TRAN/report-14>

According to TC, this proposal would apply to 24 airports in Canada, covering 94% of scheduled passenger travel and addressing 91% of runway overruns in its study period.

Some Canadian airports, such as Ottawa/Macdonald-Cartier International Airport, Vancouver International Airport, and Montréal/Pierre Elliott Trudeau International Airport, have implemented 300 m RESAs on their major runways, exceeding current TC regulatory requirements and conforming to ICAO's recommendation. Other airports have yet to take action, pending the outcome of TC's proposed RESA regulations. Additionally, to maximize the likelihood of safe landings, some airports have improved runway surfaces, for example, with runway grooving.

NAV CANADA is currently consulting with industry on takeoff and landing performance assessments to ensure crews are informed about the entire runway surface condition, improving upon current reporting. It has also made available a computer application that permits airport operators to upload real-time reporting of current runway conditions observations into the NOTAM system.

Many airport runways have geographic constraints that limit the development of adequate RESAs. In such cases, technical solutions, such as an engineered arresting system, could be implemented. For example, as of 2018, in the U.S., there are 106 runway-end engineered arresting system installations at 63 airports, with another 7 installations planned at an additional 6 airports.⁸ However, at this time there are no such installations in Canada.

Actions required

Operators of airports with runways longer than 1800 m must conduct formal runway-specific risk assessments and take appropriate action to mitigate risks of overrun to people, property, and the environment.

Transport Canada must adopt at least the ICAO standard for RESAs, or a means of stopping aircraft that provides an equivalent level of safety.

⁸ Federal Aviation Administration, "Fact Sheet – Engineered Material Arresting System (EMAS)," at https://www.faa.gov/news/fact_sheets/news_story.cfm?newsId=13754