



# Annual Report to Parliament 2009-2010



**20TH ANNIVERSARY**

29 MARCH 2010

**Advancing transportation safety  
one investigation at a time**

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**ANNUAL REPORT TO PARLIAMENT 2009–2010**

Place du Centre  
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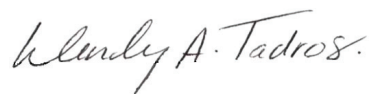
01 June 2010

The Honourable Josée Verner, P.C., M.P.  
President of the Queen's Privy Council for Canada  
House of Commons  
Ottawa, Ontario K1A 0A6

Dear Minister:

In accordance with subsection 13(3) of the *Canadian Transportation Accident Investigation and Safety Board Act*, the Board is pleased to submit, through you, its annual report to Parliament for the period 01 April 2009 to 31 March 2010.

Yours sincerely,



Wendy A. Tadros  
Chair



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## The Chair's Message

Twenty years ago, Parliament created the Transportation Safety Board of Canada (TSB) – to conduct independent investigations of selected incidents and accidents in the federally regulated transportation industry. The creation of the TSB was an investment in Canada's future. It was an investment in the infrastructure critical to our country's economic and social health.

This investment has paid dividends to Canadians by making us safer as we move ourselves and our goods across this country and around the world.

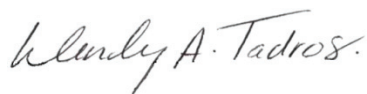
Canadians can be proud of the Board's innovative work, work that has established Canada as a world leader in independent accident investigation. In this Annual Report, you will see many of the ways in which the TSB has improved transportation safety by changing operating practices, equipment and the laws that underpin the transportation industry.

And Canada now enjoys one of the safest transportation systems in the world. Even so, Canadians expect that we at the Transportation Safety Board work to make it even safer. Let me assure you, we are up to the task.

At the TSB, we will continue to conduct independent, expert investigations. No matter whether the accident happens on our waterways, along our pipelines or railways or in our skies, we will respond. We will inform Canadians about what happened, why it happened and we will make clear what needs to be done to make the system safer.

And when the Board feels important safety issues have not been addressed, we will speak up as we did last March with our Watchlist. On it are nine critical safety issues that must be tackled to make Canada's transportation system safer.

As this organization celebrates its first 20 years of accomplishments, we look forward to the challenges that await us in the next 20 years in transportation safety and we value the opportunity to serve Canadians.



**Wendy A. Tadros**  
Chair

# 20-Year Anniversary

## History and Accomplishments

### The TSB: A Brief History of Accident Investigation in Canada

The first major official Canadian transportation accident investigation was of the 1914 sinking of the *Empress of Ireland*, in which 1012 people perished. Since then, transportation accidents were investigated by the regulators. Some major accidents, such as the 1986 passenger train derailment near Hinton, Alberta, were investigated by judicial inquiries.

The first recommendation for an independent, multi-modal transportation accident investigation agency was made in 1972 as part of a report on the state of Canadian accident investigation and safety promotion. Since then, numerous other government studies and accident inquiries made similar recommendations. As early as 1979, legislation was introduced to create such an agency, but it died on the order paper. While the multi-modal approach to accident investigation was debated up until the formation of the TSB, there was consensus over time that the organization should be independent, to avoid real or perceived conflicts of interest.

In 1984, the Canadian Aviation Safety Board (CASB) was established, following a recommendation of the 1979 Commission of Inquiry on Aviation Safety. Responsible for investigating aviation accidents, it made recommendations to advance aviation safety and made its findings public through accident investigation reports. While the CASB reported to Parliament through the Minister of Transport, it functioned independently of the department, and the Minister was required to officially respond to the Board's recommendations.

With the 1989 passing of the *Canadian Transportation Accident Investigation and Safety Board Act*, the TSB was formed on March 29, 1990 to bring the aviation, marine, railway and pipeline investigative resources under the same roof. It reports to Parliament through the President of the Queen's Privy Council for Canada.

Today, the TSB exists as an independent investigation authority with the sole goal of advancing transportation safety. Thanks to the professionalism and dedication of its staff, the TSB has made significant contributions to accident investigation techniques and methodologies over the past twenty years.



Since its inception, the TSB has conducted thousands of investigations across the modes it investigates. Some major investigations include:

- The 22 March 2006 striking and subsequent sinking of the passenger ferry *Queen of the North* in British Columbia.
- The ruptures of three natural gas pipelines due to stress corrosion cracking in Ontario between January 1991 and July 1992.
- The derailment and fire of a freight train in Mont-Saint-Hilaire, Quebec, on 30 December 1999.
- The 02 September 1998 in-flight fire and collision into water of Swissair Flight 111 near Peggy's Cove, Nova Scotia.

Through its close contacts with regulators, manufacturers and other investigative authorities, findings from TSB investigations have led to numerous improvements to operational practices, equipment design and regulations throughout all sectors of the marine, pipeline, rail and aviation industries. These efforts have firmly established the TSB as a leader in transportation safety around the world.

## **Twenty Years of Advancing Safety**

After 20 years and thousands of investigations, the TSB has been instrumental in improving transportation safety by changing operating practices, equipment and the laws that underpin the transportation industry.

In the marine mode, the TSB played a leadership role in developing an investigation code now used by marine investigators worldwide. Survival suits are now required for all crew members on vessels trading internationally. In Canada, small passenger vessels now need a float-free liferaft and all passengers must now receive a safety briefing prior to each voyage.

Pipelines have become safer, too. A TSB investigation helped jumpstart the creation of an integrity management program to deal proactively with system deficiencies. Other investigations have prompted advances in pipeline spacing, as well as improvements in the emergency shutoff system, and substantive changes in the federal electrical code. Many of these measures have since been adopted by companies and regulators worldwide.

Our work has brought similar safety benefits to our railways and those who live and work alongside them. Following a derailment caused by defective wheels, a TSB investigation led to prompt action to remove them from service. Other investigations have resulted in improved emergency information for passengers, tougher standards for maintenance rails, computerized records to assist with track repairs, and safer storage of dangerous goods near our cities.

In aviation, cooperation between TSB investigators and international regulators and manufacturers led to improved inspection techniques for aircraft parts made from composite materials. The TSB has also been influential in reducing the risk of fires aboard aircraft. We have worked to ensure pilots no longer land where visibility is poor, and that they do land at the first sign of smoke from an unknown source.

TSB investigators have also come up with innovative ways to improve how accidents are investigated. For example, as more electronic equipment makes its way onto locomotives, bridges and flight decks, we have been successful in recovering data from their memory units. This valuable information is useful in gaining a better understanding of what happened leading up to an accident. It often supplements on-board data recorder information or fills in the blanks when it is unavailable. Our investigators also developed leading-edge flight data recorder playback and analysis software. This software has since been commercialized and is being used by investigative bodies, manufacturers and operators around the world.

We are pleased with how our thousands of investigations have helped to make transportation safer. Looking ahead, the TSB will continue to investigate accidents, striving to find out what happened, and why. We do this, and all our work, because a safe transportation system is critical to Canada's economic and social well-being, whether it be on our waterways, along our pipelines and railways, or in our skies.

## Section 1: Overview

### 1.1 Members of the Board



**Chair Wendy A. Tadros**

Transportation and legal experience includes Director of Legal Services for the National Transportation Agency of Canada; Inquiry Coordinator for “The Road to Accessibility: An Inquiry into Canadian Motor Coach Services”; and counsel to the Canadian Transport Commission before the Commission of Inquiry into the Hinton Train Collision.



**Member Kathy Fox**

Transportation safety and air traffic services experience includes air traffic controller, commercial pilot, flight instructor, various management positions at Transport Canada, and Vice President of Operations at NAV CANADA. In 1999, received the Transport Canada Aviation Safety Award. In November 2004, was inducted into the Quebec Air and Space Hall of Fame.



**Member Martin Lacombe**

Transportation and railway experience includes operations management and accident investigations with industry and the Canadian Transport Commission; Vice President of the Railway Association of Canada and Vice President of the Australasian Railroad Association. Was President of Genesee Rail-One, overseeing management and operation of short-line railways. Served in 2007 as a member of the Railway Safety Act Review Panel.



**Member Ian S. MacKay**

Transportation and legal experience includes working as a lawyer for Transport Canada and the National Transportation Agency (subsequently the Canadian Transportation Agency) with duties ranging from training inspector to conducting public hearings. Served as Vice President and member of the executive team of the Canadian Air Transport Security Authority.



**Member Jonathan Seymour**

Transportation policy and marine management experience includes Executive Director of International Maritime Centre–Vancouver; chartering, commercial and general manager for several shipping companies; marine policy advisor to the British Columbia government; and policy and economic consultant.

## 1.2 Senior Management

---

Chief Operating Officer*	J. L. Laporte
Executive Director*	G. McDonald / J.L. Laporte (Acting)
General Counsel	A. Harding
Director General, Corporate Services	J.L. Laporte / Chantal Lemyre
Director, Marine Investigations	Y. Myers / M. Ayeko (Acting)
Director, Rail/Pipeline Investigations	I. Naish / K. Jang
Director, Air Investigations	M. Clitsome
Director, Operational Services	T. Crosby
Director, Communications	A. Masson

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\* The Chief Operating Officer position was created in June 2009 to replace that of Executive Director.

## 1.3 Mission of the TSB

We conduct independent safety investigations and communicate risks in the transportation system.

## 1.4 Independence

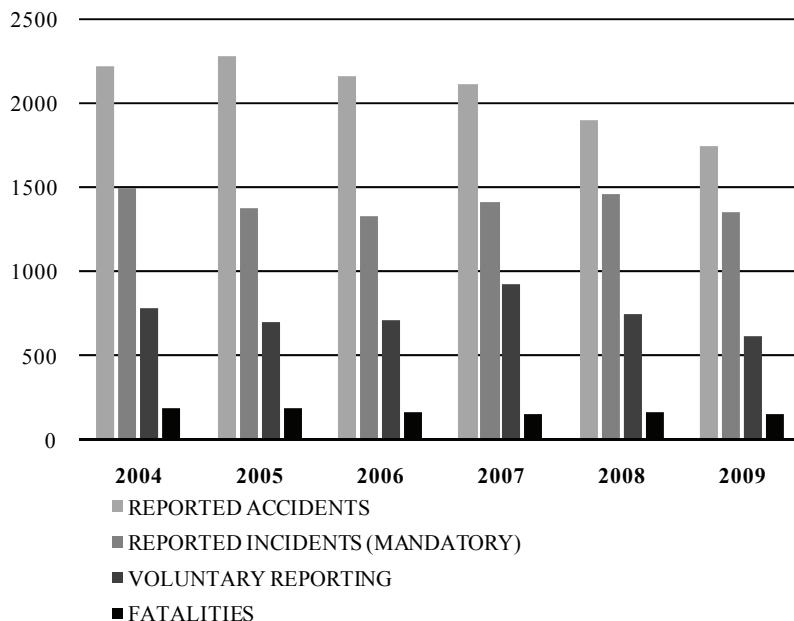
To encourage public confidence in transportation accident investigation, the investigating agency must be, and be seen to be, objective, independent and free from any conflicts of interest. The key feature of the TSB is its independence. It reports to Parliament through the President of the Queen's Privy Council for Canada and is separate from other government agencies and departments. Its independence enables it to be objective in arriving at its conclusions and recommendations. The TSB's continuing independence and credibility rest on its competence, openness, integrity and the fairness of its processes.

## Section 2: Activities

### 2.1 Occurrences, Investigations and Safety Action

In 2009, a total of 1740 accidents and 1357 incidents were reported in accordance with the TSB's regulations for mandatory reporting of occurrences.<sup>1</sup> The number of accidents in 2009 decreased by 8 per cent from the 1901 accidents reported in 2008 and by 18 per cent from the 2004–2008 annual average of 2133 accidents. The number of reported incidents decreased to 1357 in 2009 from 1464 in 2008, and decreased from the 2004–2008 average of 1412. There were also 616 voluntary incident reports. Fatalities totalled 157 in 2009, down 6 from the 2008 total, and down 15 from the 2004–2008 average.

**Figure 1: Occurrences Reported to the TSB**

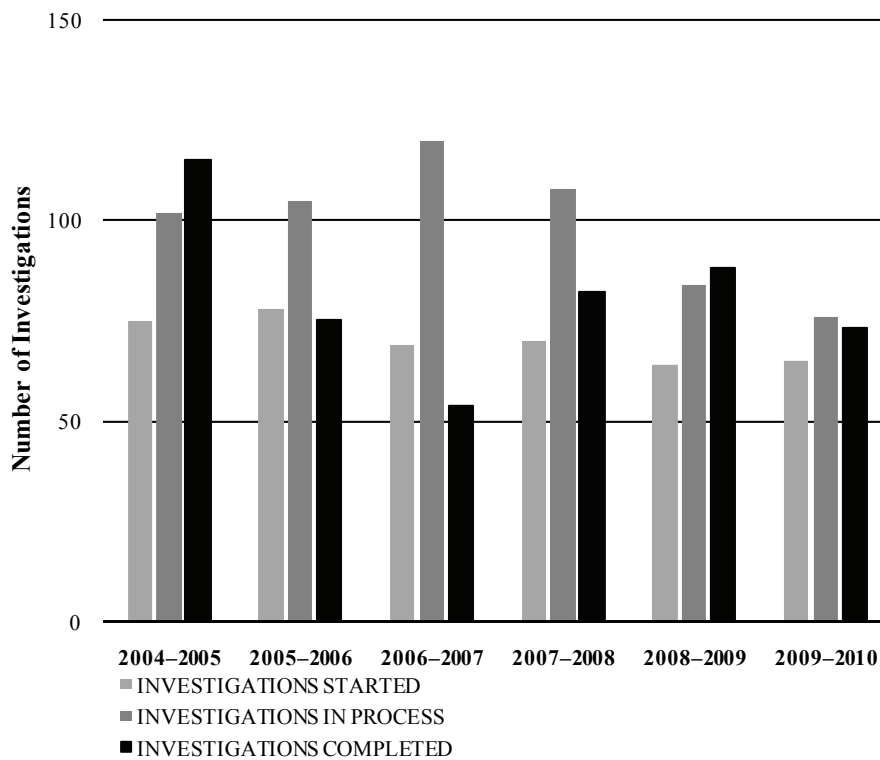


All reported occurrences were assessed in accordance with the Board's Occurrence Classification Policy to identify those with the greatest potential for advancing transportation safety. Information was entered into the TSB database for historical record, trend analysis and safety deficiency validation purposes.

<sup>1</sup> While the Board's operations are for the 2009–2010 fiscal year, occurrence statistics are for the 2009 calendar year unless otherwise indicated. Please note that, in a live database, the occurrence data are constantly being updated. Consequently, the statistics can change slightly over time. Comparisons are generally to the last 5 or 10 years. For definitions of terms such as *accident*, *incident* and *occurrence*, see Appendix B.

In fiscal year 2009–2010, investigations were undertaken for 65 of the occurrences reported to the TSB. In that same period, 73 investigations were completed, compared to 88 in the previous year.<sup>2</sup> The number of investigations in process decreased to 76 at the end of the fiscal year from 84 at the start. Average time to complete an investigation decreased to 454 days in fiscal year 2009–2010 from 534 days in the previous year.

**Figure 2: Investigations Started, in Process and Completed**



Overall, the TSB has been successful in identifying safety deficiencies and in reducing risks in the transportation system. TSB investigations result in reports identifying safety deficiencies and, where appropriate, containing recommendations to reduce risks. Over this past year, in all cases where the TSB undertook an investigation, safety deficiencies or contributing factors were identified and communicated. These results reflect careful application of the TSB’s Occurrence Classification Policy in deciding whether to investigate, and a thorough implementation of the investigation methodology. This systematic approach ensures that TSB investigation resources are invested in areas with the greatest potential safety payoffs.

<sup>2</sup> Investigations are considered complete after the final report has been issued. See Appendix A for a list of reports released by the TSB in 2009–2010 by sector.

In 2009–2010, in addition to investigation reports, the TSB issued a total of 55 safety outputs: 11 recommendations, 24 safety advisories and 20 safety information letters (see Table 1 for a breakdown by sector).

**Table 1: Safety Outputs by the TSB**

Sector	Recommendations <sup>3</sup>	Safety Advisories	Safety Information Letters
Marine	1	7	9
Pipeline	0	0	0
Rail	4	8	9
Air	6	9	2
TOTAL	11	24	20

Note: In 2009–2010, a total of 1 marine safety concern, 4 rail safety concerns and 5 air safety concerns were identified.

Safety information is also provided informally to key stakeholders throughout the investigation process, permitting them to take immediate safety actions where appropriate. It is common practice for industry and government to take safety actions during the course of TSB investigations. Such safety actions range widely in scope and importance. Operators will often take immediate remedial action after discussion with TSB investigators (for example, to clear the sight-lines at a railway crossing by trimming bushes and vegetation). Regulators such as Transport Canada (TC) and the Federal Aviation Administration in the United States regularly issue mandatory directives requiring inspections and/or component replacement based on the TSB’s preliminary findings. In such situations, rather than issuing recommendations, the TSB can then report on the corrective actions already taken by industry and government agencies.

In accordance with the *Canadian Transportation Accident Investigation and Safety Board Act*, a federal minister who is notified of a TSB recommendation must, within 90 days, advise the Board in writing of any action taken or proposed to be taken in response, or the reasons for not taking action. The Board considers each response, assessing the extent to which the related safety deficiency was addressed. When a recommendation generates responses from within and outside Canada, the Board’s assessment is based primarily on the Canadian response. This year, the TSB continued to publish on its website ([www.bst-tsb.gc.ca](http://www.bst-tsb.gc.ca)) its assessment of industry and government organization responses to its recommendations made after 01 January 2005.

As presented in Table 2, during the period between 29 March 1990 and 31 March 2010, a total of 529 recommendations were assessed by the Board in the fully satisfactory, satisfactory intent, satisfactory in part and unsatisfactory categories. In addition, 8 recommendations are awaiting Board assessment, bringing the total number to 537.

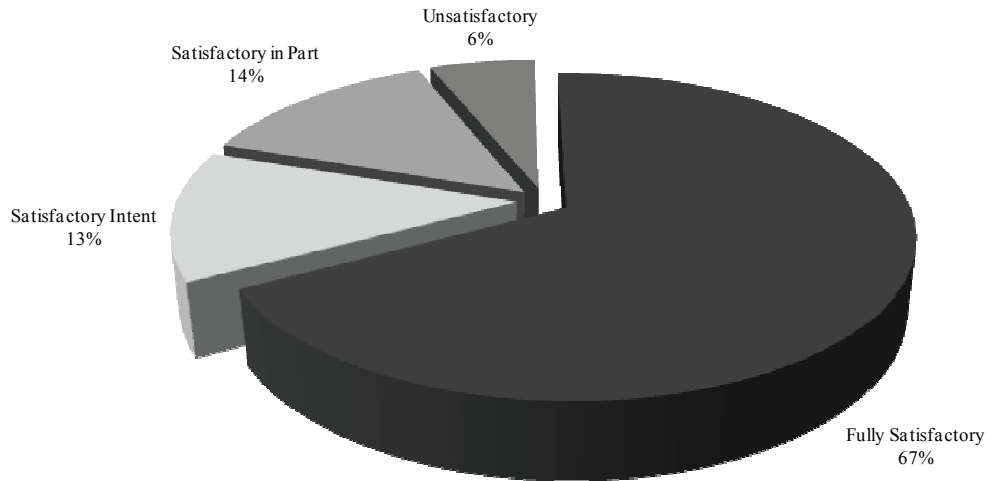
<sup>3</sup> For definitions of terms such as *recommendation*, *safety concern*, *safety advisory* and *safety information letter*, see Appendix B.

**Table 2: Board Assessments of Responses to Recommendations, 1990–2010**

Sector	Number of Recommendations	Fully Satisfactory	Satisfactory Intent	Satisfactory in Part	Unsatisfactory
Marine	146	106	28	11	1
Pipeline	20	14	0	2	4
Rail	128	96	15	8	9
Air	235	141	26	51	17
<b>Recommendations with a Board Assessment</b>	<b>529</b>	<b>357</b>	<b>69</b>	<b>72</b>	<b>31</b>

In the 20-year period from 1990 to 2010, a majority of Board recommendations have effected positive change. As shown in Figure 3, in 80 per cent of cases (67 per cent fully satisfactory and 13 per cent satisfactory intent), change agents have taken action or plan to take action that will substantially reduce the deficiency noted in the recommendation. In 14 per cent of cases (satisfactory in part), change agents have taken or plan to take action that will only partially address the deficiency noted in the recommendation. In 6 per cent of cases (unsatisfactory), change agents have neither taken nor plan to take action that will address the deficiency noted in the recommendation.

**Figure 3: Ratings of Assessments of Responses, 1990–2010**





## **2.2 Communicating Transportation Safety to Canadians and the Transportation Community**

Following a major accident, Canadians expect to learn about what happened, why it happened and what needs to be done to prevent a similar accident in the future. The transportation industry also depends on the TSB to report findings and recommendations to make the changes necessary to increase safety.

To meet these needs, the TSB communicates its findings to Canadians through final investigation reports, website updates and media events organized throughout the country. We also share information with regulators and the industry about important safety deficiencies we find during investigations so that they can take prompt action to correct them.

In 2009–2010, we held 8 media events and responded to several hundred media inquiries through the Head Office central media line, not including those inquiries handled regionally or immediately at an accident site.

Board Members also gave speeches and presentations at a number of transportation industry events to connect with decision makers, raise awareness of transportation system risks and encourage further action on TSB recommendations. This fiscal year, they spoke to 6 audiences in the aviation, marine and railway industries.

TSB investigators play an important role in promoting the TSB's work and sharing information learned from investigations by attending events and conferences in Canada and abroad. They also hosted visits from other international investigative bodies to exchange information and best practices in investigations.

In 2009–2010, the TSB completed 73 investigation reports. During this period, 207 new subscribers joined the TSB electronic notification system for a total of 2766 subscribers. The TSB Macro-Analysis Division published annual and monthly statistical reports and responded to 368 requests for complex transportation occurrence database information.

To further increase uptake on TSB recommendations, we released our Safety Watchlist. This list raises awareness of the nine most important safety issues that pose the greatest risks to Canadian transportation and where further action is needed to eliminate them. The Watchlist will be updated periodically as the regulator and industry make progress in addressing these issues.

The TSB website continues to be an important resource for providing information on accident investigations and transportation safety in general. Since the website redesign last year, we continue to make improvements to site navigability and content. We received an average of over 62 000 daily hits and almost 5000 daily visits.

In summary, 2009–2010 was another active year in reaching out to Canadians and to stakeholders in the transportation community.

## **2.3 Marine Sector**

### **2.3.1 Annual Statistics**

In all, 390 marine accidents were reported to the TSB in 2009, a 7 per cent decrease from the 2008 total of 420 and 16 per cent decrease from the 2004–2008 average of 466. Marine fatalities totalled 16 in 2009, down from the 2008 total of 25 and the 2004–2008 average of 21.

Shipping accidents, which comprised 87 per cent of marine accidents, reached a 35-year low of 338 in 2009, down from 361 in 2008 and from the five-year average of 413. Nearly 40 per cent of all vessels involved in shipping accidents were fishing vessels. Accidents to persons aboard ship, which include falls, electrocution, and other types of injuries requiring hospitalization, totalled 52 in 2009, a 12 per cent decrease from the 2008 total of 59 but comparable to the five-year average of 53.

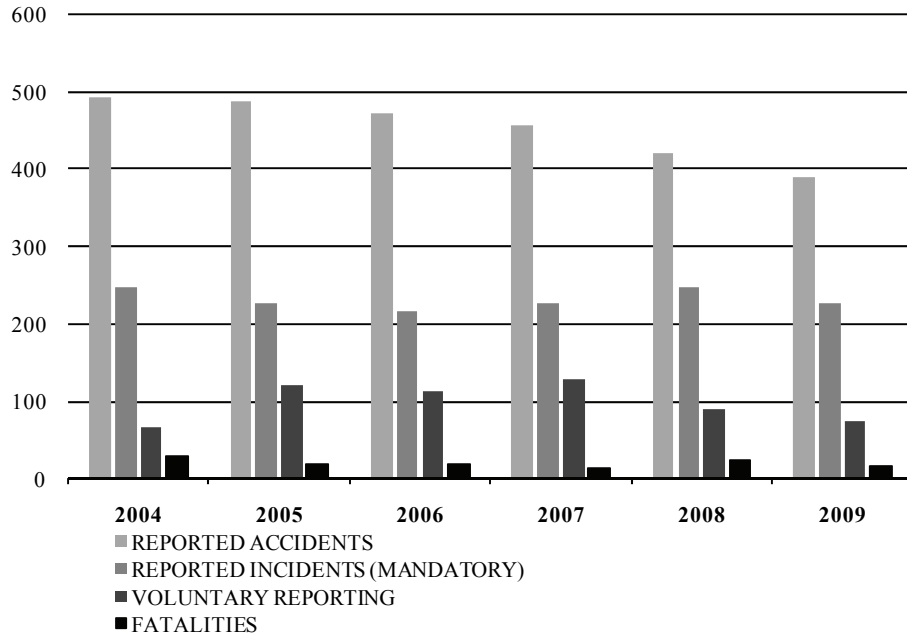
Marine activity for Canadian commercial non-fishing vessels over 15 gross tons (excluding passenger vessels and cruise ships) decreased by 8 per cent from the 2004–2008 average. This yields an accident rate of 3.3 accidents per 1000 movements, down from the five-year average of 3.6. Marine activity for foreign commercial non-fishing vessels decreased by 3.0 per cent from the 2004–2008 average while the accident rate decreased to 1.6 accidents per 1000 movements, down from the five-year average of 1.7.

In 2009, shipping accidents resulted in 9 fatalities, down from 14 in 2008 and the five-year average of 13. Accidents aboard ship resulted in 7 fatalities, down from the 11 in 2008 and the five-year average of 8.

Twenty-six vessels were reported lost in 2009, down from the 2008 total of 35 and the five-year average of 30.

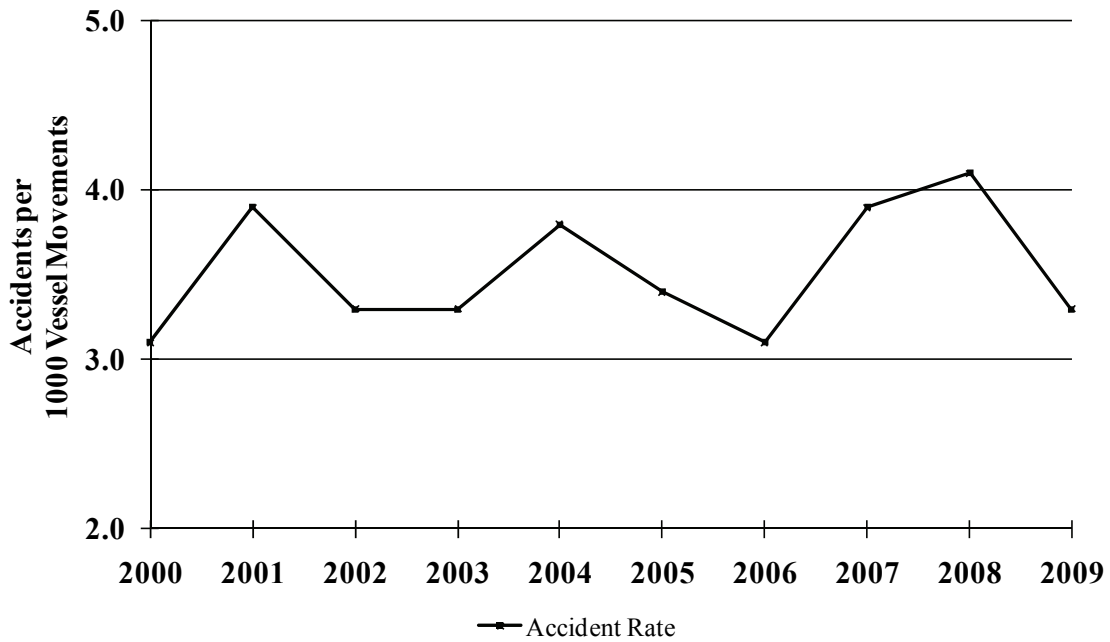
In 2009, 228 marine incidents were reported to the TSB in accordance with the mandatory reporting requirements. This represents an 8 per cent decrease from the 2008 total of 248 but is comparable to the five-year average of 233.

**Figure 4: Marine Occurrences and Fatalities**



The 2009 Canadian-flag shipping accident rate decreased to 3.3 accidents per 1000 movements from the 2008 rate of 4.1.

**Figure 5: Canadian-Flag Shipping Accident Rates**



### 2.3.2 Investigations

In 2009–2010, 11 marine investigations were started and 9 investigations were completed. This represents a decrease in the number of investigations completed compared to the previous year (18). The average duration of completed investigations decreased to 529 days compared to 796 days the year before.

**Table 3: Marine Productivity**

	2005–2006	2006–2007	2007–2008	2008–2009	2009–2010
Investigations Started	17	8	7	6	11
Investigations Completed	12	8	19	18	9
Average Duration of Completed Investigations (Number of Days)	651	801	936	796	529
Recommendations	6	0	3	2	1
Safety Advisories	5	8	12	7	7
Safety Information Letters	8	8	4	12	9
Note: Results can fluctuate significantly from year to year due to a number of factors such as staff turnover, the complexity of investigations and the investigation of major occurrences.					

### 2.3.3 Safety Actions Taken

One marine safety recommendation was issued in 2009–2010.

The Marine Branch reassessed responses to 33 recommendations issued since 1992. The Board's reassessments were communicated to the appropriate change agent(s) for information and action.

### 2.3.3.1 Marine Recommendation Issued in 2009–2010

<p><b>Grounding, Chemical/Products Tanker <i>Sichem Aneline</i></b>  <b>Port of Montréal, Quebec, 11 April 2007</b></p> <p><b>Report No. M07L0040</b></p>	
<b>RECOMMENDATION</b>	<p><b>M09-01</b></p> <p>The Department of Transport advocate at the International Maritime Organization (IMO) effective measures to ensure that maintenance and failure records remain on board throughout a vessel's life.</p>
<b>RESPONSE</b>	<p>In its 23 July 2009 letter, the Minister of Transport, Infrastructure and Communities agreed in principle with the recommendation.</p> <p>The response noted that, currently, the International Safety Management Code does not require the transfer of maintenance records upon the sale or handover of a vessel. The Department will research any previously submitted documents on this issue by other flag states. Furthermore, once completed, the Department will work together with the TSB to formulate an information paper for submission to the IMO, which will be submitted to the Flag State Implementation Committee meeting, scheduled for the summer of 2010.</p>
<b>BOARD ASSESSMENT OF RESPONSE</b>	<p>If implemented, the proposed action by Transport Canada (TC) to submit an information paper—advocating effective measures to ensure that maintenance and failure records remain on board throughout a vessel's life—to the IMO would satisfy the intent of the recommendation.</p>
<b>BOARD ASSESSMENT RATING</b>	<p>Satisfactory Intent</p>

### 2.3.3.2 Assessment of Responses to Marine Recommendations Issued in 2008–2009

<b>Capsizing While Under Tow, Small Fishing Vessel <i>L'Acadien II</i>,                      18 nm SE of Cape North, Cape Breton Island, Nova Scotia, 29 March 2008</b>	
<b>Report No. M08M0010</b>	
<b>RECOMMENDATION</b>	<b>M08-04</b>  The Department of Transport include in the proposed Fishing Vessel Safety Regulations adequate measures to ensure that all fishing vessels operating in ice—including those participating in the seal hunt—are structurally suited for their operating environment.
<b>RESPONSE</b>	In its 24 February 2009 letter, the Minister of Transport, Infrastructure, and Communities agreed with the general intent of the recommendation.  The response noted that the responsibility for safe construction and operation of a vessel is incumbent upon the designer and/or builder and ultimately on the owner and/or master of the vessel. Operating in ice-covered waters requires prudence, and going astern in heavy ice is a specialized operation.  The response indicated that TC is developing new Fishing Vessel Safety Regulations that will include revised provisions for fishing vessels that may navigate in ice-covered waters. The provisions related to vessel structure will apply to new and modified vessels. They will also apply, based on risk, and where reasonable and practicable, to existing vessels. These provisions, which are expected to be published in the <i>Canada Gazette, Part I</i> , by spring 2010, will apply to vessels that are over 9 m in length.

**Capsizing While Under Tow, Small Fishing Vessel *L'Acadien II*,  
18 nm SE of Cape North, Cape Breton Island, Nova Scotia, 29 March 2008**

**Report No. M08M0010**

	<p>In a follow-up meeting, TC advised that the new Fishing Vessel Safety Regulations will now include provisions that apply to vessels less than 9 m that may navigate in ice-covered waters. A public consultation information paper on the draft Fishing Vessel Safety Regulations, which apply to fishing vessels less than 24 m, and a consultation document on the <i>Construction Standards for Small Vessels</i>, TP 1332, were made available at the national meeting of the Canadian Marine Advisory Council held in April 2009. The information paper stated that a fishing vessel shall not embark on any voyage into ice-covered waters unless the hull of the vessel has been designed or adequately strengthened to resist damage from anticipated conditions. Existing vessels shall meet the design and construction requirements set out in TP 1332, as is reasonable and practical to do so. The consultation document on TP 1332 stated that the hull of vessels shall be strengthened if the vessel is intended for operation in waters where the presence of ice requires the vessel to make extraordinary manoeuvres in order to avoid hull damage.</p>
<p><b>BOARD ASSESSMENT OF RESPONSE</b></p>	<p>The new proposed Fishing Vessel Safety Regulations will include provisions relating to the structure of fishing vessels less than 24 m in length that navigate in ice-covered waters. However, existing fishing vessels, many of which are less than 15 gross tonnage and would have not been previously inspected, are only required to comply where it is reasonable and practical to do so. TC has indicated that the “reasonable and practical” provisions may be applied following a risk-based assessment on a case-by-case basis. However, if the owner of the vessel can demonstrate that the costs of the modifications are such that it is unreasonable and impracticable to modify the vessel, the Minister may take measures such as placing operating restrictions on the vessel. While new vessels will benefit from the provisions of the proposed regulations, the risk associated with existing vessels may be substantially reduced if hazards are properly identified, risks are adequately assessed and corrective actions, such as modification and hull strengthening, are made to these vessels.</p>

<b>Capsizing While Under Tow, Small Fishing Vessel <i>L'Acadien II</i>, 18 nm SE of Cape North, Cape Breton Island, Nova Scotia, 29 March 2008</b>	
<b>Report No. M08M0010</b>	
<b>BOARD ASSESSMENT RATING</b>	Satisfactory Intent

<b>RECOMMENDATION</b>	<p><b>M08-05</b></p> <p>The Department of Fisheries and Oceans develop comprehensive safe towing policies, procedures, and practices that take into account all safety risks associated with towing small vessels in ice-infested waters.</p>
<b>RESPONSE</b>	<p>In her letter of 23 February 2009, the Minister of Fisheries and Oceans indicated that a team had been established to develop an action plan to respond to the recommendation. This action plan is also intended to respond to the Search and Rescue Operation Report and the independent Girouard Report. Canadian Coast Guard (CCG) plans to release its action plan concomitantly with the assessment of the response to the recommendation.</p> <p>The Minister accepted and concurred with the recommendation and will pursue implementation of the response through the following means:</p> <ul style="list-style-type: none"> <li>• develop an “Assistance to Disabled Vessels Policy” applicable to the whole of CCG;</li> <li>• develop clearer seamanship procedures and guidelines for towing by CCG ships;</li> <li>• conduct a review of training, technology and equipment for towing applicable to CCG operations; and</li> <li>• initiate research to better understand towing dynamics and associated risks.</li> </ul> <p>CCG intends to have the guidelines developed in time for the next ice season (that is, early 2010). The CCG Commissioner will inform the Board of any follow-up action.</p> <p>As an interim measure, CCG Fleet Circular (FC) 07-2008, <i>Suspension of the Towing of Small Vessels with Persons On board While in Ice</i>, which was implemented in April 2008, will remain in place.</p>



<b>Capsizing While Under Tow, Small Fishing Vessel <i>L'Acadien II</i>, 18 nm SE of Cape North, Cape Breton Island, Nova Scotia, 29 March 2008</b>	
<b>Report No. M08M0010</b>	
	<p>The CCG has also drafted four icebreaking program directives that deal with provision of icebreaking services, commercial and fishing harbour breakouts and support to sealing vessels. These draft directives have been developed with the intent to provide guidance in the interpretation and application of the level of service for both CCG personnel and clients receiving program services. The directives are currently the subject of a consultation with stakeholders, including fishermen engaged in fisheries taking place in seasons where ice might be present either in harbours or on fishing grounds.</p>
<b>BOARD ASSESSMENT OF RESPONSE</b>	<p>The Board believes that permanent and comprehensive safety measures are required to address the risks associated with towing small vessels in ice.</p> <p>The proposed action plan will address the policies, procedures, and practices related to towing in ice and take into account the associated risks. Moreover, the knowledge gained from the proposed research could significantly reduce the residual risks associated with towing in ice.</p> <p>It is worth noting that, until such time as this plan is implemented, FC 07-2008 will remain in effect.</p>
<b>BOARD ASSESSMENT RATING</b>	<p>Satisfactory Intent</p>

### 2.3.3.3 Other Marine Safety Actions

TC proposed new Small Vessel Regulations and published them in the *Canada Gazette, Part I*, on 25 April 2009. The proposed regulations require that the stability of a small commercial vessel built on or after 01 April 2005 be adequate to safely carry out its intended operations and that the owner demonstrate this adequate stability upon request. TC is now reviewing comments from stakeholders and interested parties. Final approval and publication of the regulations in the *Canada Gazette, Part II*, is expected in early 2010. (TSB Investigation Report M08M0062)

TC informed the TSB that, at the December 2008 National Tonnage Committee meeting, TC agreed to expand the existing list of vessel types and to examine how it can identify vessels that have dual operation on the Canadian Register of Vessels and Certificate of Registry. This was done in an effort to capture those small commercial vessels that may also occasionally carry passengers but are not certified to do so. (TSB Investigation Report M08W0236)

A Canadian ship management company issued the following guidelines to its vessels:

- Decorative lighting (Christmas lights) displayed on the vessel must not interfere with the visibility of the ship's navigation lights or aspect determination.
- Decorative lighting (Christmas lights) are not to be displayed or in the ON mode during the vessel's navigation or underway condition. Lights may be displayed while berthed in port only.
- The company will discontinue any "sponsorship" of contests that promote use of decorative lights that may affect safe navigation.

The company also forwarded TSB's Marine Safety Information letter 02/09 to the Canadian Shipowners Association and the United States Lake Carriers' Association for review and follow-up. (TSB Investigation Report M08C0081)

Following an occurrence involving a fire on a sail-training vessel, TC required that the operator make extensive modifications to the vessel to bring it in compliance with TC's *Standard Relating to Design, Construction and Operational Safety of Sail Training Vessels*, TP 13313. In addition, TC required the operator to implement a ship- and shore-based safety management system. (TSB Investigation Report M07C0034)

## **2.4 Pipeline Sector**

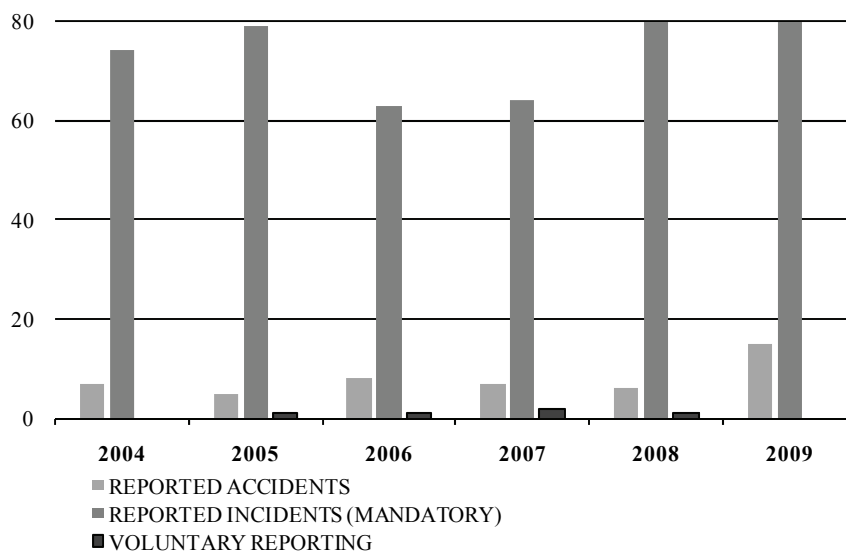
### **2.4.1 Annual Statistics**

In 2009, there was a 38 per cent increase in federally regulated pipeline and associated facilities due to an additional 23 705 kilometres of pipeline transferred from provincial jurisdiction.

Fifteen pipeline accidents were reported to the TSB in 2009, up from the 2008 total of 6 and from the 2004–2008 average of 7. Estimated pipeline activity has remained constant from the previous year. The last fatal pipeline accident in the portion of the industry under federal jurisdiction occurred in 1988, and the last accident involving serious injury occurred in 2006.

In 2009, 118 pipeline incidents were reported to the TSB in accordance with the mandatory reporting requirements, up from 84 in 2008 and the five-year average of 73. In all, 81 per cent of those incidents involved uncontained or uncontrolled release of small quantities of gas, oil and high-vapour-pressure products.

**Figure 6: Pipeline Occurrences**

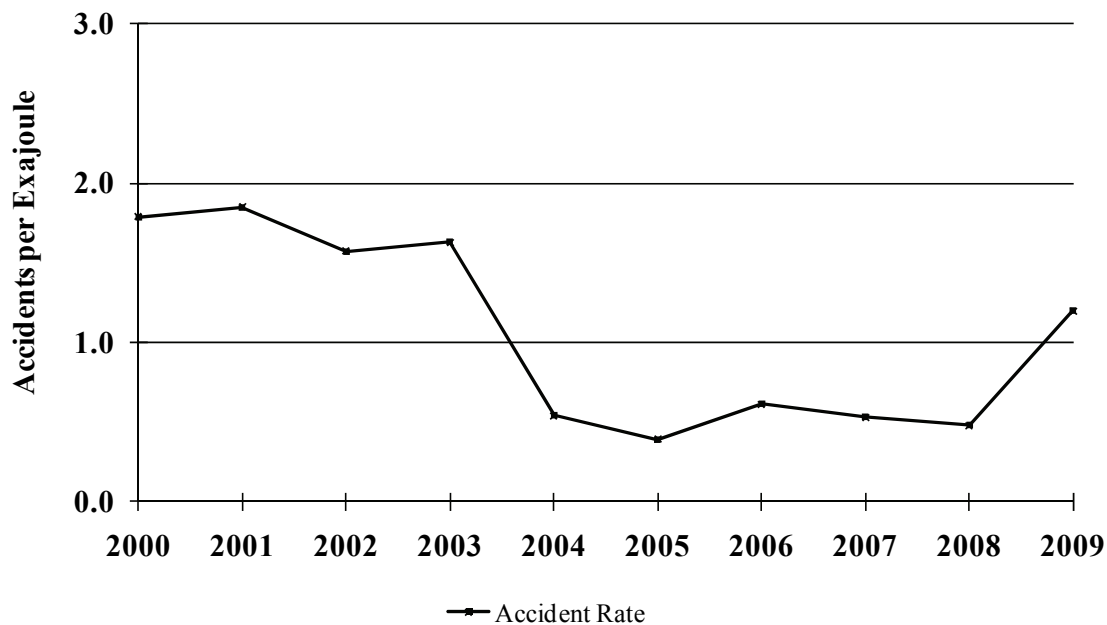


\* No pipeline fatality has been reported since 1988.

One indicator of pipeline transportation safety in Canada is the pipeline accident rate.<sup>4</sup> The 2009 rate was 1.2 pipeline accidents per exajoule, up from 2008 and from the 2004–2008 average of 0.5.

<sup>4</sup> Pipeline accident rates after 2003 reflect the impact of clarifications to the pipeline industry of the TSB’s accident and incident reporting requirements, and of internal adjustments to the data in TSB’s Pipeline Occurrence Database.

**Figure 7: Pipeline Accident Rates**



### 2.4.2 Investigations

In 2009–2010, 3 pipeline investigations were started and 1 investigation was completed. The average duration of completed investigations has decreased to 374 days, compared to 542 days in 2008–2009.

**Table 4: Pipeline Productivity**

	2005–2006	2006–2007	2007–2008	2008–2009	2009–2010
Investigations Started	2	1	2	1	3
Investigations Completed	1	1	2	2	1
Average Duration of Completed Investigations (Number of Days)	922	407	489	542	374
Recommendations	0	0	0	0	0
Safety Advisories	0	0	0	0	0
Safety Information Letters	0	1	0	1	0

Note: Results can fluctuate significantly from year to year due to a number of factors such as staff turnover, the complexity of investigations and the investigation of major occurrences.

### **2.4.3 Safety Actions Taken**

Westcoast Energy Inc. conducted ultrasonic thickness testing on every sending and receiving barrel in its sour gas gathering systems. An integrity inspection, which included an external and internal visual inspection and ultrasonic inspection and radiographs, was conducted on most barrels in its Grizzly Valley sour gas system. (TSB Investigation Report P09H0006)

Westcoast Energy Inc. added vapour phase corrosion inhibitor to all barrels in wet sour gas service after launching and receiving operations and prohibited the pre-loading of sending barrels with methanol. (TSB Investigation Report P09H0006)

TransNorthern Pipeline Inc.'s Integrity Management Program and related documentation was reviewed and is being amended to include the evaluation of dents in the pipeline system when discovered during field inspection or excavation activities. These enhancements include: identifying a dent as being unconstrained, evaluating its fitness for service, and determining the appropriate repair. (TSB Occurrence P09H0086)

## **2.5 Rail Sector**

### **2.5.1 Annual Statistics**

A total of 1038 rail accidents were reported to the TSB in 2009, a 12 per cent decrease from the 2008 total of 1181 and a 23 per cent decrease from the 2004–2008 average of 1353. Estimated rail activity decreased by 14 per cent from 2008 and by 16 per cent from the five-year average. The accident rate increased to 13.2 accidents per million train-miles in 2009 from 13.0 in 2008 but decreased from the five-year rate of 14.5.

Rail-related fatalities totalled 71 in 2009, down from the 2008 total of 74 and the five-year average of 91.

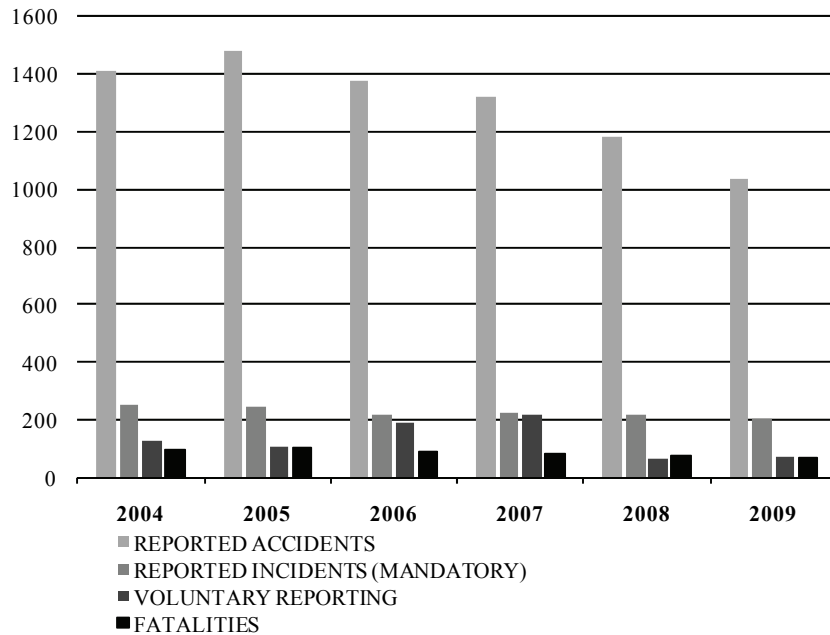
Five main-track collisions occurred in 2009, compared to six in 2008 and the five-year average of five. In 2009, there were 68 main-track derailments, a decrease of 47 per cent from the 2008 total of 129 and 57 per cent from the five-year average of 157. Non-main-track derailments decreased to 495 in 2009 from 571 in 2008 and the five-year average of 675.

In 2009, crossing accidents decreased to 186 from the 2008 total of 222 and the five-year average of 239. Crossing-related fatalities numbered 19, down from 26 in 2008 and the five-year average of 28. Trespasser accidents decreased by 3 per cent to 71 in 2009 from 73 in 2008, and by 21 per cent from the five-year average of 90. With a total of 52 fatalities in 2009, trespasser accidents continued to account for the majority of rail fatalities.

In 2009, 133 rail accidents involved dangerous goods (this also includes crossing accidents in which the motor vehicle was carrying a dangerous good), down from 153 in 2008 and the five-year average of 189. Three of these accidents resulted in a release of product.

In 2009, rail incidents reported to the TSB in accordance with the mandatory reporting requirements totalled 207, down from 216 in 2008 and the five-year average of 232. Movements exceeding limits of authority incidents (106) comprised the largest proportion of the 207 reportable incidents. The second-largest proportion was dangerous goods leaker incidents (78).

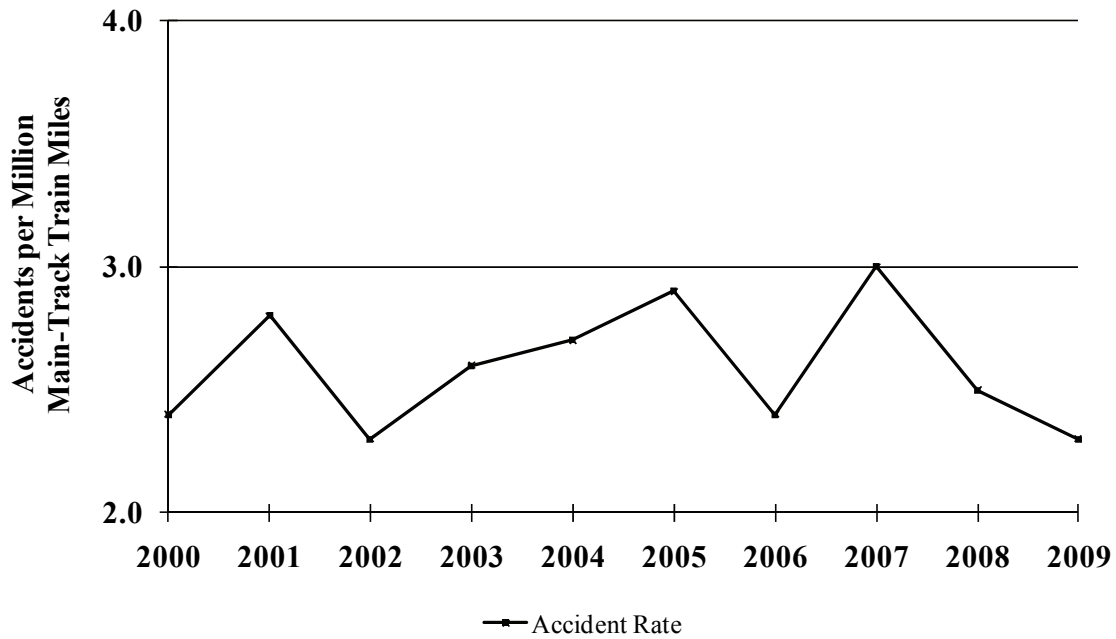
**Figure 8: Rail Occurrences and Fatalities**



Another indicator of rail transportation safety in Canada is the main-track accident rate. This rate decreased to 2.3 accidents per million main-track train-miles in 2009 from 2.5 in 2008, and the five-year average of 2.7.<sup>5</sup>

<sup>5</sup> Because accident statistics (derailments since 2001) have been adjusted in light of clarifications to industry of TSB's reporting requirements, historical rail accident rates after 2001 have been updated accordingly.

**Figure 9: Main-Track Accident Rates**



### 2.5.2 Investigations

A total of 18 rail investigations were started in 2009–2010 and 13 investigations were completed. The average duration of completed investigations decreased to 498 days from 539 days in 2008–2009.

**Table 5: Rail Productivity**

	2005–2006	2006–2007	2007–2008	2008–2009	2009–2010
Investigations Started	9	18	13	14	18
Investigations Completed	9	11	14	22	13
Average Duration of Completed Investigations (Number of Days)	519	598	697	539	498
Recommendations	0	2	4	2	4
Safety Advisories	9	8	16	11	8
Safety Information Letters	8	2	13	12	9

Note: Results can fluctuate significantly from year to year due to a number of factors such as staff turnover, the complexity of investigations and the investigation of major occurrences.

## 2.5.3 Safety Actions Taken

Four rail safety recommendations were issued in 2009–2010.

The Rail Branch monitored responses to 26 recommendations and conducted reassessments for 16 of those. The Board’s reassessments were communicated to the appropriate change agent(s) for information and action.

### 2.5.3.1 Rail Recommendations Issued in 2009–2010

<b>Crossing Collision, VIA Rail Canada Inc. Passenger Train Pincourt/Terrasse-Vaudreuil, Quebec, 17 December 2007</b> <b>Report No. R07D0111</b>	
<b>RECOMMENDATION</b>	<b>R09-01</b>  Transport Canada conduct safety assessments of level crossings on the high-speed passenger rail Québec-Windsor corridor and ensure that defences are adequate to mitigate the risk of truck/train collisions.
<b>RESPONSE</b>	Transport Canada (TC) agrees in principle with the recommendation and has indicated continued involvement and overview to ensure that crossing safety assessments will be conducted. TC officials have contacted the Provincial Departments of Transport regarding the safety of trucks at crossings.
<b>BOARD ASSESSMENT OF RESPONSE</b>	TC has acknowledged the deficiency and followed up with the stakeholders, whereby the involved railways have conducted some safety assessments of crossings on the corridor and more are planned. TC has also outlined a number of ongoing initiatives with respect to trucks and grade crossing safety that will potentially result in additional safety benefits. TC has described action which, if implemented in full, will substantially reduce or eliminate the safety deficiency. However, at present, the action has not been sufficiently advanced to reduce the risks.
<b>BOARD ASSESSMENT RATING</b>	Satisfactory Intent



<b>Crossing Collision, VIA Rail Canada Inc. Passenger Train Pincourt/Terrasse-Vaudreuil, Quebec, 17 December 2007</b>	
<b>Report No. R07D0111</b>	
<b>RECOMMENDATION</b>	<b>R09-02</b>  Transport Canada implement standards to improve the visibility of emergency contact signage at railway crossings in Canada.
<b>RESPONSE</b>	TC accepts the recommendation and is currently investigating the feasibility of implementing special signage for emergency contact numbers. Based on the results, TC will work at having the signage incorporated in the proposed RTD 10 standard ( <i>Road/Railway Grade Crossings: Technical Standards and Inspections, Testing and Maintenance Requirements</i> ).
<b>BOARD ASSESSMENT OF RESPONSE</b>	TC has accepted the recommendation and is working at mitigating the deficiency. TC has described action which, if implemented in full, will substantially reduce or eliminate the safety deficiency. However, at present, the action has not been sufficiently advanced to reduce the risks for transportation safety.
<b>BOARD ASSESSMENT RATING</b>	Satisfactory Intent

<b>Runaway/Derailment, Canadian National Freight Train Near Lillooet, British Columbia, 29 June 2006</b>	
<b>Report No. R06V0136</b>	
<b>RECOMMENDATION</b>	<b>R09-03</b>  Canadian National take effective action to identify and mitigate risks to safety as required by its safety management system, and the Department of Transport require Canadian National to do so.
<b>RESPONSE</b>	TC accepts the recommendation and believes that action taken by CN will improve its safety management system (SMS). TC has issued orders to revise certain rules, part of the SMS, prescribing that railways address the operational use of dynamic braking and air brakes, filing amendments with TC.
<b>BOARD ASSESSMENT OF RESPONSE</b>	To be reported next fiscal year
<b>BOARD ASSESSMENT RATING</b>	Pending

<b>Crossing Collision and Derailment, VIA Rail Canada Inc. Train Mallorytown, Ontario, 15 July 2008</b>	
<b>Report No. R08T0158</b>	
<b>RECOMMENDATION</b>	<b>R09-04</b>  Transport Canada work with the provincial governments to expedite the implementation of a national standard for low ground clearance advance warning signs at railway crossings.
<b>RESPONSE</b>	TC accepts the recommendation and is working with the Traffic Operation and Management Standing Committee (TOMSC) of the Transportation Association of Canada to develop a sign for low ground clearance advance warning at railway crossings. The TOMSC is organizing and coordinating research for the improvement of traffic control devices and practices in Canada and disseminating information relating to recommended traffic control practices. A proposal to develop the sign has been filed with the TOMSC.
<b>BOARD ASSESSMENT OF RESPONSE</b>	To be reported next fiscal year
<b>BOARD ASSESSMENT RATING</b>	Pending

### 2.5.3.2 Other Rail Safety Actions

TC identified the Bison Drive crossing in Winnipeg, Manitoba, as a higher priority for funding to add automatic gates and to improve track circuits. (TSB Investigation Report R08W0181)

After the TSB identified a defective locomotive check valve, Canadian National (CN) initiated a blitz campaign to test and, if necessary, replace defective locomotive check valves. CN added a one-way check valve test to its Operational Brake Test Schedule and Procedure that is conducted every 184 days. In addition, CN updated its locomotive Quadrennial Schedule and Procedure to include mandatory replacement of these check valves. (TSB Rail Safety Advisory 06/06 and TSB Investigation Report R06V0136)

CN's British Columbia South Division issued an operating instruction specifying that southward trains on the Lillooet Subdivision between Kelly Lake, Mile 192.6, and Polly, Mile 162, must operate with dynamic brake-equipped locomotives. (TSB Rail Safety Advisory 01/07 and TSB Investigation Report R06V0136)

CN worked with a car builder to address the risks associated with steel sensor plates and empty/load devices on certain rail cars. A design for an improved sensor plate that resists breakage was developed. (TSB Rail Safety Information Letter 01/08 and TSB Investigation Report R06V0136)

TC conducted an inspection between Mile 13 and Mile 107 of the Chemin de fer de la Matapédia et du Golfe's (CFMG) Mont-Joli Subdivision and audited CFMG's inspection procedures. A notice related to the lack of documentation concerning rail wear and low-profile joint bars was issued. (TSB Rail Safety Advisory 04/08 and TSB Investigation Report R08M0015)

After a collision with a VIA Rail Canada Inc. passenger train, CN identified the section of track between Mile 1.6 and Mile 5.1 of the CN Bedford Subdivision to be changed from subdivision track to Occupancy Control System (OCS) track. (TSB Investigation Report R08M0063)

TC initiated a program to identify highway crossings on the Québec-to-Windsor corridor where the crossing approach may be steep enough to impede the safe passage of large trucks, such as lowboy trailers. New funding, in the range of \$7.1 million, was provided for the Grade Crossing Improvement Program. In addition, the Economic Action Plan provides \$28 million over the next five years to further enhance grade crossings. (TSB Investigation Report R08T0158)

Canadian Pacific Railway (CPR) enhanced its training for rail flaw detection car operators. An Engineering Bulletin was issued mandating that all bolt holes that are drilled or exposed during the replacement of joint bars be deburred or chamfered. During the replacement of a cracked joint bar, both the newly installed and the adjacent joint bar will receive a visual inspection for cracks. The replacement of the bolts on compromise joint bars will also require new bolts with elastic stop nuts or equivalent lock nuts. (TSB Investigation Report R09D0012)

CPR directed that more vigilant track and rail inspections be conducted through its crossings. To improve the effectiveness of induction/ultrasonic testing, rail grinding is to be scheduled at crossing locations where the rail exhibits conditions that can interfere with rail flaw detector response. (TSB Investigation Report R08C0164)

CN developed and implemented track protection procedures for derailment clearing operations within its Winnipeg Terminal. CN implemented a protocol requiring a transportation officer to lead the investigation of all incidents to ensure compliance with all investigation recording and reporting requirements. (TSB Investigation Report R08W0219)

At Limoilou, Quebec, CN installed a semi-automatic switch stand for switch EL18 that allows rolling stock to trail through the switch points. CN issued a bulletin removing the item pertaining to switches in the *Informations générales triage Limoilou* (Limoilou Yard General Information). As such, the Timetable instruction allowing switches to be lined and locked in the reverse position is now clearly applicable. (TSB Investigation Report R09Q0030)

CN and the City of Québec are working to remove the pedestrian level crossing at Limoilou and to replace it with a grade-separated pedestrian crossing. (TSB Investigation Report R09Q0030)

## 2.6 Air Sector

### 2.6.1 Annual Statistics

Canadian-registered aircraft, other than ultralights, were involved in 249 reported accidents in 2009, a 1 per cent decrease from the 2008 total of 252 and a 5 per cent decrease from the 2004–2008 average of 262. The estimate of flying activity for 2009 is 4 171 000 hours, yielding an accident rate of 5.9 accidents per 100 000 flying hours, up from the 2008 rate of 5.5, but down from the five-year rate of 6.4. Canadian-registered aircraft, other than ultralights, were involved in 28 fatal occurrences with 64 fatalities in 2009, comparable to the 26 fatal occurrences with 51 fatalities in 2008 and the five-year average of 30 fatal occurrences with 49 fatalities. A total of 9 fatal occurrences involved commercial aircraft (5 aeroplanes and 4 helicopters), and 13 of the remaining 19 fatal occurrences involved privately operated aeroplanes.

The number of accidents involving ultralights increased to 34 in 2009 from 29 in 2008, but the number of fatal accidents decreased to 3 in 2009 from 12 in 2008.

The number of foreign-registered aircraft accidents in Canada for 2009 (14) was comparable to the 2008 total (15). There were 2 fatal accidents in 2009 and none in 2008.

In 2009, a total of 804 incidents were reported to the TSB in accordance with the mandatory reporting requirements. This represents a 12 per cent decrease from the 2008 total of 916 and an 8 per cent decrease from the 2004–2008 average of 874.

**Figure 10: Air Occurrences and Fatalities**

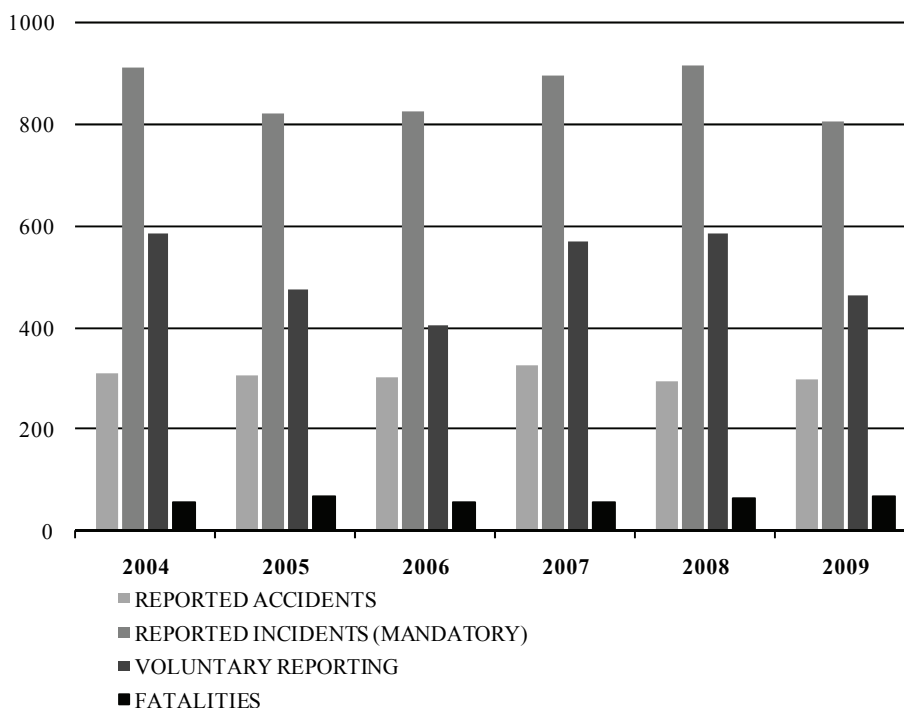
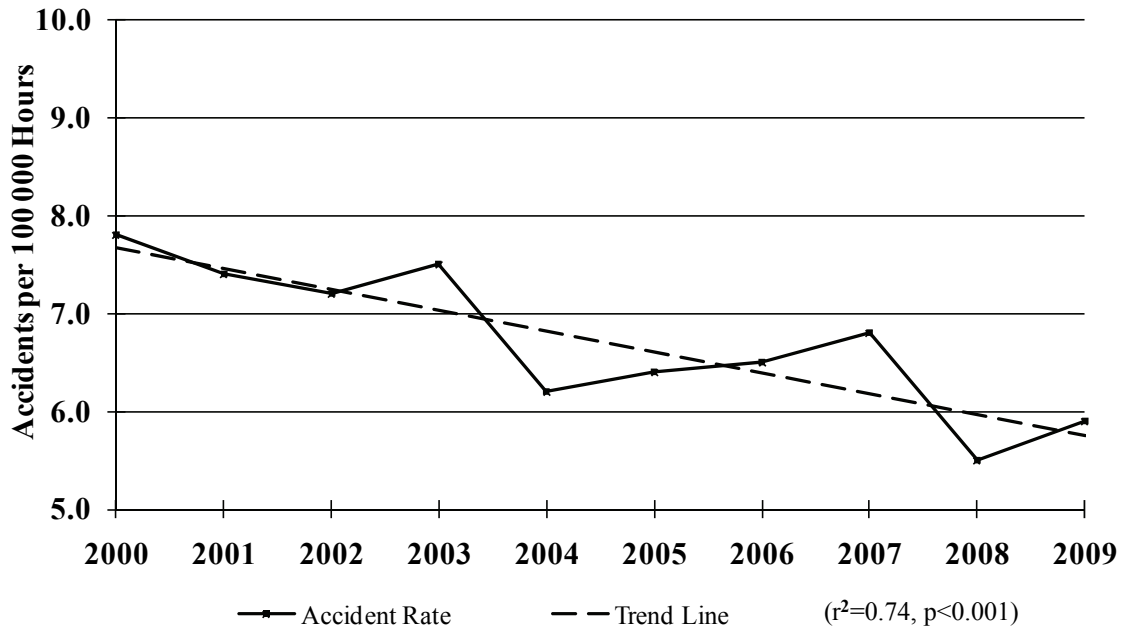


Figure 11 shows a significant downward trend in the accident rate for Canadian-registered aircraft over the past 10 years.

**Figure 11: Canadian-Registered Aircraft Accident Rates**



## 2.6.2 Investigations

A total of 33 air investigations were started in 2009–2010 and 50 investigations were completed. This represents an increase in the number of investigations completed compared to the previous year (46). The average duration of completed investigations is 430 days, unchanged from 2008–2009.

**Table 6: Air Productivity**

	2005–2006	2006–2007	2007–2008	2008–2009	2009–2010
Investigations Started	50	41	49	43	33
Investigations Completed	53	34	47	46	50
Average Duration of Completed Investigations (Number of Days)	404	516	493	430	430
Recommendations	6	4	11	1	6
Safety Advisories	7	16	13	13	9
Safety Information Letters	5	12	9	8	2
Note: Results can fluctuate significantly from year to year due to a number of factors such as staff turnover, the complexity of investigations and the investigation of major occurrences.					

### 2.6.3 Safety Actions Taken

Six air safety recommendations were issued in 2009–2010. Responses to two of them have been received and have been assessed.

The Air Branch reassessed the response to recommendation A07-06 in May 2009. The Board’s reassessment was communicated to the appropriate change agent(s) for information and action.

#### 2.6.3.1 Air Recommendations Issued in 2009–2010

<b>Bounced Landing/Go-Around After Touchdown, Kelowna Flightcraft Air Charter Ltd., Boeing 727-227, Hamilton Airport, Ontario, 22 July 2008</b>	
<b>Report No. A08O0189</b>	
<b>RECOMMENDATION</b>	<b>A09-01</b>  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.

**Bounced Landing/Go-Around After Touchdown,  
Kelowna Flightcraft Air Charter Ltd., Boeing 727-227,  
Hamilton Airport, Ontario, 22 July 2008**

**Report No. A08O0189**

**RESPONSE**

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.

<p><b>Bounced Landing/Go-Around After Touchdown, Kelowna Flightcraft Air Charter Ltd., Boeing 727-227, Hamilton Airport, Ontario, 22 July 2008</b></p> <p><b>Report No. A08O0189</b></p>	
<p><b>BOARD ASSESSMENT OF RESPONSE</b></p>	<p>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.</p> <p>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.</p>
<p><b>BOARD ASSESSMENT RATING</b></p>	<p>Satisfactory in Part</p>

<p><b>Collision with Terrain, Transwest Air, Beech A100 King Air, Sandy Bay, Saskatchewan, 07 January 2007</b></p> <p><b>Report No. A07C0001</b></p>	
<p><b>RECOMMENDATION</b></p>	<p><b>A09-02</b></p> <p>The Department of Transport require commercial air operators to provide contemporary crew resource management (CRM) training for <i>Canadian Aviation Regulations</i> (CARs) subpart 703 air taxi and CARs subpart 704 commuter pilots.</p>



<b>Collision with Terrain, Transwest Air, Beech A100 King Air, Sandy Bay, Saskatchewan, 07 January 2007</b>	
<b>Report No. A07C0001</b>	
<b>RESPONSE</b>	TC has accepted the recommendation in principle, and in accordance with the Cabinet Directive on Streamlining Regulations (CDSR), the rulemaking process will commence with a more detailed risk assessment. TC is expecting to present the risk assessment and supporting recommendation to the Civil Aviation Regulatory Committee (CARC) in the spring of 2010. The resulting recommendation from CARC will trigger the rulemaking process.
<b>BOARD ASSESSMENT OF RESPONSE</b>	Transport Canada's written response to the recommendation indicates that it accepts the recommendation in principle, and intends to conduct a more detailed risk assessment. The risk assessment is expected to be complete in the spring of 2010, with resulting recommendations to be presented to the CARC to trigger the rulemaking process. However, Transport Canada has not yet issued or recommended specific courses of action that, if implemented, would reduce or eliminate the deficiency identified in Board Recommendation A09-02.
<b>BOARD ASSESSMENT RATING</b>	Satisfactory Intent

<b>Touchdown Short of Runway, Jetport Inc., Bombardier BD-700-1A11 (Global 5000), Fox Harbour Aerodrome, Nova Scotia, 11 November 2007</b>	
<b>Report No. A07A0134</b>	
<b>RECOMMENDATION</b>	<b>A09-03</b>  The Department of Transport ensure that eye-to-wheel height information is readily available to pilots of aircraft exceeding 12 500 pounds.
<b>RESPONSE</b>	TC agrees with the intent of the recommendation, and in accordance with the CDSR, the rulemaking process will commence with a more detailed risk assessment to identify the appropriate regulatory response. TC is expecting to present the risk assessment and supporting recommendation to the CARC in the fall of 2010. The resulting recommendation from CARC will trigger the rulemaking process.

<b>Touchdown Short of Runway, Jetport Inc., Bombardier BD-700-1A11 (Global 5000), Fox Harbour Aerodrome, Nova Scotia, 11 November 2007</b>	
<b>Report No. A07A0134</b>	
<b>BOARD ASSESSMENT OF RESPONSE</b>	To be reported next fiscal year
<b>BOARD ASSESSMENT RATING</b>	Pending

<b>RECOMMENDATION</b>	<p><b>A09-04</b></p> <p>The Department of Transport require training on visual glide slope indicator (VGSI) systems so pilots can determine if the system in use is appropriate for their aircraft.</p>
<b>RESPONSE</b>	<p>Pilots are trained on VGSI systems during their private and commercial courses. When pilots take training for their night rating, further training on VGSI systems takes place.</p> <p>TC has reviewed the training and determined that additional training is not required. However, TC will revise the <i>Aeronautical Information Manual (AIM)</i> section on Approach Slope Indicator Systems with an emphasis on the following:</p> <ul style="list-style-type: none"> <li>• pilots must ensure that the approach slope indicator system is appropriate for the given aircraft type based on eye-to-wheel height (EWH) information provided by the aircraft manufacturer;</li> <li>• the aircraft manufacturer should be contacted to determine the EWH information for the given aircraft type, if this information is not already available in the Aircraft Flight Manual (AFM) or other authoritative aircraft manual (for example, Flight Crew Operating Manual (FCOM)); and</li> <li>• failure to assess the EWH and approach slope indicator system compatibility could result in decreased terrain clearance margin and in some cases even premature contact with terrain.</li> </ul> <p>TC will also produce an advisory circular to highlight the above information to flight crews. These actions are to be completed by spring of 2010.</p>

<b>Touchdown Short of Runway, Jetport Inc., Bombardier BD-700-1A11 (Global 5000), Fox Harbour Aerodrome, Nova Scotia, 11 November 2007</b>	
<b>Report No. A07A0134</b>	
<b>BOARD ASSESSMENT OF RESPONSE</b>	To be reported next fiscal year
<b>BOARD ASSESSMENT RATING</b>	Pending

<b>RECOMMENDATION</b>	<b>A09-05</b>  The Canadian Business Aviation Association set safety management system implementation milestones for its certificate holders.
<b>RESPONSE</b>	<p>The Canadian Business Aviation Association (CBAA) concurs with the Board’s recommendation. On 10 December 2002, it published its first set of certification standards containing SMS requirements for private business aviation operators. Enhancements to the operational safety standards and certification system as a whole were developed as a cooperative effort between TC, the CBAA, program–accredited auditors and the private operator certificate (POC) holder members and implemented on 27 June 2007 and again on 26 June 2009. There is a comprehensive three-phase enhancement project in the consultation process at this time and proposed changes will be implemented in the first half of 2010.</p> <p>Learning from years of experience, consultation and criticism, the CBAA is hopeful that any and all noted issues within the subject reports are appropriately addressed.</p> <p>Canadian private operator members are unwavering in the commitment to the association to reach a sound, appropriate and effective equilibrium between safety, security and operational excellence and will continue to expend time and resources to meet these objectives.</p> <p>The CBAA concurs with the Board’s recommendation and is pleased to provide more detail on the status of CBAA’s implementation of the recommendation through its planned amendments to the Business Aviation Operational Safety Standards.</p>

**Touchdown Short of Runway, Jetport Inc., Bombardier BD-700-1A11  
(Global 5000), Fox Harbour Aerodrome, Nova Scotia, 11 November 2007**

**Report No. A07A0134**

	<p>The objectives of the proposed amendments are two-fold:</p> <ol style="list-style-type: none"> <li>1. set objective standards for audit periodicity; and</li> <li>2. set milestones for achieving minimum SMS levels upon initial certification and within three years thereafter.</li> </ol> <p>Private operators will be required to achieve, at minimum, a Level 1 SMS during the initial certification audit and then undergo another audit within one year of operation, following which it is proposed that the audit periodicity will be set at one year for a Level 1 SMS, two years at Level 2 and three years for a Level 3 SMS. In order to maintain a valid POC, a private operator will be required to achieve and maintain a Level 2 SMS within three years after initial certification.</p> <p>The CBAA is required under the CARs to consult with its operator members before adopting amendments to the Business Aviation Operational Safety Standards. The consultation process is now well underway and it is intended that the amendments will be adopted by 30 June 2010. Of course, the final wording of the standards to meet the objectives stated above is dependent on the results of the consultations. A copy of the amended standards will be provided as soon as they are published.</p>
<b>BOARD ASSESSMENT OF RESPONSE</b>	To be reported next fiscal year
<b>BOARD ASSESSMENT RATING</b>	Pending

<b>RECOMMENDATION</b>	<p><b>A09-06</b></p> <p>The Department of Transport ensure that the Canadian Business Aviation Association implement an effective quality assurance program for auditing certificate holders.</p>
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**Touchdown Short of Runway, Jetport Inc., Bombardier BD-700-1A11  
(Global 5000), Fox Harbour Aerodrome, Nova Scotia, 11 November 2007**

**Report No. A07A0134**

**RESPONSE**

TC agrees with the recommendation. A full review of the CBAA regulatory program, including the requirements to include an effective quality assurance program for auditing certificate holders, has been initiated with the results to be presented for consultation before the Canadian Aviation Regulation Advisory Council (CARAC).

In the meantime, TC continues to work with the CBAA towards strengthening its quality assurance program and will be making the required adjustments to TC's surveillance program. To address this and other findings, as well as collaterally responding to the TSB recommendation, TC took the following action:

- It assigned additional resources (working and supervisory level pilot inspectors with managerial support and direction from a Chief level position) to oversee the CBAA Private Operator Certificate Program, and to improve associated processes and procedures. Such improvements include regular, scheduled communications with the CBAA, the monitoring of reported occurrences and follow-up review with the CBAA.
- It undertook a formal follow-up of the 2007 assessment and CBAA's progress in addressing the findings raised. The follow-up took place in the spring of 2009. This review found that the finding concerning CBAA's implementation of a quality assurance program of its audit program had not been fully addressed and, as such, this finding remained open. The CBAA has recently notified the Department of proposed changes to its processes and procedures to address this finding. TC reviewed these changes and met with the CBAA in January 2010. Consequently, the CBAA modified its quality assurance program.

<b>Touchdown Short of Runway, Jetport Inc., Bombardier BD-700-1A11 (Global 5000), Fox Harbour Aerodrome, Nova Scotia, 11 November 2007</b>	
<b>Report No. A07A0134</b>	
	Subsequent to TC's formal response to the TSB's recommendations, on 16 March 2010, the Minister of Transport announced that TC will take back the certification and oversight functions for business aviation from the CBAA. This is to take effect on 01 April 2011.
<b>BOARD ASSESSMENT OF RESPONSE</b>	To be reported next fiscal year
<b>BOARD ASSESSMENT RATING</b>	Pending

### 2.6.3.2 Assessment of Responses to Air Recommendations Issued in 2007–2008 and 2008–2009

<b>Runway Overrun and Fire, Air France, Airbus A340-313, Toronto/Lester B. Pearson International Airport, Ontario, 02 August 2005</b>	
<b>Report No. A05H0002</b>	
<b>RECOMMENDATION</b>	<b>A07-02</b>  France's Direction Générale de l'Aviation Civile and other civil aviation authorities establish clear standards limiting approaches and landings in convective weather.
<b>RESPONSE</b>	Although it would be preferable to have clear standards limiting approaches in convective weather, defining and implementing those standards would require long-range work internationally because the decision criteria should be standardized throughout the countries. Instead of working on defining standards limiting approaches in convective weather, the Direction Générale de l'Aviation Civile (DGAC) is examining short-term and long-term alternative measures to better assist crew members in making decisions.

**Runway Overrun and Fire, Air France, Airbus A340-313,  
Toronto/Lester B. Pearson International Airport, Ontario, 02 August 2005**

**Report No. A05H0002**

	<p>The DGAC is putting in place a work structure to better assist crew members and to give them the most adapted and accurate, timely information. That structure includes the organization that can transmit the information (air traffic control or airline operations) as well as the support used (speech or data link). The problematic associated with a more active decision-making assistance (suggestion to divert and even temporary closure of airport) will also be discussed in the framework.</p> <p>The DGAC also intends to specifically implement a crisis centre for severe convective weather. That centre could establish partial or full limitations for the flow of departures and arrivals on the basis of the changing situation.</p>
<b>BOARD ASSESSMENT OF RESPONSE</b>	<p>In its response, the DGAC thinks that the specific wording of this recommendation would require long-range work to establish standard decision criteria throughout the countries. The DGAC is therefore proposing a series of alternative measures to better assist crews in decision making, following the example of the Department of Transport's response.</p> <p>Specifically, it is putting in place a work structure to better assist crew members and to give them the most adapted and accurate, timely information. Particularly, in the case of forecast severe convective weather, the DGAC also intends to start an experiment in order to implement a crisis centre, which would include representatives from the meteorological service, the air traffic control service, the airport manager and the airlines. The crisis centre could also establish partial or full limitations for the flow of departures and arrivals on the basis of the changing situation.</p>

<b>Runway Overrun and Fire, Air France, Airbus A340-313, Toronto/Lester B. Pearson International Airport, Ontario, 02 August 2005</b>	
<b>Report No. A05H0002</b>	
	This response, even though not specifically in the context of the recommendation, is positive proof that the DGAC is fully aware that more needs to be done to decrease or eliminate this type of accident. The DGAC thinks that a more thorough training of crews and support units would be more effective in the short term than would be the long-range work of obtaining universal approval of clear standards limiting approaches in convective weather. The response is therefore more in line with Recommendation A07-04.
<b>BOARD ASSESSMENT RATING</b>	Satisfactory in Part

<b>RECOMMENDATION</b>	<b>A07-04</b>  France's Direction Générale de l'Aviation Civile and other civil aviation authorities mandate training for air transport pilots to better enable them to make landing decisions in deteriorating weather.
<b>RESPONSE</b>	For optimum decision making, the crew must mainly have the most accurate information at the right time, and the DGAC thinks that improvements are possible in that field, as indicated in its response to Recommendation A07-02.  The DGAC intends to extend its classroom training on cockpit resource management, threat and error management, and skills development to other types of training for instructor licensing and qualifications so that pilots are aware of that information at different stages of the training. The DGAC is also making the examiners aware of these concepts. Similar action in Europe is expected.  The DGAC pointed out that the technical elements needed by crews when conditions deteriorate are a better awareness of precautionary landings and a better understanding of actual braking performance. Consequently, the DGAC intends to make these drills mandatory in the training and routine inspections.



<p><b>Runway Overrun and Fire, Air France, Airbus A340-313, Toronto/Lester B. Pearson International Airport, Ontario, 02 August 2005</b></p> <p><b>Report No. A05H0002</b></p>	
	<p>It is also generally appropriate to talk about the desirable and positive aspect of the go-around decision, as did the DGAC in its work and publications relating to unstabilized approaches.</p>
<p><b>BOARD ASSESSMENT OF RESPONSE</b></p>	<p>The DGAC response to this recommendation is a clear indication that a better training of flight crews is at the basis of action needed to enhance their decision making. The DGAC therefore intends to extend concepts such as cockpit resource management, threat and error management and skills development to other types of training for instructor licensing and qualifications so that pilots are aware of that information at different stages of the training. The DGAC is also making the examiners aware of these concepts. It also indicates that similar action in Europe is expected. The DGAC points out that it is appropriate to talk about the desirable and positive aspect of the go-around decision, as did the DGAC in its work and publications relating to unstabilized approaches.</p>
<p><b>BOARD ASSESSMENT RATING</b></p>	<p>Satisfactory Intent</p>

<p><b>RECOMMENDATION</b></p>	<p><b>A07-06</b></p> <p>The Department of Transport require all Code 4 runways to have a 300 m runway end safety area (RESA) or a means of stopping aircraft that provides an equivalent level of safety.</p>
<p><b>RESPONSE</b></p>	<p>In its response to this recommendation, TC states that it is currently working with industry experts to review airport certification standards.</p> <p>The review of TP 312, <i>Aerodrome Standards and Recommended Practices</i>, has resulted in a recommendation to harmonize the Canadian standards with the current International Civil Aviation Organization (ICAO) RESA standards beyond the runway strip end contained in Annex 14 – Aerodromes. The result of this review will be subject to the Canadian Aviation Regulation Advisory Council regulatory consultation process.</p>

<b>Runway Overrun and Fire, Air France, Airbus A340-313, Toronto/Lester B. Pearson International Airport, Ontario, 02 August 2005</b>	
<b>Report No. A05H0002</b>	
<b>BOARD ASSESSMENT OF RESPONSE</b>	In its response, TC does not address the specific content of the recommendation, namely to: “require all Code 4 runways to have a 300 m runway end safety area (RESA) or a means of stopping aircraft that provides an equivalent level of safety.” Rather, it proposes to harmonize TP 312 with the ICAO Annex 14 RESA standard, which only requires a RESA 150 m in length. Furthermore, where construction of a RESA, of any length, is impracticable, TC’s response is silent.
<b>BOARD ASSESSMENT RATING</b>	Satisfactory in Part

<b>Engine Power Loss – Forced Landing, Sonicblue Airways, Cessna 208B (Caravan), Port Alberni, British Columbia, 21 January 2006</b>	
<b>Report No. A06P0010</b>	
<b>RECOMMENDATION</b>	<b>A07-08</b>  The Department of Transport take into account all propulsion system failures when assessing the safety of single-engine commercial operations.
<b>RESPONSE</b>	To address this and other safety issues related to Canadian single-engine instrument flight rules (SEIFR) operations, TC will undertake a complete review of the CARs relating to commercial SEIFR operations.
<b>BOARD ASSESSMENT OF RESPONSE</b>	TC has completed a review of SEIFR and has produced an interim report “Review of Single Engine Instrument Flight Rules (SEIFR) Operations Under Part 7 of the Canadian Aviation Regulations.” The interim report, which was completed in April 2009, was intended to be reviewed by TC management in late June 2009.  TC is undertaking a review of its regulations as they pertain to commercial SEIFR; however, the review is not complete and in the meantime there is residual risk to the travelling public, should an engine fail in SEIFR operations.
<b>BOARD ASSESSMENT RATING</b>	Satisfactory Intent

<b>Hydraulic Flight Control Malfunction, Vancouver Island Helicopters, Eurocopter AS 350 B2 (Helicopter), Kamarang, Guyana, 06 February 2005</b>	
<b>Report No. A05F0025</b>	
<b>RECOMMENDATION</b>	<b>A07-09</b>  The European Aviation Safety Agency, in coordination with other involved regulatory authorities and industry, ensure that the AS 350 helicopter hydraulic cut-off (HYD CUT OFF) switch is capable of handling the inductive electrical load of the circuit.
<b>RESPONSE</b>	The European Aviation Safety Agency (EASA) acknowledges receipt of the recommendation. It advised that the recommendation is under consideration and that the outcome will be communicated to the TSB in due course.
<b>BOARD ASSESSMENT OF RESPONSE</b>	To be reported next fiscal year
<b>BOARD ASSESSMENT RATING</b>	Pending

<b>Mid-Air Collision between a Cessna 172P and a Cessna 182T, Caledon, Ontario, 1 nm W, 04 August 2006</b>	
<b>Report No. A06O0206</b>	
<b>RECOMMENDATION</b>	<b>A08-03</b>  The Department of Transport, in coordination with NAV CANADA, take steps to substantially reduce the risk of collision between visual flight rules aircraft operating in Class E airspace surrounding the Toronto/Lester B. Pearson International Airport.
<b>RESPONSE</b>	TC had requested NAV CANADA to review the architecture of the airspace underlying the Terminal Control Area surrounding Toronto/Lester B. Pearson International Airport (LBPIA). As part of a more extensive airspace review of the Windsor–Toronto–Montréal corridor, the air navigation service provider submitted a proposal in the form of an aeronautical study that addresses the very issues identified in the Board’s Aviation Investigation Report A06O0206. This submission, while far more wide ranging than the airspace issues addressed in the recommendation, is presently under review by TC. However, the proposed changes to the airspace surrounding LBPIA have been accepted.

<p><b>Mid-Air Collision between a Cessna 172P and a Cessna 182T, Caledon, Ontario, 1 nm W, 04 August 2006</b></p> <p><b>Report No. A06O0206</b></p>	
	<p>More specifically, the Class C airspace exclusion surrounding the Brampton Airport will be expanded to more than double its present area while the floor of this airspace will be raised to commence above 2500 above sea level (asl) between the 12- and 15-nautical mile arcs centered on LBPIA. In addition, segregated and unidirectional visual flight rules (VFR) routes to and from the Brampton Airport, based on prominent geographical and planimetric features, will be published. In respect of Class E airspace surrounding and underlying the Toronto terminal area serving other general airports and access to commonly used flight training areas, common frequency areas and segregated routes will be established.</p> <p>Due to the extent of the changes to be implemented, implementation of the airspace structure and operational procedures were planned to take effect on 12 March 2009 to coincide with regular publication dates. In the intervening period, an awareness and education program for the general and recreational aviation community continued to be enhanced.</p>
<p><b>BOARD ASSESSMENT OF RESPONSE</b></p>	<p>The airspace in the Toronto area was revised effective 12 March 2009 and published in the Canada Flight Supplement and the 36th edition of the Toronto VFR Terminal Area (VTA) Chart. Significant changes are as follows:</p> <ul style="list-style-type: none"> <li>• enlargement of Class E airspace based at 700 feet above ground level (agl) up to and including 2500 feet asl around the Brampton Airport. Previously, the Class E airspace that was capped at 2500 feet did not include 2500 feet;</li> <li>• change of the vertical boundaries between layers of the “upside down wedding cake” around Toronto/LBPIA so that the altitude of the boundary is included in the lower level of airspace; that is, where the boundary was previously shown as 2500 or 3500 feet, it is now shown such that the underlying airspace goes up to 2500 or 3500 feet and overlying Class C airspace starts “<i>above</i> 2500 or 3500 feet” rather than <i>at</i> 2500 or 3500 feet;</li> </ul>

**Mid-Air Collision between a Cessna 172P and a Cessna 182T,  
Caledon, Ontario, 1 nm W, 04 August 2006**

**Report No. A06O0206**

- several new VFR routes are depicted including two one-way routes (one outbound, the other inbound) between the Brampton Airport and areas to the northwest and two westbound routes and one eastbound route beginning north of the Brampton Airport and extending to the east to points north of the Toronto/Buttonville Airport;
- realignment of airspace associated with Toronto/City Centre Airport, Downsview Airport, and Toronto/Buttonville Airport to eliminate small pockets of Class E airspace between Toronto/Buttonville and Toronto/City Centre airports;
- establishment of three “common frequency areas” (CFAs) in the vicinity of Toronto. Guidance for the use of the CFAs and the VFR transit routes is published on the reverse side of the Toronto VTA Chart.

These changes provide improved structure and guidance to facilitate the flow of VFR traffic operating in Class E airspace in the vicinity of Toronto and address many of the issues that were previously identified in the TC safety review in 2001–2002 of VFR operations in the vicinity of Toronto, following a previous mid-air collision.<sup>6</sup> As such, they represent an improvement to the safety of VFR operations in the vicinity of Toronto.

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<sup>6</sup> Transport Canada, TP 13796E, *Safety Review of VFR Operations within the Greater Toronto Area, Final Report, July 2000-April 2001*, October 2004.

<b>Mid-Air Collision between a Cessna 172P and a Cessna 182T, Caledon, Ontario, 1 nm W, 04 August 2006</b>	
<b>Report No. A06O0206</b>	
	<p>However, in its response, TC does not address the specific circumstances that led to Recommendation A08-03, namely that the combination of ground elevation of 1400 feet asl, normal minimum height of flight of 1000 feet agl, and a Class C floor of 2500 feet asl results in traffic being concentrated vertically at the single altitude of 2400 feet asl. Changing the Class C floor to “above 2500 feet” from “2500 feet” does not significantly redress the lack of vertical dispersion of VFR traffic in the vicinity of the accident location. Furthermore, the new VFR transit routes do not provide separation from aircraft on intersecting transit routes or from traffic that is northbound (as was one of the aircraft in the accident) or southbound and therefore not on a transit route. Traffic is still concentrated both vertically and geographically and therefore there remains a risk of a mid-air collision between aircraft operating under the VFR principle of see-and-avoid.</p>
<b>BOARD ASSESSMENT RATING</b>	Satisfactory in Part

### 2.6.3.3 Other Air Safety Actions

Following a short landing and gear collapse accident, Fox Harbour Development Limited decommissioned the abbreviated precision approach path indicator (APAPI) for Runway 33 and replaced it with a precision approach path indicator (PAPI) 2 system, suitable for aircraft with eye-to-wheel height up to 25 feet and displaced the threshold of Runway 33 by 88 feet. (TSB Investigation Report A07A0134)

As a result of the same accident, the responsibility for providing oversight of the Canadian Business Aircraft Association (CBAA) was transferred from the Department of Transport Standards Branch to the National Operations Branch, a project manager was deployed to the National Operations Branch to develop and implement an oversight program of the CBAA, and this person was appointed as the Chief of the Airlines Division in the National Operations Branch and continued to have overall responsibility for oversight of the CBAA. To assist, two operations inspectors were assigned directly to the CBAA oversight responsibilities. (TSB Investigation Report A07A0134)

As a result of a hard landing during autorotation practice, Eurocopter developed a proposed supplement for the AS 350 rotorcraft flight manual (RFM) that deals with engine emergencies training procedures. The proposal provides explicit instructions on the procedure to be followed for practice autorotations, for both fuel flow control lever (FFCL) and twist grip engine controls. Regulatory approval is pending. (TSB Investigation Report A08A0007)

Following the investigation into the crash of a BC Hydro inspection helicopter on an urban street resulting in multiple fatalities, the company engaged an international aviation risk management company to carry out a risk assessment of all BC Hydro flight profiles. In turn, it developed a framework for a helicopter management system, which incorporates hazard identification and mitigation, vendor selection and audits, helicopter selection criteria, standard operating procedures, and associated training. Subsequently, BC Hydro engaged a Canadian aviation consultant to guide its efforts in implementing that system. (TSB Investigation Report A08P0125)

When the TSB investigated why three fire trucks were inadvertently cleared onto an active runway on which an aircraft was taking off, NAV CANADA reviewed its procedures involving controller runway ownership. As a result, a new runway surface indicator (RSI) was designed and implemented in early September 2008. This system operates within the extended computer display system (EXCDS), allowing visibility at all positions within the Toronto tower, as well as recording all actions associated with the application. Both the EXCDS and phraseology manuals have been updated to reflect the current standard of operation. (TSB Investigation Report A08H0002)

After a landing with the gear up, the operator immediately conducted a risk assessment through its internal safety management system (SMS). A critical fleet inspection was undertaken to mitigate the risk of recurrence and several potential areas of safety action were identified. A review of the operator's inspection program was begun to include a check for indication of tire rub or damage due to door/tire contact, as well as a more detailed rigging check to focus on specific areas of the landing gear, like the nacelle channels and stops. (TSB Investigation Report A09C0028)

Following a serious wake turbulence encounter, Air Canada convened a working group to review company training and operational procedures pertaining to jet upset. The training syllabus outlining the hazards associated with excessive use of rudder under certain conditions will be extended to all company aircraft types. Annual recurrent briefing and simulator training were revised where appropriate. (TSB Investigation Report A08W0007)

In February 2008, Airbus issued a revision to chapter 05-51-44 of the Airbus Maintenance Manual (AMM) for A318/A319/A320/A321 aircraft defining inspection requirements following high lateral acceleration events. Air Canada incorporated this information into the maintenance program for the aircraft types. Following a high lateral acceleration event, determination of aircraft serviceability will be made based on digital flight data recorder/quick access recorder (DFDR/QAR) data analysis conducted by Airbus. (TSB Investigation Report A08W0007)

## Appendix A – Reports Released by the TSB in 2009–2010 by Sector

### Marine Reports Released in 2009–2010

DATE	LOCATION	VESSEL(S)	TYPE	EVENT	REPORT NO.
2006.04.22	Port Saguenay, Que.	<i>Nils B</i>	General cargo	Explosion	M06L0045
2007.04.11	Port of Montréal, Que.	<i>Sichem Aneline</i>	Chemical/ products tanker	Grounding	M07L0040
2007.07.13	Off Amherst Island, Lake Ontario, Ont.	<i>Fair Jeanne</i>	Sail-training vessel	Engine room fire	M07C0034
2008.09.04	West Coast of Vancouver Island, B.C.	<i>Love and Anarchy</i>	Small fishing vessel	Capsizing and subsequent sinking	M08W0189
2008.09.17	Halifax Harbour, N.S.	<i>Fireboat 08-0448B</i>	Fireboat	Capsizing	M08M0062
2008.10.21	Off George Island, Lake Winnipeg, Man.	<i>Bonnie Mouse</i>	Workboat	Capsizing and subsequent sinking	M08C0058
2008.10.30	Burke Channel, Restoration Bay, B.C.	<i>Jumbo B</i>	SeaLander 37 landing craft	Near capsizing with loss of life	M08W0236
2008.12.17	Beauharnois Canal, St. Lawrence Seaway, Que.	<i>Québécois Capt. Henry Jackman</i>	Bulk carrier Bulk carrier	Collision	M08C0081
2009.04.08	Queen Charlotte Strait, B.C.	<i>Velero IV</i> <i>Silver Challenger II</i>	Fishing research vessel Small fishing vessel	Collision	M09W0064

### Pipeline Report Released in 2009–2010

DATE	LOCATION	COMPANY	EVENT	REPORT NO.
2009.02.20	Near Wonowon, B.C.	Westcoast Energy Inc., carrying on business as Spectra Energy Transmission	Sour gas pipeline sending barrel rupture	P09H0006



## Rail Reports Released in 2009–2010

DATE	LOCATION	COMPANY	EVENT	REPORT NO.
2006.06.29	Near Lillooet, B.C.	Canadian National	Runaway/derailment	R06V0136
2007.04.22	Bow Island, Alta.	Canadian Pacific Railway	Main-track collision	R07C0040
2007.09.17	MacMillan Yard, Toronto, Ont.	Canadian National	Collision and train derailment	R07T0270
2007.12.17	Pincourt/ Terrasse-Vaudreuil, Que.	VIA Rail Canada Inc.	Crossing collision	R07D0111
2008.03.12	Near Matapédia, Que.	VIA Rail Canada Inc.	Main-track derailment	R08M0015
2008.07.03	Halifax, N.S.	Canadian National and VIA Rail Canada Inc.	Non-main-track collision	R08M0063
2008.07.15	Mallorytown, Ont.	VIA Rail Canada Inc.	Crossing collision and derailment	R08T0158
2008.09.09	Winnipeg, Man.	Canadian National	Crossing collision	R08W0181
2008.10.22	Symington Yard, Winnipeg, Man.	Canadian National	Employee injury	R08W0219
2008.11.30	Near Burdett, Alta.	Canadian Pacific Railway	Main-track train derailment	R08C0164
2008.12.31	Villeroy, Que.	Canadian National	Main-track train derailment	R08Q0028
2009.02.06	Dalhousie, Que.	Canadian Pacific Railway	Main-track derailment	R09D0012
2009.07.17	Québec, Que.	Canadian National	Derailment	R09Q0030

## Air Reports Released in 2009–2010

DATE	LOCATION	AIRCRAFT	EVENT	REPORT NO.
2007.01.07	Sandy Bay, Sask.	Beech A100 King Air	Collision with terrain	A07C0001
2007.05.20	Toronto, Ont.	Bombardier Regional Jet CL-600-2B19	Hard landing and main landing gear collapse	A07O0124
2007.07.02	Ramsay Arm, B.C.	Bell 214B1 (helicopter)	Tail rotor driveshaft fracture	A07P0209
2007.10.04	Trenton, Ont.	Ilyushin 76TD	Collision with trees on approach	A07O0273
2007.10.19	Richmond, B.C.	Piper PA-34-200 Seneca	Loss of control and collision with building	A07P0357
2007.11.11	Fox Harbour Aerodrome, N.S.	Bombardier BD-700-1A11	Touchdown short of runway	A07A0134
2007.11.15	Toronto/Lester B. Pearson International Airport, Ont.	Learjet 35A	Runway incursion	A07O0305
2007.11.23	Stoney Point, Ont.	Aerospatiale AS 350 B3 (helicopter)	In-flight engine failure	A07O0314
2008.01.10	Mount Pearl, N.L.	Eurocopter AS 350 BA Astar (helicopter)	Hard landing and power recovery autorotation	A08A0007

<b>DATE</b>	<b>LOCATION</b>	<b>AIRCRAFT</b>	<b>EVENT</b>	<b>REPORT NO.</b>
2008.01.10	Pitt Meadows, B.C., 2 nm W	Eurocopter AS 350 B3 (helicopter)	Limited power and hard landing	A08P0011
2008.02.08	Temagami, Ont.	Sikorsky S-76A (helicopter)	Controlled flight into terrain	A08O0029
2008.02.17	Ottawa, Ont.	Boeing 737-700	Runway overrun	A08O0035
2008.03.20	Québec/Jean Lesage International Airport, Que.	Challenger CL-600-2A12	Landing with nose wheel retracted	A08Q0055
2008.03.28	Wainwright, Alta., 16 nm NE	Piper PA-46-350P (Jetprop DLX)	Loss of control and in-flight breakup	A08W0068
2008.05.13	Cranbrook, B.C.	Bell 206B JetRanger (helicopter)	Loss of engine power and collision with terrain	A08P0125
2008.05.22	Saskatoon, Sask.	Boeing 737-217	Engine power loss	A08C0108
2008.06.19	Lac à l'Épaulé, Que.	Eurocopter EC 120B (helicopter)	Loss of visual references and collision with water	A08Q0110
2008.07.06	Snow Lake, Man., 15 nm N	Noorduyn Norseman MK V	Engine failure and forced landing	A08C0145
2008.07.06	Barrie-Orillia, Ont.	Van's RV-3B	Loss of control and collision with terrain	A08O0168
2008.07.14	Schefferville, Que., 70 nm E	de Havilland DHC-2 MK-1 (Beaver)	Engine failure and collision with terrain	A08A0095
2008.07.22	Hamilton, Ont.	Boeing 727-227	Bounced landing/go-around after touchdown	A08O0189
2008.07.29	Toronto, Ont.	Boeing 737-700	Runway incursion	A08H0002
2008.07.30	Fort McMurray, Alta., 30 nm SW	Jetstream 3100 and Boeing 737	Loss of separation	A08W0151
2008.08.01	Winnipeg, Man., 180 nm SE	Bombardier CRJ 705	Airspace decay and uncommanded descent	A08C0164
2008.08.03	Alice Lake, B.C.	Grumman G-21A Goose	Aerodynamic stall and collision with terrain	A08P0241
2008.08.03	Pitt Meadows Airport, B.C.	Bill Dause Beech 65-A90 (King Air)	Dual-engine power loss and forced landing	A08P0242
2008.08.09	Mississauga, Ont.	Boeing 747-400 and Boeing 757-200	Loss of separation and risk of collision	A08O0215
2008.08.09	Carmacks, Y.T.	Bell 206B (helicopter)	Controlled flight into water	A08W0162
2008.08.13	Legate Creek, B.C.	Bell 206L (helicopter)	Loss of control and collision with terrain	A08P0265
2008.08.17	Beaver Lodge, Alta., 15 nm W	Cessna 337	Aerodynamic stall and impact with terrain	A08W0173
2008.08.18	Huntington, N.S.	Kitfox IV	Loss of control and stall/spin	A08A0106
2008.08.31	Cochrane, Ont.	Embraer EMB-110P1	Nose landing gear failure during landing	A08O0235
2008.09.01	Shelburne, Ont., 7 nm W	Cessna 172P	Uncontrolled descent into terrain	A08O0233
2008.09.23	Parent, Que., 27 nm SW	DHC-2 MK 1	Visual flight rules flight into adverse weather and forced landing	A08Q0187
2008.11.22	Gods Lake Narrows, Man., 5 nm NW	Beechcraft A100	Loss of control and collision with terrain	A08C0237

<b>DATE</b>	<b>LOCATION</b>	<b>AIRCRAFT</b>	<b>EVENT</b>	<b>REPORT NO.</b>
2008.11.25	Edmonton Area Control Centre, Alta.	Boeing 737-700 and Cessna 525 (Citation CJ1)	Loss of separation	A08W0232
2008.11.27	Fort Smith, N.W.T.	British Aerospace BAe 3112	Aerodynamic stall and hard landing	A08W0237
2008.12.03	Lac Simon, Que.	Robinson R44 Raven I (helicopter)	Controlled flight into water	A08Q0231
2008.12.13	Cambridge Bay, Nun.	Dornier 228-202	Controlled flight into terrain	A08W0244
2009.01.30	Grande Cache, Alta., 20 nm NW	Robinson R44 (helicopter)	Loss of power and collision with terrain	A09W0021
2009.02.04	La Ronge, Sask.	de Havilland DHC-6 Series 100	Collision with terrain at take-off	A09C0017
2009.03.03	Winnipeg, Man.	Swearingen SA226-TC Metro II	Gear-up landing	A09C0028
2009.04.22	Ottawa, Ont.	Bombardier DHC-8-402	Aft fuselage strike	A09O0073
2009.06.07	Port Hope Simpson, N.L., 4 nm W	Britten-Norman Islander (BN.2A-27)	Loss of control and collision with terrain	A09A0036
2009.06.12	Chetwynd, B.C., 6 nm SSW	Amateur-built Glastar	Engine power loss and forced landing	A09P0156
2009.06.15	Easterville, Man.	Bell 204B (helicopter)	In-flight fire	A09C0087
2009.06.15	Castor, Alta., 13 nm NE	Beechcraft V35B Bonanza	Collision with terrain	A09W0105
2009.07.13	Gladstone, Man.	Pezetel M18B Dromader and Air Tractor AT-401	In-flight collision	A09C0114
2009.08.12	Courtland, Ont.	Cessna 150J	Loss of control and collision with terrain	A09O0171
2009.08.14	Lillooet, B.C., 20 nm S	Bell 212 (helicopter)	Loss of control and collision with water	A09P0249

## Appendix B – Glossary

<b>Accident</b>	in general, a transportation occurrence that involves serious personal injury or death, or significant damage to property, in particular to the extent that safe operations are affected (for a more precise definition, see the <i>Transportation Safety Board Regulations</i> )
<b>Incident</b>	in general, a transportation occurrence whose consequences are less serious than those of an accident, or that could potentially have resulted in an accident (for a more precise definition, see the <i>Transportation Safety Board Regulations</i> )
<b>Occurrence</b>	a transportation accident or incident
<b>Recommendation</b>	a formal way to draw attention to systemic safety issues, normally warranting ministerial attention
<b>Safety Concern</b>	a formal way to draw attention to an identified unsafe condition for which there is insufficient evidence to validate a systemic safety deficiency but the risks posed by this unsafe condition warrant highlighting
<b>Safety Advisory</b>	a less formal means for communicating lesser safety deficiencies to officials within and outside the government
<b>Safety Information Letter</b>	a letter that communicates safety-related information, often concerning local safety hazards, to government and corporate officials

## Appendix C – Assessment Categories and Ratings for Responses to Board Recommendations

Responses to recommendations are assessed based on the extent to which the underlying safety deficiency has been or is being addressed. The acceptance or understanding of a deficiency is not a criterion for the assessment rating. The assessment criterion is the potential or actual effectiveness of action planned or taken to reduce or eliminate the deficiency.

Four categories are used to assess responses: *fully satisfactory*, *satisfactory intent*, *satisfactory in part* and *unsatisfactory*.

**Fully Satisfactory** A **Fully Satisfactory** rating is assigned if the action taken will substantially reduce or eliminate the safety deficiency. An acceptable alternative course of safety action to the one suggested by the recommendation may have been taken.

**Satisfactory Intent** A **Satisfactory Intent** rating is assigned if the planned action, when fully implemented, will substantially reduce or eliminate the safety deficiency. However, for the present, the action has not been sufficiently advanced to reduce the risks to transportation safety. The TSB will monitor the progress of the implementation of the planned actions and will reassess the deficiency on an annual basis or when otherwise warranted.

**Satisfactory in Part** A **Satisfactory in Part** rating is assigned if the planned action or the action taken will reduce but not substantially reduce or eliminate the deficiency. The TSB will follow up with the respondent as to options that could further mitigate the risks associated with the deficiency. The TSB will reassess the deficiency on an annual basis or when otherwise warranted.

**Unsatisfactory** An **Unsatisfactory** rating is assigned if no action has been taken or proposed that will reduce or eliminate the deficiency. This rating applies to situations where the TSB has received inadequate explanations to convince it that the risks are not worth pursuing. In the Board's view, the safety deficiency will continue to put persons, property or the environment at risk. In such a situation, the TSB should reassess the statement of the deficiency and pursue the issue with the respondent, in the hope of acquiring additional convincing information. The TSB will reassess the deficiency on an annual basis or when otherwise warranted.