

Transportation Safety Board
of Canada



Bureau de la sécurité des transports
du Canada

ANNUAL REPORT TO PARLIAMENT 2010-2011



Canada

Transportation Safety Board of Canada
Place du Centre
200 Promenade du Portage
4th Floor
Gatineau, Quebec K1A 1K8
819-994-3741
1 800 387-3557
www.bst-tsb.gc.ca
communications@bst-tsb.gc.ca

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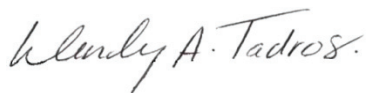
20 June 2011

The Honourable Peter Penashue, 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 2010 to 31 March 2011.

Yours sincerely,

A handwritten signature in cursive script that reads "Wendy A. Tadros".

Wendy A. Tadros
Chair

Table of Contents

The Chair’s Message	1
Section 1: Overview.....	3
1.1 Members of the Board	3
1.2 Senior Management	4
1.3 Mission of the TSB	4
1.4 Independence	4
Section 2: Activities	5
2.1 Occurrences, Investigations and Safety Action	5
2.2 Communicating Transportation Safety to Canadians and the Transportation Community	9
2.3 A Look Back at our 20th Anniversary	9
2.4 Watchlist Update.....	10
2.5 Air Sector	13
2.5.1 Annual Statistics	13
2.5.2 Investigations	15
2.5.3 Safety Actions Taken	16
2.5.3.1 Air Recommendations Issued in 2010–2011	17
2.5.3.2 Assessment of Responses to Air Recommendations Issued in 2009–2010 and 2007–2008	19
2.5.3.3 Other Air Safety Actions	27
2.6 Marine Sector.....	30
2.6.1 Annual Statistics	30
2.6.2 Investigations	31
2.6.3 Safety Actions Taken.....	32
2.6.3.1 Other Marine Safety Actions	32
2.7 Rail Sector.....	34
2.7.1 Annual Statistics	34
2.7.2 Investigations	36
2.7.3 Safety Actions Taken.....	37
2.7.3.1 Rail Recommendation Issued in 2010–2011	37
2.7.3.2 Assessment of Responses to Rail Recommendations Issued in 2009–2010	38
2.7.3.3 Other Rail Safety Actions	40

2.8	Pipeline Sector	43
2.8.1	Annual Statistics	43
2.8.2	Investigations	44
2.8.3	Safety Actions Taken.....	45

Appendices

Appendix A	– Reports Released by the TSB in 2010–2011 by Sector	47
Appendix B	– Glossary	51
Appendix C	– Assessment Categories and Ratings for Responses to Board Recommendations.....	52

Figures

Figure 1	Occurrences Reported to the TSB.....	5
Figure 2	Investigations Started, in Process and Completed	6
Figure 3	Ratings of Assessments of Responses, 1990–2011	8
Figure 4	Watchlist Recommendations Ratings of Assessments of Responses, 1990–2011.....	11
Figure 5	Air Occurrences and Fatalities.....	14
Figure 6	Canadian-Registered Aircraft Accident Rates	15
Figure 7	Marine Occurrences and Fatalities.....	30
Figure 8	Canadian-Flag Shipping Accident Rates	31
Figure 9	Rail Occurrences and Fatalities	35
Figure 10	Main-Track Accident Rates	36
Figure 11	Pipeline Occurrences	43
Figure 12	Pipeline Accident Rates	44

Tables

Table 1	Safety Outputs by the TSB	7
Table 2	Board Assessments of Responses to Recommendations, 1990–2011	8
Table 3	Air Productivity	16
Table 4	Marine Productivity	32
Table 5	Rail Productivity	36
Table 6	Pipeline Productivity.....	45

The Chair's Message

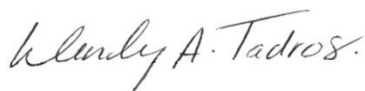
For over 20 years, the dedicated and highly skilled experts at the Transportation Safety Board of Canada (TSB) have investigated thousands of transportation occurrences. No matter where things go wrong—on our waterways, along our pipelines or railways, or in our skies—we make sure Canadians know what happened and why. Now, as we enter our third decade, we feel more confident than ever that Canadians can be proud of our innovative work—work that has established Canada as a world leader in accident investigation.

This year, our Annual Report to Parliament once again identifies a number of important safety issues. We have made recommendations aimed at improving railway tank cars carrying dangerous goods, increasing the safety of helicopters operating over water, and helping passengers survive floatplane crashes.

Our work, though, does not stop there. Our mandate is to improve transportation safety, not just report on it, and that means we are committed to ensuring that our voice is heard and understood by regulators and the industry.

One measure of our success is the number of recommendations that have been implemented. A total of 29 recommendations received a rating of “Fully Satisfactory” in 2010–2011. Overall, this means that the response to 71% of TSB recommendations have been rated Fully Satisfactory. That figure, which was at 66% a year ago, has been trending upward since 2006. However, even though it is rewarding to see accident rates trend downward as some of the tough issues are tackled, progress remains slow. This, in turn, compromises safety, as accidents continue to occur due to the same underlying issues. In some cases, the gap between our recommendations and sufficient action has been over 15 years. That's simply not good enough.

Canadians need to have confidence in our transportation system, and that confidence needs to be built on trust: trust that recommendations are coming from strong scientific work put forth by a capable and independent voice, and that they will be implemented in a timely manner. Greater trust will only follow if more progress is made on important safety issues. I believe this is a matter of priorities and progress depends on the Department of Transport and its Minister bringing the greatest degree of resolve to these important issues.



Wendy A. Tadros
Chair

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
General Counsel	A. Harding
Director General, Corporate Services	C. Lemyre
Director, Air Investigations	M. Clitsome
Director, Marine Investigations	M.-A. Poisson / Y. Myers / M. Ayeko (Acting)
Director, Rail/Pipeline Investigations	K. Jang / R. Johnston (Acting)
Director, Operational Services	T. Crosby
Director, Communications	A. Masson / C. Laflamme (Acting)

1.3 Mission of the TSB

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

1.4 Independence

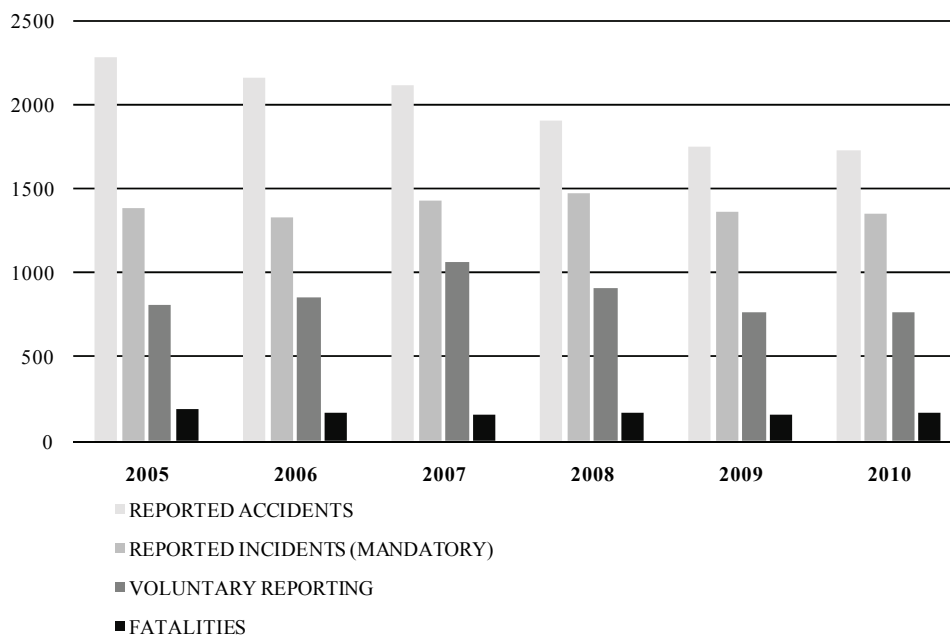
To encourage public confidence in transportation accident investigation, the investigating agency must be, and be seen to be, objective, independent and free from any conflicts of interest. The key feature of the TSB is its independence. It reports to Parliament through the President of the Queen's Privy 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 2010, a total of 1727 accidents and 1349 incidents were reported in accordance with the TSB's regulations for mandatory reporting of occurrences.¹ The number of accidents in 2010 decreased by 1% from the 1748 accidents reported in 2009 and by 15% from the 2005–2009 annual average of 2038 accidents. The number of reported incidents decreased to 1349 in 2010 from 1360 in 2009, and was below the 2005–2009 average of 1397. In 2010, the TSB also received 765 voluntary reports. Fatalities totalled 168 in 2010, up 13 from the 2009 total, but the same as the 2005–2009 average.

Figure 1: Occurrences Reported to the TSB

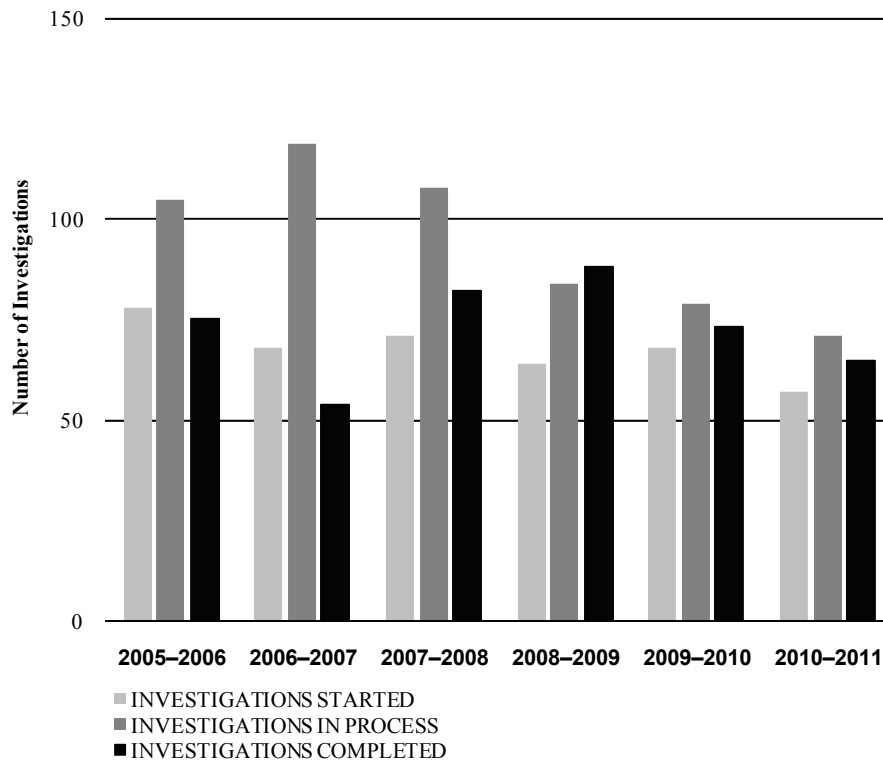


All reported occurrences were assessed in accordance with the Board's Occurrence Classification Policy to identify those with the greatest potential for advancing transportation safety. Information was entered into the TSB database for historical record, trend analysis and safety deficiency validation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

¹ While the Board's operations are for the 2010–2011 fiscal year, occurrence statistics are for the 2010 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 2010–2011, investigations were undertaken for 57 of the occurrences reported to the TSB. In that same period, 65 investigations were completed, compared to 73 in the previous year.² The number of investigations in process decreased to 71 at the end of the fiscal year from 79 at the start. Average time to complete an investigation decreased to 488 days in fiscal year 2010–2011 compared to the previous five-year average (531).

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, contain recommendations to reduce risks. Over this past year, 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.

² Investigations are considered complete after the final report has been issued. See Appendix A for a list of reports released by the TSB in 2010–2011 by sector.

In 2010–2011, in addition to investigation reports, the TSB issued a total of 46 safety outputs: 7 recommendations, 22 safety advisories and 17 safety information letters (see Table 1 for a breakdown by sector).

Table 1: Safety Outputs by the TSB

Sector	Recommendations ³	Safety Advisories	Safety Information Letters
Air	6	6	3
Marine	0	5	6
Rail	1	9	8
Pipeline	0	2	0
TOTAL	7	22	17

Note: In 2010–2011, a total of 2 air safety concerns, 1 marine safety concern, and 2 rail safety concerns were identified.

Safety information is also provided informally to key stakeholders throughout the investigation process, permitting them to take immediate safety actions. 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) 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 2011, a total of 537 recommendations were assessed by the Board in the fully satisfactory, satisfactory intent, satisfactory in part and unsatisfactory categories. In addition, 7 recommendations are awaiting Board assessment, bringing the total number to 544.

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

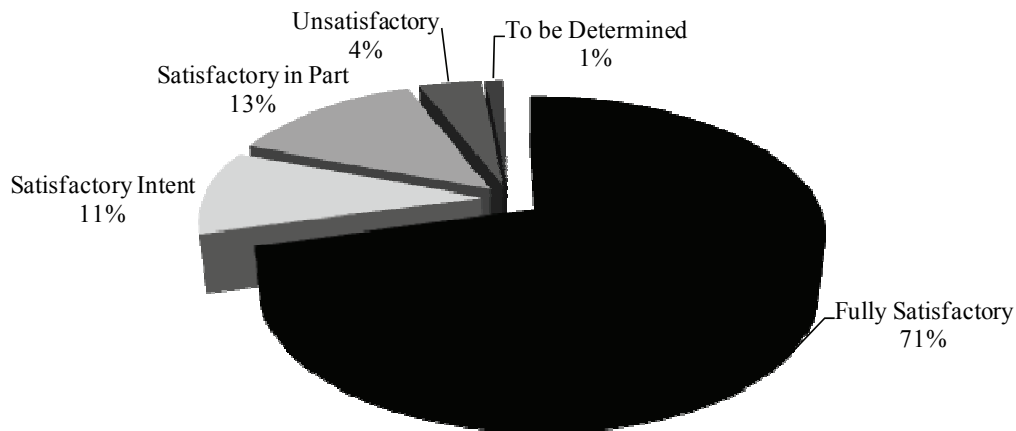
Table 2: Board Assessments of Responses to Recommendations, 1990–2011

	Air	Marine	Rail	Pipeline	Total Recommendations
Number of Recommendations	247	146	131	20	544
Fully Satisfactory	145	113	108	20	386
Satisfactory Intent	20	25	11	0	56
Satisfactory in Part	56	6	10	0	72
Unsatisfactory	20	2	1	0	23
To be determined	6	0	1	0	7

In the 21-year period from 1990 to 2011, a majority of Board recommendations have effected positive change. As shown in Figure 3, in 82% of cases (71% fully satisfactory and 11% satisfactory intent), change agents have taken action or plan to take action that will substantially reduce the deficiency noted in the recommendation. In 13% 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 4% of cases (unsatisfactory), change agents have neither taken nor plan to take action that will address the deficiency noted in the recommendation.

Over the next four years, the Board is aiming to have the status of 80% of all its recommendations as “Fully Satisfactory.”

Figure 3: Ratings of Assessments of Responses, 1990–2011



2.2 Communicating Transportation Safety to Canadians and the Transportation Community

At the TSB, investigating accidents is only part of our job. When something goes wrong—on our waterways, along our railroads or pipelines, or in our skies—we find out what happened, why, and what can be done to prevent something similar in the future. But just as important is communicating that information to the people who need it most: government and industry stakeholders, media outlets, first responders, national and local authorities, manufacturers, and the Canadian public.

To do that, we use a variety of forums and formats: safety advisories and information letters, final investigation reports, regular updates on the TSB website, monthly statistical reports, and media events across the country. In 2010–2011 alone, we released 65 investigation reports, and held 7 media events from coast to coast. We also responded to hundreds of media inquiries through the Head Office central media line—and that does not begin to include the thousands of questions that get handled at a regional level, or face-to-face at an accident site. The TSB Human Factors and Macro-Analysis Division published annual and monthly statistical reports and responded to 385 requests for complex transportation occurrence database information.

The TSB website continues to be an important resource for providing information on accident investigations and transportation safety in general. This year, we received an average of about 55 000 daily hits and 4500 daily visits. As well, there were approximately 240 000 document downloads. Furthermore, in September 2010, the TSB launched its RSS feeds, which helped maximize the profile of our website and products.

In addition, the TSB has built a vibrant outreach program, informing groups and associations about who we are, how we can work together, and generally making sure our message gets “out there.” To this end, Board members regularly give speeches and presentations, connecting with decision makers, raising awareness of transportation risks and encouraging further action on TSB recommendations. This fiscal year, they spoke to 23 audiences representing all four modes. TSB investigators also play an important role in promoting TSB’s work and sharing information learned from investigations by attending and giving presentations at events and conferences in Canada and abroad.

All of this keeps us busy, of course, but it is worth it. Investigating accidents and keeping Canadians informed is a team effort, and at the TSB we are all working toward the same goal: making—and keeping—our nation’s transportation system as safe as it can be.

2.3 A Look Back at our 20th Anniversary

At the TSB, we’ve been busy over the last 12 months. We came together to connect with Canadians, take stock of our accomplishments, and reflect on the uniqueness of our TSB family.

We kicked things off in March 2010, with a high-profile news conference promoting the release of our safety Watchlist, which targets nine key issues posing the biggest risk to Canadians. Later that spring, we opened our doors at the lab to the media for a guided tour, and then opened them a second time for a public tour in June as part of “Doors Open Ottawa.” In addition to on-line video testimonials, we also staffed a series of information booths at select locations across the country—letting Canadians know who we are and what we do. All of that, of course, was in addition to our “regular” work: investigating accidents, writing recommendations and, in general, making transportation in Canada as safe as it can be.

Though our anniversary year has drawn to a close, our pride and commitment to excellence will continue. We take this opportunity to celebrate the people who make things tick. Whether they’re in the field or behind a desk, facing the media, sifting through wreckage, or balancing the books, members of the TSB family are working hard for Canadians. For more than 20 years, their expertise, diligence and integrity have helped advance transportation safety, one investigation at a time, making this an organization we can all be proud of.

That’s truly worth celebrating.

2.4 Watchlist Update

What it is, and why it matters

At the TSB, we conduct independent investigations into selected incidents and accidents. Once our findings are complete, we make them public, along with our recommendations. Our work, though, does not stop there. Our mandate is to improve transportation safety, not just report on it—and that means speaking up if a risk still remains, and pushing for change when not enough has been done.

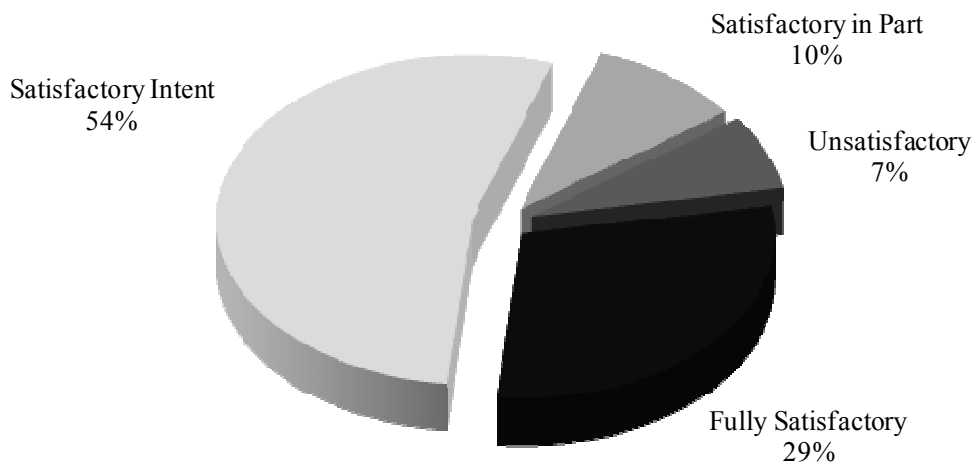
In March 2010, we released our safety Watchlist, which highlights nine critical issues posing the greatest risk to Canadians, issues that must be tackled to make Canada’s transportation system safer. Prior to this, our experts had found troubling patterns in their work. In fact, far too frequently, they arrived at the scene of an accident only to see the same set of persistent safety issues. In some cases, these outstanding issues were up to 15 years old, yet still not sufficiently addressed.

The Watchlist, then, became a “blueprint for change”—a way to restate the TSB’s safety messages, stimulate discussion, and generate further action on the part of regulators and industry.

Progress Achieved in 2010–2011

Underpinning the nine issues in the Watchlist are 41 safety recommendations—action items aimed at both industry and regulators. Prior to March 2010, only a handful of the responses to these recommendations had received our highest rating of “Fully Satisfactory.” Since the Watchlist’s release, we have added the “Fully Satisfactory” rating to seven more. This means that, in the first year, we are a little under a third of the way in addressing these crucial safety issues.

Figure 4: Watchlist Recommendations Ratings of Assessments of Responses, 1990–2011



Air

In aviation, there has been very limited progress, and no Watchlist-related recommendations have become Fully Satisfactory. To the contrary, the responses to two Watchlist-related recommendations have been downgraded by the Board to “Unsatisfactory.” This is a troubling trend.

New regulations have been drafted to require the implementation of technology to warn pilots about ground proximity and thereby reduce the risk of “controlled flight into terrain” accidents.

Transport Canada has taken back the oversight of business aircraft and continues to work on the implementation of safety management systems (SMS). For large carriers, these systems appear to be working well. However, it is taking time to extend SMS to Canada’s air taxis, helicopter operators, commuter airlines and flight training schools.

International standards have also been established for better data and voice recorders on board aircraft. However, Transport Canada is just beginning the process to harmonize Canadian requirements with the new international standards.

Despite some success at preventing collisions on runways, a greater use of enhanced collision warning systems is still required. Pilots also need to receive timely information about runway surface conditions, particularly during bad weather.

Transport Canada has undertaken a review of historical data with the intention of improving the safety of planes that overrun. Based upon a preliminary analysis, Transport Canada is proposing to move toward a requirement for runways to be compliant with the International Civil Aviation Organization (ICAO) standard of a 90 m runway end safety area (RESA) beyond the 60 m runway end strip (for a total of 150 m). Transport Canada also intends to undertake a risk assessment and cost benefit analysis with respect to the ICAO recommended 300 m. This action has not yet advanced sufficiently to adequately reduce the risks to transportation safety.

Marine

Good progress has been made in the marine sector, as three Watchlist-related recommendations have become Fully Satisfactory.

Over the last year, major steps have been taken to give crews aboard Canada's ferries better emergency preparedness training, and more effective methods to account for passengers. The regulatory framework is in place to address this safety issue, and it is now up to industry to implement the new measures in an effective manner.

The Canadian Coast Guard has developed and implemented new policies and procedures pertaining to the towing of fishing vessels in ice conditions. New Fishing Vessel Safety regulations have been drafted by Transport Canada and once implemented they are expected to directly address recommendations regarding survival suits, the stowage and launching of liferafts, and vessel stability. However, this work is progressing very slowly. Greater priority needs to be placed on this long-standing issue in order to improve the safety of Canadians who earn their living fishing at sea.

Transport Canada has also begun consultations to develop a three-tiered approach for safety management of domestic vessels based on their size, type and/or number of passengers. Moreover, proposed regulations will provide for the mandatory carriage of data recorders on board certain Canadian passenger vessels and cargo vessels. All of these steps—if and when they are fully implemented—will greatly improve safety.

Rail

In the rail sector, good progress has also been made, with the response to three Watchlist-related recommendations becoming Fully Satisfactory during the past year.

Progress has been made by the regulator with respect to the auditing and enforcement oversight of railway SMS. Guidelines and tools have also been developed to assist railways with their SMS implementation.

Transport Canada, meanwhile, is ensuring that safety assessments are conducted on railway crossings in the busy Québec-Windsor corridor. Significant progress has been made by industry in this area. There has also been progress made toward developing special signage at crossings for emergency contact numbers and low ground clearance advance warning signs.

With regard to train marshalling and handling, Transport Canada has undertaken research into train/track interaction, but there are as yet no timelines for implementing any new policies or guidelines. Industry has taken some steps to improve train marshalling practices, but not all railways are progressing equally, and the TSB continues to investigate new accidents where marshalling practices caused or contributed to the accident.

Through ongoing renewal of locomotives and the use of distributed power for main-track operations, the industry has made good progress toward reducing the risk of losing event recorder information during an accident.

What's Next?

Clearly, while some progress has been made, much more remains to be done. We have set a goal of 100% implementation: Over the next four years, we want the status of every single Watchlist recommendation— all 41 of them—to become “Fully Satisfactory.”

To this end, we will monitor all action taken and provide regulators with periodic scorecards. We will also continue our outreach activities to raise greater awareness of the Watchlist issues. Next spring we will conduct a more fulsome assessment, reporting publicly on action taken and the results that have been achieved. We will also review and update our Watchlist. Issues that have been addressed in a Fully Satisfactory manner will be removed, and new issues may be added.

2.5 Air Sector

2.5.1 Annual Statistics

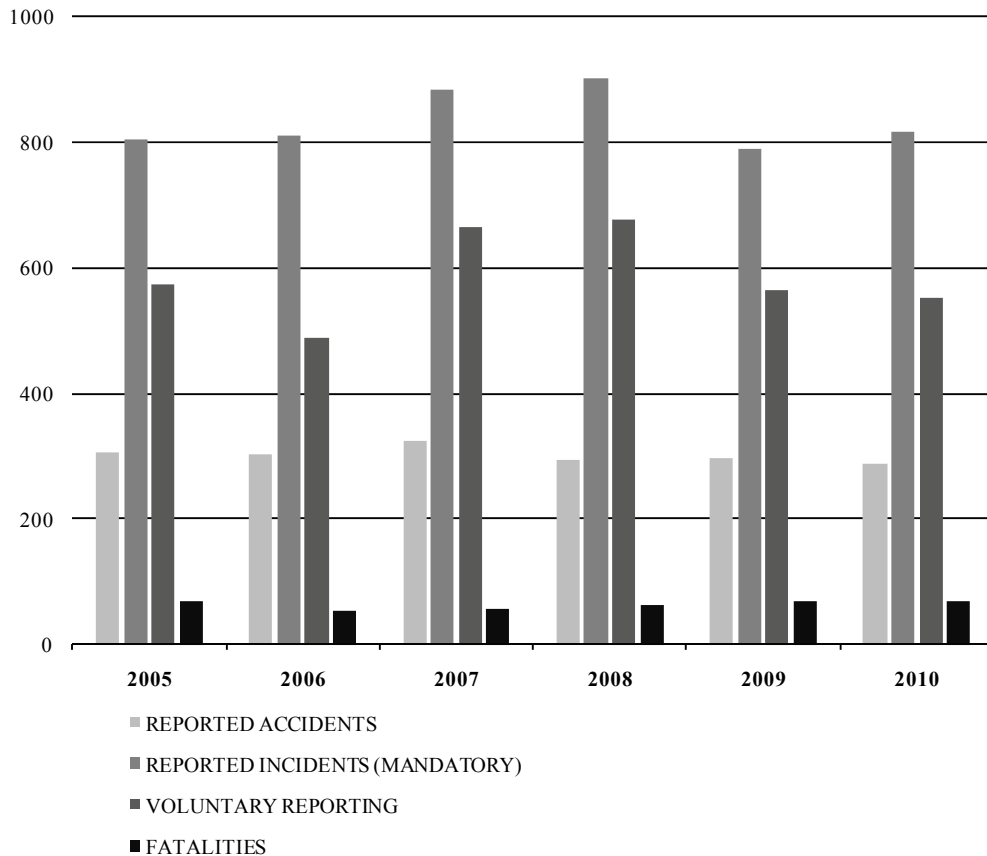
Canadian-registered aircraft, other than ultralights, were involved in 244 reported accidents in 2010, a 2% decrease from the 2009 total of 249 and 7% below the 2005–2009 average of 261.

Canadian-registered aircraft, other than ultralights, were involved in 31 fatal occurrences with 64 fatalities in 2010, comparable to the 28 fatal occurrences with 64 fatalities in 2009 and the five-year average of 30 fatal occurrences with 54 fatalities. A total of 15 fatal occurrences involved commercial aircraft (12 aeroplanes and 3 helicopters), and 15 of the remaining 16 fatal occurrences involved privately operated aeroplanes. The number of accidents involving ultralights decreased to 30 in 2010 from 34 in 2009, and the number of fatal accidents in 2010 was 3, the same as in 2009.

The number of foreign-registered aircraft accidents in Canada for 2010 (14) was comparable to the 2009 total 15. There were 2 fatal accidents in 2010 and 2 in 2009.

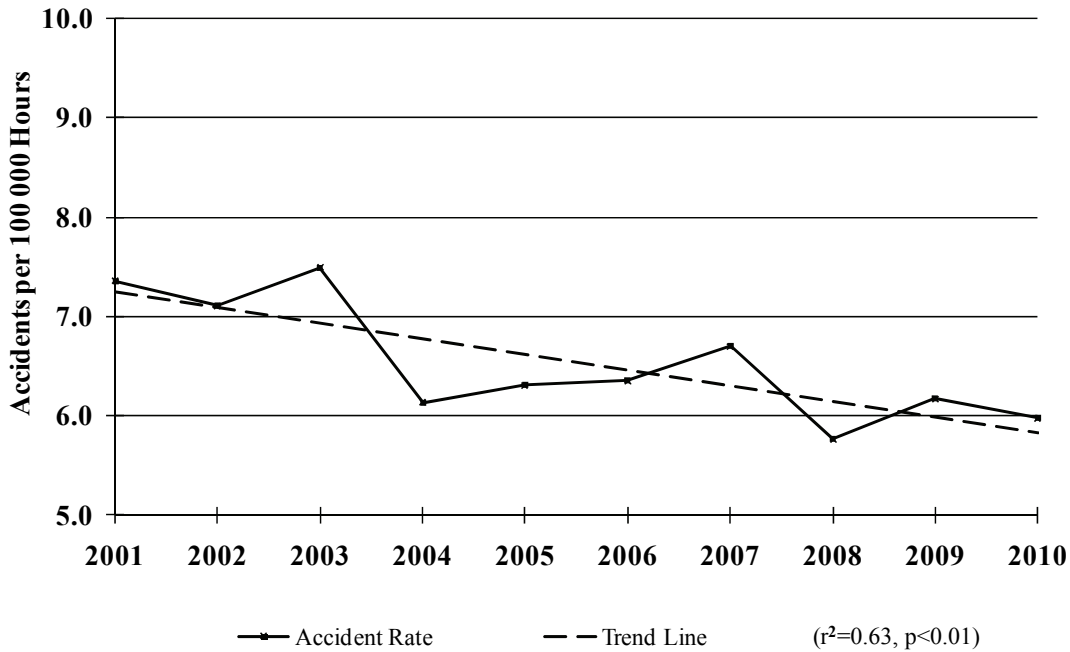
In 2010, a total of 816 incidents were reported to the TSB in accordance with mandatory reporting requirements. This represents a 4% increase from the 2009 total of 788 but a 3% decrease from the 2005–2009 average of 837.

Figure 5: Air Occurrences and Fatalities



According to data provided by Transport Canada, the estimate of flying activity for 2010 is 3 980 000 hours, yielding an accident rate of 6.0 accidents per 100 000 flying hours, down from the 2009 rate of 6.2, and down from the five-year rate of 6.3. There has been a significant downward trend in the accident rate for Canadian-registered aircraft over the past 10 years.

Figure 6: Canadian-Registered Aircraft Accident Rates



2009 and 2010 hours flown are estimated (Source: Transport Canada)

2.5.2 Investigations

A total of 37 air investigations were started in 2010–2011 and 38 investigations were completed. This represents a decrease in the number of investigations completed compared to the previous year (50). The average duration of completed investigations was 503 days, up from the 2009 average of 430 days and the previous five-year average (450 days). This increase is attributable to concentrated efforts to complete complex investigations such as the Air Canada in-flight control difficulties (TSB Investigation Report A08W0007), the Cougar Helicopters Inc. main gearbox failure and collision with water (TSB Investigation Report A09A0016), the Seair Seaplanes Ltd. loss of control and collision with water (TSB Investigation Report A09P0397), and the Air France runway excursion (TSB Investigation Report A08Q0171). There was also a greater-than-average number of occurrences in the Quebec region in 2010–2011.

Table 3: Air Productivity

	2005– 2006	2006– 2007	2007– 2008	2008– 2009	2009– 2010	2010– 2011
Investigations Started	50	41	49	43	33	37
Investigations Completed	53	34	47	46	50	38
Average Duration of Completed Investigations (Number of Days)	404	516	493	430	430	503
Recommendations	6	4	11	1	6	6
Safety Advisories	7	16	13	13	9	6
Safety Information Letters	5	12	9	8	2	3
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

Six air safety recommendations were issued in 2010–2011.

The Air Branch reassessed responses to 27 recommendations issued since 1990. The Board’s reassessments were communicated to change agents for information and action.

2.5.3.1 Air Recommendations Issued in 2010–2011

Main Gearbox Malfunction and Collision with Water, Cougar Helicopters Inc., Sikorsky S-92A, St. John's, Newfoundland and Labrador, 35 nm E, 12 March 2009	
Report No. A09A0016	
RECOMMENDATION	A11-01 The Federal Aviation Administration, Transport Canada and the European Aviation Safety Agency remove the “extremely remote” provision from the rule requiring 30 minutes of safe operation following the loss of main gearbox lubricant for all newly constructed Category A transport helicopters and, after a phase-in period, for all existing ones.
RESPONSE	Awaiting response
BOARD ASSESSMENT OF RESPONSE	To be reported next fiscal year
BOARD ASSESSMENT RATING	Pending
RECOMMENDATION	A11-02 The Federal Aviation Administration assess the adequacy of the 30 minute main gearbox run dry requirement for Category A transport helicopters.
RESPONSE	Awaiting response
BOARD ASSESSMENT OF RESPONSE	To be reported next fiscal year
BOARD ASSESSMENT RATING	Pending
RECOMMENDATION	A11-03 Transport Canada prohibit commercial operation of Category A transport helicopters over water when the sea state will not permit safe ditching and successful evacuation.
RESPONSE	Awaiting response
BOARD ASSESSMENT OF RESPONSE	To be reported next fiscal year
BOARD ASSESSMENT RATING	Pending

Main Gearbox Malfunction and Collision with Water, Cougar Helicopters Inc., Sikorsky S-92A, St. John's, Newfoundland and Labrador, 35 nm E, 12 March 2009	
Report No. A09A0016	
RECOMMENDATION	A11-04 Transport Canada require that supplemental underwater breathing apparatus be mandatory for all occupants of helicopters involved in overwater flights who are required to wear a PTSS.
RESPONSE	Awaiting response
BOARD ASSESSMENT OF RESPONSE	To be reported next fiscal year
BOARD ASSESSMENT RATING	Pending

Loss of Control and Collision with Water Seair Seaplanes Ltd., de Havilland DHC-2 (Beaver), Lyall Harbour, Saturna Island, British Columbia, 29 November 2009	
Report No. A09P0397	
RECOMMENDATION	A11-05 The Department of Transport require that all new and existing commercial seaplanes be fitted with regular and emergency exits that allow rapid egress following a survivable collision with water.
RESPONSE	Awaiting response
BOARD ASSESSMENT OF RESPONSE	To be reported next fiscal year
BOARD ASSESSMENT RATING	Pending

RECOMMENDATION	A11-06 The Department of Transport require that occupants of commercial seaplanes wear a device that provides personal flotation following emergency egress.
RESPONSE	Awaiting response
BOARD ASSESSMENT OF RESPONSE	To be reported next fiscal year
BOARD ASSESSMENT RATING	Pending

2.5.3.2 Assessment of Responses to Air Recommendations Issued in 2009–2010 and 2007–2008

<p>Touchdown Short of Runway, Jetport Inc., Bombardier BD-700-1A11 (Global 5000), Fox Harbour Aerodrome, Nova Scotia, 11 November 2007</p> <p>Report No. A07A0134</p>	
<p>RECOMMENDATION</p>	<p>A09-03</p> <p>The Department of Transport ensure that eye-to-wheel height information is readily available to pilots of aircraft exceeding 12 500 pounds.</p>
<p>RESPONSE</p>	<p>On 21 January 2011, Transport Canada (TC) indicated that a risk assessment was presented at the October 2010 Civil Aviation Regulatory Committee (CARC) meeting and a risk control option was accepted. TC will publish an article in the <i>Aviation Safety Letter</i>. Completion is planned for the fall of 2011. TC will also provide additional information in the <i>Aeronautical Information Manual</i> (AIM) to advise air operators and pilots to contact the manufacturer of their aircraft if they do not have eye-to-wheel height (EWH) information.</p>
<p>BOARD ASSESSMENT OF RESPONSE</p>	<p>In its reassessment of March 2011, the Board said that it is pleased that an article will be published and that additional information will be added to the AIM. However, while these two actions will raise awareness, they will not ensure that EWH information is readily available to pilots of aircraft exceeding 12 500 pounds. While TC's initial response to this recommendation indicated that it agreed with the intent of the recommendation to ensure that EWH information be readily available to pilots of aircraft exceeding 12 500 pounds, in its latest response, it appears that TC is passing on the responsibility of ensuring the information is available to the air operators and pilots.</p>

<p>Touchdown Short of Runway, Jetport Inc., Bombardier BD-700-1A11 (Global 5000), Fox Harbour Aerodrome, Nova Scotia, 11 November 2007</p> <p>Report No. A07A0134</p>	
	<p>In view of the limited number of manufacturers involved in the production and sale in Canada of aircraft exceeding 12 500 pounds, the Board expected that TC would take a more proactive approach in ensuring that this information be readily available to pilots and endeavoured to raise awareness of this issue with the different manufacturers. This would have resulted in long-term results, as well as a global approach to mitigation of this deficiency. In addition, the success of the approach taken by TC will be difficult to assess in the future.</p> <p>TC's action taken to date will not substantially reduce or eliminate the safety deficiency.</p>
BOARD ASSESSMENT RATING	Satisfactory in Part

RECOMMENDATION	<p>A09-04</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>
RESPONSE	<p>Pilots are trained on visual slope indicator systems during their private and commercial courses. When pilots take training for their night rating, further training on visual slope indicator systems takes place.</p> <p>Transport Canada (TC) has reviewed the training and determined that additional training is not required. However, TC will revise the <i>Aeronautical Information Manual</i> (AIM) section on Approach Slope Indicator Systems with an emphasis on the following:</p> <ul style="list-style-type: none"> • pilots must ensure that the approach slope indicator systems are appropriate for the given aircraft type based on eye-to-wheel height (EWH) information provided by the aircraft manufacturer;

Touchdown Short of Runway, Jetport Inc., Bombardier BD-700-1A11 (Global 5000), Fox Harbour Aerodrome, Nova Scotia, 11 November 2007	
Report No. A07A0134	
	<ul style="list-style-type: none"> • 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 • 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. <p>TC will also produce an advisory circular to highlight the above information to flight crews. These actions have not yet been completed.</p>
BOARD ASSESSMENT OF RESPONSE	<p>In its response, TC indicates that VGSI training is already provided to pilots at different stages of their training. While it will be providing additional information on VGSI in its AIM and producing an advisory circular, it has determined that additional training is not required.</p> <p>However, even if VGSI training is already provided to pilots at different stages of their training, the investigation determined that, while most pilots are aware that different VGSI systems are in use, they are not aware of their limitations, nor are they aware of the fact that some VGSI systems may be inappropriate for a given type of aircraft. This indicates that the current training program is not successful at adequately transmitting the information.</p> <p>While the planned actions have the potential to reduce some of the risk, they will benefit only pilots referring to the AIM or pilots targeted by the advisory circular. Without training on VGSI systems so pilots can determine if the system in use is appropriate for their aircraft, there continues to be a substantial level of risk to crews and the travelling public.</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>Requiring VGSI training as part of a pilot's aircraft type conversion training would provide an ideal opportunity to enhance awareness of any limitations that may exist between the aircraft and the various VGSI systems.</p> <p>Given TC's proposals, the Board is concerned that the level of VGSI awareness among pilots and the associated risks identified in Recommendation A09-04 will not be fully addressed.</p>
BOARD ASSESSMENT RATING	Satisfactory in Part

RECOMMENDATION	<p>A09-05</p> <p>The Canadian Business Aviation Association set safety management system implementation milestones for its certificate holders.</p>
RESPONSE	<p>In its initial response, dated 18 February 2010, the Canadian Business Aviation Association (CBAA) indicated that it concurred with the Board recommendation. On 15 March 2010, the CBAA provided details on the status of CBAA's implementation of the recommendation through its planned amendments to the Business Aviation Operational Safety Standards (BA-OSS). The objectives of the proposed amendments were to set objective standards for audit periodicity and to set milestones for achieving minimum safety management system (SMS) levels upon initial certification and within three years thereafter.</p> <p>The CBAA indicated that 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 the initial audit, it was proposed that the audit periodicity be set at one year for a Level 1 SMS, two years for a Level 2 SMS and three years for a Level 3 SMS. Furthermore, in order to maintain a valid private operator certificate (POC), a private operator will be required to achieve and maintain a Level 2 SMS within three years after initial certification. No milestone was set for Level 3 SMS.</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 CBAA is required under the <i>Canadian Aviation Regulations (CARs)</i> to consult with its operator members before adopting amendments to the BA-OSS. This consultation process got underway and it was intended that the amendments be adopted by 30 June 2010, dependent on the results of the consultations, with final wording to follow.</p> <p>However, on 16 March 2010, Transport Canada (TC) announced that, effective 01 April 2011, the government was taking back responsibility for the certification of business aviation from the CBAA. Therefore, TC will be responsible for POC holders and the CBAA will be removed from the regulatory structure. Because of this, the CBAA informed the TSB that it would not be feasible to proceed with the proposed amendments before the transfer date. However, as an interim measure to meet the intent of the recommendation, the CBAA will stress with its accredited auditors the necessity for operators to meet all requirements of the CBAA's SMS standards. In addition, the CBAA will place emphasis on monitoring auditor fulfilment of this requirement through its quality assurance program.</p>
BOARD ASSESSMENT OF RESPONSE	<p>In its response, the CBAA indicated that it agrees with the Board's recommendation. In addition, it indicated that the CBAA planned amendments to the BA-OSS with the objectives of setting objective standards for audit periodicity and to set milestones for achieving minimum SMS levels upon initial certification and within three years thereafter. A consultation process is underway for adoption of the proposed amendments.</p> <p>However, TC announced that, effective 01 April 2011; the government will take back responsibility for the certification of business aviation operators from the CBAA, therefore removing the CBAA from the regulatory structure. While the CBAA will not have sufficient time to implement all of its proposed changes before the transfer date, it has indicated that it will stress with its accredited auditors the necessity for operators to meet all requirements of the CBAA's SMS 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	
	The combined safety actions initiated by the CBAA and TC should, if fully implemented, substantially reduce or eliminate the safety deficiency.
BOARD ASSESSMENT RATING	Satisfactory Intent

RECOMMENDATION	A09-06 The Department of Transport ensure that the Canadian Business Aviation Association implement an effective quality assurance program for auditing certificate holders.
RESPONSE	<p>Transport Canada (TC) agrees with the recommendation. A full review of the Canadian Business Aviation Association (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).</p> <p>In the meantime, TC continues to work with the CBAA toward strengthening its quality assurance program and will be making the required adjustments to TC's surveillance program.</p> <p>To address this and other findings, as well as collaterally responding to the TSB recommendation, TC took the following action:</p> <ul style="list-style-type: none"> • 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.

<p>Touchdown Short of Runway, Jetport Inc., Bombardier BD-700-1A11 (Global 5000), Fox Harbour Aerodrome, Nova Scotia, 11 November 2007</p> <p>Report No. A07A0134</p>	
	<ul style="list-style-type: none"> 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. <p>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 took effect on 01 April 2011.</p>
<p>BOARD ASSESSMENT OF RESPONSE</p>	<p>The Board's assessment will confine itself to the content of the Minister of Transport's announcement dated 16 March 2010, which supersedes the information contained in TC's response dated 05 February 2010.</p> <p>TC has indicated that it will begin enhanced surveillance of the CBAA's Private Operator Certificate Program during the transition period of retracting certification and oversight of business aviation.</p> <p>During the next year, there will be limited change for business aviation operators. The CBAA was still responsible for certification of business aviation until 01 April 2011. TC has initiated safety actions, which, if fully implemented, will substantially reduce or eliminate the safety deficiency.</p>
<p>BOARD ASSESSMENT RATING</p>	<p>Satisfactory Intent</p>

Hydraulic Flight Control Malfunction, Vancouver Island Helicopters, Eurocopter AS 350 B2 (Helicopter), Kamarang, Guyana, 06 February 2005	
Report No. A05F0025	
RECOMMENDATION	A07-09 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.
RESPONSE	The European Aviation Safety Agency (EASA) advised that Eurocopter recognizes that the hydraulic cut-off switch experienced a series of problems following the introduction of a design change which increased from 3 to 4 the number of “electrovalves” commanded by the switch. The risk analysis conducted by the manufacturer considers the severity of the failure of the hydraulic cut-off switch which can be detected during the pre-flight check as minor and the loss of the hydraulic cut-off switch together with the seizure of the servo-slide valve distributor as catastrophic. The probabilities associated to both cases have been shown acceptable when compared with the certification safety objectives for the two failure criticality levels. In addition, Eurocopter developed a new design change that is intended to avoid premature deterioration of the switch. This newly designed switch has been installed on all aircraft manufactured since December 2008. Eurocopter has also issued a non-mandatory service bulletin that recommends the retrofit of the hydraulic cut-off switch. Given the above, the EASA considers this issue closed.
BOARD ASSESSMENT OF RESPONSE	The Board is pleased with the work the EASA and Eurocopter have accomplished to mitigate the risks associated with the deficiency identified in Recommendation A07-09. Developing a new hydraulic cut-off switch design for production aircraft and encouraging operators to retrofit through a service bulletin are both good strategies to reduce the risks. However, the Board would like to have seen an indication that the Eurocopter supply system has been purged of the existing hydraulic cut-off switch design.
BOARD ASSESSMENT RATING	Satisfactory in Part

2.5.3.3 Other Air Safety Actions

This section highlights air safety action taken by regulators, operators, and manufacturers on various issues as a result of TSB investigations.

TSB Investigation Report A10W0038

Following a loss of separation occurrence at Yellowknife, Northwest Territories, NAV CANADA issued a unit operations bulletin and briefed controller staff on the “plan, execute and monitor” process. The bulletin emphasized the timely and accurate transfer of information to participating agencies. Additionally, it emphasized that the role Yellowknife Airport controllers play in the execution of a plan is an active one, and that they are instrumental in ensuring the safe and efficient control of traffic.

TSB Investigation Report A10W0040

As a result of the investigation into a runway incursion involving an intersection departure at Calgary International Airport, Alberta, during reduced visibility operations, the operator issued a Flight Operations Bulletin directing that, when operating in low or reduced visibility conditions, crews were to perform only full length departures from all runways. NAV CANADA issued an Operations Letter directing that, during low or reduced visibility operations, departures from runway intersections would be discontinued unless the tower coordinator position was open and staffed.

TSB Investigation Report A08O0036

Following the investigation into an aircraft collision with trees on approach to Hamilton Airport, Ontario, the operator issued two Flight Operations Bulletins (FOB). The first (01-08) requires flight crews to use only the non-directional beacon (NDB) minimums of 1280 feet mean sea level (MSL) published for Runway 30 at Hamilton when conducting the localizer Runway 30 approach and not the lower localizer minimums of 1160 feet MSL. The second (02-08) requires flight crews to use pilot-monitored approach (PMA) procedures for all non-precision approaches on Boeing 727 aircraft, regardless of reported weather conditions.

TSB Investigation Report A08Q0051

When the TSB reported on an aircraft out-of trim condition on board an Airbus A310-308 aircraft, the operator initiated several new procedures and clarified others. The procedures applicable to low-visibility take-off situations were clarified for the benefit of company check pilots, guidelines for autopilot engagement after take-off were added to the standard operating procedure, and the pilot training program was modified to include a comprehensive technical and practical training package on upset recovery training. Also, an exercise on abnormal pitch behaviour emergency procedure was added to the recurrent simulator training program.

For the same occurrence, as a follow-up to information provided by TSB's engineering staff, Canadian Aviation Electronics (CAE) examined the pertinent technical data and found that there was an error in the simulator's modeling of the force gradient beyond 38 mm of shaft movement in the artificial feel unit. CAE refined the software in the simulator used by the operator, to allow the control column force to increase, on an increased gradient, for additional, more realistic control force at high-speed, low-altitude, neutral or nose-down trim.

Additionally, CAE decided to verify if the CAE-made Airbus A300 and A310 simulators were also affected by the same issue. As such, on 16 July 2010, CAE wrote a Field Service Bulletin (FSBT-SIM- 438-SW) to all its customers potentially affected as operator of these simulators. This represents approximately 10 simulators around the world.

TSB Investigation Report A08W0007

Following a serious wake turbulence encounter involving an Airbus A319-114, Airbus issued a revision to the Airbus Maintenance Manual, chapter 05-51-44, for A318/A319/A320/A321 aircraft defining inspection requirements following high lateral acceleration events. The operator incorporated this information into the maintenance program for the aircraft types. Airbus issued Operator Information Telexes SE 999.0012/08/LB, dated 15 February 2008, and SE999.0012/08/LB Revision 01, dated 03 April 2008, to all operators of Airbus aircraft. The purpose was to communicate details of the event as well as inform operators of pending changes to reporting and maintenance requirements after encountering severe lateral acceleration.

TSB Investigation Report A09P0397

After the TSB investigation of a fatal accident involving a floatplane collision with water, Transport Canada completed a number of initiatives including:

- publishing articles in the *Aviation Safety Letter* to promote egress training and effective passenger briefings,
- developing posters and pamphlets for distribution to floatplane passengers to increase awareness of their role in safety,
- tasking its inspectors to ensure floatplane operators receive the latest safety promotion materials to emphasize the importance of egress training and better passenger briefings during their visits and to conduct follow-up telephone surveys of floatplane operators to verify that they are using the safety promotion materials, and
- producing a video for use by operators promoting best practices and lessons learned in floatplane operations.

TSB Investigation Report A09A0016

Following the initiation of TSB's investigation into a helicopter main gearbox (MGB) malfunction and collision with water, the United States Federal Aviation Administration (FAA) issued Emergency Airworthiness Directive (AD) 2009-07-53 for Sikorsky S-92A helicopters, which required, before further flight, removing all titanium studs that attach the MGB filter bowl assembly to the MGB and replacing them with steel studs. This AD was superseded by AD 2009-13-01, dated 16 June 2009, which required the same actions as the existing AD as well as changes to the Rotorcraft Flight Manual (RFM).

The FAA issued AD 2010-10-03, making it mandatory to replace the MGB filter bowl assembly with a two-piece MGB filter bowl assembly and to replace the existing mounting studs. The AD specified that these actions are intended to prevent failure of the MGB filter bowl assembly due to failure of the mounting studs or the filter bowl, loss of oil from the MGB, failure of the MGB, and subsequent loss of control of the helicopter.

The operator introduced a more detailed and robust Safety Management System (SMS) designed to bring all departmental safety practices together. Aviation safety, occupational safety, and maintenance quality assurance were combined into one program called the Integrated Safety Management System (ISMS). The combined program allows a documented, comprehensive approach throughout company operations leading to better internal communications and more effective safety action.

Sikorsky issued Alert Service Bulletin 92-63-014A Revision A, which described procedures for removing titanium studs and replacing them with steel studs.

Sikorsky designed, qualified, and fielded a new two-piece filter bowl, using six replaceable nut and bolt fasteners.

East coast offshore oil rig operators began supplying Survival Egress Air LV2 (SEA LV2) emergency underwater breathing apparatus (EUBA) systems to all passengers following orientation sessions, which included offshore briefings and demonstrations, heliport check-in briefings, and mandatory in-water training. The SEA LV2 is a compressed air device and the bottle is affixed to the chest area of the passenger transportation suit systems (PTSS). The unit provides approximately 21 breaths based on an average breath volume of 1.5 litres at a breath rate of 10.5 breaths per minute, which equates to approximately 2 minutes of air.

Helly Hansen assisted the operator's personnel in ensuring that all offshore employees were wearing a PTSS of the appropriate size. The resizing was completed by performing a functional assessment of the PTSS that included ensuring adequate seals around the wrists and face as well as appropriate mobility. When the seals or mobility were less than adequate, passengers underwent a full body measurement. The fit checks revealed that approximately 250 of the 1600 regular rotation offshore workers were wearing improperly fitted PTSS.

2.6 Marine Sector

2.6.1 Annual Statistics

In all, 353 marine accidents were reported to the TSB in 2010, a 10% decrease from the 2009 total of 393 and a 21% decrease from the 2005–2009 average of 447. Marine fatalities totalled 17 in 2010, up from the 2009 total of 14 but down from the 2005–2009 average of 19.

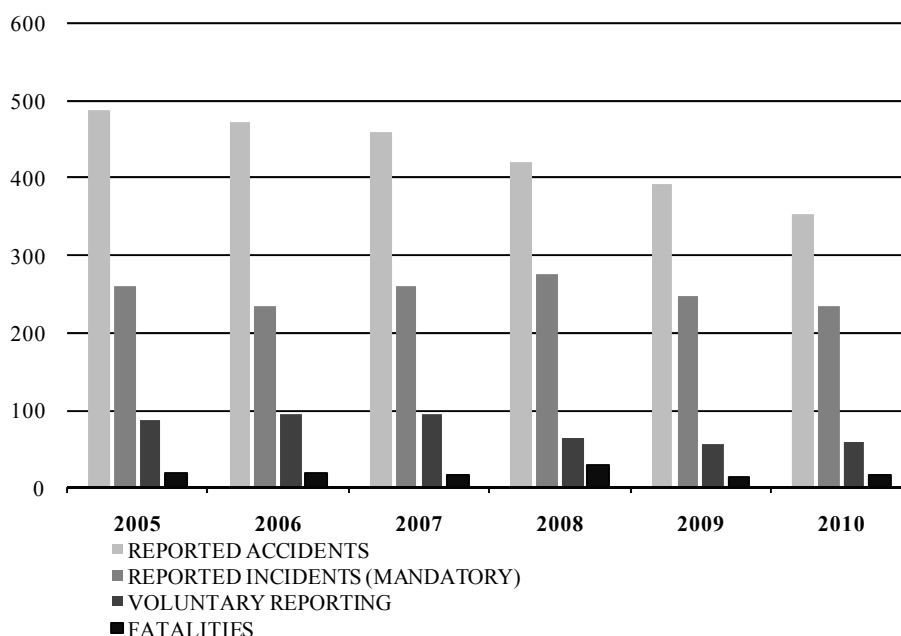
Shipping accidents, which comprised 85% of marine accidents in 2010, were down to 299 from 341 in 2009 and from the five-year average of 393. A total of 42% of all vessels involved in shipping accidents were fishing vessels. Accidents to persons aboard ship, which include falls, electrocution, and other types of injuries requiring hospitalization, totalled 54 in 2010, comparable to the 2009 total of 52 and the same as the five-year average.

In 2010, shipping accidents resulted in 11 fatalities, up from 7 in 2009 but the same as the five-year average. Accidents aboard ship resulted in 6 fatalities, down from the 7 in 2009 and the five-year average of 9.

In all, 26 vessels involved in reportable TSB accidents were reported lost in 2010, down from the 2009 total of 27 and the five-year average of 31.

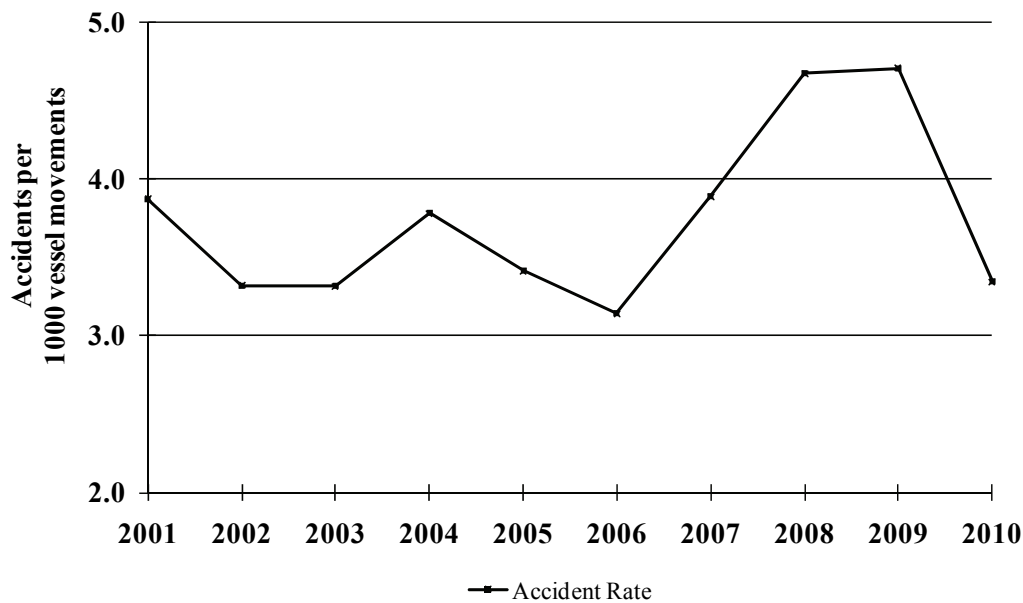
In 2010, 234 marine incidents were reported to the TSB in accordance with mandatory reporting requirements. This represents a 5% decrease from the 2009 total of 247, and is down 8% compared to the five-year average of 255.

Figure 7: Marine Occurrences and Fatalities



According to information provided by Transport Canada, marine activity for Canadian commercial non-fishing vessels over 15 gross tons (excluding passenger vessels and cruise ships) decreased by 18% from the 2005–2009 average. This yields an accident rate of 3.3 accidents per 1000 movements, down from the 2009 rate of 4.7 and down from the five-year average of 3.9. Marine activity for foreign commercial non-fishing vessels decreased by 9% from the 2005–2009 average while the accident rate decreased to 1.7 accidents per 1000 movements, down from the five-year average of 1.9.

Figure 8: Canadian-Flag Shipping Accident Rates



Vessel movements are estimated for 2010 (Source: Transport Canada)

2.6.2 Investigations

In 2010–2011, 5 marine investigations were started and 8 investigations were completed. This represents a decrease in the number of investigations completed compared to the previous year (9). The average duration of completed investigations was 529 days, the same as in 2009, and below the average of the previous five years (744 days).

Table 4: Marine Productivity

	2005– 2006	2006– 2007	2007– 2008	2008– 2009	2009– 2010	2010– 2011
Investigations Started	17	8	7	6	11	5
Investigations Completed	12	8	19	18	9	8
Average Duration of Completed Investigations (Number of Days)	651	801	936	796	529	529
Recommendations	6	0	3	2	1	0
Safety Advisories	5	8	12	7	7	5
Safety Information Letters	8	8	4	12	9	6
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

No marine safety recommendation was issued in 2010–2011.

The Marine Branch reassessed responses to 18 recommendations issued since 1990. The Board’s reassessments were communicated to the appropriate change agent(s) for information and action.

2.6.3.1 Other Marine Safety Actions

This section highlights marine safety action taken by the regulator, operators, and manufacturers on various issues as a result of TSB investigations.

TSB Investigation Report M07L0158

On 22 March 2010, Transport Canada (TC) published Ship Safety Bulletin 02/2010, which outlines the possible side effects from over-the-counter or prescription medications that are of particular concern with respect to the performance of crew members in safety-critical positions.

TC indicated that it is currently carrying out a two-year pilot project, based in the Pacific region, which is testing Safety Management System (SMS) domestic implementation with a view to developing a SMS regulation and implementation strategy for vessels that are not required to comply with the International Safety Management (ISM) Code.

The ship management company involved reported that it took 11 specific safety measures following the release of the TSB report. Four of the safety measures involved physical modifications to the vessel, including the addition of two electronic chart system repeaters and the installation of a washroom on the navigation bridge. Five of the safety measures were procedural, affecting passenger safety directly (including passenger briefing and passenger accounting). The remaining two measures address operational procedures on the bridge and on the vessel in general, including the development of an operational guide for new officers.

TSB Investigation Report M09W0141

TC observed a Lloyd's Document of Compliance audit and met with a tug management company to discuss the results of the company's internal investigation into the capsizing of one its tugs. The tug's management company replaced its Domestic Safety Management manual with the company's existing safety management manual used for the voluntary adoption of the ISM Code. TC reviewed the manual and determined that it met the requirements of the domestic SMS guidelines.

In addition to its own investigation, the company took the following actions: issued a safety memo to all the company's crews concerning the girding of the vessel; amended its emergency response plans (now includes capsizing guidelines); conducted a company-wide meeting to discuss the occurrence with the crews (and follow-up); and reviewed marine casualties to determine if there were any scenarios that should be considered for inclusion within its emergency procedures.

TSB Investigation Report M09C0051

A ship management company distributed a fleet circular to its vessels highlighting an occurrence on one of its vessels and its causes, verified the installation of the simplified voyage data recorder (S-VDR) on all its vessels and exemplified this occurrence in its company-run Bridge Team Management courses.

Following this occurrence, a Pilotage Authority made it mandatory for all local pilots to review/practice the manoeuvre involved in the occurrence during Authority pilot training programs undertaken every five years.

A technical bulletin (2010-05-17) was issued by Transas Marine International AB and sent to all vessels equipped with Transas VDR/SVDR 3200 with a notification that crew should check the switch SW4-5 setting.

TSB Investigation Report M09W0147

The owner of a whale-watching company involved in an occurrence retrained its crews on the safety equipment, including the use of the primary and auxiliary pumps. Crew members are now required to record each training and drill session in a log kept in the company office. Pre-trip planning was expanded to include a discussion among the vessel masters and the owner on the weather, tides, courses, and navigational hazards. An updated version of the company safety manual was also drafted.

TSB Investigation Report M09L0074

TC carried out stability calculations for a fishing vessel involved in an occurrence, which revealed deficiencies in the intact stability of the vessel. TC identified nine similarly built vessels. The owners of these vessels were contacted and advised of the risks. On 08 July 2009, the TSB issued Marine Safety Information Letter (MSI) 03/09 (Adequacy of stability of certain series-built fishing vessels). The nine vessels in question were detained until such time as each vessel underwent an inclining test and possessed a stability booklet. As of August 2010, eight of the nine vessels have complied (the ninth is not in operation).

2.7 Rail Sector

2.7.1 Annual Statistics

A total of 1075 rail accidents were reported to the TSB in 2010, a 3% increase from the 2009 total of 1043 but a 16% decrease from the 2005–2009 average of 1278. Rail-related fatalities totalled 81 in 2010, up from the 2009 total of 71 but below the five-year average of 85.

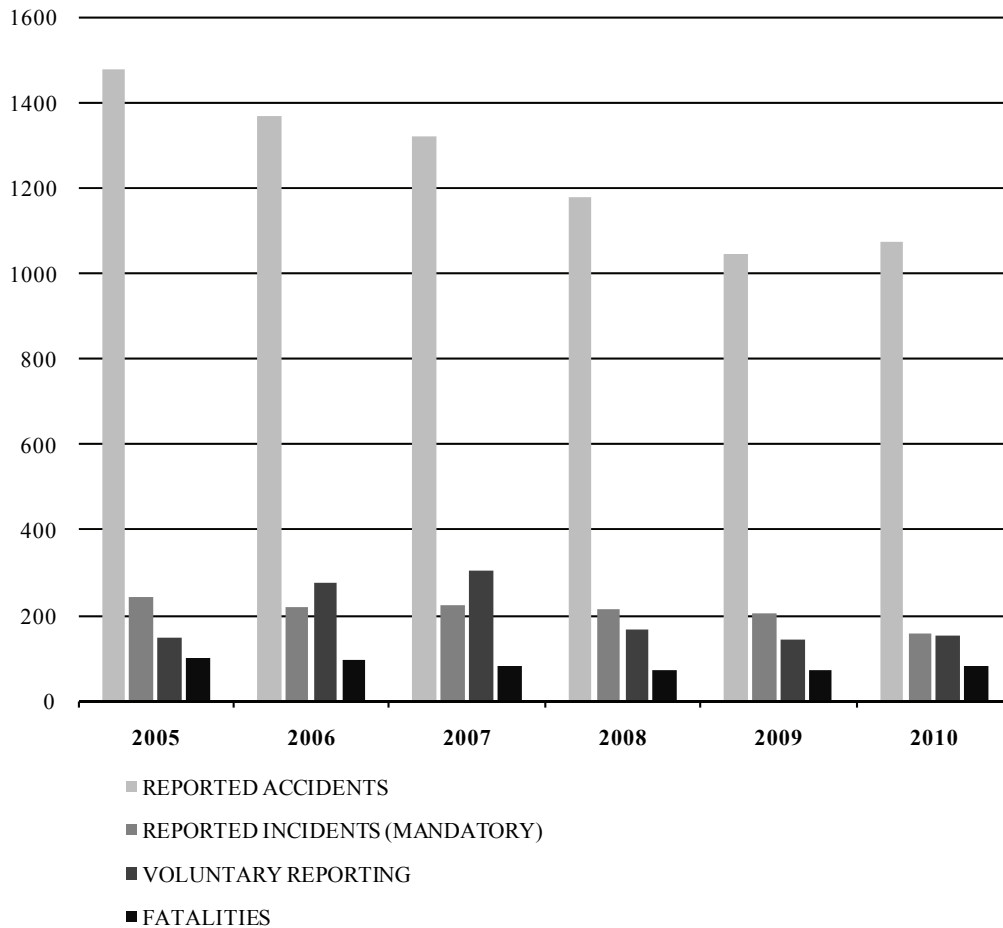
Four main-track collisions occurred in 2010, compared to 5 in 2009 and the five-year average of 6. In 2010, there were 80 main-track derailments, an increase of 19% from the 2009 total of 67 but a 42% decrease from the five-year average of 139. Non-main-track derailments increased to 539 in 2010 from 497 in 2009 but decreased from the five-year average of 632.

In 2010, crossing accidents decreased to 181 from the 2009 total of 188 and the five-year average of 228. Crossing-related fatalities numbered 24, up from 19 in 2009 but down from the five-year average of 27. Trespasser accidents increased by 13% to 81 in 2010, up from 72 in 2009, but down by 4% from the five-year average of 84. With a total of 55 fatalities in 2010, trespasser accidents continued to account for the majority of rail fatalities.

In 2010, 141 rail accidents involved dangerous goods (this also includes crossing accidents in which the motor vehicle was carrying a dangerous good), up from 133 in 2009 but below the five-year average of 174. Two of these accidents resulted in a release of product.

In 2010, rail incidents reported to the TSB in accordance with the mandatory reporting requirements totalled 159, down from 207 in 2009 and the five-year average of 222. Movements exceeding limits of authority incidents (102) comprised the largest proportion of the 159 reportable incidents. The second-largest contributor was dangerous goods leaker incidents (40).

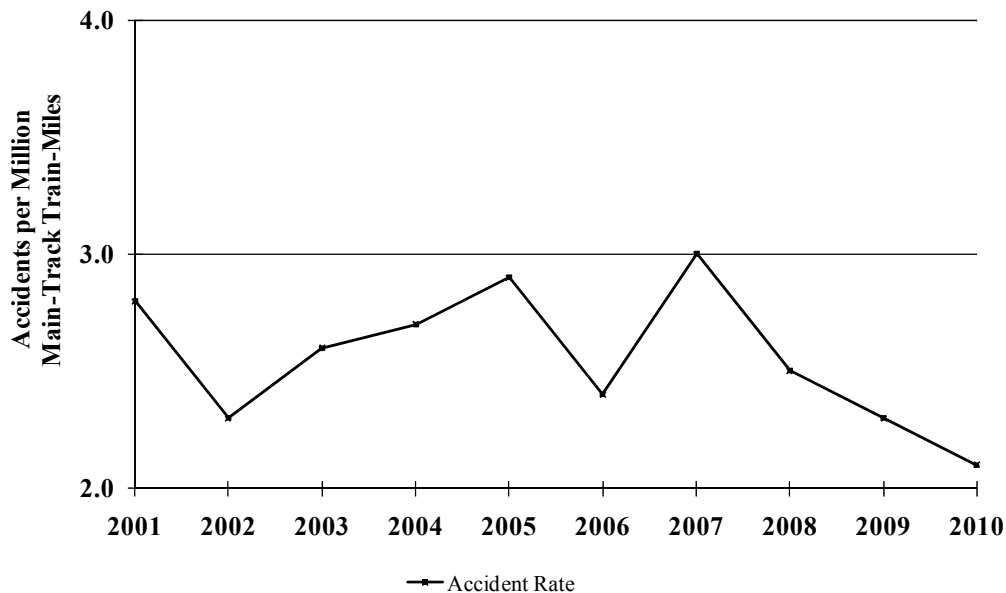
Figure 9: Rail Occurrences and Fatalities



According to data provided by Transport Canada, estimated rail activity increased by 7.3% from 2009 but decreased by 7.3% from the five-year average. The accident rate decreased to 12.8 accidents per million train-miles in 2010 from 13.3 in 2009, and the five-year rate of 14.1.

Another indicator of rail transportation safety in Canada is the main-track accident rate (Figure 10). This rate decreased to 2.1 accidents per million main-track train-miles in 2010 from 2.3 in 2009, and the five-year average of 2.7.

Figure 10: Main-Track Accident Rates



Main-track train-miles are estimated (Source: Transport Canada)

2.7.2 Investigations

A total of 14 rail investigations were started in 2010–2011 and 16 investigations were completed. The average duration of completed investigations was 442 days, down from the 2009 average of 498 days and below the previous five-year average (570 days).

Table 5: Rail Productivity

	2005– 2006	2006– 2007	2007– 2008	2008– 2009	2009– 2010	2010– 2011
Investigations Started	9	18	13	14	18	14
Investigations Completed	9	11	14	22	13	16
Average Duration of Completed Investigations (Number of Days)	519	598	697	539	498	442
Recommendations	0	2	4	2	4	1
Safety Advisories	9	8	16	11	8	9
Safety Information Letters	8	2	13	12	9	8

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.

2.7.3 Safety Actions Taken

One rail safety recommendation was issued in 2010–2011.

The Rail Branch reassessed responses to 30 recommendations issued since 1990. The Board’s reassessments were communicated to the appropriate change agent(s) for information and action.

2.7.3.1 Rail Recommendation Issued in 2010–2011

Rolling Stock Damage Without Derailment or Collision, Canadian National Freight Train at Dugald, Manitoba, 14 January 2009	
Report No. R09W0016	
RECOMMENDATION	R10-01 The Department of Transport, in conjunction with the railway industry and other North American regulators, establish a protocol for reporting and analyzing tank car stub sill failures so that unsafe cars are repaired or removed from service.
RESPONSE	Transport Canada (TC) accepts the intent of the recommendation. TC recognizes the importance of having appropriate data through effective reporting systems to protect public safety in the transportation of dangerous goods. Following this accident, TC analyzed the current data on tank car stub sill failures to identify trends and anomalies, and will continue this work as more information becomes available. In January 2010, TC initiated a stub sill inspection program for rail tank cars with its federal inspectors. TC is committed to working with the industry and other North America regulators to take appropriate steps to improve data collection and reporting requirements for stub sill repairs. TC has ongoing meetings with the Federal Railroad Administration (FRA) and the Association of American Railroads to investigate both the particulars of this accident and the associated data collection concerns. TC and the FRA are considering implementing additional interim reporting requirements for industry.

Rolling Stock Damage Without Derailment or Collision, Canadian National Freight Train at Dugald, Manitoba, 14 January 2009	
Report No. R09W0016	
	Over the next three or four years, TC will be conducting a full review and update of reporting requirements in Part 8 of the <i>Transportation of Dangerous Goods Regulations</i> . This review will consider any interim measures adopted, and assess the need for further regulatory changes to improve reporting of stub sill failures.
BOARD ASSESSMENT OF RESPONSE	TC initiated a full review and update of reporting requirements for failed tank car stub sills and, with the FRA, is considering implementing additional interim reporting requirements; however, the review is expected to last three to four years, and the results are unknown. TC has initiated safety actions, which, if fully implemented, will substantially reduce or eliminate the safety deficiency.
BOARD ASSESSMENT RATING	Satisfactory Intent

2.7.3.2 Assessment of Responses to Rail Recommendations Issued in 2009–2010

Runaway/Derailment, Canadian National Freight Train Near Lillooet, British Columbia, 29 June 2006	
Report No. R06V0136	
RECOMMENDATION	R09-03 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.
RESPONSE	Transport Canada (TC) accepts the recommendation and believes that action taken by Canadian National (CN) will improve its Safety Management System (SMS). TC has issued orders to revise certain rules affecting train operations and the use of dynamic braking.

Runaway/Derailment, Canadian National Freight Train Near Lillooet, British Columbia, 29 June 2006	
Report No. R06V0136	
BOARD ASSESSMENT OF RESPONSE	The Railway Locomotive Inspection and Safety Rules and the Railway Freight and Passenger Train Brake Inspection and Safety Rules were approved as amended. Although some risks will be mitigated through the implementation of these rules, the result of CN's overall approach to identify and mitigate risks to safety, as required by its SMS, will not be known immediately.
BOARD ASSESSMENT RATING	Satisfactory Intent

Crossing Collision and Derailment, VIA Rail Canada Inc. Train Mallorytown, Ontario, 15 July 2008	
Report No. R08T0158	
RECOMMENDATION	R09-04 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.
RESPONSE	Transport Canada (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.

Crossing Collision and Derailment, VIA Rail Canada Inc. Train Mallorytown, Ontario, 15 July 2008	
Report No. R08T0158	
BOARD ASSESSMENT OF RESPONSE	TC accepted the Board's recommendation and indicated that the Department is working with the appropriate authorities to develop a sign for low ground clearance advance warning at railway crossings. Distribution of the investigation report to members of the TOMSC should promote this safety issue and facilitate the desired outcome. However, the development of the proposed sign and its effectiveness will not be known immediately. TC has initiated safety actions, which, if fully implemented, will substantially reduce or eliminate the safety deficiency.
BOARD ASSESSMENT RATING	Satisfactory Intent

2.7.3.3 Other Rail Safety Actions

This section highlights rail safety action taken by regulators and operators on various issues as a result of TSB investigations.

TSB Investigation Report R08E0150

Canadian National (CN) implemented increased track inspections and speed restrictions where rail defect data indicated a higher risk of cold weather problems. CN is continuing to place emphasis on rail flaw detector testing during cold weather months. There has been a significant increase in the number of rail flaw detector tests over its main line track.

TSB Investigation Report R09H0010

Subsequent to a locomotive fire on a passenger train, VIA Rail Canada Inc. (VIA) revised its maintenance documentation to address potential problems with fuel injection pumps and fuel injectors. VIA revised its Emergency Response Procedures Refresher Course for On-Train Employees and updated its train evacuation procedures, passenger handling safety plan, and communications equipment. RailTerm introduced new rail traffic control protocols related to communications and track authorities when handling train emergencies.

TSB Investigation Report R09W0016

Transport Canada (TC), the United States Federal Railroad Administration (FRA), the Association of American Railroads (AAR), and tank car builders, are reviewing the UTLZBN design stub sill to better understand its failure mode and to determine if any regulatory action is required for tank cars built with these stub sills. CN enhanced its Smart Yard system at MacMillan Yard to ensure that bad order cars are appropriately handled.

TSB Investigation Report R09T0057

RailAmerica, in response to an accident involving improperly secured and unattended equipment on the Hydro Spur at Nanticoke, Ontario, revised its practices and expectations related to the securement of equipment.

TSB Investigation Report R09T0092

CN, in response to a train derailment involving high in-train forces, reviewed and revised its train make-up rules for conventional freight trains operating on the Kingston Subdivision. CN continues to monitor its train configurations for exceptional marshalling issues, such as large blocks of empties ahead of large blocks of loads. CN began implementing distributed power (DP) trains on the Kingston Subdivision with the intention that, in future, all trains operating at this location will be DP trains.

TSB Investigation Report R09H0006

Subsequent to a derailment involving broken securement mechanisms for various panels on a locomotive, TC completed a survey of federally regulated railways to ensure that various panels on locomotives are appropriately secured. TC Rail Safety inspectors verified that adequate instructions exist for inspecting the securement mechanisms and that railway inspections are being performed as required.

After a beaver dam collapse resulted in a track washout and train derailment, RailAmerica implemented annual aerial inspections to identify high-risk flooding areas beyond the range of conventional right-of-way and culvert inspections.

TSB Investigation Report R09W0118

After a CN freight train collided with the tail end of the preceding train, CN issued a Notice to all chief dispatchers and rail traffic controllers (RTCs) concerning Rule 564(e) and items 759 and 760 of the *Rail Traffic Control Manual*. The notice prohibits the use of reduced speed Rule 564 authority when there is equipment ahead in the block.

TSB Investigation Report R09V0230

Subsequent to a train collision during which crew members were distracted, Canadian Pacific Railway (CPR) established a signal record checklist as a standard operating procedure to aid in the detection, identification, communication, and documentation of signals.

TSB Investigation Report R09V0235

CN installed an Emergency Slope Washout and Detection System (ESWOD) near Komo, British Columbia, in the Fraser Canyon corridor after a train struck a debris slide of rock, mud and trees.

TSB Investigation Report R10T0035

Subsequent to a derailment investigation involving a failed axle that had previously been reconditioned, the AAR directed the AAR Wheels, Axles, Bearings and Lubrication (WABL) Committee to review non-destructive testing methods for inspecting axle bodies.

TSB Investigation Report R06T0022

TC reviewed the status of the removal of all suspect CNPU loose wheels from service in Canada and advised that the immediate threat to safety had been addressed by the railway industry. The majority of the suspect wheel sets have been identified and removed. TC requested from CN a semi-annual report on any residual wheel sets identified.

TSB Investigation Report R05T0030

TC developed the *Pedestrian Safety at Crossing Guide* to evaluate the risk to pedestrians at grade crossings. TC Rail Safety inspectors have evaluated most multi-track main-line crossings and the results are being further analyzed.

CN developed a new standard for “Walk Light” warning lights at restricted crossings where access is controlled. TC has approved the standard (TC E-39) for the use of these lights. CN has installed these warning lights at six private crossings.

TC approved Engineering Standards for Grade Crossing Systems Used at Restricted Grade Crossings (TC E-52) where access is not controlled.

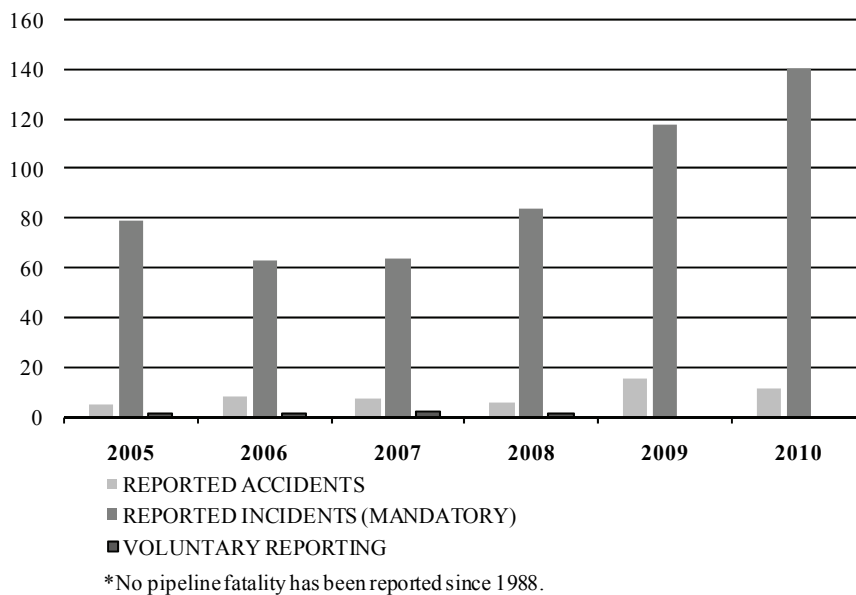
2.8 Pipeline Sector

2.8.1 Annual Statistics

Eleven pipeline accidents were reported to the TSB in 2010, down from the 2009 total of 15, but above the 2005–2009 average of 8. 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 2010, 140 pipeline incidents were reported to the TSB in accordance with the mandatory reporting requirements, up from 118 in 2009 and the five-year average of 82.⁴ In all, 86% of those incidents involved uncontained or uncontrolled release of small quantities of gas, oil and high-vapour-pressure products.

Figure 11: Pipeline Occurrences

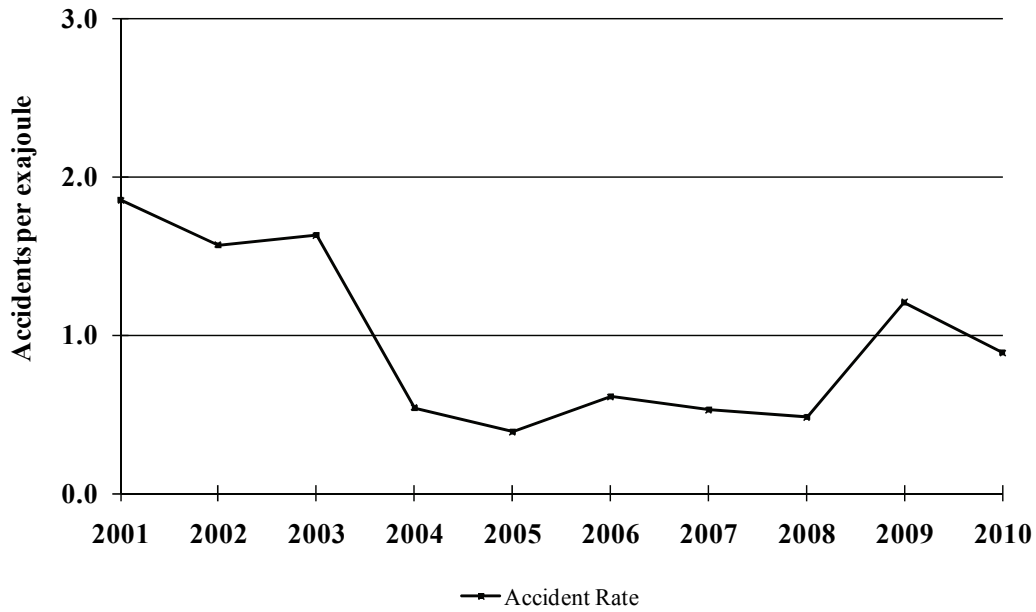


One indicator of pipeline transportation safety in Canada is the pipeline accident rate.⁵ The 2010 rate was 0.9 pipeline accidents per exajoule (according to information provided by the National Energy Board of Canada), down from 2009 (1.2) but up from the 2005–2009 average of 0.6.

⁴ In 2009, there was a 38% increase in federally regulated pipeline and associated facilities due to an additional 23 705 kilometres of pipeline transferred from provincial jurisdiction.

⁵ 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 12: Pipeline Accident Rates



Exajoules are estimated for 2009 and 2010 (Source: National Energy Board)

2.8.2 Investigations

In 2010–2011, 1 pipeline investigation was started and 3 investigations were completed. The average duration of completed investigations was 431 days, up from the 2009 average of 374 days, but remaining below the average of the previous five years (538 days).

Table 6: Pipeline Productivity

	2005– 2006	2006– 2007	2007– 2008	2008– 2009	2009– 2010	2010– 2011
Investigations Started	2	1	2	1	3	1
Investigations Completed	1	1	2	2	1	3
Average Duration of Completed Investigations (Number of Days)	922	407	489	542	374	431
Recommendations	0	0	0	0	0	0
Safety Advisories	0	0	0	0	0	2
Safety Information Letters	0	1	0	1	0	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.						

2.8.3 Safety Actions Taken

This section highlights pipeline safety action taken by the regulator and operators on various issues as a result of TSB investigations.

TSB Investigation Report P09H0074

Subsequent to the rupture of a TransCanada PipeLines Limited (TCPL) natural gas pipeline near Englehart, Ontario, the following safety actions were taken:

- TCPL reduced the interval for hydrostatic testing for valve sections on Line 100-2 with previous in-service or hydrostatic test failures from five years to four years.
- TCPL conducted in-line inspections for stress corrosion cracking (SCC) to verify the pipe integrity on three valve sections of Line 100-2.
- TCPL continues to enhance its stress corrosion cracking management capabilities through the development and implementation of crack-sensitive in-line inspection (ILI) tools.

TSB Investigation Report P09H0083

Subsequent to the rupture of a natural gas pipeline near Marten River, Ontario, TCPL conducted an ILI of several segments of Line 100-1 for hard spots.

TSB Investigation Report P09H0084

Subsequent to the leak of an Enbridge Pipelines Inc. (Enbridge) crude oil pipeline near Odessa, Saskatchewan, the following safety actions were taken:

- Enbridge revised the reporting criteria for ILI vendors to include dents with multiple apexes or dents in close proximity to each other, regardless of depth.
- Enbridge imposed maximum limits on drag-reducing agent injection rates to ensure that its material balance system model operates within its design range.

The National Energy Board (NEB) issued an advisory to pipeline companies to highlight the need to review and update their integrity management programs to consider the failure of shallow dents.

Appendix A – Reports Released by the TSB in 2010–2011 by Sector

Air Reports Released in 2010–2011

DATE	LOCATION	AIRCRAFT	EVENT	REPORT NO.
2008.01.10	Washington State, United States	Airbus A319-114	Encounter with wake turbulence	A08W0007
2008.02.19	Hamilton, Ont.	Boeing 727-260	Collision with trees on approach	A08O0036
2008.03.05	Québec International Airport/Jean Lesage, Que.	Airbus A310-308	Out-of-trim nose down condition leading to an airplane upset	A08Q0051
2008.04.30	Montréal, Que., 50 nm W	Airbus A330-343	In-flight fuel feed failure resulting in engine fuel starvation	A08Q0082
2008.08.26	Montréal/Pierre Elliott Trudeau International Airport, Que.	Boeing 747-428	Runway excursion	A08Q0171
2008.10.22	Kuujuuaq, Que.	Boeing 737 and de Havilland DHC-8	Risk of collision	A08Q0209
2008.11.04	Natuashish, N.L.	de Havilland DHC-6-300 Twin Otter and de Havilland DHC-6-300 Twin Otter	Mid-air collision	A08A0147
2008.11.16	South Thormanby Island, B.C.	Grumman G-21A	Controlled flight into terrain (CFIT)	A08P0353
2008.12.14	North Bay Jack Garland Airport, Ont.	de Havilland DHC-8-100	Runway overrun	A08O0333
2009.01.06	Buckland, Que.	Piper PA-28-140	Controlled flight into terrain	A09Q0003
2009.01.16	Island Lake, Man.	Beech 100	Collision with trees on missed approach	A09C0012
2009.02.09	Fort McMurray, Alta.	Beech 1900D and snowplow	Runway incursion and risk of collision	A09W0026
2009.03.06	Whitehorse International Airport, Y.T.	Bombardier CL-600-2D15 and airport maintenance vehicles (snow sweepers)	Risk of collision	A09W0037
2009.03.12	St. John's, N.L., 35 nm E	Sikorsky S-92A	Main gearbox malfunction and collision with water	A09A0016
2009.04.24	Penticton, B.C., 20 nm SW	Canadair CL600 and Boeing 777-200LR	Loss of separation	A09P0096
2009.05.04	Saint-Louis, Que.	Cessna 150L	Collision with cable – sinking in water	A09Q0065

DATE	LOCATION	AIRCRAFT	EVENT	REPORT NO.
2009.05.13	Lac au Mirage, Que.	Aventurier (amateur-built)	In-flight breakup of the right wing	A09Q0071
2009.06.19	North Bay, Ont.	Boeing 767-300	Erroneous instrument indications resulting in airspeed and altitude deviations	A09O0117
2009.07.17	Kangiqsujuaq, Que., 36 nm SE	Bell 206L (helicopter)	Controlled flight into terrain	A09Q0111
2009.07.19	Kamsack, Sask.	Piper PA-46-310P	Loss of control and collision with terrain	A09C0120
2009.07.22	Creston, B.C., 8.5 nm NW	Robinson R44 Astro (helicopter)	In-flight breakup	A09P0210
2009.08.03	Torrance, Ont.	Cessna TU206G (amphibious)	Tree strike during climb-out	A09O0159
2009.08.04	Nahanni Butte, N.W.T., 17 nm W	Robinson R44 Raven II (helicopter)	Loss of control and tail strike	A09W0146
2009.08.05	Mont-Laurier, Que.	Enstrom F-28C (helicopter)	Loss of control and collision with cables	A09Q0131
2009.09.21	Huttonville, Ont.	Robinson R22 Alpha (helicopter)	Collision with terrain	A09O0207
2009.10.10	South River, Ont., 22 sm E	Piper PA-28R-180	Controlled flight into terrain	A09O0217
2009.10.11	Mirabel, Que.	Piper PA-34-200T	Fuel starvation	A09Q0181
2009.10.20	Vancouver, B.C., 40 nm NE	de Havilland DHC-8-311	Flightdeck windshield – electrical arcing and fire	A09P0351
2009.10.23	Thunder Bay, Ont., 10 nm NE	Cessna 185A	Fuel starvation and forced landing	A09C0167
2009.11.06	Cat Lake, Ont., 8 nm SW	Cessna 310R	Controlled flight into terrain	A09C0172
2009.11.29	Lyall Harbour, Saturna Island, B.C.	De Havilland DHC-2-MK 1 (Beaver)	Loss of control and collision with water	A09P0397
2010.01.31	Varadero, Cuba	Airbus A320-232	Runway excursion	A10F0012
2010.03.01	Yellowknife, N.W.T.	CL600-2B19 and BAE 3112	Loss of separation	A10W0038
2010.03.02	Calgary International Airport, Alta.	BAE 125-800A and de Havilland DHC-8-102	Runway incursion	A10W0040
2010.03.23	Toronto, Ont.	Airbus A320-211	Cabin smoke and passenger evacuation	A10O0045
2010.05.13	Pikwitonei, Man., 3 nm E	Beech 95-55	Fuel starvation and forced landing	A10C0060
2010.05.25	Toronto/ Buttonville Municipal Airport, Ont.	Cirrus SR20	Power loss and collision with building	A10O0101
2010.07.18	Rankin Inlet, Nun.	Aero Commander 500S	Engine power loss and forced landing	A10C0123

Marine Reports Released in 2010–2011

DATE	LOCATION	VESSEL(S)	TYPE	EVENT	REPORT NO.
2007.08.16	Entrée Island, Harrington Harbour, Que.	<i>Nordik Express</i>	Passenger vessel	Striking	M07L0158
2009.05.01	Off Sainte-Thérèse Island, Montréal, Que.	<i>1815</i>	Rescue boat	Capsizing	M09L0068
2009.05.18	Off Rivière-au-Renard, Que.	<i>Marsouin I</i>	Small fishing vessel	Capsizing with loss of life	M09L0074
2009.07.19	Entrance to Sechelt Rapids, B.C.	<i>North Arm Venture</i> <i>North Arm Express</i>	Tug Barge	Tug girding and capsizing	M09W0141
2009.07.23	Campbell Bay, Strait of Georgia, B.C.	<i>Explorathor</i>	Passenger vessel	Bottom contact and subsequent sinking	M09W0147
2009.09.12	Cape Spear, N.L., 67 nm E	<i>Sea Gypsy Enterprises</i>	Small fishing vessel	Taking on water and sinking	M09N0031
2009.10.05	Lac Saint-Louis, Que.	<i>Federal Agno</i>	Bulk carrier	Grounding	M09C0051
2009.12.16	Cape St. Mary's, N.S., 11 nm SW	<i>Pubnico Explorer</i>	Small fishing vessel	Taking on water and sinking	M09M0073

Rail Reports Released in 2010–2011

DATE	LOCATION	COMPANY	EVENT	REPORT NO.
2008.12.18	Peers, Alta.	Canadian National	Main-track derailment	R08E0150
2008.12.29	Waneta, B.C.	Kettle Falls International Railway	Non-main-track train runaway and collision	R08V0270
2009.01.14	Dugald, Man.	Canadian National	Rolling stock damage without derailment or collision	R09W0016
2009.02.11	Nanticoke, Ont.	Southern Ontario Railway	Runaway and non-main-track train derailment	R09T0057
2009.02.13	Robinson, Ont.	Canadian National	Main-track train derailment	R09W0033
2009.03.21	Brighton, Ont.	Canadian National	Main-track train derailment	R09T0092
2009.06.03	Hodgson, Ont.	Ottawa Valley Railway	Main-track derailment	R09H0006
2009.06.28	Jones, Ont.	Canadian National	Main-track train collision	R09W0118
2009.08.16	Richmond, Ont.	VIA Rail Canada Inc.	Locomotive engine fire	R09H0010
2009.09.09	Montréal, Que.	VIA Rail Canada Inc.	Non-main-track collision	R09D0053
2009.10.14	Nanaimo, B.C.	VIA Rail Canada Inc.	Crossing collision	R09V0219
2009.10.30	Redgrave, B.C.	Canadian Pacific Railway	Main-track train collision	R09V0230
2009.11.17	Komo, B.C.	Canadian National	Main-track derailment	R09V0235
2009.11.21	Saint-Tite, Que.	Canadian National	Main-track derailment	R09Q0047
2009.12.05	Spy Hill, Sask.	Canadian National	Main-track train derailment	R09W0252
2010.03.02	Morrisburg, Ont.	Canadian National	Main-track train derailment	R10T0035

Pipeline Reports Released in 2010–2011

DATE	LOCATION	COMPANY	EVENT	REPORT NO.
2009.09.12	Near Englehart, Ont.	TransCanada PipeLines Limited	Natural gas pipeline rupture	P09H0074
2009.09.26	Near Marten River, Ont.	TransCanada PipeLines Limited	Natural gas pipeline rupture	P09H0083
2009.09.29	Odessa, Sask.	Enbridge Pipelines Inc.	Crude oil pipeline leak	P09H0084

Appendix B – Glossary

Accident	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>)
Incident	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>)
Occurrence	a transportation accident or incident
Recommendation	a formal way to draw attention to systemic safety issues, normally warranting ministerial attention
Safety Concern	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
Safety Advisory	a less formal means for communicating lesser safety deficiencies to officials within and outside the government
Safety Information Letter	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.