Transportation Safety Board of Canada

Bureau de la sécurité des transports du Canada

TSB

TRANSPORTATION SAFETY BOARD

Annual Report to Parliament

2002-2003

Canada

Transportation Safety Board of Canada
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Place du Centre
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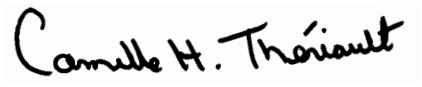
12 June 2003

The Honourable Stéphane Dion, 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 2002 to 31 March 2003.

Yours sincerely,



Camille H. Thériault
Chairperson

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MEMBERS OF THE BOARD

Chairperson Camille H. Thériault. Public management experience includes Premier of New Brunswick, provincial Minister of Economic Development, and responsibility for the Information Highway Secretariat. Private enterprise experience includes General Manager of the Kent Industrial Commission and Vice-President of the United Maritimes Fishermen's Cooperative.

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.

Member Charles H. Simpson. Transportation executive experience includes Executive Vice-President, Operations, of Air Canada; President of the Canadian Air Line Pilots Association; and Vice-President of the International Federation of Air Line Pilots Associations.

Member 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 R. Henry Wright. Management and consulting experience includes auditor for the Ontario Ministry of Community and Social Services, senior management administrator of several non-profit organizations, and consultant in government and public relations.

CHAIRPERSON'S MESSAGE

Since its creation 13 years ago, the Transportation Safety Board of Canada (TSB) has focused on its mandate to advance transportation safety in the marine, pipeline, rail and air modes of transportation. We are committed to reviewing developments in transportation safety and identifying safety risks that we believe government and the transportation industry should address to reduce injury and loss. With each investigation we conduct, we continue to focus on improving transportation safety, today and for the future. Given the events of the past two years, and concerns with the safety and security of transportation, Canadians expect no less.

Now well into its second decade of existence, the TSB is not content to rest on its past successes and has increased its focus on future challenges. The Board has built a solid reputation and awareness of our role and mandate continues to grow. However, in order to meet the challenges of the future while continuing to build on past experience, issues such as an aging workforce and recruitment and retention need to be addressed. Like many Canadian organizations, the TSB is facing a potential loss of corporate knowledge as experienced staff retire. One of the challenges the TSB will face in the coming years will be the recruitment, training, and retention of qualified staff who are the backbone of any organization.

Advances in technology have resulted in rapid changes in transportation. The TSB needs to adapt to these changes and take advantage of these advances. This will help ensure that our investigations remain at the leading edge and that we continue to meet the expectations of our stakeholders.

March 2003 saw the completion of the investigation into the crash of Swissair Flight 111. TSB investigators have made use of many developments in technology over the course of this very complex investigation, which resulted in the Board making 23 Aviation Safety Recommendations. This was the largest, most complex aviation safety investigation the TSB has ever undertaken and required a significant investment of people, resources and time. The efforts of thousands of hardworking people from various countries, industries and regulatory authorities culminated in a comprehensive report that has changed the face of aviation safety. The lessons learned over the course of this investigation will stand us in good stead as we face the challenges of future investigations.

On the international scene, the TSB continues to be part of the International Transportation Safety Association, an affiliation of independent accident investigation agencies from countries around the world who share information and investigative skills. Information regarding various transportation occurrences is shared between countries, contributing to better international cooperation on investigations.

Also on the international front, Marine Branch staff participated in a number of International Maritime Organization safety committees and working groups, including those which involved fatigue and human element matters, and the development of carriage requirements for voyage data recorders. Air Branch staff participated in consultations and conferences on international standards and bilateral agreements and protocols with the investigation authorities of France, Iceland, Norway, Portugal, and Thailand. The assistance provided to the Portuguese authorities in the Air Transat accident has reinforced the international view of the TSB as a highly competent, independent agency.

Rail Branch staff took part in consultations and safety conferences with the investigation authorities of Australia, New Zealand, South Africa, Finland, and the United States. Pipeline staff participated in conferences with counterparts from Australia, Brazil, and the United Kingdom.

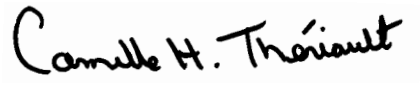
Now more than ever, as we move further into the 21st century, transportation transcends international borders, and lessons learned in one jurisdiction can be lessons learned by all.

Internally, the TSB is continuing to refine its business-planning process in order to ensure that priorities are identified and funded to enable the organization to deliver on its mandate in the most effective and efficient manner. An overall focus on management improvements is designed to help the organization prepare to meet the challenges of the future.

The Business Plan for 2002-2003 produced many excellent results throughout the year and established a solid foundation for further improvements in subsequent years. The articulation of priorities and a resource-planning cycle adapted to TSB needs, the execution of a formalized stakeholder-needs analysis, the creation of a performance-measurement structure, focussed training for investigative staff to improve the quality and timeliness of TSB safety products, and the integration of workplace and human resource issues into day-to-day management deliberations are just a few indicators of progress achieved during the past fiscal year.

In developing the business plan for fiscal year 2003-2004, the TSB will focus to a greater degree upon the measurement of outcomes. All of our business plan activities are motivated by the overriding objectives of finding ways to enhance the TSB's relevance and contribution to transportation safety in Canada and internationally, and of continuously strengthening the organization from within.

As we look back on the history of the TSB with pride, we also look forward with confidence that we will be able to meet the challenges the future may bring.



Camille H. Thériault

SENIOR MANAGEMENT

Executive Director	D. Kinsman
General Counsel	A. Harding
Director General, Investigation Operations	T. Burtch
Director General, Information Strategies and Analysis	G. Hunter
Director, Corporate Services	J. L. Laporte
Director, Marine Investigations	F. Perkins
Director, Rail/Pipeline Investigations	I. Naish
Director, Air Investigations	D. Verreault
Director, Engineering	J. Hutchinson

MANDATE OF THE TSB

The *Canadian Transportation Accident Investigation and Safety Board Act* is the legal framework governing the TSB.

The mission of the TSB is to advance transportation safety by:

- conducting independent investigations, including public inquiries, into selected transportation occurrences to make findings as to their causes and their contributing factors;
- identifying safety deficiencies;
- making recommendations designed to eliminate or reduce safety deficiencies; and
- reporting publicly on its investigations and findings.

It is not the function of the Board to assign fault or to determine civil or criminal liability.

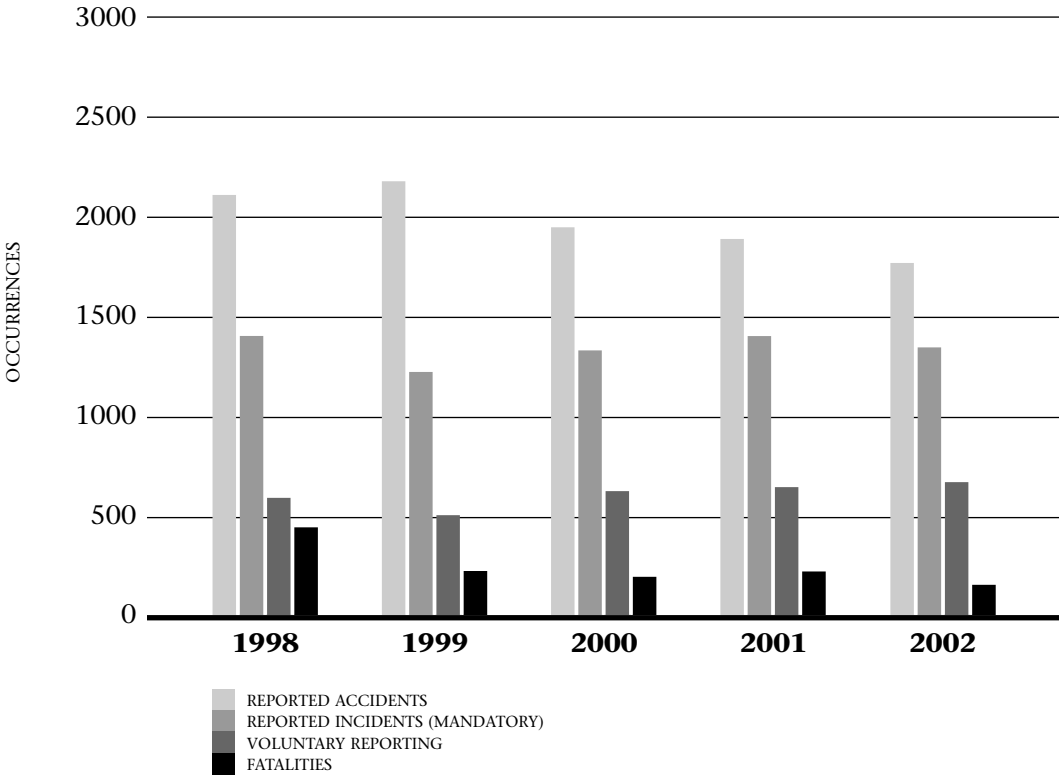
INDEPENDENCE

To encourage public confidence the investigating agency must be, and be seen to be, objective, independent, and free from any conflict of interest. A 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. This 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, and the integrity of its processes.

OCCURRENCES, INVESTIGATIONS AND SAFETY ACTIONS

In 2002, 1812 accidents and 1374 incidents were reported in accordance with the TSB's regulations for mandatory reporting of occurrences[1]. There were also 657 voluntary incident reports. The number of accidents in 2002 decreased by 8% from the 1959 accidents reported in 2001 and by 13% from the 1997-2001 annual average of 2071 accidents.

Figure 1 – Occurrences Reported to the TSB



All reported occurrences were examined in accordance with the Board's Occurrence Classification Policy to identify those with the greatest potential for advancing transportation safety. Investigations were undertaken for 87 of the approximately 3800 occurrences reported to the TSB in fiscal year 2002-2003. In fiscal year 2002-2003, 109 investigations were completed, compared to 112 in the previous year.[2] The number of investigations in process decreased to 138 at the end of the fiscal year, from 160 at the start. Average time to complete an investigation dropped slightly to 580 days in fiscal year 2002-2003, from 582 days in the previous year. Information on all reported occurrences was entered in the TSB database for historical record, trend analysis, and safety deficiency validation purposes.

1 While the Board's operations are for the 2002-2003 fiscal year, occurrence statistics are for the 2002 calendar year. Comparisons are generally to the last 5 or 10 years. For definitions of terms such as *accident*, *incident*, and *occurrence*, see Appendix A.

2 Investigations are considered complete after the final report has been issued.

Figure 2 – Investigations in Process / Completed

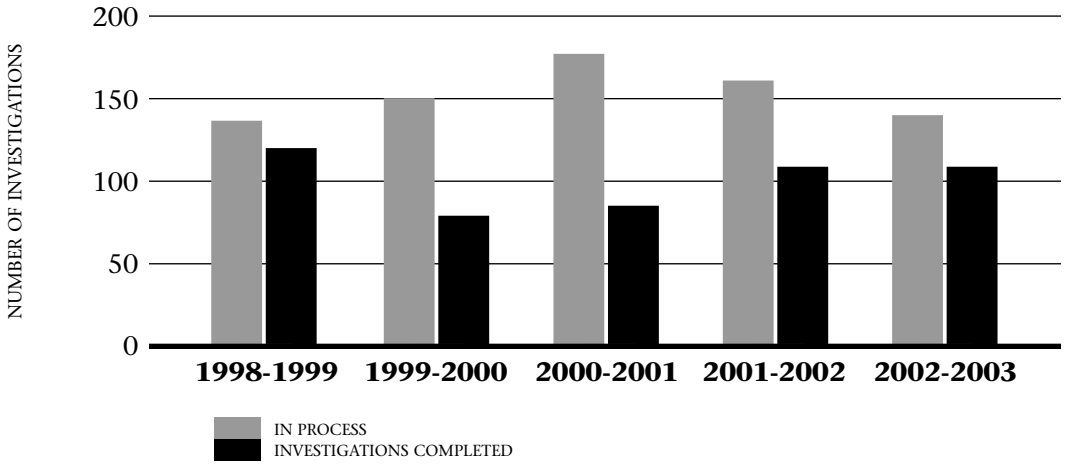


Figure 3 – Safety Action by the TSB

2002-2003	Recommendations[3]	Safety Advisories	Safety Information Letters
Marine	5	7	17
Pipeline	0	0	1
Rail	5	6	9
Air	12	11	6
Total	22	24	33

Note: A total of eight Safety Concerns were issued for Marine in 2002.
A total of six Safety Concerns were issued for Rail in 2002.

In accordance with the *Canadian Transportation Accident Investigation and Safety Board Act*, a federal minister who is notified of Board recommendations must, within 90 days, advise the Board in writing of any action taken or proposed to be taken in response, or of reasons for not taking action. The Board considers each response, assessing the extent to which the safety deficiency was addressed.

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

Figure 4 – Board Assessment of Responses to Recommendations

2002–2003	Fully Satisfactory Attention to Safety Deficiency	Satisfactory Intent to Address Safety Deficiency	Attention to Safety Deficiency Satisfactory in Part	Unsatisfactory Attention to Safety Deficiency	To Be Assessed	Total
Marine	0	0	2	0	0	2
Pipeline	0	0	0	0	0	0
Rail	0	4	1	0	0	5
Air	0	3	0	0	0	3
Total	0	7	3	0	0	10

LIAISON WITH CANADIAN TRANSPORTATION COMMUNITY

As part of the TSB's effort to keep abreast of technological change, and to maintain contact with the transportation industry in Canada, TSB staff and Board members attend and participate in various conferences and technical meetings pertinent to transportation safety.

Marine staff made safety presentations to the Canadian Marine Advisory Council, the Association of Marine Underwriters of British Columbia, and representatives of the fishing industry of Gaspé, Quebec. Across Canada, staff also participated in meetings with the Canadian Maritime Law Association, the Society of Naval Architects and Marine Engineers, and representatives of marine operators.

Air staff provided formal briefings on the TSB's mandate, organization, and operations to the Air Transport Association of Canada, the Aerospace Industries Association of Canada, Nav Canada, the Saskatchewan Aviation Council and the Northern Air Transport Association. Staff also provided briefings to Air Canada, Jazz and WestJet air carrier operators on occurrence investigation notification, procedures, and methodology.

Rail and Pipeline staff made presentations to the Railway Association of Canada, Transport Canada, University of New Brunswick Transportation Group, and western provincial rail safety regulators. The presentations related to the mandate of the TSB and the manner in which the Board's business is conducted.

INTERNATIONAL COOPERATION AND KNOWLEDGE TRANSFER

The TSB's mission is to advance transportation safety, not only in Canada but also worldwide. This cooperation comes in many forms: participation in safety symposiums, international safety organizations, and international investigations.

In 2002, the TSB continued as the lead investigator into the Swissair Flight 111 accident off Peggy's Cove, Nova Scotia. The Swissair 111 report, released 27 March 2003, was the most exhaustive investigation ever undertaken by the TSB. During the investigation, the Board led the efforts of thousands of individuals from various countries, companies and regulatory authorities. The report was four years in the making—due in large part to a complex underwater salvage effort in which 98% of the aircraft was recovered—and provides the world with one of the most detailed aviation disaster accounts ever compiled. The TSB also participated in the inquiry of another high-profile transportation accident as the accredited observer for Canada at the investigation into the Air Transat Flight 236 accident in Lajes, Azores (Portugal).

Significant safety advances were made from the earliest stages of the investigation, as the TSB acted immediately to inform the aviation community once any safety deficiencies were identified. In all, the Board issued 23 Aviation Safety Recommendations, Aviation Safety Advisories, and Aviation Safety Information Letters related to the Swissair investigation—the greatest contribution ever made by Canadians to international aviation safety.

TSB staff also attended other international transportation meetings, including those of the Marine Accident Investigators International Forum, the International Maritime Organization, the International Civil Aviation Organization and the International Society of Air Safety Investigations. The Marine branch continues to participate in the presentation of marine accident investigation courses sponsored by the IMO and given annually at the International Maritime Academy in Trieste, Italy.

Rail Branch staff took part in consultations and safety conferences with the investigation authorities of Australia, New Zealand, South Africa, Finland, and the United States. Pipeline staff participated in conferences with counterparts from Australia, Brazil, and the United Kingdom.

Documentation of human factors in investigation, investigating for fatigue and the TSB's investigation methodology was sent to rail regulatory/investigative agencies in South Africa and South Korea. Copies of TSB investigation reports on railway subgrade failure were forwarded to the Swedish Railway Inspection Board.

MARINE

ANNUAL STATISTICS

The number of marine accidents was at its lowest since 1975, with a total of 483 reported to the TSB in 2002. This represents a 7% decrease from the 2001 total of 517 and a 14% decrease from the 1997-2001 average of 559. Marine fatalities totalled 26 in 2002, down from 34 in 2001 and the 1997-2001 average of 33.

Shipping accidents, which accounted for 93% of marine accidents, totalled 447 in 2002, down from 458 in 2001 and the 1997-2001 average of 494. Half of all vessels involved in shipping accidents were fishing vessels. Accidents to persons aboard ship, which comprise the other 7%, and include falls, electrocution, and other types of injuries requiring hospitalization, showed a 39% decrease over the 2001 total of 59 and a 45% decrease over the 1997-2001 average of 65.

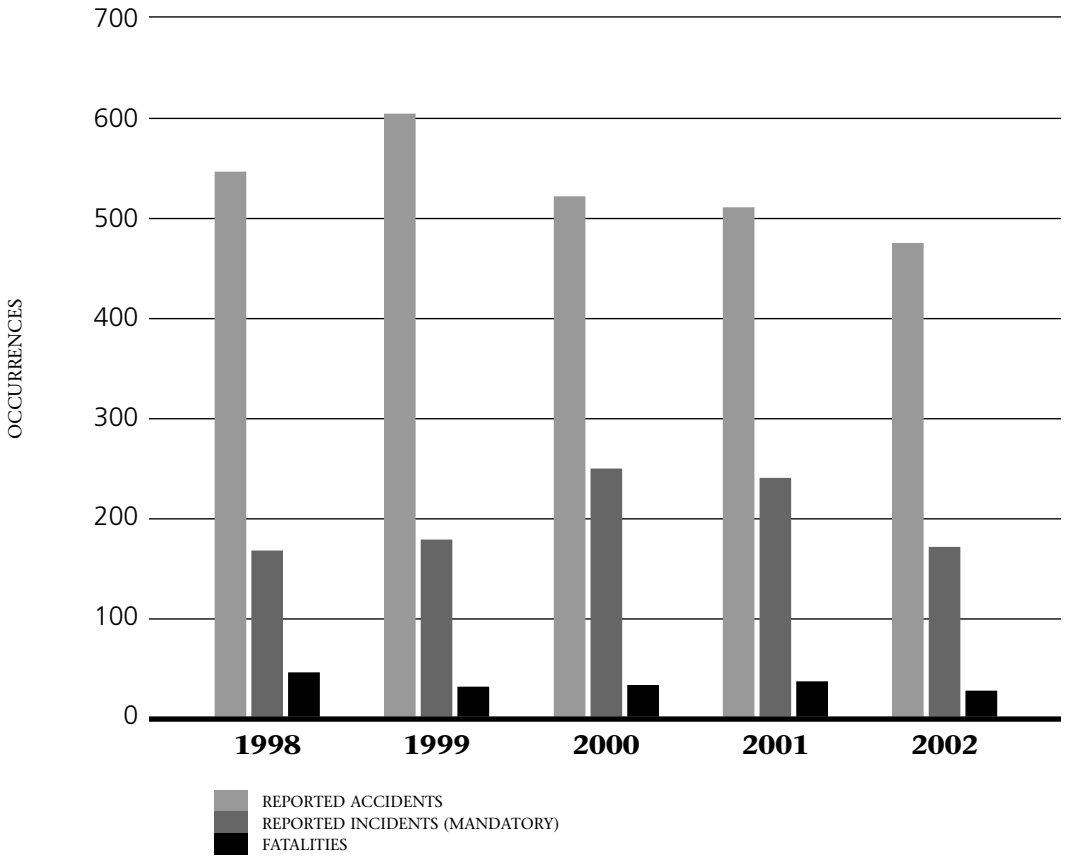
In 2002, the Canadian commercial vessel accident rate was 4.29 per 1000 trips, a 2% increase over the 2001 rate of 4.21, and a 21% increase over the 1997-2001 average of 3.54. The 2002 foreign commercial vessel accident rate was 1.61 per 1000 trips, a 13% decrease compared to the 2001 rate of 1.84, and a 23% decrease from the 1997-2001 average of 2.09.

In 2002, shipping accidents resulted in 17 fatalities, equal to last year and down two from the 1997-2001 average. Accidents aboard ship resulted in 9 fatalities, compared to 17 in 2001 and the 1997-2001 average of 14. Five shipping accidents and one accident aboard ship resulted in multiple fatalities.

Twenty-five vessels were reported lost in 2002, a considerable decrease over the 51 reported lost in 2001 and the 1997-2001 average of 48. This decrease is mainly accounted for by a decrease in lost vessels under 60 gross tons.

In 2002, 172 marine incidents were reported in accordance with TSB mandatory reporting requirements. This represents a 28% decrease from the 2001 figure of 239 and a 13% decrease over the 1997-2001 average of 197. This decrease is primarily attributable to a reduction in reported mechanical failures and close-quarters situations.

Figure 5 – Marine Occurrences and Fatalities



MARINE INVESTIGATIONS STARTED IN 2002-2003

The following information is preliminary. Final determination of events is subject to the TSB's full investigation.

DATE	LOCATION	VESSEL(S)	TYPE	EVENT	OCCURRENCE NO.
2002.04.01	Sechelt Rapids, BC	(no name)	Open rental boat	Capsizing	M02W0049
2002.04.13	Gabriola Island, BC	*Bowen Queen*	Passenger/vehicle	Steering control failure	M02W061
2002.04.21	St. Lawrence River, near Morrisburg, ON	*Progress*	Tug	Striking	M02C0011
2002.05.15	Anstruther Lake, Apsley, ON	(no name)	Workboat	Sinking	M02C0018
2002.05.22	Île de Grâce, QC	*Vaasaborg*	General cargo	Grounding	M02L0039
2002.06.11	Malaspina Strait, BC	*Bruce Brown*	Log salvage	Capsizing	M02W0089
2002.06.23	Ottawa River, Hull, QC	*Lady Duck*	Amphibious	Sinking	M02C0030
2002.07.08	Near Brasseau Bay, BC	*Fritzi-Ann*	Fishing	Capsizing	M02W0102
2002.07.16	Traverse Verchères, St. Lawrence River, QC	*Kent*	Bulk carrier	Fall overboard	M02L0061
2002.08.04	White Islets, BC	*Statendam*	Passenger	Fire	M02W0135
2002.08.13	Sandheads, BC	*Cap Rouge II*	Fishing	Capsizing	M02W0147
2002.10.12	South Shore Canal, St. Lawrence River, QC	*Stellanova* *Canadian Prospector*	General cargo Bulk carrier	Collision	M02C0064
2003.02.26	Batiscan, St. Lawrence River, QC	*Great Century*	Bulk carrier	Grounding	M03L0026

MARINE REPORTS APPROVED IN 2002-2003

DATE	VESSEL(S)	EVENT	REPORT NO.
1999.06.29	*Marabell 8*	Capsizing with loss of life	M99W0095
2000.04.11	*Millenium Yama*	Main-engine failure	M00L0034
2000.08.14	*Mersey Venture*	Uncontrolled descent of freight elevator	M00M0083
2000.10.18	*Fossnes*	Grounding	M00L0114
2001.01.09	*Alligator Victory*	Fatal accident	M01W0006
2001.02.03	*Thebaud Sea*	Fire in starboard engine room	M01M0005
2001.04.19	*Fame*	Flooding and sinking	M01N0020
2001.06.13	*Wasca II*	Near sinking	M01W0116
2001.06.30	*Lady Duck*	Taking on water and sinking	M01C0033
2001.07.30	*Cast Privilege*	Grounding	M01L0080
2001.08.11	*Windoc*	Striking and subsequent fire on board	M01C0054
2001.11.16	*Cedar*	Steering-gear failure and subsequent grounding	M01L0129
2002.04.13	*Bowen Queen*	Malfunction of automatic steering control	M02W0061

MARINE RECOMMENDATIONS APPROVED IN 2002-2003

Occurrence No.	Recommendations	Response Summary	Board Assessment of Response Action	Safety Action Taken
M01C0054	M02-01 The St. Lawrence Seaway Management Corporation reassess and clearly identify safety-sensitive positions in their organization in which incapacity due to impairment could result in direct and significant risk of injury to the employee, others or the environment.	To be reported next fiscal year.		
M01C0054	M02-02 The St. Lawrence Seaway Management Corporation establish programs and policies which are pro-active and promote early detection of impairment and safety risk of employees occupying safety-sensitive positions by management, supervisors or peers and which provide an effective mechanism for remedial action.	To be reported next fiscal year.		
M01C0054	M02-03 The St. Lawrence Seaway Management Corporation conduct, in collaboration with the other appropriate authorities and organizations, exercises to respond to vessel-related emergencies which may be encountered within the Seaway, including the Welland Canal, in order to evaluate the preparedness for responding to a major vessel-related emergency.	To be reported next fiscal year.		
M01C0054	M02-04 The Department of Transport ensure that overall preparedness is appropriate for responding to vessel-related emergencies within the Seaway.	To be reported next fiscal year.		
M01C0054	M02-05 The St. Lawrence Seaway Management Corporation ensure that physical and administrative defences are in place to ensure that Seaway bridges are prevented from coming into contact with transiting vessels.	To be reported next fiscal year.		

RESPONSES RECEIVED IN 2002-2003 TO RECOMMENDATIONS

Occurrence	Recommendation	Response Summary	Board Assessment of Response Action	Safety Action Taken
M99W0133	M01-04 The Department of Transport, in collaboration with the Council of Marine Carriers and other industry representatives, ensure that tugs and tows are equipped with navigation lights that meet the safety range of visibility.	Transport Canada (TC) agreed with recommendation M01-04 and needs to work with the Council of Marine Carriers (CMC) and others in the marine community to improve navigation lighting-compliance levels in the towing industry.	Satisfactory in Part	Collaboration between TC, the CMC and industry had led to the recent acceptance of new portable barge navigation lights. The CMC reports that several of its member companies who are involved in the movement of barges on the West Coast have purchased and fitted these lights on their barges.
M99W0133	M01-05 The Department of Fisheries and Oceans, in conjunction with the appropriate authorities in the United States, explore ways to ensure that operators of pleasure craft in their respective jurisdictions possess adequate competency and basic knowledge of navigation safety, including the requirements of the *International Regulations for Preventing Collisions at Sea*.	The 2000 *Safe Boating Guide* was amended to include information about the shapes and lights to be displayed by vessels engaged in towing. The Canadian Coast Guard's (CCG) Office of Boating Safety sent a letter to encourage the State of Washington to work towards a mandatory competency program for recreational boaters who navigate the shared coastline. The State of Washington was also petitioned by the US Coast Guard to bring in an operator competency regime.	Satisfactory in Part	An amendment to the *Competency of Operators of Pleasure Craft Regulations* is being considered to ensure that the Canadian regulations apply equally to visiting operators of foreign pleasure craft and Canadian operators. There also is an intention by CCG to overhaul the testing and certification process for pleasure craft. The US Coast Guard Office of Boating Safety reported that some headway has been made in this area and the State may have a requirement for operator competency in place by next summer.

REPLIES TO MARINE RECOMMENDATIONS

M01-04

- Transport Canada (TC) agreed with this recommendation.
- TC will work with the Council of Marine Carriers (CMC) and others in the marine community to improve navigation lighting compliance levels in the towing industry.
- TC accepted a new portable light that offers a greater visibility range and intensity.
- Several members of the CMC, who are involved in the movements of barges on the West Coast, have purchased and fitted these lights on their barges.
- Board Assessment: *Satisfactory in Part*.

M01-05

- The 2000 *Safe Boating Guide* was amended to include information about the shapes and lights to be displayed by vessels engaged in towing.
- The Canadian Coast Guard's (CCG) Office of Boating Safety sent a letter to encourage the State of Washington to work towards a mandatory competency program for recreational boaters who navigate the shared coastline. (The State of Washington was also petitioned by the US Coast Guard to bring in an operator competency regime.)
- An amendment to the *Competency of Operators of Pleasure Craft Regulations* is being considered to ensure that the Canadian regulations apply equally to visiting operators of foreign pleasure craft and Canadian operators. There is an intention by CCG to overhaul the testing and certification process for pleasure craft.
- The US Coast Guard Office of Boating Safety reported to CCG that some headway has been made in this area and the State may have a requirement for operator competency in place by next summer.
- Board assessment: *Satisfactory in Part*.

M02-01

- To be reported next fiscal year.

M02-02

- To be reported next fiscal year.

M02-03

- To be reported next fiscal year.

M02-04

- To be reported next fiscal year.

M02-05

- To be reported next fiscal year.

OTHER MARINE SAFETY ACTION TAKEN

- TC to conduct a review of the maintenance and inspection requirements of articulated and platform vehicle ramps and similar devices on ferries, and consideration to be given to more explicit wording in the regulations to clearly address these devices.
- A presentation was made at a meeting of the operational group of the Association of Canadian Port Authorities, highlighting that serious shipboard fires are possible, that municipal crews are untrained and that there is a need for pre-incident coordination.
- Fire departments of four municipalities along the Welland Canal and the St. Lawrence Seaway Management Corporation (SLSMC) are examining equipment and training issues associated with responding to shipboard fires.
- The SLSMC introduced new communication procedures regarding the initiating bridge-lowering sequence for all free-standing bridges between Montreal and Port Colborne.
- The SLSMC created four new shift-supervisor positions to supervise operational staff. Shift supervisors are now required to visit the bridge operator at every bridge on every shift.
- All amphibious vehicle operations across Canada were re-inspected by TC to verify compliance with all applicable regulations.
- TC issued a letter to Ontario operators of amphibious vehicles built by various manufacturers, recommending the immediate installation of watertight plugs or caps.
- TC sent a letter to all owners, operators, and builders of amphibious vehicles across Canada, reminding them of precautionary measures, based on best practices and existing regulations and standards, to enhance safety.
- On 01 May 2002, the *Small Vessel Regulations* were amended to require safety briefings on passenger vessels. TC issued a ship safety bulletin to advise operators of the requirement to conduct safety briefings. A letter was sent by TC to Ontario operators and a manufacturer, informing them of the requirement. TC also issued an advisory note referencing passenger safety briefings to its marine inspectors.
- TC has stated it will issue a ship safety bulletin to address the potential problem of steering-gear ram failure and high vibration associated with the Sperry/Kort nozzle combination.
- The Department of Fisheries and Oceans (DFO)/Canadian Coast Guard (CCG) *Radio Aids to Marine Navigation Annual Edition 2002* to include information about the importance of alerting authorities at the earliest possible moment of any situation that may involve a danger to life.
- TC has stated that it will bring to the attention of pilotage authorities the importance of pilots not to be engaged in non-pilotage duties when piloting a vessel, especially when in restricted waterways.
- The owner of a fleet of large fishing vessels issued safe working procedures for on-board freight elevators.
- A provincial occupational health and safety division issued corrective orders to the owner of a fleet of large fishing vessels to correct unsafe conditions and practices on board its vessels.
- DFO/CCG Quebec Region reviewed their marine traffic communications procedures and now issues vessel traffic restrictions to ships in both official languages.
- A ship management company will be promoting closer bridge teamwork through the use of suitable simulator training courses.

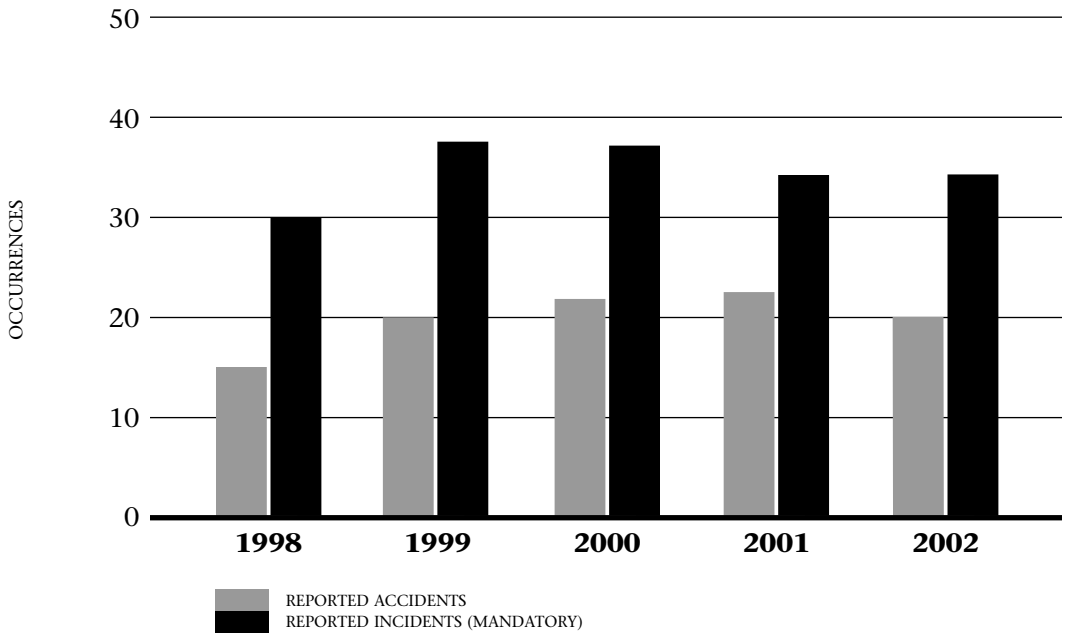
- A fleet-wide safety bulletin was issued by an owner to all ships' staff, providing guidance on the inspection of the fuel system on the specific make of generators.
- Splash guards were fitted to a vessel's fuel oil filters to redirect any potential fuel leaks to the bilge.
- Electric solenoids on a vessel's engine room exhaust ventilation dampers were replaced with a non-electrified, manual closing arrangement (pull station).
- TC has stated it will carry out a review of the quality assurance and inspection procedures of a manufacturer of lifebuoys.
- DFO/CCG has stated it will be meeting with concerned parties to review plans in place for special events, such as the *Celebration of Light*, to ensure the safe transit of vessels.
- Modifications to a small commercial catamaran were made to increase its positive buoyancy.
- A discussion paper by TC for new training and certification programs for the operators of small commercial and fishing vessels, including passenger vessels under 5 GRT, received support from industry stakeholders.
- DFO updated its 2003 edition of *Notice to Mariners* on the importance notifying, as early as possible, search and rescue authorities of potential distress situations.
- Improvements to the construction of certain immersion suits to permit more constant use were made by manufacturers.
- British Columbia Ferry Corporation and the manufacturers of an automatic steering control system are in the process of drawing up a comprehensive "time based" planned maintenance schedule for the printed circuit boards used in the automatic steering control unit.
- TC issued an advisory note to its marine safety inspectors to confirm, during annual inspections, that if sprinklers systems are found to be secured to wooden structures or not adequately installed, such structures are replaced by appropriate structures constructed of non-combustible materials.
- TC will consider including in the new *Fire Safety Regulations* a provision requiring that fire control plans on Canadian non-convention vessels be stored so as to be readily available to shore-based fire departments.
- TC will issue a ship safety bulletin requesting that ship operators make available fire control plans on Canadian non-convention vessels.

A total of 20 pipeline accidents were reported to the TSB in 2002, compared to 23 in 2001 and the 1997-2001 average of 21. The last fatal pipeline accident in the portion of the industry under federal jurisdiction occurred in 1988. No serious injuries resulted from pipeline accidents in 2002. Between 1997 and 2001, five serious injuries occurred, including four from one accident in 1998.

Pipeline activity is estimated to have increased by 5% over last year, yielding an accident rate of 1.5 pipeline accidents per exajoule in 2002, down from 1.82 in 2001 and the 1997-2001 average rate of 1.85.

In 2002, 34 pipeline incidents were reported in accordance with TSB mandatory reporting requirements, equal to last year's total and down one from the 1997-2001 average. In 2002, 82% of incidents involved uncontained or uncontrolled release of small quantities of gas, oil, and high vapour-pressure products.

Figure 6 – Pipeline Occurrences



PIPELINE INVESTIGATIONS STARTED IN 2002-2003

The following information is preliminary. Final determination of events is subject to the TSB's full investigation.

DATE	LOCATION	COMPANY	EVENT	OCCURRENCE NO.
2002.04.14	Brookdale, MB	TransCanada Pipelines	Natural gas pipeline rupture	P02H0017
2002.12.07	Côteau du Lac, QC	TransNorthern Pipelines	Oil pipeline rupture	P02H0052

PIPELINE REPORTS APPROVED IN 2002-2003

DATE	LOCATION	COMPANY	EVENT	REPORT NO.
2001.01.17	Hardisty, AB	Enbridge Pipelines Inc.	Oil pipeline rupture	P01H0004
2001.09.29	Stoney Creek, ON	Enbridge Pipelines Inc.	Oil pipeline rupture	P01H0049

PIPELINE SAFETY ACTION TAKEN

Following two incidents involving failure of mechanical seals on pipeline systems in the West, a manufacturer of stainless steel drive screws revised its inventory system to ensure that there would be no future possibility of an incorrect order being made.

RAIL

ANNUAL STATISTICS

In 2002, rail accidents reported to the TSB reached a ten-year low of 985, representing a 7% decrease from last year's total of 1060 and a 10% decrease from the 1997-2001 average of 1089. Rail activity increased by 2.9 million train-miles over last year, resulting in an accident rate of 10.7 accidents per million train-miles compared to 11.8 in 2001 and the 1997-2001 average rate of 12.1. There were 96 rail-related fatalities in 2002, compared to 99 in 2001 and the 1997-2001 average of 100. All rail-related fatalities in 2002 were accounted for by crossing and trespasser accidents, with 48% and 52% of fatalities respectively.

There were 117 main track derailments and 8 main track collisions in 2002, compared to 127 and 7, respectively, in 2001 and the 1997-2001 averages of 129 and 10. Non-main track train collisions totalled 112 in 2002, a 30% increase over the 86 reported in 2001, and a 7% increase over the 1997-2001 average of 105. Non-main track train derailments numbered 347 in 2002, down from 385 in 2001 and the 1997-2001 average of 377.

There were 261 crossing accidents in 2002, down from 278 in 2001 and the 1997-2001 average of 281. Although the number of crossing accidents has decreased, the number of crossing-related fatalities showed a 12% and 28% increase, respectively, over last year and the 1997-2001 average.

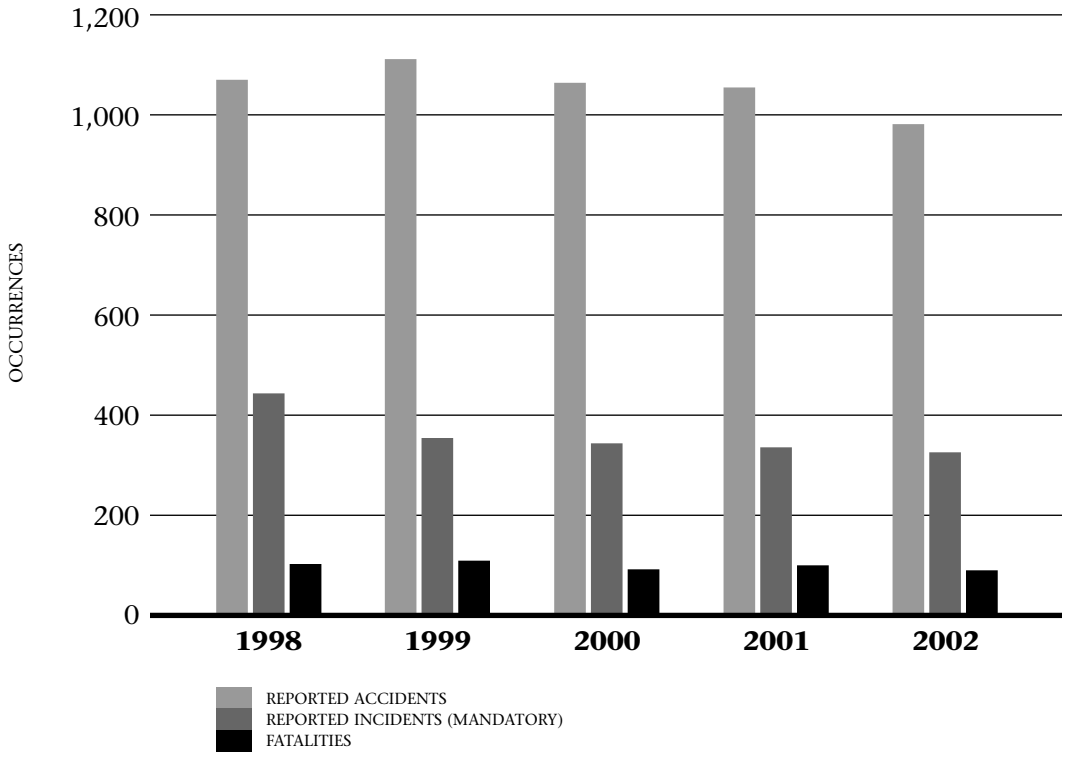
Trespasser accidents (individuals, primarily pedestrians, struck by rolling stock on railway rights-of-way other than at railway crossings) totalled 72 in 2002, down from 79 in 2001 and the 1997-2001 average of 86. Trespassing fatalities showed an 11% and 17% decrease, respectively, over last year and the 1997-2001 average.

In 2002, 224 accidents involved railcars carrying or having recently carried dangerous goods, compared to 205 in 2001 and the 1997-2001 average of 241; three of these accidents resulted in a release of product.

Accidents involving passenger trains totalled 66 in 2002, down from 76 in 2001 and the 1997-2001 average of 71. Most accidents involving passenger trains either occur at crossings or involve trespassers being struck by a train.

In 2002, reported rail incidents reached a twenty-year low of 303, down from 322 in 2001 and the 1997-2001 average of 373. Dangerous-goods leakers not related to train accidents annually account for the largest proportion of these incidents. There were 167 dangerous-goods leakers in 2002, down from 194 in 2001 and the 1997-2001 average of 221.

Figure 7 – Rail Occurrences and Fatalities



RAIL INVESTIGATIONS STARTED IN 2002-2003

The following information is preliminary. Final determination of events is subject to the TSB's full investigation.

DATE	LOCATION	COMPANY	EVENT	OCCURRENCE NO.
2003.03.28	Lennoxville, QC	Canadian National	Main track derailment	R03D0042
2003.02.21	Melrose, ON	Canadian Pacific	Main track collision and derailment	R03T0080
2003.02.13	Parry Sound, ON	Canadian Pacific	Main track derailment	R03T0064
2003.02.05	Port Moody, BC	Canadian Pacific	Non-main track derailment	R03V0019
2003.02.04	MacMillan Yard, Toronto, ON	Canadian National	Dangerous-goods leaker	R03T0047
2003.01.21	Toronto Yard, Agincourt	Canadian Pacific	Yard collision	R03T0026
2003.01.21	St. Charles, QC	Canadian National	Train collision with a track unit	R03Q0003
2002.12.04	Bullshead, AB	Canadian Pacific	Main track derailment	R02E0114
2002.10.24	Hibbard, QC	Canadian National	Main track derailment	R02D0113
2002.08.13	Shubenacadie, NS	Canadian National	Main track derailment	R02M0050
2002.07.23	Carstairs, AB	Canadian Pacific	Main track derailment	R02C0054
2002.07.22	Joffre, QC	Canadian National	Non-main track derailment	R02Q0041
2002.07.08	Camrose, AB	Canadian National	Main track derailment	R02C0050
2002.07.03	L'Assomption, QC	Canadian National	Main track derailment	R02D0069
2002.05.13	Kingston, ON	VIA	Crossing accident	R02T0149
2002.05.02	Firdale, MB	Canadian National	Crossing accident	R02W0063
2002.04.28	Natal, BC	Canadian Pacific	Main track collision and derailment	R02V0057

RAIL REPORTS APPROVED IN 2002-2003

DATE	LOCATION	COMPANY	EVENT	REPORT NO.
1999.01.19	Trenton, ON	VIA	Movement exceeds limits of authority	R99T0017
1999.04.13	Bégin, QC	Canadian National	Derailment	R99Q0019
1999.09.23	Mowat, ON	Canadian National	Derailment	R99T0256
1999.11.09	Limehouse, ON	VIA/Amtrak	Crossing collision	R99S0100
1999.12.30	Mont-Saint-Hilaire, QC	Canadian National	Derailment and collision	R99H0010
2000.04.19	Maple Ridge, BC	Canadian Pacific	Derailment	R00V0060
2000.05.16	White, ON	Canadian National	Derailment	R00W0106
2000.05.22	Cressman, QC	Canadian National	Derailment	R00Q0023
2000.06.20	Chalk River, ON	Ottawa Valley Railway	Derailment	R00H0004
2000.07.09	Rockwood, ON	VIA	Derailment	R00T0179
2000.08.30	La Tuque, QC	VIA	Crossing	R00D0098
2000.11.30	Winnipeg, MB	Canadian National	Derailment	R00W0246
2000.12.09	Blue Bell, NB	Canadian National	Derailment	R00M0044
2000.12.10	Marysville, ON	Canadian National	Derailment	R00T0324
2000.12.12	Lone Rock, SK	Canadian Pacific	Derailment	R00E0126
2000.12.13	Martel, BC	Canadian National/ Canadian Pacific	Collision	R00V0206
2000.12.14	Anita, ON	Canadian National	Derailment	R00W0263
2001.01.08	Bowker, ON	Canadian Pacific	Derailment	R01W0007
2001.02.02	Red Deer, AB	Canadian Pacific	Derailment	R01E0009
2001.03.12	Bonfield, ON	Ottawa Valley Railway	Derailment	R01H0005
2001.04.18	Stewiacke, NS	VIA	Derailment	R01M0024
2001.09.24	Richmond Hill, ON	Canadian National	Derailment	R01T0255
2002.01.12	Whitby, ON	VIA	Collision with object on track	R02T0008
2002.03.03	Carmangay, AB	Canadian Pacific	Derailment	R02C0013
2002.05.13	Kingston, ON	VIA	Crossing	R02T0149

RAIL RECOMMENDATIONS APPROVED IN 2002-2003

Occurrence No.	Recommendation	Response Summary	Board Assessment of Response Action	Safety Action Taken
R99T0256 A Canadian National freight train derailed at Mowat siding near Britt, Ontario, 23 September 1999.	R02-01 The Department of Transport review the classification and safety marks for anhydrous ammonia to ensure that it is in a class and division consistent with the risks it poses to the public.	Transport Canada (TC) has reviewed the issue and has agreed that the alternate class UN2.3 (8) is appropriate, but has not taken any specific action towards this reclassification	Satisfactory in Part	TC will raise the matter at the next meeting of the Federal Provincial Task Force and of the Minister's Advisory Council on the Transportation of Dangerous Goods (TDG).
R99T0256 A Canadian National freight train derailed at Mowat siding near Britt, Ontario, 23 September 1999.	R02-02 The Department of Transport, in conjunction with the tank car owners, review the existing inspection and maintenance program for thermal protection of tank cars already in service, and ensure that their thermal protection systems confer acceptable thermal resistance to reduce the risk of the premature release of dangerous goods in a fire.	TC initiatives include audits of shop facilities, participation in the FRA-AAR Task Force of the Tank Car Committee and use of thermography to help identify thermal voids.	Satisfactory Intent	Tank car shops are revising their procedures on an industry-wide basis Association of American Railroads tank car committee (Docket T65.7)
R99H0010 Derailment and collision of Canadian National Train U-783-21-30 with Canadian National Train M-306-31-30, Mile 50.84, St.-Hyacinthe Subdivision, St.-Hilaire , QC, 30 December 1999.	R02-03 Transport Canada review the provisions of Schedule I and the requirements for emergency response plans to ensure that the transportation of liquid hydrocarbons is consistent with the risks posed to the public.	TC has reviewed Schedule I and requirements for emergency response plans and presented the discussion to the TDG Task Force and the TDG General Policy Advisory Council to initiate further actions.	Satisfactory Intent	Action Pending
R99H0010 Derailment and collision of Canadian National Train U-783-21-30 with Canadian National Train M-306-31-30, Mile 50.84, St.-Hyacinthe Subdivision, St.-Hilaire , QC, 30 December 1999.	R02-04 Transport Canada ensure that the design specifications for locomotive event recorders include provisions regarding the survivability of data.	TC supports this reccommendation and will review the US rule and initiate a similar rule-making process in Canada.	Satisfactory Intent	Action Pending

Occurrence No.	Recommendation	Response Summary	Board Assessment of Response Action	Safety Action Taken
R99H0010 Derailment and collision of Canadian National Train U-783-21-30 with Canadian National Train M-306-31-30, Mile 50.84, St.-Hyacinthe Subdivision, St.-Hilaire , QC, 30 December 1999.	R02-05 Transport Canada review the requirements for the inspection and quality control of thermite field welds to ensure that an adequate level of safety is maintained on all types of tracks.	TC supports this recommendation and, in co-operation with the industry, anticipates making revisions to the *Track Safety Rules*, and the industry following with revisions to industry policies.	Satisfactory Intent	Action Pending
R00H0004 Main-track train derailment, Ottawa Valley Railway Train No. 556-17, Mile 1.88, North Bay Subdivision, 20 June 2000	R03-01 The Department of Transport, in co-operation with the industry, research the issue of continuous operation of UDE problematic trains and establish policies and procedures to resolve this issue.	Awaiting response		
Via passenger train at Trenton Junction	R03-02	Awaiting release		

REPLIES TO RAIL RECOMMENDATIONS

R02-01

Transport Canada's (TC) view is that the full information system, including the placard used, effectively provides information to responders.

TC will be writing to all fire departments in Canada to ensure they are aware of new regulatory provisions and, at that time, will reconfirm that anhydrous ammonia must be treated as toxic and that, in special circumstances, anhydrous ammonia can burn.

TC agrees that the UN classification of Class 2.3 (8) is an appropriate one and will accept the UN classification for shipments within Canada.

TC did attempt to have a special classification for anhydrous ammonia of Class 2.4 accepted at the United Nations and within North America, but was unsuccessful. Subsequently, TC adopted in the 15 August 2001 regulations the classification as used in the United States.

TC will further consider the classification of anhydrous ammonia and raised the matter at a meeting of the Federal-Provincial Task Force and the Minister's Advisory Council on the Transportation of Dangerous Goods (TDG).

R02-02

TC agrees with the recommendation and has been proactive in addressing this issue. Thermally protected tank cars in dangerous goods service must be re-qualified in accordance with sections 25.5.10 and 25.6.5 of the CAN/CGSB 43.147-2002 standard as part of the overall TC Safety Systems Inspection Program.

TC has carried out audits on a number of different tank car shop facilities where re-qualifications are being carried out. Tank car shops were advised that they must revise their procedures.

In order to promote proper inspection techniques on an industry-wide basis, a task force was initiated under the auspices of the Association of American Railroads (AAR) tank car committee (Docket T65.7). Both TC and the Federal Railroad Administration (FRA) are part of this task force.

TC is continuing its research studies to determine the effect of thermal protection defects on the re-qualification of tank cars and is currently developing a tool for scientifically determining the maximum acceptable deterioration of thermal protection.

TC inspectors will continue to assess the adequacies of the inspection techniques/procedures used by tank car owners as part of the TC oversight activities of tank car facilities.

R02-03

TC supports this recommendation and has already begun a review as recommended by the Board.

TC's Emergency Response Assistance Plan (ERAP) program is in place so that shippers of certain dangerous goods can provide specialized knowledge to local emergency response authorities at the scene of an accident.

TC will review the possibility of extending this requirement to shippers of large quantities of other dangerous goods, such as hydrocarbons.

In light of the TSB recommendation, a discussion paper was developed and presented in November 2002 at both the Federal-Provincial/Territorial TDG Task Force and the TDG General Policy Advisory Council meetings. The discussion paper provided an overview that describes the central purpose of ERAP and current criteria used to mandate ERAP use, outlined the possible new criteria of large quantities of flammable commodities requiring an ERAP, and reviewed the accident circumstances at Mont-Saint-Hilaire.

R02-04

TC supports this recommendation and recognizes the need to extend the existing design and construction standards for locomotive event recorders to address data survivability, or crashworthiness, which is not addressed at this time. The FRA in the US is presently developing a rule on the crashworthiness of locomotive event recorders that would be similar to the standards for aeronautical and marine event recorders.

TC is closely following the development of the proposed US rule. It is anticipated that the US rule will be finalized in August 2003, at which time TC will review it and initiate a similar rule-making process in Canada.

R02-05

TC supports this recommendation and has already initiated a review on all types of rail welds currently performed by railways, as well as the type of inspection and testing conducted of these welds, with the objective of identifying any areas where safety practices can be enhanced.

TC has been in regular discussions with both Canadian National (CN) and Canadian Pacific Railways (CPR) to help the railways assess the current level of adequacy of the quality of field welds. The assessment will help to determine, for each class of track, how soon after being poured thermite welds should be tested for flaws and defects. The assessment will also help determine, once all thermite welds have been inspected, whether any sit on or tight against tie plates.

TC expects that the review will provide the necessary information to determine the adequacy of inspections, maintenance, and quality control of thermite welds for all types of track. The results of the review will be analyzed by TC's Working Group on Track Safety Rules. This working group has been recently created to recommend amendments to Track Safety Rules and railway industry practices.

In the interim, TC continues to work with CN and CPR to ascertain that both companies are maintaining and executing all rail welds in compliance with existing standards and procedures.

OTHER RAIL SAFETY ACTION TAKEN

- New Ultratrain replacement tank cars have been constructed to an improved standard. Changes were made to strengthen the loading/unloading accessories on the cars, and full roll-over protection for the top valve fittings was introduced.
- The AAR has added Mechanical Interchange Rule 41(v) and *Why Made 89* code for condemnation of wheels with subsurface defects as detected by ultrasonic inspection of wheels in service.
- The AAR has changed Mechanical Interchange Rule 41(r) to prescribe that a 90 000 pounds or greater impact, as indicated by a wheel impact load detector (WILD), is cause for a wheel to be considered condemnable at any time, with or without a wheel out-of-round measurement verification.
- TC and the railway industry have agreed to form a working committee to determine if changes to the *Railway Track Safety Rules* and to the inspection methods used by the industry are required. The committee will examine issues such as rail testing frequency and parameters to evaluate track conditions.
- TC is developing an audit/monitoring program for train traffic control signals that will include all forms of wayside detector systems, including WILDs.
- CN has inspected all of their rail transporter cars and completed a program to repair and modify the locking-pin mechanisms. CN has also reiterated its loading and unloading inspection program for these cars with their mechanical inspectors and advised them to pay particular attention to the door-locking mechanisms and doorstops.
- The CN rail traffic controller induction training course has been amended to include a one-day comprehensive introduction to mechanical equipment, and will provide prospective rail traffic control personnel with an overview of the purpose and function of the components of a railway car.
- CN is presently adding contact information to its corporate website to allow operators of low-clearance equipment to review routings that include the need to traverse CN railway crossings and to arrange for special flagging protection where required.
- Last year, CPR adopted changes to its WILD policy. In addition to monitoring actual wheel impact values, the WILD detection software now includes algorithms that recalculate wheel impact values to a standard speed of 50 mph. This policy also identifies specific set-off and repair actions to be taken and speed restrictions to be imposed.
- TC has prepared an amendment to Canada Motor Vehicle Safety Standard 111 that will allow the required reflected field of view to be fulfilled with smaller rearview mirrors on highway vehicles that present less direct-view obstructions.

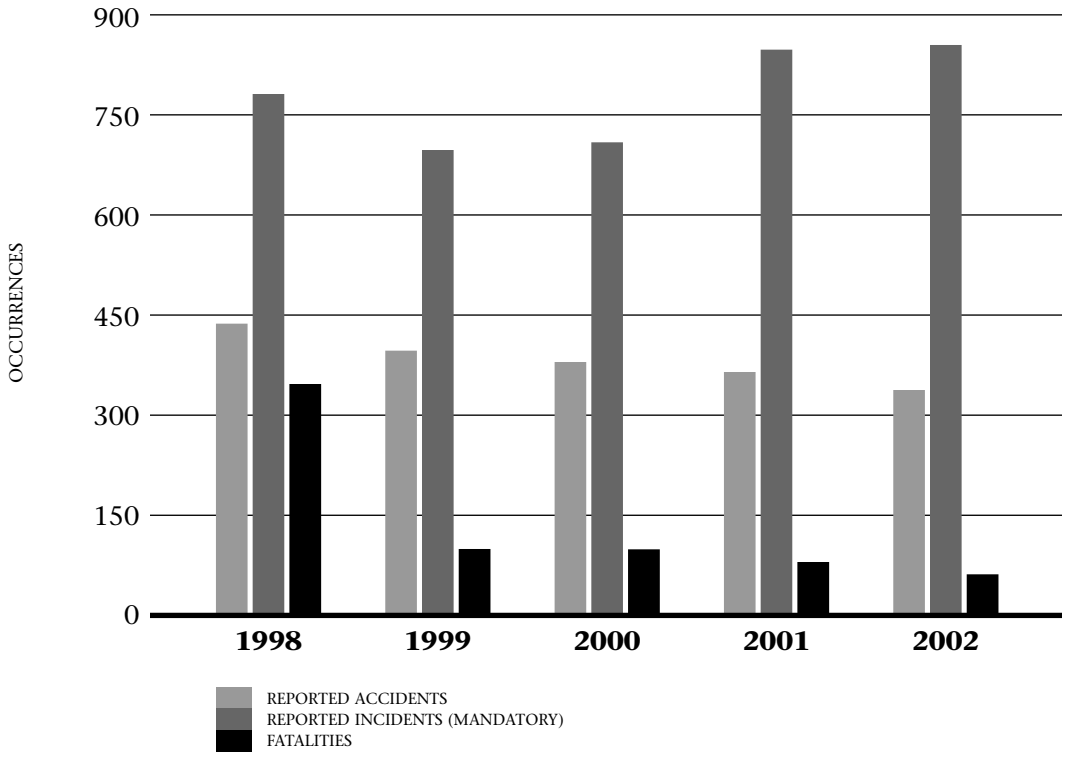
Canadian-registered aircraft (other than ultralights) were involved in 274 reported accidents in 2002. This total represents a 25-year low, with a 7% decrease from the 295 reported in 2001 and a 19% decrease from the 1997-2001 annual average of 340. Flying activity in 2002 decreased 3% over 2001 to 3 730 000 hours. This yields a 2002 accident rate of 7.3 accidents per 100 000 flying hours, which is lower than the 2001 accident rate of 7.6 and the 1997-2001 average rate of 8.8. The accident rate is also at a 25-year low. Canadian-registered aircraft (other than ultralights) were involved in 28 fatal accidents in 2002, with 47 fatalities. This is slightly fewer than the 1997-2001 average of 34 fatal accidents, with 71 fatalities. Of the fatal accidents in 2002, 13 involved private-operated aircraft and 6 involved helicopters.

The number of accidents involving ultralights remained relatively unchanged with 35 in 2001 and 36 in 2002. Fatal accidents increased to 9 with 12 fatalities in 2002 compared to 6 fatal accidents with 8 fatalities in 2001.

The number of foreign-registered aircraft involved in accidents in Canada decreased to 13 in 2002 from 29 in 2001. Fatal accidents decreased from 8 accidents with 10 fatalities in 2001 to 1 accident with 2 fatalities in 2002.

In 2002, 865 incidents were reported in accordance with TSB mandatory reporting requirements. This represents a 1% increase from last year and a 16% increase from the 1997-2001 average of 747.

Figure 8 – Air Occurrences and Fatalities



AIR INVESTIGATIONS STARTED IN 2002-2003

The following information is preliminary. Final determination of events is subject to the TSB's full investigation.

DATE	LOCATION	AIRCRAFT TYPE	OCCURENCE NO.
2002.04.08	Manning, 20 nm W, AB	Robinson Helicopter R22 BETA	A02W0064
2002.04.16	CYWG Winnipeg Intl, MB	Swearingen SA-226-AT	A02C0072
2002.04.18	SU34 Hare Field, ON	Schweizer 269C (300C)	A02O0105
2002.04.25	Stephenville, 38 nm ESE, NL	Beech 1900D	A02A0046
2002.04.25	Saskatoon, 63 nm E, SK	Boeing 747-200	A02C0079
2002.04.25	Saskatoon, 63 nm E, SK	Boeing 747-400	A02C0079
2002.05.09	CYLQ La Tuque, 30 nm E, QC	Cessna 180J	A02Q0054
2002.05.13	CYYZ Toronto/Lester B. Pearson Intl, ON	Boeing 767-300	A02O0123
2002.05.18	CYYB North Bay, ON	Beech A100	A02O0131
2002.05.20	Three Valley, 11 nm W, BC	Bell Helicopter 206L4	A02P0096
2002.05.21	CCW4 Stanley, NS	Schempp-Hirth KG Cirrus	A02A0065
2002.05.27	CZJN Swan River, MB	Cessna TU206 F	A02C0105
2002.06.02	Tobin Lake, SK	Bell Helicopter 205A-1	A02C0114
2002.06.06	Needle Peak, BC	Cessna 182P	A02P0109
2002.06.11	Winnipeg, MB	Piper PA-31-350	A02C0124
2002.06.14	EDDF Frankfurt/Rhein-Main Intl	Airbus A330-343	A02F0069
2002.06.19	Kamloops, BC	McDonnell Douglas Helicopter 369D (500D)	A02P0126
2002.06.20	North Atlantic (Cymon Intersection)	Boeing 747-400	A02A0079
2002.06.20	North Atlantic (Cymon Intersection)	Boeing 767	A02A0079
2002.06.20	North Atlantic (Cymon Intersection)	Boeing 767-300	A02A0079
2002.06.27	CYQF Red Deer (Vicinity), AB	British Aerospace Jetstream 3112	A02W0115
2002.06.27	CYQF Red Deer (Vicinity), AB	Fairchild SA227DC	A02W0115
2002.06.28	Sasaginnigak Lake, 10 nm S, MB	de Havilland DHC-2 MK I	A02C0143
2002.06.29	Engemann Lake, SK	Cessna 185F	A02C0145
2002.07.01	CZBB Boundary Bay, BC	Cessna 172N	A02P0136
2002.07.11	Chitek Lake 5 nm E, SK	Bell Helicopter 205A-1	A02C0161
2002.07.14	CSD3 Valleyfield, 2.5 nm S, QC	Super Chipmunk	A02Q0098
2002.08.07	Smithers, 10 nm S, BC	Bell Helicopter 214B-1	A02P0168

Date	Location	Aircraft Type	Occurence No.
2002.08.08	Wendle Creek, BC	Sikorsky S-61L	A02P0169
2002.08.15	McBride, 19 nm SE, BC	Aerospatiale SA 315B	A02P0179
2002.08.18	CYYR Goose Bay, NL	Bell Helicopter 212	A02A0098
2002.08.25	CYYZ Toronto/ Lester B. Pearson Intl, ON	Cessna TU206G	A02O0272
2002.08.25	CYYZ Toronto/ Lester B. Pearson Intl, ON	McDonnell Douglas DC-9-51	A02O0272
2002.09.02	CYQB Québec/Jean Lesage Intl, QC	Mooney M20 E	A02Q0119
2002.09.04	CZHP High Prairie, 7 nm SE, AB	Piper PA-34-220T	A02W0173
2002.09.07	CNJ4 Orillia, ON	Cessna 172M	A02O0287
2002.09.10	CYQX Gander Intl, NL	McDonnell Douglas DC-8-63	A02A0107
2002.09.11	CYHZ Halifax Intl, NS	Piper PA-31-350	A02A0108
2002.09.11	Pink Mountain, BC	Bell Helicopter 212	A02W0178
2002.09.17	CYXU London, ON	Sikorsky S-76A	A02O0301
2002.09.18	CYYZ Toronto/ Lester B. Pearson Intl, ON	Piper PA-44-180	A02H0002
2002.09.18	CYYZ Toronto/ Lester B. Pearson Intl, ON	de Havilland DHC-8 (DASH 8)	A02H0002
2002.09.28	Nord de Aguanish, QC	de Havilland DHC-3 (OTTER)	A02Q0130
2002.10.15	Porcher Inlet, BC	McDonnell Douglas Helicopter 369D (500D)	A02P0256
2002.10.17	CYYQ Churchill, 258 nm NE, MB	Boeing 777-228	A02C0227
2002.10.20	CYVR Vancouver Intl, BC	Airbus A340-300	A02P0261
2002.10.24	CYYZ Toronto/ Lester B. Pearson Intl, ON	de Havilland DHC-8-300	A02O0349
2002.11.12	CYZP Sandspit, BC	Cessna 550	A02P0290
2002.11.20	CYVR Vancouver Intl, BC	Boeing 747-200	A02P0299
2002.11.20	CYVR Vancouver Intl, BC	Shorts SD 360	A02P0299
2002.12.07	CYYZ Toronto/ Lester B. Pearson Intl, ON	Airbus A321	A02O0406
2002.12.16	Lake Errock, BC	Sikorsky S-61N	A02P0320
2003.01.11	St.John's Intl, NL	Beechcraft 1900D	A03A0002
2003.01.21	Mekatina, ON	Aérospatiale AS-350-B2	A03O0012
2003.01.29	Pikangikum, 2 nm SW, ON	Beechcraft 99	A03C0029
2003.02.02	Halifax Intl, NS	Boeing 737-200	A03A0012
2003.02.04	Badger, 19 nm W, NL	Cessna 188 B	A03A0013

Date	Location	Aircraft Type	Occurence No.
2003.02.11	Windsor, ON	Airbus A320-200	A03O0034
2003.02.14	Goose Bay, NL	Cessna 210 N	A03A0022
2003.03.05	St. John's Intl, 90 nm E, NL	MD-11	A03H0001
2003.03.05	St. John's Intl, 90 nm E, NL	Boeing 757-200	A03H0001
2003.03.13	Dauphin, MB	Beechcraft C90A	A03C0068
2003.03.25	Langley, 7 nm NE, BC	Piper PA28-140	A03P0068

AIR REPORTS APPROVED IN 2002-2003

Date	Location	Aircraft Type	Event	Report No.
1998.06.18	CYMX Montreal Intl (Mirabel), QC	Swearingen SA-226-TC	In-flight fire – landing gear well	A98Q0087
1998.09.02	Peggy's Cove, 5 nm SW, NS	McDonnell Douglas MD-11	On board fire	A98H0003
1998.12.07	CYBC Pointe-Lebel, QC	Britten-Norman BN-2A-26	Loss of control	A98Q0194
2000.07.19	Porter's Lake, NS	Cessna 150M	Loss of control – spin	A00A0110
2000.09.22	CYFB Iqaluit, NU	Boeing 727-200	Runway excursion	A00H0005
2000.10.06	CYUY Rouyn-Noranda, 5 nm S, QC	Cessna 550	Runway excursion	A00Q0141
2000.11.01	CYHC Vancouver Harbour, BC	de Havilland DHC-6	Loss of power and collision with water	A00P0210
2000.11.28	CYFC Fredericton, NB	Fokker F-28 MK 1000	Runway overrun	A00A0185
2001.01.15	Porteau Cove, BC	Sikorsky S-61N	Loss of main-rotor drive	A01P0003
2001.01.24	Edmonton Vortac (Vicinity), AB	Cessna 560	Loss of separation	A01W0015
2001.01.24	Edmonton Vortac (Vicinity), AB	Boeing 747-400	Loss of separation	A01W0015
2001.02.20	CYVO Val-d'Or, 2 nm SE, QC	Piper PA31-350	Controlled flight into terrain	A01Q0034
2001.03.14	CYYT St. John's Intl, 1.5 nm ESE, NL	Piper PA-30	Loss of control	A01A0022
2001.03.25	Eclipse Camp, BC	McDonnell Douglas Helicopter 369D (500D)	Main-rotor blade failure	A01P0061
2001.03.27	Montreal Intl (Dorval), 60 nm SW, QC	Piaggio P-180	Loss of separation	A01Q0053
2001.03.27	Montreal Intl (Dorval), 60 nm SW, QC	Airbus A310-300	Loss of separation	A01Q0053

Date	Location	Aircraft Type	Event	Report No.
2001.03.27	Montreal Intl (Dorval), 60 nm SW, QC	Canadair CL-600-2B19 (RJ)	Loss of separation	A01Q0053
2001.04.04	CYKZ Toronto/ Buttonville Municipal, 10 nm N, ON	Robinson Helicopter R22 BETA	Loss of control – collision with terrain	A01O0099
2001.04.28	Baker Lake, 26 nm N, NU	McDonnell Douglas Helicopter 369E (500E)	Forced landing – dynamic rollover	A01C0064
2001.05.12	CYVR Vancouver Intl, BC	Cessna 172M	Air proximity – safety not assured	A01P0111
2001.05.12	CYVR Vancouver Intl, BC	Airbus A320	Air proximity – safety not assured	A01P0111
2001.05.16	Abbotsford, 10 nm E, BC	Robinson Helicopter R22 BETA	In-flight break-up	A01P0100
2001.05.22	CYZF Yellowknife, NT	Boeing 737-210	Hard landing	A01W0117
2001.05.25	Red Earth Creek, 33 nm NE, AB	Cessna T310Q	Collision with terrain	A01W0118
2001.05.31	Uranium City, 190 nm NE, SK	Airbus A340-300	Loss of separation	A01W0129
2001.05.31	Uranium City, 190 nm NE, SK	Boeing 747-200	Loss of separation	A01W0129
2001.06.08	Duxar Intersection, 110 nm NW, BC	Boeing 737-200	Loss of separation	A01P0126
2001.06.08	Duxar Intersection, 110 nm NW, BC	McDonnell Douglas DC-10-30	Loss of separation	A01P0126
2001.06.09	CYVR Vancouver Intl, BC	Boeing 767-200	Loss of separation	A01P0127
2001.06.09	CYVR Vancouver Intl, BC	Airbus A340-300	Loss of separation	A01P0127
2001.06.10	Northern Control area, NT	Boeing 767-300	Loss of separation	A01C0115
2001.06.10	Northern Control area, NT	Boeing 747-300	Loss of separation	A01C0115
2001.06.14	CYYJ Victoria Intl, BC	Bombardier CL-600-2B19	ILS false localizer capture	A01P0129
2001.06.18	Lake Lavieille (Algonquin Park), ON	Cessna 210L	In-flight break-up	A01O0165
2001.06.20	Field concession #4/ Sandford Rd. Uxbridge, ON	Robinson Helicopter R22	In-flight collision	A01O0164
2001.06.20	Field concession #4/ Sandford Rd. Uxbridge, ON	Cessna 170B	In-flight collision	A01O0164
2001.07.04	Empress, 20 nm W, AB	Boeing 737-200	Risk of collision	A01W0160
2001.07.04	Empress, 20 nm W, AB	Fokker F-28 MK 1000	Risk of collision	A01W0160

Date	Location	Aircraft Type	Event	Report No.
2001.07.07	Nestor Falls, 2 nm NW, ON	de Havilland DHC-2 MK I	Collision with power line	A01C0152
2001.07.13	Red Lake, 35 nm SE, ON	Airbus A320-200	Loss of separation	A01C0155
2001.07.13	Red Lake, 35 nm SE, ON	Boeing 757-200	Loss of separation	A01C0155
2001.07.14	Gloucester, ON	Ted Smith Aerostar (56140) RX-7	Collision with object – wirestrike	A01O0200
2001.07.18	Cultus Lake, BC	Cessna U206 G	Overturned on water landing	A01P0165
2001.07.18	CYUL Montreal Intl (Dorval), QC	Cessna 172N	Risk of collision	A01Q0122
2001.07.18	CYUL Montreal Intl (Dorval), QC	de Havilland DHC-8-100	Risk of collision	A01Q0122
2001.07.20	EICK Corcaigh Intl Airport (Cork)	Boeing 727-225	Cargo door opening on take-off	A01F0094
2001.07.23	Port Hardy, 48 nm E, BC	Cessna 421	Risk of collision	A01P0171
2001.07.23	Port Hardy, 48 nm E, BC	de Havilland DHC-7 (DASH 7)	Risk of collision	A01P0171
2001.07.26	CYHT Haines Junction, 25 nm SW, YT	Cessna 185 F	Collision with terrain	A01W0186
2001.07.30	CEQ5 Grande Cache, 25 nm W, AB	Eurocopter AS-350 BA	Loss of control – uncontrolled rotation	A01W0190
2001.08.03	CYTS Timmins, 1.2 nm N, ON	Cessna 182Q	Controlled flight into terrain	A01O0210
2001.08.04	KFLL Fort Lauderdale	Boeing 737-200	Engine fire	A01F0101
2001.08.09	Baffin Island, NT	McDonnell Douglas Helicopter 369D (500D)	Loss of control	A01Q0139
2001.08.13	Juniper Station, 42 km NE, NB	Bell Helicopter 206B	Collision with terrain	A01A0100
2001.08.13	Mackenzie Lake, 4 nm NE, BC	de Havilland DHC-2 MK I	Collision with terrain	A01P0194
2001.08.20	Valemount, 37 nm SE, BC	Helio H-295	Structural failure	A01P0203
2001.08.24	CAA8 Invermere, BC	Pitts S2A-E	Engine power loss	A01P0207
2001.09.02	CYRL Red Lake, ON	Pilatus PC-12	Engine power loss	A01C0217
2001.09.13	Swan Lake Airstrip, YT	Beech UC45-J	Loss of control after take-off	A01W0239
2001.09.27	CYWG Winnipeg Intl, 2 nm N, MB	Beech 95	Collision with terrain	A01C0230
2001.10.05	Fort Simpson, 5.5 nm WNW, NT	McDonnell Douglas Helicopter 369HS	Power loss – fuel starvation	A01W0255
2001.10.11	Shamattawa, 1 nm N, MB	Fairchild SA-226-TC	Controlled flight into terrain	A01C0236

Date	Location	Aircraft Type	Event	Report No.
2001.10.15	CYJF Fort Liard, NT	Piper PA-31-350	Controlled flight into terrain	A01W0261
2001.10.23	CYYZ Toronto/ Lester B. Pearson Intl, ON	Boeing 767-200	Runway incursion	A01O0299
2001.10.24	CYPE Peace River, AB	de Havilland DHC-8-100	Landed beside runway	A01H0004
2001.11.02	Inuvik, 4 nm NE, NT	Cessna 208 B	Controlled flight into terrain	A01W0269
2001.12.03	CZBB Boundary Bay, BC	Cessna 152	Loss of control after take-off	A01P0296
2001.12.11	Victoria VOR, 5 nm N, BC	Piper PA-31-350	Aircraft misidentification – safety not assured	A01P0305
2001.12.11	Victoria VOR, 5 nm N, BC	Cessna 208 B	Aircraft misidentification – safety not assured	A01P0305
2001.12.18	CYZF Yellowknife, 5 nm E, NT	Eurocopter EC120B	Loss of engine power, hard landing	A01W0297
2001.12.31	Fort Good Hope, 30 nm S, NT	Cessna 172N	Controlled flight into terrain	A01W0304
2002.01.04	CYYJ Victoria Intl, BC	Boeing 737-200	Operating irregularity	A02P0004
2002.02.14	Brookfield, 10 nm ENE, NS	Cessna 172L	Collision with tree and ground	A02A0015
2002.03.05	La Ronge, 40 nm N, SK	Hawker Siddeley HS 748 2A	ATS related event – safety not assured	A02C0043
2002.03.05	La Ronge, 40 nm N, SK	Beech 1900D	ATS related event – safety not assured	A02C0043
2002.03.27	CYSJ Saint John, NB	Fokker F-28 MK 1000	Runway excursion on landing	A02A0038
2002.04.16	CYWG Winnipeg Intl, MB	Fairchild SA-226-TC	Runway excursion	A02C0072
2002.04.25	Saskatoon, 63 nm E, SK	Boeing 747-200	ATS related event – safety not assured	A02C0079
2002.04.25	Saskatoon, 63 nm E, SK	Boeing 747-400	ATS related event – safety not assured	A02C0079

AIR RECOMMENDATIONS APPROVED IN 2002–2003

Occurrence No.	Recommendation	Response Summary	Board Assessment of Action	Safety Action Taken
A98Q0087 In-flight fire, landing-gear well, Propair Inc., Swearingen Metro II SA226, Mirabel Intl, QC, 18 June 1998	A02-03 Transport Canada, the United States Federal Aviation Administration, and Fairchild explore options for SA226 and SA227 aircraft to be equipped with a brake pressure warning indicator for each main wheel brake system.	Transport Canada (TC) clearly indicated that it endorsed the TSB position and that it had asked the FAA to contact the aircraft manufacturer to study the possibility of installing a braking-circuit pressure indicator on Fairchild SA226 and SA227 planes.	Satisfactory Intent	No action taken to date
A02O0123 Cargo bay fire, Air Canada, Boeing 767-300, Toronto Intl, ON, 13 May 2002	A02-04 The Department of Transport take action to reduce the short term risk and eliminate the long term risk of heater ribbon installation failures starting fires, and coordinate and encourage a similar response from other appropriate regulatory authorities.	TC indicates that it shares a similar concern and is working closely with the FAA, Boeing and other foreign civil aviation authorities to assess and study the short and long term risks of heater ribbon installations, and to determine an appropriate means of addressing the issue in both the short and long term.		

AIR RECOMMENDATIONS APPROVED IN 2002–2003

Occurrence No.	Recommendation	Response Summary	Board Assessment of Action	Safety Action Taken
A02O0123 Cargo bay fire, Air Canada, Boeing 767-300, Toronto Intl, ON, 13 May 2002	A02-05 The Department of Transport take action to reduce the short term risk and eliminate the long term risk of contaminated insulation materials and debris propagating fires, and coordinate and encourage a similar response from other appropriate regulatory authorities.	TC indicates that it shares a similar concern and is working closely with the FAA, Boeing and other foreign civil aviation authorities to assess and study contaminated thermal acoustic insulation, and to determine an appropriate means of addressing the issue in both the short and long term.		
A98H0003 Smoke in the cockpit, Swissair MD-11 HB-IWF, Peggy's Cove, NS, 02 September 1998	A02-06 to A02-14	Awaiting response		

REPLIES TO AIR RECOMMENDATIONS

A02-01

- Transport Canada (TC) agrees that approach ban regulations are required.
- In September 1999, TC initiated regulatory action to implement new approach ban regulations based on visibility.
- Since then, TC has prepared sixteen (16) Notices of Proposed Amendments (NPA 2000- 001, 002, 006, 007, 008, 009, 010, 011, 012, 106, 107, 108, 116, 117, 194, and 195) to address the TSB Recommendation A02-01 concerning approach ban regulations.
- These NPAs are currently under review at the Department of Justice and it was expected that the final product would be published in the June 2002 issue of the *Canada Gazette*.
- The TSB was to be sent a copy of the approved version once available.
- As of late, these NPAs are still with the Department of Justice for legal review; no time frame could be provided as to the expected time the review will be completed.
- Board Assessment: *Satisfactory Intent*.

A02-02

- TC concurs with the Board's assessment.
- Educational programs in risk management and pilot decision-making have contributed to the creation of an acceptable safety culture in aviation operations.
- TC agrees that including a ceiling limit in the approach ban merits consideration.
- The Department is also aware of the difficulty in creating a practical and enforceable regulation based on the known limitations of available weather observation services and the associated implications of defining what ceiling and sky condition could be used to constitute an adequate safety margin.
- TC will bring forward this recommendation to the Canadian Aviation Regulation Advisory Council (CARAC) Technical Committee.
- An issue paper will be prepared for submission to the Commercial Air Service Operations Technical (CASO) Committee for February 2003, and will include the recommendation from the report, statistics supplied by TSB, and a proposed rule and recommendation on the need to form a CASO working group to study the issue.
- Board Assessment: *Satisfactory Intent*.

A02-03

- TC clearly indicated that it endorsed the TSB position.
- TC asked the FAA to contact the aircraft manufacturer to study the possibility of installing a braking-circuit pressure indicator on Fairchild SA226 and SA227 planes.
- Board Assessment: *Satisfactory Intent*.

A02-04 AND A02-05

- TC agrees with the recommendations.
- TC is working with the FAA, Boeing and other manufacturers to assess and study the short and long term risks of heater ribbon installations.
- TC is working to determine an appropriate means of addressing the issue in both the short and long term.

- The US Seattle Aircraft Evaluation Group agrees with the safety recommendations initiated by the TSB. TSB has reviewed the Federal Aviation Administration (FAA) Safety Recommendation 02.326 pertaining to this safety deficiency.
- The US Department of Transport is to take action to reduce the short term, and eliminate the long term risk of contaminated materials and debris that propagate fires, and coordinate and encourage a similar response from other appropriate regulatory agencies.
- Under a new maintenance process called Enhanced Zonal Analysis Procedure, US manufacturers will identify all electrical wiring in each aircraft zone, and examine each for the presence of any combustible material.

A02-06 TO A02-014

- To be reported next fiscal year.

OTHER AIR SAFETY ACTION TAKEN

- TC is taking action to address issues regarding the effectiveness of administrative procedures related to the monitoring and follow-up of pilot medical assessments.
- TC, the US Federal Aviation Administration (FAA) and aircraft operators have taken action to prevent possible damage to aircraft auxiliary power units during de-icing operations in high wind conditions.
- Pratt & Whitney Canada is presently reviewing their database to determine the number and causes of fuel pump drive coupling failures on PT-6 engines. This review may result in the release of a Service Difficulty Advisory Bulletin.
- Nav Canada has initiated a program to establish a back-up, tuneable PAL for use in the event of communications failure in the Vancouver area. The plan is to provide additional radio equipment that can be instantly accessed from control positions.
- On 18 April 2002, additional spot heights were added to Victoria approach charts to aid in pilot terrain awareness. The instrument landing system approach chart for Runway 09 in Victoria, British Columbia, now depicts a warning for mountainous terrain in the NW and SW quadrants.
- After a runway excursion accident, the operator added a crew resource management segment to the training program for its pilots.
- Following a controlled-flight-into-terrain accident at night, the company instituted a policy of operating their aircraft with a second qualified pilot while in IFR or night VFR operations.
- TC has introduced a Notice of Proposed Amendment 2001-131 to CAR 605.37, requiring installation of a terrain avoidance warning system (TAWS) in commercial aircraft. The amendment, if approved, requires that CAR 705 aircraft, all CAR 704 aircraft with 10 or more seats, and all CAR 703 aircraft with 6 or more seats manufactured after 29 March 2002, be equipped with TAWS; those aircraft manufactured before that date must be equipped by 29 March 2005.
- In response to a rising number of air traffic services (ATS) operating irregularities, Nav Canada has re-issued a Staff Information Bulletin titled *A Reminder: Nav Canada Focus on Safety in ATS*. The bulletin reaffirms the goal of safety and identifies specific areas of concentrated attention.

- The risks involved in pilots and controllers not immediately challenging any flight number discrepancies was evidenced in an incident involving three aircraft where safety was not assured. As a result, Nav Canada published three Air Traffic Services Information Bulletins to alert operational personnel to the risks associated with communication errors.
- TC, Aircraft Certification, Pacific Region has been made aware of potential inadequate maintenance of Helio H-295 Courier ailerons, and will conduct an examination to determine if any action is required.
- Effective 15 May 2002, Nav Canada implemented well-defined procedures for air traffic operations specialists (ATOS) to follow in the exchange of flight data, both between and within ACCs. The new procedures also provide ATOSs with specific direction on how to proceed when a reject message is received.
- The FAA is working on a notice of proposed rulemaking to expedite an airworthiness directive to effect mandatory compliance with MD Helicopters Inc.'s Service Bulletin SB369D-201R1 and Torque Events Inspection/Assessment.
- TC is planning an article for the Vortex newsletter that will inform readers about how autorotation RPM is affected by weight, density, altitude, speed and adjustment, including a discussion on rate of climb and H-V (height-velocity) charts.
- TC has recognized the need to update CAR 302 and TP 312 regarding airside vehicle operations. New draft regulations and standards were presented to the CARAC Part III Technical Committee in April 2002, proposing to strengthen the regulatory requirements with respect to, inter alia, procedures for access and control of vehicles.
- Within two days of a collision accident between a de-icing vehicle and an aircraft at Toronto LBPA International Airport, the operator of the central de-icing facility, and the airport authorities, corrected a number of the deficiencies that contributed to the occurrence.
- Following an engine fire occurrence, Boeing revised the non-normal operation section of the *Flight Crew Training Manual* for all Boeing aircraft to include both the basis for landing at nearest suitable airports and procedures for such action.
- As of July 2002, automated conflict prediction and alerting capability has been implemented in both Moncton and Edmonton ACCs, and is being implemented in Winnipeg ACC. The Board is pleased with progress made to date by Nav Canada and looks forward to implementation of conflict prediction and alerting capability throughout the entire system.
- Following an aircraft collision with a powerline, TC advised that it regularly promotes safety awareness on the hazards of low flying. These promotional activities include seminars and print collateral, such as the *Take-five* brochures and recurring wire strike articles in safety newsletters.

APPENDIX A — GLOSSARY

Accident	In general, a transportation event (marine, pipeline, rail, or aviation) that results in serious injury or death to persons or damage to property or the environment (for a more precise definition, see the *Transportation Safety Board Regulations*)
Exajoule	10^{18} joules. (A joule is a unit of work or energy equal to the work done by a force of one newton acting through a distance of one metre)
Incident	In general, a transportation event (marine, pipeline, rail, or aviation) that results in minor injury to persons or minor damage to the vehicle/equipment; a situation that could potentially have turned into an accident (for a more precise definition, see the *Transportation Safety Board Regulations*)
Occurrence	A transportation accident or incident
Recommendation	A formal way to draw attention to systemic safety issues, normally warranting ministerial attention
Safety Advisory	A less formal means for communicating lesser safety deficiencies to officials within and outside of government
Safety Information Letter	A letter that communicates safety-related information, often concerning local safety hazards, to government and corporate officials