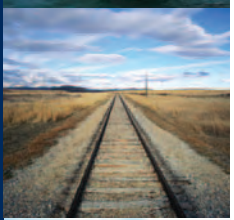
Australian Government

Australian Transport Safety Bureau

2005 Annual Review



Safe Transport

Australian Government

Australian Transport Safety Bureau

ATSB Annual Review 2005

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Executive Director's message

In 2004–05 the ATSB benefited considerably from the funding boost for aviation investigations and aviation database replacement that was provided in the May 2004 Federal Budget. During the year, the Bureau recruited and commenced training 12 extra aviation safety investigators, instigated 109 aviation occurrence investigations and released 98 aviation investigation reports, up from around 60 in recent years. High profile aviation safety investigation reports released in 2004–05 included reports on investigations into a fatal Cessna C404 aircraft accident at Jandakot Airport WA, a fatal Emergency Medical Services (EMS) helicopter accident near Mackay, Qld and a Boeing 737 terrain proximity warning near Canberra. The Bureau also released nine aviation safety research reports.

During 2004–05 the ATSB issued 19 aviation safety recommendations and two safety advisory notices and successfully negotiated valuable safety actions by regulators, operators, manufacturers and other safety stakeholders. For example, following ATSB recommendations from the investigation into the EMS helicopter accident, the Queensland Emergency Services Department is improving standards and support for Community Helicopter Providers including requirements for night Visual Flight Rules (VFR) flights and the helicopter operator is requiring and training all pilots to Command Instrument Rating standard. The Bureau also completed Stage 1 of the Safety Investigation Information Management System (SIIMS) aviation database replacement project, which involved developing ATSB user requirements and the trial of software tools to support the improved management of safety investigations.

The ATSB's marine achievements in 2004–05 included 11 marine investigation reports including on the grounding of the cruise liner *Astor*, and the fatal collision between the bulk carrier *Asian Nova* and the fishing vessel *Sassenach.* The ATSB also undertook an extensive education campaign within the fishing industry on commercial fishing vessel safety.

In November 2004 the ATSB established an Adelaide regional office as a base for its rail team leader and two other rail investigators. Two rail investigators are based in the ATSB's Brisbane office and one in the Canberra central office. During 2004-05 the Bureau's rail safety investigation team initiated seven investigations on the Defined Interstate Rail Network (DIRN) under the *Transport Safety Investigations Act 2003* (TSI Act) and released the first TSI Act rail investigation reports on freight train derailments at Ararat, Victoria and Bates, South Australia. The ATSB also completed a rail investigation report under Victorian legislation into the derailment and subsequent collision at Chiltern between a freight train and a passenger train.

On road safety, the ATSB is coordinating the Australian Government involvement, in partnership with the NSW and Victorian governments and private sector organisations, in a large-scale trial of a best-practice education programme for novice drivers. During 2004-05 the Bureau released 32 road safety research and statistical reports, including a research report on road texture and crash risk and a survey of community attitudes. Steady progress was also made with road safety jurisdictions and stakeholders, but with substantial challenges remaining to meet or better the 2010 target of no more than 5.6 road deaths per 100,000 population.

The October 2004 International Civil Aviation Organization (ICAO) report on ICAO's May/June 2004 audit of the ATSB expressed high satisfaction with Australia's legislative, organisational and training framework for aviation safety investigation and the professional and efficient conduct of the ATSB investigations reviewed in detail. As expected, the audit team did make a number of recommendations for improvement against which the ATSB has undertaken corrective actions.

Following the 15-fatality Metroliner aircraft accident near Lockhart River, Queensland, in May 2005, the Bureau commenced its major investigation into the causes of this tragedy and released a preliminary factual report in June 2005. In November 2004 the Queensland Government asked the ATSB to chair a joint Queensland Transport investigation into the derailment of the Cairns Tilt Train north of Bundaberg, which injured a significant number of the 157 passengers and crew. The Queensland Minister for Transport released an interim report on this derailment on 16 February 2005.

The Bureau is continuing its commitment to training its investigators through the Diploma of Transport Safety Investigation course. In 2004–05 fifteen staff completed the TSI Diploma and a further 30 are progressing through the course.

During the year the Bureau signed a number of Memoranda of Understanding (MOUs) including with the Civil Aviation Safety Authority (CASA), the Australian Maritime Safety Authority (AMSA), the Victorian Rail Safety Regulator and with transport safety bodies in Indonesia and South Korea.

The ATSB continued to release all of its significant safety outputs to the public. Hits on the ATSB website www.atsb.gov.au amounted to around sixteen million.

A number of valued staff members retired during the year or prior to publication of this Review. I note in particular the contribution of Jon Henchy in Transport Safety Statistics. From early June 2005 I was off-line assisting the Rt Hon Sir John Wheeler with a review of Airport Security and Policing and Joe Motha has acted as ATSB Executive Director in addition to his normal duties with great professionalism and dedication which I wish to acknowledge with thanks.

I am grateful to the former Deputy Prime Minister and Minister for Transport and Regional Services, the Hon. John Anderson MP, the Minister for Local Government, Territories and Roads, the Hon. Jim Lloyd MP, and to the Secretaries of the Department of Transport and Regional Services, Mr Ken Matthews AO and Mr Mike Taylor for their support throughout the year. We look forward to working with the new Minister for Transport and Regional Services, the Hon. Warren Truss MP in 2005–06. The ATSB was again grateful for the bipartisan support it received for its safety work. The ATSB's ongoing effectiveness as the Australian Government's primary transport safety investigator remains reliant on both the perceptions and reality of its independence, fairness and professionalism.

Kym Bills

The ATSB's mission statement

Objective

Safe transport.

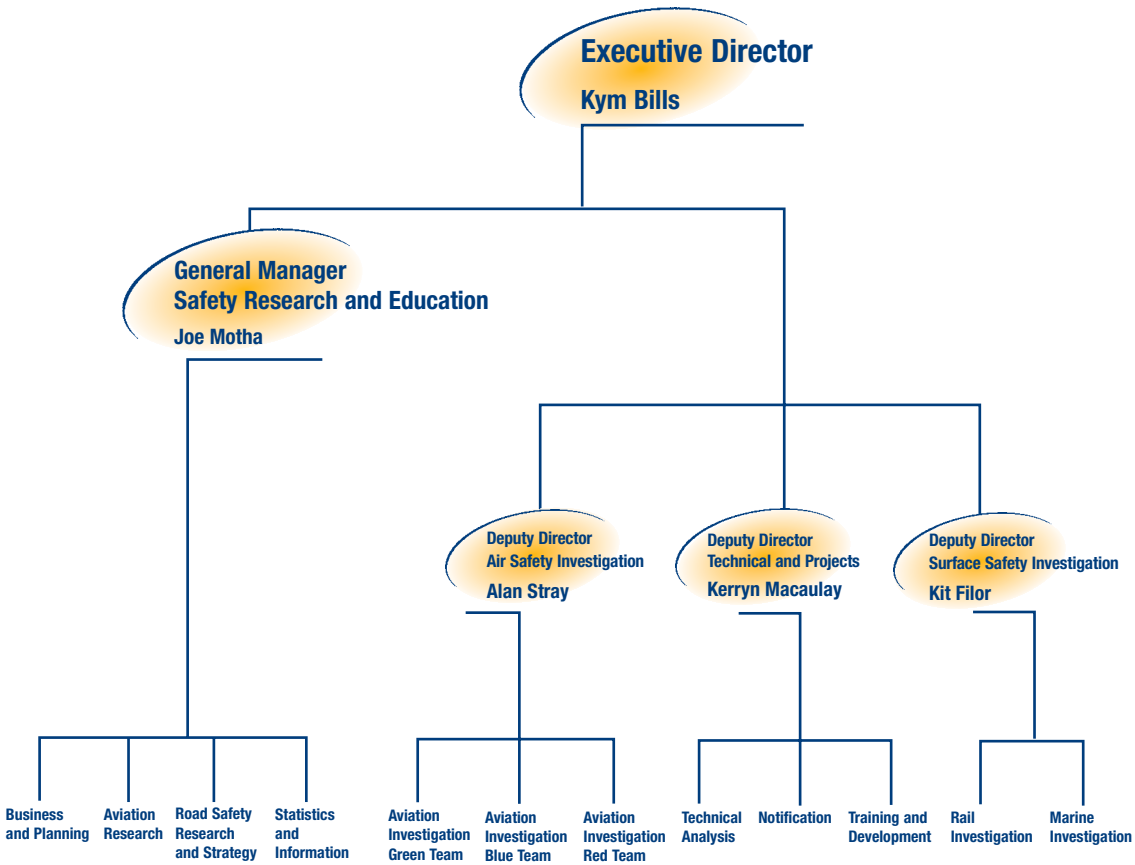
Our mission

The Australian Transport Safety Bureau contributes to the wellbeing of all Australians by maintaining and improving transport safety and public confidence through excellence in:

- independent investigation of transport accidents and other safety occurrences
- safety data recording, analysis and research
- raising safety awareness and knowledge.

ATSB organisation chart

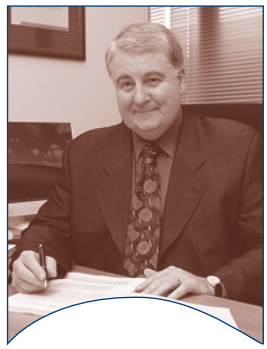
as at 30 June 2005



Note: *Joe Motha acted as Executive Director while Kym Bills was seconded to the position of Secretary of the Airport Security & Policing Review between June–Sept 2005*

Executive profiles

Mr Kym Bills

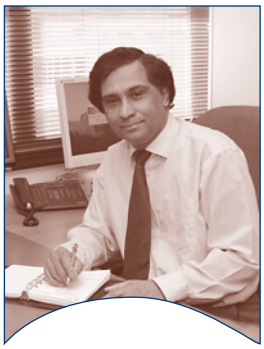


Executive Director
Kym Bills

Kym Bills was appointed Executive Director of the newly formed Australian Transport Safety Bureau on 1 July 1999. Prior to his current position with the ATSB, Mr Bills was First Assistant Secretary of the Department's Maritime Division from 1994. He was also a Director of ANL Limited during its restructuring from September 1995 to the signing of sale contracts at the end of 1998 and a member of the Board of the Australian Maritime Safety Authority from 1995 to 1997. In 1998, Mr Bills led negotiations at the International Maritime Organization, which established a new legal regime for archipelagic sea lanes including a precedent case for protecting Australia's shipping and other interests through the Indonesian archipelago. From June to September 2005, Mr Bills was head of the Secretariat for the review of airport security and policing by the Rt Hon Sir John Wheeler.

In addition to Transport, Mr Bills has held a number of Australian Government public service positions since 1978 including in the Department of Foreign Affairs, the Office of National Assessments, the Department of Immigration and Ethnic Affairs, the Department of Finance, and the Department of Workplace Relations and Small Business. Mr Bills holds degrees from the universities of Adelaide, Flinders, Oxford and the ANU and is a fellow of a number of professional bodies.

Mr Joe Motha



General Manager
Joe Motha

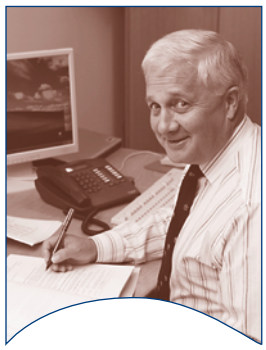
Joe Motha is the General Manager of Safety Research and Education. He started as the then Director of Safety Research and Education in September 2002. This Director role was renamed General Manager in March 2005. From July 1999 to September 2002, he was Deputy Executive Director, Sea, Air and Safety at the Bureau of Transport and Regional Economics (BTRE).

During his 13 years with the BTRE in its various forms, Mr Motha researched various transport issues including transport safety, accident costing, valuation of life and injury in transport accidents, and transport-related environmental issues. His individual and team-based work has resulted in a number of research papers and reports. In 1997, a research team led by Mr Motha won the Australasian Evaluation Society's best public sector evaluation study award for a report on the federal government's Black Spot Road Safety Programme.

Before joining the then Bureau of Transport and Communications Economics in 1989, Mr Motha worked in the Maritime Policy Division of the former Department of Transport and Communications. His public service experience also includes periods with the Australian Taxation Office, the former Inter-State Commission and the former Department of Primary Industry. Mr Motha also has overseas experience in industry, shipping and commerce.

Mr Motha has tertiary qualifications in science, economics, international affairs and business administration.

Captain Kit Filor, PSM



Deputy Director
Kit Filor

Kit Filor is the Deputy Director of Surface Safety Investigation and is responsible for marine and rail safety investigations.

After a career at sea on tankers and as master on cross-channel ferries in the UK, Captain Filor and his family emigrated to Australia, where he took up a position as a Commonwealth marine surveyor in Devonport. After two years, he moved to Canberra to the Ship Operations Section in the Marine Safety Division. He became increasingly involved in marine casualty investigation.

Captain Filor was appointed Inspector of Marine Accidents on 1 January 1991 when the Marine Incident Investigation Unit was formed as an independent investigation body separate from the regulator (what became the Australian Maritime Safety Authority).

Captain Filor was instrumental in formulating the International Maritime Organization (IMO) Code for the Investigation of Marine Casualties and Incidents. He has re-written the IMO Model Course for the Investigation of Marine Accidents and Incidents and is a regular lecturer at the International Maritime Academy in Trieste, Italy. He is chairman of the Marine Accident Investigators' International Forum.

In 1996, he was awarded the Public Service Medal in the Queen's Birthday Honours for services to marine safety. Captain Filor also holds a Diploma of Transport Safety Investigation.

Mr Alan Stray

Deputy Director
Alan Stray

Alan Stray is Deputy Director of Aviation Safety Investigation. He has been an aviation safety investigator with the ATSB and its predecessor, the Bureau of Air Safety Investigation, since January 1987.

Mr Stray has managed all areas of ATSB's aviation investigation operations and, from January to June 2001, acted as Director of Safety Investigations. In recent years, he has secured, on behalf of the Bureau, memorandums of understanding with government and aviation agencies in Asia-Pacific and the Russian Federation.

Between 1992 and 1994, Mr Stray was an exchange officer with the Transportation Safety Board of Canada. While serving there as a management investigator, he developed Reflexions, a multimodal safety magazine modelled on the successful BASI Journal, which he had produced in Australia for several years.

Mr Stray is a licensed aircraft maintenance engineer, holds an Airline Transport Pilot Licence, and has flown in Papua New Guinea, Canada, the USA and Australia in a variety of piston-engine and turbo-prop aircraft types. He holds a Diploma of Transport Safety Investigation and management qualifications.

Ms Kerryn Macaulay

Deputy Director
Kerryn Macaulay

Kerryn Macaulay is the Deputy Director of Technical and Projects and is responsible for the oversight of the Technical Analysis team; notifications and confidential reporting; legislative matters affecting the ATSB, the training and development needs of Bureau staff and major projects including replacement of the OASIS aviation safety database.

Kerryn is a commercial pilot and flight instructor with an Airline Transport Pilot Licence. She joined the then Bureau of Air Safety Investigation (BASI) in 1995 as an Air Safety Investigator. Kerryn managed the Safety Analysis Branch of BASI, which included the review and release of Safety Recommendations and safety study reports to organisations within the aviation industry including regulatory agencies, operators and manufacturers.

Since the formation of the ATSB in 1999, Kerryn assisted in developing a capacity to investigate rail accidents and incidents and was appointed as the first Team Leader to the Rail Safety Unit. Kerryn completed a three-year project to develop and implement Commonwealth multi-modal legislation, which culminated in the introduction of the *Transport Safety Investigation Act 2003* and which enabled the ATSB to investigate accidents and serious incidents on the interstate rail system in addition to the investigation of accidents and incidents in the aviation and marine transport modes.

Kerryn also assisted the Bureau to become a Registered Training Organisation and to develop a Diploma of Transport Safety Investigation, which enables the Bureau to more adequately meet its unique training requirements. Kerryn is a trained teacher and holds a Diploma of Transport Safety Investigation.

In October 2003, Kerryn was seconded to the newly established NSW Independent Transport Safety and Reliability Regulator for a period of eight months to assist in setting up the Office of Transport Safety Investigation, including the development of investigation protocols and the establishment of a confidential reporting scheme for employees of the rail, ferry and commercial bus industries.

Modal overviews

Road

Role

The ATSB aims to improve national road safety by:

- undertaking research projects
- collecting and analysing statistics
- coordinating the National Road Safety Strategy and Action Plans
- providing safety, education and information material.

Key safety activities and results

During 2004–05 the ATSB continued to monitor and report on road safety progress under the National Road Safety Strategy framework approved by Ministers of the Australian Transport Council (ATC). Chairing and working with the National Road Safety Strategy Panel, the ATSB maintained close ties with state and territory transport agencies and other major stakeholders. During the year, the ATSB finished coordinating the implementation of the *National Road Safety Action Plan for 2003 and 2004* and finalised the next plan for 2005 and 2006.

Significant progress has been achieved in reducing the national road fatality rate. As at 30 June 2005, the fatality rate per 100 000 people was 7.8 compared with a pro rata rate of 7.5 required to meet the National Road Safety Strategy target of no more than 5.6 deaths per 100 000 people by 2010.

The Bureau released seven research programme reports, three seeding grant reports and 25 statistical publications, including well publicised reports on community attitudes to road safety and the novice driver education programme.

National Road Safety Strategy and Action Plans

In November 2000, the ATC approved the *National Road Safety Strategy for 2001–2010* and an associated Action Plan for 2001 and 2002. The National Strategy provides a framework that

complements the strategic road safety plans of state, territory and local governments and other stakeholders. It aims to reduce the yearly number of road fatalities per 100 000 population by 40 per cent—from 9.3 in 1999 to no more than 5.6 in 2010.

A second Action Plan covered calendar years 2003 and 2004 and the third Action Plan for calendar years 2005 and 2006 was endorsed by Ministers at the ATC meeting of 19 November 2004. The third Action Plan lays out a clear set of priorities for national road safety and highlights the Safe System concept as an overarching framework. Action items are listed under the key areas of safer roads and roadsides, safer speeds, safer vehicles, safer road users and other supporting measures. Ministers agreed that the next review of the Strategy would be in 2006 when the next action plan for 2007 and 2008 is developed.

The ATSB and the National Road Safety Strategy Panel monitor and report on the National Strategy's progress. During 2004–05 the ATSB:

- convened and chaired two Panel meetings
- coordinated the preparation of a progress report for the ATC
- coordinated the development of the Action Plan for 2005 and 2006.

Road safety research programme

Input from the ATSB's road safety research programme helps the Australian government to formulate and review its road safety policies in consultation with jurisdictions and partner organisations. It also contributes to work on vehicle safety standards undertaken within the Vehicle Safety Standards Branch of the Department of Transport and Regional Services.

Most research projects are contracted out to private sector consultants or academics. ATSB officers identify the directions, manage the projects, exercise quality control, use the material in advice, and incorporate it in key safety messages.

In 2004–05 the ATSB released seven road safety research reports which are itemised in Appendix 1. These cover projects on road-user safety, protective equipment and road infrastructure. The ATSB disseminates research reports widely in print form and through its website using a 'Consultant's Report (CR)' sequence. Reports published between 1979 and 2001 are also available in a set of fully text-searchable CD-ROMs.

Road texture and crash risk

Road macrotexture concerns surface roughness in the 0.5 mm to 50 mm range and is generally believed to affect braking performance. Macrotexture can easily be measured using laser profilometers in the course of routine highway condition surveys. Few studies examining the relationship between macrotexture and crashes have yet been ubdertaken. The ATSB commissioned the ARRB Group Ltd to investigate this relationship. The resulting report (CR 223) issued in February 2005 is available on the ATSB's website.

The ARRB Group consultants compared crash and macrotexture data from three highways in Western Australia, Victoria, and South Australia. They identified crash sites as rural (speed limit greater than 80 km/h) or urban (speed limit 80 km/h or less) and carried out separate analysis for rural and urban sites.

The results agree with previous work indicating that crash risk rises with decreasing macrotexture. Although the precise value of macrotexture at which the risk rises is not the same in various studies, the prospects for a surface management process based on macrotexture are nevertheless good. This study indicates that 13 per cent of crashes on the Great Eastern Highway and 17 per cent of crashes on the Princes Highway could be avoided by resurfacing all low macrotexture sites, although 21 per cent and 29 per cent of each highway respectively would need to be resurfaced to achieve this. Improvements could be more narrowly targeted at high risk sites such as intersections and curves.

Further work is required on the relationship between crash risk and macrotexture before a surface management process based on macrotexture can be developed. The ATSB has commissioned the ARRB Group Ltd to undertake a preliminary study on the effect of road surface texture on stopping distance.

Community Attitudes Survey 2004

The ATSB's 2004 survey of community attitudes to road safety was the seventeenth in the long running survey programme, the main purposes of which are to monitor attitudes to a variety of road safety issues, evaluate specific road safety countermeasures, suggest new areas for intervention and identify significant differences amoung jurisdictions.

The issues examined included: perceived causes of road crashes, exposure and attitudes to random breath testing, attitudes to speed, perceptions of police enforcement, reported usage of seat belts,

involvement in road crashes, and experience of fatigue while driving.

Just a few of the findings of this wide-ranging survey include:

- 98 per cent community approval for Random Breath Testing and 89 per cent for mandatory carrying of licences
- 83 per cent agree that speed limits are generally set at reasonable levels
- 77 per cent believe that 50 km/h limits on local residential streets reflect the right speeds for these areas
- strong support for speed enforcement activities to continue at existing levels (46 per cent) or to increase (39 per cent)
- around one-third still believe it is okay to speed if you are driving safely
- 15 to 24 year-olds were more likely than other drivers to admit to speeding, and were much more likely to have been in a crash in the past three years.

Road Safety Research Grants Programme

On an annual basis, the ATSB makes available several small competitive road safety research grants. The programme invites researchers and community groups to submit innovative research ideas. Appendix 2 lists road safety research grants awarded in 2004–05.

Novice Driver Education

The Australian Transport Safety Bureau is coordinating the Australian Government's contribution, in partnership with the NSW and Victorian Governments and private sector organisations, to a trial education programme for young drivers. The programme will be delivered to novices who have held a provisional licence for about three months. Novices are defined as drivers who are 17–21 years old in NSW and 18–22 years old in Victoria at the time of licensing (reflecting the minimum licensing age of 17 years in NSW, and 18 years in Victoria).

The project Steering Committee is developing a 'best-practice' programme with the assistance of a specially appointed group of Australian and overseas experts. The main elements of the curriculum were established during an intensive four-day workshop in April 2005, and a professional curriculum developer will be

engaged to finalise the cirriculum. It will feature insight learning processes, facilitated group discussion of safety issues, and an on-road mentoring session.

The trial is expected to involve 14 000 course participants in NSW and Victoria (7 000 in each state), with a similar number of novices selected for a control group. It will be one of the largest and most rigorous studies ever undertaken in the area of post-licence driver education, and is likely to attract considerable overseas interest.

At this stage, the trial is expected to commence operation in each state in early 2006 after completion of a pilot phase, and it will run over the following 12 months. The Committee is commissioning a specialist organisation to design and conduct a comprehensive evaluation.

Australian Road Assessment Program (AusRAP)

The Australian Road Assessment Program (AusRAP) is an initiative of the Australian Automobile Association (AAA) and its member motoring clubs. Based on an established European system known as EuroRAP, the programme presents information on the safety of Australia's roads using objective measures of casualty crash risk. In 2004–05, the ATSB provided the AAA with a grant of $350,000 to assist with the creation of a national AusRAP and database and with the further development of risk assessment protocols. The Government's contribution was publicly announced by Minister Lloyd in June 2005.

Vehicle safety research

The ATSB funded a series of vehicle crash tests involving side impacts with poles. Several passenger 4WD models were tested in the series, which clearly demonstrated the head protection benefits of curtain airbags. The work was carried out in association with the Australian New Car Assessment Program (ANCAP), with results contributing to the Department's vehicle standards research programme.

Participation in road safety forums

Austroads

Austroads is the association of Australian and New Zealand road transport and traffic authorities. As the road modal group of the Australian Transport Council (ATC), it advances Australia's broader

transport agenda. There is a small national office, but the majority of the work is undertaken or managed by the staff of member organisations. The ATSB's General Manager of Safety Research and Education is a member of the Austroads Road Safety Task Force.

National Road Safety Strategy Panel

The ATSB convenes, chairs and provides secretariat services to the National Road Safety Strategy Panel. The Panel meets twice a year and brings together key stakeholders in road safety, including representatives of transport agencies, police, user groups and industry. It reports to the Australian Transport Council through the Standing Committee on Transport and in consultation with Austroads. The role of the Panel is to:

- assist in identifying emerging national road safety priorities and in developing national road safety strategies and action plans
- monitor implementation of the current National Road Safety Strategy and Action Plan and related national strategies and action plans for specific areas of road safety
- identify and recommend areas of research to assist in reducing the incidence and severity of road trauma, including input to the Austroads research programme
- provide a forum for the exchange of data and information among stakeholders on road safety matters
- promote the development and implementation of road safety countermeasures based on research and best practice.

Motorcycle Safety Consultative Committee

The ATSB chairs the Motorcycle Safety Consultative Committee, which usually meets twice a year in Canberra. The Committee provides a forum where the Australian Government (represented by the ATSB and other departmental staff as appropriate) and major motorcycle rider associations can address national motorcycle safety issues.

Fleet Safety Forum

The ATSB participates with state and territory road safety agencies, university research centres and other national bodies in a Fleet Safety Forum to explore the possible road safety benefits of workplace-based fleet safety programmes. The Forum aims to facilitate fleet safety improvements, at both a macro policy level and in Australia's various government-operated vehicle fleets.

Heavy Vehicle Safety Strategy Task Force

This Task Force, chaired by the National Transport Commission, meets twice a year to facilitate implementation of the National Heavy Vehicle Safety Strategy, and monitor progress.

Indigenous Road Safety Working Group and Forum

The ATSB chairs the Indigenous Road Safety Working Group, which advises the National Road Safety Strategy Panel on indigenous issues. Members include representatives from federal, state and territory organisations. Available statistics indicate that the indigenous road fatality rate may be around three times that of the non-indigenous population. The ATSB chaired a national Indigenous Road Safety Forum and a meeting of the Working Group on 27 and 28 September 2004 in Alice Springs. The ATSB arranged the event in partnership with the Northern Territory Department of Infrastructure, Planning and Environment.

Over 60 delegates attended the forum, representing key stakeholders from federal, state and Northern Territory agencies that deal with transport, health, safety, corrective services and sport and cultural affairs, plus the police, driver training schools, motorist associations, community organisations, local government and local aboriginal elders. The Working Group met after the forum to discuss the key issues identified by delegates. These included the inadequacy of existing statistical fatality and injury data, unlicensed driving, low seat belt wearing rates, unsafe alcohol consumption, inadequate infrastructure, involvement of local indigenous communities and information sharing among road safety stakeholders.

The Working Group resolved to monitor action to address these issues and methods of nationally sharing information and resources to advance indigenous road safety. The ATSB facilitated this process by:

- advising members of the Standing Committee on Transport and Ministers of the Australian Transport Council of the recommended actions from the forum
- posting information about the forum outcomes on the ATSB website
- initiating action to improve the quality of indigenous road safety data collected nationally
- liaising with the Australian Government Department of Health to include the Working Group action in the draft of the National Aboriginal and Torres Strait Islander Safety Promotion Strategy

- participating as a working group member to support Western Australia's development of the Internet indigenous road safety information sharing project
- commissioning the ARRB Group Ltd to update information in the research report *Australian Indigenous Road Safety*
- convening and chairing a teleconference of the Working Group on 26 May 2005.

Australasian Traffic Policing Forum

The Australasian Traffic Policing Forum (ATPF) was originally established to foster best practice in road safety and traffic law enforcement among state Police Services. Its current membership includes senior traffic police managers from all Australian states and territories, New Zealand and Fiji. The ATSB is also a permanent member of the Forum, with a particular role in supporting constructive linkages between police and other road safety organisations. The ATPF normally meets twice a year. The ATSB attended a one-day meeting held in Perth (November 2004) and a two-day meeting in Darwin (May 2005).

National road safety statistics

The ATSB disseminates national statistics and reports on deaths and serious injuries caused by road crashes. Important publications include the twelve monthly reports which analyse Australia's road crash deaths and an annual publication comparing Australia's road toll with that in other OECD countries.

ATSB statistical reports for 2004–05

In 2004–05 the ATSB released and published on its website 25 road safety and rail statistics publications including the 13 road fatality statistical reports mentioned above. The other twelve special-issue statistical reports included: *Deaths and Serious Injuries Among Female Motorcyclists*, in which trends in accident rates among female as well as male motorcyclists are analysed; *Fatal Road Crashes Involving Articulated Trucks* in which it is shown that accident rates in this sector during the last decade have plateaued despite the increase in the sector size; *Cycle Safety: A National Perspective* which presents data on trauma due to road accidents involving cyclists; and *Profile of Road Safety Among Indigenous Australians* which shows that the rate of road fatalities among indigenous Australians is higher than that of other Australians in every State and twice as high nationally.

Statistical collections that the ATSB has updated during 2004–2005 include *Road Fatalities Australia: 2004 Statistical Summary*, and *Serious Injury Due To Road Crashes* which monitors the numbers and types of serious injuries occurring on our roads.

Public education

The slogan for World Health Day 2004 – 'Road Safety Is No Accident' – suggests that road safety does not happen accidentally, but requires a deliberate effort by governments and their many partners. Consequently, the ATSB continues to distribute a wide range of road safety materials to stakeholders and the general public to raise awareness of key road safety issues and to contribute to a safer road environment for all.

In 2004–05 the Bureau produced a CD record of proceedings from the Indigenous Road Safety Forum and Working Group meeting held in Alice Springs on 27 and 28 September 2004. It includes an audio recording of the forum presentations, copies of the powerpoint slides, photographs and the list of recommended actions from the Working Group meeting. Copies of the CD were provided to the forum delegates and to the National Aboriginal Community Controlled Health Organisation for distribution nationally to their 130 Aboriginal Medical Services. The availability of free copies is advertised on the ATSB website.

The new *National Road Safety Action Plan 2005 and 2006* includes an action item to complete the development of an Internet-based clearing house to share effective indigenous road safety initiatives among stakeholders and communities. The Western Australian Office of Road Safety has coordinated the work nationally and other road safety jurisdictions in Queensland, South Australia, the Northern Territory, and New South Wales have provided support funding. In 2004–05 the ATSB contributed $20,000 towards this project. The WA Office of Road Safety appointed the Public Health Unit at Edith Cowan University to develop the Internet site as part of the existing Aboriginal Indigenous HealthInfoNet site. Launch of the site is planned for November 2005.

Rail

Role

The ATSB conducts rail safety investigations on the Defined Interstate Rail Network under the *Transport Safety Investigation Act 2003* (TSI Act) and undertakes rail investigations on intrastate rail networks at the invitation of State authorities. The ATSB also coordinates the publication of the National Rail Occurrence Database, from data supplied by the various state and territory rail regulators.

Key safety activities and results

In 2004–05, the ATSB initiated seven rail safety investigations on the Defined Interstate Rail Network under the TSI Act 2003. During the year the ATSB completed an investigation on behalf of the Victorian state authorities into the fatal level crossing accident at Benalla, Victoria in October 2002. Three final ATSB investigation reports were released in 2004–05 containing a total of 22 safety recommendations to rail safety stakeholders. In October 2004 the Victorian Minister of Transport released the ATSB investigation report into the derailment and subsequent collision at Chiltern between a freight train and a passenger train. Also, the ATSB released its first investigation reports under the Transport Safety Investigation Act into train derailments at Ararat, Victoria and Bates, South Australia. The median completion time for the two TSI investigations was 519 days.

In November 2004 the Queensland Government asked the ATSB to chair a joint Queensland Transport investigation into the derailment of the Cairns Tilt Train north of Bundaberg on the night of 15 November 2004. A significant number of the 157 passengers and crew on board were injured, some seriously. An interim report regarding the derailment was released by the Queensland Minister for Transport on 16 February 2005.

The ATSB continued to coordinate the development of a national rail occurrence database in cooperation with State and NT rail regulators. Data on a number of key safety indicators are published on the ATSB web site.

Rail investigations completed in 2004–05

Chiltern derailment and subsequent collision

In March 2003, the Department of Infrastructure, Victoria, asked the ATSB to conduct an investigation into a derailment and subsequent collision at Chiltern between a freight train (1SP2N) and a passenger train (8318) on 16 March. No serious injuries were reported by either train crew or passengers.

Chiltern is located on the main railway corridor between Sydney and Melbourne, approximately 272.227 kilometres from Melbourne's Spencer Street Station. The rail corridor contains two tracks, one broad gauge and one standard gauge. The standard gauge track is controlled and managed by the Australian Rail Track Corporation (ARTC) located in Adelaide. The broad gauge track is controlled and managed by Freight Australia located in Melbourne.

The derailment of train 1SP2N was caused by a 'screwed journal' on a wagon located in the 15th position of the train consist. The wagon had reportedly been in storage for several years and had been reintroduced into service. The screwed journal was the result of a failed wheel bearing due to a loss of interference fit on the axle journal. Heat (from friction) built up to a point at which the bearing seized and the journal detached from the axle. The wheelset then became unstable causing the derailment.

There was about two minutes from the time train 1SP2N came to a standstill, up to the time the driver of train 8318 applied the emergency brake, to try and stop train 8318 before the derailed train. In that time the drivers from train 1SP2N had repeatedly tried to warn train 8318, but were unsuccessful. The drivers also followed procedure by notifying the ARTC standard gauge train control but the message was delayed by four minutes before being relayed to the broad gauge train control (Centrol), not in time to prevent the collision.

The investigation identified a number of contributing factors including wagon maintenance; inadequate industry standards or 'best practice'; and communication systems, condition, procedure and use. The ATSB issued the 12 safety recommendations listed in Appendix 4 to five rail safety stakeholders. The Victorian Department of Infrastructure has included in its audit programme of relevant Australian rail organisations an ongoing scheduled audit of the maintenance of wheel bearings and of communications between train control centres. Pacific National (PN) has reviewed

and implemented new maintenance schedules based on distance and time. PN has also mandated inspections of rolling stock entering service after extended periods, including rolling the wheel bearings within a certain time frame to ensure lubrication within the unit.

Ararat derailment

On 28 November 2003, Pacific National freight train 2PW4-N travelling between Perth and Wollongong via Melbourne derailed two wagons after traversing a buckled rail at Ararat in Western Victoria. No injuries resulted from the derailment. The ATSB released its investigation report on this rail accident on 9 February 2005.

Ararat is located on the main railway corridor between Melbourne and Adelaide, approximately 265 kilometres from Spencer Street Station in Melbourne.

Bates derailment

Train 6WP2 operated by Pacific National Ltd (PN) derailed at 2222 (central summer time) on Sunday 9 November 2003 as it was passing through Bates, South Australia. The train had departed Port Augusta that morning and was proceeding to Perth, Western Australia.

The derailment was limited to wagon number RKCX24 positioned 21st in a train of 73 wagons. The condition of a Roller Bearing Unit (RBU) on the right hand third axle of the wagon had progressively deteriorated to a point where friction-induced heat caused the portion of axle between the RBU and the wheel to become 'plastic' causing the RBU to seize whereupon the axle separated or 'screwed' off as the axle turned.

Approximately 1275 metres of track sleepers and 150 metres of rail were damaged as a result of the derailment. No injuries were reported and no dangerous goods were involved. The investigation concluded that train 6WP2 derailed due to the failure of an RBU on wagon RKCX24 and identified a number of causal factors relating to bearing roller assembly cage failure associated with: bearing refurbishment and assembly; storage; and handling of the wheel set.

The ATSB recommendations arising from the Chiltern, Ararat and Bates rail accident investigation reports are detailed in Appendix 4.

Rail Investigations in progress at 30 June 2005

At 30 June 2005 the ATSB continued 11 rail accident investigations including 10 under the provisions of the TSI Act, plus the joint Queensland Transport investigation into the Cairns Tilt Train accident under Queensland legislation. At 30 June three of the TSI Act investigations were more than one year old. The TSI Act investigations include:

- the derailment of a freight train near Alumatta, Victoria, on 15 March 2004. This investigation report was released on 18 August 2005
- the near head-on collision of a freight train with an empty passenger train near Sandgate, NSW, on 25 February 2004. This investigation report was released on 21 September 2005
- a Signal Passed At Danger incident near Murarrie, Queensland, on 28 June 2004. This investigation is nearing completion
- a Signal Passed At Danger incident at Fisherman Islands, Queensland, on 20 September 2004
- the derailment of a cement freight train near Benalla, Victoria, on 23 September 2004
- the derailment of a coal freight train at Thornton, New South Wales, on 11 October 2004
- the derailment of a freight train at Glenalta, South Australia, on 21 November 2004
- the derailment and subsequent collision at Dynon, Victoria, on 19 January 2005 involving a freight train and an interstate passenger train. The ATSB released an interim report regarding the accident on 20 May 2005
- two freight train derailments within one hour in Western Australia on 30 January 2005. The first derailment was at Koolyanobbing and the second near Merredin
- a shunting accident at Regency Park, South Australia, on 2 February 2005 that resulted in very serious injuries to a rail employee.

At the invitation of the Queensland Government the ATSB is chairing a joint Queensland Transport investigation into the derailment of the Cairns Tilt Train north of Bundaberg on the night of 15 November 2004. An interim report regarding the derailment

was released by the Queensland Minister for Transport on 16 February 2005.

National Rail Occurrence Database

In cooperation with the state and NT rail safety regulators, the ATSB has continued to develop the National Rail Occurrence Database. The formal data collection procedures are now in place, and it is expected that, by the second quarter of 2005–06, the database will be populated with a greatly expanded set of occurrence data that will be of value to industry, regulators, investigators and researchers.

Participation in rail safety forums

During 2004–05, the ATSB participated in several rail safety forums. Participation helps the Bureau communicate the safety message, maintain its industry contacts, and stay informed on relevant policy and technical issues. These forums included:

- Railway Signal Engineers conference, 29 October 2004 – 1 presentation
- Rail Corp Safety Science Courses, Macquarie University – 6 presentations
- Spencer Street Runaway train investigation presentations to industry – 5 presentations
- Pacific National System Safety Accident Investigation Course in Sydney, June 20005

The ATSB continued to liaise with state authorities at their request to explain the provisions of the *Transport Safety Investigation Act 2003* and ongoing development of safety databases, and associated matters.

The Bureau attended one meeting of the Australian Transport Council Rail Group in Canberra in August 2004 and provided relevant briefings within required timeframes for this meeting and for a meeting of the Standing Committee on Transport in Melbourne in October 2004.

Training for rail industry personnel

During 2004–05 seven rail industry staff, representing track access providers and rail accreditation authorities, completed an ATSB human factors training course in Canberra – four in November 2004 and three in May 2005.

Marine

Role

Accident investigation

The ATSB's Marine Investigation Unit (MIU) investigates accidents and incidents involving Australian-registered ships anywhere in the world and foreign ships in Australian waters or en route to Australian ports. The purpose of marine investigations is to enhance safety at sea by determining the factors contributing to accidents and incidents.

Since 1 July 2003 the MIU has investigated marine accidents under the provisions of the *Transport Safety Investigation Act 2003* (TSI Act) and associated regulations. Under the TSI Act, accidents, incidents and potential incidents must be reported to the ATSB. Depending on the type and severity of an occurrence, the Executive Director of the ATSB may decide that an investigation will be conducted. Other action may be:

- to seek more information from an owner, operator, crew or appropriate bodies
- to enter details of the incident into the marine database.

Every investigation results in a published report which includes the facts of the incident, an analysis, conclusions and recommendations. The reports do not seek to assign fault or to determine civil or criminal liability and the results of investigations are not binding on the parties to any legal, disciplinary or other proceedings.

The ATSB distributes its marine investigation reports and safety and educational material nationally and internationally and promotes marine safety in Australia and overseas. The Bureau sends about 1000 copies of each report to Australia's maritime community and educational institutions, to marine administrations in Australia and abroad, and to overseas maritime colleges and universities. All reports are available on the ATSB's website.

Key safety activities and results

In 2004–05, the ATSB was funded for up to ten new marine investigations but actually started thirteen new investigations. The Bureau released 11 marine investigation reports, three in a shortened report format, with a median completion time of 372 days, 112 days less than in 2003–04. These reports included a

total of 42 safety recommendations to marine safety stakeholders. At 30 June 2005 the ATSB continued 12 marine accident investigations, three of which were more than one year old.

The eleven investigation reports released comprised: three groundings, three collisions involving ships and fishing vessels, a fatality on a container ship, a lifeboat accident and three incidents involving machinery damage which left the ship disabled at sea.

In addition to the safety investigation activities, the MIU started a proactive safety awareness programme aimed at the Australian commercial fishing industry. The programme is designed to raise awareness within the fishing industry of the recurring factors that the ATSB found in its 23 investigations of collisions between ships and fishing vessels. In the last five years the Bureau has investigated two collisions that both resulted in the loss of the fishing vessel and death of its skipper.

The ATSB completed phase one of the safety awareness programme in the latter half of 2004. This initial phase involved a series of meetings with federal and state fishing industry peak bodies and regulatory authorities. In December 2004 the Bureau commenced the ongoing phase two of the programme, which involves a series of face-to-face presentations to fishermen in larger fishing ports. To date, the Bureau has held meetings with fishermen in several ports in Queensland, Northern Territory and New South Wales. The ATSB prepared a new safety bulletin for distribution at the meetings along with a selection of other safety materials including investigation reports. The Bureau also produced a DVD in conjunction with the Australian Maritime Safety Authority, Maritime Safety Queensland and the New South Wales Maritime Authority, which will be distributed at future meetings.

Key investigation reports published during 2004–05

Astor – Grounding

On the evening of 26 February 2004, the Bahamas-registered passenger ship *Astor* departed the Queensland port of Townsville for an overnight trip to Cairns. A harbour pilot was on board, but the master, as is common practice on passenger ships, manoeuvred the ship clear of the berth and, even though this was his first visit to Townsville, kept the conduct of the ship throughout the pilotage. The pilot adopted an advisory role.

At about 1908, as the ship was turning from the harbour into Platypus Channel, part of the approach channel to the port, it grounded its port side on the side of the channel. At about 1911, the ship slid clear of the bank without assistance and continued out of the port's approach channels. After it had cleared the channels, the ship was stopped for about two hours to check that the hull was not breached and that all machinery was operating normally. The ship later proceeded to Cairns, where an underwater survey of the hull was carried out to ascertain the extent of the damage.

The investigation into the grounding of *Astor* was complicated by the fact that the voyage data recorder (VDR) data was not backed up in the time immediately after the grounding (highlighting a deficiency in crew training in this important facet of ship operations) and by the fact that company procedures were not followed with respect to the keeping of bridge records.

The ATSB's report concluded that the following factors contributed to the grounding:

- The master did not accept the pilot's advice after the ship left the berth.
- Communications on the bridge were in a language the pilot was not able to understand.
- The ship's master and bridge team members did not employ good bridge resource management (BRM) practices at any time leading up to the grounding.
- The master had positioned the ship incorrectly for a turn to starboard into Platypus Channel.
- The master did not present an outward passage plan to any of those present on the bridge at the time of departure.

The ATSB recommended that:

- Ship owners, managers, operators and masters of ships ensure that all bridge staff are fully trained in the correct operation of voice data recorder (VDR) data backup procedures for the particular ship on which they are serving.
- Manufacturers of VDR units should ensure that indicator lights are free of any possible ambiguity and that consideration be given to printing emergency back-up instructions on VDR control panels on ships' bridges.

- Masters of vessels should not actively control the ship directly during pilotage unless they are familiar with the port and they do so in full agreement with any pilot.
- Ships' masters should ensure that all bridge orders in pilotage waters are in a language understood by pilots and ships' staff.
- Ship owners, managers and operators should instruct masters and ships' crews to use all elements of effective Bridge Resource Management.

The report's recommendations are detailed at Appendix 4.

Asian Nova/Sassenach – Collision

On the evening of 29 May 2003, the 225 m long Panama-registered bulk carrier, *Asian Nova*, was en route to the Queensland port of Townsville. By 2300 the ship had cleared Palm Passage and was heading south inside the Great Barrier Reef at 11 knots.

At about 2300, the third mate on the ship's bridge saw a group of small vessels ahead of the ship and started to track the vessels on the ship's radar. He assessed that there was a risk of collision with a slow-moving vessel heading in a south-easterly direction and shortly after 2330, made a small alteration of course to starboard to pass clear.

Just before midnight the second mate came to the bridge to relieve the third mate. The two men had a very brief handover and then the third mate left. During this time, the ship continued to approach the vessel that the third mate had been tracking. When the third mate had left the bridge, the second mate checked the navigation chart and saw that ship was off its planned track. He then altered the ship's course to port. He had not seen the small vessel ahead of the ship.

At about 0001 *Asian Nova* fouled the warps of the Australian fishing vessel *Sassenach*. The prawn trawler was dragged against the hull of the bulk carrier, damaging its port quarter and causing it to capsize and sink.

Sassenach's skipper lost his life as a result of the collision and his body was recovered from the sunken trawler on 5 June 2003. The deckhand was able to jump clear at impact and was rescued some five hours later by a searching fishing boat.

The ATSB's report concluded that the third mate's course alteration to starboard just after 2330 was insufficient to provide an adequate passing distance astern of *Sassenach* and that he should have stayed

on the bridge until the ship had passed clear. The report also concluded:

- The second and third mates did not follow the recommended practice, company requirements, or the ship's standing orders when handing over control of the navigational watch.
- The second mate resumed the course marked on the chart before properly assessing whether it was safe to do so.
- The second mate did not keep a proper lookout.
- Interpersonal relations were possibly a factor in the deficient handover between the third and second mates.

The ATSB recommended that:

- Masters and ship's officers should follow the correct procedure and guidelines to ensure a safe handover of watch.
- Ships' masters should ensure that an additional lookout is available to be posted during the hours of darkness when watchkeeping seamen are assigned other duties that inhibit their ability to maintain a proper lookout.
- Ships equipped with recording instruments for course, engine movement or any other parameter relevant to the safety of navigation during a passage should be required to ensure that they are operational and running when underway.

The report's three recommendations are listed with all 2004–05 ATSB marine recommendations at Appendix 4. All eleven ATSB marine reports released in 2004–05 are listed at Appendix 3 and the twelve marine investigations ongoing into 2005–06 are at Appendix 5.

Marine safety actions 2004–05

The ATSB's marine investigations of a number of lifeboat accidents on ships, including the accident aboard the *Lowlands Grace* in Port Hedland in October 2004, have led to the Australian Maritime Safety Authority targeting lifeboats in their Port State Control inspections. To date, these inspections have revealed a number of serious deficiencies.

The Bureau's *Maersk Tacoma* investigation recommendations included a recommendation relating to prompt reporting by disabled ships in Australian waters. This has led the regulator and the shipping company involved to focus on this requirement.

A series of collisions between Australian fishing vessels and trading ships has resulted in some significant ATSB investigation reports, recommendations and initiatives that have led to increased industry awareness and a focus by the state marine regulators on this issue.

Participation in marine safety forums

Marine Accident Investigators' International Forum (MAIIF)

The Marine Accident Investigators' International Forum (MAIIF) was established in Canada in 1992. The thirteenth meeting of MAIIF was held in Cape Town, South Africa, from 4–8 October 2004. Fifty five delegates representing 36 countries attended and Australia chaired the meeting.

The agenda included national and regional activity in marine casualty investigation, technical innovation, human factors in accidents and incidents, investigator training, pilotage, fishing vessel safety and the future role of MAIIF.

Delegates presented some fifteen papers referring to research or case studies during the four meeting days and these formed the basis of discussion for the various agenda items.

Papers presented dealt with a number of issues, including:

- the vulnerability of vessels to asymmetrical flooding in the event of the hull being breached
- fatigue in coastal shipping operations
- fire investigation using a Computation Fluid Dynamic fire modelling tool
- fishing vessel safety, with papers from South Africa, Vanuatu and Finland
- the review of the International Maritime Organisation (IMO)'s Code for the Investigation of Marine Casualties and Incidents.

In addition to the technical papers, delegates made significant decisions on the future direction of MAIIF. During the meeting delegates decided, based on a preliminary Australian draft, that MAIIF will seek consultative status at IMO.

Flag State Implementation (FSI) Sub-Committee

The ATSB participated at the thirteenth meeting of the IMO Flag State Implementation Sub-Committee in London from 7–11 March

2005, and formed part of the Working Group on Casualty Analysis and Statistics. Eighty one member countries were represented, together with the Food and Agriculture Organization, the European Commission, the Arab Federation of Shipping, and 17 non-governmental organisations with consultative status.

In his opening remarks, the IMO's Secretary General referred to the Code for the Investigation of Marine Casualties and Incidents. He noted that sea transport was highly reliable and environmentally friendly. However, accidents, particularly those involving pollution, influenced the perception of sea transport among the general public and politicians. He stressed the need for a uniform approach to the investigation of marine accidents.

The ATSB's role at FSI 13 centred on:

- casualty analysis and remaining an active member of the Correspondence and Working Groups
- analysis and recommendations relating to IMO's casualty database via the Correspondence Group
- amending circulars relating to casualty reporting
- discussing accidents involving life boats
- discussing the acceleration of information flow from FSI to the Committees and technical sub-committees
- proposing options for mandating the Code for the Investigation of Marine Casualties and Incidents
- between Sub-Committee meetings, coordinating a correspondence group which is examining issues relating to a possible mandatory code for investigating marine casualties.

Maritime conferences, courses, training and presentations

In April 2005 officers from the ATSB's MIU attended the National Marine Safety Committee's marine safety conference in Hobart. Also in April 2005, an investigator attended and facilitated discussions at the Australian marine pilots competency audit programme in Malaysia.

Members of the MIU made presentations to various forums throughout the year including:

- to fishermen, seafood industry councils and state regulatory authorities as part of the commercial fishing industry awareness programme

- at the MAIIF meeting in South Africa
- various meetings of marine pilots
- an Australian Maritime Safety Authority (AMSA) International Safety Management Code audit workshop in Sydney
- an AMSA surveyors workshop
- a Navy training day in Nowra
- the National Marine Safety Council conference in Hobart
- meetings of marine lawyers in Melbourne and Sydney
- to Judges from the Indonesian Marine Court during their visit to the ATSB in Canberra.

The ATSB also continued its support of the Advanced Marine Pilot Training Programme by making presentations on human factors at the various courses throughout the year.

Aviation

Role

As Australia's prime aviation safety investigation agency, the ATSB investigates accidents, incidents and safety deficiencies involving civil aircraft in Australia. It does so in accordance with Annex 13 to the Convention on International Civil Aviation (Chicago Convention 1944), which has legal force through the *Transport Safety Investigation Act 2003* (TSI Act) for aviation occurrences after 1 July 2003.

From 1 July 2003 all air transport safety matters listed in section 23 of the *Transport Safety Investigation Act 2003* that occur in Australia must be reported to the ATSB. The Bureau then decides if it will investigate. Investigating selectively allows the Bureau to more thoroughly analyse those occurrences it believes will yield the most useful safety benefits within the budget available after meeting international obligations and community expectations with respect to fatal accidents. The ATSB may also assist in investigations of accidents and serious incidents involving Australian-registered aircraft overseas, or with overseas investigations involving foreign aircraft if an overseas investigating authority seeks assistance and the Bureau has suitable available resources.

ATSB investigations are for the sole purpose of improving safety. This is accomplished by identifying safety issues during an investigation. The ATSB will then work cooperatively with organisations such as the Civil Aviation Safety Authority and aircraft manufacturers and operators, who are best placed to implement changes to improve safety. Action taken by these organisations will be reported in ATSB reports as Safety Action. In cases where no action is taken, the ATSB will issue Safety Recommendations to the appropriate organisations.

As with similar bodies worldwide, ATSB recommendations are not mandatory but encourage change through safety action.

The ATSB publicises its aviation safety results through:

- aircraft accident/incident reports
- aviation safety research reports
- safety recommendations, advisory notices and information circulars
- articles in magazines such as CASA's *Flight Safety Australia*
- participation in safety conferences and forums.

Key safety activities and results

In 2004–05, the ATSB received 6047 notifications of aviation accidents and incidents, commenced 109 new occurrence investigations and recruited and commenced training 12 new aviation investigators with additional funding provided in the May 2004 Budget.

During 2004–05, the ATSB released 98 aviation investigation and technical reports with a median time from occurrence date to report release of 247 days which was down from the 2003–04 figure of 347 days. This decrease was due to the higher investigator numbers and to the increased proportion of shorter category-four investigations among the higher numbers of total investigations. Incomplete investigation reports increased slightly from 75 at the end of 2003–04 to 86 at 30 June 2005, following the 2004–05 increase in investigations instigated. The number of investigations more than 12 months old decreased slightly from 15 to 14.

Significant aviation safety investigation reports released during 2004–05 included:

- VH-AMR Beech King Air air ambulance accident near Coffs Harbour, NSW
- VH-UXF Robinson R22 helicopter fatal accident near Derby, WA
- VH-WAC Piper PA-23-250 fatal accident near Mareeba, Qld
- VH-TUR Cessna 172M fatal accident near Wedderburn south west of Sydney, NSW
- VH-TRZ Piper Cherokee fatal accident near Lake Eildon, Victoria
- VH-HTD Bell 407 helicopter fatal accident north of Mackay, Qld
- VH-ANV Cessna 404 fatal accident at Jandakot Aerodrome, WA
- VH-VXF Boeing 737 terrain warning near Canberra, ACT.

At the beginning of 2005–06 the ATSB continued to investigate 86 occurrences and technical safety matters including:

- VH-YKL Robinson R44 helicopter fatal accident north-west of Kununurra, WA (released in July 2005)
- VH-CTT Piper PA-34-200 fatal accident at Bankstown aerodrome, NSW (released in July 2005)
- VH-OHA Robinson R22 helicopter fatal accident near Camden, NSW
- VH-LST Aero Commander 500-S fatal accident north-west of Hobart, Tas
- VH-JWX Robinson R44 helicopter fatal accident near Roma, Qld
- VH-TNP Piper PA-31T fatal accident near Benalla, Vic
- HB-LRW Cessna 421C fatal accident at El Questro, WA
- VH-TFU Fairchild Metroliner fatal accident near Lockhart River, Qld
- VH-CSH Bell 206B fatal helicopter accident near Dunedoo, NSW

- VH-FIN Cessna 310R fatal accident near Tamworth, NSW
- VH-KJD Beechcraft B300 serious aircraft incident near Theodore, Qld
- VH-OAO Piper PA-31-350 fatal aircraft accident near Mount Hotham, Vic
- a major technical study of a range of failures in high-powered reciprocating engines.

A full list of ATSB aviation investigations underway at the beginning of 2005–06 is at Appendix 5.

Occurrence investigations

Table 20:
Accidents & Incidents Notified to the ATSB 1996–97 to 2004–05

Occ Type.	1996–97	1997–98	1998–99	1999–00	2000–01	2001–02	2002–03	2003–04	2004–05
Accident	252	244	227	203	215	179	155	152	157
Serious Incident	0	0	1	12	8	7	10	6	25
Incident	3707	3985	5683	5253	5881	5455	5831	4408	5865
Total Notified Occurrences	3962	4229	5911	5468	6133	5641	5996	4566	6047

Note: *Occurrences 'notified' are those assessed by the ATSB to meet accident and incident definitions for the purpose of entry to the OASIS database.*

Occurrences reported since 1996–97 under Part 2A of the *Air Navigation Act 1920* and since 1 July 2003 under the TSI Act 2003 show an increase from 3962 reported in 1996–97 to 6047 occurrences reported to the ATSB in 2004–05 (see table 20), close to the 2000–01 maximum of 6133. An increase may be the result of an improving safety reporting culture rather than any worsening of safety. The decline in 1999–00 may be partly the result of the avgas fuel contamination that grounded thousands of small aircraft in late 1999 and early 2000. The decline from 2000–01 to 2003–04 was due in part to a decline in tourism and aviation activity as a result of the effects of the terrorist attacks in the USA on September 2001 and in Bali, Indonesia on 12 October 2002; the cessation of Ansett's operations; and the spread of the SARS virus.

Key aviation safety investigation reports published during 2004–05

Cape Hillsborough Air Ambulance Bell 407 Helicopter Accident report

On the evening of 17 October 2003, an air ambulance Bell 407 helicopter, registered VH-HTD (HTD), being operated under the 'aerial work' category, was tasked with a patient transfer from Hamilton Island to Mackay, Queensland. The crew consisted of a pilot, a paramedic and a crewman. Approximately 35 minutes after the departure of the helicopter from Mackay, the personnel waiting for the helicopter on the island contacted the Ambulance Coordination Centre (ACC) to ask about its status. ACC personnel then made repeated unsuccessful attempts to contact the helicopter before notifying Australian Search and Rescue (AusSAR), who initiated a search for the helicopter. AusSAR dispatched a BK117 helicopter from Hamilton Island to investigate. The crew of the BK117 located floating wreckage, that was later confirmed to be from HTD, at a location approximately 3.2 nautical miles (NM) east of Cape Hillsborough, Queensland. There were no survivors.

Following 12 days of side scan array sonar searches, underwater diving and trawling, the main impact point and location of heavy items of wreckage were located. The wreckage was recovered and examined at a secure onshore location.

Although the forecast weather conditions did not necessarily preclude flight under the night Visual Flight Rules (VFR), the circumstances of the accident were consistent with pilot disorientation and loss of control during flight in dark night conditions. The effect of cloud on any available celestial lighting, lack of a visible horizon and surface/ground-based lighting, and the pilot's limited instrument flying experience, may have contributed to this accident. Although not able to determine with certainty what factors led to the helicopter departing controlled flight, the investigation determined that mechanical failure was unlikely.

The circumstances of the accident combined most of the risk factors known for many years to be associated with helicopter Emergency Medical Services (EMS) accidents including those relating to the pilot, the operating environment and organisational factors. The pilot was inexperienced for long distance over water night operations out of sight of land and in the helicopter type. He did not hold an instrument rating, had limited instrument flying experience and was new to the organisation and EMS operations. The accident occurred on a dark night with no celestial or surface/ground-based

lighting, the flight path was over water with no fixed surface lit features, and the forecast weather in the area of the helicopter flight path included the possibility of cloud at the altitude flown.

The organisational risk factors included that a number of different organisations were involved in providing this EMS helicopter service and that the operation was from a base remote from the operator's main base. Actual or perceived pressures may have existed to not reject missions due to weather or other reasons and there was also an apparent lack of awareness of helicopter EMS safety issues and helicopter night VFR limitations. Oversight for ensuring safety was divided and diminished and no single organisation with expertise in aviation had overall oversight for operational safety.

The ATSB issued safety recommendations to CASA during the investigation and with the final report, and the investigation also resulted in safety actions by the Queensland Emergency Services Department and the operator. These outcomes are featured in the following recommendations section, in Appendix 4, and in the final VH-HTD investigation report which is available on the ATSB website.

Fatal accident after takeoff from Jandakot Aerodrome in Perth

On 11 August 2003, at about 1535 Western Standard Time, a Cessna 404 Titan (C404) aircraft, registered VH-ANV, took off from runway 24 right (24R) at Jandakot Airport, WA. One pilot and five passengers were on board the aircraft. The flight was being conducted in the 'aerial work' category, under instrument flight rules.

Shortly after the aircraft became airborne, while still over the runway, the pilot recognised symptoms that he associated with a failure of the right engine and elected to continue the takeoff. The pilot retracted the landing gear, selected the wing flaps to the up position and feathered the propeller of the right engine.

The pilot later reported that he was concerned about clearing a residential area and obstructions along the flight path ahead, including high-voltage powerlines crossing the aircraft's flight path 2,400 m beyond the runway. The aircraft was approximately 450 m beyond the upwind threshold of runway 24R when the pilot initiated a series of left turns. Analysis of radar records indicated that during the turns, the airspeed of the aircraft reduced significantly below the airspeed required for optimum single-engine performance.

The pilot transmitted to the aerodrome controller that he was returning for a landing and indicated an intention to land on runway 30. However, the airspeed decayed during the subsequent manoeuvring such that he was unable to safely complete the approach to that runway. The pilot was unable to maintain altitude and the aircraft descended into an area of scrub-type terrain, moderately populated with trees. During the impact sequence at about 1537, the outboard portion of the left wing collided with a tree trunk and was sheared off. A significant quantity of fuel was spilled from the wing's fuel tank and ignited. An intense post-impact fire broke out in the vicinity of the wreckage and destroyed the aircraft.

Four passengers and the pilot vacated the aircraft, but sustained serious burns in the process. One of those passengers died from those injuries 85 days after the accident. A fifth passenger did not survive the post-impact fire.

Analysis of radar data indicated that the aircraft was operating significantly below the optimum speed for maximum single-engine climb performance for most of the flight. A number of factors affect an aircraft's one-engine inoperative performance, including any variation from the airspeed to achieve the one-engine inoperative best rate of climb, control inputs made by the pilot to manage the situation and the effect of manoeuvring/turning the aircraft.

Examination of the right engine revealed a material anomaly with the fuel pump sleeve bearing. That bearing exhibited evidence of localised adhesive wear (galling) that had restricted the rotation of the pump spindle shaft. The bearing had previously been replaced during the last engine overhaul. Analysis of the bearing revealed that it had been manufactured from material that possessed inferior galling resistance when compared with bearings from similar pumps. The investigation concluded that the specified material for the replacement sleeve bearing was inadequate with respect to its galling resistance. High torsional loads between the spindle shaft and the sleeve bearing had caused the pump's drive shaft to shear at a critical phase of flight. Associated with a loss of drive to the pump shaft was a reduction in fuel pressure, which was insufficient to sustain operation of the engine at take-off power.

Following the occurrence, the operator modified other Cessna C404 aircraft in its fleet to incorporate a warning light to indicate low fuel pressure. The ATSB has previously issued three recommendations (see ATSB report BO/200105618) relevant to pilot training for

engine-out operations in multi-engine aircraft. Those recommendations are also relevant to the circumstances of this occurrence.

Boeing 737 Terrain Proximity Warning Alert near Canberra

On 24 July 2004, a Boeing 737-838 aircraft departed Perth at 0211 Eastern Standard Time on a scheduled passenger service from Perth to Canberra with 87 passengers and crew onboard. At 0544 the flight crew received a terrain proximity caution from the aircraft's enhanced ground proximity warning system (EGPWS) while descending to the south-east of Canberra Airport

During the flight the environmental conditions on the flight deck became abnormally hot because of a pre-existing air conditioning problem. (Although maintenance personnel were unable to rectify the fault, continued operation was permitted under the operator's approved maintenance procedures). Due to staff shortages that morning, the air traffic control (Canberra Terminal Control Unit) services normally provided were not available. This meant that the aircraft's descent below 9,000 ft was conducted without air traffic control radar assistance. As the aircraft approached Canberra, the crew elected to track to the Church Creek (CCK) locator beacon 10.9 NM south-east of Canberra Airport, to enter the holding pattern prior to descending to intercept the instrument landing system (ILS) approach for runway 35.

As the aircraft approached CCK, the copilot, under the direction of the pilot in command, entered the holding pattern details into the Flight Management Computer (FMC). In so doing, an erroneous data entry was made, which resulted in the FMC computing a holding pattern with a leg length of 14 NM. By entering a leg distance of 14NM, the crew inadvertently commanded the FMC to take the aircraft about 11 NM beyond the published holding pattern limit.

The crew descended from 9,000 ft, after passing overhead CCK. During descent, the aircraft departed from the airspace specified for holding. Consequently, the aircraft was operated closer to the surrounding terrain than intended.

The EGPWS detected the aircraft's proximity to terrain and provided the crew with a 'CAUTION TERRAIN' message to which they responded by climbing the aircraft to 6,500 ft. Sixteen seconds before the message, the crew commenced a right turn to intercept the inbound track to CCK. At the time of the message, the aircraft's height above terrain was 2,502 ft (radio altimeter indication).

During the turn, the aircraft passed 0.6 NM (1.11 km) north abeam and 810 ft higher than the closest terrain (a spot height of 4,920 ft above mean sea level). It also passed 2.7 NM (5 km) north abeam Tinderry Peak. During the recovery manoeuvre the aircraft descended to 5,730 ft. The crew subsequently joined the runway 35 localiser.

It is likely that both the pilot in command and the copilot were experiencing fatigue due to the cumulative effects of ineffective sleep in the period preceding the Perth to Canberra night sector and the ongoing period of wakefulness during the flight. Additionally, as they approached Canberra, the crew was working at a low point in their circadian rhythms. The crew's lack of recognition of the inaccurate entry in the FMC is consistent with the effects of fatigue, and it is likely that those effects were exacerbated by the excessive flight deck temperatures.

As a result of this occurrence, the aircraft operator has taken action to ensure prompt rectification of flight deck or passenger cabin temperature control problems and increased the minimum holding pattern altitude at Church Creek. Airservices Australia has issued a temporary local instruction detailing how the Canberra Terminal Control Unit staff shortage contingency plan should be activated. Additionally, chart publisher Jeppesen Sanderson Inc. has advised the ATSB that they intend to include the Distance Measuring Equipment (DME) identifier in the holding pattern limit notes on relevant charts.

Aviation safety recommendations released and safety actions taken during 2004–05

The ATSB strongly prefers to encourage positive safety actions and to report those actions undertaken in its final reports if this is possible, to avoid the need to make safety recommendations. However, some recommendations remain necessary, especially when there are international safety implications.

In 2004–05, the ATSB raised and issued 19 recommendations and two safety advisory notices. Twenty nine different aviation occurrence investigations resulted in separately identified safety actions.

Aviation safety recommendations 2004–05

The ATSB issued 19 aviation recommendations and two safety advisory notices during 2004–05 relating to important issues including:

- The possibility of out-of-trim flight in Bell 206 helicopters uncovering the fuel inlets at low fuel levels.
- Raytheon B300 cabin door in-flight separation and the potential safety deficiency of the cabin door warning system becoming prematurely earthed.
- Constructors of Canadian Safari and other lightweight helicopters to review the installation of an engine speed governor and discernibly different audible RPM speed tones.
- Pratt and Whitney to review the processes to accomplish Variable Stator Vane (VSV) ring pin flaring and compliance with service bulletin PWENG72-432 and to ensure PW4000 Engine VSV Levelling Arm Pin Retention.
- Runway centreline and touchdown zone lighting at Darwin being consistent with CASA recommended practices for runways wider than 50m.
- Assessment of the significance of diastolic blood pressure to the risk of a cardiac event in applicants for an aviation medical certificate.
- Australian operators of Boeing 737-800 series aircraft not operating R4 (fourth retread) tyres or above until serviceability limitations identified.
- Emergency Medical Service helicopter piloting numbers, qualifications and autopilot issues, and training and recency requirements.
- Adequacy of Qantas Airways procedures for deploying over-wing slides during known brake fire situations. Consideration of the visual cues used and potential risk to passengers of evacuating within close proximity of a fire zone.

A detailed list of the ATSB's aviation recommendations is at Appendix 4.

Full details of aviation safety recommendations and responses are listed on the ATSB website at www.atsb.gov.au.

Details of key 2004–05 ATSB air safety recommendations included:

VH-HTD Bell 407 helicopter crash near Cape Hillsborough, Qld on 17 October 2003 – Operator classification and/or minimum safety standards for helicopter Emergency Medical Services (EMS) operations

R20050002 issued on 15 March 2005

The Australian Transport Safety Bureau recommends that the Civil Aviation Safety Authority review its operators classification and/or its minimum safety standards required for helicopter EMS operations. This review should consider increasing;

1) the minimum pilot qualifications, experience and recency requirements,

2) operational procedures and

3) minimum equipment for conduct of such operations at night.

CASA response summary

CASA has reviewed its previous advice in relation to this matter [provided with the directly involved parties comments to draft occurrence report 200304282] and has no additional comment to provide in response to recommendation R20050002. However, it should be noted that resources to review this action will be allocated in accordance with CASA's reviewed priorities.

CASA will review:

- the requirements for helicopter EMS operations to include consideration for two pilots, or a stability augmentation and/or autopilot system;
- the special operational and environmental circumstances of helicopter EMS services, particularly with regard to pilot qualifications, training and recency including instrument flight competency; and
- the pilot recency requirements for helicopter EMS operations to ensure that operator check and training processes are focused on the EMS environment.

The ATSB is continuing to monitor the CASA actions in relation to this safety recommendation. The earlier VH-HTD recommendations and responses from previous financial years are featured in the VH-HTD final report and on the ATSB website.

Following the VH-HTD accident investigation, the Queensland Department of Emergency Services took initiatives to improve standards and support for community helicopter providers including requirements for night Visual Flight Rules (VFR) flights. The helicopter operator is requiring and training all pilots to Command Instrument Rating standard and has bought an Instrument Flight Rules (IFR) autopilot helicopter.

The Bureau will continue to monitor all proposed actions taken to prevent similar occurrences. Responses to address the safety recommendations will be published on the ATSB website.

Failed tyres on B737-800 aircraft – Occurrence 200405118

Recommendation R20040093 to Australian operators of B737 – 800 series aircraft issued on 23 December 2004

In light of the recent industry experience, the Australian Transport Safety Bureau recommends that Australian operators of Boeing 737-800 series aircraft review the practice of fitting retread tyres of R4 (fourth retread) or above, until their serviceability limitations can be identified.

Response summary

On 21 February 2005, Virgin Blue Airlines advised the ATSB that, 'In response to the subject Safety Recommendation, Virgin Blue Airlines Head of Engineering directed that the maximum retread level of all B737-800 main wheel tyres used in service would be the R3 (third retread) level. This level conforms to the Safety Recommendation.'

On 23 December 2004 Qantas Airways advised the ATSB that it had implemented a detailed inspection of all B737-800 main gear tyres and was more thoroughly inspecting the tyres on a daily and pre-flight basis. It is also annotating pressure 'top ups' in the aircraft technical log and mating an R1 or R2 tyre on the same gear as an R4 or above tyre. Qantas also indicated that if a regulatory directive was issued to remove all R4, and above, tyres from service, it would propose an incremental replacement.

Dunlop Aircraft Tyres Ltd (DATL) in the United Kingdom have examined the failed B737-800 tyres involved in occurrence 200405118 and the ATSB is reviewing the results as part of the ongoing investigation.

VH-KJD Raytheon B300 cabin door separation during flight from Brisbane to Truganinni, Queensland on 7 September 2004 – Raytheon B300 cabin door warning system (R20040075)

The Australian Transport Safety Bureau recommends that the Civil Aviation Safety Authority advise operators of Beechcraft King Air and Raytheon King Air aircraft of the potential safety deficiency of the cabin door warning system becoming prematurely earthed, resulting in a sense switch or switches no longer providing an electrical signal for its or their position.

CASA response summary

CASA responded to the recommendation on 7 December 2004 advising that they will release an airworthiness bulletin to all operators of the aircraft. On 10 February 2005 CASA issued Air Worthiness Bulletin AWB 31–3 Issue 1 which included the following recommendation.

> *It is recommended that all operators examine all internal switches in the door for possible earthing of a switch terminal to the retaining nut. Inspection of the switches may be accomplished by removing the door trim in accordance with the procedure in the maintenance manual. Using a bright light and mirror if necessary, inspect all internal door switches for the interference condition described. Any interference or potential interference, which could cause earthing, should be reported to Raytheon or Beech before attempting adjustment. The manufacturer's advice must be sought to correct the interference or potential interference condition. Adjusting the gap incorrectly may result in the switches not being in the correct position to work correctly when the door is closed. Report any defect found to CASA. Service Difficulty Reporting is available online.*

2004–05 action on aviation recommendations from 2003–04 included:

Recommendations 20040039 and 20040040 issued separately to the Department of Transport and Regional Services and the Civil Aviation Safety Authority on 18 March 2005 following the ATSB Hamilton Island VH-MAR investigation

The Australian Transport Safety Bureau recommends that the Civil Aviation Safety Authority, in conjunction with the Department of Transport and Regional Services, establish the safety benefits of the introduction of a drugs and alcohol testing programme to the Australian aviation industry for safety-sensitive personnel. Where

possible, the programme should harmonise with existing and evolving national and international regulations.

Response summary

On 18 March 2004, the ATSB issued the above recommendations 20040039 and 20040040 as part of the accident report on the VH-MAR fatal accident that occurred at Hamilton Island in September 2002. Minister Anderson asked CASA and the Department to jointly develop terms of reference and to review the above issue. Submissions from interested parties and an extensive programme of research and analysis followed.

The resulting DOTARS/CASA Draft Report on the 'Safety Benefits of Introducing Drug and Alcohol Testing for Safety-Sensitive Personnel in the Aviation Industry' issued in May 2005 concludes that a testing regime is justified from a safety perspective and provides a possible framework for how such a regime might be implemented. Following consultation with industry, the Final Report is expected to be presented to the Minister for Transport and Regional Services in October 2005 for his consideration.

VH-CYC Cessna engine flareout near Green Island Qld on 8 February 2004 – Emergency Power Lever (EPL) (R20040058)

The Australian Transport Safety Bureau recommends that the Civil Aviation Safety Authority assess the safety benefit of mandating Cessna Alert Bulletin CAB01-15 with regards to the Emergency Power Lever (EPL) on all Approved Single Engine Turbine Powered Aeroplane Australian registered C208 aircraft.

CASA response summary

On 14 July 2004, CASA responded that they had assessed the safety benefit of mandating Cessna Alert Bulletin CAB01-15 and agreed to issue an Airworthiness Directive (AD), which will mandate the Cessna Bulletin. On 26 May 2005, CASA issued Airworthiness Directive AD/CESSNA 208/18 Emergency Power Lever (EPL) Shear Wire.

Engine manufacturer response summary

On 10 November 2004, the engine manufacturer issued Service Information Letter Number (SIL) PT6A-053R3 (revision three) to SIL PT6A-053R2 to clarify that the EPL is for emergency use only in accordance with the aircraft manufacturer's pilot operating

handbook. (SIL) PT6A-053R3 removed any reference to conducting familiarization training with the EPL.

Aviation safety actions 2004–05

Aviation safety actions by aviation operators, manufacturers and regulators linked to 2004–05 ATSB aviation investigation reports, but separate from ATSB safety recommendations. These safety actions identified by occurrence report number include:

- The Robinson R22 helicopter manufacturer has modified the seat structure design to strengthen the seat belt anchor points for both seats (200400508).
- An aircraft operator has trialled amended procedures for disseminating weather information to crews and is amending documented procedures. Awareness videos and an article have publicised this occurrence. A programme is continuing to add a predictive windshear capacity to the operator's fleet (200304400).
- Airservices Brisbane Centre modified local instructions to international High Frequency radio operators relaying communications between Air Traffic Control (ATC) and pilots. Modifications were to ensure that operators passed messages within five minutes of receipt by the Australian Flight Information Centre for relay, or if not possible, that they provide the messages to the appropriate ATC sector (200402228).
- In response to a bogged Boeing 737 aircraft at Melbourne, an information package was circulated to airport operator crews concerning hazards, operation and human factors, best practices, prevention strategies and lines of defence, and cockpit procedures (200403722).
- Operator procedures for flights in Ujung Padang Flight Information Region near Indonesia requiring aircraft to operate with the Traffic Alert and Collision Avoidance System (TCAS) or cruise at standard levels (200402411).
- RAAF Darwin removed Wickham Point from procedures to reduce aircraft conflict risk (200402703) and changed auto release procedures to ensure different auto release headings for succeeding aircraft taking off from Darwin (200402705).
- An aircraft operator now restricts its Bandeirante aircraft to two-pilot operation, and strengthened fuel verification process and fuelling procedures during flight turnarounds.

Also new limits were imposed on combined ownership/management/operating roles in the organisation (200404700).

- An Airservices newsletter reminded controllers of factors contributing to runway incursions. Airservices is investigating the ICAO surface movement control system for Sydney and other Australian airports. Sydney Airport Corporation Limited has improved coordination and monitoring of airside runway users through working groups, forums and information exchanges (200303726).
- Airservices issued National instruction NI 09/2004 on Safety Alerts, Traffic Avoidance Advice and Traffic Information. Airservices also issued Aeronautical Information Circular H10/04 Traffic Information-Safety Alerts (2 Sept 04), and produced a computer-based training programme for Air Transport System controllers on duty of care, as guidance on whether a safety alert is required to be initiated (200401273).
- An aircraft operator has acquired new aeromedical aircraft with Enhanced Ground Proximity Warning (EGPW), new operational, training and quality assurance personnel, reviewed flight operation and training manuals and a quick action handbook for emergency procedures. Airservices is reviewing the Manual of Air Traffic Services to clarify and remove ambiguity in descent restrictions for pilots conducting instrument approaches in Instrument Meteorological Conditions (200302172).

Other safety actions are separately identified in reports 200205893, 200203655, 200300224, 200300458, 200302820, 200400433, 200401115, 200402049, 200402287, 200402622, 200402749, 200403210, 200404286.

Highlighted aviation safety actions

VH-PHF Bell 206B (II) charter air ambulance driveshaft failure 9 km SW Alice Springs 14 June 2004 – Safety action on Kaflex driveshafts (200402194)

CASA safety action

As a result of consultative briefings between CASA and the ATSB early in the investigation, CASA wrote to all Bell 206 operators on 11 August 2004, to raise awareness among those operators who had KAflex® driveshafts installed in their helicopters of the ongoing

inspection and maintenance requirements, and the warnings listed in the Kamatics Corporation Supplemental Type Certificate SH7767SW (STC). This was done to ensure that these operators incorporated the STC requirements into the appropriate periodic maintenance schedules and flight manuals for the affected helicopters on the Australian civil register.

Manufacturer safety action

Throughout the investigation, the manufacturer worked cooperatively with the ATSB to address the deficiencies identified. The manufacturer has advised that to date they have changed the STC manual and included advice on the correct use of the historical service card and reviewed the layout of the historical service card with a view to accounting for 1500-hourly driveshaft inspections. They have also worked towards incorporating a flight manual supplement into the approved flight manual (AFM) for use by aircrew operating helicopters that have the STC incorporated. The flight manual supplement would include warning notices about red dust residue and turning fasteners.

Any changes made to the historical service card format, STC wording and AFM supplement will be submitted to the US Federal Aviation Administration, the designated approving regulator for final approval.

Operator safety action

The operator advised that the company had manufactured and was fitting a readily visible stainless steel placard to the engine firewall adjacent to the KAflex® driveshaft, titled 'KAflex Driveshaft – Daily Inspection' and listing the STC warning and inspection requirements. This placard would be fitted to any helicopter operated by the company that is fitted with a KAflex® shaft or to any helicopter subsequently retrofitted with one.

The operator also advised that a supplementary logbook for the driveshaft would always accompany the aircraft logbooks. They would also instigate a programme to highlight for company flight and maintenance personnel the differences between KAflex® and non-KAflex® equipped machines and the consequent maintenance and inspection requirements.

The Bureau will continue to monitor all proposed actions taken to prevent similar occurrences. Subsequent evidence to address the deficiencies, when received, will be published on the ATSB website.

VH-HPE Fairchild Industries SA-227 aircraft departing Sydney Airport on 22 March 2004 – Control yoke pitch trim operating in reverse from normal operation (200400998)

CASA safety action

As a result of this and other similar occurrences, the Australian Civil Aviation Safety Authority advised the US Federal Aviation Administration of the occurrences and published an article titled *Nose up, nose down* regarding trim switches in the November/December 2004 issue of *Flight Safety Australia* magazine. The article analyses the cause of these failures and highlights the importance of maintaining switches and following correct procedures to prevent similar occurrences.

Aircraft maintenance contractor safety action

As a result of this occurrence, the aircraft maintenance contractor has highlighted the occurrence to all engineering staff and required all maintenance engineers to re-familiarise themselves with procedures in relation to critical maintenance tasks, including duplicate inspections.

Aircraft operator safety action

The aircraft operator published an alert to all company pilots reminding them of their responsibility to confirm the correct sense of aircraft flight control systems prior to departure. The operator also instigated a formal mechanism for crews to apply Minimum Equipment Limit (MEL) conditions when operating at a remote aerodrome.

VH-LBZ Cessna Conquest charter flight from Lake Johnston to Perth, WA on 21 February 2003, at Western Australia. Increased right engine exhaust gas temperature and power without pilot input (200300458)

Engine manufacture safety action

On 17 December 2003, after consultation with, and agreement from, the airframe manufacturer, the engine manufacturer promulgated Service Bulletins TPE331-A73-0266 and 0267 recommending maintenance action affecting the Viscojet, and a functional test able to detect early blockage of the Viscojet.

Operator safety action

The operator has addressed the risk of Viscojet blockage resulting from its operations in the northern WA environment by increasing

the frequency at which it cleans the P-3 air filter elements to every 50-flight hours.

In addition, the operator has reviewed its engine shutdown procedures in the case of an Uncommanded Power Increase during Takeoff in Conquest aircraft. While the airframe manufacturer indicated reluctance to amend the published procedure to include movement of the condition levers into the SHUT-OFF detent, indication was given that, if time and circumstances permitted, emergency action could be used as a back-up to the existing priority of activating the STOP button.

After consideration, the operator has amended its emergency procedures to include movement of the condition levers into the SHUT-OFF detent. The Civil Aviation Safety Authority has accepted that amendment.

Safety promotion

Along with CASA, the ATSB provides safety information to the aviation industry. The Bureau promotes aviation safety by:

- publishing investigation reports and safety studies
- publishing safety recommendations and safety advisory notices
- providing information on its website
- delivering presentations at conferences and safety forums
- cooperating with international safety agencies
- contributing to Parliamentary inquiries
- participating in coronial inquests
- publishing the ATSB Supplement in CASA's *Flight Safety Australia* (Appendix 1 lists articles published during 2004–05)
- contributing articles to aviation journals
- maintaining safety programmes such as the Aviation Self Reporting Scheme (ASRS) and the INDICATE aviation safety programme.

Presentations at conferences and safety forums

Effective safety systems depend on communication, a free exchange of information between safety professionals, and the ability to target those directly involved, including operators and managers.

To help spread the safety message, investigators spoke to:

- aero clubs and flying training schools
- aerial agriculture conferences
- airport fire fighters
- aviation safety investigators' conferences
- Airservices Australia training days
- Australian and International Pilots Association
- Australian Federation of Air Pilots
- Australian Defence Force Academy
- Aviation Law conferences
- Bureau of Meteorology
- chief flying instructors
- flight safety and other industry forums
- helicopter operators
- regional airlines' conferences
- Singapore Aviation Academy
- tertiary institutions.

Professional conferences address engineering, human factors, flight operations, air traffic control, cabin safety and flight recording issues.

In 2004–05, ATSB aviation staff attended:

- International Society of Air Safety Investigators Conference, Gold Coast, August 2004 – Four ATSB presentations
- International Society of Aero Medical Services/Flight Nurses Association, Perth, October 2004 – one ATSB presentation
- Flight Safety Foundation 57th International Air Safety Seminar, Shanghai, November 2004
- International Transportation Safety Association, Washington, March 2005 – five ATSB presentations
- International Federation of Air Traffic Controllers Associations conference, Melbourne, April 2005

- Australian Women Pilots Association Conference, Wangaratta. April 2005 – ATSB conducted a Safety Workshop.
- NZA Society of Air Safety Investigators Queenstown New Zealand , June 2005 – five ATSB presentations
- 2005 Flightscape Users Conference, Ottawa, Canada, June 2005
- St John Ambulance National Conference, Melbourne, June 2005.

Ministerial directions and discontinued investigations

On 1 December 2003 the Minister for Transport and Regional Services signed an Instrument of Direction for the ATSB to investigate the effectiveness of Bankstown Aerodrome fire fighting arrangements following the VH-CTT Piper PA-34-200 fatal accident at Bankstown aerodrome. The final report on the Bankstown firefighting arrangements was issued as occurrence 200305496 on 24 December 2004 and the final report on the VH-CTT accident was issued on 27 July 2005. Both reports are available on the ATSB website.

During 2004–05 the ATSB discontinued four preliminary investigations and downgraded the incidents to category five occurrences. These incidents involved:

- A foreign-registered Boeing 747 cargo aircraft conducted an emergency landing at Adelaide aerodrome. Following a comprehensive assessment of available information, including air traffic control communications recordings, no safety issues were found to have been involved.
- A rejected take-off of a Boeing 737 aircraft at Melbourne Airport. Evidence identified that both air traffic control and flight crew acted in an appropriate manner to prevent an infringement of separation standards.
- Damage to the number-2 tyre of a Boeing 737-800 aircraft, showing sidewall separation and shredding of tyre shoulders. This tyre damage was similar to that being investigated in occurrence 200405118, which occurred on the previous day and is being investigated as part of that occurrence.
- A Traffic Alert and Collision Avoidance System (TCAS) alert on a de Havilland Dash 8 aircraft concerning a Beechcraft King Air aircraft near Essendon Airport. The pilot of the King Air advised that he diverted his attention during the climb and did not

adequately monitor the aircraft's altitude following the departure. Consequently, there was relatively little safety benefit to be gained from continuing the investigation compared with other priorities.

Further details of these occurrences and reasons for discontinuance are detailed on the ATSB website.

Coronial inquests

Telephone evidence from a transport safety investigator was sought on Friday 2 July 2004 by a Queensland coronial hearing at Caboolture into the fatal VH-MTX helicopter accident on 19 March 2003. During July 2004 the ATSB also briefed the Victorian State Coroner on the VH-TRZ fatal aircraft accident that occurred at Lake Eildon on 7 February 2004. On 3 February 2005, ATSB investigators briefed the NSW Coroner on the VH-CTT accident at Bankstown.

In June 2005 investigators and technical staff attended and provided evidence at the WA Coronial inquest into the VH-ANV fatal accident at Jandakot Aerodrome on 13 August 2003. Scrutiny of the ATSB VH-ANV Jandakot report by the WA Coroner yielded a favourable outcome for the Bureau. On 30 June 2005, an ATSB transport safety investigator provided advice by telephone to the Queensland Coronial inquest into the fatal VH-WAC accident which occurred 1.5 km south west of Mareeba aerodrome on 1 October 2003.

During the week commencing Monday 25 July 2005, the ATSB provided evidence to the Queensland Coronial hearing at Mackay into the fatal VH-HTD Emergency Medical Services helicopter accident at Cape Hillsborough, Queensland in October 2003. One investigator gave evidence at the coronial inquest and two investigators gave evidence by telephone.

International cooperation

As aviation is an international endeavour, aircraft accidents and incidents, regardless of location, are of direct interest to the global industry.

International Civil Aviation Organization (ICAO) standards and recommended practices in Annex 13 to the Chicago Convention apply to international and Australian civil aviation operations.

Unless a difference is filed with ICAO, investigations of aircraft accidents and serious incidents must comply with Annex 13 to the

Convention on International Civil Aviation – the convention that gave birth to ICAO. Australia has incorporated the provisions of Annex 13 into the *Transport Safety Investigation Act 2003*, and filed several differences.

The ATSB is a corporate member of the international Flight Safety Foundation (FSF), one of the world's most influential private aviation safety organisations. The FSF has developed accident prevention programmes with the International Civil Aviation Organization, the International Air Transport Association and the US Federal Aviation Administration.

The ATSB is also a member of the International Society of Air Safety Investigators (ISASI) and the International Transportation Safety Association (ITSA). The Executive Director of the ATSB will become Chairman of ITSA from March 2006.

During the year, the ATSB achieved considerable cooperation from international aviation regulators, manufacturers and operators. In March 2005 the ATSB recommended (R20040086) that the Civil Aviation Authority of Singapore (CAAS) liaise with Pratt & Whitney's Singapore based overhaul joint venture to review the process for accomplishing Variable Station Vane ring pin flaring and compliance with the service bulletin PW4ENG72432 to ensure the processes are appropriate and in accordance with the service bulletin.

CAAS reviewed the flaring process with Pratt & Whitney's joint venture overhaul facility in Singapore and found the process to be in accordance with service bulletin PW4ENG72432. CAAS has, however, noted that the measuring process for the flared pins using vernier caliper was slow and tedious. To eliminate the possibility of human errors, the overhaul facility has since designed and used a Go/No-go gauge for the checking of flared pins. The facility has found the use of the gauge to be satisfactory. The ATSB also issued related recommendations R20040084 and R20040087 to Pratt and Whitney and R20040088 to the Federal Aviation Administration for which responses have yet to be received.

The ATSB also received international cooperation with investigations of two jet engine failures in August 2004. Following the 9V-SYB B777-312 Rolls-Royce Trent 800 engine failure at Melbourne, the ATSB is cooperating with Singapore Airlines and the Singapore and UK aviation accident investigation bodies in investigating the factors associated with this engine failure. After the VH-VQA B717 engine failure near Melbourne, the engine was sent to Rolls Royce in Germany, who stripped and examined the engine and provided a report to the ATSB. A member of the German BFU

safety investigation authority acted on behalf of the ATSB at the examination.

ATSB technical analysis expertise in materials failure analysis and flight recorder replay and analysis also assisted investigations in New Zealand.

International recognition of ATSB aviation activities

The following international journals featured the listed article topics on ATSB aviation investigation, technical analysis and research reports.

Publication	Topic
Flight Safety Foundation (FSF) *Accident Prevention,* report November 2003	VH-FMN B200 Super King Air accident at Mt Gambier
FSF *Accident Prevention,* August 2004	Ilyushin IL-76 jet freighter crash investigation in Timor – Leste report
Transportation Research Board – International Research News July 2004	Australian General Aviation Accidents: How Do They Happen?
FSF *Accident Prevention,* June 2005	VH-LQH Toowoomba crash on takeoff report
FSF *Aviation Mechanics Bulletin* May–June 2005	VH-OJU evacuation and brake fires at Sydney report
ICAO Journal No. 4 2004	VH-TJX microburst encounter at Brisbane report
ICAO Journal No. 1 2005	Ilyushin IL-76 jet freighter crash investigation in Timor–Leste report
FSF *Human Factors and Aviation* Medicine 2004 Vol 51 No 6	*Australian survey finds pilot confidence in workplace* safety research report
ISASI Forum magazine Jan–March 2005	*Flight Data Analysis Using Limited Data Sets*

ICAO Audit of the ATSB's aviation activities

The October 2004 ICAO report on ICAO's May/June 2004 audit of the ATSB expressed high satisfaction with Australia's legislative, organisational and training framework for aircraft safety investigation and the professional and efficient conduct of the ATSB investigations reviewed in detail. The ATSB sought this ICAO audit to ensure that we met international best practice for aviation accident and incident safety investigation and could take early action in areas where we were able to improve ahead of the

international ICAO safety audit programme from May 2005 which includes Annex 13.

The ICAO audit team 'commended the positive and professional approach of the ATSB in proactively seeking the audit' and made a number of very positive findings. For example, the team 'was highly satisfied with the legislative and organizational framework established by Australia and the ATSB, enabling the conduct of aircraft accident and incident investigations' in particular through the *Transport Safety Investigation Act 2003* and Regulations.

The ICAO team 'commended' the ATSB's 'very comprehensive training policy and programme' and, based on the two complex accident investigations audited, found: 'despite multiple difficult circumstances in each of the investigations reviewed, the investigators appeared to have managed the investigation tasks in a professional and efficient manner, consistent with the established standards and practices of the ATSB. Furthermore … safety issues were properly addressed and the processing of reports of the investigations was generally accomplished in a timely manner'.

As expected, the audit team did make a number of recommendations for improvement including regarding documentation, memoranda of understanding, post-accident medical testing, budgeting and number of investigations, investigator training, and occurrence reporting, against which the ATSB has submitted a corrective action plan.

These recommendations are being progressed with the Government and internally. In transmitting the audit report, ICAO stated that it was 'pleased to advise that the ATSB's proposed corrective action plan was found to be fully acceptable'. In the interests of transparency, the full ICAO audit was made available on the ATSB's website. The ATSB is taking the ICAO results very seriously as a basis for improvement.

Aviation safety research

The ATSB has released nine aviation research reports in 2004–05. These included:

Twin-engine aircraft are assumed to be safer than single-engine aircraft when considering risks associated with loss of power. A research paper considered accident statistics for light twin-engine aircraft to identify risks associated with particular types of power loss related accident, and to compare rates with similar accidents in

single-engine aircraft. There was a strong correlation between the risk of a fatality in these accidents and the degree to which control was maintained by the pilot during the accident sequence.

A research paper examined the processes associated with the management of aircraft operations during a large and complex operation that was set up to control a locust plague. The paper looked at how the management processes may be set up to inherently and explicitly reduce the risks associated with the airborne operations, and commented on how an organisation approaches risk in a hazardous environment to inject or mitigate risk in the process.

A research paper examined the risks associated with flight in adverse weather by comparing the total population of reported accidents and incidents against behaviours sorted by risk. The greatest risk was associated with Visual Flight Rules flight into instrument meteorological conditions. A difference in general decision-making behaviour was also identified at the half way point of any flight, suggesting that this could be a 'psychological turning point' for pilots, irrespective of the absolute flight distance involved.

The final analysis of the results from the 'safety climate' questionnaire has been released as a research paper. It was based on a questionnaire that was sent to commercial pilots in 2003. This paper analyses experiences that pilots considered to be risky during their flying in the twelve months before completing the questionnaire.

There is growing interest in the use of night vision goggles to enhance safety and capability for civil helicopter emergency medical services (HEMS) in Australia. A research paper reviewed the state of technology and procedures for ensuring safe operations using night vision goggles in civil helicopter operations in different countries to provide a level of comparison with Australian systems.

The structure of some parts of Australian airspace were changed, and this provided an opportunity to assess whether it was possible to measure changes in risk associated with the structural changes. A research paper analysed frequencies of certain reported occurrence types to assess changes in risk associated with changes in airspace structure. The paper concluded that it was not possible to form any conclusions on the basis of changes in the occurrence frequencies analysed.

A research paper reviewed academic literature and the practical management of diabetes mellitus in pilots. It examined the risks

associated with the condition and methods for managing the risks in flight.

Recorded voice data from accident aircraft can be an important source of information for an investigation. This paper reported on research that has been undertaken to allow deeper analysis of recorded conversations to gain more understanding of crew interactions during a flight. The paper provides more rigour to interpretations of recorded conversations.

An aviation safety research grants programme was also continued. Funding for research was advertised on the basis of competitive tender. A number of organisations are presently undertaking research under this programme. The grants are set out in Appendix 2.

Technical and projects

Role

The Technical and Projects Branch of the ATSB was established in September 2004 and has responsibilities primarily concerned with organisational capability. In particular, the branch seeks to ensure improved Bureau capabilities and responsiveness to external customers. The Technical and Projects Branch's responsibilities include technical analysis, notifications and confidential reporting, legislation, training and development, and projects.

Technical analysis

Technical analysis involves supporting ATSB investigations, and investigations of other parties who are investigating for transport safety, through the analysis of recorded transport data and failures in systems and components.

During 2004–05 the ATSB technical analysis team completed 57 technical analysis reports and projects including 11 stand alone investigation reports, 31 technical reports and projects supporting other ATSB investigations, and 13 further projects including external use of ATSB flight data expertise. These include

- analysis of engine electronic control (ECU) data sourced from non-volatile memory from the Bell 407 VH-HTD helicopter accident near Mackay on 17 October 2003
- full metallurgical failure analysis of reduction gearbox bull gear from the VH-OAE aircraft, relating to an uncontained TPE331 engine failure

- flight recorder data analysis for the VH-TJB runway excursion accident at Darwin airport
- support and provision of technical evidence to the WA Coronial Inquest on the VH-ANV Cessna C404 aircraft accident at Jandakot WA, including extensive review of technical literature and third party investigative findings.

At the beginning of 2005–06 the ATSB continued 26 technical analysis investigations including 17 stand alone investigations. These technical investigations include:

- a major ongoing technical analysis investigation relating to a range of failures in high-powered reciprocating engines
- Flight Data Recorder and Cockpit Voice Recorder analysis from the VH-TFU Metroliner SA227-DC aircraft following a 15-fatality accident near Lockhart River, Queensland, on 7 May 2005
- extensive analysis of physical evidence from the aircraft propellers, structure, instrumentation, seating, seat belts and cabin heating relating to the VH-LST Aerocommander aircraft accident north-west of Hobart, Tasmania, on 19 February 2004
- assistance to the Directorate of Flight Safety, Australian Defence Force (DFS-ADF) with the analysis of audio information from a Sea King helicopter following an accident at Nias, Indonesia, on 2 April 2005.

ATSB technical analysis expertise in materials failure analysis and flight recorder replay and analysis also assisted investigations in New Zealand.

Notifications and Confidential Reporting

Notifications

The notifications team is primarily responsible for receipting and categorizing all aviation safety notifications reported to the ATSB. Other responsibilities include the manning of the aircraft accident 'hotline' during normal working hours and the coding of Category 5 occurrence details into the aviation database.

The ATSB receives approximately 8000 reports annually of which around 5000 are entered into the database. The remaining reports are identified as duplicates, having been received from other sources

and matched accordingly, while others are assessed as not satisfying the definitional requirements of a transport safety matter.

The aviation database is the primary application used to record information relating to investigations and statistical data for Category 1 to 5 aviation occurrences. The notifications team is responsible for the management of:

- system security and integrity
- training for all users
- active participation in the continual development, enhancement and redesign of the database
- extraction of aviation data, ranging in levels of complexity, for analysis and reporting to internal and external customers.

Confidential reporting

Confidential reporting involves managing a marine confidential reporting scheme and the voluntary reporting aspect of the CASA Aviation Self Reporting Scheme.

Confidential Marine Reporting Scheme

The ATSB Confidential Marine Reporting Scheme (CMRS) commenced operating on 20 May 2004. The scheme enables the ATSB to receive, assess and act on confidential reports to improve safety in Australian waters.

The ATSB operates the CMRS under the provisions of the Navigation (Confidential Marine Reporting Scheme) Regulations 2004 which apply to marine activities associated with the operation or safety of a ship to which the *Navigation Act 1912* applies.

The CMRS encourages the reporting of safety issues by ships' crews and others in the marine industry. For instance, a passenger on a ship or a person ashore who observes a marine safety issue and wishes to report the matter may use the scheme.

Matters which may be reported under the scheme include:

- unsafe navigation
- defective lifesaving equipment
- extreme corrosion of the hull
- crew schedules resulting in fatigue
- unreported accidents or near misses.

When dealing with reports, any reference to a reporter or any information that might identify such a person is removed to 'de-identify' the report. The ATSB may send de-identified information to AMSA or use it in alert bulletins or information briefs to the maritime community. Reviews of information from reports will be published and the effectiveness of the scheme will be periodically assessed by a committee established for that purpose.

Under the TSI Act, the ATSB operates a mandatory reporting system for marine accidents or near accidents. The CMRS separately aims to obtain voluntary reports of unsafe practices, procedures or conditions and take action to prevent or minimize the risks of accidents. The scheme cannot be used for reporting accidents or incidents that are reportable under mandatory reporting requirements, or for reporting industrial relations issues or unlawful interference with a ship. Details of the scheme and notification forms are available from the ATSB's website. For inquiries about the scheme, contact CMRS on 1800 020505 or cmrs@atsb.gov.au.

From 1 July 2004 to 30 June 2005, 13 reports were processed through the CMRS.

Aviation Self Reporting Scheme

On 21 February 2004, following an amendment to the Civil Aviation Act 1988 and associated regulations, a voluntary and confidential aviation self reporting system – the Aviation Self Reporting Scheme (ASRS) – was introduced by the Government.

To be eligible for acceptance under ASRS, the report must be about the reporter's own contravention of a Civil Aviation Regulation or a Civil Aviation Safety Regulation. The report must be submitted to the ATSB, in writing, no later than 10 days following the contravention. In addition to providing protection from administrative action, the reports, while protecting the reporter's identity, may also be used to:

- strengthen the foundation of aviation human factors safety research
- identify deficiencies and problems in the Australian aviation safety system
- provide data for planning and improvement to the Australian aviation safety system.

A report by the holder of a civil aviation authorisation under the ASRS does not satisfy the reporting obligations under the *Transport Safety Investigation Act 2003* for Immediately Reportable Matters or Routine Reportable Matters. These reports of accidents and incidents must be made to the Executive Director of Transport Safety Investigation through the ATSB's mandatory open reporting scheme.

For inquiries, contact ASRS staff on 1800 020 505 or asrs@atsb.gov.au. The Management of Enforcement and Investigations may be contacted at CASA on 131 757 for specific inquiries related to claiming immunity.

From 1 July 2004 to 30 June 2005, the ATSB processed five reports through the Aviation Self Reporting Scheme.

Legislation

The ATSB's legislation responsibilities involve implementing and amending legislation critical to the Bureau's operations, including the *Transport Safety Investigation Act 2003* and the development of supporting memoranda of understanding with ATSB stakeholders.

Transport Safety Investigation Act

The *Transport Safety Investigation Act 2003* (TSI Act) has proved to be effective in facilitating the ATSB's independent, no-blame, systemic transport safety investigations.

ATSB staff members receive training on the interpretation and application of the TSI Act. Staff members are also required to consult the ATSB's Policy and Procedures Manual and other supporting material which provides guidance on the Act's application. Externally, the ATSB has continued to work with industry and Government agencies in promoting awareness and understanding of the TSI Act through presentations and discussion forums.

As of 30 June 2005, one aviation and two marine investigations continued that were commenced under legislation existing prior to the TSI Act coming into effect on 1 July 2003.

Aviation Confidential Reporting Legislation

In January 2005, the Minister for Transport and Regional Services agreed to regulations being made under the *Air Navigation Act 1920* to provide for a confidential reporting scheme for the aviation

industry. The industry is currently being consulted on a draft of the proposed regulations.

Memoranda of Understanding

Adding to the existing Memoranda of Understanding (MoU) with industry and Government agencies, in 2004–05 the ATSB signed MoUs with the Indonesian National Transportation Safety Committee, the Korean Aviation Accident Investigation Board, CASA, AMSA, the National Offshore Petroleum Safety Authority and the Victorian Rail Safety Regulator. The ATSB is progressing MoUs to completion with the Western Australia Rail Safety Regulator, Police agencies, and Defence Flight Safety – Australian Defence Force. MoUs that the ATSB has signed are available on its website.

Training and Development

Training and development in the ATSB involves the identification and delivery of core training for investigators and other staff and the administration of the ATSB as a registered training organisation in the delivery of the Diploma of Transport Safety Investigation.

This year's training and development programme has demonstrated the ATSB's ongoing commitment to maintaining the highest standards in staff development. Such development is and will remain a major contributor to maintaining the Bureau's operational readiness.

The ATSB appointed a training and development manager on 1 November 2004. This appointment provided a valuable opportunity to increase the rigour and timeliness of both core training and professional development activities. As a result, an additional 15 investigation personnel have satisfied the requirements of the ATSB's Transport Safety Investigation Diploma in 2004–05 while a further 30 are progressing through the qualification. Now, with a credible platform established, attention will be turned towards scoping an advanced programme. This will most likely take shape in the form of advanced studies in safety management.

The 2004–05 training programme included a range of core training and professional development opportunities for all ATSB personnel. While the Diploma of Transport Safety Investigation remains the priority, whole of Bureau training was also provided.

Diploma of Transport Safety Investigation core training 2004–05

- Basic and Advanced OH&S (including Bloodborne Pathogens) – several
- Critical Incident Stress Debriefing
- Media Awareness/Media Release
- Aircraft Accident Investigation Fundamentals – delivered by Cranfield University (UK)
- Cognitive Interviewing
- Human Factors (November 2004 and May 2005)
- Coronal Witness

Professional development courses 2004–05

- Basic Aeronautical Knowledge
- Airbus General Familiarisation – A330
- Dangerous Goods Awareness
- Certificate IV in Workplace Training and Assessment
- Basic Computer Skills
- Negotiation Skills
- Introduction to the Australian Public Service
- Procurement and Contract Management
- Australian Public Sector Management Programme
- Australian and New Zealand School of Government – Executive Masters in Public Administration (two places sponsored by the Department of Transport and Regional Services – Corporate)

Projects

Technical and Projects Branch's projects responsibilities involve the replacement of the aviation occurrence database (Occurrence Analysis Safety Information System – OASIS) through the Safety Investigation Information Management System (SIIMS) Project.

The ATSB's SIIMS project to replace the current aviation occurrence database, received Government funding in 2004–05 of $7.9m (including capital, expense and depreciation components) spanning

three financial years between 2005 and 2008. When implemented, the new system will increase the efficiency of management of information and resources, make safety investigation reports more robust and objectively defensible and improve communication of safety information to industry and the public.

Stage one of the SIIMS Project, completed in 2004–05, developed ATSB user requirements and the trial of software tools to support the improved management of safety investigations. Stage two of the project includes customising the tools trialled in stage one to better meet Bureau requirements and developing a new occurrence database to improve collection and analysis of data on the 8000 reports of aviation events received annually.

Statistics and Information

Role

The Statistics and Information Section plays a central role in collecting, publishing and analysing quantitative data related to national road and rail transport safety and in releasing transport investigation and research reports and providing safety information to stakeholders.

Transport Safety Statistics

The ATSB's transport safety statistics responsibilities include providing quantitative information and advice on road and rail transport safety statistics to the Minister, Parliament and other key stakeholders such as state safety bodies and key transport safety organisations.

The road and rail safety statistics team maintain the following road and rail safety databases:

- Monthly Fatality Crash Database, Fatality Crash Database, International Road Traffic Accident Database (IRTAD), National Transport Injury Database
- National Rail Occurrence Database
- Australian Truck Crash Database and database of limited insurance industry information on major truck crashes

Information

The ATSB's information responsibilities involve coordinating report releases, media, disseminating safety information, graphic design, Freedom of Information, and the ATSB website. Specific responsibilities include:

- safety information dissemination to stakeholders and the community
- media releases and issues likely to provoke national media interest
- release of ATSB investigation reports
- designing and publishing safety investigation and education materials
- materials in support of larger public communication events and launches
- the ATSB supplement in Flight Safety Australia and other journals
- graphic standards and style
- Freedom of Information and legal issues
- managing the ATSB's website.

During 2004–05, the Section responded to an estimated 6000 requests for safety information. Responses ranged from giving verbal advice on safety-related issues to distributing reports, statistical monographs and road safety public education materials.

The Section also fielded media inquiries and promoted public awareness of the ATSB's safety resources.

The Section updated and reprinted road safety resources as required: for example, the Key Facts for New Drivers brochures. A new edition was also released for the Civil and Military Aircraft Accident Procedures for Police Officers and Emergency Services Personnel. The section also managed the production of an ATSB corporate video to publicise ATSB activities.

Media

Wide public interest in the ATSB's activities and findings require a well-planned media response. The ATSB can be reached through its media contact officer or rostered duty officer (24 hours, seven days a week).

The Section organised media conferences with respect to the following high-profile aviation accidents and investigation reports:

- VH-TNP fatal aircraft accident near Benalla, Victoria (on site)
- VH-FIN fatal aircraft accident near Tamworth, NSW (on site)
- VH-CSH fatal aircraft accident near Dunedoo, NSW (on site)
- VH-TFU fatal aircraft accident near Lockhart River, Queensland (central office)
- VH-TFU Lockhart River Preliminary Report (central office).

These conferences helped ensure that the extensive media coverage that followed was well informed and responsible. They also helped to publicise the ATSB's role in transport safety.

Release of investigation reports

Information staff disseminate ATSB investigation reports to the Minister, departmental executives, regulatory authorities, Directly Involved Parties, safety stakeholders and members of the public.

Graphic design and publishing

Graphic design and publishing staff provide quality control of publications produced internally and externally. The ATSB website has benefited by way of high-quality design elements which have been incorporated into the general site design, and which form the visual basis for many reports and articles.

Freedom of information

The ATSB started 2004–05 with three Freedom of Information requests (FOIs) on hand and received 13 FOIs during the financial year. The Bureau completed 11 FOIs, six within 30 days, four between 30 and 61 days, and one large agreed staged release over a two year period. Two FOIs were withdrawn. At 30 June 2005 two FOIs were on hand.

The Section also attended to 12 subpoenas within specified timeframes. The ATSB's FOI decisions were subject to two internal reviews in 2004–05.

The ATSB was not involved in any 2004–05 hearings of Courts or the Administrative Appeals Tribunal (AAT), or with any applications to the Ombudsman.

Website

The Statistics and Information Section currently develops and maintains the ATSB's website www.atsb.gov.au.

Users can access information by selecting navigation links within each transport mode, or by searching directly for specific information using a customised search engine. The site contains:

- safety investigation and other reports
- research publications
- public education material (advice on child safety, drink driving, speeding, learner driving, fatigue, motorcycle safety and first aid).
- accident and incident statistics
- media alerts and releases
- speeches and 'audio grabs'
- online purchasing and downloads
- free 'subscription' information service
- safety-related articles of interest (backgrounders, fact sheets and discussion papers).

The site offers information that the ATSB has produced or commissioned in easily searchable, accessible and downloadable formats. Users can request copies of road safety education material and teaching resources, or purchase online other ATSB safety information products such as the Ride On motorcycle safety video and DVD, and the Road Safety Research Library (a 3-CD set).

The site's Accident and Incident Report form and Aviation Self Reporting Scheme (ASRS) form provide a secure option for reporting aviation safety accidents and incidents and making other confidential reports. The site's free subscription information service announces new releases and developments to interested parties and industry stakeholders by means of regular e-mail notifications, which may be customised to provide information of specific interest to individual subscribers.

In 2004–05, the site attracted approximately 16 million hits and by 30 June 2005 was averaging over 61 thousand hits per day. The number of hits increases markedly following the release of high-profile information or reports, particularly in aviation and road safety.

Transport safety performance statistics

Cross modal safety comparisons

Table 1 compares the relative risk of fatal injury to passengers using all major forms of land and air transport in Australia. Airline travel is by far the safest form. Bus and rail are the safest forms of land transport, while motorcycling is the least safe of all forms of transport.

Table 1:
Relative risk of fatal injury by Australian transport mode

Transport mode	Relative fatality rate based on passenger kilometres travelled (car travel 1.0)
Aviation	
High capacity RPT	0.0
Low capacity RPT	0.2
Fixed wing General Aviation	5.7
Road	
Car	1.0
Bus	0.2
Motorcycle	28.0
Rail	0.2
Marine	0.0

Source: ATSB, ABS: using latest available data.

Multimodal trends (fatalities)

Table 2 shows the number of deaths in each of the major transport modes over the last decade. Road deaths have declined annually since the commencement of the *National Road Safety Strategy 2001–2010.*

Table 2:
Australian transport fatalities by mode, calendar years 1995 to 2004

Year	Road	Rail	Marine	Aviation
1995	2017	46	55	44
1996	1970	30	60	43
1997	1767	43	46	32
1998	1755	43	46	48
1999	1764	41	51	43
2000	1817	38	42	38
2001	1737	34	56	45
2002	1715	30	38	24
2003	1621	29	51	38
2004	1589	29	51	25

Sources: *ATSB (road and aviation), Australian Bureau of Statistics (rail and marine).*
Note: [..] *Denotes data unavailable.*

The number of transport accident fatalities per 100 000 population decreased substantially during the period 1995 to 2004 (the latest ten-year period for which data are available), from 11.9 to 8.4 fatalities per 100 000 of population (Figure 1).

Note that the aviation fatalities data include VH-registered sports aviation, gliding operations, foreign-registered aircraft within Australian territory, and excludes Military-registered aircraft.

FIGURE 1:
Australian transport fatalities (all modes) per 100 000 population, calendar years 1995 to 2004

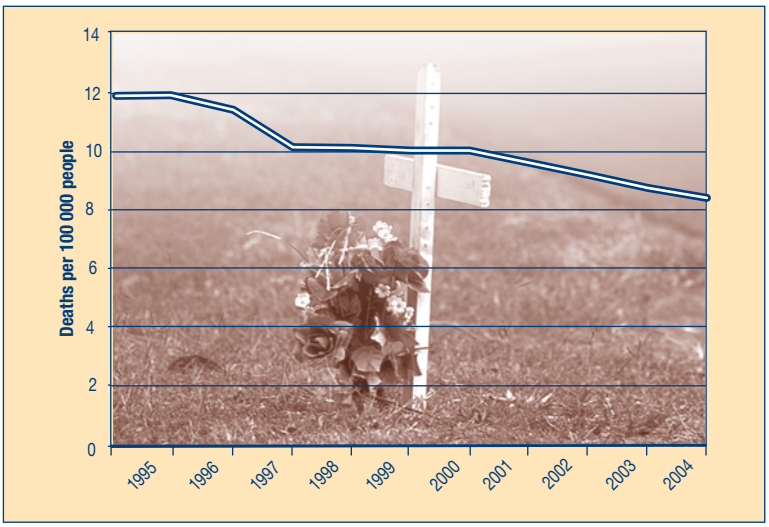
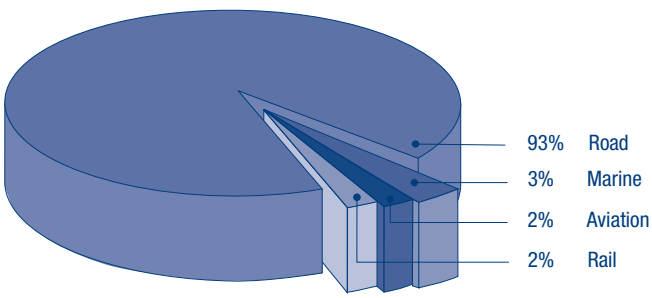


Figure 2 shows that road trauma is by far the largest contributor to transport deaths. It accounted for 93 per cent of total transport fatalities in the five years from 2000 to 2004.

FIGURE 2:
Australian transport fatalities in the last five available years (2000 to 2004) by mode

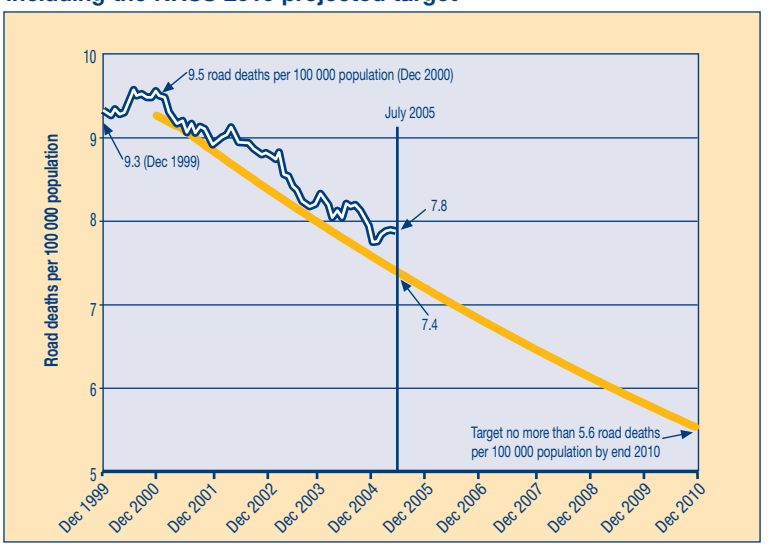


Sources: *ATSB (road and aviation). Australian Bureau of Statistics (rail and marine). Marine and rail data were estimated for 2004.*

Road safety trends

The aim of the *National Road Safety Strategy 2001–2010* (NRSS) is to reduce the road death rate to no more than 5.6 road deaths per 100 000 population by 2010.

FIGURE 3:
Australian road death rates per 100 000 population, 2000–2004, including the NRSS 2010 projected target

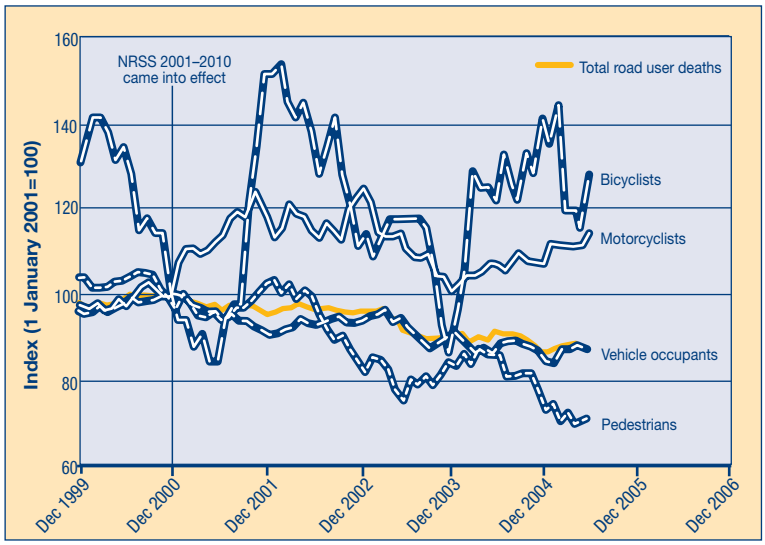


Source: *ATSB*

The NRSS came into effect on 1 January 2001, at which time the annual road death rate for the preceding 12 months was 9.5 deaths per 100 000 population – a rate that was slightly above the 9.3 death rate used as a base for the NRSS. Figure 3 shows that by mid–2004 the Australian 12-month road death rate per 100 000 population stood at 7.8. On a straight line projection between the starting rate of 9.3 and the target rate of 5.6 by the end of 2010, the projected rate for mid–2005 was 7.4 deaths per 100 000 population. The substantial challenge of meeting the target is evident.

Since the introduction of the NRSS, vehicle occupant and pedestrian deaths have decreased by 13 per cent and 31 per cent respectively. On the other hand, motorcyclist and bicyclist deaths have increased by 9 per cent and 23 per cent respectively.

FIGURE 4:
Australian road deaths by road user group (indexed at 1 January 2001), December 1999 to June 2005



As shown in Figure 4, the annual number of deaths in the Motorcyclist sub-group has grown each year by approximately 3.3 per cent. By comparison, the annual number of deaths in the Pedestrian sub-group has fallen by approximately 7.9 per cent each year.

A national transport injury database has been established and a publication titled *Serious Injury Due to Road Crashes* is available in the road safety statistics section of the ATSB website. Table 3 details serious road crash injury by road user group from July 1999 to June 2003. There is as yet insufficient data available to comment on serious injury trends.

Table 3:
Persons seriously injured in road crashes, Australia, July 1999 to June 2003: road user group by period

Period	Drivers	Passengers	Pedestrians	Motorcyclists	Bicyclists	Other	Total
Jul–Dec 1999	3242	3071	1471	1895	1257	209	11145
Jan–Jun 2000	3297	2952	1395	2067	1384	144	11239
Jul–Dec 2000	3454	2939	1472	2001	1215	155	11236
Jan–Jun 2001	3230	2825	1328	2161	1198	151	10893
Jul–Dec 2001	3672	2994	1326	2187	1191	132	11502
Jan–Jun 2002	3414	2883	1260	2299	1303	114	11273
Jul–Dec 2002	3427	2694	1243	2224	1254	133	10975
Jan–Jun 2003	3383	2692	1249	2215	1431	126	11096

Table 4:
Australian road deaths per 100 000 population, by state and territory, calendar years 1999 to 2004

Year	NSW	Vic.	Qld	SA	WA	Tas.	NT	ACT	Australia
1999	9.0	8.2	9.0	10.1	11.8	11.2	25.4	6.1	9.3
2000	9.3	8.6	8.9	11.0	11.3	9.12	6.1	5.7	9.5
2001	8.0	9.2	8.9	10.1	8.7	12.9	25.3	5.0	8.9
2002	8.5	8.2	8.7	10.1	9.3	7.8	27.7	3.1	8.7
2003	8.1	6.7	8.2	10.3	9.2	8.6	26.7	3.4	8.2
2004	7.7	6.9	8.0	9.1	9.0	12.0	17.5	2.8	7.9

Sources: *Calculated using ATSB road death data, and Australian Bureau of Statistics population data.*

Since the end of 2000, the road death rate per 100 000 population has decreased in all states and territories except Tasmania. Nationally during this period, the road death rate has decreased by 17 per cent.

Truck safety trends

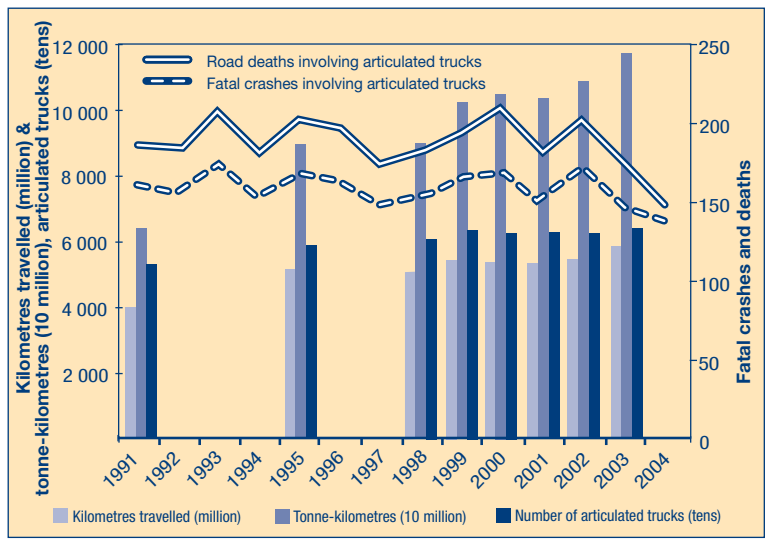
Table 5 shows the number of road deaths in crashes involving articulated trucks in each jurisdiction between 2000 and 2004. A downward trend for Australia as a whole is not yet evident, although the figure for 2004 is encouraging. Data for heavy rigid trucks are not yet available but are estimated to be of the order of two-thirds of the road deaths involving articulated trucks.

Table 5:
Australian road deaths in crashes involving articulated trucks, by state and territory, calendar years 2000 to 2004

Year	NSW	Vic.	Qld	SA	WA	Tas.	NT	ACT	Australia
2000	84	40	40	19	13	6	6	0	208
2001	60	45	33	18	14	5	0	3	178
2002	86	49	28	13	14	3	7	0	200
2003	65	41	35	10	17	1	2	1	173
2004	64	37	13	11	17	4	1	0	147

Source: *ATSB.*

FIGURE 5:
Australian road deaths and fatal crashes involving articulated trucks, articulated truck kilometres travelled, tonne-kilometres, and number of articulated trucks, calendar years 1991 to 2003



Sources: *ATSB data, ABS 'Survey of Motor Vehicle Use' data.*

While road deaths and fatal crashes involving articulated trucks have decreased in the past two years, they have generally remained relatively stable since the early 1990s. On the other hand, kilometres travelled, tonne-kilometres, and articulated truck numbers all increased (Figure 5). Overall, between 1991 and 2003, (the latest period for which activity data are available):

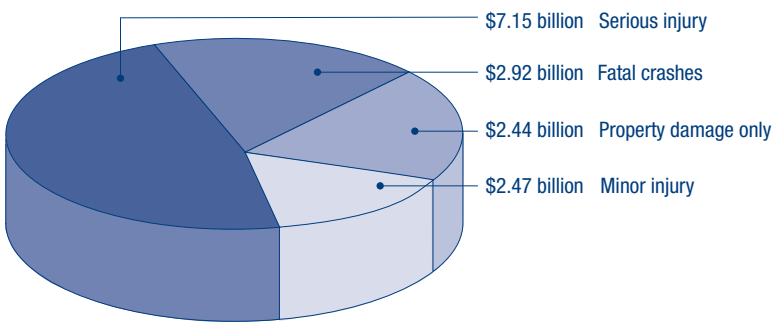
- road death rate per kilometre travelled declined by 36 per cent
- road death rate per tonne-kilometre declined by 50 per cent
- kilometres travelled by articulated trucks increased by 48 per cent
- articulated truck tonne-kilometres increased by 84 per cent
- articulated truck numbers increased by 21 per cent.

The ATSB has developed an Australian Truck Crash Database to investigate serious casualty crashes involving both articulated trucks and heavy rigid trucks. Currently, data for the years 2000 and 2002 are available.

Cost of road accidents

Road crashes impose a substantial financial burden on the Australian community as a whole and on particular groups within the community. The cost of road crashes in Australia in 1996 has been conservatively estimated at $15 billion in 1996 dollar values (Road Crash Costs in Australia, Bureau of Transport Economics Report 102, 2000). Figure 6 shows the breakdown of these costs across crashes of different severity categories.

FIGURE 6:
Annual cost of road crashes in Australia, 1996, by type of crash



Source: Road Crash Costs in Australia, BTRE Report 102, All costs are in 1996 dollars.

Rail safety trends

Table 6 presents rail fatalities for the latest available 10-year period. The figures show fluctuations in rail fatalities from year to year, with an overall downward trend.

Table 6:
Australian rail fatalities, calendar years 1994 to 2003

Year	NSW	Vic.	Qld	SA	WA	Tas.	NT	ACT	Australia
1994	18	8	6	4	7	0	0	0	43
1995	16	14	11	3	1	0	1	0	46
1996	9	11	3	2	5	0	0	0	30
1997	21	16	2	2	2	0	0	0	43
1998	25	8	3	3	4	0	0	0	43
1999	19	10	2	2	8	0	0	0	41
2000	14	12	2	3	6	0	0	1	38
2001	14	11	6	1	2	0	0	0	34
2002	12	9	5	0	2	0	1	1	30
2003	16	8	2	1	2	0	0	0	29

Sources: Compiled by ATSB using unpublished data from the Australian Bureau of Statistics.

Table 7:
Costs of rail accidents in Australia–1999 ($ million)

Type of costs of rail accidents	Rail accidents		Other rail-related incidents		All rail-related incidents
	Rail accidents excluding level crossing accidents	Level crossing rail accidents	Level crossing acidents involving motor vehicles	Suicides and attempted suicides	
Workplace productivity	20	8	3	19	50
Household productivity	19	8	3	18	48
Medical/ambulance/ rehabilitation	2	0	1	3	6
Quality of life	11	5	2	12	31
Total	52	21	9	53	135
Productivity costs	56	0	1	0	57
Other costs	4	0	0	1	5
Overall total	111	22	10	53	196

Source: *BTRE. All figures are in 1999 dollars, based on a discount rate of 4 per cent, and are rounded to the nearest million dollars.*

Marine safety trends

Tables 8 and 9 show database details of marine investigations from 1991 to June 2005.

Table 8:
Australian marine investigations by incident type, 1 January 1991 to 30 June 2004, and 1 July 2004 to 30 June 2005.

Incident type	1991–2004	2004–05	Total
Grounding	56	3	59
Collision	34	3	37
Fire/Explosion	24	-	24
Foundering	10	-	10
Structure	5	-	5
Equipment	13	1	14
Berthing	7	-	7
Machinery damage	8	3	9
Accidents causing fatalities	25	1	26
Accidents causing serious injuries	9	-	9
TOTAL	191	11	202

Table 9:
Number of vessels involved in incident investigations by vessel type, 1 January 1991 to 30 June 2004 and 1 July 2004 to 30 June 2005

Vessel type	1991–2004	2004–05	Total
Bulk carrier	93	3	96
Tanker	22	1	23
Container	15	2	17
General	18	1	19
Roll on/roll off	6	2	8
Livestock	5	-	5
Supply/offshore	9	-	9
Tug	5	-	5
Training	4	-	4
Fishing vessel	26	3	29
Passenger	2	2	4
Pleasure	7	-	7
Other	6	-	6
TOTAL	218	14	232

Table 10:
Total Australian maritime accident casualties and costs, 1993

Year	No. of fatalities	No. of hospital injuries	Cost to the community nominal $m	Cost to the community 1993 $m
1993	73	901	316	316

Sources: *BTCE estimates based on data provided by Australian Bureau of Statistics, Australian Department of Transport, Australian Maritime Safety Authority, National Injury Surveillance Unit and the Insurance and Superannuation Commission.*

Aviation safety trends

Australia has a good international aviation safety record.

Accident information is usually presented in terms of Australia's aviation sectors:

- high-capacity (Regular Public Transport aircraft with a seating capacity greater than 38 seats or a maximum payload exceeding 4200 kg)
- low-capacity (Regular Public Transport aircraft with a seating capacity of fewer than 39 seats or a maximum payload of 4200 kg)
- General Aviation (aircraft used for charter, agricultural spraying, training, survey, private and business operations).

Table 11:
Aviation accidents and fatal accidents over a 10-year period, 1995 to 2004.

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
High capacity										
All accidents	1	1	0	1	7	3	3	1	1	1
Fatal accidents	0	0	0	0	0	0	0	0	0	0
Low capacity										
All accidents	4	2	0	2	3	3	3	4	3	1
Fatal accidents	1	0	0	0	0	1	0	0	0	0
General aviation										
All accidents	235	223	243	216	173	202	188	144	142	151
Fatal accidents	24	23	19	25	22	16	26	10	17	12

Note: *General Aviation data include charter, agriculture, business, private, flying training, other aerial work and 'VH' registered sports aviation, gliding and ballooning accidents.*

Aviation accidents

High-capacity aircraft operations continue to be the safest, with extremely low accident rates. As table 11 shows, both high-capacity and low-capacity operations are very safe in terms of the number of accidents reported. For the General Aviation sector, the number of accidents each year is larger, and there is scope to examine trends with more confidence. Figure 7 shows all General Aviation accidents and fatal accidents over the decade to 2004.

FIGURE 7:
Fatal accidents and total accidents involving Australian-registered General Aviation aircraft, calendar years 1995–2004

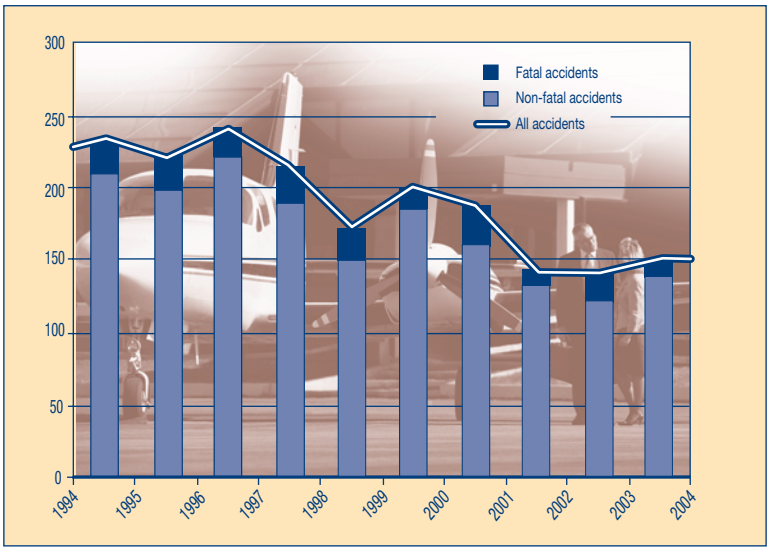


Figure 7 shows a downward trend in total accidents recorded in the General Aviation sector. An additional perspective may be obtained by examining accident rates based on the number of hours flown. Figure 8 shows accident rates for the General Aviation sector in Australia over the 10 years 1994 to 2003.

FIGURE 8:
Accidents involving Australian-registered General Aviation aircraft per 100 000 hours flown, calendar years 1994–2003

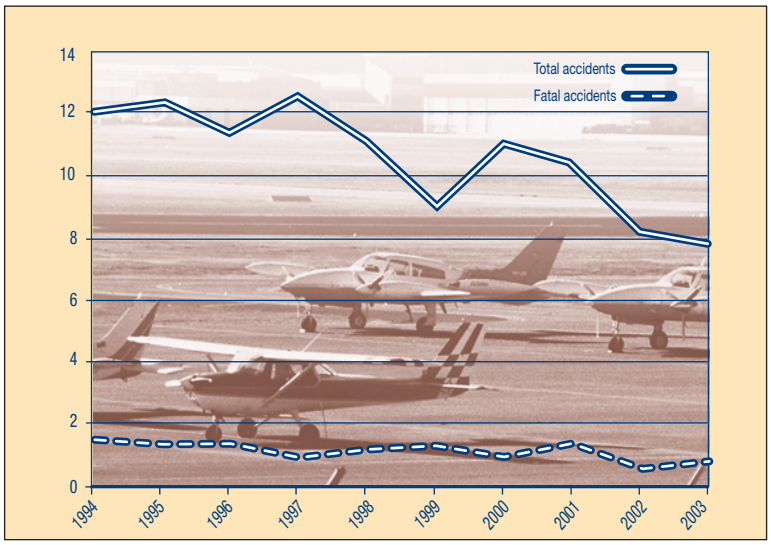


Table 12:
Australian-registered high capacity air transport traffic (departures and hours), calendar years 1995 to 2004

Year	Departures (x1000)	Hours Flown (x1000)
1995	293.4	666.1
1996	299.6	704.5
1997	295.1	718.2
1998	293.1	708.5
1999	293.4	709.5
2000	323.2	777.2
2001	339.9	798.8
2002	310.1	720.3
2003	326.8	758.7
2004p	378.8	882.2

Source: *BTRE*

p – Provisional data only

Table 13:
Australian-registered low capacity air transport traffic (departures and hours), calendar years 1995 to 2004

Year	Departures (x1000)	Hours Flown (x1000)
1995	310.1	248.1
1996	324.8	258.2
1997	325.0	276.7
1998	329.5	285.5
1999	331.3	285.4
2000	326.7	285.7
2001	275.4	249.2
2002	220.3	208.4
2003	203.0	195.8
2004p	197.5	186.6

Source: *BTRE*

p – Provisional data only

Table 14:
Australian-registered charter traffic (hours flown), calendar years 1995 to 2004

Year	Hours Flown (x1000)
1995	468.8
1996	483.3
1997	486.7
1998	497.5
1999	507.5
2000	479.7
2001	468.6
2002	448.0
2003	431.6
2004p	480.3

Source: *BTRE*

p – Provisional data only

From 1995–2004, high capacity activity generally increased, with a slight decrease occurring in 2002 associated with the collapse of Ansett.

From 1995–2004 activity in the low capacity airline sector initially increased before a period of stability in the late 1990s. In the last two years, activity has decreased by approximately 30 per cent and can in part be attributed to the collapse of Ansett and an increase in low cost jet carrier operations, which has limited the associated regional airlines' activity. Charter activity has fallen in recent years.

Tables 15, 16 and 17 provide accident information for high-capacity, low-capacity and charter respectively, for the years 1995 to 2004. The data are presented in terms of the categories used by the ATSB to record accidents and incidents. Categories 1 and 2 are applied if there is an accident involving one or more air transport aircraft with fatalities and/or serious injuries; or where there was a significant risk of fatalities or serious injuries and a substantial commitment of investigative resource. Category 4 is normally used for occurrences where the facts do not indicate a serious safety deficiency or where the deficiency is well-known. Occurrence categories have varied over time, with the balance between categories 4 and 5 in particular influenced by resource availability and investigator workload.

For the period 1995 to 2004, most high-capacity, low-capacity and charter accidents are category 4.

The ATSB investigation categories by mode are set out at Appendix 7.

Table 15:
Accidents involving Australian-registered high-capacity aircraft by investigation category, calendar years 1995 to 2004

	Investigation category				
Year	2	3	4	5	Total
1995	.	.	.	1	1
1996	.	1	.	.	1
1997	.	.	.	.	0
1998	.	.	1	.	1
1999	1	2	3	1	7
2000	.	1	2	.	3
2001	.	.	1	2	3
2002	.	.	.	1	1
2003	.	1	.	.	1
2004	.	.	.	1	1

Table 16:
Accidents involving Australian-registered low-capacity aircraft by investigation category, calendar years 1995 to 2004

	Investigation category				
Year	2	3	4	5	Total
1995	1	.	3	.	4
1996	.	1	1	.	2
1997	.	.	.	.	0
1998	.	.	2	.	2
1999	.	1	2	.	3
2000	1	.	2	.	3
2001	.	.	2	1	3
2002	.	.	.	4	4
2003	.	,	.	3	3
2004	.	.	1	.	1

Table 17:
Accidents involving Australian-registered charter aircraft by investigation category, calendar years 1995 to 2004

	Investigation category				
Year	2	3	4	5	Total
1995	1	4	36	1	42
1996	.	9	24	1	34
1997	.	3	38	8	49
1998	1	3	37	.	41
1999	.	2	19	.	21
2000	1	3	7	15	26
2001	1	2	7	22	32
2002	1	1	4	13	19
2003	.	2	7	16	25
2004	.	1	4	9	14

Table 18 shows that, based on hours flown, both high- and low-capacity aircraft operations have significantly lower accident rates than do charter operations.

Table 18:
Australian-registered aircraft accidents per 100 000 departures and per 100 000 hours flown (high-capacity, low-capacity and charter), calendar years 1995 to 2004

	High capacity		Low capacity		Charter
Year	Accidents per 100000 departures	Accidents per 100000 hours flown	Accidents per 100000 departures	Accidents per 100000 hours flown	Accidents per 100000 hours flown
1995	0.3	0.2	1.3	1.6	9
1996	0.3	0.1	0.6	0.8	7
1997	0	0	0	0	10.1
1998	0.3	0.1	0.6	0.7	8.2
1999	2.4	1	0.9	1.1	4.1
2000	0.9	0.4	0.9	1.1	5.4
2001	0.9	0.4	1.1	1.2	6.8
2002	0.3	0.1	1.8	1.9	4.2
2003	0.3	0.1	1.5	1.5	5.8
2004	0.3	0.1	0.5	0.5	2.9

International aviation accident comparison

Compared with the rest of the world, Australia has the lowest accident rate for high-capacity aircraft (see Figure 9). International comparisons of high-capacity operations are often based on hull losses per million departures.

FIGURE 9:
International comparison of hull losses per million departures, calendar years 1994 to 2003

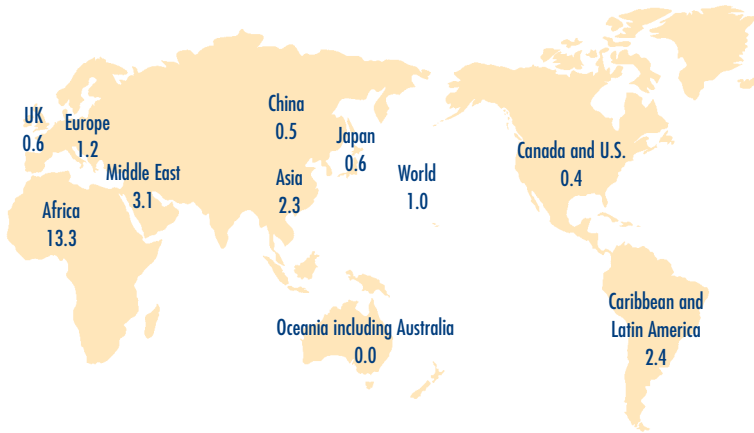


Figure 9 provides data for the period 1994 to 2003 for the different regions of the world compared with the world average of 1.0 hull losses per million departures. While Oceania, including Australia, is the lowest for the world at 0.0 hull losses per million departures, Australia has never had either a hull loss or a fatal accident involving a high-capacity jet aircraft. Oceania covers a large area and goes as far north as Guam. It is less economic to repair older aircraft and hull loss data are in some measure biased by the age of aircraft involved in serious accidents.

Aviation incidents

There are considerably more aviation incidents recorded than aviation accidents. Tables 19 to 21 show the incidents recorded by investigation category for high-capacity, low-capacity and charter aircraft.

Table 19:
Reported incidents involving Australian-registered high-capacity aircraft by investigation category, calendar years 1995 to 2004

	Investigation category				
Year	2	3	4	5	Total
1995	.	10	55	711	776
1996	.	5	59	660	724
1997	.	7	264	572	843
1998	.	2	580	784	1366
1999	.	1	552	1057	1610
2000	.	4	76	1601	1681
2001	.	10	33	1650	1693
2002	.	2	26	1683	1711
2003	.	6	10	1376	1392
2004	.	6	23	1900	1929

Table 20:
Incidents involving Australian-registered low-capacity aircraft by investigation category, calendar years 1995 to 2004

	Investigation category				
Year	2	3	4	5	Total
1995	.	.	26	294	320
1996	.	.	29	328	357
1997	.	4	156	277	437
1998	1	2	315	258	576
1999	.	2	289	382	673
2000	1	4	37	745	787
2001	.	4	15	712	731
2002	1	.	4	533	538
2003	.	2	4	538	544
2004	.	1	11	600	612

Table 21:
Incidents involving Australian-registered charter aircraft by investigation category, calendar years 1995 to 2004

	Investigation category				
Year	2	3	4	5	Total
1995	.	1	16	339	356
1996	.	.	20	341	361
1997	.	.	96	242	338
1998	.	1	187	217	405
1999	.	3	173	233	409
2000	.	.	16	411	427
2001	.	1	7	341	349
2002	.	.	5	389	394
2003	.	.	2	355	357
2004	.	.	8	434	442

Although changes in investigation category definitions over time complicate comparisons, tables 19 and 21 show that over the period 1995 to 2004, the yearly number of reported incidents involving high-capacity and low-capacity air transport operations has steadily increased, particularly from 1998. The introduction of electronic safety incident reports from Airservices Australia during 1998 has resulted in an increased number of incidents reported. The improvement in reporting also suggests a growing safety culture within the airlines. The ATSB also contributed to the increase by adopting a more comprehensive incident recording policy during this period, including recording all reported bird strikes instead of only those seriously damaging aircraft.

Table 22 shows reported incident rates for high-capacity, low-capacity and charter aircraft. In contrast to reported charter accidents per 100 000 hours (see table 15), charter incidents per 100 000 hours are significantly fewer than those reported by the high-capacity and low-capacity sectors. This is likely to reflect the better reporting culture within the Regular Public Transport (RPT) sectors.

Table 22:
Incidents involving Australian-registered aircraft (high-capacity, low-capacity and charter), calendar years 1995 to 2004

	High capacity		Low capacity		Charter
Year	Accidents per 100000 departures	Accidents per 100000 hours flown	Accidents per 100000 departures	Accidents per 100000 hours flown	Accidents per 100000 hours flown
1995	264.5	116.5	103.2	129.0	75.9
1996	242.0	102.9	109.6	137.9	75.1
1997	285.6	117.4	134.4	157.9	69.9
1998	465.1	192.4	173.9	200.7	81.6
1999	548.8	226.9	203.1	235.8	80.6
2000	528.1	219.6	242.4	277.2	89.6
2001	501.4	213.3	266.6	294.5	73.4
2002	553.9	238.8	245.5	259.5	88.0
2003	437.5	188.5	268.9	278.8	83.4
2004p	509.2	218.7	312.7	328.0	92.0

p – Provisional data only

Cost of aviation accidents

As with other transport modes, aviation accidents result in considerable losses to the community in terms of costs, fatalities and injuries. The Bureau of Transport Economics estimated that the cost of aviation accidents was close to $112 million in 1996 (see table 23). Reportedly, the direct cost of the 1999 QF1 Bangkok runway overshoot by a 747 was of the order of $100m. A 747 accident involving a large number of fatalities could involve more than a billion dollars in overall costs.

Table 23:
Estimated cost of aviation accidents in 1996

Category	Cost/losses ($ 000's)
Productivity losses	65 075
Property damage	20 854
Loss of quality of life	16 100
Insurance administration	3733
Legal costs	326
Emergency services	988
Accident investigation	1648
Medical costs	1314
Rehabilitation/long term care	446
Workplace costs—non-victim	994
Premature funeral costs	64
TOTAL	$111 542

Source: *BTRE*

Internal management and processes

Financial overview

In 2004–05 the ATSB expended funding of $17.897m, including $0.398m through revenue and $0.487m for capital expenditure, to deliver its safety outputs.

Operating expenditure in 2004–05 was well above 2003–04, reflecting additional funding in the May 2004 Budget for increased aviation safety investigations and for replacement of the aviation safety investigation database. In addition, the department contributed $3.0m in 2004–05 to the novice driver training road safety initiative of which the ATSB share was $1.0m.

The ATSB operating budget funding for 2005–06 is broadly in line with 2004–05 after allowance for one-off factors. Internal budget supplementation was received for certified agreement staffing increases ($0.4m); operating funding for the aviation database replacement ($0.4m in 2004–05) was discontinued as expenditure is being capitalised from 2005–06; and the $1.0m ATSB novice driver contribution in 2004–05 was a one-off, although the ATSB continues to support the novice driver initiative financially by way of significant project management and executive coordination activity.

Table 24:
ATSB Departmental expenses 2005–06

Comparisions	2001–02 ACTUAL $ m	2002–03 ACTUAL $ m	2003–04 ACTUAL $ m	2004–05 ACTUAL $ m	2005–06 BUDGET $ m
ATSB Departmental expenses					
Employee expenses	8.238	8.195	8.860	10.020	11.480
Supplier expenses[1]	3.786	3.689	2.895	4.758	4.030
Depreciation/amortisation expenses	0.240	0.424	0.419	0.467	0.500
Other expenses	0.144	0.004	0.190	2.165	0.370
Total Departmental expenses	12.407	12.312	12.364	17.410[2]	16.380
Revenue	0.273	0.388	0.336	0.398	0.100
Net cost to Department	12.134	11.924	12.028	17.013	16.280
Capital Expenditure					
Plant & Equipment[3]	0.927	0.600	0.204	0.487	0.223
SIIMS Project[4]					0.416
Staffing					
Average staffing level (FTE)[5]	105	92	89	98	110

The 2005–06 Portfolio Budget Statement includes the ATSB's departmental expenses under Outcome 1 'Fostering an efficient, sustainable, competitive, safe and secure transport system'. The Department's Outcome/Output structure was revised effective March 2005 and a comparison against the former structure can be found in the 2005–06 PBS at page 26. The table below shows budget funding by output, including corporate overhead attributed to the ATSB. The ATSB contributes to two outputs under the new structure, Output 1.1.1 Investigation and Output 1.1.2 Safety.

Table 25:
ATSB funding by output ($m)[6]

	2003–04 PBS Revised	2004–05 PBS Revised	2005–06 PBS	2005–06 PBS Revised
Output 1.1.1 Investigation				
ATSB[7]	.	.	13.844	13.251
Corporate[8]	.	.	7.450	7.450
Total	**.**	**.**	**21.294**	**20.701**
Output 1.1.2 Safety				
ATSB	.	.	2.536	3.129
Corporate	.	.	1.016	1.016
Total	**.**	**.**	**3.552**	**4.145**
Summary				
ATSB	13.888	17.289	16.380	16.380
Corporate[9]	8.361	7.643	8.466	8.466
Total	**22.249**	**24.932**	**24.846**	**24.846**

Notes

1. *Includes funding for road safety public communication, which in 2001–02 was provided through revenue from the Administered Black Spot Programme. Funding from 2002–03 onwards has been added to the ATSB's base allocation for supplier expenses.*
2. *Includes 2004 budget measure funding for increased aviation investigations and replacement of the aviation investigation database; also includes internal funding allocation of $1m for new novice driver education road safety initiative.*
3. *ATSB agreed during 2001–02 to transfer responsibility for the management of all its current and future IT capital projects to the Corporate division.*
4. *Capital funding for the replacement of the aviation investigation database with a new Safety Investigation Information Management System (SIIMS)was provided in the 2004 budget.*
5. *Average staffing FTE across the year.*
6. *The ATSB Annual Review 2004 shows prior year funding per the previous DOTARS output structure.*
7. *Direct internal funding allocation to the ATSB. Following the May 2005 PBS, elements of aviation research were reclassified from the Investigation Output to the Safety Output.*
8. *Corporate internal funding attributed to the ATSB as corporate overhead.*
9. *Prior year corporate overhead amounts were subsequently revised from those shown in the ATSB 2004 Annual Review.*

Comparison of staffing levels (year end FTE)

Classification Level	Actual 2004–05	Projected 2005–06
Executive Director	1.0	1.0
General Manager*	0.0	1.0
Deputy Director Transport Safety Investigation	3.0	3.0
Team Leader Transport Safety Investigation	8.0	8.0
Senior Transport Safety Investigator	49.8	50.8
Transport Safety Investigator	2.0	2.0
Executive Level 2	4.8	5.9
Executive Level 1	7.6	7.6
Australian Public Service Level 6	12.4	14.4
Australian Public Service Level 5	7.9	8.7
Australian Public Service Level 4	3.0	4.0
Australian Public Service Level 3	3.0	3.0
Australian Pubic Service Level 2 (GAPS)	3.0	2.0
TOTAL	105.5	111.4

* *On 30 June Joe Motha was acting Executive Director while Kym Bills was seconded to head the Wheeler Review secretariat.*

Risk management

The ATSB Business Plan's risk management section outlines a number of risks faced and suggests how the Bureau might respond to the more serious ones. Major areas of risks included:

- A major safety accident occurs
- Minister/stakeholders lose confidence in ATSB/DOTARS
- Inappropriate or inaccurate material is released
- Stakeholders are critical
- IT is not reliable or aligned with our business

People profile

The ATSB values staff who are committed to helping prevent transport deaths and injuries. It seeks to develop a satisfied, capable and productive workforce that is well managed to achieve 'results through people'.

ATSB staff work within the APS Values and Code of Conduct set out in the Public Service Act. Further responsibilities are outlined in the Financial Management and Accountability Act and other legislation.

The ATSB ensures there are clear linkages between individual Plans-on-a-Page, unit business plans and the Department's Portfolio Budget Statements. Six-monthly performance exchanges with staff allow supervisors to give and receive feedback, review Results-on-a-Page and discuss learning and development needs.

The ATSB is a diverse community of team players and encourages staff to work efficiently and effectively and reach their potential in a safe, fair and flexible workplace.

Ministerial correspondence and briefing

Ministerial correspondence

The ATSB helped draft 184 responses to letters for Ministers.

Briefing Minutes for Ministers

The ATSB submitted 171 briefing Minutes to Ministers.

Questions on Notice

During 2004–05 the ATSB drafted 11 Question on Notice responses and significant contributions to responses, excluding the Senate Committee responses listed below.

Parliamentary Committees

In 2004–05 the ATSB appeared at two Senate Estimates Hearings of the Rural and Regional Affairs and Transport Legislation Committee:

- Additional Estimates in February 2005, after which the ATSB drafted answers to five questions on notice.
- Budget Estimates in May 2005, after which the ATSB drafted answers to two questions on notice.

Overview of Key Safety Outputs

FIGURE 10:
ATSB occurrence investigations initiated/in process/completed (aviation, marine and rail modes)

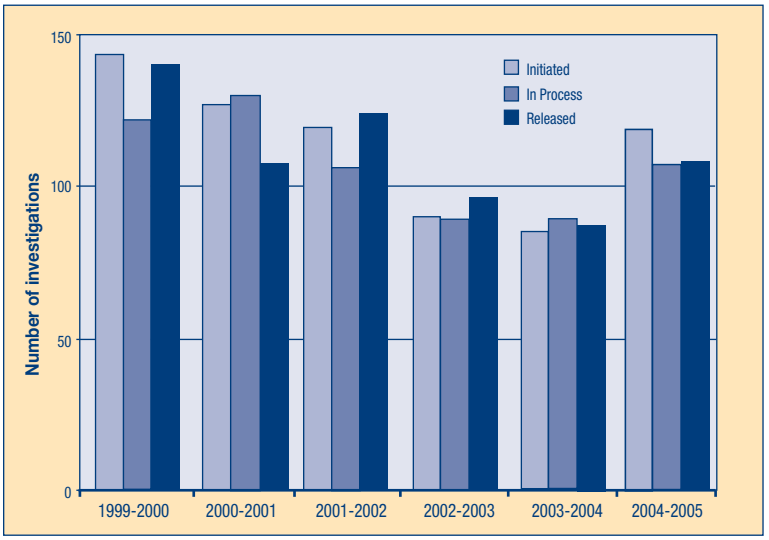
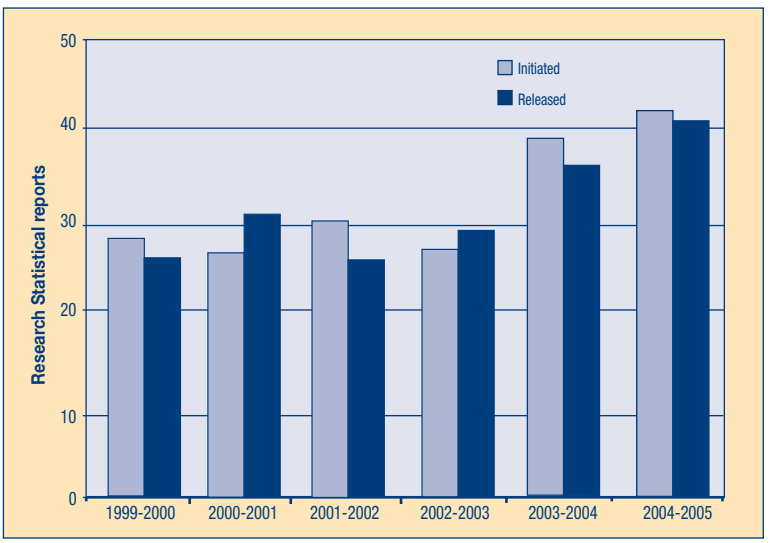


FIGURE 11:
ATSB statistical and research publications initiated/completed



Major accident preparedness

The ATSB aims to review and test its major accident investigation response capabilities annually. A major accident exercise planned for late 2004 did not occur as the timing was directly preceded by the Bureau's significant involvement in the Cairns Tilt Train accident.

The 15-fatality Lockhart River accident was Australia's worst commercial aviation accident in over 35 years. The ATSB's Lockhart River accident investigators operated effectively in this remote location. Ongoing preparation for a desktop major accident exercise is planned for 2005–06. An advanced TSI Diploma is planned to reinforce investigator training for major accident roles.

Workforce planning

Replacing the ATSB's specialist staff is generally not easy and resources constrain duplicating or actively recruiting certain specialist positions ahead of time. To ensure that critical positions, such as those of transport safety investigators, remain filled, the ATSB monitors expected staff departures. The ATSB also considers consultancy assistance to augment its staff if required.

Asset management

The ATSB has assets with a book value of $1.190 m including specialist computer equipment and software (such as for air traffic control and aircraft data recorder analysis), a teleconferencing unit, and technical equipment such as electron and optical microscopes. These assets are subject to depreciation.

Access and equity

In November 2000, the Australian Transport Council adopted the *National Road Safety Strategy 2001–10*. Noting that not all road users enjoy the same level of safety, the Strategy commits the ATSB to improving equity among road users. Targeted groups include:

- youth and older people
- indigenous Australians
- Australians from a non-English speaking background
- residents in rural and remote areas
- pedestrians, cyclists and motorcyclists.

The National Road Safety Strategy and the Action Plan for 2005 and 2006 also address equity issues specific to indigenous road safety. In 2004–05 the ATSB supported continued collaboration among jurisdictions on indigenous road safety issues by:

- convening and chairing a national forum in Alice Springs on 27–28 September 2004 to facilitate the sharing of information about advancing indigenous road safety
- briefing members of the Standing Committee on Transport and Ministers of the Australian Transport Council of the recommended actions from the forum
- posting information about the forum outcomes on the ATSB website
- initiating action through the forum and an Indigenous Road Safety Working Group to improve the quality of indigenous road safety data collected nationally
- liaising with the Australian Government Department of Health to include the recommended action from the forum in a draft of the National Aboriginal and Torres Strait Islander Safety Promotion Strategy
- participating as a working group member to support Western Australia's development of the Internet indigenous road safety information sharing project
- commissioning the ARRB Group Ltd to update information in the research report *Australian Indigenous Road Safety*
- distributing on request, copies of the Aboriginal road safety video *Corrugations to Highways*
- convening and chairing a teleconference of the Working Group on 26 May 2005.

The Charter of Public Service in a Culturally Diverse Society represents a nationally consistent approach to ensuring that government services are delivered in a way that is sensitive to the language and cultural needs of all Australians. The ATSB as part of the Department of Transport and Regional Services is committed to ensuring its programmes are accessible and equitable to all Australians. The ATSB places all significant reports on its website.

Aboriginal reconciliation

The Council of Australian Governments (COAG) has requested that ministerial councils develop action plans, performance reporting strategies and benchmarks for Aboriginal reconciliation where these do not already exist.

To help implement the Strategy and the Action Plan, the ATSB convened the Indigenous Road Safety Working Group and a forum was held in September 2004 in Alice Springs. This was the third such forum organised by the ATSB. A fourth is planned for 2006.

Disability strategy

The Department is also committed to the Australian Government's Disability Strategy.

Government online and e-services initiative

The ATSB provides required online information and services. The ATSB also supports the Government's Online Strategy objectives concerning Australian Government Locator Service metadata, accessibility for the disabled, and copyright and privacy concerns.

ATSB online services are supplied concurrently with those of the Department via an integrated website content management system and secure hosting solution. The ATSB website provides online purchasing to facilitate cost recovery for a selection of material from within its current range of safety information products.

Other ATSB online services and initiatives implemented in 2004–05 included:

- regular weekly updates process for active aviation investigations
- regular monthly updates process for General Aviation statistics
- consolidated information and training materials for novice driver safety
- consolidated information and training materials for indigenous road safety
- record of proceedings CD from 2004 Indigenous Road Safety Forum.

Occupational health and safety

All ATSB investigators receive occupational health and safety training during their induction and are vaccinated against possible bloodborne pathogen hazards while conducting an on-site investigation. Recurrent OH&S training has now been introduced for all investigators. The ATSB has also increased its number of OH&S representative positions from two to five.

During 2004–05 the ATSB also provided information and training to emergency services personnel about the hazards likely to be encountered at accident sites. The ATSB also provided training in accident site OH&S hazards and bloodborne pathogens to personnel from airlines that are likely to assist the ATSB in the event of a major accident investigation.

In 2004–05 the ATSB again offered free influenza inoculations to staff, with 31 per cent of ATSB employees receiving inoculations at the ATSB and DOTARS.

Looking ahead

Projects to be undertaken in 2005–06 include:

- Assess more than 5000 aviation, marine and rail safety accident and incident reports
- Complete approximately 100 aviation, 10 marine and 10 rail occurrence investigations, including reports on fatal accidents at Benalla and Lockhart River and on the Tilt Train accident, and commence a similar number
- Commence and conduct fatal and other serious occurrence investigations in an appropriate and timely way
- Improve rail safety reporting, investigation and analysis through a proactive approach with industry and jurisdictions
- Coordinate a major cooperative novice driver education trial in NSW and Victoria
- Release approximately 10 aviation research investigation reports and 25 road safety statistical and research publications
- Undertake Stage 2 of the SIIMS aviation database replacement project including customising the tools trialled in Stage 1 to meet ATSB requirements and developing a new occurrence database to improve collection and analysis of data on the aviation occurrences reported annually to the ATSB
- Improve the quality and timeliness of up to 10 new rail investigations and work with industry to broaden safety data
- Conduct up to 10 new marine investigations; issue up to 10 safety notices from the marine confidential reporting system
- Conduct a desktop major aviation accident exercise linked to CAVDISPLAN and improve on any weaknesses
- Evaluate any problems or gaps in the Transport Safety Investigation Act and Regulations and develop solutions
- Further develop truck safety databases and analysis and contribute to national research on fatigue and on drugs

- Contribute to international safety improvements including through the International Maritime Organization, International Civil Aviation Organization, International Society of Air Safety Investigators, International Transportation Safety Association, and Marine Accident Investigators International Forum.

Because much of the ATSB's work is necessarily reactive, many investigations will be undertaken in 2005–06 that were unknown at the beginning of the financial year.

Appendixes

Appendix 1: Research, statistical, and other non-investigation publications released in 2004–05

The ATSB released the following publications during 2004–05. Most of the reports are available on the Bureau's website www.atsb.gov.au or can be obtained by telephoning 1800 621 372.

Road safety research reports

On-Road Evaluation of Perceptual Countermeasures (2004) (CR219)

Consultants: ARRB Transport Research and Monash University Accident Research Centre

Speeding has been long recognised as a major factor in the occurrence and severity of road crashes. While enforcement, education/publicity and engineering programmes have assisted in reducing speed-related road trauma, supplementary measures have been sought to reduce the incidence of unsafe speed behaviours, particularly at hazardous locations.

This study is the fourth and final stage of a study on low-cost perceptual countermeasures designed to reduce driver speed on roads. The report documents the on-road evaluation of two treatments: peripheral transverse lines applied on the approach to intersections and enhanced post spacings with ascending heights applied at road curves.

Assessing the level of safety provided by the Snell B95 standard for bicycle helmets (2004) (CR220)

Consultant: Human Impact Engineering

A review of the Trade Practices Act in 1999 legalised the sale in Australia of bicycle helmets meeting the American Snell B95 Standard. Concerns were raised with the National Road Safety Strategy Panel that these helmets were not subject to appropriate quality assurance testing. The study assessed whether the differences between the technical requirements and quality assurance

approaches used by the Snell B95 and AS/NZS 2063:1996 standards are likely to result in significant differences in the level of safety provided to the user.

Community attitudes to road safety: Community Attitudes Survey Wave 16 (2003) (CR221)

Community attitudes to road safety: Community Attitudes Survey Wave 17 (2004) (CR224)

Consultants: The Social Research Centre

These reports document the findings from the Australian Transport Safety Bureau's surveys of community attitudes to road safety for 2003 and 2004 respectively.

The in-scope population for the surveys was persons aged 15 years and over, and the sample comprised private dwellings across Australia listed in the Electronic White Pages telephone directory. A total of 1638 and 1665 interviews were conducted in March and April in both 2003 and 2004, with an average interview length of 16 and 14 minutes. The response rates (completed interviews divided by all contacts excluding away for survey period) were 68 per cent and 64 per cent. The issues examined include: perceived causes of road crashes, exposure and attitudes to random breath testing, attitudes to speed, perceptions of police enforcement, reported usage of seat belts, involvement in road crashes, and experience of fatigue while driving.

Development of novice driver education/development curriculum (2005) (CR222)

Novice drivers continue to have a higher level of crash involvement than more-experienced drivers, with the consequence that there is ongoing interest in the development and implementation of effective road safety measures for this group. To influence and direct the evidence-based practice in this popular area, the ATSB commissioned the development of a best-practice driver education/development programme for Australian novice drivers with about 6 months of solo driving experience. The ATSB retained the authors to research and prepare a model novice driver curriculum program based on best road safety practice and contemporary psychological and educational theory. The authors were also required to develop specifications for a large-scale, crash-based trial of this programme in a suitable Australian jurisdiction.

This report provides an outline of the Novice Driver Coaching Programme curriculum, together with a rationale for the content, orientation and emphases of the programme. Other programme documentation including on novice driver coaching, coach training and coaching programme auditing is attached as appendices.

A pilot study of the relationship between macrotexture and crash occurrence (2005) (CR223)

Consultants: ARRB Group Ltd

Road macrotexture concerns surface roughness in the 0.5 mm to 50 mm range and is generally believed to affect braking performance. Macrotexture can easily be measured using laser profilometers in the course of routine highway condition surveys. The ATSB commissioned the ARRB Group Ltd to investigate the relationship between macrotexture and crashes.

Static fires at retail petrol stations

This study examined the myths and facts about fires caused by static electricity and exploding mobile phones.

Static electricity is a common phenomenon with motor vehicles. In contrast to refuelling a vehicle, the risk of a fire igniting from a static charge is higher when an unearthed container is being filled with fuel. In recognition of the potential for fires to ignite at petrol stations due to static electricity, the report provides a number of safety tips for motorists. These include safety tips to minimise the build up of static charge and strategies to control the effects of static discharge.

Road safety statistical reports

- Twelve issues of the monthly bulletin *Road Deaths in Australia*
- R*oad deaths Australia: 2004 statistical summary*
- *Fatal road crashes involving articulated trucks*
- *Female motorcyclists*
- *Mortality and morbidity due to transport accidents*
- *Serious injury due to road crashes (including a section on motorcyclists)*

- *Bicycle safety*
- *Young drivers report*
- *International road safety comparisons: the 2002 report*
- *Road safety and indigenous Australians*
- *Easter road toll*
- *Christmas road toll*
- Internet access for the public to the most up-to-date fatal road crash data via a user-friendly interface to one of the ATSB's fatal road crash databases was also continued via the ATSB website.

Rail occurrence database reports

- *Rail Activity 2001–03*
- *Rail Occurrences 2001–03*
- Civil and Military Aircraft Accident Procedures for Police Officers and Emergency Personnel – Edition 3 – March 2005

2004-5 Aviation Safety Research

Diabetes mellitus and its effects on pilot performance and flight safety: A review

This paper is a review of academic literature and practical management of diabetes mellitus in pilots. It examines the risks associated with the condition and methods for managing the risks associated with diabetes mellitus in pilots.

General Aviation pilot behaviours in the face of adverse weather

This paper examines the risks associated with flight in adverse weather by comparing the total population of reported accidents and incidents, and comparing behaviours sorted by risk. The greatest risk was associated with Visual Flight Rules Flight into Instrument Meteorological Conditions. A difference in general decision-making behaviour was also identified at the half way point of any flight, suggesting that this could be a 'psychological turning point' for pilots, irrespective of the absolute flight distance involved.

A context for error: Using conversation analysis to represent and analyse recorded voice data

Recorded voice data from accident aircraft can be an important source of information for an investigation. This paper reports on research that has been undertaken to allow deeper analysis of recorded conversations to gain more understanding of crew interactions during a flight. The paper provides more rigour to interpretations of recorded conversations.

Power loss related accidents involving twin-engine aircraft

Twin-engine aircraft are assumed to be safer than single engine aircraft when considering risks associated with loss of power. This paper considers accident statistics for light twin-engine aircraft to identify risks associated with particular types of power loss related accident, and to compare rates with similar accidents in single-engine aircraft.

Aviation Safety Indicators 2005: A report on safety indicators relating to Australian Aviation

This paper provides an update on statistics that provide a snapshot of the safety of Aviation in Australia. The previous version of this paper was published in 2002.

ATSB Aviation Safety Survey – pilots' flying experiences

This paper describes the results of the last section of a questionnaire that was sent to commercial pilots in 2003. It describes experiences that pilots have considered to be risky during their flying in the twelve months before the questionnaire.

Risks associated with aerial campaign management: Lessons from a case study of aerial locust control

This paper examined the processes associated with the management of aircraft operations during a large and complex operation that was managing a locust plague. It looked at how the management processes may be set up to inherently and explicitly reduce the risks associated with the airborne operations.

Night vision goggles in civil helicopter operations

This paper reviewed the state of technology and procedures for ensuring safe operations using night vision goggles in civil helicopter operations in different countries to provide a level of comparison with Australian systems.

National Airspace System Stage 2b: Analysis of available data

This paper analysed frequencies of certain reported occurrence types to assess changes in risk associated with changes in airspace structure. The paper concluded that it was not possible to form any conclusions on the basis of changes in the occurrence frequencies that were analysed.

Aviation safety articles in CASA's Flight Safety Australia (including ATSB supplement)

July–August 2004

- *Iluyshin of safety* article on ATSB investigation in Baccau, East Timor
- *Executive Director's Message*
- *Dynamic helicopter rollover*
- *Moorabbin Airport Fatal Accident*
- *Safety Briefs* (loss of tail rotor control, left main landing gear collapsed, loss of steering control, aircraft stalled/collision with ground, loss of engine power, inappropriate/inadvertent flap/slat selection).

September–October 2004

- *Close call at Coffs article – King Air accident at Coffs Harbour*
- *Executive Director's Message – Reflecting on the ATSB's outputs in 2003–04*
- *Circuit Airprox*
- *Toowoomba accident claims four lives*
- *Safety Briefs* (collision on final approach, collision with power line, loss of separation standards, compressor stall after takeoff, loss of torque, one-engine inoperative landing).

November–December 2004

- *Executive Director's Message – ICAO Audit of the ATSB's aviation activities*
- *Winning research grants*
- *Drive shaft failure Robinson R22*

- *Safety briefs* (runway incursion, collision with fence, engine failure, burning smell on flight deck, airprox event, collision with water).

January–February 2005

- *Executive Director's Message – Emerging Safety Issues*
- *Low level stall after take off*
- *Mareeba crash linked to possible pilot incapacitation*
- *Safety briefs* (tyre deflation during departure, helicopter strikes power cables, flight Management System problem on approach, loss of hydraulic system, engine failure, forced landing).

March–April 2005

- *Executive Director's Message*
- *Brake fires and evacuation*
- *Fatal accident after takeoff from Jandakot Airport, WA*
- *Safety briefs* (loss of power on joy flight, lack of separation assurance, Boeing 737 bogged at Melbourne, Darwin runway excursion, thunderstorm damage, Boeing 767-33A engine failure).

May–June 2005

- *Fatal night flight* article about EMS helicopter crash near Mackay
- *Executive Director's Message*
- *Crash after takeoff at El Questro*
- *Diploma of Transport Safety Investigation*
- *Safety Briefs* (taxiway confliction, incorrect switch installation, incorrect remote control units, failure of horizontal stabiliser actuator, collision with ground, failure of primary inverter).

ATSB articles in Australian Safety Journals during 2004–05

Aviation safety

Aero Australia	Oct/Dec 2004	*GA fatal accidents: How do they happen.*
Aero Australia	Jan/Mar 2005	*ATSB Review – Cannabis and its effects on pilot performance and flight safety*
Australian Flying	Sept/Oct 2004	*ASRS – Voluntary self reporting*
Australian Flying	Nov/Dec 2004	*Six lives lost – Hamilton Island acohol and human performance*
Australian Flying	January/February 2005	*MBZ Tragedy – Moorabbin airport*
Australian Flying	May/June 2005	*From the Heart – Mareeba VH-WAC*
AOPA	Sept 2004	*'Bounce' saves King Air (VH-AMR Coffs Harbour)*
AOPA	Nov 2004	*RA 'not serious'*
AOPA	Nov 2004	*Robinson hidden fault widespread – VH-UXF*
ISASI Publications	Nov 2004	*Kym Bills presentation to ISASI 2004 – Surfers Paradise*
Tarmac (WA)	Feb 2005	*Alcohol and Cannabis*
Tarmac	April 2005	*Saving lives in the sky*
Tarmac	May 2005	*ATSB Report Summary VH-ANV C404 Jandakot accident*
Tarmac	June 2005	*ATSB Interim Factual Report into El Questro, WA accident*
Air News	June 2005	*God's Little Mystery Education Corner by Aminta Hennessy*

Marine safety

Shipping in Australia	The SAL Annual Review of Shipping 2004-2005	*Independent Investigations – towards greater safety*
Professional Fisherman	Dec 2004/Jan 2005	*Commercial fishing vessel safety awareness campaign*
Asia Pacific Shipping	Jan 2005	*ATSB marine safety activities*
Shipping Industry Journals		*Confidential Marine Safety Reporting Scheme*

Multimodal safety

Logistics and Transport	July/Aug 2004	*Multimodal Safety - Recent ATSB achievements & contributions*
Logistics and Transport	Nov/Dec 2004	*Multi-modal transport safety*

Rail safety

Institution of Railway Signal Engineers	Nov/Dec 2004	*The evolution of rail safety*
Railway Digest	Oct 2004	*Overview of ATSB*
Railway Digest	Oct 2004	*Derailment of XPT at Wodonga 2001*
Railway Digest	Nov 2004	*Derailment and subsequent collision at Chiltern, Vic. 2003*
Railway Digest	June 2005	*Beresfield, NSW – Collision between 2 coal trains*
Rail Express	Nov 2004	*Rail investigation activities of ATSB*
Track and Signal	Jan 2005	*Australia has a world class rail safety investigation organisation*
Track and Signal	April/June 2005	*Meticulous work of ATSB – Derailment of train 2PWA at Ararat, Victoria*

Road safety

Safety in Australia	Sept 2004	*Perceptual Counter Measures; influencing speed through road markings*
Kidsafe	Sept 2004	*Safe travel to school*
Kidsafe	Feb 2005	*Child safety in your driveway*
Child Safety Handbook	May 2005	*Road safety – It's not child's play*

Appendix 2: ATSB grants 2004–05

Road Safety Research Grants Programme

Successful applications

Five grants were awarded for work to be undertaken under the Road Safety Research Grant Programme funded by the ATSB.

Factors influencing learner driver experiences

Applicant: Ms Lyndel Bates, Centre for Accident Research & Road Safety – Queensland

This study will survey learner drivers and parents/carers across two states with different driver licensing systems to identify the personal, social, legal (including licensing requirements) and socio-demographic factors that influence novice drivers' experiences during the learner licence phase. It will examine how licensing requirements impact on learners' experiences and what support is provided by parents or carers. This study will inform policy in relation to driver licensing, and provide baseline data which could be used to evaluate changes to driver licensing systems.

Helmet protection against basilar skull fractures

Applicant: Mr Tom Gibson, Human Impact Engineering

A major cause of fatal injury to helmeted riders of motorcycles is basilar skull fracture from facial impacts. This project will investigate mechanisms of basilar skull injury to helmeted riders in a series of fatal crashes. The results will be applied to improving the test methodology to prevent these injuries.

The role of risk-propensity in the risky driving of younger and older drivers

Applicant: Dr Julie Hatfield

This survey will investigate interrelationships between aspects of risk-propensity (measured using recently-developed questionnaires), age, experience, risk-perception, and risky driving to inform improved road safety countermeasures. It aims to disentangle the roles of inexperience, inaccurate risk perception, risk propensity (positive attitudes to risk itself). Data collection will involve a survey of 200 people at motor registries and 200 people at university. This study will contribute to improved understanding of the factors underlying the risky behaviour of young drivers, and could lead to better tailored countermeasures.

Instrumentation to acquire road profile data for use in whole body vibration apparatus

Applicant: Dr John Patterson, Swinburne University of Technology

This study aims to replicate earlier survey research on vibration, with a stimulus that mimics the vibrations generated by selected road profiles at selected speeds. Subjects will complete a questionnaire on subjective changes in energy and mood, and heart rate variability and electroencephalograph (EEG) measurements will be taken to validate subjective fatigue ratings. The study will also develop the instrumentation to allow real road profile data to be used to generate vibration signals for further research. Overall, this is a practical and moderately priced proposal.

Intelligent transport system technologies to support police enforcement activities

Applicant: Dr Michael Regan, Monash University Accident Research Centre

This study aims to identify and define, from first principles, intelligent transport systems (ITS) and telematics technologies which have significant potential to enhance the effectiveness and efficiency of Police enforcement activities in Australia. It includes a review of the literature and practice in relation to the enforcement activities undertaken by Police, the tasks involved, and the ITS applications that exist or could be brought together to optimise Police enforcement activities. It includes a process of consultation with relevant experts and industry groups.

Reports issued 2004–05

Older road users: From driving cessation to safe transportation

Author: J Liddle, K McKenna, K Broome – School of Health and Rehabilitation Sciences, University of Queensland

Driving is a complex and important part of everyday life for many people, including those who are older. Due to the changes associated with ageing, older road users encounter various negative outcomes including an increased risk of fatal road injuries. Older drivers are often encouraged to give up driving to decrease this risk. However, driving cessation itself has many health and social implications.

This study used two phases, incorporating qualitative and quantitative methods, to investigate the process and outcomes of driving cessation and to develop resources that aimed to assist in the transition from driving cessation to safe transportation. The researchers piloted the implementation by evaluating feedback from reference groups of health professionals and older people.

Cognitive screening for the safe driving competence of older people with mild cognitive impairment or early dementia

Author: C Snellgrove - Repatriation General Hospital (RGH), Division of Rehabilitation, Aged Care & Allied Health, South Australia

Associated with the ageing of the Australian population is an increasing number of older drivers (aged 65 years and above). When the exposure data are taken into account, older drivers are at very high risk of crash, injury, and fatality. Dementing disorders associated with ageing are thought to contribute to impairment of driving ability, and the accident involvement of older drivers.

Driving with moderate or severe dementia represents a significant risk to road safety. Mild cognitive impairment (MCI) and early dementia are less reliable predictors of driving performance, and the point at which driving becomes unsafe is not easy to determine. The aims of this study were, first, to describe the on-road driving performance of a group of older people with MCI or early dementia, and second, to validate a new cognitive screening instrument developed to indicate the likely driving competence of older people with MCI or early dementia. The instrument, named the Maze Task, was developed by the researcher as a timed pencil and paper test of attention, visuoconstructional skills, and executive functions of planning and foresight.

Development of an anti-whiplash seat

Author: M Yuen, L Bilston - The Prince of Wales Medical Research Institute, New South Wales

This project involved the development of an anti-whiplash car seat for rear impact collisions. The completion of this project has shown that the whiplash injury potential during rear impact can be significantly reduced with the implementation of an occupant conforming seatback that maintains an optimal position for any seatback angle. This result was enhanced by the addition of an active head restraint.

The road safety implications of unlicensed driving: A survey of unlicensed drivers

Author: Mr Barry Watson, Centre for Accident Research and Road Safety (CARRS-Q) Queensland University of Technology

This study aimed to better understand the factors contributing to unlicensed driving in order to develop and implement more effective countermeasures to the behaviour. This involved surveying

a cross-section of unlicensed driving offenders using face-to-face interviews at the Central Magistrates Court in Brisbane.

The results confirm that unlicensed drivers should not be viewed as a homogenous group. Significant differences were found among the offender types in terms of their socio-demographic characteristics (age, education level, prior criminal convictions), driving history (prior convictions for unlicensed driving and other traffic offences), whether they were aware of being unlicensed, the degree to which they limited their driving while unlicensed, and their drink driving behaviour. The differences among offenders suggest that it is unlikely that one approach will adequately address the problem.

Other road safety grants

Australian Road Assessment Programme (AusRAP)

The ATSB provided the Australian Automobile Association with a grant of $350,000 to assist with the creation of a national AusRAP database and with the further development of risk assessment protocols.

Recording artists,actors and athletes against drink driving (RADD)

RADD is a mass media programme designed to raise awareness of the dangers associated with drink driving and to promote alternative strategies. The ATSB provided RADD Australia Limited with a grant of $50,000 to support the expansion of the program.

Used Car Safety Ratings programme

The ATSB co-sponsors the Used Car Safety Ratings programme developed by the Monash University Accident Research Centre (MUARC). In 2004-05, the ATSB provided a $22,000 grant to support further data collection and analysis.

Content analysis of motor vehicle advertisements

A $35,000 grant was awarded to the Queensland University of Technology to support this research undertaken by the Centre for Accident Research and Road Safety-Queensland (CARRS-Q). The project was designed to examine safety related themes in Australian advertisements for new vehicles, and to evaluate changes in advertising content over the last few years.

Aviation Safety Research Grants Programme

Successful applications

The ATSB awarded six aviation safety research grants in 2004–05:

Regional airline Line Operations Safety Audit

Applicant: Mr Geoff Collis

The Line Operations Safety Audit (LOSA) has become a widely accepted tool among the major jet aircraft carriers for identification and management of human error on the flightdeck. LOSA has not been developed in regional airline operations, yet the regional airline sector has traditionally experienced higher accident rates than large carriers. This project will enable research into the use of LOSA in a regional Australian airline and contribute to baseline data on regional airlines being assembled by the LOSA Collaborative.

Cabin safety communication – public perceptions, attitudes and behaviours

Applicant: Mr Andrew Parker

Cabin safety communication – in particular the use of safety briefings and safety cards – is of vital importance in conveying procedural information to passengers that they would need to act on in the event of an emergency. This project will seek to measure the Australian public's attitudes, perceptions and behaviours towards cabin safety and safety communication.

Evacuation commands for optimal passenger management

Applicant: Ms Lauren Thomas

The efficient evacuation of passengers is crucial to survivability in aircraft accidents where hull-loss is not immediate. This project will run passenger evacuation experiments to validate the effectiveness of a selection of commands and procedures deemed as best practice by an industry forum held through the Australian Society of Air Safety Investigators (ASASI) Asia Pacific Cabin Safety Working Group.

Assessing change in the accident resilience of airlines

Applicant: Dr Robert Dannatt

Empirical evidence indicates that change in the 'accident resilience' of organisations is inevitable. Aircraft accident investigations often show an unexpected degradation of safety vigilance in airlines. An

organisation must constantly monitor its 'critical indicators' in order to identify shifts in its safety health. This project aims to establish current practice and to identify what are considered to be the critical indicators to measure safety health.

Child restraint in aircraft

Applicant: Mr Tom Gibson

It is normally considered that the safest seating option for an infant during flight is for it to be secured in its own child restraint. However, this is not a stipulation in the current regulations. This project will test a selection of Australian child restraint systems to assess how well they fit current aircraft seats and perform according to the US Federal Aviation Administration's dynamic seat test.

Evaluation of general aviation pilot performance

Applicant: Dr Mark Wiggins

Non-commercial general aviation pilots tend to be over-represented in aircraft accident and incident statistics when compared to other categories of operation. This project will conduct an evaluation of the operational error-rates of general aviation pilots in a range of in-flight situations, using a simulator. It will establish a baseline level of performance against which future changes to the aviation system may be assessed

Aviation safety research grant reports issued in 2004–05

The interpretation and use of weather radar displays in aviation

Applicant: Dr Mark Wiggins

This project investigated the use of weather radar displays in commercial aviation. Three studies were involved. The first study used an expertise model of the use of weather radar displays to classify aircraft accident and incident reports. The study's three data sources included the US Federal Aviation Administration Accident/Incident Data System, the US National Transportation Safety Board Accident and Incident Database, and the Aviation Safety Reporting System (US). Study Two involved a cognitive interview of experienced commercial pilots and their use of weather radar displays to assist in the management of flight. The results of Studies One and Two provided the basis for the development of the third study, a survey that was distributed to pilots both in hard-copy and on-line via the Internet. The outcomes from the studies form

the basis for a number of recommendations concerning improvements in training, education and the design of weather radar displays.

Error management in aviation training

Dr Matthew Thomas

Human error remains a significant factor in the majority of aviation incidents and accidents. The aim of this study was to work towards providing the Australian aviation industry with a training package for flight crew error management.

Error management training refers to the structured development of error management competencies through a formal process of training. Fundamental to the concept is that the error management training be fully integrated into ground, simulator and line training.

The project sought to provide an initial scientific basis for error management training programme. The report identifies aspects of best-practice, and provides an exploration of the curriculum foundations for error management training. Considerable ongoing research and development is still required in the evolution of this new approach to training towards safety management.

Other Aviation Safety Grants

Guild of Airline Pilots and Navigators (GAPAN)

The ATSB also made a grant of $250,000 to the Guild of Airline Pilots and Navigators (GAPAN) following an announcement by the then Minister. The grant was to enable GAPAN to establish a safety training program for Australian commercial pilots based on the Line Operations Safety Audit program endorsed by the International Civil Aviation Organization, the International Air Transport Association, and the International Federation of Airline Pilots Associations. The ATSB is seeking access to the international Line Operations Safety Audit database in Austin Texas to augment its future investigations and research projects.

Aviation Safety Foundation of Australia (ASFA)

The ATSB provided ASFA with $19250 to help fund the first stage of a ASFA Research Project (AVSAFE) which aims to evaluate and analyse insurance claims data.

Australian Women's Pilots Association (AWPA)

The ATSB has provided the AWPA with a $2000 grant to enable a female commercial pilot to attend a safety management course.

Appendix 3 – Investigation reports released in 2004–05

Rail reports released in 2004–05

Occurrence Date	Rail accident or incident	Date released
16 Mar 2003	Derailment of Freight Train 1SP2N and the Subsequent Collision of Passenger Train 8318 at Chiltern, Vic.	21 Oct 2004
28 Nov 2003	Derailment of Pacific National Freight Train 2PW4-N at Ararat, Vic.	09 Feb 2005
15 Nov 2004	Derailment of Cairns Tilt Train VCQ5 at Berajondo, Qld – Interim Report	16 Feb 2005
19 Jan 2005	Collision between Freight Train 4MP5 and XPT Passenger Train 8622 at South Dynon, Vic.- Interim Report	20 May 2005
9 Nov 2003	Derailment of train 6WP2 near Bates, SA	30 June 2005

Marine reports released in 2004–05

Report Number	Vessel(s)	Date	Location	Date released
200	*Astor*	26 Feb 2004	Platypus Channel, Townsville, Qld	25 Aug 2004
196	*Lancelot / FV Jenebar*	21 Aug 2003	Off Forster, Central Coast, NSW	27 Aug 2004
198	*Port Arthur*	20 Oct 2003	Port Botany, NSW	07 Dec 2004
193	*Searoad Mersey*	21 Mar 2003	Bass Strait	24 Dec 2004
190	Tauranga Chief	17 Jan 2003	Bradley's Head, Sydney, NSW	08 Feb 2005
195	*Asian Nova/FV Sassenach*	29 May 2003	Off Palm Islands, QLD	30 Mar 2005
202	*Harmonic Progress*	16 Apr 2004	At sea, south of Lihou Reef (Coral Sea)	30 Mar 2005
205	*True North*	07 Aug 2004	St George Basin, WA	03 May 2005
203	*P&O Nedlloyd Taranaki/ FV Ocean Odyssey*	29 Jun 2004	5 miles southeast of Port Botany, NSW	02 Jun 2005
206	*Aotearoa Chief*	14 Aug 2004	Off Port Philip Heads, Vic.	02 Jun 2005
171	*Maersk Tacoma*	8 Aug 2001	Bass Strait	15 Jun 2005

Aviation investigation and technical analysis reports released in 2004–05

No	Occurrence number	Occurrence date	Occurrence type	Registration	Location	State	Date released
1	200400242	27 Jan 2004	Accident	VH-WRF	19km E Byron Bay	NSW	02 Jul 2004
2	200402060	04 Jun 2004	Accident	VH-TFI	Utopia Station, (ALA)	NT	02 Jul 2004
3	200401661	11 May 2004	Accident	VH-WMC	Winton, Aerodrome	QLD	21 Jul 2004
4	200302172	15 May 2003	Accident	VH-AMR	6km NE Coffs Harbour, Aerodrome	NSW	16 Aug 2004
5	200300224	07 Feb 2003	Accident	VH-JWX	Camden, Aerodrome	NSW	17 Aug 2004
6	200402259	20 Jun 2004	Accident	VH-DDQ	Gladstone, Aerodrome	QLD	18 Aug 2004
7	200305442	17 Aug 2003	Accident	C-GEAP	Bonaparte Lake, Named feature	Other	09 Sep 2004
8	200400437	07 Feb 2004	Accident	VH-TRZ	Eildon	Vic.	09 Sep 2004
9	200400924	08 Mar 2004	Accident	VH-KYQ	Tandarra	Vic.	09 Sep 2004
10	200401110	27 Mar 2004	Accident	VH-NIJ	15km SE Bunbury, (ALA)	WA	09 Sep 2004
11	200205780	08 Dec 2002	Accident	ZK-NBC	56km ESE Brisbane, Aerodrome	QLD	14 Sep 2004
12	200304074	28 Sep 2003	Accident	VH-UXF	93km S Derby	WA	01 Oct 2004
13	200402791	28 Jul 2004	Accident	VH-KHU	Mangalore, Aerodrome	Vic.	12 Oct 2004
14	200300458	21 Feb 2003	Accident	VH-LBZ	Lake Johnston, Named feature	WA	13 Oct 2004
15	200402685	20 Jul 2004	Accident	VH-DSP	Medlow Bath	NSW	13 Oct 2004
16	200301337	29 Mar 2003	Accident	VH-VDB	4km SW McLaren Vale	SA	18 Oct 2004
17	200403533	20 Sep 2004	Accident	VH-UPN	Cockatoo Island (ALA)	WA	22 Oct 2004

No	Occurrence number	Occurrence date	Occurrence type	Registration	Location	State	Date released
18	200303633	15 Aug 2003	Accident	VH-MVP	1.45km W Camden, Aerodrome	NSW	25 Nov 2004
19	200400443	08 Feb 2004	Accident	VH-CYC	Green Island	QLD	30 Nov 2004
20	200404286	01 Nov 2004	Accident	VH-AHL	Mudgee, Aerodrome	NSW	10 Dec 2004
21	200402049	04 Jun 2004	Accident	VH-OWA	83km NW Mackay, VOR	QLD	11 Dec 2004
22	200302847	22 Jun 2003	Accident	VH-TUR	Wedderburn, (ALA)	NSW	16 Dec 2004
23	200304091	01 Oct 2003	Accident	VH-WAC	1km WSW Mareeba, Aerodrome	QLD	13 Jan 2005
24	200403764	03 Oct 2004	Accident	VH-ELQ	Gold Coast, Aerodrome	QLD	28 Feb 2005
25	200302980	02 Jul 2003	Accident	VH-OJU	Sydney, Aerodrome	NSW	07 Mar 2005
26	200303579	11 Aug 2003	Accident	VH-ANV	Jandakot, Aerodrome	WA	11 Mar 2005
27	200304282	17 Oct 2003	Accident	VH-HTD	28km N Mackay, Aerodrome	QLD	15 Mar 2005
28	200402038	02 Jun 2004	Accident	VH-NSA	1km NW Same, Aerodrome	Other	22 Mar 2005
29	200400508	10 Feb 2004	Accident	VH-HBI	5km SE Caloundra, (ALA)	QLD	28 Apr 2005
30	200404285	30 Oct 2004	Accident	VH-JVW	Forbes, (ALA)	NSW	23 May 2005
31	200402243	21 Jun 2004	Accident	VH-MPI	30km E Gladstone, Aerodrome	QLD	25 May 2005
32	200500216	20 Jan 2005	Accident	VH-SBH	Rose Bay, (ALA)	NSW	20 Jun 2005
33	200501287	08 Mar 2005	Accident	VH-FGN	Patek, (ALA)	Other	30 Jun 2005
34	200501656	18 Apr 2005	Accident	VH-LCZ	Warooka, (ALA)	SA	30 Jun 2005
35	200300040	16 Jan 2003	Incident	VH-EKN	Orange, Aerodrome	NSW	07 Jul 2004

No	Occurrence number	Occurrence date	Occurrence type	Registration	Location	State	Date released
36	200402949	11 Aug 2004	Incident	VH-ROU	Mareeba	QLD	13 Aug 2004
37	200300894	13 Mar 2003	Incident	VH-KDQ/ VH-PHB/VH-TQA	19km WSW Sydney, VOR	NSW	31 Aug 2004
38	200300073	01 Jan 2003	Incident	VH-OGB	Satna, (IFR)	Other	09 Sep 2004
39	200402538	07 Jul 2004	Incident	VH-WBA	463km NW Perth, Aerodrome	WA	29 Sep 2004
40	200402025	03 Jun 2004	Incident	VH-TJD/VH-WZI	6km W Melbourne, VOR	Vic.	02 Oct 2004
41	200401273	07 Apr 2004	Incident	VH-LDJ/VH-VBT	93km NW Brisbane, Aerodrome	QLD	14 Oct 2004
42	200303726	24 Aug 2003	Incident	PK-GPE	Sydney, Aerodrome	NSW	26 Oct 2004
43	200304938	27 Nov 2003	Incident	VH-SDA	Brisbane, Aerodrome	QLD	18 Nov 2004
44	200305203	17 Dec 2003	Incident	VH-TQX	Sydney, Aerodrome	NSW	25 Nov 2004
45	200304918	30 Nov 2003	Incident	VH-TQA	Sydney, Aerodrome	NSW	25 Nov 2004
46	200401411	19 Apr 2004	Incident	VH-TQQ/VH-KXF	13km SE Mildura, Aerodrome	Vic.	25 Nov 2004
47	200404460	12 Nov 2004	Incident	VH-PTA	Mudgee, Aerodrome	NSW	25 Nov 2004
48	200402714	22 Jul 2004	Incident	VH-ANM	Darwin, Aerodrome	NT	10 Dec 2004
49	200403210	30 Aug 2004	Incident	VH-LFU	19km NE Jabiru, (ALA)	NT	11 Dec 2004
50	200403720	30 Sep 2004	Incident	–	Sydney, Aerodrome	NSW	11 Dec 2004
51	200402749	26 Jul 2004	Incident	VH-VQA	37km S Mackay, Aerodrome	QLD	15 Dec 2004
52	200402703	20 Jul 2004	Incident	VH-ZZI/REG_ 2004027032	Darwin, Aerodrome	NT	14 Jan 2005

No	Occurrence number	Occurrence date	Occurrence type	Registration	Location	State	Date released
53	200402705	21 Jul 2004	Incident	VH-ANM/VH-HPA /VH-OKJ	37km NE Darwin, Aerodrome	NT	14 Jan 2005
54	200403800	06 Oct 2004	Incident	VH-VXM/AUSY796	93km SE Darwin, VOR	NT	08 Feb 2005
55	200500074	12 Jan 2005	Incident	VH-YJO/ZK-OJG	22km E Melbourne, Aerodrome	Vic.	14 Feb 2005
56	200303701	21 Aug 2003	Incident	VH-OCF	28km N Bankstown, Aerodrome	NSW	15 Feb 2005
57	200402542	09 Jul 2004	Incident	VH-OEI	Sydney, Aerodrome	NSW	21 Feb 2005
58	200403722	04 Oct 2004	Incident	ZK-FDM	Melbourne, Aerodrome	Vic.	21 Feb 2005
59	200402228	16 Jun 2004	Incident	9V-SPE/GC-IVC	174km SE Atmap, (IFR)	Other	24 Feb 2005
60	200401115	22 Mar 2004	Incident	VH-OGB/ZK-NCF	130km S Oleng, (IFR)	Other	28 Feb 2005
61	200400726	28 Feb 2004	Incident	V8RBG	Perth, Aerodrome	WA	03 Mar 2005
62	200404815	04 Dec 2004	Incident	VH-HIS/VH-YXS	Jandakot, Aerodrome	WA	07 Mar 2005
63	200401549	11 Apr 2004	Incident	VH-FDG	74km S Mount Magnet, Non Directional Beacon	WA	22 Mar 2005
64	200403384	19 Aug 2004	Incident	VH-BSM	50km E Tamworth, Aerodrome	NSW	22 Mar 2005
65	200402287	21 Jun 2004	Incident	VH-VQB	Sydney, Aerodrome	NSW	05 Apr 2005
66	200402622	02 Jul 2004	Incident	VH-WZS/VH-RXE	Sydney, Aerodrome	NSW	05 Apr 2005
67	200301304	13 Mar 2003	Incident	VH-SQR	Brisbane, Aerodrome	QLD	18 Apr 2005
68	200400998	22 Mar 2004	Incident	VH-HPE	Sydney, Aerodrome	NSW	28 Apr 2005
69	200403227	31 Aug 2004	Incident	VH-LTW/VH-LET	113km WNW Devonport, VOR	Tas.	28 Apr 2005

No	Occurrence number	Occurrence date	Occurrence type	Registration	Location	State	Date released
70	200402747	24 Jul 2004	Incident	VH-VXF	39km SSE Canberra, Aerodrome	ACT	05 May 2005
71	200304839	25 Nov 2003	Incident	VH-EBU	Narita Airport	Other	11 May 2005
72	200402194	14 Jun 2004	Incident	VH-PHF	9km SW Alice Springs, Aerodrome	NT	11 May 2005
73	200402648	17 Jul 2004	Incident	VH-TJH/VH-VQB	Hamilton Island, Aerodrome	QLD	01 Jun 2005
74	200304815	17 Nov 2003	Incident	VH-OJI	Singapore, Changi, Aerodrome	Other	01 Jun 2005
75	200404930	01 Dec 2004	Incident	VH-FDN/VH-OAI	74km E Perth, Aerodrome	WA	02 Jun 2005
76	200501310	01 Apr 2005	Incident	B-22805	Sangshan, Aerodrome	Other	30 Jun 2005
77	200305496	11 Nov 2003	SADN	Firefighting arrangements	Bankstown, Aerodrome	NSW	22 Dec 2004
78	200205893	15 Dec 2002	Serious Incid.	VH-TJF	Canberra, Aerodrome	ACT	30 Aug 2004
79	200300029	16 Jan 2003	Serious Incid.	VH-VBS	Sydney, Aerodrome	NSW	02 Oct 2004
80	200402065	06 Jun 2004	Serious Incid.	VH-SJA/VH-DXX	Cowes, VOR	Vic.	19 Oct 2004
81	200302433	29 May 2003	Serious Incid.	VH-VQD	13km NNW Mackay, Aerodrome	QLD	16 Dec 2004
82	200404700	29 Nov 2004	Serious Incid.	VH-BWC	11km N Darwin, Aerodrome	NT	17 Dec 2004
83	200402411	19 Jun 2004	Serious Incid.	VH-OGP/VH-OGQ	Samge, (IFR)	Other	03 Feb 2005
84	200402626	13 Jul 2004	Serious Incid.	VH-ANJ/VH-OAP	56km NNE Kununurra, VOR	WA	03 Feb 2005
85	200300418	19 Feb 2003	Serious Incid.	VH-TJB	Darwin, Aerodrome	NT	22 Feb 2005
86	200304400	26 Oct 2003	Serious Incid.	VH-EAL	Coolangatta, Aerodrome	QLD	07 Mar 2005

No	Occurrence number	Occurrence date	Occurrence type	Registration	Location	State	Date released
87	200403857	11 Oct 2004	Serious Incid.	VH-SBV	277km NW Cairns, VOR	QLD	07 Mar 2005
88	200500141	15 Jan 2005	Serious Incid.	ZK-OJA	31km E Melbourne, Aerodrome	Vic.	12 Mar 2005
89	200500838	20 Feb 2005	Serious Incid.	VH-OGO	93km NE Melbourne, VOR	Vic.	22 Mar 2005
90	200400856	09 Mar 2004	Serious Incid.	VH-VOB	4km NE Modbury, Locator	SA	05 Apr 2005
91	200500857	02 Feb 2005	Serious Incid.	VH-MYI	Julia Creek, (ALA)	QLD	30 Apr 2005
92	200502024	10 May 2005	Serious Incid.	VH-MZV	Darwin, Aerodrome	NT	06 Jun 2005
93	200403868	11 Oct 2004	Serious Incid.	VH-VOF	Perth, Aerodrome	WA	08 Jun 2005
94	200404823	06 Dec 2004	Serious Incid.	VH-FWI	56km SW Rockhampton, Aerodrome	QLD	09 Jun 2005
95	200501482	09 Apr 2005	Serious Incid.	VH-EBW	Auckland, Aerodrome	Other	14 Jun 2005
96	200404065	30 Nov 2003	Tech Analysis	ZK-HCC	Technical Analysis Investigation, Populated place		18 Nov 2004
97	200305447	01 Jul 2003	Tech Analysis	VH-OJO	Technical Analysis Investigation, Populated place	ACT	24 Dec 2004
98	200305497	11 Aug 2003	Tech Analysis	VH-ANV	Jandakot, Aerodrome	WA	14 Apr 2005

Appendix 4: Transport safety recommendations and safety advisory notices issued in 2004–05

This appendix provides detailed information on the status of safety recommendations and safety advisory notices issued by the ATSB in 2004–05.

Aviation

Under existing memoranda of understanding, both the CASA and Airservices Australia have agreed to respond to the ATSB within 60 days of the date of issue of any safety recommendations. No other organisations are obliged to respond but a nominal 60-day due date is listed and any response received is published.

On some occasions a response is made to a draft safety output. This situation may result in a response date being prior to the formal issue date.

In 2004–05, the ATSB issued 19 recommendations (including one recommendation to multiple organisations) and 13 responses have been received. Of the responses, 1 was closed-accepted, 3 were closed-partially accepted, 6 were being monitored and 3 were closed not accepted.

Updated responses to prior year recommendations are available in the ATSB website. There are no outstanding responses to 2004–05 recommendations from Australian aviation authorities.

The ATSB also issued two safety advisory notices to CASA for which no formal response is required.

Marine

Eleven investigation reports completed in 2004–05 contained safety recommendations that were released in 2004–05. There is no requirement for the shipping industry to respond to these.

Rail

The ATSB completed one rail investigation report in 2004–05 for Victorian authorities under Victorian legislation which was issued by the Victorian authorities. The ATSB also completed its first two investigation reports under the *Transport Safety Investigation Act (TSI Act) 2003*. There is no requirement for formal responses to recommendations issued with the ATSB's TSI Act reports.

ATSB rail recommendations issued in 2004–05

Recommendation	Date of issue
Derailment of Freight Train 1SP2N and the subsequent collision of passenger train 8318 at Chiltern, Victoria on 23 March 2005.	21 October 2004

Victorian Department of Infrastructure

RR200300023

The ATSB recommends that the Department of Infrastructure review all accredited organisation's Safety Management System (SMS) provisions for the maintenance standards of wheel bearings. Particularly to the maximum bore size of bearings, the minimum journal diameter, storage life and procedures for extending effective service life of the bearing.

RR200300024

The ATSB recommends that the Department of Infrastructure monitor the review of communications technologies between Train Control centres.

Pacific National

RR200300025

The ATSB recommends that Pacific National review rolling stock maintenance schedules to include distance and time based criteria.

RR200300026

The ATSB recommends that Pacific National ensure that stored bearings, separate or mounted, are serviced as recommended by the manufacturer.

RR200300027

The ATSB recommends that Pacific National review the procedures for rolling stock, bogies, or wheelsets entering service after extended periods of storage or inactivity.

RR200300028

The ATSB recommends that Pacific National review training procedures for the use of radio equipment during an emergency.

Freight Australia

RR200300029

The ATSB recommends that Freight Australia review communications technologies to allow for greater reliability between other Train Control centres during emergencies.

RR200300030

The ATSB recommends that Freight Australia review communications procedures with other Train Control centres during emergencies on shared railway corridors.

Australian Rail Track Corporation

RR200300031

The ATSB recommends that the Australian Rail Track Corporation review communications technologies to allow for greater reliability between other Train Control centres during emergencies.

Recommendation	Date of issue
RR200300032 The ATSB recommends that the Australian Rail Track Corporation review communications procedures with other Train Control centres during emergencies on shared railway corridors.	
Australasian Railway Association Incorporated RR200300033 The ATSB recommends that the Australasian Railway Association consider the implementation of minimum maintenance standards for packaged and boxed axle bearings.	
Safety Actions already initiated After the accident Pacific National reviewed and implemented new maintenance schedules based on distance and time. Additionally, rolling stock entering service after extended periods have to be inspected, this includes rolling the bearings within a certain time frame to ensure lubrication within the unit.	
Derailment of Pacific National Freight Train 2PW4-N at Ararat, Vic. on 28 November 2003.	09 February 2005
Australian Rail Track Corporation RR20050001 The ATSB recommends that the Australian Rail Track Corporation (ARTC) review track maintenance procedures to ensure that track geometry and stress free temperature are within the specified standards.	
RR20050002 The ATSB recommends that the ARTC review the use of rail creep monuments to better monitor, record, and control rail creep.	
Bates derailment of train 6WP2 near Bates, South Australia on 9 November 2003.	30 June 2005
Pacific National RR20050003 The ATSB recommends that Pacific National undertake a review and implementation of remedial action as required of workshop processes for the care and fitment of bearings to make sure that appropriate measures are in place to reduce the risk of subsequent cage related failure.	
RR20050004 The ATSB recommends that Pacific National undertake a review and implementation of remedial action as required of the storage, transportation, and handling of bearings to make sure that appropriate measures are in place to reduce the risk of accidental damage, particularly with regard to stored RBUs fitted to wheel sets.	

Recommendation	Date of issue

RR20050005
The ATSB recommends that Pacific National undertake a review and implement remedial action as required of the refurbishment and assembly of bearings to make sure that:

a) appropriate measures are in place to reduce the risk of accidental damage to components

b) reconditioned roller assemblies are appropriately inspected when installed

c) bearing bore sizes are satisfactory at the time of overhaul. (Desirably the method of measurement should be assessed to determine if it could adequately differentiate between diameters at the outer edges of the inner rim compared with the centre of the ring).

d) journal diameters are satisfactory at the time of overhaul

e) bench end play measurements at bearing re-qualification are examined to make sure that the measurements are within specification and lateral end play on installation is within specification.

RR20050006
The ATSB recommends that Pacific National further develop and validate their procedure for the use of Wheel Condition Monitoring systems. The procedure should include but not be limited to the following:

a) identification of limiting factors and circumstances for the withdrawal of wagons from service when a fault or number of developing fault readings has been detected

b) formalisation of the actions to make sure that faults detected are acted on in a specified time

c) formalisation of the actions by train crews and others when faults detected enroute are advised by the Australian Rail Track Corporation.

RR20050007
The ATSB recommends that Pacific National continue their utilisation of Bearing Acoustic Monitoring systems with a view to improving the application of the information provided as soon as practicable and in line with their Major Hazard Action Plan.

RR20050008
The ATSB recommends that Pacific National develop and validate a procedure for the use of Bearing Acoustic Monitoring systems. The procedure should include but not be limited to the following:

a) identification of limiting factors and circumstances for the withdrawal of wagons from service when a fault or number of developing fault readings has been detected

b) formalisation of the actions to make sure that faults detected are acted on in a specified time

c) formalisation of the actions by train crews and others when faults detected enroute are advised by the Australian Rail Track Corporation.

Recommendation	Date of issue

South Australian Railway Safety Regulator

RR20050009

The ATSB recommends that the South Australian Railway Safety Regulator monitor the implementation of validated procedures in Pacific National for the use of Wheel Impact Load Detection System/Wheel Condition Monitoring systems.

RR20050010

The ATSB recommends that the South Australian Railway Safety Regulator monitor the continued development towards feasible implementation of Bearing Acoustic Monitoring systems and ensure that validated procedures for its use are implemented in both Pacific National and the Australian Rail Track Corporation.

Australian Rail Track Corporation

RR20050011

The ATSB recommends that the Australian Rail Track Corporation develop and validate a procedure for the use of Bearing Acoustic Monitoring systems. The procedure should include but not be limited to the following:

a) identification of limiting factors and circumstances for the withdrawal of wagons from service when a fault or number of developing fault readings has been detected

b) formalisation of the actions to make sure that faults detected are acted on in a specified time

c) formalisation of the actions when faults are detected en-route and operators are advised by the Australian Rail Track Corporation.

ATSB marine recommendations issued in 2004–05

Recommendation	Date of issue
Independent investigation into the grounding of the Bahamas flag vessel Astor on 26 February 2004 in Platypus Channel, Townsville, Qld.	25 Aug 2005
MR20040021 Ship owners, managers, operators and masters of ships ensure that all bridge staff are fully trained in the correct operation of Voice Data Recorder (VDR) data backup procedures for the particular ship on which they are serving.	
MR20040022 Manufacturers of VDR units should ensure that indicator lights are free of any possible ambiguity and that consideration be given to printing emergency back-up instructions on VDR control panels on ships' bridges.	
MR20040023 Masters of vessels should not actively con the ship directly during pilotage unless they are familiar with the port and they do so in full agreement with any pilot.	
MR20040024 Ships' masters should ensure that all bridge orders in pilotage waters are in a language understood by pilots and ships' staff.	
MR20040025 Ship owners, managers and operators should instruct masters and ships' crews to use all elements of effective Bridge Resource Management at all times.	
Independent investigation into the collision between the Malta flag vessel Lancelot and the Australian fishing vessel Jenebar off Forster, central NSW coast on 21 August 2003	27 Aug 2005
MR20040026 Ship owners, operators, managers and masters, fishing vessel owners, operators and skippers should ensure that the requirements for watchkeepers to keep a proper lookout, visually and by radar are understood and complied with.	
MR20040027 The National Marine Safety Committee and State and Territory marine authorities should review the minimum qualifications for watchkeepers on fishing vessels.	
MR20040028 The National Marine Safety Committee and State and Territory marine authorities should ensure that guidance on procedures for watchkeeping and safety of navigation applies to all vessels.	
MR20040029 Fishing vessels equipped with Very High Frequency (VHF) radio should maintain a watch on channel 16.	
MR20040030 Radar manufacturers' operating manuals should contain explicit instructions for setting up Automatic Radar Plotting Aids (ARPA)s for collision avoidance.	

Recommendation	Date of issue
Independent investigation into the lifeboat accident aboard the Panama flag vessel Port Arthur in Port Botany, NSW on 20 October 2003	27 Aug 2005
MR20040031 Ishihara Dockyard Company should ensure that all shipowners and operators of ships equipped with their lifeboats are advised of incidents involving their on-load release systems and that advice of design changes is promulgated to all such vessels.	
MR20040032 Manufacturers of on-load release systems for lifeboats should ensure that ships using their equipment are provided with detailed instructions for the operation and maintenance of such systems in accordance with the requirements of Regulation 36 of Chapter III of the International Convention for the Safety of Life at Sea 1974 and its Protocol of 1988.	
MR20040033 Shipowners and operators should examine their safety management systems in respect of lifeboat on-load release systems and ensure that crew training, maintenance regimes and operational safeguards are commensurate with the considerable risks associated with these systems.	
MR20040034 ISM accreditation authorities should ensure that ships' safety management systems contain crew training, maintenance regimes and operational safeguards which are commensurate with the considerable risks associated with operating lifeboats fitted with on-load release systems.	
Independent investigation into the machinery damage aboard the Australian flag ship Searoad Mersey in Bass Strait on 21 March 2003	07 Dec 2004
MR 20040035 Operators of Wartsila Vasa 32 engines ensure that they comply with the manufacturer's recommendations in respect of the overhaul and replacement of piston assemblies at the operating hours stipulated.	
MR 20040036 Wartsila NSD review their system for distributing technical bulletins to ensure that all owners and operators of their engines are provided with appropriate advice and warnings in a timely manner.	
Independent investigation into the grounding of the Malta flag vessel Tauranga Chief at Bradley's Head, Sydney on 17 Jan 2003	
MR20040037 Pilots and bridge teams should ensure the conventions governing helm orders are observed, particularly the use of 'midships' when changing rudder direction and also consider the use of hand signals to supplement verbal steering orders.	

Recommendation	Date of issue
MR20040038 Shipping companies should review their crew change practices and give consideration to staggering crew changes to minimise the risk of all of the crew suffering travel related fatigue at the same time.	08 Feb 2005

ATSB aviation recommendations issued in 2004–05

Recommendation	Issue date	Receiving organisation	Datu due/ received	Status of response
R20040072 The Australian Transport Safety Bureau recommends that Bell Helicopters consider incorporating a change to the Bell 206B Flight Manual to alert owners of helicopters of this type to the possibility of uncovering the fuel pump inlets during out-of-trim flight at a low fuel level.	12 Jul 2004	Bell Helicopter Co	10 Sept 2004 Received 30 Sept 2004	Closed - not accepted
R20040073 The Australian Transport Safety Bureau recommends that Bell Helicopters consider the incorporation of a specific note in all maintenance manuals highlighting to maintenance personnel the possibility of incorrect orientation of the lower tank unit float arm.	12 Jul 2004	Bell Helicopter Co	10 Sept 2004 Received 30 Sept 2004	Closed - not accepted
R20040074 The Australian Transport Safety Bureau recommends that the Civil Aviation Safety Authority advise operators of Beech craft King Air and Raytheon King Air aircraft of the potential safety deficiency of the cabin door warning system becoming prematurely earthed, resulting in a sense switch or switches no longer providing an electrical signal for its or their position. The recommendation was simultaneously issued as R20040075 to the US Federal Aviation Administration.	25 Oct 2004	Civil Aviation Safety Authority	24 Dec 2004 Received 07 Dec 2004	Closed - not accepted
R20040075 The Australian Transport Safety Bureau recommends that the US Federal Aviation Administration advise operators of Beechcraft King Air and Raytheon King Air aircraft of the potential safety deficiency of the cabin door warning system becoming prematurely earthed, resulting in a sense switch or switches no longer providing an electrical signal for its or their position. The recommendation was simultaneously issued as R20040074 to the Civil Aviation Safety Authority.	25 Oct 2004	Federal Aviation Administration (FAA)	24 Dec 2004	No response

Recommendation	Issue date	Receiving organisation	Datu due/ received	Status of response
SAN20040076 The Australian Transport Safety Bureau advises constructors of Canadian Safari and other lightweight helicopters to review the installation of an engine speed governor.	3 Nov 2004	Canadian Safari helicopter manufacturers	02 Jan 2005	No response required
SAN20040077 The Australian Transport Safety Bureau advises constructors of Canadian Safari and other lightweight helicopters to review the safety benefits of providing discernibly different aural warning tones to differentiate between main rotor RPM overspeed and underspeed conditions.	3 Nov 2004	Canadian Safari helicopter manufacturers	02 Jan 2005	No response required
R20040084 The Australian Transport Safety Bureau recommends that Pratt & Whitney plc review the processes used by its Singapore based overhaul joint venture to accomplish VSV ring pin flaring and compliance with service bulletin PW4ENG 72-432, to ensure the processes are appropriate and in accordance with the service bulletin.	15 Mar 2005	Pratt and Whitney	14 May 2005	No response
R20040086 The Australian Transport Safety Bureau recommends that the Civil Aviation Authority of Singapore liaises with Pratt & Witney's Singapore based overhaul joint venture to review the process for accomplishing the ring pin flaring and compliance with the service bulletin PW4ENG72432 to ensure the processes are appropriate and in accordance with the service bulletin.	15 Mar 2005	Civil Aviation Authority of Singapore	14 May 2005 Received 01 April 2005	Closed - accepted
R20040087 The Australian Transport Safety Bureau recommends that Pratt & Whitney plc review Pratt & Whitney PW4000 engine maintenance procedures for ensuring the integrity of high pressure compressor variable stator vane synchronizing ring pins, to ensure that they adequately address and manage the potential for loss of vane arm pin retention.	15 Mar 2005	Pratt and Whitney	14 May 2005	No response

Recommendation	Issue date	Receiving organisation	Datu due/ received	Status of response
R20040088				
The Australian Transport Safety Bureau recommends that the US Federal Aviation Administration review Pratt & Whitney PW4000 engine maintenance procedures for ensuring the integrity of high pressure compressor variable stator vane synchronizing ring pins, to ensure that they adequately address and manage the potential for loss of vane arm pin retention.	15 Mar 2005	Federal Aviation Administration (FAA)	14 May 2005	No response
R20040090				
The Australian Transport Safety Bureau recommends that the Department of Defence (airport infrastructure owner) and Darwin International Airport Pty Ltd (civilian facilities operator) consider installation of centreline lighting and touchdown zone lighting, consistent with CASA recommended practices on runways wider than 50 m.	04 Mar 2005	Department of Defence ,	03 June 2005 Received 16 Mar 2005	Monitor
		Darwin International Airport Pty Ltd	03 June 2005	Monitor
R20040091				
The Australian Transport Safety Bureau recommends that the Civil Aviation Safety Authority review the medical certification standards to consider the potential increased significance of diastolic blood pressure to the risk of a cardiac event in applicants for an aviation medical certificate.	13 Jan 2005	Civil Aviation Safety Authority	14 Mar 2005 Received 11 May 2005	Monitor

Recommendation	Issue date	Receiving organisation	Datu due/ received	Status of response
R20040093				
In light of the recent industry experience, the Australian Transport Safety Bureau recommends that Australian operators of Boeing 737-800 series aircraft review the practice of fitting retread tyres of R4 (fourth retread) or above, until their serviceability limitations can be identified.	23 Dec 2004	Australian Operators of B737-800 series aircraft	21 Feb 2005 Received Virgin Airlines 21 Feb 2005 Qantas 23 Dec 2004	Monitor
R20040094				
The Australian Transport Safety Bureau recommends that as a priority the International Civil Aviation Organisation develop an international standard for the marking of aircraft equipped with rocket-assisted recovery parachute systems to ensure that they fully alert persons to the hazards and the danger areas on the aircraft.	21 Jan 2005	International Civil Aviation Organization	22 Mar 2005	No response
R20040095				
The Australian Transport Safety Bureau recommends that as a priority the Federal Aviation Administration liaise with the European Aviation Safety Agency and the International Civil Aviation Organisation to develop an international standard for the marking on all aircraft with rocket-assisted recovery parachute systems to ensure that they fully alert persons to the hazards and the danger areas on the aircraft.	21 Jan 2005	Federal Aviation Administration (FAA)	22 Mar 2005	No response
R20040096				
The Australian Transport Safety Bureau recommends that as a priority the European Aviation Safety Agency liaise with the Federal Aviation Administration and the International Civil Aviation Organisation to develop an international standard for the marking on all aircraft with rocket-assisted recovery parachute systems to ensure that they fully alert persons to the hazards and the danger areas on the aircraft.	21 Jan 2005	European Aviation Safety Agency	22 Mar 2005	No response

Recommendation	Issue date	Receiving organisation	Datu due/ received	Status of response
R20040097				
The Australian Transport Safety Bureau recommends that the Australian Civil Aviation Safety Authority publish guidance alerting all personnel who would normally attend an accident site to the dangers associated with aircraft equipped with rocket-assisted recovery parachute systems.	21 Jan 2005	Civil Aviation Safety Authority	22 Mar 2005 Received 19 May 2005	Monitor
R20050002				
The Australian Transport Safety Bureau recommends that the Civil Aviation Safety Authority review its operators classification and/or it's minimum safety standards required for helicopter Emergency Medical Services operations. This review should consider increasing; (1) the minimum pilot qualifications, experience and recency requirements, (2) operational procedures and (3) minimum equipment for conduct of such operations at night. CASA has reviewed its previous advice in relation to this matter [provided with the directly involved parties comments to draft occurrence report 200304282] and has no additional comment to provide in response to recommendation R20050002. However, it should be noted that resources to review this action will be allocated in accordance with CASA's reviewed priorities. CASA will: • Review the requirements for helicopter EMS operations to include consideration for two pilots, or a stability augmentation and/or autopilot system; • Review the special operational and environmental circumstances of helicopter EMS services, particularly with regard to pilot qualifications, training and recency including instrument flight competency; and • Review the pilot recency requirements for helicopter EMS operations to ensure that operator check and training processes are focused on the EMS environment.	15 Mar 2005	Civil Aviation Safety Authority	14 May 2005 Received 29 Aug 2005	Monitor

Recommendation	Issue date	Receiving organisation	Datu due / received	Status of response
R20050003 The Australian Transport Safety Bureau recommends that Qantas Airways Ltd, review the adequacy of their procedures for the deployment of over-wing slides during known brake fire situations. This review should take into consideration the visual cues used and potential risk to passengers of evacuating within close proximity of a fire zone	17 Mar 2005	Qantas Airways Limited	16 May 2005 Received 06 July 2005	Closed - partially accepted
R20050004 The Australian Transport Safety Bureau recommends that the Civil Aviation Safety Authority review the adequacy of operator procedures for the deployment of over-wing slides during known brake fire situations. This review should take into consideration the visual cues used and potential risk to passengers of evacuating within close proximity of a fire zone.	17 Mar 2005	Civil Aviation Safety Authority	16 May 2005 Received 18 July 2005	Closed - partially accepted

Appendix 5: ATSB investigations underway at 30 June 2005

Rail investigations underway at 30 June 2005

Occurrence date	Location	Description
25 Feb 2004	Sandgate, NSW	Near head-on collision of a freight train with an empty passenger train
15 Mar 2004	Alumatta, Vic.	Derailment of a freight train
28 Jun 2004	Murarrie, Qld	Signal Passed At Danger (SPAD) incident
20 Sept 2004	Fisherman Islands, Qld	Signal Passed At Danger (SPAD) incident
23 Sept 2004	Benalla, Vic.	Derailment of cement freight train
11 Oct 2004	Thornton, NSW	Derailment of a coal train
21 Nov 2004	Near Belair railway station, SA	Derailment of a Pacific National freight train
15 Nov 2004	Berajondo, Qld	Derailment of a Queensland Rail Tilt Train commuter service bound from Brisbane to Cairns
19 Jan 2005	South Dynon, Vic.	A passenger train/freight train collision.
30 Jan 2005	Merredin and Koolyanobbing, WA	Freight train derailments
2 Feb 2005	Regency Park, SA	Freight train shunting accident

Marine investigations underway at 30 June 2005

Vessel	Incident date	Type	Occurrence and location
Goliath*	22-Sep-2002	Bulk carrier	Machinery damage in Bass Strait
Goliath*	12-Feb-2003	Bulk carrier	Machinery damage SE of Jervis Bay, NSW
Windeward Bound	3-Jun-2004	Sail training ship	Knockdown SE of Point Hicks, Vic.
Mellum	28-Sep-2004	General cargo	Grounding at Thevenard, SA
Lowlands Grace	7-Oct-2004	Bulk carrier	Lifeboat fatality off Port Hedland, WA
L'astrolabe	27-Jan-2005	Antarctic supply ship	Fatality and serious injury south of Tasmania
Goa/Marie Chocolat	19-Feb-2005	Bulk carrier/yacht	Collision approaching Newcastle Harbour, NSW
Spartia/FV Hanna Lee	15-Apr-2005	Bulk carrier/ fishing vessel	Collision off Bunbury, WA
Hui Shun Hai	21-Apr-2005	Bulk carrier	Serious injury off south coast of WA
Probo Panda	11-May-2005	Products/oil/ bulk/ore carrier	Fatality at anchorage off Gladstone, Qld
Golden Bell	16-May-2005	Bulk carrier	Fatality at anchorage off Dampier, WA
Java Sea	24-May-2005	General cargo	Fire alongside Cairns, Qld
Pilsum/China Steel Growth	24-Jun-2005	Bulk carriers	Collision at anchorage off Newcastle, NSW

* *The two GOLIATH incidents are counted as a single investigation and will feature as a single investigation report*

Aviation investigations underway at 30 June 2005

No	Date of occurrence	Investigation Category	Occurrence number	Occurrence type	Manufacturer	Model	Location
1	06 Sep 2003	3	200303861	Incident	de Havilland Canada	DHC-8-102	Brisbane, Aerodrome, Qld
2	01 Jul 2003	2	200305443	Tech Analysis	(Multi Engine Study)		Technical Analysis Investigation, Populated place
3	10 Jul 2003	3	200305448	Tech Analysis	Boeing Co.	727-277	Technical Analysis Investigation, Populated place
4	03 Oct 2003	4	200305494	Tech Analysis	Convair Division of General Dynamics Corporation	CV-580	Technical Analysis Investigation, Populated place
5	01 Jul 2003	3	200305495	Tech Analysis			Technical Analysis Investigation, Populated place
6	18 Jun 2004	4	200402415	Incident	Saab Aircraft AB	SF-340A	83km SW Albury, Aerodrome, NSW
7	31 Aug 2004	4	200403238	Incident	de Havilland Canada	DHC-8-315	78km NNW Brisbane, VOR, Qld
8	22 Jan 2005	4	200500285	Serious Incid.	Boeing Co.	717-200	28km ENE Cairns, Aerodrome, Qld
9	14 Feb 2005	4	200500620	Tech Analysis	Cessna Aircraft Company	404	Tamworth, NSW
10	10 Mar 2005	4	200501155	Tech Analysis	Bell Helicopter Co.	212	Near Moliana, East Timor
11	18 Mar 2005	4	200501189	Incident	Boeing Co.	717-200	38km SE Fliki, (IFR)
12	08 Apr 2005	4	200501462	Tech Analysis	Cessna Aircraft Company	207	Perth, WA
13	13 Apr 2005	3	200501655	Serious Incid.	Robinson Helicopter Co.	R22 BETA	Mareeba, Aerodrome, Qld
14	09 May 2005	4	200502004	Tech Analysis	Westland Helicopters Ltd	Sea King MK 50	Nias Island, Indonesia
15	18 May 2005	4	200502231	Incident	Piper Aircraft Corp.	PA-31P-350/A2	13km WSW Young, NSW

No	Date of occurrence	Investigation Category	Occurrence number	Occurrence type	Manufacturer	Model	Location
16	03 May 2005	4	200502272	Accident	Fairchild Industries Inc	SA227-AC	Technical Analysis Investigation, Populated place
17	13 May 2005	4	200502316	Incident	Hughes Helicopters	369E	Fig Tree Pocket, Qld
18	07 May 2005	2	200501977	Accident	Fairchild Industries Inc	SA227-DC	12km NW Lockhart River, Aerodrome,Qld
19	20 Jun 2003	3	200302820	Accident	Robinson Helicopter Co	R22 MARINER	13km NW Camden, Aerodrome, NSW
20	08 Nov 2003	3	200304546	Accident	Robinson Helicopter Co	R44	43km NW Kununurra, Aerodrome,WA
21	11 Nov 2003	3	200304589	Accident	Piper Aircraft Corp	PA-34-200	Bankstown, Aerodrome, NSW
22	19 Feb 2004	3	200400610	Accident	Aero Commander Div	500-S	58km NNW Hobart, Aerodrome, Tas.
23	30 May 2004	3	200401917	Accident	Robinson Helicopter Co	R22 MARINER	40km S Tobermorey, (ALA), NT
24	19 Jul 2004	3	200402669	Accident	Bell Helicopter Co	47G-3B1	12km W Wodonga, Vic.
25	28 Jul 2004	3	200402797	Accident	Piper Aircraft Corp	PA-31T	34km SE Benalla, Aerodrome, Vic.
26	30 Jul 2004	3	200402820	Accident	Agusta, SPA, Costruzioni Aeronautiche	A109C	Brisbane, Qld
27	15 Aug 2004	3	200403006	Accident	Mooney Aircraft Corp	M20K	8.5km NNE Caloundra, (ALA), Qld
28	30 Aug 2004	3	200403202	Accident	Cessna Aircraft Company	421C	El Questro, (ALA), WA
29	08 Sep 2004	3	200403351	Accident	Robinson Helicopter Co	R44	56km W Roma, Non Directional Beacon, Qld
30	19 Oct 2004	3	200404085	Accident	FFT GMBH	SC01 B-160	20km SW Saint George, Aerodrome, Qld
31	22 Nov 2004	3	200404590	Accident	Bell Helicopter Co	206B	12km SW Dunedoo, (ALA), NSW
32	06 Jan 2005	3	200500004	Accident	Air Tractor Inc	AT-802A	2.7km ESE Wynella Station, Qld

No	Date of occurrence	Investigation Category	Occurrence number	Occurrence type	Manufacturer	Model	Location
33	07 Mar 2005	3	200501000	Accident	Cessna Aircraft Company	310R	7km WSW Tamworth, Aerodrome, NSW
34	23 Apr 2005	3	200501788	Accident	Cessna Aircraft Company	A150L	7km S Healesville, Vic.
35	15 May 2005	3	200502116	Accident	Champion Aircraft Corp	7GCAA	Stonefield, SA
36	02 Apr 2004	4	200401217	Accident	Bell Helicopter Co	47G-3B1	2.5km NW Brisbane, Aerodrome, Qld
37	15 Jun 2004	4	200402215	Accident	Hiller Aviation	UH-12E	11km W Innisfail, Qld
38	10 Aug 2004	4	200402947	Accident	Piper Aircraft Corp	PA-31-350	4km NW Darwin, Aerodrome, NT
39	27 Sep 2004	4	200403651	Accident	Kawasaki Heavy Industries	47G3B-KH4	11km NE Strahan, Tas.
40	18 Jan 2005	4	200500167	Accident	Beech Aircraft Corp	200	Perth, Aerodrome, WA
41	05 Mar 2005	4	200500993	Accident	Avions Pierre Robin	R-2160	2km W Jandakot, Aerodrome, WA
42	12 May 2005	4	200502078	Accident	Eurocopter International Pacific Limited	EC120B	Shannons Flat, NSW
43	06 Apr 2004	3	200401270	Incident	Airbus	A330-301	Sydney, Aerodrome, NSW
44	02 Aug 2004	3	200402839	Incident	Fairchild Industries Inc	SA227-DC	Perth, Aerodrome, WA
45	25 Aug 2004	3	200403110	Incident	Boeing Co	777-312	Melbourne, Aerodrome, Vic.
46	19 Dec 2004	3	200405118	Incident	Boeing Co	737-86N	Canberra, Aerodrome, ACT
47	01 Apr 2004	4	200401353	Incident	British Aerospace Plc	3201	65km E Mount Gambier, VOR, SA
48	27 May 2004	4	200401904	Incident	Boeing Co	737-700	41km SSE Cairns, Aerodrome, Qld
49	22 Jun 2004	4	200402291	Incident	Cessna Aircraft Company	404	28km SE Tumut, Aerodrome, NSW
50	13 Jul 2004	4	200402667	Incident	Fairchild Industries Inc	SA227-DC	28km E Ceduna, Aerodrome, SA

No	Date of Occurrence	Investigation Category	Occurrence number	Occurrence type	Manufacturer	Model	Location
51	28 Jul 2004	4	200402819	Incident	British Aerospace Plc	BAe 146-100	Pecan, (IFR)
52	30 Aug 2004	4	200403209	Incident	Fairchild Industries Inc	SA226-T	28km W Mount Mcquoid, VOR, NSW
53	21 Oct 2004	4	200404178	Incident	Boeing Co/Beech Aircraft Corp.	737-76N/58	65km SE Alice Springs, Aerodrome, NT
54	22 Oct 2004	4	200404214	Incident	Boeing Co.	747-338	Istem, (IFR)
55	01 Nov 2004	4	200404287	Incident	Boeing Co/Lockheed Georgia Co.	767-336/C-130J	9km ENE Sydney, Aerodrome, NSW
56	09 Nov 2004	4	200404436	Incident	de Havilland Canada	DHC-8-315	64km SSW Casino, Non Directional Beacon, NSW
57	28 Nov 2004	4	200404707	Incident	Boeing Co/Boeing Co.	747-400/ 747-438	278km NW NIKOM, (IFR)
58	09 Dec 2004	4	200405064	Incident	Airbus	A330-301	Singapore, Changi, Aerodrome
59	18 Jan 2005	4	200500145	Incident	Saab Aircraft AB/ de Havilland Canada	SF-340B/ DHC-8-102	Albury, VOR, NSW
60	21 Jan 2005	4	200500222	Incident	de Havilland Canada	DHC-6 SERIES 200	Wilton, (ALA), NSW
61	25 Jan 2005	4	200500302	Incident	Boeing Co.	727	Brisbane, Aerodrome, Qld
62	31 Jan 2005	4	200500355	Incident	de Havilland Canada/ McDonnell Douglas Corporation	DHC-8-202/ F/A-18A	Williamtown, Aerodrome, NSW
63	01 Feb 2005	4	200500382	Incident	Boeing Co.	737-838	Sydney, Aerodrome, NSW
64	02 Feb 2005	4	200500395	Incident	de Havilland Canada	DHC-8-315	130km SSE Tamworth, Aerodrome, NSW
65	10 Feb2 005	4	200500860	Incident	de Havilland Canada	DHC-8-315	45km WNW Maleny, VOR, NSW
66	15 Feb 2005	4	200500654	Incident	de Havilland Canada	DHC-8-102	Hamilton Island, Aerodrome, Qld

No	Date of occurrence	Investigation Category	Occurrence number	Occurrence type	Manufacturer	Model	Location
67	17 Feb 2005	4	200500719	Incident	Boeing Co.	737-838	83km E Adelaide, VOR, SA
68	19 Feb 2005	4	200500778	Incident	de Havilland Canada	DHC-8-102	Sydney, Aerodrome, NSW
69	03 Mar 2005	4	200500925	Incident	Fokker B.V.	F27 MK 50	11km ENE Perth, Aerodrome, WA
70	04 Mar 2005	4	200500994	Incident	Boeing Co	737-86N	Melbourne, Aerodrome, Vic.
71	06 Apr 2005	4	200501392	Incident	de Havilland Canada/Boeing Co.	DHC-8-102/ 737-800	37km S Proserpine, VOR, Qld
72	28 Apr 2005	4	200501912	Incident	Embraer-Empresa Brasileira de Aeronautica	EMB-120 ER	36km SE Marymia, (ALA), WA
73	30 Apr 2005	4	200501921	Incident	Boeing Co/Cessna Aircraft Company	717-200/A152	Hobart, Aerodrome, Tas.
74	30 Apr 2005	4	200501905	Incident	Beech Aircraft Corp.	V35A	15km N Benalla, Aerodrome, Vic.
75	25 Jun 2005	4	200502968	Incident	Aero Commander Div/ de Havilland Canada	500-S/DHC-8-315	Cairns, Aerodrome, Qld
76	21 Nov 2004	3	200404589	Serious Incid.	Fairchild Industries Inc.	SA227-AC	33km ENE Canberra, Aerodrome, ACT
77	14 Apr 2005	3	200501628	Serious Incid.	Boeing Co/Aero Commander Div.	737-700/500-S	Brisbane, Aerodrome, Qld
78	19 Apr 2005	3	200501720	Serious Incid.	de Havilland Canada/Boeing Co.	DHC-8-202/747	90km E Sydney, Aerodrome, NSW
79	17 May 2005	3	200502137	Serious Incid.	Boeing Co.	717-200	Hobart, Aerodrome, Tas.
80	30 May 2005	3	200502400	Serious Incid.	Boeing Co.	747-300	Sydney, Aerodrome, NSW
81	10 Aug 2004	4	200402948	Serious Incid.	Boeing Co.	717-200	22km SSE Melbourne, Aerodrome, Vic.

No	Date of occurrence	Investigation Category	Occurrence number	Occurrence type	Manufacturer	Model	Location
82	07 Sep 2004	4	200403333	Serious Incid.	Beech Aircraft Corp	B300	13km WNW Theodore, Qld
83	08 Oct 2004	4	200403825	Serious Incid.	de Havilland Canada	DHC-8-102	Gold Coast, Aerodrome, Qld
84	130 ct 2004	4	200403956	Serious Incid.	Cessna Aircraft Company/ Piper Aircraft Corp	182R/PA-28-151	11km SW Jandakot, Aerodrome, WA
85	07 Dec 2004	4	200404857	Serious Incid.	Bombardier Aerospace	Learjet 45 Aerodrome, Qld	130km NW Maroochydore/Sunshine Coast, Qld
86	24 Apr 2005	4	200501819	Serious Incid.	Airbus	A340	Perth, Aerodrome, WA

Appendix 6: ATSB Aviation Recommendations to CASA and Airservices with the Status of Open or No Response

Recommendation	Description	Issue date	Receiving organisation	Response due	Status of response
R20000130*	The Australian Transport Safety Bureau recommends that the Civil Aviation Safety Authority identify and adopt an appropriate specification for each grade of fuel that is approved for use in Australia, or in aircraft on the Australian civil register.	04 Aug 2003	Airservices Australia	03 Oct 2003	Open
R20000131*	The Australian Transport Safety Bureau recommends that the Civil Aviation Safety Authority, either by itself, or in cooperation with other organisations, develop a process to satisfy itself that fuel that is fit for purpose is consistently supplied to aircraft.	30 Mar 2001	Civil Aviation Safety Authority	4 Mar 2002	Open
R20000132*	The Australian Transport Safety Bureau recommends that the Civil Aviation Safety Authority develop appropriate lines of communication to ensure that it is made aware in a timely manner of information relating to the management of situations related to fuel quality that could affect the safety of flight.	30 Mar 2001	Civil Aviation Safety Authority	4 Mar 2002	Open

Recommendation	Description	Issue date	Receiving organisation	Response due	Status of response
R20000133*	The Australian Transport Safety Bureau recommends that the Civil Aviation Safety Authority ensure that prior to any significant devolution or change in regulatory process, appropriate measures are taken to ensure that aviation safety is not diminished.	30 Mar 2001	Civil Aviation Safety Authority	4 Mar 2002	Open
R20000186*	*The Australian Transport Safety Bureau recommends that the Civil Aviation Safety Authority review its relationship with other regulatory bodies to clarify the limits of their respective regulatory powers and responsibilities with respect to aviation fuels, to ensure that aviation safety issues are effectively regulated.	30 Mar 2001	Civil Aviation Safety Authority	4 Mar 2002	Open

Note ** CASA's initial response to these recommendations in March 2002 advised that CASA would not be in a position to respond to the content and recommendation of the ATSB Avgas report until such time as a portfolio response to the Senate Rural and Regional Affairs and Transport Report into matters relating to aviation fuel has been finalised.*

Appendix 7: Accident procedures and categorisation

Aviation

Procedures

The *Transport Safety Investigation Act 2003* forms the basis of procedures followed by the Bureau. The ATSB uses the categories below when prioritising its aviation investigations to meet international obligations and achieve the most important safety outcomes within its given budget.

Decision Guidelines for Accident/Incident Categorisation

The ATSB is resourced each year to undertake a finite number of aviation investigations. It is acknowledged, however, that an occurrence with a large number of deaths would represent a 'major accident' and supplementary funding may be required.

In categorising aviation transport safety matters and selecting which of those the ATSB should investigate, the decision-makers consider:

1. The potential safety value that may be gained by conducting an investigation;
2. On board fatalities and/or serious passenger injuries;
3. The public profile of the occurrence;
4. The extent of resources available and projected to be available; and, in the event of conflicting priorities,
5. Any risks associated with not investigating; and
6. The requirement under s21(2) of the TSI Act for the Executive Director to publish reasons (justification) for discontinuing an investigation where an investigation has already commenced.

The following broad hierarchy should also be taken into account when making the decision to initiate and categorise an investigation:

1. Passenger operations;
2. Freight and other commercial operations; and
3. Non-commercial operations.

The decision to investigate will also have regard as to whether, in the absence of an ATSB investigation, a credible safety investigation is likely.

In view of these considerations, initiation of a formal ATSB investigation can only be made at or above Team Leader level after discussion and agreement with the Deputy Director and Executive Director. Each investigation will be categorised on a scale of 1 – 5 (see below).

Following the initial assessment of an occurrence a decision will be made whether or not to conduct a field investigation. Unless otherwise agreed by the Executive Director, all occurrences will initially be categorised at level 4. Subsequently an investigation may be upgraded or downgraded. The decision to upgrade (and commit extra resources) or to downgrade must be made at Deputy Director level or above after discussion with the Executive Director. Any decision to discontinue an investigation must be endorsed by the Executive Director.

The following guidance on the categorisation of aviation transport safety matters is intended to serve as a suggested starting point based on initial information. This guidance is not intended to cover all possible scenarios but illustrates a broad range of typical events. It is expected that judgment will be required in order to categorise some events which do not neatly fit these categories or where the circumstances, potential safety value and available resources suggest that they should be assigned a different category.

Aviation Category 1

- An *accident* involving one or more High Capacity Air Transport (scheduled and non-scheduled) passenger aircraft *with fatalities.*
- An *accident* involving one or more High Capacity Air Transport (scheduled and non-scheduled) passenger aircraft *without fatalities*
  - *where there was a significant risk of fatalities or serious injuries and a substantial commitment of investigative resources is likely to significantly mitigate future High Capacity Air Transport accidents and funding is available for an investigation under this category.*
- A *serious incident* (as defined by ICAO see Attachments A & B) involving one or more High Capacity Air Transport (scheduled and non-scheduled) passenger aircraft

- *where there was a significant risk of fatalities or serious injuries and a substantial commitment of investigative resources is likely to significantly mitigate future High Capacity Air Transport (scheduled and non-scheduled) accidents and funding is available for an investigation under this category.*

Aviation Category 2

- An *accident* involving one or more High Capacity Air Transport cargo aircraft *with fatalities and serious injuries*.
- An *accident* involving one or more High Capacity Air Transport cargo aircraft *without fatalities* and *serious injuries*
  - *where there was a significant risk of fatalities or serious injuries and a substantial commitment of investigative resources is likely to significantly mitigate future High Capacity Air Transport cargo aircraft accidents and funding is available for an investigation under this category.*
- An *accident* involving one or more Low Capacity Air Transport (scheduled) passenger aircraft *with a significant number of fatalities* (for example, it may involve more than five fatalities) and serious injuries.
- An *accident* involving one or more Low Capacity Air Transport (scheduled) passenger aircraft *without fatalities* or *with a relatively low level of fatalities* (eg less than five) and serious injuries
  - *where there was a significant risk of more fatalities or serious injuries and a substantial commitment of investigative resources is likely to significantly mitigate future Low Capacity Air Transport (scheduled) accidents and funding is available for an investigation under this category.*
- A *serious incident* (as defined by ICAO see Attachments A & B) involving one or more Low Capacity Air Transport (scheduled) passenger aircraft
  - *where there was a significant risk of multiple fatalities (eg more than five) and serious injuries and a substantial commitment of investigative resources is likely to significantly mitigate future Low Capacity Air Transport (scheduled) accidents and funding is available for an investigation under this category.*
- An *accident* involving one or more Low Capacity charter (non-scheduled) aircraft with fare-paying passengers and *multiple fatalities* and serious injuries (for example it may involve more than five fatalities)

- *where a substantial commitment of investigative resources is likely to significantly mitigate future Low Capacity Air Transport (scheduled) and charter (non-scheduled) accidents and funding is available for an investigation under this category.*

Aviation Category 3

- An *accident* involving one or more Low Capacity Air Transport passenger (scheduled) or charter (non-scheduled) aircraft with fare-paying passengers with *fatalities* and/or serious injuries not classified as a category 2 investigation.
- An *accident* involving Air Transport cargo operations with *fatalities*.
- An *accident* involving one or more training aircraft with *fatalities* and where investigation is likely to significantly mitigate future accidents and funding is available for an investigation under this category.
- An *accident* (as defined by ICAO, see Attachment A) *without fatalities* involving one or more High or Low Capacity Air Transport aircraft not classified as a category 1 or 2 investigation and where investigation is likely to significantly mitigate future accidents and funding is available for an investigation under this category.
- An *accident* involving one or more general aviation aircraft (other than sport aviation) with *fatalities* where investigation is likely to significantly mitigate future accidents and funding is available for an investigation under this category.
- An a*ccident* involving one or more charter or other general aviation aircraft
  - *where there was a significant risk of fatalities or serious injuries and a substantial commitment of investigative resources would significantly mitigate accidents and funding is available for an investigation in this category.*
- A *serious incident* (as defined by ICAO see Attachments A & B) involving one or more High or Low Capacity Air Transport aircraft not classified as a category 1 or 2 investigation and where investigation is likely to significantly mitigate future accidents and funding is available for an investigation under this category.
- A *serious incident* (as defined by ICAO see Attachments A & B) involving one or more Air Transport cargo, charter or training aircraft where investigation is likely to significantly mitigate

future accidents and funding is available for an investigation under this category.

Aviation Category 4

- An *accident* involving a foreign aircraft covered by Article 26 of the Chicago Convention that is not being investigated as category 1, 2, or 3.
- An *accident* involving aircraft (other than sport aviation) with fatalities where available resources and future safety considerations do not allow for a more detailed investigation.
- An *accident or serious incident* (as defined by ICAO, see Attachments A & B) involving Australian designed and manufactured aircraft types on the Australian Register with international safety implications not being investigated as category 1, 2, or 3.
- An *accident or serious incident* (as defined by ICAO, see Attachments A & B) involving one or more High or Low Capacity Air Transport aircraft not being investigated as category 1, 2, or 3 and funding is available for an investigation.
- An *accident* (as defined by ICAO, see Attachment A) involving one or more charter or general aviation aircraft without fatalities
  - *where a limited commitment of investigative resources could significantly mitigate future aviation accidents and funding is available for an investigation.*
- A *serious incident* (as defined by ICAO, see Attachments A & B) involving one or more non Air Transport aircraft
  - *where a limited commitment of investigative resources could significantly mitigate future accidents and funding is available for an investigation.*

Aviation Category 5

- An *accident* (including with *fatalities*) or *serious incident* involving a sport aviation aircraft unless foreign and required to be investigated under *Article 26* of the Chicago Convention.
- An *accident* involving aircraft *without fatalities*
  - *where the potential safety lessons do not, after initial review, justify the commitment of investigative resources within available funds. Basic incident data will be filed for statistical purposes.*

- A *serious incident* or *incident* involving aircraft
  - *where the potential safety lessons do not, after initial review, justify the commitment of investigative resources within available funds. Basic incident data will be filed for statistical purposes.*

Marine

Decision Guidelines for Accident/Incident Categorisation

The ATSB is resourced each year to undertake a finite number of marine investigations. It is acknowledged, however, that an occurrence with a large number of passenger fatalities or which results in major pollution of the Great Barrier Reef or other sensitive area would represent a 'major accident' that may require supplementary funding.

In categorising marine transport safety matters and selecting which of those the ATSB should investigate, decision-makers consider:

1. The potential safety value that may be gained by conducting an investigation;
2. Obligations under international conventions;
3. Recommendations stemming from IMO Assembly resolutions and Committee circulars;
4. The public profile of the occurrence;
5. Whether the occurrence is part of an identifiable trend;
6. The extent of resources available and projected to be available in the event of conflicting priorities and the extent of any investigation backlog;
7. Any risks associated with not investigating; and
8. The requirement under s21(2) of the TSI Act for the Executive Director to publish reasons (justification) for discontinuing an investigation where an investigation has already commenced.

The following broad hierarchy should also be taken into account when making the decision to initiate and categorise an investigation:

1. On-board fatalities and/or serious passenger injuries;
2. The pollution of environmentally sensitive areas;

3. Ships subject to significant structural damage;

4. Occurrences which disrupt, or have the potential to disrupt, major port operations; and

5. Occurrences that do not involve any of the above, but where the requirements of the International Safety Management Code may reasonably be anticipated to have been breached.

The decision to investigate will also have regard as to whether, in the absence of an ATSB investigation, a credible safety investigation by another organisation is likely.

In view of these considerations, initiation of a formal ATSB investigation can only be made at or above Team Leader level after discussion and agreement with the Deputy Director and/or Executive Director. Each investigation will be categorised on a scale of 1 – 5 (see below).

Following the initial assessment of a marine transport safety matter a decision will be made whether or not to conduct a field investigation. Unless otherwise agreed by the Executive Director, all occurrences will initially be categorised at level 4. Subsequently an investigation may be upgraded or downgraded. The decision to upgrade (and commit extra resources) or to downgrade must be made at Deputy Director level or above after discussion with the Executive Director. Any decision to discontinue an investigation must be endorsed by the Executive Director.

In assessing initial and developing action on any marine investigation due regard shall be had to the IMO requirements relating to reports on marine casualties and incidents, MSC Circ.953/MEPC Circ 372. This circular outlines the IMO reporting requirements, based on 'very serious', 'serious' and 'less serious' casualties and incidents.

For the purpose of reporting information to the Organisation, ship casualties are classified as 'very serious casualties', 'serious casualties', 'less serious casualties' and 'marine incidents'. Administrations are requested to submit data for all 'very serious casualties' and 'serious casualties'.

Where there are important lessons to be learned from 'serious casualties', 'less serious casualties' and 'marine incidents', full investigation reports should be submitted along with the additional information indicated in annex 3.

Marine Category 1

- An *accident* involving one or more ships resulting in large scale fatalities.

Marine Category 2

- An *accident* involving major pollution of an area of recognised environmental sensitivity such as the Great Barrier Reef.
- The total loss of an Australian ship with loss of life.
- An *accident* involving multiple fatalities.

Marine Category 3

- An *accident* involving one or more vessels involving serious injury.
- An *accident* involving one or more vessels that resulted in pollution of the marine environment or potential pollution of an area of particular environmental sensitivity.
- A failure of a structural member of a ship so as to render the ship unseaworthy.
- The loss, presumed loss, or abandonment of a ship.
- A collision between two ships so that the watertight integrity of one or both vessels is compromised.
- Fire aboard a ship that compromises the seaworthiness of a ship.
- The failure of the main engine, steering gear, or electrical generating system that renders the ship disabled, requiring external assistance to bring the ship to a place of safety.

Marine Category 4

- Collision of a ship with another ship or fishing vessel where the damage to either vessel is significant. An accident involving one or more vessels without fatalities or serious injuries and without substantial property damage where investigation is likely to contribute to mitigating future accidents.
- A ship stranding or grounding.
- Fire aboard ship where the seaworthiness of the ship is not affected
- Contact damage with a navigation aid or port infrastructure.

- Loss of stability such that the ship and its crew are imperilled.
- A ship or other vessel involved in a near collision, near stranding.
- A serious breach of the ISM Code.

When a decision has been made to investigate, marine investigations are initially categorised as Category 4. Following any filed investigation, the level of investigation will be assessed for the relative benefits to the maritime community and the general public. Any decision to upgrade or downgrade will be made on the recommendation of the Deputy Director in consultation with the Director and/or the Executive Director.

Marine Category 5

- An *accident* or *serious incident* where another competent body will be conducting an investigation and available resources do not warrant an ATSB investigation.
- An *accident* involving one or more vessels without fatalities or significant pollution, where the potential safety lessons do not, after initial review, justify the commitment of investigative resources within available funds. Data will be filed for statistical purposes.
- An *accident* involving contact with navigational or port infrastructure, where the seaworthiness of the ship is not compromised.
- An *accident* or *serious incident* involving a minor breach of the ISM Code.

Rail

Decision Guidelines for Accident/Incident Categorisation

The ATSB is resourced each year to undertake a finite number of rail investigations on the Defined Interstate Rail Network (DIRN). It is acknowledged, however, that an occurrence with a large number of deaths (not including an occurrence that was primarily a road accident) would represent a 'major accident' and supplementary funding may be required.

In categorising rail transport safety matters and selecting which of those the ATSB should investigate, the decision-makers consider:

1. The potential safety value that may be gained by conducting an investigation;
2. On board fatalities and/or serious passenger injuries;
3. The public profile of the occurrence;
4. The extent of resources available and projected to be available; and, in the event of conflicting priorities,
5. Any risks associated with not investigating; and
6. The requirement under s21(2) of the TSI Act for the Executive Director to publish reasons (justification) for discontinuing an investigation where an investigation has already commenced.

The following broad hierarchy should also be taken into account when making the decision to initiate and categorise an investigation:

1. Passenger operations;
2. Freight and other commercial operations; and
3. Non-commercial operations.

The decision to investigate will also have regard as to whether, in the absence of an ATSB investigation, a credible safety investigation is likely.

In view of these considerations, initiation of a formal ATSB investigation can only be made at or above Team Leader level after discussion and agreement with the Deputy Director and/or Executive Director. Each investigation will be categorised on a scale of 1–5 (see below).

Following the initial assessment of a rail transport safety matter a decision will be made whether or not to conduct a field investigation. Unless otherwise agreed by the Executive Director, all occurrences will initially be categorised at level 4. Subsequently an investigation may be upgraded or downgraded. The decision to upgrade (and commit extra resources) or to downgrade must be made at Deputy Director level or above after discussion with the Executive Director. Any decision to discontinue an investigation must be endorsed by the Executive Director.

In relation to any ATSB investigation requested under state or NT legislation the Executive Director's approval to initiate the

investigation is required. Where the ATSB reviews an investigation undertaken by another credible body (eg an independent investigation commissioned by a state rail regulator or the ARTC) and wishes to publish the report in the interests of future safety and permission to do so is given, such a report could be published by the Executive Director under the TSI Act with proper attribution.

The following guidance on the categorisation of rail transport safety matters is intended to serve as a suggested starting point based on initial information. This guidance is not intended to cover all possible scenarios but illustrates a broad range of typical events. It is expected that judgment will be required in order to categorise some events which do not neatly fit these categories or where the circumstances, potential safety value and available resources suggest that they should be assigned a different category.

Rail Category 1

- An *accident* involving one or more trains resulting in large scale fatalities and serious injuries, property damage and intense public interest.

Rail Category 2

- An *accident* involving one or more trains with five or more fatalities (except where it is primarily a road accident) plus serious injuries, property damage and intense public interest.

Rail Category 3

- An *accident* involving one or more trains with less than five fatalities (except where it is primarily a road accident), serious injuries and property damage.
- An *accident* involving one or more trains with serious injuries and property damage (except where it is primarily a road accident) where there was a significant risk of fatalities or serious injuries ('on-train' or 'off-train'), substantial property damage and a substantial commitment of investigative resources is likely to significantly mitigate the possibility of future accidents.
- A *serious incident* involving one or more trains and/or failure of a safety management system where there was a significant risk of multiple fatalities and serious injuries and a substantial commitment of investigative resources is likely to significantly mitigate future passenger train accidents.

- An *accident* involving one or more trains at an active level crossing where an investigation is likely to significantly mitigate future accidents.
- Occurrences indicating a trend that may involve serious safety deficiencies.

Rail Category 4

- An *accident* involving one or more trains without fatalities or serious injuries and without substantial property damage where investigation is likely to contribute to mitigating future accidents.
- A *serious incident* involving one or more trains and/or failure of a safety management system where a limited commitment of investigative resources could contribute to mitigating future accidents.
- An *accident* involving one or more trains at a passive level crossing where a limited commitment of investigative resources could mitigate future accidents.
- Any other significant safety occurrence not included in the preceding categories.

Rail Category 5

- An *accident* or *serious incident* where another competent body will be conducting an investigation and available resources do not allow for an ATSB investigation.
- An *accident* involving one or more trains without fatalities where the potential safety lessons do not, after initial review, justify the commitment of investigative resources within available funds. Data will be filed for statistical purposes.
- An *accident* involving one or more trains with 'off-train' fatalities at a passive level crossing which is primarily a road accident.
- An *accident* or *serious incident* involving one or more trains and/or failure of a safety management system where the

potential safety lessons do not, after initial review, justify the commitment of investigative resources. Data will be filed for statistical purposes.

Australian Government

Australian Transport Safety Bureau

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Australian Goverment
Department of Transport and Regionl Services