

Transport Accident Investigation Commission

2006 ANNUAL REPORT

Transport Accident Investigation Commission

Te Komihana Tirotiro Aitua Waka

Annual Report for the period 1 July 2005 to 30 June 2006

Presented to the House of Representatives
as required by section 150 of the Crown Entities Act 2004.

27 October 2006

Minister of Transport

Parliament Buildings

WELLINGTON

Dear Minister,

In accordance with section 150 of the Crown Entities Act 2004, the Commission is pleased to submit, through you, its 16th Annual Report to Parliament for the period 1 July 2005 to 30 June 2006.

Yours faithfully,

Hon. W P Jeffries
Chief Commissioner

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The Commission

The Transport Accident Investigation Commission is New Zealand's independent transport accident investigation agency investigating aviation, rail, and maritime accidents and serious incidents. The Commission operates under the Transport Accident Investigation Commission Act 1990 as a standing Commission of Inquiry. The Commission is also an independent crown entity as defined in section 7 of the Crown Entities Act 2004.

The Commission: Bryan Wyness (Commissioner), Hon. Bill Jeffries (Chief Commissioner), Pauline Winter (Deputy Chief Commissioner).

The Commission's Contribution to the Transport System

The Commission inquires into certain accidents and serious incidents in the aviation, rail, and maritime sectors to prevent similar occurrences in the future.

The Commission is one of 6 crown entities in the New Zealand transport sector. It is the transport sector's only independent crown entity. The Commission's independence is regarded as a necessary condition to ensuring a confidential environment for inquisitorial investigations where blame is not to be ascribed. In this respect the Commission's role and functions complement the activities of the 3 regulating crown entities, which as agents of the crown are obliged to give effect to government policy. The regulators enforce compliance of rules for safety, as well as promoting safety, whereas the Commission advises on the learning's from its inquiries into accidents and serious incidents through publication of its findings, and making safety recommendations for the improvement of transport safety. In reporting on its findings it may determine weaknesses in government policy.

Aside from its functional activities the Commission participates in the transport sector's collaborative planning forums. The lead group for the sector's planning is the Board Reference Group, made up of board members from each agency. The Board Reference Group is supported by the Planning Task Force, made up of officials from each agency.

In 2005 the sector oversaw 3 major initiatives across the whole government transport sector. These were developing:

- the Transport Sector Strategic Directions document (TSSD)
- the Sector Monitoring and Indicators Framework
- integrated strategic documents.

The Commission was pleased to participate in the forums, and will continue to support collective planning as appropriate, given its statutory role.

The Commission is charged with determining the circumstances and causes of accidents and incidents with a view to avoiding similar occurrences in the future, rather than to ascribe blame to any person.

The Commission comprises 3 Commissioners; a Chief Commissioner, Deputy Chief Commissioner, and a Commissioner, each of whom are appointed by the Governor-General on the recommendation of the Minister of Transport for terms of 3 years or more. For the purposes of the Crown Entities Act 2004 the Commissioners are also deemed board members of the Transport Accident Investigation Commission, with the Chief Commissioner as chairperson.

The Commission is supported by an administration comprising the Chief Executive of the crown entity, an investigative team, an administrative staff, and assessors appointed to assist the Commission in its determinations.

Members of the Commission are:

Hon. Bill Jeffries – Chief Commissioner
Appointed June 1997

Mr Jeffries is a Wellington barrister practising in civil and commercial litigation. He is a former Minister of Transport, Civil Aviation and Meteorological Services, and is also a former Minister of Justice. In 1995 the Swedish government appointed Mr Jeffries as Honorary Consul-General for Sweden. Also most recently he has been the Chairman of the International Transport Safety Association, a grouping of similar bodies to the Commission.

Pauline Winter – Deputy Chief Commissioner
Appointed September 2001

Ms Winter has her own consultancy business INTERPACIFIC Limited. She is the former Chief Executive of Workbridge Inc and a board member of the Legal Services Agency, the Auckland Festival Trust and the Growth and Innovation Advisory Board. She is a member of the UNITEC and NACEW (National Advisory Council on the Employment of Women) Councils. She was recently appointed to Chair NACEW and she chairs the Pacific Business Trust and is a member of the Committee for Auckland.

Bryan Wyness – Commissioner
Appointed November 2004

Mr Wyness's industry knowledge is primarily aviation related with particular knowledge in flight safety along with his skills as a Flying Instructor, Flight Superintendent, Fleet Captain and Flight Operations Manager (Technical). He also holds a Bachelor of Science degree and an Airline Transport Pilot Licence and Flight Navigator qualification. He is the former Vice President Flight Operations of Air New Zealand. He has held appointments with the International Advisory Committee of the Flight Safety Foundation and is a Fellow of the Royal Aeronautical Society.

Chief Commissioner's Overview

Aviation

This is the 16th Annual Report to the Minister of Transport of the Transport Accident Investigation Commission. It is perhaps timely to reflect on the larger developments driving the actual performance of the statutory duties of the Commission. These duties are to investigate judicially, inquisitorially, independently, and on a scientific/forensic basis, the facts of a transport accident or incident in order to discover the lesson or lessons which may serve the New Zealand public and others to prevent a similar occurrence in the future. The Commission's mission is to extract positive value from negative or potentially negative events involving priceless human lives and lost wealth.

What generally has the Commission learned in the 16 years of meeting the heavy responsibilities of its statutory function? I shall sketch out our lessons learned. I begin with the precipitating event of an inquiry.

Standing at the smoking ruins of an aircraft crash or railway accident or observing that the "cruel" sea has captured another vessel with the drowning of those "who sailed upon her", the Commission's investigators begin an ordered process of inquiry in accordance with the statute and international practice standards.

The essence of the process of inquiry is to wind-back the accident chain of events, similar to reversing a movie film. The new development of thinking, which I record in this broad over-view, is the Commission's growing realisation that the process of inquiry into the causes of and accident, or incident, must penetrate further and further back in time.

This is because such deeper retrospective analysis into the genesis leads to better understanding of significant causes. All transport involves the inter-action of often quite sophisticated transport technology, planes, ships and trains,

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the people who own, manage and operate these transport vehicles and the general environment within which they function, which includes communications infrastructures serving the operation.

Transport operations may for the purpose of analysis, be described as the "out-put" of an organisation. Therefore, the functioning of the transport organisation itself is an early and essential part of the chain of events which lead to the accident or incident under examination by the Commission.

The next question is, what criteria should the Commission adopt to assess whether the transport organisation is functioning in a way which may have contributed to the accident or incident under examination?

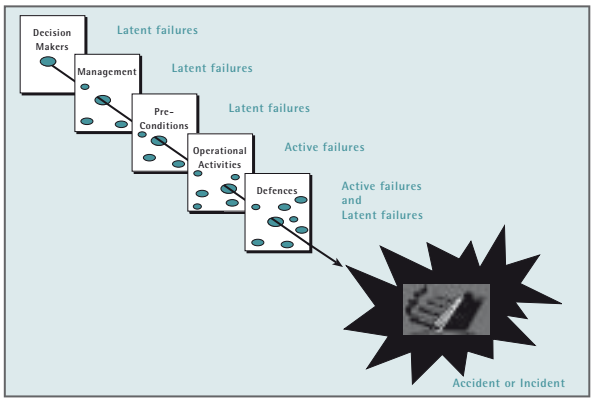
The international leaders in the theory of accident investigation have defined these very criteria by which the Commission's investigators may assess whether or not the transport organization's function, policies, practices, procedures or management may have in some vital respect, contributed to, or caused, the accident or investigation under examination.

The first influential international thinker in this respect, is Professor James Reason of the United Kingdom. The "Reason Model" of assessment of the transport organisation's functioning may briefly be summarised as being based on the premise that, within any given transport organisation, "latent pathogens" – unseen, unsafe conditions – tend to build up before an accident or unsafe event occurs. The dangerous pathogens lie dormant in any transport organisation, and information flow is the means by which these unsafe conditions are spotted or acted upon. Understanding of these "pathogens" and their role in accidents or incidents yields very high value lessons.

Hon. WP Jeffries
Chief Commissioner

Professor Reason's famous metaphor involves the "Swiss-cheese" model whereby the accident "arrow" penetrates through the succession of "holes" in what ought to be defences, causing the final accident or incident.

The other leading thinker in this area is Professor Ron Westrum (US – Eastern Michigan University) who advises that an investigator can judge the organisation and its members for accident investigation purposes by the way it or they respond to information (about the latent, or indeed open, pathogens).



The James Reason "Swiss cheese" model of accident causation.

According to Professor Westrum, there are 3 broad categories of response: the worst is the "pathological" response which is stupid denial. The next, and the most common, is a "bureaucratic" response whereby they or it in the organisation

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respond to vital safety information by recording but not analysing for significance. For example, the post 9/11 syndrome used against the American Central Intelligence Agency and the Federal Bureau of Investigation, – the failure to "join the dots", that is, connect the events into a meaningful conclusion, illustrate the pitfalls of the dull bureaucratic response to early warning signals or "pathogens".

The best response is the "generative response" whereby latent pathogens are quickly spotted and corrected. A "generative" transport organisation is eternally vigilant, every working moment identifying and responding to early warning signals so that pre-emptive action to avoid an accident can be taken. These "learning organisations" are safer in their operation than those which do not operate according to such standards.

The overall justification for the Commission in adopting the Reason/Westrum accident investigation philosophy is because our statute demands that the Transport Accident Investigation Commission conduct its investigations in order to avoid recurrence of similar events.

These philosophies assist in that task. Another new development is the use of technology in providing evidence.

In March 2006, accompanied by the Deputy Chief Commissioner Pauline Winter and the newly appointed Chief Executive, Lois Hutchinson, I attended the annual meeting of the International Transport Safety Association in Canberra, Australia.

A high-light was meeting and hearing Dr David Warren, the Australian inventor of the "black-box", the instrument which records the voices of the pilots in aircraft and which is built in such a way as to withstand the huge physical trauma of an aircraft accident. With this surviving voice information, and flight data investigators are provided with vital clues to assist them in the investigation of the aircraft accident.

Building on the pioneer work of Dr David Warren in the 1950's, information in crash-proof form is now available which describes in vast detail the actual workings of all the vital systems of the aircraft. The "black-box", which is actually painted orange, is now available for shipping and railway operators as well.

"Generative", that is, astute transport operators, interrogate operational data from these various recording devices in a comprehensive way, to learn valuable safety lessons which can avoid accidents. Air New Zealand has such a programme.

A further development relates to human performance. An aviation concept is "crew resource management" or "CRM" whereby cockpit crews are trained to act jointly in critical situations in order to tap the knowledge of all the responsible participants. This "CRM" model is now being introduced into maritime operations and also to the railway sector. The art is to reconcile the necessary hierarchy of the prime responsibility of a Captain, with the recognition that better decisions in crisis often result from a collegial approach. Separately, current medical scientific insights into "micro sleep" and performance impairment caused through inadequate sleep, casts more and more light on the Commission's understanding of the conduct of some personnel in transport operations.

In summary, the development of deeper investigation back into the accident or incident chain of events, using the Reason/Westrum models of assessing the part played by the transport organisation from which the transport operation emerges, together with increasing use of high technology data recording devices, means the Commission is better able to fulfil its mission of turning negative events into positive lessons in order to avoid a repeat occurrence. The Transport Accident Investigation Commission continually challenges itself, to meet the high responsibilities placed upon it, by its statute and to serve you, as Minister of Transport, in the aim of building a safe New Zealand.

The conscientious interest in the Commission by the Minister for Transport Safety, the Hon. Harry Dunyhoven, as well as your immediate attention and action in respect of substantive extensions of the Commission's safety mandate, is appreciated by the Commission.

The Commission records its appreciation of John Goddard, Aviation Investigator of 24 years standing, and Captain John Mockett, Chief Investigator of Accidents, who have both retired from the Commission in this year. Both these men's work for the Commission has helped make New Zealand transport safer.

Hon. W P Jeffries
Chief Commissioner

Hon. W P Jeffries (Chief Commissioner), Lois Hutchinson (Chief Executive), Pauline Winter (Deputy Chief Commissioner) with Dr David Warren, the Australian inventor of the cockpit voice recorder.

Chief Executive's Report

Marine

The year in review commenced with a surge in notifications in all modes under the Commission's mandate. Overall notifications increased 36% on last year. Marine notifications in particular increased 67%. It is pleasing to think that the safety messages are manifestly getting across to transport operators so that self reporting of incidents is on the increase. However, the increase in marine notifications can be linked to the environmental pressure group "Guardians of the Sound" activities protesting about the speed of ferries moving through the Marlborough Sounds. A surge in notifications occurred early in the reporting year, with a discernable downward trend thereafter. Notifications had slowed 14% by June. So, perhaps counter intuitively, there remains a question as to the extent of under reporting of accidents and incidents in our transport modes of interest, particularly marine.

The Commission launched fewer investigations in the year. Although the Commission's information systems at present do not readily support deep enquiry into categories of occurrences, the Commission is working to remedy the situation through its future work programme. However, the information available to the Commission does suggest that the number of significant accidents and incidents in all three modes is decreasing. The Commission has just in this last year adopted a more focused approach to monitoring accident and incident trends but it is too early for us to draw substantive conclusions on the data available to us. We have set a baseline for reporting so we now will be able to evaluate the data with greater confidence going forward.

With investigation numbers down the Commission made the most of the opportunity to clear a backlog of cases. Reports produced by the Commission increased 26% on last year,

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dropping the level of open cases from 50 at June 2005 to 26 at June 2006.

The Commission ended the financial year with a deficit. The deficit was difficult to avoid, arising as it did from the Commission's decision to recover the fishing vessel *Kotuku* from Foveaux Strait in April. Recovery of wreckage from seas and mountains is resource intensive in terms of labour, equipment and time. This begs the question "Why do it?" The answer lies with the remarks made by Chief Commissioner Hon. Bill Jeffries in his overview. New Zealand has already placed positive value on learning lessons from adverse events so as to reduce the likelihood of similar event occurring by establishing the Transport Accident Investigation Commission. Our work and our commitment are to get to the truth of events. Our work practices arise out of international best practice for accident investigations. Our investigative methodologies are common to the international community of accident investigators. Our investigative discipline requires evidential analysis. The wreckage of a vehicle is primary evidence in any inquiry.

The primacy of wreckage to an inquiry cannot be overstated. The Commission recognises the distress to loved ones that bringing forth wreckage evokes. However, each event tells its own story. The vehicle, after the event, is like a messenger retelling the unfolding of events, which may have lessons for others in similar situations, or reveal system weaknesses that if left unattended could result in catastrophic collapse at some later stage.

The Commission has learnt its own lessons about the value of salvaging complete wreckage having this year released its report into its resumed investigation into a helicopter accident in 2001 where 3 people died. In the Commission's original report released in February 2002 a finding as to likely cause precipitating the accident implicated maintenance engineers involved in the upkeep of the helicopter. The Commission did not have the full wreckage of the helicopter. Two years after the occurrence the Commission had laid before it new and material evidence involving similar components from 2 other helicopters that had crashed. The new evidence threw doubt on the conclusions arrived at in the first report, so the Commission re-opened its investigation to get at the truth. This was the first time in the Commission's 16 year history that an investigation was re-opened. The findings reported on in June this year, 5 years after the occurrence, showed that the original finding implicating the engineers was not sustainable. Recovering wreckage is painful for family, but not recovering wreckage can be as hurtful to others.

Conducting investigations and reporting on findings of transport accidents is not the only work of the Commission. There is the "housekeeping" associated with being an independent crown entity.

Lois Hutchinson
Chief Executive

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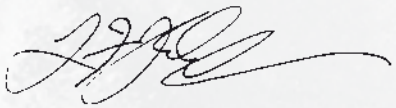
The Commissioners and Commission staff participated in various forums and meetings related more to the Commission as a crown entity than to its role as a Commission of Inquiry. This is background work in the life of the Commission but just as important for the health and vitality of a state sector agency. The Commission is pleased to participate in the transport sector's strategic planning and management forums. In addition, our meeting with the Equal Employment Commissioner gave real benefit to our consideration of succession planning. The Commission has an older workforce reflective of the required experience and skills of credible accident investigators. The Commission is developing a good employer strategy that will, we hope, support our workforce for longevity while at the same time enabling timely succession in the workplace.

Finally words of thanks to our Chief Commissioner Hon. Bill Jeffries who has agreed to stay on as our Chief Commissioner for a further 2 years after already 9 years of superb leadership; to John Goddard who retired after 24 years as an Aviation Investigator; and to Captain John Mockett who has retired after 9 years, 4 of those years as our Chief Investigator of Accidents.

Also, thank you to Maritime New Zealand for its support in recovering the Fishing Vessel *Kotuku*. Often there is a tension between regulator and inquirer. This is not unexpected given the respective roles, however by and large the roles complement each other, working as we do to improve transport safety in the wider transport system.



Lois Hutchinson
Chief Executive

Chief Investigator of Accidents' Report

Rail

Another year has passed, and like all others, it had its share of challenges, demands and rewards.

In terms of the Transport Accident Investigation Commission Act 1990, our principal purpose is to determine the circumstances and causes of accidents and incidents with a view to avoiding similar occurrences in the future, rather than to ascribe blame to any person. In more simple terms, we investigate to find not only what went wrong, but also why. In doing so, we look to find the reasons why certain actions were taken or not taken. Our sole objective is to find the lessons than can be learned, and to recommend changes that will reduce the risk of similar events occurring for the same reasons.

In an investigation, scrutiny falls on "the Man, the Machine, and the Environment". To understand what went wrong on the day, the actions taken or omitted by the operating crew (the Man) need to be fully understood first, but the inquiry must not end there. Examination of all, or relevant parts of, the aircraft, train or ship (the Machine) are examined to see if any failure, either in the design or in operation, caused the crew to act as they did. Then the Environment in which the crew were operating must be examined. The most obvious and immediate environmental impact may have been the weather and its influence on the operation of the vehicle. The less obvious, but equally important and influencing, is the operating environment in which crews work. In order to do their job properly and safely, operational crews need to be supported by a robust system.

Marine

That environment includes the rules and regulations promulgated by the industry regulator, and the operator's management organisation. In combination these must supply appropriate equipment that is properly maintained, training and certification, clear operating instructions, an unambiguous chain of command and continuous updating of knowledge to keep up with technological advances.

The causes and circumstances of an occurrence can be found anywhere in the areas of inquiry, and are rarely singular in nature. Rather, there is usually a chain of events that come together on the day to cause the accident. Many of the accidents that we investigate involve death and serious injury. The only value that can come out of such trauma is the learning and application of lessons for the future safety of operations.

John Mockett
Chief Investigator of Accidents

During the year, the Commission launched investigations into 7 aviation, 17 rail and 9 marine occurrences. Of the investigations underway, including some from previous years, 12 aviation, 29 rail and 12 marine investigations were completed and their reports approved for publication by the Commission.

While it is true to say that some investigations reveal emerging themes of common causes and circumstances, some of which are discussed elsewhere in this report, it is also true that each accident or incident is unique with its own characteristics made up of location, numbers of people involved, number type and size of vehicles involved, and the size and type of operation. Therefore, each investigation, particularly at the scene examination stage, has its own unique challenges.

Of particular note this year was the investigation into the capsize and sinking of the fishing vessel *Kotuku* in Foveaux Strait on 13 May, with the loss of 6 lives. We determined that in order to conduct a complete investigation, the wreck had to be raised for examination. The recovery operation was met with some emotional and cultural opposition from the next-of-kin and wider families of those who died, and also from the general fishing community of Bluff. That opposition brought its own pressure to bear on the Commission, but without the wreck a full investigation would not have been possible.

The wreck was found lying on its side in about 30 metres of water, in an area renowned for its bad weather. The lifting operation involved a dive team, a barge and crane and several support boats, all of which had to be hired. To get the boat into lifting position took several attempts. Once brought to the surface and pumped out, the boat could not float unaided because of the damage sustained during the sinking. With the lifting flotation devices still attached, the boat was towed to Stewart Island where some temporary repairs were made.

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Different flotation devices, both internal and external, were added and the fragile boat towed across Foveaux Strait to Riverton, where it was taken out of the water and transported to storage in Invercargill for examination. The raising was a delicate operation, in which there was always the risk of failure in such a hostile environment.

I congratulate the Investigator-in Charge for his organisational skills, but hesitate to give him the credit for the unusually long spell of good weather which helped the success of the operation.

The raising of the *Kotuku* and the subsequent examinations and tests severely stretched the Commission's resources, both human and financial. At various stages, all 3 Commission staff with marine expertise were involved on site, which would have limited our ability to launch another marine investigation had one been needed. The costs to the Commission have escalated to the highest in the past decade for a single investigation. The investigation is ongoing.

The resumed investigation into the in-flight break up of helicopter ZK-HJH was finalised during this year. Because of the controversy that surrounded the first investigation into this accident, the second, brought about by the introduction of significant new evidence, had to be as thorough, transparent and robust as possible. To achieve this, external experts in the fields of metallurgy, fracture analysis, bearings and aircraft type were engaged. The resumed investigation took 18 months to complete.

At the beginning of the year, there were 25 rail investigations in progress and yet to be finalised. The team of rail investigators has worked extremely hard and, by the end of the year, had reduced this number to 12, even with the addition of 17 investigations launched during the year. The rail investigators have achieved this without any compromise to the report standards, and I congratulate them on their efforts.

On the personnel side, John Goddard, our most senior Air Investigator, has retired and left the Commission in July 2006. John started with the Office of Air Accident Investigation and remained when the Commission superseded that office. John was Investigator-in-Charge of nearly 140 investigations in his 24 years between the two organisations. I would like to publicly acknowledge John's contribution to transport safety.

I too have retired, and will leave the Commission in October 2006. There are many things that I will miss about this fascinating yet demanding position, not least of which is the team of dedicated investigators. The team often works in difficult conditions, both physically and emotionally, yet none has demurred. I have been impressed with their commitment to and enthusiasm for the goal of improving transport safety. It has been my privilege to have managed the team since May 2002. I also take this opportunity to wish the Commission and my successor well in their future endeavours.

John Mockett
Chief Investigator of Accidents

Medical Advisor's Report

The primary role of the Medical Advisor is to undertake the medical investigation of transport accidents as a service to the investigator-in-charge, with the assistance of the Coroner's forensic pathologist.

The medical investigation is intended to:

- identify any possible medical, physiological or psychological factors that may have played a role in the causation of the accident
- characterise the injury dynamics of the impact sequence, and
- determine any remediable factors affecting accident survivability.

Dr Robin Griffiths
Medical Advisor

A secondary function of the Medical Advisor is to ensure the occupational safety and health protection of Commission staff, both in the office and on site during their investigations.

As part of the OSH function, the Commission has developed regular blood borne pathogens protective procedures, a capability that it has shared with the government agencies and airlines. The Commission also liaises with the New Zealand Police and Civil Defence and Emergency Management (CDEM) on other aspects of managing major transport accidents such as the coordinated incident management system, victim support and disaster victim identification.

Aviation and rail accidents often involve a thorough investigation of factors relating to impact survivability, as in the Ansett DHC-8 and Skyferry accidents. In marine accidents, a more frequently required function is to advise on immersion survivability in adverse sea conditions. Crew medical incapacitation is fortunately rare, but crew impairment by alcohol or drugs is relatively more common. The Commission requests toxicological investigation on all deceased passengers in crew, but is seeking legislative authority to test transport accident crew who survive, in order to characterise and reduce the risk to flight safety by substance impairment.

Cooperation with forensic pathologists and dentists is vital, and the Commission is extremely grateful to the national forensic pathology service for its support and advice. The Commission also receives considerable support from the country's Coroners, who have parallel interests in a careful investigation of transport accidents causing death. Without their good offices, the Commission's medical investigation functions would be significantly more difficult.

Dr Robin Griffiths
Medical Advisor

The Assessors

The Commission may, from time to time, appoint a suitably qualified person to be an assessor for the purposes of an investigation. The assessors are independent advisors to the Commission who have technical skills relevant to the investigations under consideration. The Transport Accident Investigation Commission Act 1990 allows the Commission to co-opt assessors to be members of the Commission. They are then able to attend and speak at Commission Meetings, which is in practice what they do.

The Commission has 8 assessors.

The Assessors are:

AVIATION

Richard Rayward
Pat Scotter
Nick Marwick

RAIL

Don Davis
Alan McMaster
William (Bill) Jones

MARINE

Keith Ingram
David McPherson

Back row: Nick Marwick, Alan McMaster, Pat Scotter, Don Davis
Front row: Keith Ingram, Richard Rayward, William (Bill) Jones
Absent: David McPherson

Making Inquiries – The Commission's Work

The Commission's work involves a number of phases, depending on the form of its inquiry. The Commission's standard approach to inquiry is instigated with notification of an accident or serious incident, then distinct phases of:

- investigation
- report preparation
- consultation with affected and interested parties
- Commissioners' determinations on the investigative reports
- Commissioners' determination of safety recommendations
- final report release to the public
- the issuance of the safety recommendations to the regulators, and where appropriate, involved transport operators.

The Commission normally holds its hearings in camera. However, it may hold a public hearing if it is likely to provide any significant advantages over the Commission's standard procedure for determining the causes and circumstances of an accident or incident.

Occurrences are Notified

Operators must notify the transport regulators where an accident or incident occurs involving aircraft, maritime vessels, or trains. Once notified, the regulator must notify the Commission of any accident or serious incident. The Commission must then determine whether the occurrence as reported happened in circumstances that have, or are likely to have, significant implications for transport safety, or may allow the Commission to establish findings or make recommendations that may increase transport safety. If, in its determinations, the Commission affirms the above then it must investigate.

Investigations are Launched

Having made the decision to launch an investigation the Commission assembles an investigative team appropriate to the circumstances of the occurrence. The investigation team is led by an investigator-in-charge, and is made up of experts who have the skills and knowledge to examine relevant aspects of the accident or incident.

A site investigation is carried out as soon as practical. The length of time this takes to complete varies depending on the severity and complexity of the accident or incident. Investigators carry a warrant authorising them to control the site, and to seize and detain evidence. They also have certain powers of entry.

Investigators interview or confer with anyone whose information may assist in the determination of the causes and circumstances of an accident or incident. Investigators carry photo-identity cards to identify themselves. Mindful of the stress an accident or incident brings to those involved or affected, investigators strive to arrange and conduct interviews with sensitivity, and allow a support person to be present (as long as they do not impede the interview). Some people may need to be interviewed several times. A person can be required to attend an interview and to answer questions. The Transport Accident Investigation Commission Act 1990 prevents other people and organisations obtaining investigators' records of interviews and discussions and certain other types of information from the Commission. The Transport Accident Investigation Commission Act 1990 does not prevent people making statements to anyone else, but those statements must not include or speculate on information provided by the Commission.

Information from interviews will be included in the final report only when pertinent to the analysis of the accident or incident.

The Commission engages specialists to provide advice, analysis and opinion on matters not within the Commission's own expertise. Laboratories in New Zealand or overseas analyse components, "read out" voice recorders and decipher data recorders.

Reports are Prepared

The Commission's report is a summary of the investigation. It contains the relevant facts, analysis, findings and safety recommendations. Before finalising the report the Commission circulates a preliminary report to any person whose conduct is stated or implied to have contributed to the cause of the accident to give them an opportunity to comment on or to refute that statement. The Commission may also seek comment from others who may be able to contribute to the accuracy of the report, or to the effectiveness of safety recommendations.

Because the preliminary report may contain inaccuracies and may be subject to change, its circulation is strictly limited and wider disclosure is prohibited under the Transport Accident Investigation Commission Act 1990. Submissions have the same protection as records of interviews and discussions.

The final report incorporates improvements arising from any further investigation and the submissions on the preliminary report. Recipients of the preliminary report and, if they so request, next of kin and others similarly affected, are forwarded a copy of the final report on a confidential basis a few days before public release.

Most final reports are released within 7 or 8 months of the start of the investigation. In the case of a particularly complex investigation, reports take longer to complete. In addition to providing reports as outlined above, the Commission makes its reports available on interloan from public libraries, or they may be purchased individually or by annual subscription from the Commission. The Commission's website carries an index of Commission reports, report abstracts and safety recommendations and status, as well as general information about the Commission.

The Commission encourages operators to take responsibility for taking corrective action as soon as is practicable, after the event. The Commission's preference is for operators to recognise and take the corrective or preventive action before a safety recommendation is needed. Where operators do act of their own volition to take a safety action the Commission will identify and include the action taken in its final report.

Safety Recommendations are Issued

Safety recommendations are fundamental to the Commission's role of accident prevention. With human lives at stake, timeliness is an essential part of the recommendation process. As a result the Commission may issue a safety recommendation without waiting for an investigation to be completed. The Commission designates the person or party expected to take action and describes the result it recommends. The Commission consults with the recipient of the safety recommendation prior to finalising the recommendation. Final safety recommendations are usually incorporated in the accident report together with the relevant parts of any replies (if available).

Investigations – Making a Difference

The Commission launched 33 investigations in 2005/2006. The Commission's principal function is to investigate accidents and incidents.

In launching investigations into adverse occurrences it is expected that there are lessons to be learnt that can be shared, and in time the learnings adopted sufficiently to reduce the likelihood of similar events occurring. In each year the Commission does have cause to pause and reflect on particular occurrences because of the issues raised in the course of investigation, or because the occurrence echoes previous occurrences, suggesting that lessons have not been learnt, or because there is an emerging theme or pattern within a sector that may be a signal for wider concern.

Below are some examples of the kinds of investigation that prompted the Commission to take a reflective stance.

The separated left wing of Metroliner ZK-POA.

From the Aviation Sector –

The Importance of Operating Procedures

Investigation 05-006 ZK-POA involved an aircraft breaking up in flight over terrain near Stratford in the Taranaki region. The 2 crew members died in the accident. This investigation emphasised the importance of the approved aircraft flight manual, or the operator's Standard Operating Procedures (SOPs), including all of the procedures required for normal or alternate operations, and supplementary or less commonly performed procedures. This is necessary to ensure standardisation and to prevent or minimise the potentially hazardous individual interpretation of a procedure.

The significance of SOPs arose because the captain of the aircraft decided to re-balance the fuel in the wings of the aircraft while in cruise flight. This in itself is not unusual. However, in this instance the procedure was undertaken with the autopilot engaged. The engagement of the autopilot set off a sequence of events that led to the aircraft going into a spiral dive from which the crew was unable to recover. The requirement to disconnect the autopilot while balancing fuel in-flight was not explicit in the SOPs.

The Commission determined the need for a written SOP for in-flight fuel balancing for the operators of the Metro aircraft type, and the need for the aircraft flight manual to include a limitation and warning that the autopilot be disengaged for in-flight fuel balancing, and to contain a procedure for in-flight fuel balancing. The Commission addressed the issues to the Director of Civil Aviation by making safety recommendations which the Director accepted and acted upon. As a consequence the aircraft type certificate holder, M7 Aerospace Corporation of USA, has drafted new aircraft flight manual procedures for fuel re-balancing that affect a number of its aircraft models.

Investigation 05-010 ZK-MCJ involved an aircraft landing at Queenstown Aerodrome, where it inadvertently left the runway. On board were 47 passengers and 2 cabin crew, and 2 pilots and a maintenance engineer on the flight deck. There were no injuries, and no damage to the aeroplane. However, the outcome could have been a lot worse.

On the day, there was a strong southerly wind flow at Queenstown. Because of thunderstorm activity and the wind direction in relation to the terrain, the flow resulted in particularly gusty crosswind conditions that were near the maximum demonstrated limit for the aeroplane. The primary cause of the incident was a sudden gust, which most probably exceeded the aeroplane limit, striking the vertical stabiliser and weathercocking the aeroplane forcefully to the left. This loss of control was exacerbated by the gust occurring during a critical phase of the landing, before the captain had completed the normal landing sequence actions and before effective nose wheel steering was available.

The operator's incident recovery procedure was utilised to good effect and demonstrated the value of having such procedures in place. However, the operator's training programme did not ensure that pilots had the necessary knowledge and skills to operate the ATR 72-212A in strong crosswind conditions. Consequently, this contributed to the first officer not positioning the control column sufficiently forward during the landing so that the captain would have effective nose wheel steering.

In considering the circumstances and cause of the incident the Commission determined the need for the operator to enhance its ATR 72 (aircraft type) training programmes to ensure that pilots were adequately trained for operations in strong crosswind conditions, and for the pilot flying to remind the pilot not flying about the correct landing technique before each landing in strong crosswinds.

Two safety recommendations were made to the operator to address these issues. The operator accepted both SRs and has implemented them.

The Importance of Terrain Awareness

Investigation 05-003 ZK-FMW involved an aircraft colliding with terrain in the Taupo/Ruapehu region. Three people died in the collision. The aircraft was chartered as part of a package offered by a tour operator. The occupants were the pilot and the couple who had chartered the flight for a day's excursion which would take them from Auckland to Kerikeri in the morning and Taupo in the afternoon.

The pilot filed an instrument flight rules (IFR) flight plan in preparation for the flight. During the instrument approach to Taupo Aerodrome the aircraft deviated left of the published final approach track and struck Mount Tauhara, 8 kilometres from the aerodrome. At the time of the aircraft's approach to Taupo Aerodrome there was rain and a low cloud base, which witnesses to the accident described as obscuring Mount Tauhara.

The Commission's investigation into the accident could not conclusively determine the cause of the accident. However, in analysing the circumstances of the accident the Commission concluded that the characteristics of the accident – a serviceable and controlled aircraft in almost level flight on a steady heading, inclement weather and approaching the conclusion of an instrument approach are typical of a "controlled flight into terrain" type accident. There was substantial evidence indicating that the pilot was controlling and manoeuvring the aircraft during the approach but was not aware of his exact geographical position. If the aircraft had been fitted with a terrain awareness system (TAWS), a TAWS alert of the rising terrain ahead of ZK-FMW should have given sufficient warning to allow the pilot to manoeuvre the aircraft away from the mountain.

The evidence is strong for the effectiveness of TAWS, with real benefits for single-pilot instrument flight rules operations, and so the Commission made a safety recommendation to the Director of Civil Aviation that he "promote the early introduction of terrain awareness and warning systems for Part 135 aircraft, current and new, flown under single-pilot IFR in accordance with the criteria to be prescribed by the proposed new Rules".

From the Rail Sector – Derailments

The Importance of Recording the Service Life of Train Components RBU Failures

Investigations: 04-130 involving four separate derailments from a common cause, Kahahi and Owhango
05-118 express freight Train 245, derailment at Ohingaiti
05-126 express freight Train 246, derailment at South Junction, Pukerua Bay

An express freight train derailment on 5 November 2004 was the first of 6 such incidents investigated by the Commission during 2005/2006. Of these derailments, 4 were caused by roller bearing unit (RBU) failures and 2 were caused by the fracture of previously undetected cracked bogie side frames.

A finding from each of the investigations was that historical records confirming when RBUs were fitted to wheel sets were not kept, nor were such records kept detailing the service life of the wheel sets. Therefore it could not be established when the RBUs responsible for the derailments had been fitted to the respective wagon wheel sets, or their subsequent service life.

Fire damaged wagon following roller bearing unit failure.

A safety recommendation was issued to Toll NZ Consolidated Limited (Toll Rail) that it develop a system for recording and tracking both new and reconditioned key components used on bogies.

Toll Rail accepted this recommendation but noted that it would take 10 years for the implementation to be complete, as bogies can have up to 10 years, life between overhauls.

Bogie side frame failures

The investigations found that in each case the bogie side frame had failed due to high cycle fatigue followed by ductile overload. In one case the origin of the fatigue crack could be traced to a non-compliant weld that extended into a relatively highly stressed area of the side frame, but in the second case no metallurgical evidence of a defect could be found at the fatigue origin.

Neither the age of the bogies nor their operational and maintenance history could be determined as, in the case of the wheel set components, no recording of bogie component overhauls was kept. However, during the investigation Toll Rail advised that it had implemented a process for marking and recording serial numbers on bogies when they were overhauled to enable tracing of the history of a bogie should it be involved in an incident. Because of this, no safety recommendation covering this issue was made.

The pre-departure visual checks of the trains could not have detected the existing fractures in the bogie side frames because the cracks would have been camouflaged by the grime and discoloration of the surrounding surface and would not have been visible to the person carrying out the inspection.

The Importance of Managing Staff Fatigue

Investigations: 05-102 track warrant control irregularities, Woodville and Otane
05-105 express freight Train 829, track occupation irregularity, Kokiri

Three operating irregularities involving train controllers between 18 January and 3 February 2005 led to separate investigations by the Commission during 2005/2006.

The findings of the investigations included that the performance of the involved train controllers was probably impaired due to cumulative sleep debt as a result of excessive rostered hours and hours actually worked to accommodate changes in rosters or staff shortages. Although the posted rostered hours for the respective train controllers met the guidelines for medium and short notice changes, they were considered excessive.

Other factors identified related to rostering and hours of duty included:

- one train controller working an excessive number of late and night shifts in the 6 weeks leading up to his incident
- the practice of calling back train controllers while on rostered days off duty to fill vacancies within the train control office
- the multi desk qualification of two of the train controllers made them among the few available to fill vacancies on other train control desks.

Although ONTRACK had a system for monitoring total posted hours and actual hours worked each fortnight by train controllers, the system was reactive and did not restrict or control shifts or total hours worked.

At the time of these incidents train controllers roster conditions had ineffective controls to restrict hours or work, successive night shift rotations and shift extensions that required train controllers to work an additional 4 hours with little or no lead in time.

Previous investigations into fatigue related incidents involving locomotive engineers had highlighted a lack of an appropriate process to manage rostered hours and actual hours worked by locomotive engineers, particularly "at-risk" night shifts. Following recommendations arising from these investigations Toll Rail had developed a strategy for rostering locomotive engineers that included rostering a maximum of three consecutive night shifts, to be followed by an extended period of rest before they could be re-rostered for duty. This change, however, had not been extended to include the train control environment at that time.

Track occupation worksite west of Kokiri.

From the Maritime Sector –

The Importance of Bridge Resource Management

Investigations: **04-214 *Aratere*, loss of mode awareness[1], Tory Channel**
05-207 *Santa Regina/MV Timeless*, collision, off Picton Point, Queen Charlotte Sound
05-208 *Santa Regina*, near grounding, Tory Channel Eastern entrance
05-211 *Spirit of Competition*, collision with bridge, Onehunga

Each of these investigations highlighted the inadequacy of bridge resource management (BRM). BRM is the use and co-ordination of all the skills and resources available to the bridge team to achieve the established goal of optimum safety and efficiency.

The use of BRM helps to eliminate the potential for one-person error, and aids the flow of information between members of the bridge team, and between the bridge team and the outside world. Part of the flow of information between members of the bridge team is challenge and response and the use of closed-loop communications to ensure that orders and information are heard and understood.

When used effectively, BRM ensures that all the bridge team members share a common view of the intended passage, maintain situational awareness, anticipate dangerous situations, acquire all relevant information and act upon it in a timely manner, avoid an error chain being formed, and aims to prevent preoccupation with minor problems.

Aratere in Tory Channel.

Although BRM has been in place for many years, some of the bridge teams of large and small ships alike have not made best use of the resources to hand. As with any skill, BRM needs constant reinforcement to prevent operators lapsing into their old practices. Since the Commission has investigated incidents involving ships from both of the Cook Strait ferry companies, those companies have improved training and have promoted the BRM culture throughout their fleets.

In investigation 04-214 the passenger freight ferry *Aratere*, in automatic steering, failed to make a programmed course alteration as it was entering Tory Channel from Cook Strait. The navigational bridge team had to intervene and make a manual alteration of course to prevent the *Aratere* grounding at full speed on the north side of the channel.

The Commission identified that a less than optimal the standard of BRM contributed to the cause and circumstances of the loss of mode awareness. In addition, there was no contingency plan available for the situation the master and mate encountered, thus their workload suddenly increased at a critical part of the voyage.

In this case the Commission made a safety recommendation to the ferry operator that it instigate a programme of training and practice to reinforce bridge resource management techniques amongst members of bridge navigation teams on board the company's vessels. The operator accepted and actioned the safety recommendation.

1 Investigations 04-214. 05-207, and 05-208 occurred in the 2004-2005 year with the investigations largely undertaken and completed in the 2005-2006 year.

The report on the *Aratere's* loss of mode awareness has been reported world-wide for its coverage of bridge resource management and human factors. It has been used internationally as a case study for resource management training. Feature articles have been published in Alert, the international maritime human element bulletin issued by the Nautical Institute and Lloyds Register of Shipping, and Ferry International Magazine.

The Importance of Operating Procedures

As with Aviation the availability of, and adherence to, standard operating procedures can make a critical difference to people's safety.

Investigations: **04-215** ***Southern Winds*****, grounding, Charles Sound**[2]
04-219 ***Tiger III*****, grounding, Cape Brett**
05-201 ***Quickcat/Doctor Hook*****, collision, Motuihe Channel**
05-210 ***Milford Mariner*****, grounding, Milford Sound**

Milford Mariner in Milford Sound.

These investigations identified systemic and procedural issues where the standard operating procedures did not follow industry "best practice" principles, or reflect the actual ship board processes. In each case the Commission recommended to the owners and operators of the vessels that they review and amend their operational documentation to reflect best operating practices.

The investigation into the restricted limit passenger ship *Milford Mariner*, which grounded during a cruise of Milford Sound with the Master, 9 crew and 56 passengers on board identified the grounding was due in part to a latent problem with the ship's engines, which were liable to stall if the engine was put astern when the ship was moving ahead at a speed in excess of 5 knots.

There were no injuries to the passengers or crew, and little damage to the ship. However, in adverse weather or had the hull been punctured, there was the potential for a major occurrence involving large numbers of people.

The Commission made recommendations to the operator to improve its policies and procedures in regard to addressing safety critical operational defects, staff training and engine operations. The operator accepted the recommendations and has made considerable progress in their implementation.

2 Investigations 04-215, 04-219 and 05-201 occurred in the 2004/2005 year with the investigations largely undertaken and completed in 2005/2006.

Summary of Occurrences Investigated

Within the period 1 July 2005 to 30 June 2006 Transport Accident Investigation Commission

Table 1 – Aviation Investigations

INV NO:	VEHICLE DESCRIPTION	REPORTED EVENT	LOCATION	OCCURRED	LAUNCHED
05-008	Cessna 206, ZK-WWH	Loss of control on take-off	Queenstown	10-Aug-05	10-Aug-05
05-009	AS350 Squirrel helicopter, ZK-HGI	Heavy landing	Franz Josef Glacier	17-Aug-05	17-Aug-05
05-007	Piper Seneca PA34-200T, ZK-MSL	Gear up landing	Napier	07-Jul-05	07-Jul-05
05-010	Mount Cook ATR 72-500, ZK-MCJ	Runway excursion	Queenstown	05-Oct-05	06-Oct-05
05-011	Robinson R22 helicopter, ZK-HPR	Loss of control	Haast	17-Dec-05	18-Dec-05
06-001	Air Tractor AT-602, VH-NIT	Loss of control	Ballidu, Western Australia	22-Oct-05	21-Feb-06
06-002	Piper Aztec PA23-250, ZK-FMU	Gear-up landing	Napier	13-Apr-06	14-Apr-06

Table 2 – Rail Investigations

INV NO:	VEHICLE DESCRIPTION	REPORTED EVENT	LOCATION	OCCURRED	LAUNCHED
05-118	Express freight Train 245	Derailment	Mangaweka	27-Jul-05	27-Jul-05
05-119	Express freight service Train 644	Runaway wagons collided with motor vehicle at level crossing	Between Waingawa and Dalefield	29-Jul-05	29-Jul-05
05-120	Coal Train 142	Runaway wagons	Mercer	01-Sep-05	02-Sep-05
05-121	Express freight Train 354 and school bus	Level crossing near collision	Awakaponga	05-Sep-05	08-Sep-05
05-122	Electric multiple unit	Operating irregularity	Ngauranga	26-Sep-05	28-Sep-05
05-123	Connex SA/DS train service 4356	Braking problems on SD 5811	Meadowbank	07-Oct-05	07-Oct-05
05-124	Train 834 and Train 841	Collision	Cora Lynn	20-Oct-05	21-Oct-05
05-125	Train 1910	Train parting	Dunedin	28-Oct-05	28-Oct-05
05-126	Express freight Train 246	Derailment	South Junction	30-Oct-05	31-Oct-05

continued on the next page ...

Table 2 – Rail Investigations continued

INV NO:	VEHICLE DESCRIPTION	REPORTED EVENT	LOCATION	OCCURRED	LAUNCHED
05-127	Shunt H52	Track occupation irregularity	Te Rapa	27-Oct-05	01-Nov-05
05-128	Train service 3056	Improper door operation	Papatoetoe	31-Oct-05	02-Nov-05
05-129	Train 700 and truck	Level crossing near collision	Blenheim	21-Nov-05	22-Nov-05
06-101	DMU Train 3163	Fire	Manurewa in Auckland	15-Mar-06	15-Mar-06
06-102	Train service 4306	Braking irregularity	Between Westfield and Otahuhu	31-Mar-06	31-Mar-06
06-103	Passenger service train 6333, DM 182	Derailment	Wellington	22-Apr-06	24-Apr-06
06-104	DMU Train 4254	Smoke and fumes entered passenger carriages	Britomart	29-Apr-06	24-May-06
06-105	DMU passenger express Train 3321	Overran platform	Manurewa	13-Jun-06	14-Jun-06

Table 3 – Marine Investigations

INV NO:	VEHICLE DESCRIPTION	REPORTED EVENT	LOCATION	OCCURRED	LAUNCHED
05-209	Cargo vessel *Spirit of Resolution*	Grounding	Wairopa Channel	21-Jul-05	21-Jul-05
05-210	Passenger vessel *Milford Mariner*	Grounding	Milford Sound	19-Sep-05	19-Sep-05
05-211	Container *Spirit of Resolution*	Collision with old Mangere bridge	Onehunga	08-Oct-05	09-Oct-05
05-212	Passenger vessel *Milford Sovereign*	Loss of directional control	Milford Sound	20-Nov-05	21-Nov-05
06-201	Ro-Ro passenger freight ferry *Aratere*	Heavy weather incident	Cook Strait	03-Mar-06	04-Mar-06
06-202	Passenger ferry *Kea*	Loss of control leading to a collision with a berthed vessel	Devonport	10-Mar-06	10-Mar-06
06-203	Fishing vessel *Venture*	Grounded	Te Rua Bay, Tory Channel	19-Apr-06	19-Apr-06
06-204	Fishing vessel *Kotuku*	Capsized	Foveaux Strait	13-May-06	13-May-06
06-205	Fishing vessel *Lady Luck*	Collission with rock and subsequent foundering	Motiti Island	23-Jun-06	23-Jun-06

Reports and Recommendations – Making an Impact

Reports

The Commission released 54 reports in 2005/2006.

- 41 reports related to investigations launched in 2005
- 12 reports related to investigations launched in 2004
- one report related to an investigation originally undertaken in 2001, reported on in February 2002, and resumed after new and significant evidence was presented to the Commission in February 2003.

The Commission is required under the Transport Accident Investigation Commission Act 1990 "*...to prepare and publish findings and recommendations (if any)*" [3] in respect of the investigations undertaken. The findings and recommendations are published in the form of a report made available in hard copy or on-line from the Commission's website.

The format of the report is adopted from that which New Zealand is obliged to use when reporting to the International Civil Aviation Organisation (ICAO). ICAO administers the Convention on International Civil Aviation. This form of reporting establishes a methodical, consistent approach to critically examining evidence, and on analysis, deriving the cause(s) of the accident or incident. The format is used by accident investigation agencies the world over, forming the basis of a standard approach to transport accident investigations.

ZK-HJH fin strike by tail rotor blade.

Some notable reports this year were:

From the Aviation Sector –

01-005R, ZK-HJH, Bell UH-1H Iroquois in-flight break up, near Taumarunui in the Ruapehu region.

The Commission's resumed inquiry into the ZK-HJH accident was steeped in controversy. The original report was the cause of some upset and disagreement. Some interested parties believed the Commission had got it wrong, and pressed for a new investigation. The ensuing debate raised issues for the Commission as to the criteria that should apply when determining whether a closed investigation ought to be re-opened. The Commission looked for guidance from ICAO and its international standards and recommended practices.

Annex 13 to the Convention on International Civil Aviation is the document detailing the aircraft accident and incident investigation international standards and recommended

3 Section 8, the Transport Accident Investigation Commission Act 1990.

practices. Paragraph 5.13 of Annex 13 sets out the circumstances under which an investigation, once closed, must be re-opened.

Paragraph 5.13 says:
"If, after the investigation has been closed, new and significant evidence becomes available, the State which conducted the investigation shall re-open it..." [4]

New and significant evidence did become available in 2003 when the Civil Aviation Authority brought to the Commission's attention features of two other helicopter accidents that might also apply to the ZK-HJH occurrence. The Commission decided to re-open its investigation and begin anew. In the resumed investigation the Commission found that it could not support the findings of its first investigation. The original findings implicated the helicopter maintenance engineers by suggesting an omission on their part when replacing a set of cotter pins in the tail rotor assembly during a phased inspection. The second report found the implication was unwarranted.

From the Rail Sector –

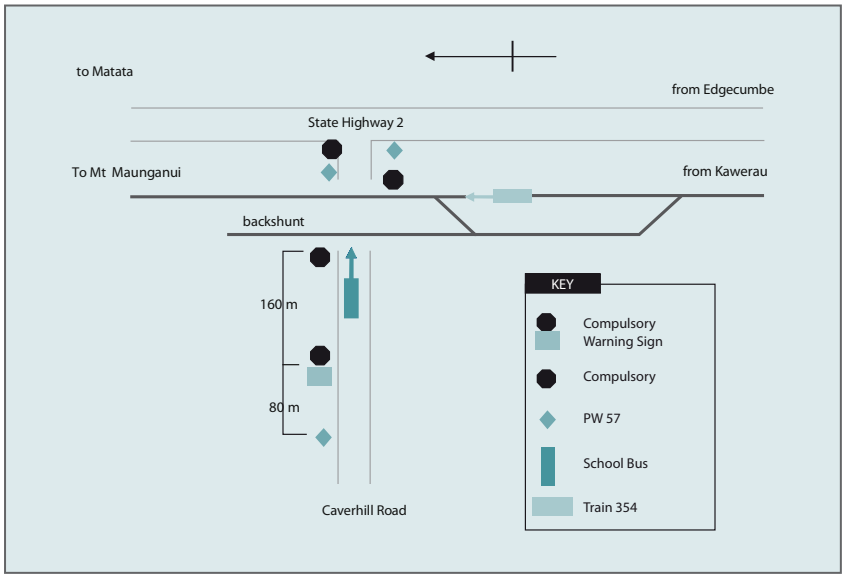
Reports 05-111, level crossing near collision with school bus at Hamilton, and 05-121, level crossing near collision with school bus at Awakaponga highlight the attendant risks associated with rail level crossings. The two occurrences involved buses carrying school children, 26 in one and 16 in the other, crossing rail tracks with a prospect of colliding with an on coming train.

The occurrence reported on in **Report 05-111** involved a school bus having to make a tight left hand turn onto an urban level crossing protected with barrier arms and warning lights. While doing so the crossing barrier arm descended, onto the roof of the bus. At the time the bus began its entry to the level crossing no signals had activitated to warn the driver of the impending lowering of the barrier arm. The report found that the view lines of the railway track for approaching motorists, and at the level crossing were not good, although the visibility for locomotive engineers was excellent. In this case the locomotive engineer of the involved train saw the events unfolding and after advising the signal man was able to proceed across the level crossing without mishap, having been given the all clear.

Safety recommendations were made to both ONTRACK and Hamilton City Council to review the design, layout, signage, and road markings at the level crossing. Both organisations responded favourably to the recommendations.

The occurrence reported on in **Report 05-121** involved a school bus passing over a rural level crossing immediately in front of an on coming train.

This level crossing was protected with a warning sign and a compulsory stop. As events unfolded the locomotive engineer saw the bus approaching the crossing, and sounded the locomotive horn. The bus did not stop. The bus passed close enough in front of the train that the locomotive engineer was able to read the rear registration number plate as his train crossed over the level crossing. The Commission found that by not stopping at the compulsory stop sign, the bus passengers were put at significant risk of injury or death.



Layout of Caverhill Road level crossing at Awakaponga.

4 See Annex 13 to the Convention on International Civil Aviation Aircraft Accident and Incident Investigation, Para. 5.13, p5-3.

From the Maritime Sector –

Report 05-207, freight and passenger ferry *Santa Regina* and private launch *Timeless* collision, and Report 05-208, freight and passenger ferry *Santa Regina*, near grounding, Tory Channel.

In a little over a month, there were 2 occurrences involving the Cook Strait ferry *Santa Regina*.

The first occurrence reported on in **Report 05-207** happened near Picton Point and involved the ferry in collision with the private launch *Timeless*, which resulted in the death of one of the 2 persons on the launch.

The next occurrence reported on in **Report 05-208** involved the ferry coming within 80m of the rocky shore as it exited the Tory Channel.

Each of these reports identified the quality of bridge resource management as a major causal factor. In response to these occurrences, the operating company reviewed the performance of bridge resource management of its ship's officers and put in place improved training. It also actively promoted the application of resource management on its ships. Improved bridge resource management practice by the staff of both Cook Strait ferry companies has reduced the probability of a major accident on this busy and dangerous piece of water.

Santa Regina in Tory Channel.

Summary of Occurrences Finalised

Table 4 – Aviation Investigations

INV NO:	DESCRIPTION	REPORTED EVENT	LOCATION	INVESTIGATED	FINAL APPROVAL
01-005R	Bell UH-IH Iroquois ZK-HJH	In-flight break-up	Taumarunui	04-Jun-01	27-Apr-06
04-003	Bell-204 UH1B, ZK-HSF	In-flight break-up	Mokoreta, Southland	23-Apr-04	17-Nov-05
04-007	PA-34-200T Seneca II, ZK-JAN	Controlled flight into terrain	Mount Taranaki	30-Nov-04	16-Dec-05
05-001	PA 28 ZK-FTR and Gulfstream ZK-KFB	TCAS alert requiring avoiding action during instrument approach	Taupo	07-Jan-05	18-Aug-05
05-002	Cessna 172, ZK-LLB	Collision with terrain	Queenstown	29-Jan-05	17-Feb-06
05-003	Piper PA-34-200T Seneca II, ZK-FMW	Controlled flight into terrain	Taupo	02-Feb-05	16-Dec-05
05-004	Flight QF 43, Boeing 747, VH-EBW	Airspace incident	Auckland	09-Apr-05	18-Jan-06
05-007	Piper Seneca PA34-200T, ZK-MSL	Gear up landing	Napier	07-Jul-05	16-Dec-05
05-008	Cessna 206, ZK-WWH	Loss of control on take-off	Queenstown	10-Aug-05	18-May-06
05-009	AS350 Squirrel helicopter, ZK-HGI	Heavy landing	Franz Josef Glacier	17-Aug-05	17-Feb-06
05-010	Mount Cook ATR 72-500, ZK-MCJ	Runway excursion	Queenstown	05-Oct-05	20-Mar-06
05-011	Robinson R22 helicopter, ZK-HPR	Loss of control	Haast	17-Dec-05	11-Jan-06

Table 5 – Rail Investigations

INV NO:	DESCRIPTION	REPORTED EVENT	LOCATION	INVESTIGATED	FINAL APPROVAL
04-103	Shunt P40	Derailment	Oringi	16-Feb-04	18-Aug-05
04-116	Train 1605	Fire	Carterton	28-Jun-04	18-Aug-05
04-118	Train 725	Entered occupied track	Between Tormore and Scargill	20-Jul-04	21-Jul-05
04-121	DBR 1119	Derailed	Auckland	24-Aug-04	21-Jul-05
04-126	Express freight Train 244	Derailment	Between Wellington and Takapu Road	11-Oct-04	27-Oct-05
04-127	Express freight Train 952	Collision with truck and trailer	Dunsandel	19-Oct-04	18-Aug-05
04-130	Express freight Train 237	Derailment	Between Kakahi and Owhango	05-Nov-04	16-Dec-05
04-132	Train PA04	Loss of overhead power	Between Kaiwhara-whara and North Island	04-Dec-04	18-May-06
05-101	Express freight Train 624	Track warrant irregularity	Woodville	18-Jan-05	16-Dec-05
05-102	Express freight Train 627	Track warrant irregularity	Otane	18-Jan-05	16-Dec-05
05-103	Express freight Train 237	Derailment	Hunterville	20-Jan-05	17-Feb-06
05-104	Train 3639	Loss of overhead power	Ngauranga	24-Jan-05	18-May-06
05-105	Express freight Train 829	Track occupation irregularity	Kokiri	03-Feb-05	16-Dec-05
05-106	Express freight Train 221 bearing failure	Derailment following	Kaiwhara-whara	04-Feb-05	16-Dec-05
05-107	Passenger service Train 3037	Wrong routing/SPAD/ wrong line travel	Westfield	14-Feb-05	17-Nov-05
05-108	4-car passenger service	Fire	Auckland	23-Feb-05	15-Jun-06
05-109	Passenger Train *Linx*	Derailments	Coromandel	20-Feb-05	17-Nov-05
05-110	Express freight Train 247	Derailment following bearing failure	Te Kauwhata	21-Feb-05	16-Dec-05
05-111	Train and school bus	Level crossing near collision	Hamilton	16-Feb-05	22-Sep-05

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Table 5 – Rail Investigations continued

INV NO:	DESCRIPTION	REPORTED EVENT	LOCATION	INVESTIGATED	FINAL APPROVAL
05-112	HRV64708 and Train 200	Track occupation irregularity	Near Taumarunui	07-Mar-05	16-Dec-05
05-113	Train 2105	Entered occupied track section	Newmarket	14-Mar-05	03-Apr-06
05-114	Express freight Train 842	Derailment following bearing failure	Between Otira and Ngakawau	21-Mar-05	16-Dec-05
05-115	Passenger Train 2100	Train parting, improper door opening	Between Ranui and Swanson	01-Apr-05	15-Jun-06
05-117	Express freight Train 211	Signal overrun	Rangitawa	12-May-05	27-Oct-05
05-118	Express freight Train 245	Derailment	Mangaweka	27-Jul-05	15-Jun-06
05-121	Express freight Train 354 and school bus	Level crossing near collision	Awakaponga	05-Sep-05	16-Dec-05
05-122	Electric multiple unit	Operating irregularity	Ngauranga	26-Sep-05	13-Apr-06
05-126	Express freight Train 246	Derailment	South Junction	30-Oct-05	27-Apr-06
05-129	Train 700 and truck	Level crossing near collision	Blenheim	21-Nov-05	15-Feb-06

Table 6 – Marine Investigations

INV NO:	DESCRIPTION	REPORTED EVENT	LOCATION	INVESTIGATED	FINAL APPROVAL
04-219	Passenger ferry *Tiger III*	Grounding	Cape Brett	18-Dec-04	22-Sep-05
04-217	Fishing vessel *San Rochelle*	Fire	100 nautical miles north of Three Kings Island	27-Oct-04	18-Aug-05
05-201	Passenger ferry *Quickcat II* and chartered passenger vessel *Doctor Hook*	Collision	Motuihe Channel	04-Jan-05	18-Aug-05
05-202	Passenger/freight ferry *Aratere*	Steering failure	Wellington Harbour	09-Feb-05	27-Oct-05
05-204	Passenger/freight ferry *Aratere*	Steering failure	Picton	20-Feb-05	27-Oct-05

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Table 6 – Marine Investigations continued

INV NO:	DESCRIPTION	REPORTED EVENT	LOCATION	INVESTIGATED	FINAL APPROVAL
05-205	Passenger vessel *Black Cat*	Starboard bow struck the sea wall	Akaroa	17-Apr-05	27-Oct-05
05-206	Passenger/freight ferry *Arahura*	Loss of propulsion	Cook Strait	24-Apr-05	16-Dec-05
05-207	Ferry *Santa Regina* and private boat *Timeless*	Collision	Picton	02-May-05	17-Feb-06
05-208	Passenger freight ferry *Santa Regina*	Near grounding	Tory Channel	09-Jun-05	19-Jan-06
05-209	Cargo vessel *Spirit of Resolution*	Grounding	Wairopa Channel	21-Jul-05	05-Aug-05
05-210	Passenger vessel *Milford Mariner*	Grounding	Milford Sound	19-Sep-05	27-Apr-06
05-211	Container *Spirit of Resolution*	Collision with old Mangere bridge	Onehunga	08-Oct-05	27-Apr-06

Safety Recommendations

The Commission made 77 safety recommendations in 2005/2006.

Safety recommendations are intended to guide remedial action so that similar accidents or incidents under similar circumstances are prevented. The Transport Accident Investigation Commission Act 1990 allows the Commission to make preliminary recommendations to the Regulators "*...as may be necessary in the interests of transport safety*"[5]. The Commission may also give notice of proposed recommendations "*...to such persons as may be appropriate in the interests of transport safety.*"[6]

In practice the Commission makes safety recommendations to regulators and operators, depending on the circumstances. Sometimes the operators take corrective action before the Commission releases its final report so their safety actions are acknowledged by the Commission in its final report.

The safety recommendations are tangible strategies towards safe action and safe behaviour. They come out of a deductive process involving investigation, examination, analysis, diagnostics, consultation, and discussion.

Some notable safety recommendations are:

From the Aviation Sector –

Getting the Message Out

On the 29 July 2005 the Commission made safety recommendation 065/05 to the Director of Civil Aviation that he:

> *publish educational material to remind IFR pilots about their mutual separation responsibilities' in uncontrolled airspace, particularly when carrying out instrument approaches to the same aerodrome.*

The final safety recommendation was unchanged from the preliminary safety recommendation.

On 26 July 2005 the Director of Civil Aviation replied to the earlier preliminary safety recommendation in part:

> **The Director will accept this recommendation and will publish an article in the November/December [2005] issue of the CAA Safety Magazine Vector, to this effect.**

On 21 November 2005 the Commission made safety recommendation 084/05 to the Director of Civil Aviation that he:

> *develop educational material to ensure that helicopter pilots understand the significance of a rotor overspeed event, and what action should be taken.*

The final safety recommendation was unchanged from the preliminary safety recommendation.

On 17 October 2005 the Director of Civil Aviation replied to the earlier preliminary safety recommendation in part:

> **The Director will accept this recommendation and will publish an article in the March 2006 issue of Vector Magazine concerning the significance of a helicopter rotor over speed event and what action should be taken.**

Making a Global Impact

On 27 February 2006, the Commission made safety recommendation 006/06 to the Director of Civil Aviation that he:

> *acts, in concert with the FAA (Federal Aviation Administration) as the type certification authority, to amend the Aircraft Flight Manuals of the Metro and*

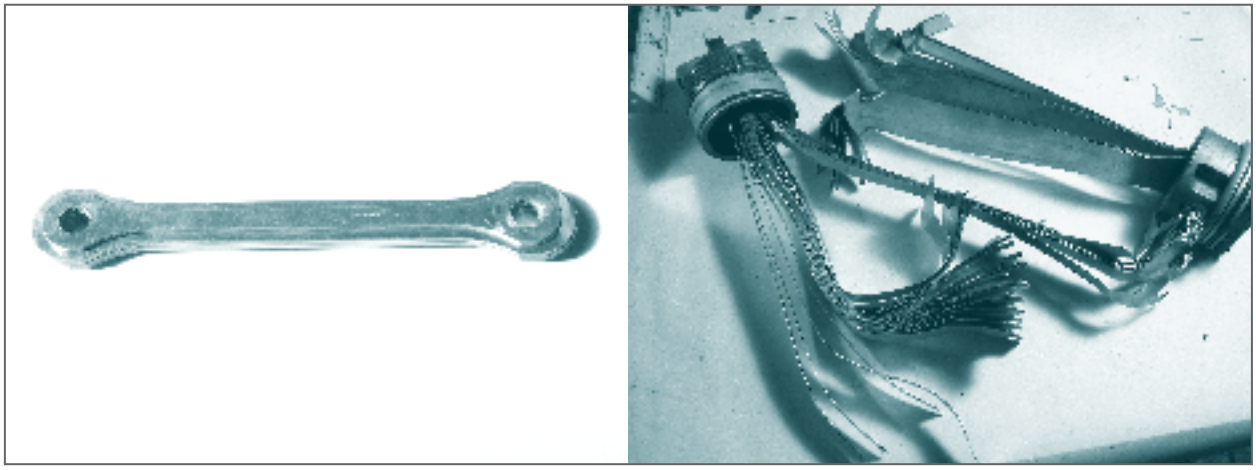
continued on the next page ...

5 Section 9, The Transport Accident Investigation Commission Act 1990.
6 Ibid.

associated types to include a limitation and caution that the autopilot and yaw damper must be disconnected while in-flight fuel balancing is done. In addition, the AFM should contain a procedure for in-flight fuel balancing.

On 25 May 2006 the Director of Civil Aviation replied in part:

The Director has accepted this recommendation and has commenced correspondence with the FAA to request that they amend the flight manuals of the Metro and associated types to include a limitation and caution that the autopilot and yaw damper must be disconnected while in flight fuel balancing is done. In addition the aircraft flight manual should contain a procedure for in flight fuel balancing. This action was commenced in May however no final date for resolution of this matter can be agreed as this is dependent on the FAA internal processes.



The failed main rotor blade tension-torsion strap from ZK-HSF compared with a serviceable part.

From the Rail Sector –

Managing the Structural Integrity of Rolling Stock

Safety recommendation **111/05** issued to Toll Rail on 7 December 2005 suggested that it develop a system for recording and tracking both new and reconditioned key components used on bogies.

Toll Rail advised on 19 December 2005 that it intended to implement this recommendation but that it will take 10 years for the implementation to be complete, as bogies can have up to 10 years life between overhauls.

Safety recommendation **007/06** issued to Toll Rail on 13 March 2006 suggested that it include within its existing procedures for overhauling bogies, an inspection other than visual only, to confirm the structural integrity of specified components before a bogie is returned to service.

Toll Rail advised on 2 April 2006 that it intended to implement this recommendation and that specific testing had already been introduced and was being applied to side frames and other specified bogie components.

Managing Fatigue Amongst Train Controllers

On 6 December 2005, the Commission made safety recommendations **097/05, 098/05, 099/05** and **100/05** to the Chief Executive of ONTRACK that he:

introduce into existing train control rostering procedures a defined maximum number of consecutive at-risk (night) shifts that may be worked together with provision for a mandatory rest period before commencing the next shift rotation

ensure that adequate appropriately trained staff are available to enable relief for vacancies amongst train controllers as a result of sickness etc to be undertaken without calling on staff rostered for or already on mandatory rest periods between shifts

ensure that where a train control shift is extended beyond 8 hours a mandatory break of at least 15 minutes is available to the train controller as close as practicable to the start of the shift extension

and

ensure that existing fatigue management training programmes include, but are not limited to, issues such as sleep practices, lifestyle, family commitments and the use of drugs including alcohol and stimulants etc.

On 19 December 2005 ONTRACK replied that it accepted and would implement safety recommendations 097/05, 098/05 and 100/05. A further review would be required before deciding whether safety recommendation 099/05 could be implemented.

Freight Wagon Bogie.

From the Maritime Sector –

Managing Fatigue

The Commission made a safety recommendation in 1998 regarding fatigue. Safety recommendation **98-209** issued to the Director of Maritime Safety suggesting that he address the management and prevention of fatigue in commercial vessels in New Zealand has been implemented. However, this was not before the Commission investigated 3 further fishing vessel groundings in 2004 that identified fatigue as the principal causal factor, which prompted the issue of a further safety recommendation **052/04** which called for the development, with industry, of a communication and education strategy to implement fatigue management guidelines.

Bronny G under cliffs on Banks Peninsula.

The Commission was reassured that fatigue management within the fishing industry was being addressed when Hon. Harry Duynhoven, Minister for Transport Safety, launched the FishSAFE safety guidelines on 12 May 2006.

continued on the next page ...

Addressing Contingency Planning

On 30 May 2005 the Commission made safety recommendation **041/05** to the General Manager, Interislander, Toll NZ Consolidated Limited that he:

> *define safety critical areas for standard voyage for vessels within the company's fleet. Institute and implement contingency plans for abnormal procedures such as, but not limited to, integrated bridge system and steering system partial and complete failures within areas.*

On 26 May 2006 the Operations Manager, Interislander replied to the preliminary safety recommendation, which was subsequently adopted unchanged as the Commission's final safety recommendation. The reply said in part:

> **Interislander accepts this recommendation and has already begun this process. We expect full implementation by end June 2005.**

Getting the Message Out

In 2005, the Commission took the unprecedented action of issuing a safety recommendation to itself. Recommendation **094/05** issued on 19 October 2005 charged the Commission with publicising the findings of its report [05-205] into the restricted limit passenger vessel *Black Cat*, boating magazines and journals in New Zealand, to warn owners and operators of the possible dangers of attaching additional items to critical control cables.

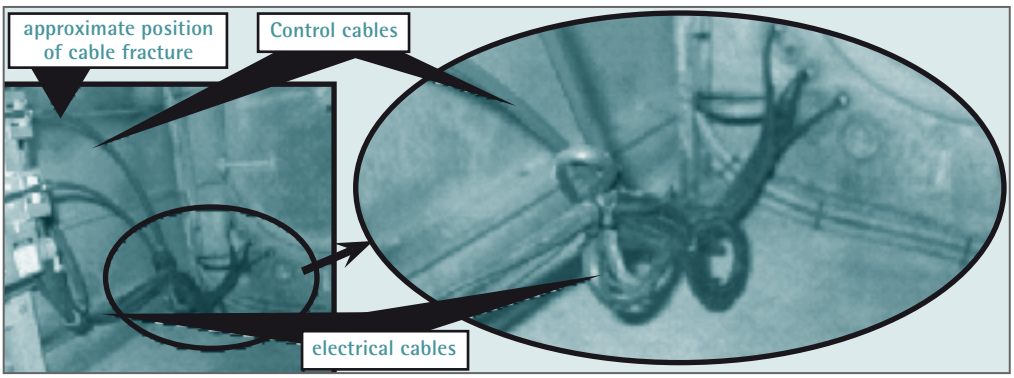
The Importance of Circular Distribution

On 17 June 2005 the Commission made safety recommendation **045/05** to the Director of Maritime Safety that he:

> *review the procedures for distribution of International Maritime Organization circulars to ensure all affected parties promptly receive International Maritime Organization documentation and the distribution and receipt are adequately recorded.(045/05)*

On 1 July 2005 the Director of Maritime New Zealand (formally the Director of Maritime Safety) replied to the final safety recommendation in part:

> **The Maritime Safety Authority accepts the intent of this recommendation for a review of our internal procedures for distribution of IMO circulars. It is our view that documentation of receipt of IMO circulars should be achieved during the routine ISM audit process on board, thereby ensuring that the intended recipient, i.e. the vessel's Master, has received the required information, rather than the company only.**



The *Black Cat* – Control Cables.

International Activities – Being Prepared

Participation in international events and training programmes is an important part of the Commission's work programme. The Commission is obliged to be in a state of preparedness for occurrences, large and small, wherever they occur. The Commission's obligations arise in part from New Zealand's international treaty agreements such as the Convention on International Civil Aviation (ICAO) where it is incumbent on signatory states to provide for a common standard of independent aviation accident investigation. Also it is important that the Commission's investigative staff are current in their investigative practice so that consistent, reliable, scientifically based investigations are undertaken, guided by best practice and supported by appropriate technologies and diagnostics.

New Zealand, as an island state with a small population, positioned as it is at 41° 00S, 174° 00E with few near neighbours, is reliant upon access to other accident management systems to ensure sufficient practice and capability to handle the next significant event. Also, as with other jurisdictions, it is recognised that for bigger accident events no one state necessarily has the investigative resources to manage its own response efficiently. Our investigators may be called upon to assist in other countries, and we in turn may call for help when required. So, to be ready, Commission members and staff attend training workshops, seminars, strategic meetings and conferences annually to learn and to cement relationships.

International events attended include the:

- International Transport Safety Association Chairpersons' Meeting, Canberra
- Marine Accident Investigators' International Forum, Vanuatu
- International Society of Air Safety Investigators' Annual Conference, Fort Worth, Texas
- Australian and New Zealand Society of Air Safety Investigators' Conference, Melbourne
- Rotocraft Investigation Course, Fort Worth, Texas
- Human Factors Course, Melbourne
- Australasian Rail Safety Conference
- International Rail Safety Conference
- Asia Pacific Pilotage Conference, Sydney
- Advanced Bridge Resource Management training, Port Keelung
- Asia Pacific aviation accident investigation workshop, Bangkok
- Flight Safety Foundation seminar, Shanghai.

Summary of Activities

Services Provided

The Minister of Transport purchases independent investigation and reporting on aviation, rail and marine accidents and incidents, and the promulgation of safety recommendations that are derived from the investigations, where appropriate. The investigations are to determine the circumstances and causes of accidents and incidents having significant implications for transport safety, with a view to avoiding similar occurrences in the future, rather than to ascribe blame to any person.

International cooperation and the exchange of accident information with similar accident investigation agencies overseas is also supported.

Summary of Occurrences Notified

The Civil Aviation Authority, Land Transport New Zealand and Maritime New Zealand are each required to notify the Commission of accidents and serious incidents reported to them.

The Commission received 679 notifications in 2005/06.

Notifications of occurences to the Commission averaged 554 per annum over the years 2003/04 through to 2005/06. There has been real growth in notifications of 40% over the 3 years with maritime sector notifications dominating, growing 44% from 2003/04. The growth in notifications comes from a surge in reporting to the Commission in the first half of the financial year from the air and marine regulators.

Table 7 – Occurrences 2003/04-2005/06

OCCURRENCES NOTIFIED BY MODE 2003-2006								
MODE	2003/04	% OF TOTAL	2004/05	% OF TOTAL	2005/06	% OF TOTAL	GRAND TOTAL	% OF TOTAL
Air	203	42%	185	37%	213	31%	601	36%
Rail	101	21%	129	26%	159	24%	389	24%
Marine	182	37%	184	37%	307	45%	673	40%
Total	486		498		679		1663	

Summary of Investigations

The Commission does not investigate every occurrence notified to it. Criteria are applied to ensure those occurrences to be investigated will add value to the lessons already learnt, and not waste scarce resources through duplication of effort where there is nothing more to be gained. Sometimes the Commission may decide to investigate where there is a clear pattern or trend emerging from a series of similar occurrences. Having decided to investigate, the investigations are prioritised according to severity of event and numbers of people harmed, or likely to be harmed.

Prioritisations used are:

Priority 1:	Widespread or major threat to public safety.
Priority 2:	Significant concern for public safety.
Priority 3:	Likely to have significant implications for transport safety.
Priority 4:	Initial enquiries are to be made to determine whether the occurrence is likely to have significant implications for transport safety. If it does, the occurrence is re-prioritised as priority 3. If it doesn't, then it is re-allocated a priority 5, and discontinued.
Priority 5:	Not for investigation.

The Commission launched 33 investigations from 679 notifications. This represents a 5% launch rate. This launch rate is 7% lower than last year. The average launch rate over the years 2003/04 through to 2005/06 is 9%.

Rail investigations continue to dominate the Commission's caseload, averaging 52% of the investigations launched over the 3 year period.

Table 8 – Investigations 2003/04-2005/06

INVESTIGATIONS LAUNCHED BY MODE 2003-2006								
MODE	2003/04	% OF TOTAL	2004/05	% OF TOTAL	2005/06	% OF TOTAL	GRAND TOTAL	% OF TOTAL
Air	7	16%	11	18%	7	21%	25	18%
Rail	22	50%	33	53%	17	52%	72	52%
Marine	15	34%	18	29%	9	27%	42	30%
Total	44		62		33		139	

Table 9 – Investigations: Launch Rates

	2003/04	2004/05	2005/06
Notifications	486	498	679
Investigations Launched	44	62	33
Rate	9%	12%	5%
Ratio	1:10	1:9	1:20

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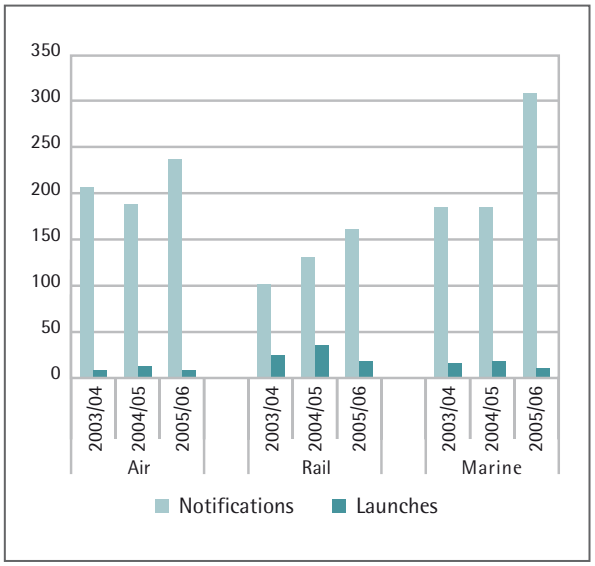
Figure 1 –
Comparison of Notifications/Investigations Launched by Mode 2003/04-2005/06



Investigations launched dropped 47% from last year's result. All modes reduced the number of investigations launched: Air by 36%, Rail by 48%, and Marine by 50%. The lower rate of investigations launched reflects the types of occurrence notified. Also, the same criteria for investigation have been consistently applied over the years, indicating that even though notifications increased, the number of significant accidents and incidents has decreased.

Some investigations, when assessed, are found not to have the significance for transport safety as first thought.

The prioritisations initially assigned are list in Table 10 below.

Table 10 –

Prioritisations	1	2	3	4	5
Air	0	0	2	5	0
Rail	0	0	11	6	0
Marine	0	0	6	3	0
Total	0	0	19	14	0

In those cases the investigation is closed without a report being published.

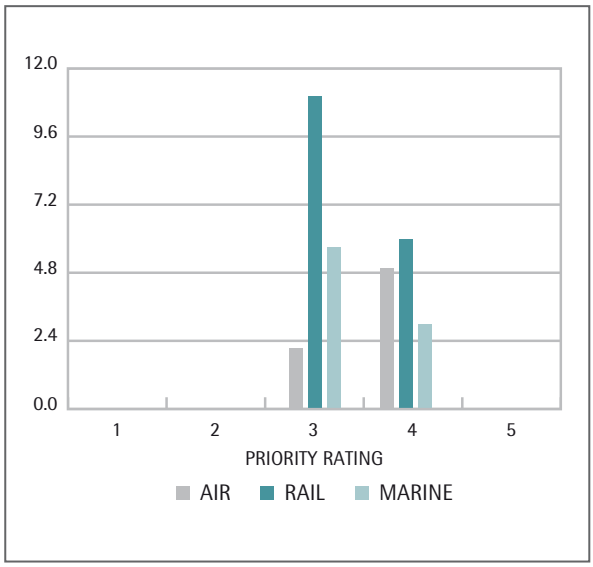
For example, Occurrence 05-129 was notified as a near collision between a heavy truck and Train 700, the Coastal Pacific passenger train, at a level crossing near Blenheim. An investigation was launched because the notified detail indicated that, although no collision had occurred, one nearly had, which had the potential to put the passengers and crew of the train at risk, and the truck driver even more so.

Investigation revealed that the train driver had seen the truck on the crossing with the warning lights going, whereas the truck driver had not seen the train or the warning lights. Timing and measurement showed that the truck probably entered the level crossing at the same moment that the train passed over the track circuitry that activated the warning lights. The train driver confirmed that the truck was well clear of the crossing by the time his train passed over it.

The warning devices were checked and found to be working correctly. The track circuitry was also checked and found to be working correctly and appropriately positioned. The road markings and signage were in place and in good condition. In other words the level crossing protection was all working as designed.

In the circumstance of this incident, there was no risk of a collision with the two vehicles being about half a kilometre apart. The incident occurred because of a fluke of timing, rather than any shortcomings in the actions of the two drivers or the protection devices.

Figure 2 – Priority Ratings Assigned by Mode



Rail occurrences account for 58% of the initial priority 3 allocations. Rail notifications are low volume compared with Air or Marine but the launch rate for Rail is 8% higher than either Air or Marine modes. The lower level of occurrence notifications in Rail reflects the volume of discrete movements undertaken. There are fewer train movements than there are Air or Marine movements on any given day so the likelihood of an event occurring is lower.

In deciding whether or not to launch an investigation the Commission has long-established criteria for the modes of transport that it looks at. If, having applied those criteria to the notification detail, there is some doubt then it is more likely that a rail investigation will be launched than in the other modes because of the differing legislation that the respective regulators operate to. If the Commission declines to investigate, then in aviation and marine an investigation will be carried out by investigatory staff within the Regulators. However in rail, Land Transport New Zealand does not have a dedicated in-house investigatory staff. Land Transport New Zealand is therefore more reliant on investigations done internally by an operator, investigations carried out by its own staff alongside other work, or must hire in external investigators if it has a particular concern about an occurrence whether or not being investigated by the Commission.

However, even with making allowances for the higher likelihood of the Commission investigating a rail occurrence, the number of priority 3 allocations to Rail occurrences compared with Air or Marine does invite further inquiry of our rail network. Table 11 below details the rail investigations launched by category of event. Derailments, level crossing collisions, and run away wagons stand out. The train derailments have been associated with metal fatigue correlated with an aged system. Level crossing occurrences are associated with road driver behaviour rather than train driver behaviour. Whereas run away wagons tend to be associated with railway staff behaviour, and aged train structures.

Table 11 –

CATEGORY OF EVENT	NUMBER
Carriage issues	2
Derailments	3
Fire	1
Level crossing collision/near collision	3
Mechanical failure	2
Over run platform	1
Runaway wagons	3
Track operating irregularity	2

continued on the next page ...

Summary of Reports

The Commission makes determinations as to circumstances and causes of accidents and incidents after inquiring into the accident or incident. The Commission compiles reports on the occurrences it investigates, providing an account of the occurrence, the form of the investigation undertaken, the people spoken to, the tests and analyses conducted, the feedback provided by interested parties, the findings obtained, and the safety recommendations, if any, made to rectify or counter the contributing factors to the accident or incident event. When the Commission approves a final draft report, the report is prepared for publication, and the investigation is deemed closed.

Table 12 –

REPORTS PRODUCED BY MODE 2003-2006								
MODE	2003/04	% OF TOTAL	2004/05	% OF TOTAL	2005/06	% OF TOTAL	GRAND TOTAL	% OF TOTAL
Air	6	18%	9	21%	12	22%	27	21%
Rail	17	50%	20	47%	30	56%	67	51%
Marine	11	32%	14	33%	12	22%	37	28%
Total	34		43		54		131	

The lower level of investigations launched across the modes enabled the Commission to focus on completing reports. The number of reports completed increased 26% on last year. Particular effort went into reducing the backlog of Rail reports outstanding. At the end of the financial year last year there were 50 open investigations, 27 relating to Rail. This year the number of open investigations dropped 48%, and the Rail backlog reduced by 41%.

There are three main stages to an investigation.
They are:

Table 13 –

Stage 1:	Under investigation, including preparation of the draft preliminary report.
Stage 2:	The draft preliminary report is approved for release by the Commission for consultation with Interested Parties.
Stage 3:	The Commission has approved the final report, with the report to be prepared for publication.

Table 14 below shows the status of open investigations as at 30 June 2006.

Table 14 –

OPEN INVESTIGATIONS					
MODE	STAGE 1	STAGE 2	STAGE 3	TOTAL	% OF TOTAL
Air	1	3	1	5	19%
Rail	11	1	4	16	62%
Marine	5	0	0	5	19%
Grand Total	17	4	5	26	100%
% of Total	65%	15%	20%	100%	

Each year a portion of the investigations undertaken do not proceed to completion with a final report. These are generally priority 4 investigations launched and discontinued because the implications for transport safety are not significant.

The number of investigations ceased without publishing a report are detailed in Table 15 below.

Table 15 –

INVESTIGATIONS CEASED WITHOUT PUBLISHING A REPORT				
MODE	2003/2004	2004/2005	2005/2006	TOTAL
Air	1	4	2	7
Rail	4	8	3	15
Marine	3	2	1	6
Total	8	13	6	28
% of Investigations Launched	23%	38%	18%	

continued on the next page ...

Summary of Safety Recommendations Issued

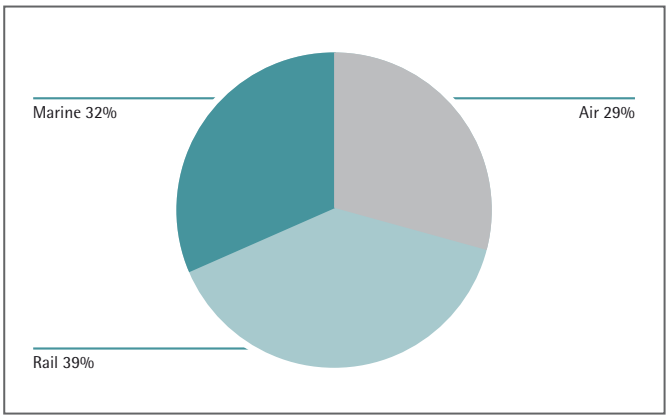
If the Commission is making an impact at all on preventing similar accidents or incidents recurring, it is through the promulgation and uptake of its safety recommendations. It is difficult to assess what direct impact the Commission has on improving the safety of transport in New Zealand but certainly some correlation may drawn between the level of uptake of the safety recommendations issued in respect of specific events and the frequency of similar events over time. Currently the Commission is unable to test for correlations, however at a rudimentary level it does monitor the uptake of its safety recommendations.

The Commission issued 77 safety recommendations. This is 42 (35%) less than last year.

Table 16 –

SAFETY RECOMMENDATIONS ISSUED 2003/04-2005/06			
MODE	2003/2004	2004/2005	2005/2006
Air	10	16	22
Rail	29	36	30
Marine	34	67	25
Total	73	119	77

Figure 3 – The Proportion of Safety Recommendations Issued by Mode 2005/06



The acceptance rate is 93% compared with 82% last year. The number of safety recommendations accepted is listed in table 17 below.

Table 17 –

NUMBER OF SAFETY RECOMMENDATIONS ACCEPTED				
MODE	2003/2004	2004/2005	2005/2006	TOTAL
Air	9	5	9	23
Rail	13	39	28	80
Marine	13	55	35	103
Total Safety Recommendations	35	99	72	206

Table 18 –

NUMBER OF SAFETY RECOMMENDATIONS DECLINED				
MODE	2003/2004	2004/2005	2005/2006	TOTAL
Air	2	2	0	4
Rail	2	0	4	6
Marine	4	9	6	19
Total Safety Recommendations	8	11	10	29

Safety recommendations, while accepted, are not always implemented on acceptance. The Commission designates accepted but unactioned safety recommendations as 'open', and monitors the time lapsed for open safety recommendations. The Commission recognises that some safety recommendations issued will require a number of years for full implementation because of the nature of change required, or the scale of the task required. Table 19 shows the number of safety recommendations open. There is a net loss of 5 open safety recommendations from last year's ending balance.

Table 19 –

NUMBER OF SAFETY RECOMMENDATIONS OPEN (SRS)				
MODE	OPENING BALANCE	ISSUED OVER THE YEAR	CLOSED OVER THE YEAR	ENDING BALANCE
Air	34	22	9	47
Rail	75	30	32	73
Marine	106	25	41	90
Total Safety Recommendations	215	77	82	210

Safety recommendations open longer than 12 months are:

Table 20 –

MODE	SRS OPEN > 12 MONTHS	SRS OPEN > 24 MONTHS
Air	22	24
Rail	45	77
Marine	68	100
Total Safety Recommendations	135	201

Work Programme

The Commission's work programme described in the 2005/2006 Statement of Intent involved a number of initiatives. Substantive work included:

1. Reviewing the Commission's Memoranda of Understanding with the 8 agencies it has regular operational engagement with. This work is on-going, forming part of next year's work programme.
2. Working with the Ministry of Transport and with the Civil Aviation Authority to the Annex 13 initiative is now carried forward into the work programme for 2006/2007.
3. Work continues across the regulators and with the Ministry to reduce the number of outstanding safety recommendations. Some safety recommendations by their nature require long-term phasing because of the scale of the enterprise involved.
4. Trend analysis capability remains at a basic level. Regulators are assisting with information requests as required. Further development in this area will come out of proposed IT enhancements, which are forming part of the Commission's work programme for 2006/2007.
5. A paper was prepared for the Commission's consideration looking at exploring avenues for establishing credible data for the impact on the economy if a perception is allowed to grow overseas that transport in New Zealand is less than safe. It was noted that:
   i. There is some data available but the extent to which that data is credible is problematic
   ii. To obtain credible data the Commission would need to under take some form of survey
   iii. The benefits of undertaking a survey are contingent upon the type of survey approach adopted and related costs.

   Given the above, and noting also that the cost to undertake research is high, the Commission decided there was no value in pursuing the required research because of the lack of reliability inherent in the dataset.
6. Development of indices of relative severity and cost – this initiative is now tied to the development of the Commission's proposed Accident Investigation Management System. Work on developing the indices proved impracticable. Work is now focusing on consolidating a process for resource allocation to categories of occurrences utilising the Commission's prioritisation system.

Statement of Responsibility

For the Year Ended 30 June 2006

In the financial year ended 30 June 2006, the Commissioners and management of the Transport Accident Investigation Commission were responsible for:

(a) The preparation of financial statements and the judgements therein

(b) Establishing and maintaining a system of internal control designed to provide reasonable assurance as to the integrity and reliability of financial reporting.

In the opinion of the Commissioners and management of the Transport Accident Investigation Commission, the financial statements for the financial year reflect fairly the financial position and operations of the Transport Accident Investigation Commission.

Hon. W P Jeffries
Chief Commissioner

Lois Hutchinson
Chief Executive

Dated 27 October 2006

Financials – Statement of Accounting Policies

For the year ended 30 June 2006

1: Reporting entity

The Transport Accident Investigation Commission is an independent Crown entity established under the Transport Accident Investigation Commission Act 1990.

The Commission investigates aviation, marine and rail accidents and incidents, the circumstances of which have, or are likely to have, significant implications for transport safety. The Commission publishes safety recommendations and reports on accidents and incidents to avoid similar occurrences in future.

The Commission also represents New Zealand at accident investigations in which New Zealand has a specific interest, conducted by overseas authorities, and exchanges accident and incident information with overseas government accident investigation authorities.

The Commission's air accident investigation capability is occasionally extended, on a cost recovery basis, to Pacific Island states with no similar agency.

2. Measurement system

The financial statements have been prepared on a historical cost basis.

3. Particular accounting policies

The following particular accounting policies that materially affect the measurement of financial performance and financial position have been applied:

(a) Budget figures –

The budget figures are those approved by the Commission at the beginning of the financial year.

The budget figures have been prepared in accordance with generally accepted accounting practice and are consistent with the accounting policies adopted by the Commission for the preparation of the financial statements.

(b) Revenue –

The Commission derives revenue through the provision of outputs to the Crown, for services to third parties and income from its investments. Such revenue is recognised when earned and is reported in the financial period to which it relates.

(c) Fixed assets are shown at cost less accumulated depreciation and have been depreciated on a straight line basis that is anticipated to write them off over their estimated useful lives –

continued on the next page ...

FIXED ASSET TYPE		USEFUL LIFE (YEARS)
Buildings (store)		33
Furniture and fitting		8 - 18
Office equipment		2.5 - 20
EDP equipment		3.3 - 10

(d) Receivables –

Receivables have been valued at expected net realisable value.

(e) GST –

These financial statements have been prepared exclusive of GST except for those payables with suppliers and receivables from customers.

(f) Statement of Cash Flows –

Cash comprises monies held in the Commission's bank accounts and short term deposits.

Financing activities comprise the change in equity and debt capital structure of the Commission.

Investing activities relate to the sale and purchase of fixed assets.

Operating activities include all transactions and other events that are not investing or financing activities. Interest received is included in operating activities.

(g) Provision for employee leave entitlements –

Provision of employee leave entitlements is recognised when employees become eligible to receive the benefits.

(h) Taxation –

The Commission is a public authority in terms of the Income Tax Act 2004 and consequently is exempt from income tax.

(i) Operating leases –

Operating lease payments, where the lessor effectively retains substantially all the risks and benefits of ownership of the leased items, are charged as expenses in the periods in which they are incurred.

(j) Financial instruments –

The Commission is party to financial instruments as part of its normal operations. These financial instruments include bank accounts, short-term deposits, debtors and creditors. All financial instruments are recognised in the statement of financial position and all revenues and expenses in relation to financial instruments are recognised in the statement of financial performance.

4. Changes in accounting policies

There have been no changes in accounting policies during the year under review.

All policies have been applied on the basis consistent with the previous year.

Statement of Financial Position

As at 30 June 2006

	Note	Actuals 30/06/06 $	Budget 30/06/06 $	Actuals 30/06/05 $
ASSETS				
Fixed assets	1	85,269	175,000	82,368
Current assets				
Cash at bank		119,491	151,703	387,909
Short-term deposits		404,313	300,000	150,000
Receivables	2	55,966	-	3,698
Accrued interest		7,168	6,000	4,747
Prepayments and advances		23,843	20,000	36,580
Total Current assets		610,781	477,703	582,934
Total Assets		696,050	652,703	665,302
Represented by:				
LIABILITIES AND TAXPAYERS' FUNDS				
Current liabilities				
Payables and Accruals	3	239,211	149,000	166,879
Provision for employee leave entitlements	4	120,733	100,000	111,820
Total Current liabilities		359,944	249,000	278,699
Taxpayers' Equity		336,106	403,703	386,603
Total Liabilities and Taxpayers' funds		696,050	652,703	665,302

The accompanying notes and statement of accounting policies should be read in conjunction with these financial statements.

Hon. W P Jeffries
Chief Commissioner

Lois Hutchinson
Chief Executive

Statement of Financial Performance

For the year ended 30 June 2006

		Note	Actuals 30/06/06 $	Budget 30/06/06 $	Actuals 30/06/05 $
REVENUE					
Crown revenue			2,616,000	2,617,000	2,422,444
Other income			4,991	7,000	4,708
Profit on sale of fixed assets			-	-	-
Interest earned			36,630	23,000	23,058
Total Revenue			2,657,621	2,647,000	2,450,210
EXPENDITURE					
Audit fees			10,927	35,400	2,177
Commissioners' fees			82,872	73,000	56,360
Depreciation			-		-
	Buildings		894	1,000	894
	EDP equipment		15,084	20,000	21,379
	Office furniture, fittings and equipment		10,347	19,000	9,904
Lease, rentals and outgoings			175,361	145,000	134,108
Capital charge		5	30,928	31,000	30,851
Personnel costs			1,586,720	1,599,000	1,534,204
Loss on sale			150	-	3,663
Other operating costs			794,835	706,500	655,702
Total Expenditure			2,708,118	2,629,900	2,449,242
Net Surplus/(Deficit)			(50,497)	17,100	968

The accompanying notes and statement of accounting policies should be read in conjunction with these financial statements.

Statement of Movements in Equity

For the year ended 30 June 2006

	Note	Actuals 30/06/06 $	Budget 30/06/06 $	Actuals 30/06/05 $
Opening Taxpayers' equity at 1 July 2006		386,603	386,603	385,635
Plus:				
Net Surplus/(Deficit)		(50,497)	17,100	968
Capital Injection		-	-	-
Total recognised revenues and expenses for the year		(50,497)	17,100	968
Closing Taxpayers' equity at 30 June 2006		336,106	403,703	386,603

The accompanying notes and statement of accounting policies should be read in conjunction with these financial statements.

Statement of Cash Flows

For the year ended 30 June 2006

	Actuals 30/06/06 $	Budget 30/06/06 $	Actuals 30/06/05 $
CASH FLOWS FROM OPERATING ACTIVITIES			
Cash was received from:			
Crown revenue	2,616,000	2,617,000	2,422,444
Other income	8,973	-	1,010
Interest received	34,209	27,000	21,930
	2,659,182	2,644,000	2,445,384
Cash was disbursed to:			
Payments to suppliers	1,035,176	855,500	731,639
Payments to employees	1,577,807	1,699,000	1,646,025
Capital charge	30,928	29,000	30,851
Net cash flows from operating activities	15,271	60,500	36,869
CASH FLOWS FROM INVESTING ACTIVITIES			
Cash was received from:			
Sale of fixed assets	1,081	-	11,855
Cash was applied to:			
Purchase of fixed assets	30,456	40,000	25,780
Net cash flows from investing activities	(29,375)	(40,000)	(13,925)
CASH FLOWS FROM FINANCING ACTIVITIES			
Cash provided from:			
Capital Contribution from the Crown	-	-	-
Cash disbursed to:			
Payment of Surplus to the Crown	-	-	-
Net Cash Flows from Financing Activities	-	-	-
Net movement in cash for the period	(14,104)	20,500	22,944
Opening bank balance	537,909	514,965	514,965
Closing bank balance	523,805	535,465	537,909

The accompanying notes and statement of accounting policies should be read in conjunction with these financial statements.

Reconciliation of Cash Flow with Statement of Financial Performance

For the year ended 30 June 2006

	30/06/06 $	30/06/05 $
(Deficit)/Surplus from Statement of Financial Performance	(50,497)	968
Add Non-Cash Items		
Depreciation	26,325	32,177
(Profit)/loss on sale of fixed assets	150	3,663
	(24,022)	36,808
Add/(Less) movements in Working Capital Items		
Decrease (increase) in Receivables	(52,268)	(3,698)
Decrease (increase) in Accrued interest	(2,421)	(1,128)
Decrease (increase) in Advances and Prepayments	12,737	(19,743)
Increase (decrease) in Creditors and Accruals	72,332	15,695
Increase (decrease) in Provisions	8,913	8,935
Total working capital items	39,293	61
Net cash flows from operating activities	15,271	36,869

The accompanying notes and statement of accounting policies should be read in conjunction with these financial statements.

Notes to the Financial Statements

For the year ended 30 June 2006

1. FIXED ASSETS

	Cost	Depreciation	Accumulated Depreciation	Value
	$	$	$	$
2006				
Buildings	29,798	894	15,065	14,733
EDP equipment	124,210	15,084	105,265	18,945
Office furniture, fittings and equipment	239,737	10,347	188,146	51,591
	393,745	26,325	308,476	85,269
2005				
Buildings	29,798	894	14,171	15,627
EDP equipment	118,629	21,379	90,229	28,400
Office furniture, fittings and equipment	216,872	9,904	178,531	38,341
	365,299	32,177	282,931	82,368

2. RECEIVABLES

	30/06/06	30/06/05
	$	$
Gross Receivables	55,966	3,698
Less: Provision for doubtful debts	-	-
Net Receivables	55,966	3,698

3. PAYABLES AND ACCRUALS

	30/06/06	30/06/05
	$	$
Trade creditors	140,793	76,563
Accrued expenses	98,418	90,316
Total Payables and Accruals	239,211	166,879

4. PROVISION FOR EMPLOYEE LEAVE ENTITLEMENTS

	30/06/06	30/06/05
	$	$
Annual leave	91,458	82,545
Retirement leave	29,275	29,275
	120,733	111,820

Notes to the Financial Statements ... continued

5. CAPITAL CHARGE

Levied at 8% on the taxpayers' funds for 2006. For the 2005 year the rate was 8%.

6. FINANCIAL INSTRUMENTS

The Commission has various financial instruments comprising both financial assets and liabilities that are stated at their estimated fair value in the Statement of Financial Position.

Financial instruments that potentially subject the Commission to credit risk consist of cash at bank and accounts receivable. All financial instruments are unsecured and do not require collateral or other security. There are no significant concentrations of credit risk.

A Term deposit is currently placed with BNZ, the term is due to mature on 9/7/06, the rate is 7.40%. The Term Deposit held with the National Bank is due to mature on 16/10/06, the rate for this was 7.20%. The term deposit held with Westpac matured 10/3/06 at the interest rate of 6.20% and was reinvested with Kiwi Bank on 13/4/06 maturing on 12/07/06 at the rate of 7.35%.

Investments and funds are invested pursuant to powers granted under Section 25 of the Public Finance Act 1989.

The Commission incurs minimal foreign currency risk through payables and accruals in the normal course of its business.

7. EMPLOYEE REMUNERATION

Total remuneration and benefits	Number of Employees	
$000	2006	2005
$100-$110	2	4
$110-$120	3	1
$120-$130	2	2
$130-$140	0	0
$140-$150	0	1
$150-$160	2	0
$160-$170	0	0
$170-$180	0	0
$180-$190	0	1

The Chief Executive's total remuneration and benefits received in 2005/2006 is in the $150,000-$160,000 band.

Notes to the Financial Statements ... continued

8. COMMISSION MEMBERS

Commission members earned the following fees during the year:

Member	Fees	
	2006	2005
Hon. WP Jeffries (Chief Commissioner)	$41,400	$27,000
Ms PA Winter	$20,350	$14,122
Mr NA Macfarlane - term ended 21 October 2004	$0	$7,278
Mr B Wyness - appointed October 2004	$21,122	$7,958

9. STATEMENT OF COMMITMENTS

The Transport Accident Investigation Commission has ongoing leases of the following amounts:

	30/06/06 $	30/06/05 $
Less than 1 year	239,580	111,609
1 - 2 years	373,726	111,609
2 - 5 years	455,747	117,792
5+ years	443,087	5,987
	1,512,140	346,997

Note:

The lease for Level 9, 114 The Terrace, Wellington was terminated on the 30/7/06 and a new lease was taken for Level 11, Cigna House.

St John House, Level 14 has been sub-leased for 2 years until the lease expires in 2008.

10. STATEMENT OF CONTINGENT LIABILITIES

There were no contingent liabilities existing at balance date. (2005: Nil.)

11. INTERNATIONAL FINANCIAL REPORTING STANDARDS

Note: The Commission is currently working with MoT in preparation for the NZ IFRS conversion.

Statement of Objectives and Service Performance

For Outputs in the Year Ended 30 June 2006

Non-Departmental Output Expenses – Reporting on Accident or Incident Investigations

The Minister of Transport purchases independent investigation and reporting on aviation, rail and marine accidents and incidents in New Zealand. The Commission investigates to determine the circumstances and causes of accidents and incidents having significant implications for transport safety, with a view to avoiding similar occurrences in the future, rather than to ascribe blame to any person.

Included in the purchased output is the promulgation of safety recommendations and reporting on the implementation status of the Commission's safety recommendations.

The Commission has 2 key performance measures. These are:

- The quantity of new investigations initiated; and
- The timeliness of producing reports.

Table 21 –

PERFORMANCE MEASURE: REPORTING ON ACCIDENT OR INCIDENT INVESTIGATIONS: NUMBER OF NEW INVESTIGATIONS INITIATED				
MODE	ACTUAL 2005/2006	TARGET 2005/2006	% TO TARGET	ACTUAL 2004/2005
Air	7	15	47%	11
Rail	17	30	57%	33
Marine	9	20	45%	18
Total	33	65	51%	62

Timelines

The Commission's performance against agreed timeline measures is shown below.

Table 22 –

MEASURE	AIR	RAIL	MARINE	COMMENT
A Preliminary Report on a major accident will be issued within 12 months of the accident occurring.	N/A	N/A	N/A	There were no major accidents in each of the modalities for the reporting period.
At least 90% of investigations into non-major occurrences will be finalized by the Commission within 9 months of the occurrence.	12 Investigations finalised 7 > 9months 42% < 9months	30 Investigations finalised 21 > 9months 27% < 9months	12 Investigations finalised 3 > 9months 75% < 9months	**Air:** Of the 7 air investigations that took longer than 9 months, 1 was the resumed investigation into the in-flight break-up of helicopter ZK-HJH. Because of the complex issues involved, this investigation took a total of 38.65 months. Two others took just over 9 months; 3 involved controlled flight into terrain and required additional research; and one involved another in-flight break up of a helicopter that was the same type as ZK-HJH. **Rail:** The times taken to finalisation are a reflection of the Rail Investigators continuing to work through to clear a backlog, which has been reduced to investigations in progress now numbering 16. **Marine:** Of the 3 marine investigations that took longer than 9 months, one occurred during the Christmas period and involved salvaging issues; one involved further research; and one involved fire on board a fishing boat.
Availability of Investigators: 24 hours per day, 365 days per year.	Achieved	Achieved	Achieved	

Audit Report

AUDIT NEW ZEALAND
Mana Arotake Aotearoa

AUDIT REPORT

TO THE READERS OF TRANSPORT ACCIDENT INVESTIGATION COMMISSION'S FINANCIAL STATEMENTS FOR THE YEAR ENDED 30 JUNE 2006

The Auditor-General is the auditor of the Transport Accident Investigation Commission (the Commission). The Auditor-General has appointed me, Stephen Lucy, using the staff and resources of Audit New Zealand, to carry out the audit of the financial statements of the Commission, on his behalf, for the year ended 30 June 2006.

Unqualified opinion

In our opinion the financial statements of the Commission on pages 49 to 58:

- comply with generally accepted accounting practice in New Zealand; and
- fairly reflect:
  - the Commission's financial position as at 30 June 2006;
  - the results of its operations and cash flows for the year ended on that date; and
  - its service performance achievements measured against the performance targets adopted for the year ended on that date.

The audit was completed on 27 October 2006 and is the date at which our opinion is expressed.

The basis of our opinion is explained below. In addition, we outline the responsibilities of the Commissioners and the Auditor, and explain our independence.

Basis of opinion

We carried out the audit in accordance with the Auditor-General's Auditing Standards, which incorporate the New Zealand Auditing Standards.

We planned and performed the audit to obtain all the information and explanations we considered necessary in order to obtain reasonable assurance that the financial statements did not have material misstatements, whether caused by fraud or error.

Material misstatements are differences or omissions of amounts and disclosures that would affect a reader's overall understanding of the financial statements. If we had found material misstatements that were not corrected, we would have referred to them in our opinion.

The audit involved performing procedures to test the information presented in the financial statements. We assessed the results of those procedures in forming our opinion.

Audit procedures generally include:

- determining whether significant financial and management controls are working and can be relied on to produce complete and accurate data;
- verifying samples of transactions and account balances;
- performing analyses to identify anomalies in the reported data;
- reviewing significant estimates and judgements made by the Commissioners;
- confirming year-end balances;
- determining whether accounting policies are appropriate and consistently applied; and
- determining whether all financial statement disclosures are adequate.

We did not examine every transaction, nor do we guarantee complete accuracy of the financial statements.

We evaluated the overall adequacy of the presentation of information in the financial statements. We obtained all the information and explanations we required to support our opinion above.

Responsibilities of the Commissioners and the Auditor

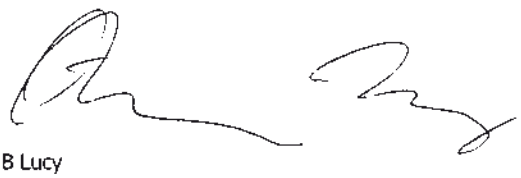
The Commissioners are responsible for preparing financial statements in accordance with generally accepted accounting practice in New Zealand. Those financial statements must fairly reflect the financial position of the Commission as at 30 June 2006. They must also fairly reflect the results of its operations and cash flows and service performance achievements for the year ended on that date. The Commissioners' responsibilities arise from the Public Finance Act 1989 and the Transport Accident Investigation Commission Act 1990.

We are responsible for expressing an independent opinion on the financial statements and reporting that opinion to you. This responsibility arises from section 15 of the Public Audit Act 2001 and the Public Finance Act 1989.

Independence

When carrying out the audit we followed the independence requirements of the Auditor-General, which incorporate the independence requirements of the Institute of Chartered Accountants of New Zealand.

Other than the audit, we have no relationship with or interests in the Commission.



S B Lucy
Audit New Zealand
On behalf of the Auditor-General
Wellington, New Zealand

The Commission's Functions and Role

The Commission is an independent Crown entity as defined in section 7 of the Crown Entities Act 2004. Its purpose and functions are set out in the Transport Accident Investigation Commission Act 1990.

In addition, the Commission is a Commission of Inquiry, having the same powers as are conferred on a Commission of Inquiry by the Commission of Inquiry Act 1908. As a Commission of Inquiry its powers are limited to aviation, rail and marine occurrences only.

Principal Purpose

The Commission's principal purpose as described in the Act is to:

> s(4) "...determine the circumstances and causes of accidents and incidents with a view to avoiding similar occurrences in the future, rather than to ascribe blame to any person."
>
> The Commission's purpose is common amongst other nations that have adopted a safety ethos and are committed to improving transport safety in their respective countries. Countries such as Canada, the United States and Australia support national agencies devoted to conducting independent investigations of transport accidents and incidents without ascribing blame.[7] In this regard New Zealand takes its place in the global community, contributing to the advancement of safety in transport both domestically and internationally.

The Meaning of Accident

The meaning of an accident is defined under the Act by cross-referencing to the definition of accident as defined in the:

- Civil Aviation Act 1990 for air accidents
- Railways Act 2005 for rail accident and
- Maritime Transport Act 1994 for maritime accidents.

For the Purposes of Aviation Occurrences an Accident is:

> "...an occurrence that is associated with the operation of an aircraft and takes place between the time any person boards the aircraft with the intention of flight and such time as all such persons have disembarked and the engine or any propellers or rotors come to rest, being an occurrence in which –

1: A person is fatally or seriously injured as a result of:

> a. Being in the aircraft; or

7 Canada: Transportation Safety Board of Canada [www.bst.gc.ca]
Australia: Australian Transport Safety Bureau [www.atsb.gov.au]
United States: National Transportation Safety Board [www.ntsb.gov.]

b. Direct contact with any part of the aircraft, including any part that has become detached from the aircraft; or

c. Direct exposure to jet blast – Except when the injuries are self inflicted or inflicted by other persons, or when the injuries are to stowaways hiding outside the areas normally available to passengers and crew; or

2: The aircraft sustains damage or structural failure that:

a. Adversely affects the structural strength, performance, or flight characteristics of the aircraft; and

b. Would normally require major repair or replacement of the affected component – Except engine failure or damage that is limited to the engine, its cowlings, or accessories, or damage limited to propellers, wing tips, antennas, tyres, brakes, fairings, small dents, or puncture holes in the aircraft skin; or

3: The aircraft is missing or is completely inaccessible..."

For the Purposes of Maritime Occurences an Accident is:

"...an occurrence that involves a ship and in which –

a. A person is seriously harmed as a result of –

vii. Being on the ship; or

viii. Direct contact with any part of the ship, including any part that has become detached from the ship; or

ix. Direct exposure to the wash of the ship or interaction (other than direct contact) between 2 ships; or

b. Being involved in the salvage of any ship, except where the injuries are self-inflicted or inflicted by other persons, or when injuries are to stowaways hiding outside the areas normally available to passengers and crew; or

c. The ship sustains damage or structural failure that –

iv. Adversely affects the structural strength, performance, or seaworthiness of the ship; or

v. Would normally require major repair or replacement of the affected component; or

vi. Poses a threat to the safety of the people on board the ship; or

d. There is a loss or escape of any substance or thing that –

vii. May result, or has resulted, in serious harm to any person; or

viii. May pose a risk, or has resulted in damage, to the ship or other ships; or

ix May pose a risk, or has resulted in damage, to any property (whether or not on board the ship); or

e. A person is lost at sea (whether or not subsequently found) or is missing; or

f. The ship is foundering, capsizing, being abandoned, stranding, missing, or has foundered, capsized, been abandoned, stranded, been in a collision, or has had a major fire on board..."

continued on the next page ...

For the Purposes of Rail Occurences an Accident is:

"...an occurrence associated with the operation of a rail vehicle or the use of railway infrastructure or railway premises that causes –

a. The death of, or serious injury to, individuals; or

b. Significant damage to property..."

The Meaning of Incident

As for the meaning of accidents, incidents are similarly defined under the Act by reference to the:

- The Civil Aviation Act 1990 for air accidents;
- Railways Act 2005 for rail accidents; and
- Maritime Transport Act 1994 for maritime accidents.

For the Purposes of Aviation Occurences an Incident is:

"...any occurrence, other than an accident, that is associated with the operation of an aircraft and affects or could affect the safety of the operation."

For the Purposes of Maritime Occurences an Incident is:

"...an occurrence, other than an accident, that is associated with the operation of a ship and affects or could affect the safety of the operation..."

For the Purposes of Rail Occurences an Incident is:

"...an occurrence, other than an accident, that is associated with the operation of a rail vehicle or the use of railway infrastructure or railway premises that placed, or could have placed, –

a. a person at risk of death or serious injury; or

b. property at risk of significant damage..."

Principal Function

The Commission's principal function is described in the Act as being:

"...[t]he investigation of accidents and incidents."

The Commission does not investigate all aviation, rail and marine accidents and incidents. It investigates those occurrences notified to it under section 27 of the Civil Aviation Act 1990, section 13(4) of the Railways Act 2005, and section 60 of the Maritime Transport Act 1994. On receiving notification of an occurrence from any of the regulators the Commission must then determine whether the notified occurrence happened in circumstances that have, or are likely to have, significant implications for transport safety, or may allow the Commission to establish findings or make recommendations that may increase transport safety.

If, in its determinations, the Commission affirms the above then it must investigate. The Commission's powers of investigation extend to any air, rail or marine occurrence that involves "...any combination of military and non-military persons, transport related things, or transport related services..."[8]

Other circumstances where the Commission might also investigate are:

- additional occurrences notified to it under the Regulators' statutes as it deems necessary where the Commission has chosen not to investigate, the Minister of Transport may direct it to undertake an investigation
- those occurrences not notified but the Commission would have investigated had it been notified.

Other Functions

In addition to investigating accidents and incidents the Commission has 7 other functions. These are:

- to make such enquiries as the Commission considers appropriate in order to ascertain the cause or causes of accidents and incidents
- to co-ordinate and direct all such investigations and to determine which other parties (if any) should be involved in such investigations
- to prepare and publish findings and recommendations (if any) in respect of any such investigation
- if requested by the Minister, to deliver a written report on each investigation to the minister, including any recommendations for changes and improvements that it considers will ensure the avoidance of accidents and incidents in the future
- to co-operate and co-ordinate with other accident investigation organisations overseas, including taking evidence on their behalf
- where notifications of occurrences from the regulators have not been received to request from the appropriate regulator further information as the Commission considers appropriate regarding any accident the Commission believes is required to be investigated under section 13(1) and (2) of the Act
- to perform any other function or duty conferred on the Commission by the Act or any other Act.

Powers

The Commission, in addition to having the powers of a Commission of Inquiry, has a number of other powers including powers of entry, powers of investigation, power to prohibit or restrict access to a site of any accident or incident, and power to seize, test and detain evidence, or have it moved to a nominated place.

The Importance of Confidentiality

To be effective in carrying out its principal function and safeguarding its principal purpose, the Commission is obliged to keep its records of evidence confidential. Confidentiality of witness interviews is the cornerstone of a no-blame investigative regime. The fundamental premise of a successful Commission investigation is that affected parties can speak to Commission investigators with the utmost confidence that what they say will not incriminate them, or be used as evidence against them at some later stage. The legislation under which the Commission operates recognises this premise and endeavours to protect the disclosure and admissibility of the Commission's investigative information. There are some circumstances where disclosure may be required. The Act specifies the circumstances where disclosure is permissible.

8 See Section 13 Transport Accident Investigation Act 1990.

These circumstances pertain to the Commission's own investigative activity, or through Court Orders; otherwise it is an offence to disclose records. In addition the Commission's investigators cannot be compelled to give evidence in any proceedings to which the Commission is not a party.

The Importance of Independence

Independence is the fundamental operating principle of the Commission, a principle that is shared amongst all other similarly constituted organisations across the globe. This is to ensure public confidence in an investigative system that is free from bias and conflict and the threat of sanction, in order that a proper determination of circumstances and cause can be made so that learnings can be taken for the overall improvement of transport safety. It is for this reason that the Commission is identified as an independent Crown entity and required to act independently when carrying out its functions and duties, and exercising its powers.

Transport Accident Investigation Commission

Organisational Structure

Bryan Wyness
Commissioner

Hon. William P Jeffries
Chief Commissioner

Pauline Winter
Deputy Chief Commissioner

Lois Hutchinson
Chief Executive

John Mockett
Chief Investigator of Accidents

Satbhama Narayan
Administration Manager

Accident Investigators		
Aviation	Rail	Marine
Ken Mathews	Dennis Bevin	Iain Hill
Ian McClelland	Vernon Hoey	Doug Monks
Peter Williams	Peter Miskell	

Administration Support Staff
Jenny Seaga
Ailsa Wong-She
Ropati Telea

Back row: Doug Monks, Iain Hill, Dr Robin Griffiths, John Mockett, Peter Miskell, Peter Williams
Front row: Satbhama Narayan, Ken Mathews, Lois Hutchinson, Vernon Hoey, Ailsa Wong-She, Ropati Telea
Absent: Dennis Bevin, Ian McClelland, Jenny Seaga

Aviation

Marine

Rail

Transport Accident Investigation Commission

HEAD OFFICE
Level 11 Cigna House | 40 Mercer Street
PO Box 10 323 | Wellington 6036 | New Zealand
Phone: +64 4 473 3112 | Facsimile: +64 4 499 1510
Free Phone: 0800 188 926

CHRISTCHURCH OFFICE
Level 1 | Terminal Building | Christchurch Airport
PO Box 14 025 | Christchurch 8455 | New Zealand
Phone: +64 3 358 9800 | Facsimile: +64 3 358 9194
Free Phone: 0800 188 927

Email: inquiries@taic.org.nz | Web site: www.taic.org.nz