Australian Government

Australian Transport Safety Bureau

ATSB TRANSPORT SAFETY REPORT
Cross-modal Research and Analysis Report
XR-2010-101
Final

Safety issues and safety actions identified through ATSB transport safety investigations: 2009-2010 financial year

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Safety issues and safety actions identified through ATSB transport safety investigations 2009-2010 financial year

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Safety issues and safety actions identified through ATSB transport safety investigations: 2009–2010 financial year

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Abstract

In the 2009–2010 financial year, the Australian Transport Safety Bureau (ATSB) completed 37 aviation, 10 marine, and 11 rail investigations where safety factors were identified using the ATSB analysis framework. From these investigations, 124 safety issues (factors that have a potential to adversely affect the safety of future operations) were identified and 141 safety actions were undertaken to address these safety issues. This report documents and analyses these safety issues and safety actions and explores the risk levels assigned to provide an understanding of where the greatest risks to each transport mode appear to lie. The results will be useful for government decision makers, regulators and the aviation, rail and marine industries to understand if and where attention to risk needs to be applied.

Inadequate procedures or the lack of procedures were a common safety issue found by ATSB investigations for all transport modes. In rail investigations, problems with safety management process practices were slightly more common than problems with procedures. When safety issues are assessed by the level of risk posed to transport safety, the lack of procedures or inadequate procedures were found to carry the most significant safety risk for all three modes.

Deck and flight operations were the functional areas that were associated with the most safety issues in marine and aviation investigations respectively. These were also the functional areas (along with navigation – pilotage for marine) that were linked to the majority of the safety issues carrying significant risk. For rail, vehicle maintenance and network operations were associated with the most safety issues of significant risk.

Proactive industry safety action was the most common way safety issues identified in investigations were addressed across the aviation and marine modes, while proactive industry safety actions made up only half of the safety actions taken by the rail mode.

Amending or adding procedures was a common proactive industry safety action for all modes. This was particularly the case for safety issues that carried significant safety risk. For marine, the proactive industry safety actions taken spread across various categories such as procedures, organisational supervision, documentation, education, and training. In addition, proactive changes or additions to documentation were the second most common proactive industry safety action for the aviation industry.

THE AUSTRALIAN TRANSPORT SAFETY BUREAU

The Australian Transport Safety Bureau (ATSB) is an independent Commonwealth Government statutory agency. The Bureau is governed by a Commission and is entirely separate from transport regulators, policy makers and service providers. The ATSB's function is to improve safety and public confidence in the aviation, marine and rail modes of transport through excellence in: independent investigation of transport accidents and other safety occurrences; safety data recording, analysis and research; fostering safety awareness, knowledge and action.

The ATSB is responsible for investigating accidents and other transport safety matters involving civil aviation, marine and rail operations in Australia that fall within Commonwealth jurisdiction, as well as participating in overseas investigations involving Australian registered aircraft and ships. A primary concern is the safety of commercial transport, with particular regard to fare-paying passenger operations.

The ATSB performs its functions in accordance with the provisions of the *Transport Safety Investigation Act 2003* and Regulations and, where applicable, relevant international agreements.

Purpose of safety investigations

The object of a safety investigation is to identify and reduce safety-related risk. ATSB investigations determine and communicate the safety factors related to the transport safety matter being investigated. The terms the ATSB uses to refer to key safety and risk concepts are set out in the next section: Terminology Used in this Report.

It is not a function of the ATSB to apportion blame or determine liability. At the same time, an investigation report must include factual material of sufficient weight to support the analysis and findings. At all times the ATSB endeavours to balance the use of material that could imply adverse comment with the need to properly explain what happened, and why, in a fair and unbiased manner.

Developing safety action

Central to the ATSB's investigation of transport safety matters is the early identification of safety issues in the transport environment. The ATSB prefers to encourage the relevant organisation(s) to initiate proactive industry safety action that addresses safety issues. Nevertheless, the ATSB may use its power to make a formal safety recommendation either during or at the end of an investigation, depending on the level of risk associated with a safety issue and the extent of corrective action undertaken by the relevant organisation.

When safety recommendations are issued, they focus on clearly describing the safety issue of concern, rather than providing instructions or opinions on a preferred method of corrective action. As with equivalent overseas organisations, the ATSB has no power to enforce the implementation of its recommendations. It is a matter for the body to which an ATSB recommendation is directed to assess the costs and benefits of any particular means of addressing a safety issue.

When the ATSB issues a safety recommendation to a person, organisation or agency, they must provide a written response within 90 days. That response must indicate whether they accept the recommendation, any reasons for not accepting part or all of the recommendation, and details of any proposed safety action to give effect to the recommendation.

The ATSB can also issue safety advisory notices suggesting that an organisation or an industry sector consider a safety issue and take action where it believes it appropriate. There is no requirement for a formal response to an advisory notice, although the ATSB will publish any response it receives.

TERMINOLOGY USED IN THIS REPORT

Safety factors

A ***safety factor*** is defined as:

> an event or condition that increases safety risk. In other words, it is something that, if it occurred in the future, would increase the likelihood of an occurrence, and/or the severity of the adverse consequences associated with an occurrence.

The ATSB investigation analysis model is based on the widely used 'chain-of-events' theory of accident causation made popular by James Reason's model of organisational accidents[1] and consists of five levels of safety factors as outlined in Table 1. For more information, see the ATSB publication *Analysis, Causality and Proof in Safety Investigations*[2].

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[1] Reason, J. (1990). *Human error*. Cambridge University Press: Cambridge.
Reason, J. (1999).*Managing the risks of organizational accidents*. Ashgate: Aldershot.

[2] Walker, M. B. & Bills, K.M. (2008). *Analysis, Causality and Proof in Safety Investigations.* (Aviation Research and Analysis Report AR-2007-053). Canberra: ATSB

Table 1: Safety factors in the ATSB investigation analysis model

Term	Description
Occurrence events (including technical events)	Occurrence events are the key events which describe an occurrence, or the events which ultimately need to be explained by an occurrence investigation. In other words, occurrence events are the safety factors that describe 'what happened'. Technical events refer to the performance of equipment and components involved in the conduct of a transport activity, such as vehicles and their associated parts and systems, as well as supporting facilities (for example, navigational aids, lighting and communication facilities).
Individual actions	Individual actions are observable behaviours performed by operational personnel. The term 'operational personnel' refers to any person that can have a relatively direct impact on the safety of a transport activity; for example, flight crew, locomotive drivers, ships' masters, cabin crew, controllers, dispatch and loading personnel, and maintenance personnel.
Local conditions	Local conditions are those conditions which exist in the immediate context or environment in which individual actions or technical events occur, and which can have an influence on the individual actions or technical events. Local conditions include characteristics of the individuals and the physical environment.
Risk controls	Risk controls are the measures put in place by an organisation to facilitate and assure safe performance of the operational components of the system (that is, operational personnel and equipment). They can be viewed as the outputs of the organisation's safety management system. Risk controls are sometimes termed 'defences', 'safeguards' or 'barriers', although some definitions of these terms can vary in scope.
Organisational influences	Organisational influences are those conditions that establish, maintain or otherwise influence the effectiveness of an organisation's risk controls. There are two main types of organisational influences: organisational conditions and external influences.

A safety factor can be either a **contributing safety factor** or **other safety factor**.

Contributing safety factor**:** a safety factor that, had it not occurred or existed at the time of an occurrence, then either:

(a) the occurrence would probably[3] not have occurred or

(b) the adverse consequences associated with the occurrence would probably not have occurred or have been as serious or

(c) another contributing safety factor would probably not have occurred or existed.

Other safety factor**:** a safety factor identified during an occurrence investigation which did not meet the definition of contributing safety factor but was still considered to be important to communicate in an investigation report in the interests of improved transport safety.

[3] 'Probably' is defined as being equivalent to 'likely' and meaning more than 66 per cent likelihood.

Safety issues

A ***safety issue*** is a safety factor that:

(a) can reasonably be regarded as having the potential to adversely affect the safety of future operations, and

(b) is a characteristic of an organisation or a system, rather than a characteristic of a specific individual, or characteristic of an operational environment at a specific point in time.

Therefore, the primary way for ATSB investigations to improve transport safety in the future is through the identification and mitigation of safety issues. As such, this report, while documenting all safety factors identified through investigations, will focus on safety issues and safety actions resulting from ATSB investigations.

Risk level

When safety issues are identified to pose an unacceptable level of risk, the ATSB will seek safety action from the relevant organisation. Safety issues are broadly classified in terms of their level of risk as follows:

- ***Critical safety issue***: associated with an intolerable level of risk and generally leading to the immediate issue of a safety recommendation unless corrective safety action has already been taken.
- ***Significant safety issue***: associated with a risk level regarded as acceptable only if it is kept as low as reasonably practicable. The ATSB may issue a safety recommendation or a safety advisory notice if it assesses that further safety action may be practicable.
- ***Minor safety issue***: associated with a broadly acceptable level of risk, although the ATSB may sometimes issue a safety advisory notice.

Safety issue risk reflects the risk level as it existed at the time of the occurrence. It is widely recognised that all modes of transport will always operate with some level of risk, but that this risk should be as low as reasonably practical. Generally, the ATSB considers that the risk associated with any minor safety issue it identifies is at an acceptable level. By contrast, the risks associated with significant or critical safety issues are considered unacceptable. If the organisation or agency responsible for an identified safety issue does not take steps or propose to take steps that reduces the risk to an acceptable level (referred to as *safety action*), the ATSB will consider issuing a formal safety recommendation.

Safety action

Safety actions are the steps taken or proposed to be taken by a person, organisation or agency in response to a safety issue. They can be classified into the following types:

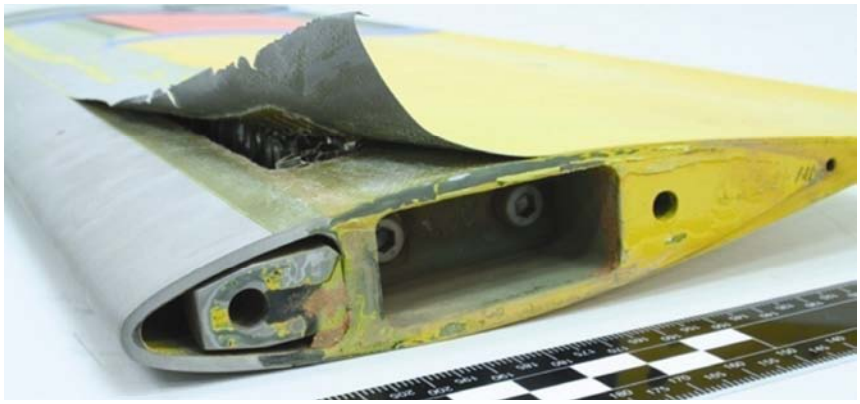
1. Proactive industry safety action

Proactive industry safety action refers to local or systemic action taken by an organisation or individual in response to the findings of an ATSB safety

investigation (or other investigation into the matter being investigated by the ATSB), prior to the release of any ATSB safety action.

2. ATSB safety action

In contrast, ATSB safety action refers to formal activities conducted by the ATSB to initiate additional safety action by relevant organisations. ATSB safety action, such as issuing safety recommendations and safety advisory notices, is normally a last resort and is generally taken when other attempts to facilitate sufficient safety action have not been successful, and the risk level is still assessed as either critical or significant (and not as low as reasonably practical).



Main rotor blade skin debonding (AO-2009-002)

Types of ATSB safety action include:

Safety Recommendation

A safety recommendation is a formal recommendation to an organisation for it to address a specific safety issue. The ATSB cannot compel an organisation to take action, but the recommendation and any response will be publicly released. The relevant party is required by law to respond to any such recommendation. ATSB safety recommendations focus on stating the problem (i.e. the description of the safety issue). They do not identify specific solutions for reducing risk.

Safety Advisory Notice

A safety advisory notice is a formal advice to an organisation or more broadly to transport industry participants that they should consider the safety issue and take action where appropriate. A safety advisory notice is a 'softer' output than a safety recommendation. It is used for less significant safety issues, when the available evidence is more limited, or when the target audience is not a specific organisation. Safety advisory notices do not require a formal response; however, the ATSB will publish the notice and any responses received.

Safety Awareness Activity

Any presentations, safety magazine articles, or other educational activities undertaken by the ATSB to increase awareness of the safety issue in the transportation industry are considered an ATSB safety awareness action.

ATSB Additional Investigation

Sometimes occurrence investigations suggest the possibility of a larger safety issue that is beyond the scope of the investigation to investigate. These can result in ATSB safety action of initiating a *safety issue investigation*.

BACKGROUND

The Australian Transport Safety Bureau (ATSB) is an independent Commonwealth Government statutory Agency that conducts independent investigation of:

- aviation accidents and serious incidents involving Australian civilian-registered aircraft anywhere in the world and foreign aircraft in Australia
- marine accidents and serious incidents involving Australian registered ships[4] anywhere in the world, foreign flag ships within Australian waters, or where evidence relating to an accident involving ships is found in Australia
- rail accidents and serious incidents that occur on the Defined Interstate Rail Network (DIRN).

The ATSB has developed a comprehensive investigation analysis framework. As part of this, safety investigations aim to identify safety factors, and in particular safety issues and resultant safety actions. Each year, the ATSB conducts about 100 investigations into transport safety matters in aviation, rail and marine. Most of the resultant investigation reports document safety issues identified during the investigation, along with the assigned risk level for each safety issue. The ATSB also individually documents safety actions completed by industry and regulators in response to the identified safety issue(s). When no or inadequate safety action occurs, the ATSB may also release a safety recommendation, which is required to be responded to by 90 days.

This report will document the ATSB-identified safety issues and related safety actions for the 2009-2010 financial year in all three transport modes (aviation, marine and rail). It will explore the risk levels assigned and provide an understanding of where the greatest risks to each transport mode appears to lie, recognising that the results are partial, given the limits of investigation activity. The results will nevertheless be useful for government decision makers, and regulators and the aviation, rail and marine industries to understand if and where greater attention needs to be applied to risk.

Priorities for investigating

The ATSB's primary investigation focus is on enhancing safety with respect to fare paying passengers, and in particular, those transport safety matters that may present a significant threat to public safety and are the subject of widespread public interest. The ATSB therefore needs to direct significant attention to identifying systemic failures in aviation, marine and rail mass public transport systems that have the potential to result in catastrophic accidents and which are often characterised by large numbers of fatalities and serious injuries.

[4] Ships do not include: trading ships on intrastate voyages; Australian fishing vessels on domestic voyages; fishing fleet support vessels on domestic voyages; inland waterways vessels; pleasure craft; off-shore industry mobile units that are fixed to the seabed; Australian defence ships; or exempt foreign ships.

Total power loss at Talbot Bay, Western Australia (AO-2008-067)

The following broad hierarchies for aviation, marine and rail which reflect the priorities described above must be taken into account when deciding whether or not to investigate and in determining the level of investigation response.

Aviation

The aviation broad hierarchy is as follows:

1. Passenger transport - large aircraft regular public transport (RPT).
2. Passenger transport - small aircraft:
   - RPT and charter
   - humanitarian aerial work (for example, RFDS, SAR flights).
3. Commercial (that is, fare paying) recreation (for example, joy flights).
4. Aerial work with participating passengers (for example, news reporters, geological surveys).
5. Flying training.
6. Other aerial work:
   - non-passenger carrying aerial work (for example, agriculture, cargo)
   - private transport/personal business.
7. High risk personal recreation/sports aviation/experimental aircraft operations.

Marine

The marine broad hierarchy is as follows:

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

Rail

The rail broad hierarchy is as follows:

1. Mainline operations that impact on passenger services.
2. Freight and other commercial operations.
3. Non-commercial operations.

Classifying investigations

Transport safety matters reported to the ATSB can be dealt with in three different ways to contribute to the ATSB's functions.

1. Full investigation: Occurrence reports that suggest that a safety issue may exist are investigated immediately. Investigation may lead to the identification of the safety issue, including its risk significance, and provide the justification for safety action.
2. Factual-only investigation: Some occurrence reports suggest that a full investigation is not warranted but that there would be benefit from additional fact gathering for future safety analysis to identify safety issues or safety trends.
3. Data entry only: Basic details of an occurrence, based primarily on the details provided in the initial occurrence notification, will be recorded in the database to be used in future safety analysis to identify safety issues or safety trends.

In the third approach, the occurrence is not investigated immediately, but may be the subject of a future investigation.

Collision between XPT passenger train WT27 and a track-mounted excavator near Newbridge, New South Wales (RO-2010-004)

The investigation levels

Investigations are classified by the level of resources and/or the complexity and time required to complete the investigation as per Table 2.

Table 2: ATSB investigation classifications

Investigation Level	Characteristics of investigation
Level 1	- likely to involve the majority of ATSB resources, in addition to significant external resources, for up to 24 months - likely to require additional one-off Government funding
Level 2	- involves a large number of ATSB and possibly external resources and/or - scale and complexity of which usually requires up to 18 months to complete
Level 3	- involves in-the-field activity, several ATSB and possibly external resources and/or - scale and complexity of which usually requires up to 12 months to complete
Level 4	- a less complex investigation which requires no more than 9 months to complete (may at times be a 'desktop' exercise requiring no in-the-field activity) and/or - involves only one or two ATSB resources
Level 5	- limited scope factual information only based investigations, which result in a short summary report of 1 to 2 pages. Generally completed within 4 to 6 weeks and published quarterly. - requires only one ATSB resource.

The Level 5 investigations are a new initiative by the ATSB in 2010. The resultant summary report is a compilation of the information the ATSB has gathered, sourced from individuals or organisations involved in the occurrences, on the circumstances surrounding the occurrence and what safety action may have been taken or identified as a result of the occurrence. For aviation, these investigations are published in a bulletin each quarter, with the first edition published in April 2010.

OVERVIEW – ALL MODES

Investigations

During the 2009-2010 financial year (1 July 2009 to 30 June 2010), the ATSB completed 90 occurrence and safety issue investigations across the aviation, marine and rail modes. Of these investigations, there were 58 comprehensive investigations (levels 1 to 4) involving the identification of safety factors through the ATSB investigation analysis model (Table 3). The ATSB investigation analysis model is based on the 'chain-of-events' theory of accident causation made popular by James Reason and is made up of the five levels of safety factors (see Table 1 in TERMINOLOGY USED IN THIS REPORT).

This report will provide analyses of the safety factors, safety issues and safety actions arising from these 58 investigations. Details about these investigations are presented in Appendix A.

There were two rail occurrences investigations (external occurrences) which the ATSB participated in under Queensland legislation. The ATSB investigations of these occurrences identified safety factors which are documented in this report. Safety actions from these investigations were in the responsibility of the State of Queensland and so have been excluded from this analysis.

Table 3: Number of level 1 to 4 investigations completed in 2009-2010 financial year

Transport Mode	Occurrence investigation	Safety Issue investigation	External occurrence investigation[5]	Total
Aviation	36	1	0	**37**
Marine	10	0	0	**10**
Rail	9	0	2	**11**

Grounding of *Breakthrough* at the Cocos (Keeling) Islands (MO-2008-003)

[5] An external occurrence investigation is undertaken outside the ATSB's normal purview and at the request of another organisation.

The ATSB also participated in 11 external aviation investigations and one marine occurrence investigation in addition to those documented in Table 3. However, they are not included in this report as these investigations involved only the initial stages of the investigation and not the analysis of safety factors. Details about these external investigations can be found in the *ATSB Annual Report 2009-2010*.

In addition, there were 19 level 5 aviation factual investigations completed in 2009-2010. As these investigations do not involve the identification of safety factors through the ATSB's formal analysis methodology, the results from these factual-only investigations are not included in this report.

It can be seen in Table 4 that all 58 investigations completed in 2009-2010 were level 3 and 4 (see BACKGROUND for information on the ATSB investigation classifications).

Table 4: Number of investigations completed by investigation level in 2009-2010 financial year

Transport Mode	Level 1	Level 2	Level 3	Level 4	Total
Aviation	0	0	15	22	**37**
Marine	0	0	7	3	**10**
Rail	0	0	2	9	**11**

Safety issues identified

Table 5 shows that there were 124 safety issues identified by the ATSB in investigations in the 2009-2010 financial year. There were no critical risk safety issues identified. (See *Risk level* on page xi for risk level definitions.)

Table 5: Number of safety issues identified by risk level in 2009-2010 financial year

Transport Mode	Minor risk	Significant risk	Critical risk	Total
Aviation	34	12	0	**46**
Marine	13	27	0	**40**
Rail[6]	25	13	0	**38**
Total	**72**	**52**	**0**	**124**

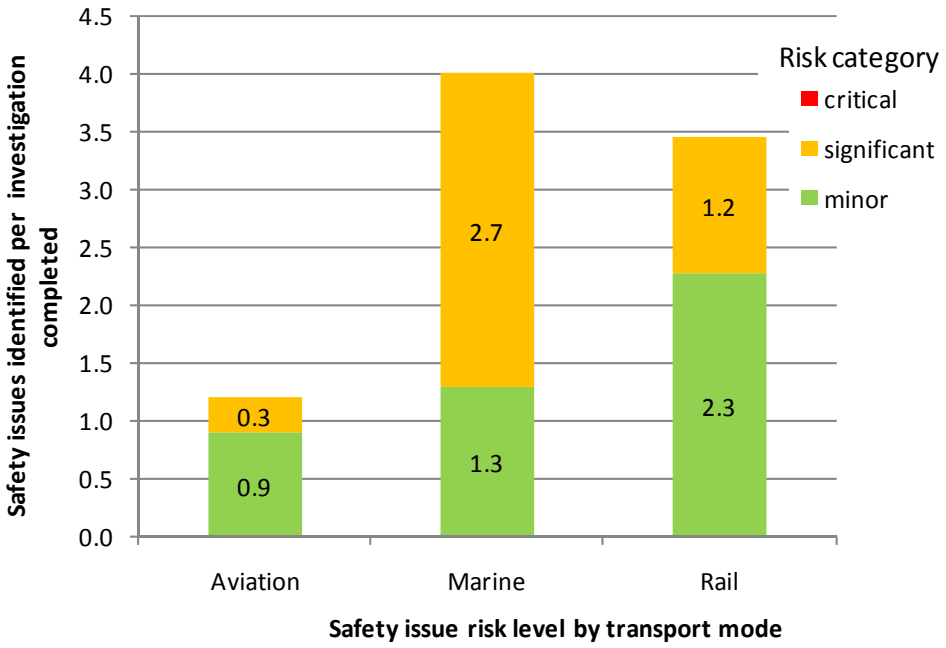
In aviation and rail investigations, more of the safety issues identified were of minor rather than significant risk, while in marine investigations, more safety issues were of significant rather than minor risk.

The number of investigations completed for each mode differs and thus, for the purpose of comparing across modes, the number of safety issues identified per investigation is shown in Figure 1. Both marine and rail investigations revealed

[6] Includes safety issues identified by the ATSB in two external rail investigations.

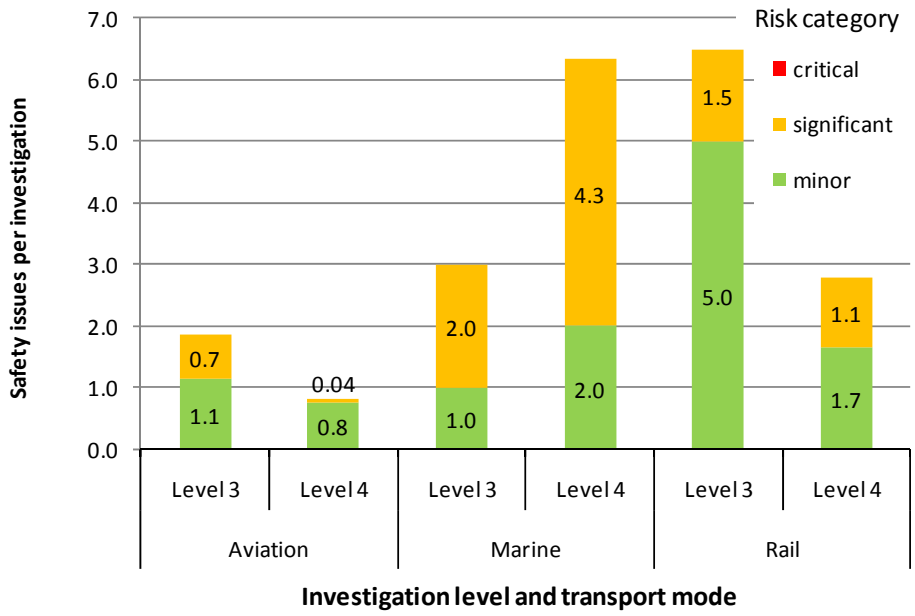
more safety issues per investigation than did aviation. This may reflect the nature of rail and marine investigations in that most investigations involve very large and commercial transport vehicles, while aviation investigations also include small aircraft and non-commercial operations. Moreover, marine investigations identified more safety issues with significant risk per investigation than did the other transport modes.

Figure 1: Safety issues identified per investigation completed in 2009-02010 financial year



In rail and aviation, level 3 investigations, which are more complex and greater in scope than level 4 investigations, led to more safety issues being identified (both in total and at the significant risk level). However, as seen in Figure 2, marine investigations did not conform to this expectation.

Figure 2: Number of safety issues identified by risk level and investigation level in 2009-2010 financial year



The details concerning the safety issues specific to each mode of transport are discussed in the following chapters.

Safety actions

Table 6 below depicts the number of safety actions that have been undertaken that address safety issues identified by ATSB investigations in each of the transport modes. (See *Safety action* on page xi for definitions of safety action types.)

Table 6: Safety actions identified in ATSB investigations (2009-2010 financial year)

	Aviation	Marine	Rail	Total
Proactive industry safety action	60	34	14	**108**
ATSB Safety Recommendation	1	4	8	**13**
ATSB Safety Advisory Notice	2	10	5	**17**
ATSB Safety Awareness Activity	2	0	0	**2**
ATSB Additional Safety Investigation	1	0	0	**1**
Total	**66**	**48**	**27**	**141**

Aviation investigations recorded more safety actions than the other modes as would be expected from the higher number of investigations and safety issues identified. Figure 3 shows the different types of safety actions that were identified per investigation for each transport mode. Overall, marine investigations prompted the most safety actions per investigation, followed by rail investigations.

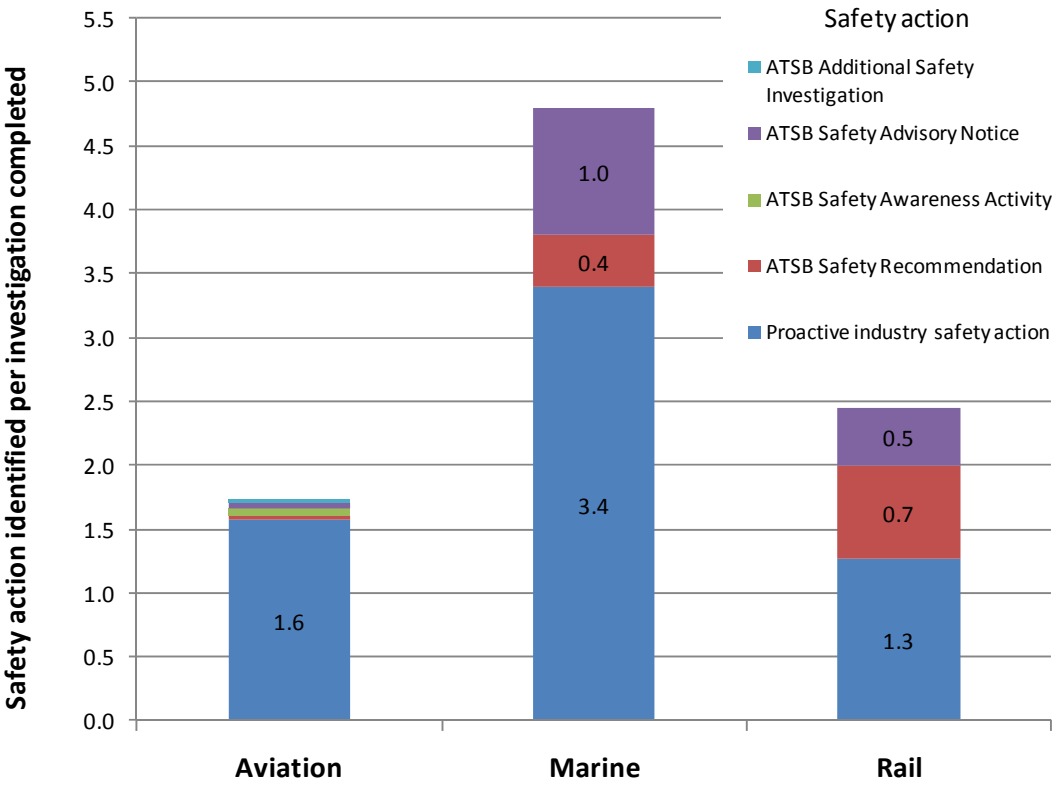
Fatality on board *Spirit of Esperance* at Townsville, Queensland (MO-2008-011)

Proactive industry safety actions are encouraged before the release of any formal ATSB safety action, and so generally, the ATSB issues safety recommendations and safety advisory notices (SANs) as a last resort. This is reflected in all transport modes having more proactive industry safety actions than formal ATSB safety actions per investigation.

Rail and marine investigations produced more safety recommendations and SANs, both in total and per investigation, than aviation investigations. Rail investigations delivered more safety recommendations per investigation than marine investigations, but marine investigations resulted in more SANs than rail investigations.

Additional ATSB safety investigations and safety awareness activity were carried out as a safety action to address an identified safety issue only in the aviation mode.

Figure 3: Safety actions per investigation completed in 2009-2010 financial year



More details about safety actions in each of the transport modes are presented in the following chapters.

Safety factors

Most of the safety factors identified in aviation investigations in the 2009-2010 financial year were individual actions, risk controls or local conditions[7] (Figure 4). Furthermore, most of these safety factors were found to have contributed to the occurrence. Individual actions made up 38 per cent of all contributing safety factors, followed by risk controls (26 per cent) and local conditions (15 per cent).

Figure 4: Safety factors identified in aviation investigations

It can be seen in Figure 5 that 57 of the 69 individual actions were aircraft operation actions. Of these aircraft operations actions, the majority were related to assessing and planning issues, followed by monitoring and checking issues and inappropriate aircraft handling.

Typical examples of assessing and planning problems in the last financial year included issues with weather and fuel planning, not conducting a go-around for an unstable approach (for high capacity aircraft), and pilots' decisions which further increased their workload. Two-thirds of these safety factors involved general aviation occurrences.

Problems with the monitoring and checking mostly involved passenger transport operations and involved monitoring of fuel tanks and flight instruments, and to establish whether the approach was stable.

[7] See page x, 'TERMINOLOGY USED IN THIS REPORT'

Aircraft handling issues were typically related to handling the control column and maintaining speed / thrust control. Over half of these safety factors involved passenger transport aircraft handling issues during the approach to land or landing.

Figure 5: Individual action safety factors identified in aviation investigations

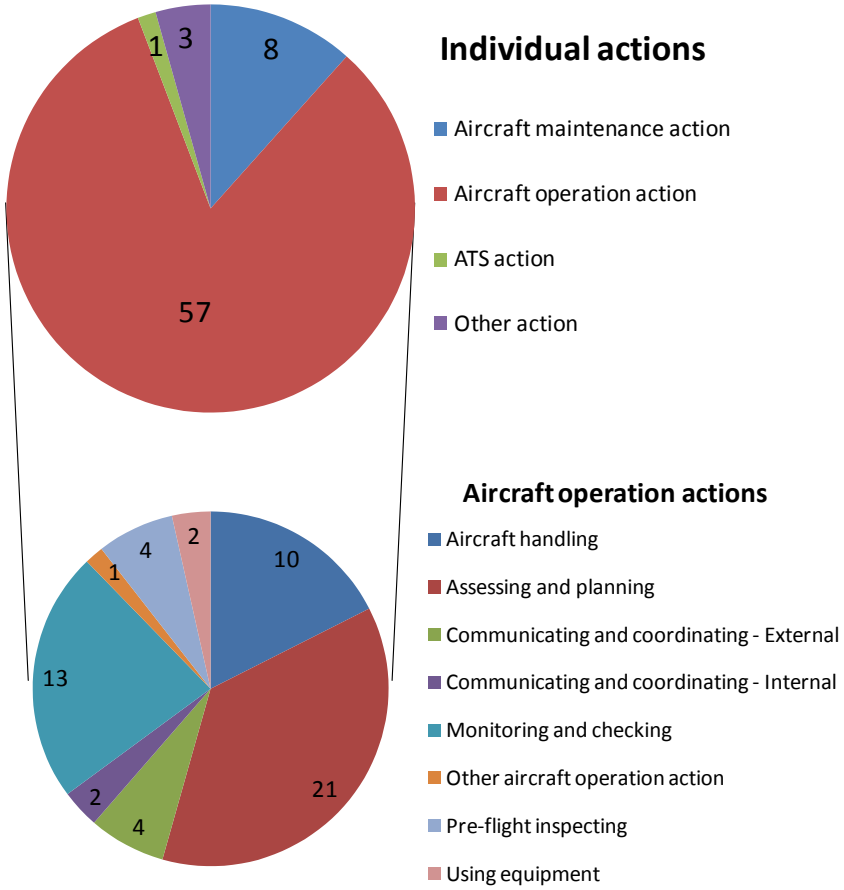
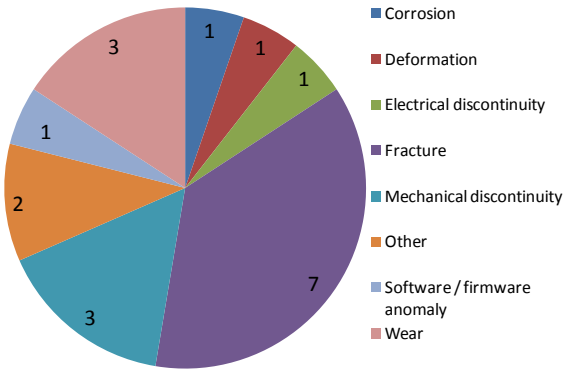
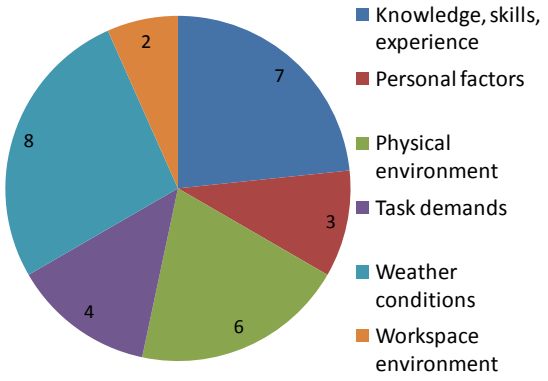


Figure 6: Technical failure mechanism safety factors identified in aviation investigations



Fractures, which refer to the physical separation of parts of an aircraft component, were found to be the main type of technical failure (Figure 6). The typical fractures were related to the turbine blade and to the combustion casing. Other examples included fractures to the tail rotor pitch change link, the engine cooling fan, and the landing gear.

Figure 7: Local condition safety factors identified in aviation investigations

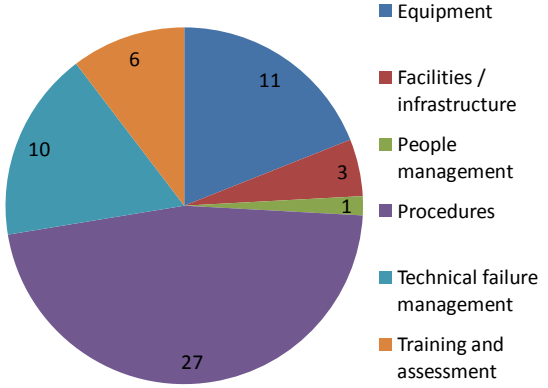


Weather conditions, pilot knowledge, skills and experience, and the physical environment were the main local conditions (Figure 7). Visibility (in terms of instrument meteorological conditions or sun glare) and turbulence issues were the most common weather conditions to be associated with aviation occurrences, generally involving general aviation.

Safety factors related to knowledge, skills, and experience included the lack of emergency procedures training or knowledge, which ranged from no simulator training for an Embraer Brasilia crew conducting passenger operations to cabin crew lacking knowledge in how oxygen systems work, and a helicopter pilot's lack of awareness about loss of tail-rotor effectiveness. Other factors involved fuel tank selection equipment knowledge and skills for a Boeing 737 crew.

The physical environment conditions varied across the six factors identified, and included wake turbulence conditions that affected a SAAB 340 aircraft on approach behind an Airbus A380 aircraft.

Figure 8: Risk control safety factors identified in aviation investigations

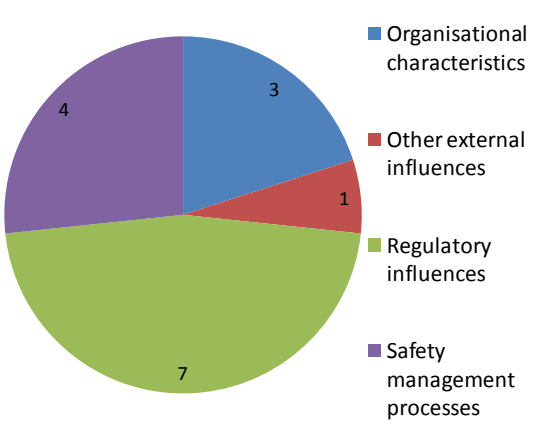


Inadequate risk controls identified by investigations were dominated by procedures (Figure 8). The majority of procedural safety factors were related to insufficient guidance provided by operators of high capacity and other passenger operations, covering a wide range and variation of procedures. In addition, several procedure-related safety factors concerned aircraft maintenance.

The more common equipment safety issue was related to the design or availability of the equipment. These included the switch layout in the cockpit and limitations of the aircraft radar.

Design issues were the most prominent technical failure management safety factor. These design issues mostly involved situations where the design of engine components or systems increased proneness for technical failure.

Figure 9: Organisational influence safety factors identified in aviation investigations



Regulatory influences made up almost half of all organisational factors (Figure 9). The majority of these influences were the lack of requirements, for example: simulator training in Australia, requirements related to endorsement training, or requirements to be equipped with a fuel low level warning system.

Safety issues

Of the 46 safety issues identified in aviation investigations, the majority (34) were of minor risk and 12 were of significant risk. There were no safety issues at the critical risk level in the 2009-2010 financial year.

The majority of safety issues, both of minor and significant risk, were associated with the flight operations area (Figure 10). Safety issues of significant risk were related to all functional areas except air traffic control.

The *other* functional area category was associated with the second most number of safety issues as well as significant safety issues. This category included aircraft/ component manufacturers, aerodrome operators and the regulator.

Figure 10: Safety issues by functional area in aviation

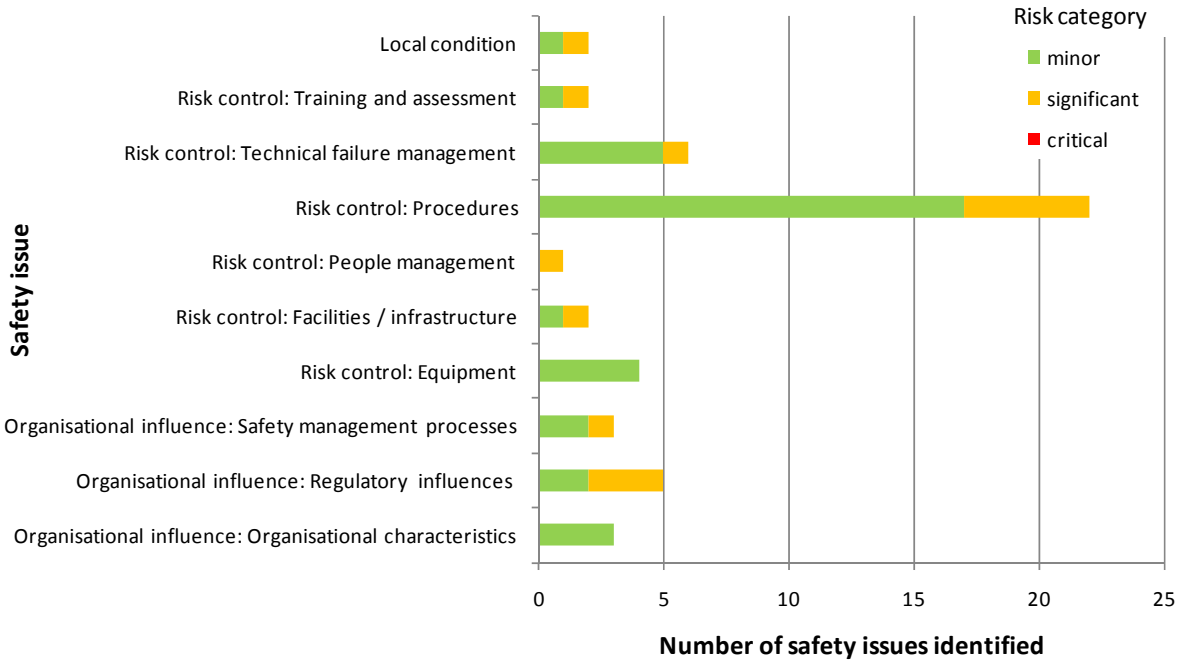
Without taking into account the risk levels, overall, inadequate procedures as a risk control made up 44 per cent of safety issues and technical failure management made up just over 10 per cent (Figure 11). Problems with procedures made up the majority of safety factors with minor risk (47 per cent), followed by technical failure management (14 per cent) and issues with equipment (11 per cent). The type of issues associated with procedures was varied. Issues with the workspace equipment were the main types of equipment risk controls, as was design issues for technical failure management.

Safety issues of significant risk in aviation

The safety issues that were considered to have posed a significant level of risk in aviation were related to procedures that act as risk controls (36 per cent of safety factors of significant risk) and to regulatory influences (21 per cent of safety factors of significant risk). Upon closer inspection, it appears that the lack of or poor documentation, procedures, or guidance were the main issues with procedures. Twenty-three per cent of procedures were described as a having a significant risk level.

One of the main safety issues to do with regulatory influence was related to simulator training. In one investigation involving low capacity passenger operations[8], it was found where there was no simulator training involved, the minimum requirements of endorsement training did not ensure that the pilots were aware of indicators and/or aircraft behaviour during critical emergency situations. The same investigation found that there was no regulatory requirement for simulator training in Australia.

Figure 11: Safety issues identified in aviation investigations



[8] *Fuel starvation - Jundee Airstrip, WA, 26 June 2007, VH-XUE, Empresa Brasileira de Aeronautics S.A., EMB-120ER* (AO-2007-017).

Other safety issues of significant risk were related to the local conditions, training and assessment, facilities / infrastructure, safety systems management, technical failure management and people management.

The above mentioned investigation[8] accounted for the significant risks associated with local conditions, training and assessment, facilities/ infrastructure, and safety management systems. There was no regulatory requirement for simulator training in Australia (training and assessment), there was an absence of a simulator training facility (facilities/ infrastructure), and the absence of simulator training meant that the endorsement and other training the flight crew had undergone did not adequately prepare them for the go-around event (knowledge, skills and experience-local conditions). Furthermore, the aircraft operator was not aware of important safety related information regarding the EMB-120 fuel system (safety management system).

In another investigation[9], involving high capacity operations, the aircraft operator had changed the standard operating procedure for the go-around (safety management system) resulting in the flight crew being unaware of the flight mode status of the aircraft during the first part of the first missed approach.

In one investigation[10], the V-belt failure or dislodgement was identified as a technical failure management (design) safety factor in a number of overseas and Australian Robinson R22 helicopter accidents. In a high capacity aircraft accident investigation[11], it was found that the operator did not have a process in place to ensure that crew members were in a fit state to resume operations after an event, or to assist the crew to recover from their experiences during an occurrence. This lack of people management as a risk control was also found to be a safety issue carrying a significant risk.

Leading edge device failure, Norfolk Island (AO- 2007-070)

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9 *Go-around event Melbourne Airport, Victoria, 21 July 2007, VH-VQT, Airbus Industrie A320-232* (AO-2007-044).

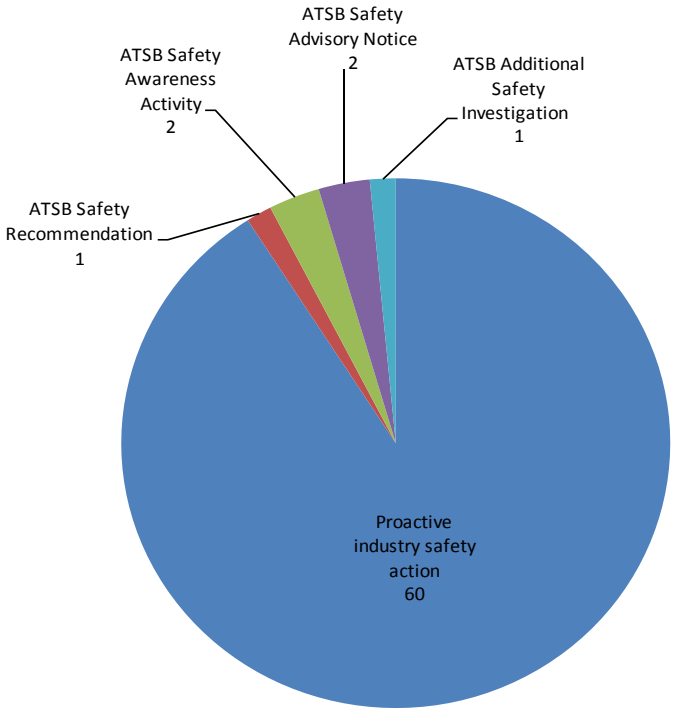
10 *Collision with terrain, Doongan Station, WA, 25 September 2007, VH-HCN, Robinson Helicopter Company R22 Beta II* (AO-2007-046).

11 *Leading edge device failure, Norfolk Island, 29 December 2007, VH-OBN, Boeing 737-229* (AO-2007-070).

Safety actions

As was shown earlier in Figure 3, the majority of safety actions in all transport modes were proactive actions undertaken by the industry prior to the publication of a formal investigation report. In aviation, 91 per cent of safety actions were carried out proactively by the industry (Figure 12).

Figure 12: Safety actions in response to aviation investigations

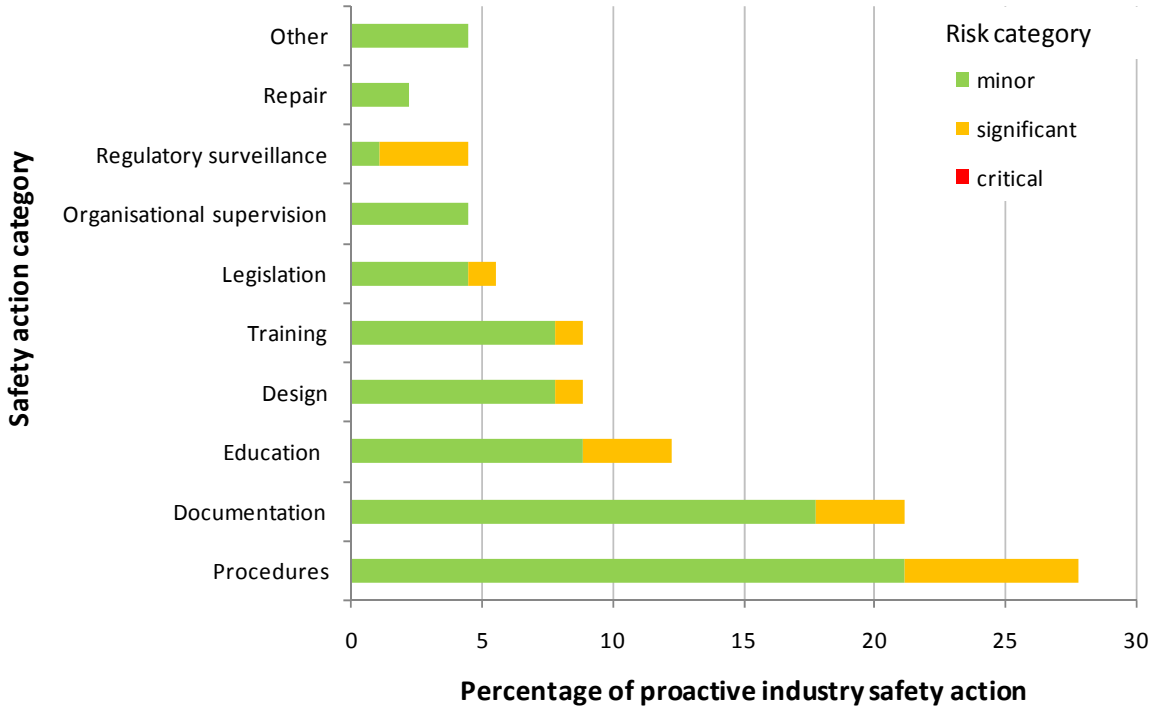


Proactive industry safety action in aviation

The vast majority of the proactive industry safety actions were related to procedures and creating or changing documentation (Figure 13). A large number of the proactive industry safety actions associated with safety issues of significant risk involved changing or creating procedures, changing or developing documentation, education and regulatory surveillance.

In the 2009-2010 financial year, there were six proactive changes or additions to procedures in response to the significant risks found. One such change followed a consultation between the aircraft manufacturer and the high capacity operator in which the go-around procedure was revised within the manufacturer's Flight Crew Operating Manual. The aim of that revision was to emphasise the critical nature of the actions by flight crew during a go-around. This revision followed an occurrence where the operator had changed the standard operating procedure for the go-around, resulting in the flight crew being unaware of the flight mode status of the aircraft during the first part of the first missed approach.[9]

Figure 13: Proactive industry safety actions in aviation



The Civil Aviation Safety Authority (CASA) also proactively responded to the significant risks identified by conducting regulatory surveillance as a proactive industry safety action. In two cases, CASA actioned follow-ups with the operator regarding their checklist procedures. CASA also issued a series of directions to the operator which addressed fuel quantity measurement procedures and flight crew training, as well as reviewing its guidance material relating to separate processes for fuel quantity measurement checks.

In terms of documentation and education, CASA proactively changed its guidance material relating to separate processes for quantity measurement checks and communicated that in the form of a Civil Aviation Advisory Publication (CAAP) also in response to the significant risks found.

ATSB Safety Recommendation in aviation

There was only one ATSB safety recommendation issued in the 2009-2010 financial year.

The recommendation related to the lack of regulatory requirement for simulator training in Australia, and this safety issue was considered to carry significant risk. On 26 October 2010, CASA issued Notice of Proposed Rule Making - NPRM 1007OS 'Mandatory Flight Simulator Training - Proposed amendments to Civil Aviation Orders (CAOs) 40.0 and 82.0' for industry comment by 21 January 2011. The ATSB is monitoring the progress of this safety action.

Hard landing - Darwin Airport, Northern Territory (AO- 2008-007)

Summary (Aviation)

- Individual actions and risk controls were commonly identified as safety factors in aviation investigations. The majority of contributing safety factors were also linked with individual actions and risk controls.
- Issues with procedures were the most common safety issue. These were usually related to the lack of or poor documentation, procedures, or guidance.
- Of the safety issues assessed as posing a significant risk to aviation safety, over a third were related to procedures, and about 20 per cent were related to regulatory influences.
- The vast majority of safety issues, including safety issues of significant risk, were associated with flight operations.
- Most of the safety actions taken by organisations and agencies in responses to safety issues were proactive in nature.
- Many of the proactive industry safety actions involved changing or creating procedures, and many of these were in response to safety issues of significant risk. Also in response to safety issues of significant risk were the development of or changes to documentation, education, and regulatory surveillance.

Aviation Safety Recommendations and Safety Advisory Notices (SANs)

Table 7 and Table 8 below provides a short description of all aviation safety recommendations and SANs in the 2009-2010 financial year. Details of these safety actions are found in Appendices B and C.

Table 7: Aviation: Safety Recommendations

Safety action type	Who	Safety issue description	Status	Safety Recommendation outcome
ATSB Safety Recommendation AO-2007-017-SR-084	Civil Aviation Safety Authority	There was no regulatory requirement for simulator training in Australia	Monitor	Latest outcome: 26 October 2010 CASA issued Notice of Proposed Rule Making - NPRM 1007OS 'Mandatory Flight Simulator Training - Proposed amendments to Civil Aviation Orders (CAOs) 40.0 and 82.0' for industry comment by 21 January 2011.

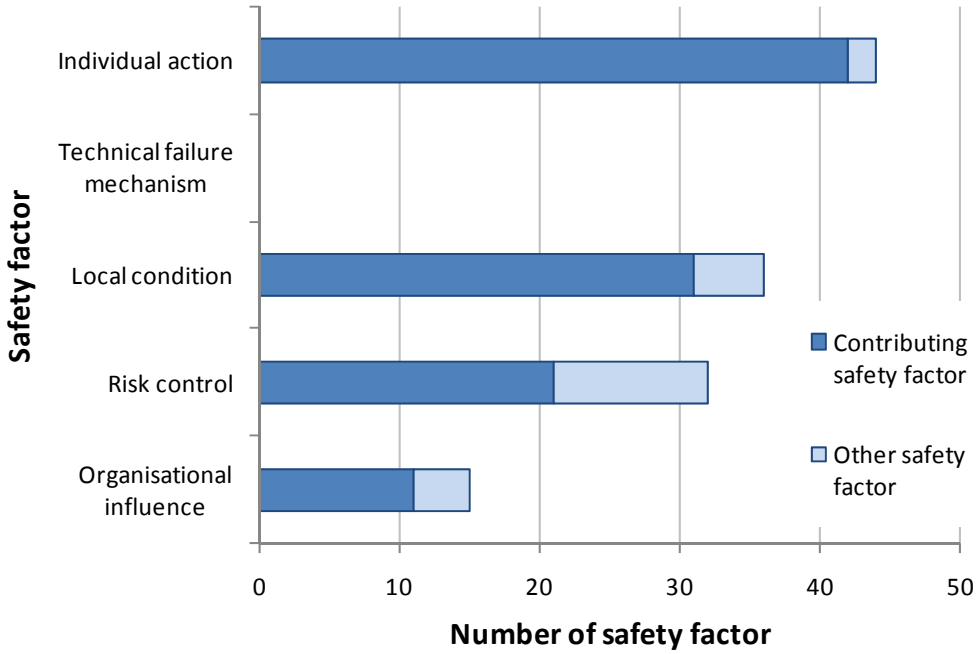
Table 8: Aviation: Safety Advisory Notices

Safety action type	Who	Safety issue description	Status
ATSB Safety Advisory Notice AO-2007-029-SAN-097	All operators	The aircraft manufacturer's documentation did not provide information or guidance to pilots for flight in turbulent conditions, increasing the risk of an inadequate pilot response to an encounter with severe turbulence.	Closed 9/11/2009
ATSB Safety Advisory Notice AO-2007-044-SAN-110	All operators	The aircraft operator did not conduct a risk analysis when changing the go-around procedure, nor did its safety management system require one to be conducted.	Closed 1/03/2010

Safety factors

The figure below shows that most of the safety factors identified in marine investigations were individual actions, local conditions or risk controls in the 2009-2010 financial year. Furthermore, most of these safety factors were found to have contributed to the occurrence. For instance, individual actions captured 40 percent and local conditions made up about a third of contributing safety factors. No technical failure mechanisms were identified as safety factors in marine investigations in the 2009-2010 financial year.

Figure 14: Safety factors identified in marine investigations



Just under half of all individual actions indentified in marine investigations were related to navigation actions, and assessing and planning issues made up about half of these navigation actions (Figure 15). Broadly speaking, the assessing and planning issues were related to the crew making decisions or changing plans based on insufficient information, not taking appropriate action to avoid collision, and anchoring too close to a pipeline.

Figure 15: Individual action safety factors identified in marine investigations

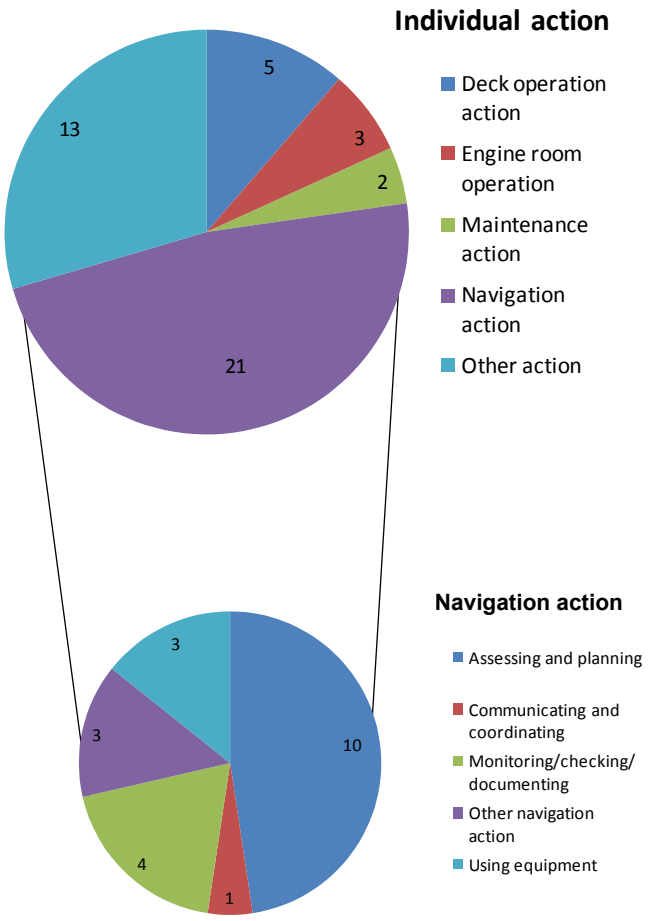
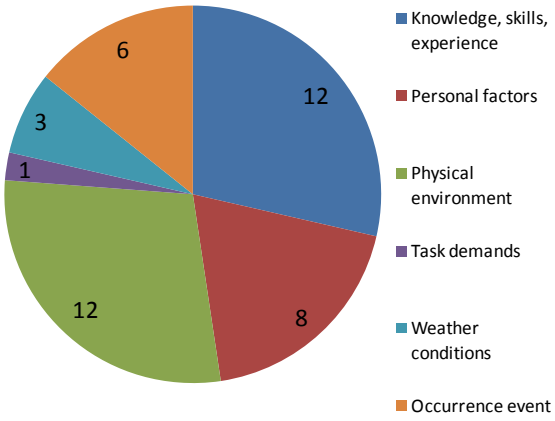


Figure 16: Local condition safety factors identified in marine investigations



The physical environment (such as unsecured lashing bins, dirty fuel oil service tanks, and low main engine fuel inlet temperature) contributed to about a third of local condition safety factors in marine investigations (Figure 16). Similarly, issues with the knowledge, skills and experience of those involved also contributed to about a third. Some examples of the latter include the lack of awareness of first aid treatment, and the second mate being ineffective in using the International Maritime Organisation's (IMO) Standard Marine Communication Phrases (SMCP) to make his own messages clearly understandable.

Figure 17: Risk control safety factors identified in marine investigations

Issues with procedures made up 69 per cent of the risk control safety factors Figure 17). Examples included: the lack of procedures or guidance relating to the anchoring equipment and ballast systems, the lack of procedures in place to deal with a lost or overdue small vessel, and insufficient guidance in stowing a ship's cargo crane hook.

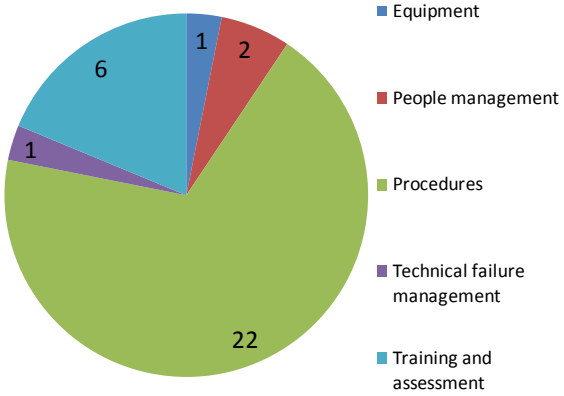
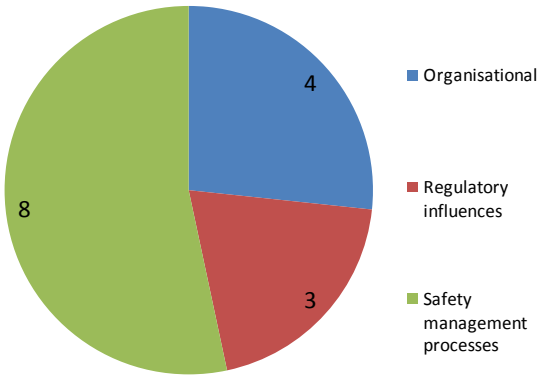


Figure 18: Organisational influence safety factors identified in marine investigations



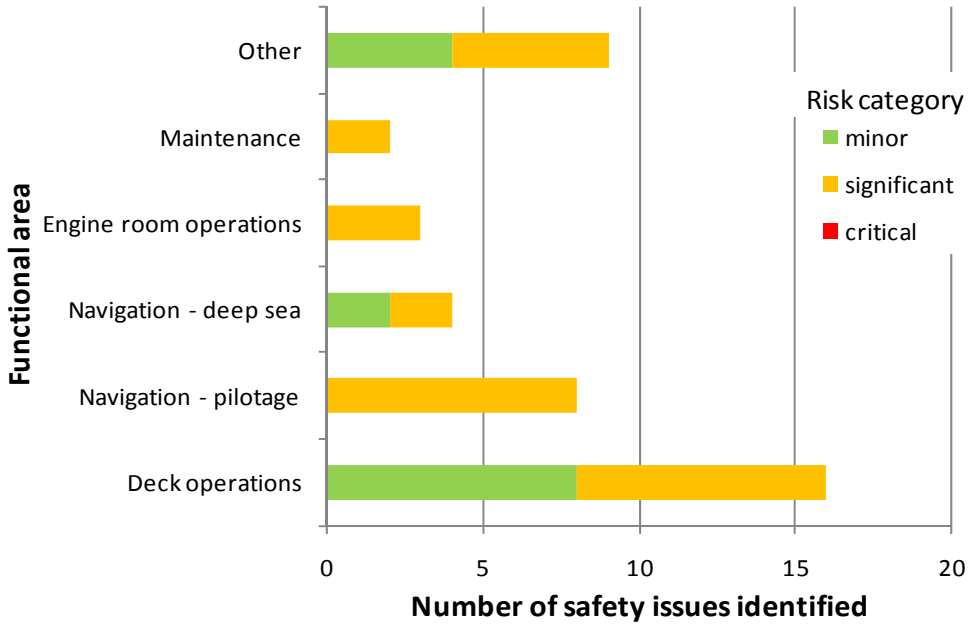
Over half of the organisational influences identified as safety factors were related to safety management system (SMS) processes (Figure 18). Some investigations found that SMS processes were either not used effectively or were inadequate. In one case, equipment was not tested and crew were not familiarised with it before departure. In another, fatigue management was ineffective.

Safety issues

Most safety issues were associated with deck operations, followed by *other* functional areas (mainly management) and navigation (pilotage). There were no safety issues identified that carried critical risk.

All safety issues associated with maintenance, navigation (pilotage) and engine room operations carried the significant risk level. Furthermore, navigation (pilotage) and deck operations were equally associated with safety issues of significant risk (Figure 19).

Figure 19: Safety issues by functional area in marine



Safety issues of significant risk in marine

Sixty-five per cent of safety issues in marine were of significant risk. Like aviation, inadequate or absent procedures made up the most of these safety issues (39 per cent), followed by local condition safety issues (23 per cent).

Risk controls: Procedures

The majority of procedural safety issues carried significant risk (Figure 20). Of the 22 procedure-related safety issues, 12 involved deck operations (four of which were of significant risk) and six involved navigation (pilotage) (all of which were of significant risk). The procedural safety issues associate with deck operations involved stowage of a cargo crane's hook, emergency steering system change over, ballast operations, and anchor cable bitter end release arrangements.

The navigation (pilotage) significant risk safety issues all related to the same investigation[12] and involved:

- lack of anchoring procedures off Melbourne
- lack of information about a submarine gas pipeline in Port Phillip
- inappropriate safe limits for anchorage boundaries from the gas pipeline
- not using English language on the bridge and so limiting the pilot's access to all information
- limitations with the Port of Melbourne Corporation's shipping control safe operating procedures
- lack of procedures or guidelines to compensate for the mobile telephone use policy

Other significant risk procedure-related safety issues involved ineffective implementation of work permit systems; a SMS did not ensure that the master was certain about his overriding authority and responsibility; lack of port procedures to deal with an incident involving shipping and a submarine gas pipeline; and the assessing and classification of sighting reports in search and rescue procedures.

Figure 20: Safety issues identified in marine investigations

Other risk controls

Training and assessment safety issues included insufficient training in the emergency steering system change over procedure to be followed in the event of steering control loss; rendering assistance to the crew of another vessel following a collision; and emergency scenario training for pilots.

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[12] *Independent investigation into the rupture of a submarine gas pipeline by the Hong Kong registered container ship* APL Sydney *in Port Phillip, Victoria on 13 December 2008* (MO-2008-012)

In one investigation[13], it was found that the people management and SMS processes in the form of work roster and hours of duty probably contributed to fatigue.

The one technical failure management safety issue[10] was related to the design of the ship's windlass and its hydraulic motor casing.

The one safety issue involving equipment[14] related to a yacht not being fitted with a passive radar reflector and its active radar transponder being turned off at the time of the collision with a bulk carrier.

Loss of the Department of Immigration and Multicultural and Indigenous Affairs vessel *Malu Sara* in Torres Strait, Queensland (MO-2009-007)

Local conditions

The local condition safety issues were typically related to the knowledge, skills and experience of the crew. Examples include the lack of knowledge, skills and or experience in relation to the stowage of cargo crane hooks, using the IMO's SMCP, stowage of the movable lashing bins, and the reliable detection of Class B Automatic Identification System (AIS) by watch keepers on board all ships.

Organisational influences

Organisational safety issues with significant risk either involved SMS processes or regulatory influences (Figure 20). In one investigation[15], the ship's health, safety, security and environment meetings and job hazard opportunity log were not effectively used to raise and discuss safety issues associated with cargo crane operations. Two SMS safety issues involved the lack of processes to avoid fatigue.

Regulatory issues identified involved:

- a lack of independent safety auditing

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[13] *Fatality on board* Thor Gitta *at sea off Western Australia, 21 May 2009* (MO-2009-004)

[14] *Collision between* Silver Yang *and* Ella's Pink Lady *off Point Lookout, Queensland, 9 September 2009* (MO-2009-008).

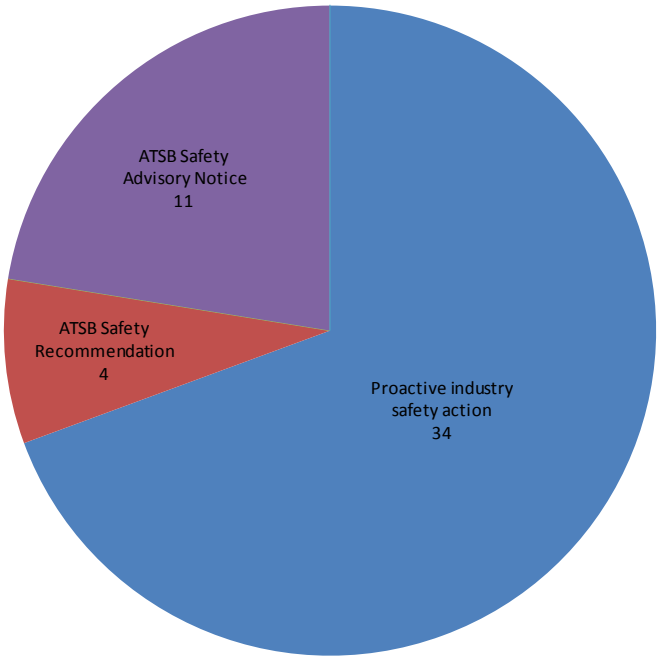
[15] *Independent investigation into the fatal injury on board the Maltese registered container ship* Spirit of Esperance *in Townsville, Queensland on 24 November 2008* (MO-2008-011)

- the inability for international work standards to avoid cumulative fatigue
- the lack of implementation of the international law to render assistance to crew of another vessel following a collision by all countries.

Safety actions

The majority of safety actions taken as a response to a marine occurrence were proactive in nature (Figure 21).

Figure 21: Safety actions in response to marine investigations



Proactive industry safety actions in marine

There were 34 proactive industry safety actions in total, which were spread across various safety action categories, such as procedures, organisational supervision and training, documentation, and education (Figure 22).

The proactive industry safety actions related to procedures carried out by the industry can be categorised into three broad areas. The first proactive action is related to revising the operator's own safety management processes– mainly with regards to steering drills, mobile phone usage and anchor positioning. The second was modifying or reviewing procedures and guidance on ballast operations, anchoring in berth to berth, anchor cable release, and anchorage boundaries from gas pipeline. The third type of procedural safety action was related to risk assessments regarding ballast operations, responses to emergency scenarios, and anchorage boundaries from gas pipeline.

Some examples of proactive organisational supervision include regular attendances on-board vessels and audits to monitor crew performance and compliance with company guidelines, as well as reviewing and discussing relevant safety bulletins and boiler instruction manuals during safety meetings.

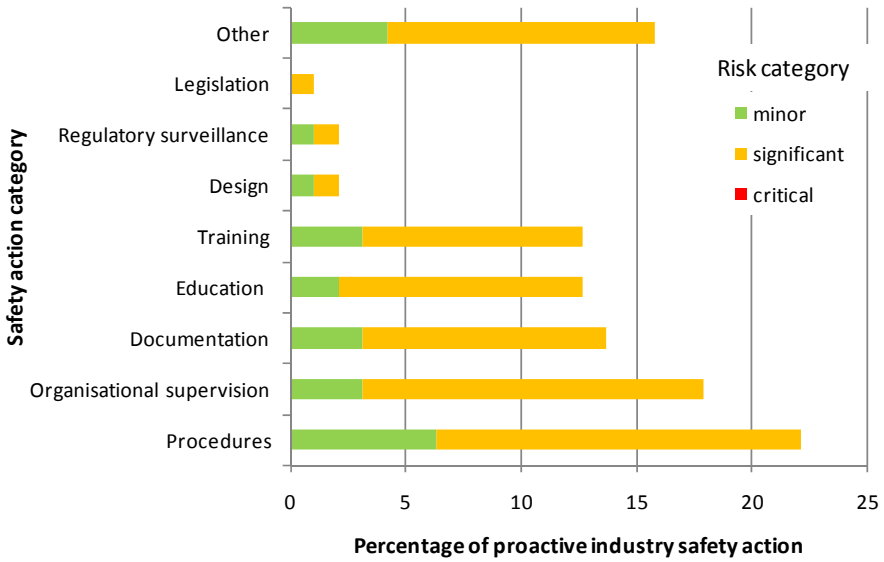
Some examples of the documentation-related proactive industry safety actions as an outcome of identified significant safety issues include reviewing manuals to confirm guidance given, revising planning procedures and practices, developing a ballast operations checklist, posting instruction tables, and requiring training officers to provide the company with written reports covering auditing and training activities.

The great majority of education safety actions in response to safety issues of significant risks were associated with issuing company circulars and fleet safety bulletins, placing placards with clear directions regarding anchor cable release procedures, and conducting English classes ashore and on board ships for crew.

Rupture of a submarine gas pipeline by *APL Sydney* in Port Phillip, Victoria (MO-2008-012)

The training provided as a result of the safety issues of significant risk were related to training crew in emergency procedures, such as undertaking emergency procedure simulations. Other examples include the ships' masters acting as 'training officers' to train crews in accordance with company guidelines, chief mates ensuring all deck department crews are trained in anchor cable release procedures, and the review of current training and qualifications of pilots with respect to anchor positions.

Figure 22: Proactive industry safety actions in marine



ATSB Safety Recommendations in marine

All of the ATSB safety recommendations were a result of the safety issues of significant risk identified in marine investigations (Figure 23). A full list of safety recommendations made can be seen in Table 9.

An occurrence[16] involving an engine room flooding attributed to the work permit system not being effectively implemented on board the ship resulted in three ATSB safety recommendations. Consequently, the operator conducted education in the form of issuing company circulars to inform crew of the accident, increased organisational supervision in terms of regular audits, and ensured work permit procedures for maintenance and repair work are carried out.

In an incident[17] where a ship's engineer was burned when the auxiliary boiler furnace 'flashed back' during a routine boiler oil firing unit burner exchange, the company had previously warned of the dangers associated with servicing the VJ type burner. But it did not inform operators that the burner could be replaced with a VJP burner (a similar burner fitted with a diesel pilot burner), or recommend that existing oil firing units could be modified. The ATSB recommended that safety action be taken to address these issues. The safety actions taken were related to the design or modification of the existing oil firing units, education about the possibility of replacing the burner with another type, and changing servicing procedures in light of the dangers associated with the VJ type burner.

Regulatory surveillance was increased after it was found that the work routine for crew and the compliance with the ILO 180[18] and STCW[19] requirements for rest probably resulted in a cumulative level of fatigue for crew in an occurrence[11]. In response to another occurrence[20] where the ship's certification was issued by a management company to itself on behalf of a State, the ATSB also recommended that the Registry should address this regulatory surveillance safety issue.

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16 *Engine room flooding on board* Great Majesty *in Port Kembla, New South Wales, 27 October 2008* (MO-2008-009)

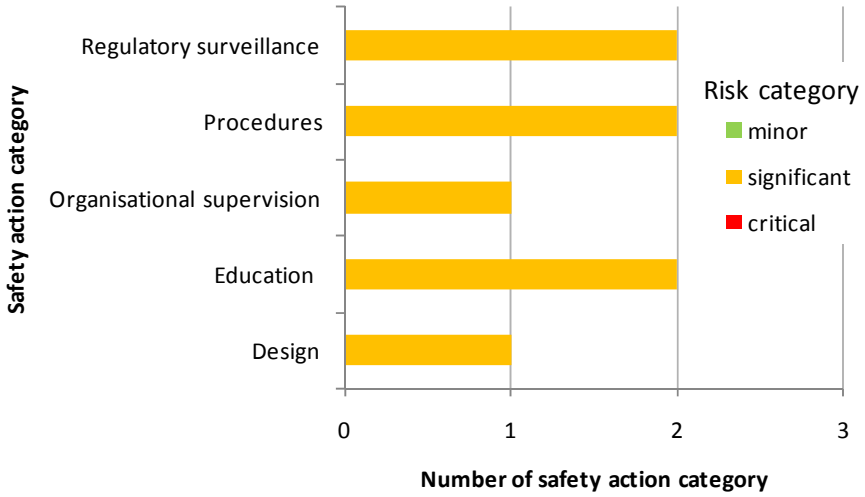
17 *Auxiliary boiler explosion on board* Saldanha *off Newcastle, 18 November 2008* (MO-2008-010)

18 ILO 180 is the International Labour Organization Convention (No. 180) concerning Seafarers' Hours of Work and the Manning of Ships (Geneva, 22 October 1996)

19 Standards of Training, Certification & Watchkeeping (STCW) Convention

20 *Independent investigation into the drifting and subsequent grounding of the Sierra Leone registered products tanker* Breakthrough *at the Cocos (Keeling) Islands on 12 February 2008* (MO-2008-003)

Figure 23: ATSB Safety Recommendations in marine



Summary (Marine)

- Individual actions were found to be the most common safety factor identified in marine investigations, closely followed by local conditions and risk controls. The same pattern was found for contributing safety factors.
- A large amount of safety issues (including those assessed to pose a significant risk to safety) were related to procedures. The issues with procedures were varied and included a lack of anchoring procedures and ineffective SMSs and work permit systems.
- Local conditions were the second most identified safety issue with significant risk (including those with significant risk). These were typically related to the knowledge, skills and experience of the crew.
- The vast majority of safety issues were associated with deck operations and *other* functional areas. Deck operations and navigation (pilotage) were linked to the most safety issues with significant risk.
- Most of the safety actions taken by organisations and agencies in response to safety issues were proactive in nature. These actions taken spread across various safety action categories such as procedures, organisational supervision, documentation, education, and training.
- There were four ATSB safety recommendations made and all of these were in response to safety issues of significant risk. The safety recommendations were mainly related to regulatory surveillance, procedures, and education.

Marine safety recommendations and Safety Advisory Notices (SANs)

Table 9 and Table 10 below provide a short description of all marine safety recommendations and SANs in the 2009-2010 financial year. Details of the safety actions are found in Appendices B and C.

Table 9: Marine: ATSB Safety Recommendations

Safety action type	Who	Safety issue description	Status	Safety Recommendation outcomes
ATSB Safety Recommendation MO-2008-009-SR-020	Parakou Shipping	The work permit system had not been effectively implemented on board the ship. Consequently, most maintenance and repair work was being carried out by ship's personnel without the work permits and 'Danger: Do Not Operate' tags that were required by the ship's procedures.	Closed - action taken 11/11/2009	The company has revised its ballast water and work permit procedures and has advised ship's crews of these changes. The company also intends to measure the implementation of these procedures through on board inspections and audits.
ATSB Safety Recommendation MO-2008-010-SR-039	Volcano Company	While the Volcano Company safety bulletin warned of the dangers associated with servicing the VJ type burner, it did not inform operators that the burner could be replaced with a VJP burner (a similar burner fitted with a diesel pilot burner), or recommend that existing oil firing units could be modified.	Closed - action taken 05/01/2010	The Volcano Company has advised the ATSB that they will; 1. Advise all operators of the occurrence of accident on board the bulk carrier *Saldanha*. 2. Advise all operators of the importance of adhering to the safety bulletin, regardless of the type of burner, and the fact that if the operation and servicing are not done as per our safety bulletin, ship crews will be exposed to the same risks as those seen on board *Saldanha*. 3. Advise all operators that the VJ burner is a direct ignition type and that there is also another type of burner VJP fitted with pilot burner. If operators wish to have a burner fitted with a pilot burner, we will advise them that the existing burner could be replaced with VJP type burner or that it can be modified. 4. We will also put the same advice on our homepage for a certain period.

Safety action type	Who	Safety issue description	Status	Safety Recommendation outcomes
ATSB Safety Recommendation MO-2009-004-SR-008	Danish Maritime Authority	Both the 6 hours on/6 hours off work routine for watchkeepers and the modified work routine for deck ratings used on board *Thor Gitta*, while complying with the ILO 180 and STCW requirements for rest, probably resulted in a cumulative level of fatigue in the crew.	Closed - partial action 2/02/2010	The DMA has, in 2008, established a procedure on examination of rest and work hours, as well as outlook whenever a Danish or Greenlandic ship is involved in grounding or collision or has a very serious accident. In these cases, the Investigation Division gather relevant information and evaluate the information before forwarding them to various departments within the DMA for further consideration. The considerations focus on whether there have been violations of rules in force. Consideration is also focusing on questions in relation to the manning of ships and possible need of changes.
ATSB Safety Recommendation MO-2008-003-SR-049	Sierra Leone International Ship Registry	The ship's certification was issued by a management company to itself on behalf of the Republic of Sierra Leone, solely with the purpose of allowing the ship to sail on an international voyage and did not represent the ship's actual management or that any effective inspections of the ship or audits of the ship's safety management system had taken place.	Closed - action taken 13/07/2010	The Sierra Leone Flag Administration has advised the ATSB that: Sierra Leone Flag Administration has reviewed this case in order to establish an understanding of the situation. The vessel was registered with Sierra Leone Flag with a special registration for one single voyage from Singapore to Nigeria (duration of the special registration is three months). The Recognized Organization, New United, issued the statutory certificates also for one voyage (duration of three months). In view of the grounding of the vessel in February 2008, we have requested the Recognized Organization to supply all information in regards to this vessel. Kindly note that all statutory certificates issued on behalf of the Republic of Sierra Leone are duly reviewed by this Administration and any questions / concerns that the Administration could have about those certificates are presented to the issuing Recognized Organization and are duly explained to this Administration.

Table 10: Marine: ATSB Safety Advisory Notices

Safety action type	Who	Safety issue description	Status
ATSB Safety Advisory Notice MO-2008-008-SAN-025	Owners, operators and masters	*Iron King's* safety management system did not include procedures that adequately ensured that the ship's master and crew were aware of, and drilled in, the emergency steering system change over procedure to be followed in the event of steering control loss.	Closed 13/10/2009
ATSB Safety Advisory Notice MO-2008-010-SAN-041	Flag States, ship owners, operators and masters	*Saldanha's* master and crew were not aware of the appropriate first aid treatment required for burn injuries. As a result, the third engineer was not immediately provided with appropriate first aid.	Closed 22/10/2009
ATSB Safety Advisory Notice MO-2008-003-SAN-047	Jevkon Oil and Gas	The International Safety Management (ISM) Code requires ship owners to ensure that each ship's master is given all necessary support to fulfil their duties. However, Jevkon Oil and Gas did not provide the necessary support either before the commencement of the delivery voyage or after the ship's crew began having difficulties using the intermediate fuel oil in the main engine and started drifting in the Indian Ocean.	Closed 9/04/2010
ATSB Safety Advisory Notice MO-2008-003-SAN-048	Jevkon Oil and Gas	The ship's safety management system was inadequate. Had Jevkon Oil and Gas implemented an effective safety management system on board *Breakthrough*, the risk of an incident such as the one that occurred on the delivery voyage would have been reduced.	Closed 10/04/2010

Safety action type	Who	Safety issue description	Status
ATSB Safety Advisory Notice MO-2008-003-SAN-050	Ship owners, managers and masters	The operation of the ship's systems and the decisions made by the ship's senior officers suggests that they did not have appropriate knowledge and experience to safely undertake *Breakthrough*'s delivery voyage and that they did not effectively use the time spent in China, standing by the ship, to acquire the necessary knowledge.	Closed 9/04/2010
ATSB Safety Advisory Notice MO-2008-011-SAN-045	ASP Ship Management	The ship's health, safety, security and environment meetings and job hazard opportunity log were not effectively used to raise and discuss safety issues associated with cargo crane operations.	Closed 14/04/2010
ATSB Safety Advisory Notice MO-2008-011-SAN-042	ASP Ship Management	The ship's safety management system working aloft procedure was not effectively implemented on board the ship and was not routinely followed when crew members climbed the emergency ladder to assist with the stowage of the cargo crane hook.	Closed 14/04/2010
ATSB Safety Advisory Notice MO-2008-011-SAN-019	Marlow Navigation	The design of the cradle for the crane's hook did not allow for unassisted stowage of the hook when the ship had a stern trim in excess of 2.1 m.	Closed 14/04/2010
ATSB Safety Advisory Notice MO-2009-008-SAN-012	Flag States	While most flag States have laws in place that implement the UNCLOS requirement for a ship's master to render assistance to the crew of another vessel following a collision, these laws are not being effectively implemented on board all ships.	Closed 15/06/2010
ATSB Safety Advisory Notice MO-2009-008-SAN-014	Owners operators and skippers of small vessels	The evidence suggests that Class B AIS transmissions may not be reliably detected by watch keepers on board all ships. Therefore, operators of small vessels fitted with Class B AIS units should be aware that they cannot rely on the AIS unit alone to warn ships of their presence.	Closed 15/06/2010

Safety factors

Most of the safety factors identified in rail investigations were risk controls or individual actions (Figure 24). About half of the safety factors were found to have contributed to an occurrence. Individual actions and risk controls ranked as the top two contributing factors (40 and 26 per cent respectively).

Figure 24: Safety factors identified in all rail investigations

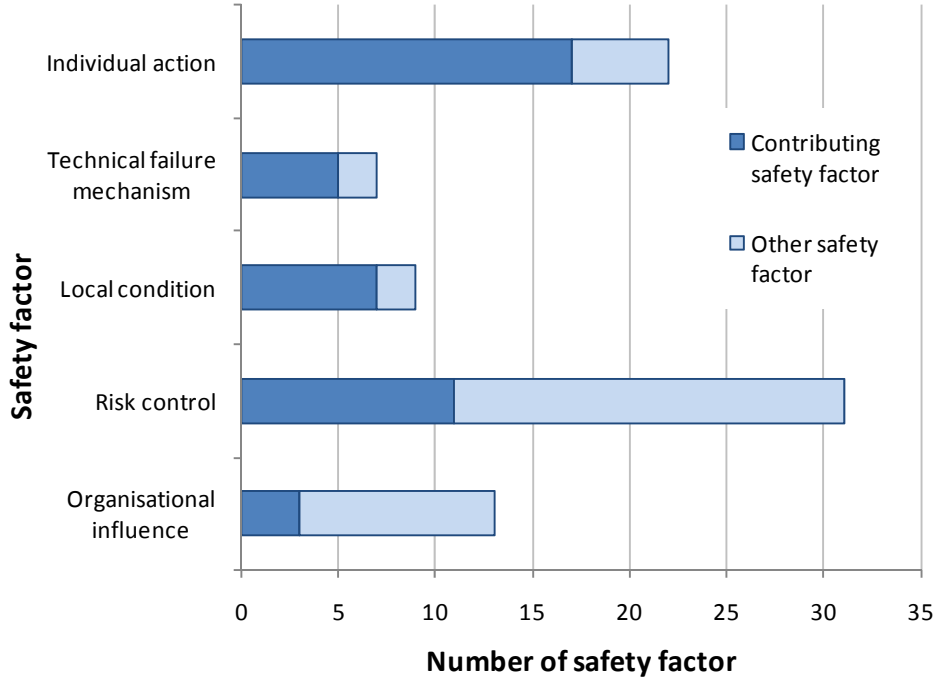


Figure 25: Individual action safety factors identified in rail investigations

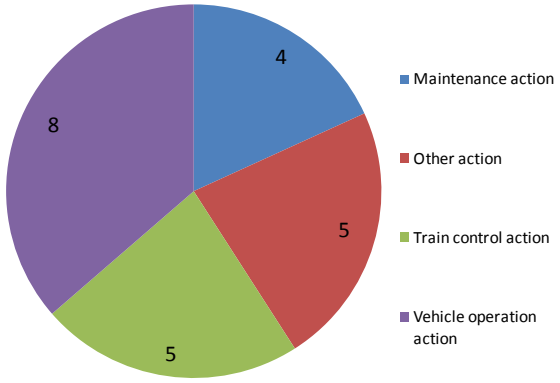
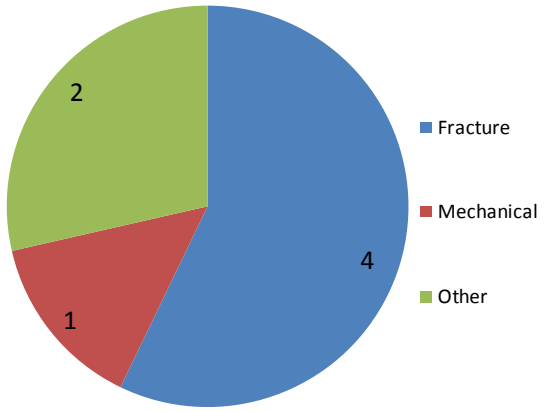


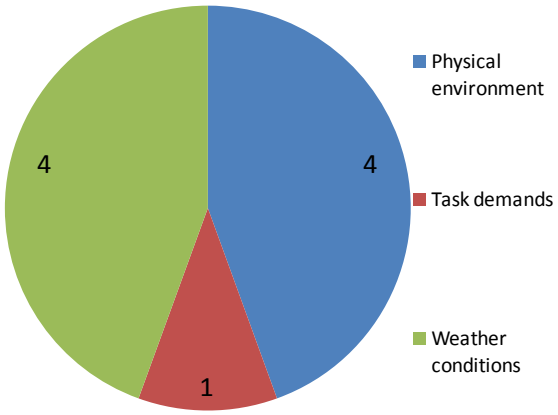
Figure 25 shows that vehicle operation action was the most common individual action safety factor in rail occurrences. Issues with vehicle handling, monitoring and checking, assessing and planning, communicating and co-ordinating with external parties, and using equipment made up vehicle operation actions.

Figure 26: Technical failure mechanism safety factors identified in rail investigations



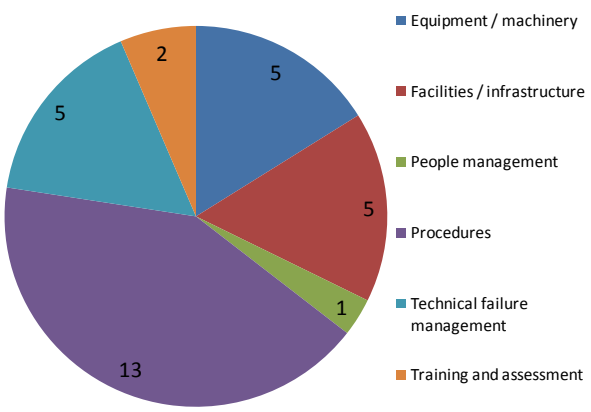
Fractures were the most common technical failure mechanism in rail (Figure 26). Examples of fractures included cracking on the tread of the wheel or high cycle fatigue cracking in the web of the rail.

Figure 27: Local condition safety factors identified in rail investigations



Weather conditions and the physical environment were equally common to local condition safety factors in rail (Figure 27). Common weather conditions identified in rail investigations were rain / flood, temperature and wind. For the physical environment, some examples included the lack of required road pavement markings or the inadequate sight distance for the road user in the absence of a stop line and / or after the stop sign was relocated.

Figure 28: Risk control safety factors identified in rail investigations



Issues with procedures were the most common form of risk control found in rail investigations (Figure 28). In terms of procedures, some examples included the Australian Rail Track Corporation (ARTC)[21] Code of Practice that lacked guidelines regarding bolt-hole cracks and track series irregularities, and an operator's ambiguous and decentralised instructions about crossing loop operations meant that crew training may have been ineffective or incomplete.

All 13 safety factors found in rail investigations at the organisational influences level involved safety management processes. Examples included manual systems of train management when interlocked/ engineered systems were not available; contractors not ensuring that street level crossings are conducted in accordance with all relevant standards; and the ARTC and the local council not having an interface coordination plan that defined each organisation's responsibilities with respect to the maintenance of the street level crossing.

Level Crossing Collision, Birkenhead, South Australia (RO- 2008-001)

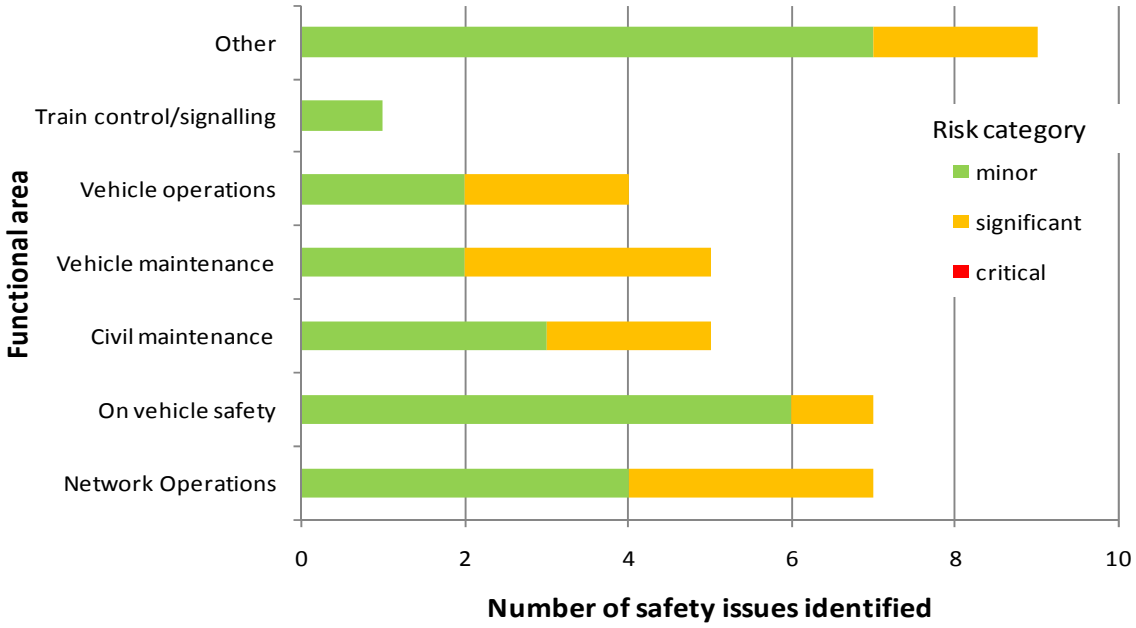
[21] ARTC currently has responsibility for the management of over 13,000 route kilometres of standard gauge interstate track, in South Australia, Victoria, Western Australia and New South Wales.

Safety issues

Of the 38 safety issues identified in rail investigations, the majority were of minor risk and 13 were of significant risk. There were no safety issues that carried a critical risk level.

Safety issues of significant risk were associated with all functional areas except train control/ signalling (Figure 29). Vehicle maintenance and network operations carried more safety issues of significant risk than the rest of the functional areas.

Figure 29: Safety issues by functional area in rail



Safety issues of significant risk in rail

Overall, safety management system (SMS) processes made up 30 per cent of the safety issues while issues with procedures made up 25 per cent (Figure 30).

Looking at just the safety issues of significant risk, procedures and safety management processes together made up 57 per cent all safety issues posing a significant risk in rail (36 and 21 per cent respectively).

Risk control: Procedures

Of the 10 procedure-related safety issues, three involved civil maintenance, two involved network operations, and two involved vehicle maintenance. Half of the procedural safety issues in rail were of significant risk and these were related to the following.

- The ARTC Code of Practice did not address the possibility that a series of track regularity could cause an undesirable harmonic response in some rail vehicles.
- An operator's system for inspection and maintenance of wheel bearings was not sufficiently robust to adequately manage the risks.

- The process for identifying potential rail defects was limited by the ultrasonic test vehicle operator's ability to detect and assess the echo patterns correctly.
- The Pacific National Freight Loading Manual did not comprehensively consider lightly loaded or empty double stacked container vehicles or other freight vehicles that exhibit a large vertical surface area and their suitability for operation under high wind conditions.
- The ARTC Code of Practice at the time of the derailment did not categorise bolt-hole cracks as defects requiring action unless they exceeded 20 mm in length.

Figure 30: Safety issues identified in rail investigations

Risk control: Technical failure management

The two technical failure management safety issues carrying significant risk were found in the same investigation[22] and were related to vehicle maintenance. The safety issues were related to cracks on the tread of a wheel and loose and broken wedge wear plates.

Other risk controls

The other risk control safety factors with significant risk were training and assessment, facilities/ infrastructure, and equipment/ machinery.

- A training and assessment safety issue involved the issuing of ambiguous or inadequate limits of authority which may increase the risk of a train overrunning an intended limit of authority.
- As a result of a level crossing collision between a train and a truck, the ATSB found that more research into the effectiveness of level crossing road traffic

[22] *Derailment of Train 5WX2 near Winton, Victoria, 31 July 2008* (RO-2008-009)

control and protection measures (facilities/ infrastructure safety issues) with respect to their effectiveness in influencing driver behaviour is needed.

- The one equipment/ machinery safety issue carrying significant risk involved warning/ detection systems. Investigations found that the heavy vehicle Intelligent Access Program could be enhanced from its current use as a monitoring program primarily aimed at vehicle route compliance to monitoring compliance over a range of safety and efficiency related parameters including vehicle speed and driver fatigue.

Derailment of train near Golden Ridge WA (RO- 2009-003)

Organisational influence

Out of the 12 safety management system processes safety issues, only three carried significant risk. The two safety issues involving vehicle operations involved the lack of consideration of lightly loaded or empty double stacked container vehicles in high wind conditions, and another involved a lack of 'best practice' by some road transport companies. The final safety issue with significant risk involved network operations and the investigation found that the manual system of train management used when interlocked/ engineered systems are not available was subject to human error and increase the risk of safe working irregularities or incidents.

Local condition

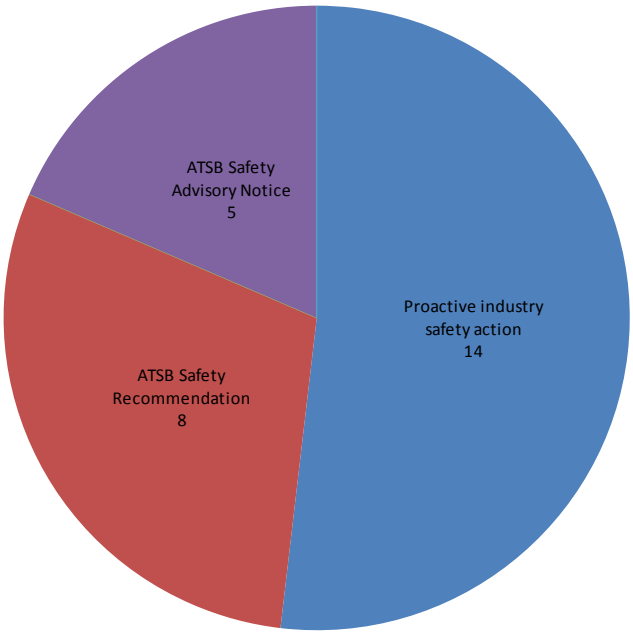
Required road pavement markings were not present or appropriately maintained at the time of a level crossing collision between a train and a road train[23]. This safety issue was considered to carry a significant safety risk.

[23] *Level Crossing Collision, Birkenhead, South Australia, 5 March 2008* (RO-2008-001)

Safety actions

Figure 31 below shows that unlike aviation and marine industries, proactive industry safety actions made up only about half of all safety actions.

Figure 31: Safety actions in response to rail investigations



Proactive industry safety action in rail

As shown in Figure 32, the most common type of proactive industry safety action in rail was related to procedures. In fact, safety actions related to procedures made up 40 per cent of all proactive industry safety actions.

Of the proactive industry safety actions associated with a significant safety issue, over half of these were related to procedures while the rest were made up of safety actions involving repairs, training, documentation, and design.

In response to the safety issues of significant risk, operators proactively changed or developed new procedures. These actions are described below:

- The ARTC instructed that all bolt-hole cracks (regardless of the crack size) be recorded as defects and removed as well as conducting further development of their ultrasonic testing process.
- The operator specified instructions to define the limits of authority or kilometrages in the case of failed trains or when clearing sections due to failures.
- Procedures were amended to specifically identify each class of wagon and its suitability for double stacking and that driver's are to slow trains and be prepared to stop when high winds are observed.

An investigation into a derailment[24] concluded that an undetected crack at an unused bolt-hole increased in size until the rail completely fractured. In response,

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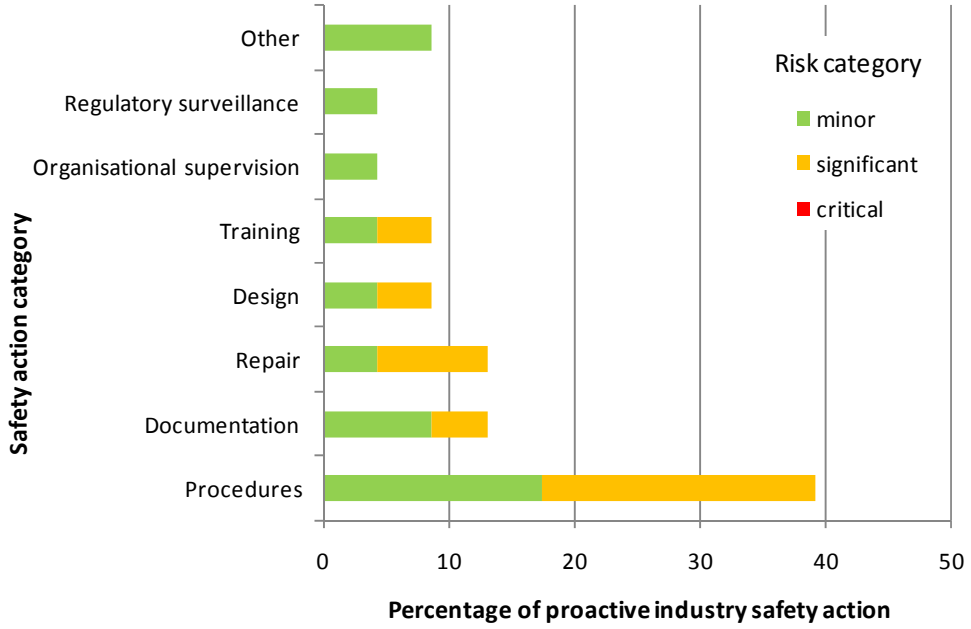
[24] *Derailment of Train 5PS6, Bates, South Australia, 19 April 2008* (RO-2008-005)

the ARTC issued repair instructions that all bolt-hole cracks are recorded as defects and removed, irrespective of the crack size. In another occurrence[25], inspections carried out prior to a derailment did not identify that axle-box housings required re-greasing. Following the derailment, the operator immediately scheduled their entire fleet of axle-box configured rolling stock to be regreased.

As a result of a derailment[26], the operator amended the standard driver's training instructions to slow double stacked trains and be prepared to stop when high winds are observed. In addition, documentation such as the Freight Loading instructions was also updated to specifically exclude double stacking of certain types of wagons.

In another investigation[22], design issues were proactively addressed when it was found that the process for identifying potential rail defects was limited by the ability of the ultrasonic test vehicle operator to detect and assess the echo patterns correctly. Thus, the operator conducted further development of their ultrasonic testing process.

Figure 32: Proactive industry safety actions in rail



ATSB Safety Recommendations in rail

Figure 33 shows the different types of safety action categories taken in response to ATSB safety recommendations. A full list of recommendations made can be seen in Table 11.

The ATSB recommended that a city council take action to address the absence or inappropriate maintenance of road pavement markings. The pavement line markings have been since been completed and / or repaired (RO-2008-001-SR-022).

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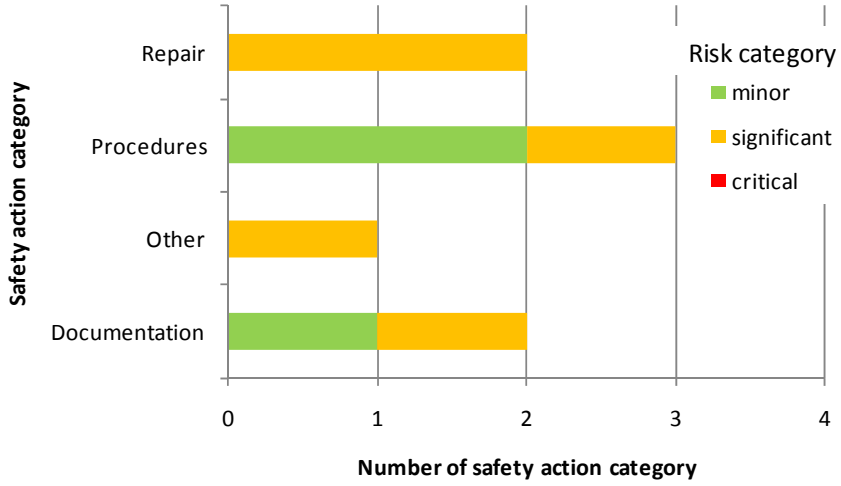
[25] *Derailment of train 1MP9, Mt Christie, South Australia, 1 September 2008* (RO-2008-010)

[26] *Derailment of train 2PM6 - near Loongana, Western Australia, 11 November 2008* (RO-2008-013)

Procedures were changed and actioned by the operator after the ATSB recommended that the ARTC address the safety issue of a paper-based safe working system which can be prone to human error compared to interlock/ engineered systems of safe working (RO-2009-002-SR-011).

In response to a derailment[20] where both the rolling stock and track related factors combined to increase the likelihood of a derailment, the ATRC has created a project group (other safety action category) to review the current practices and standards relating to the possible combinations of track geometry deficiencies and rail vehicle ride characteristics that can unite to initiate a derailment. In addition, the operator has included new examination and repair procedures and has updated documentation to reflect these changes (RO-2008-009).

Figure 33: ATSB Safety Recommendations in rail



Summary (Rail)

- Risk controls were the most common safety factor type identified in rail investigations, followed by individual actions. However, when looking at contributing safety factors only, individual actions were the most common, followed by risk controls.
- Overall, safety issues with SMSs were identified in most rail investigations, closely followed by procedures as a risk control. However, procedures were associated with a largest number of safety issues with significant risk.
- Vehicle maintenance and network operations were linked with more safety issues of significant risk than the other functional areas.
- Unlike aviation and marine modes, the proactive industry safety actions in the rail industry made up only half of the safety actions.
- The most common type of proactive industry safety action was related to procedures. In particular, in response to most safety issues of significant risk, operators proactively changed or developed new procedures.
- Changes to or the development of procedures were a common response to ATSB safety recommendations.

Rail safety recommendations and Safety Advisory Notices (SANs)

Table 11 and Table 12 below provide a short description of all rail safety recommendations and SANs in the 2009-2010 financial year. Details of the safety actions are found in Appendices B and C.

Table 11: Rail: Safety Recommendations

Safety action type	Who	Safety issue description	Status	Safety Recommendation outcome
ATSB Safety Recommendation RO-2008-001-SR-021	Port Adelaide Enfield City Council	At the time of the collision the Australian Rail Track Corporation and the Port Adelaide Enfield Council did not have an interface coordination plan that defined each organisation's responsibilities with respect to the maintenance of the Stirling Street level crossing.	Closed - partial action 8/11/2010	The Port Adelaide Enfield City Council has advised that the recommendation is accepted. The Council is awaiting the drafting of Interface Agreements by the SA State Level Crossing Advisory Committee. Also, the Council has advised that they are currently working with the Department of Transport, Energy and Infrastructure's (DTEI) Level Crossing Unit in relation to DTEI's survey and assessment of level crossings in SA. ATSB Response: After monitoring the response to the recommendations issued to the ARTC and the Port Adelaide Enfield City Council for 12 months, the latest advice received from the relevant SA Department is that it is anticipated that a Bill amending the SA Rail Safety Act 2007 that will mandate Level Crossing Interface Agreements between the rail track owner and the relevant road authority will be enacted during 2011. Given that both the ARTC and the Port Adelaide Enfield City Council have agreed to the recommendations and because the ramifications pertaining to level crossings are State-wide rather than any given level crossing, the ATSB considers that the matter is being dealt with at the appropriate level.
ATSB Safety Recommendation RO-2008-001-SR-022	Port Adelaide Enfield City Council	At the time of the collision and at times in the past, the required road pavement markings have not been present or appropriately maintained on the sealed surface of Stirling Street.	Closed - action taken 15/03/2010	The Port Adelaide Enfield City Council has advised that the recommendation is accepted. The Council has advised that immediately after the Department of Transport, Energy and Infrastructure (DTEI) works associated with the Port River Bridge were completed that the pavement line marking was completed by agencies other then the Port Adelaide Enfield City Council.

Safety action type	Who	Safety issue description	Status	Safety Recommendation outcome
ATSB Safety Recommendation RO-2008-001-SR-025	Australian Rail Track Corporation	At the time of the collision the Australian Rail Track Corporation and the Port Adelaide Enfield Council did not have an interface coordination plan that defined each organisation's responsibilities with respect to the maintenance of the Stirling Street level crossing.	Closed - partial action 12/11/2010	The ARTC accepts the above recommendation. The ARTC has been working towards establishing an interface agreement with the SA Department for Transport, Energy and Infrastructure for several years. It is anticipated that once a model agreement is established negotiations with Local Government agencies will progress at a significantly faster rate. Negotiations with Local Government organisations if not progressed as a block via the Local Government Association will need to be progressed by individual negotiation with each interfacing Council. If the latter situation is the case ARTC reserves the right to prioritise negotiations based on a number of interfaces and perceived risk to the safety of rail operations After monitoring the response to the recommendations issued to the ARTC and the Port Adelaide Enfield City Council for 12 months, the latest advice received from the relevant SA Department is that it is anticipated that a Bill amending the SA Rail Safety Act 2007 that will mandate Level Crossing Interface Agreements between the rail track owner and the relevant road authority will be enacted during 2011. Given that both the ARTC and the Port Adelaide Enfield City Council have agreed to the recommendations and because the ramifications pertaining to level crossings are State-wide rather than any given level crossing, the ATSB considers that the matter is being dealt with at the appropriate level.

Safety action type	Who	Safety issue description	Status	Safety Recommendation outcome
ATSB Safety Recommendation RO-2008-001-SR-026	Department for Transport, Energy and Infrastructure (SA)	The Australian Rail Track Corporation have not been approached to issue clearances for level crossings in South Australia by either the permit applicant or the Department of Transport Energy and Infrastructure when Heavy Vehicle Permits were issued for routine 'fixed term' Restricted Access Vehicle operations.	Closed - action taken 27/01/2010	•Non general access vehicles, such as B-Doubles, can access parts of the road network if provided with an exemption from the mass and / or dimension limits of the Road Traffic Act by a permit or through a general exemption via a government gazette notice. •Under the Department's Heavy Vehicle Access Framework, which was updated in April 2009 (see www.transport.sa.gov.au), exemptions by permit are now only being provided in limited circumstances, generally on a one off basis. •DTEI is currently reviewing all routes where permits are being used to provide access over level crossings. The objective of this review is to identify works required to upgrade the route so that there is no longer a need to issue permits for access but to have the route exemption provided by government gazette notice subject to rail authority agreement. •In addition, DTEI currently undertakes a rolling level crossing survey and assessment program which sees each individual crossing re-assessed approximately once every three years. Any issues that are found during the assessment process is brought to the attention of the relevant infrastructure manager. •In relation to Stirling Street, DTEI has worked with the ARTC to ensure all issues have been addressed. DTEI is currently in the process of securing ARTC agreement to have route gazetted thereby eliminating the need for permits.
ATSB Safety Recommendation RO-2009-002-SR-011	Australian Rail Track Corporation	Manual systems of train management, such as Special Proceed Authority working, are used when interlocked/engineered systems are not available. However, manual systems are subject to human error and increase the risk of safeworking irregularities/incidents when compared to interlocked/engineered systems of safeworking.	Closed - action taken 11/05/2010	ITSRR response to ARTC recommendation - The report into the Tarana safeworking irregularity was released by the ATSB on the 11 December 2009. The report contained one recommendation which was directed to the Australian Rail Track Corporation (ARTC). I am pleased to advise that this recommendation has been addressed by the responsible organisation and are considered closed by my Officers. The final recommendation was closed on 3 May 2010.

Safety action type	Who	Safety issue description	Status	Safety Recommendation outcome
ATSB Safety Recommendation RO-2008-009-SR-029	Australian Rail Track Corporation	The ARTC Code of Practice does not clearly address the possibility that a series of track irregularities, even minor ones which do not exceed intervention limits, could cause an undesirable harmonic response in some rail vehicles.	Closed - action taken 9/07/2010	Australian Rail Track Corporation recognises the issue identified by the Australian Transport Safety Bureau investigation and is undertaking research to identify a sustainable and practical approach to address the issue. Australian Rail Track Corporation accepts that the track maintenance standard as currently applied treats each identified track geometry deficiency as a separate entity and may not fully recognise that there may be rare but possible combinations of track geometry deficiencies and rail vehicle ride characteristics that can unite to initiate a derailment. The identified deficiency relates more the spacing of minor track geometry deficiencies in combination with rail vehicle characteristics including bogie spacing and type, wheel profile and load placement than the size of the individual geometry deficiencies. Australian Rail Track Corporation has a robust electronic track geometry measuring system in place with significant data captured and processed to generate a Track Quality Index (TQI) for any given track section. Research undertaken to date indicates the problem is not unique to the NCoP applied by Australian Rail Track Corporation, a review indicates that other codes applied within Australia and overseas have yet to define a systemic and sustainable long term solution to the problem. Australian Rail Track Corporation considers that the issue is worthy of further consideration and has established a project group to review current standards and practices including the concerns raised by Australian Transport Safety Bureau. The ATSB is satisfied that the intended action by the ARTC would adequately address the safety issue.

Safety action type	Who	Safety issue description	Status	Safety Recommendation outcome
ATSB Safety Recommendation RO-2008-009-SR-030	Pacific National Pty Ltd	The trailing bogie of wagon RCPF-31882C was found to have loose and broken wedge wear plates. It could not be verified whether the wedge wear plates had broken free before or during the derailment sequence. However, if the condition had existed prior to the derailment, it is likely that body roll induced while traversing a series of track irregularities could result in undamped harmonic oscillations.	Closed - action taken 27/04/2010	PNL has train examination procedures in place for these items. It is also included in the new version of the Pacific National Wagon Pocket Field Manual The ATSB is satisfied that the intended action by PNL would adequately address the safety issue.
ATSB Safety Recommendation RO-2008-009-SR-031	Pacific National Pty Ltd	Examination of wagon RCPF-31882C revealed a crack on the tread of a wheel on the second axle of the leading bogie. While not contributing to this derailment, if the crack were to develop to such an extent that the wheel tread completely fractured, the risk of derailment would increase significantly.	Closed - action taken 27/04/2010	PNL has train examination procedures in place for these items. It is also included in the new version of the Pacific National Wagon Pocket Field Manual The ATSB is satisfied that the intended action by PNL would adequately address the safety issue.

Table 12: Rail: Safety Advisory Notices

Safety action type	Who	Safety issue description	Status
ATSB Safety Advisory Notice RO-2008-005-SAN-035	Australian Rail Track Corporation	The process for identifying potential rail defects is limited by the ultrasonic test vehicle operator's ability to detect and assess the echo patterns correctly.	Closed 3/02/2010
ATSB Safety Advisory Notice RO-2008-005-SAN-036	Australian Rail Track Corporation	The ARTC Code of Practice does not recognise the relationship between heat-affected metal and stress concentration when specifying how far a bolt-hole should be from the rail ends before welding.	Closed 3/02/2010
ATSB Safety Advisory Notice RO-2009-003-SAN-018	Australian Rail Track Corporation	The ARTC had not undertaken an audit of track drainage arrangements for the Trans-Australian Railway to verify that the track complied with the relevant standard and that the standard was appropriate.	Closed 26/05/2010
ATSB Safety Advisory Notice RO-2009-003-SAN-019	Australian Rail Track Corporation	The ARTC Code of Practice with respect to Flooding, 'ETG-10-01', does not specify hydrological design parameters, including height of water ponding against the formation layer for a design precipitation event. This could lead to under specified track drainage arrangements and an increased risk of track damage arising from flash flood events.	Closed 26/05/2010

Safety action type	Who	Safety issue description	Status
ATSB Safety Advisory Notice RO-2009-003-SAN-020	Australian Rail Track Corporation	At the time of the derailment the ARTC did not have timely access to reliable weather information and may benefit by building closer relationships with the Bureau of Meteorology and local observers (councils, farmers, etc.) who could pass information to assist them with the identification of localised severe weather events that may potentially affect the safety of their track.	Closed 26/05/2010

APPENDIX A: INVESTIGATIONS COMPLETED

Aviation

AI-2008-038	**Instrument departure procedure design**
Date completed: 09/04/2010	Following the construction of a new hangar adjacent to runway 28 Right (28R) at Archerfield Airport, Queensland, the Australian Transport Safety Bureau (ATSB) received a number of submissions asserting that the building infringed safety standards or reduced flight safety. Drawing on an independent third-party review, the ATSB determined that the building does not breach obstacle limitation surfaces. The ATSB also conducted an initial examination of the instrument departure procedure from runway 28R. The ATSB found that the procedure complied with the extant instrument departure design requirements, but identified an ambiguity in the guidance for designing instrument departure procedures. The ATSB assessed that this ambiguity could lead to inconsistent expectations about the extent of clearance from obstacles provided to aircraft when pilots were following an instrument departure procedure. This had the potential to increase the risk of a collision with an obstacle. In response, on 30 May 2008, the (then) Executive Director of the ATSB commenced a safety issue investigation in accordance with sections 21 and 23 of the *Transport Safety Investigation Act 2003*. As a result of that investigation, the Civil Aviation Safety Authority and Airservices Australia have, in consultation, reviewed their understanding of how the design standards for instrument departure procedures should apply in Australia. They have also re-examined the runway 28 instrument departure procedure at Archerfield in the light of that review and have advised that they intend to amend the requirements for instrument departures from runway 28R. The potential for inconsistent interpretation of the instrument departure procedure design requirements has also been notified to the International Civil Aviation Organization instrument flight procedures panel, which monitors the international standards for the design of instrument procedures.
AO-2007-001	**Microburst event - Sydney Airport, NSW - 15 Apr 2007 - VH-OJR, Boeing Company 747-400**
Date completed: 21/12/2009	On 15 April 2007, a Boeing Company 747-438 aircraft, registered VH-OJR, was being operated on a scheduled passenger flight from Singapore to Sydney, NSW. On board the aircraft were 19 crew and 355 passengers. At 1923 Eastern Standard Time, the aircraft was about 100 ft above ground level prior to landing on runway 16 Right (16R) when it encountered a significant and rapid change in wind conditions. The aircraft touched down heavily and the windshear warning sounded in the cockpit. The crew conducted the windshear escape manoeuvre and made a second approach and landing. The airport was under the influence a line of high-based thunderstorms associated with light, intermittent rain. Investigation revealed that the aircraft was influenced by outflow descending from a high-based storm cell that developed into a microburst. The airport did not have a windshear warning system. Pilots of aircraft operating on the reciprocal runway had previously reported moderate windshear to air traffic control, and the surface wind conditions had changed rapidly. However, that information was not communicated to the occurrence aircraft by air traffic control. In response to this occurrence, the Bureau of Meteorology commenced a Sydney Airport Wind Shear Study to assess options for providing the aviation industry with low altitude windshear alerts. That study is scheduled for completion in April 2010.

AO-2007-008 **Date completed:** **23/12/2009**	**Total power loss - VH-IWO, B200 King Air, Fitzroy Crossing Aerodrome, 225° M 370Km - 24 May 2007** A Raytheon Beech Kingair aircraft, registration VH-IWO, was cruising at FL290 on an aero-medical flight from Newman to Fitzroy Crossing, WA with the pilot, a flight nurse and a doctor on board. When approximately 140 NM (259 km) south-south-east of Broome, the right engine inter-turbine temperature indication (ITT) was observed by the pilot to rise without any engine control input. The ITT rise was accompanied by a slight fluctuation in a number of associated engine indications. The pilot reduced power on the right engine. Shortly after the power reduction, there was a slight right engine surge, with an accompanying rise in ITT. Smoke was observed by the pilot coming from the right engine exhaust. The pilot shut down and secured the right engine and, after briefing the flight nurse and doctor, diverted to Broome Airport where a single-engine landing was completed. Examination of the right engine revealed extensive damage caused by the separation of one of the compressor turbine blades at mid span. A number of safety actions by the parties to this investigation have been reported in the Safety Action section of this report. Any additional safety action that is advised by those parties in response to this draft report will be considered for inclusion in the final investigation report.
AO-2007-017 **Date completed: 08/07/2009**	**Total power loss - Jundee Aerodrome,WA - 26 Jun 2007 - VH-XUE - Embraer Brasilia** On 26 June 2007 at 0639 Western Standard Time, an Empresa Brasileira de Aeronáutica S.A. EMB-120ER aircraft, registered VH-XUE, departed Perth, WA on a contracted passenger charter flight to Jundee Airstrip, WA. There were two pilots, one flight attendant, and 28 passengers on the aircraft. While passing through 400 ft above ground level on final approach to Jundee Airstrip, with flaps 45 set, the aircraft drifted left of the runway centreline. When a go-around was initiated, the aircraft aggressively rolled and yawed left, causing the crew control difficulties. The crew did not immediately complete the go-around procedures. Normal aircraft control was regained when the landing gear was retracted about 3 minutes later. The left engine had sustained a total power loss following fuel starvation, because the left fuel tank was empty. The investigation identified safety factors associated with the fuel quantity indicating system, the ability of the crew to recognise the left engine power loss, and their performance during the go-around. There were clear indications that the fuel quantity measurement procedures and practices employed by the operator were not sufficiently robust to ensure that a quantity indication error was detected. The failure of that risk control provided the opportunity for other safety barriers involving both the recognition of, and the crew's response to, the power loss, to be tested. Organisational safety factors involving regulatory guidance, the operator's procedures, and flight crew practices were identified in those two areas. The operator introduced revised procedures for measuring fuel quantity and the Civil Aviation Safety Authority (CASA) initiated a project to amend the guidance to provide better clarity and emphasis. The endorsement and other training that the crew had received did not include simulator training and did not adequately prepare them for the event. There was no EMB-120 flight simulator facility in Australia and no Australian regulatory requirement for simulator training. In March 2009, an EMB-120 flight simulator came into operation in Melbourne, Vic. A workshop and discussion forum was conducted on 27, 28 April 2009 for Australian Embraer 120 aircraft operators. All those operators were expected to commence utilising the simulator for flight crew endorsement training following that workshop.
AO-2007-029 **Date completed: 09/11/2009**	**Collision with terrain - near Clonbinane, Vic - 31 Jul 2007- VH-YJB, Aerocommander** On 31 July 2007, a Rockwell International Aero Commander 500-S, registered VH-YJB, departed Essendon Airport, Vic. on a business flight to Shepparton that was conducted at night under the instrument flight rules (IFR). On board were the pilot and one passenger. At 1958 Eastern Standard Time, while in the cruise at 7,000 ft above mean sea level in Class C controlled airspace, radar and radio contact with the aircraft was lost when it was about 25 NM (46 km) north-north-east of Essendon. The wreckage was found in the area of the last radar position and both occupants had been fatally injured. At the time, special weather reports for severe turbulence and severe mountain waves were current for that area. Wind speeds on the ground were reported to be 50 kts. Calculations made using the recorded radar data and forecast wind showed that the aircraft had been in cruise flight at speeds probably greater than its published manoeuvring speed, prior to disappearing from radar. The wreckage and its distribution pattern were consistent with an in-flight breakup during cruise flight. The breakup most likely resulted from an encounter with localised and intense turbulence, or from an elevator control input, or from a combination of both.

AO-2007-036	**Fuel-related event – 50 km NW of Swan Hill, Vic. 11 August 2007 VH-TJE Boeing Company 737-476**
Date completed: 28/07/2009	On 11 August 2007, a Boeing Company 737-476 aircraft, registered VH-TJE, was being operated on a scheduled passenger service from Perth, WA to Sydney, NSW. The flight crew consisted of a pilot in command, who was the pilot flying, and a copilot. The aircraft departed from Perth at 0544 Western Standard Time. About 2 hours 40 minutes later, the master caution light illuminated associated with low output pressure of the aircraft's main tank fuel pumps. The pilot in command observed that the centre tank fuel pump switches on the forward overhead panel were selected to the OFF position and he immediately selected them to the ON position. The main fuel tanks were low on fuel and the investigation estimated that there was about 100 kg in each of the main tanks. The centre fuel tank contained about 4,700 kg of fuel when the master caution occurred. The flight continued on the flight planned route and landed at Sydney 51 minutes after the initial illumination of the master caution light. The investigation determined that the flight crew had flown the previous two sectors on a B737 aircraft with a different fuel system and fuel control panel. The pilot in command was suffering from chronic stress and it is probable that this stress affected his ability to operate as a pilot in command without him being aware of this. In addition, some checklist procedures were not adhered to by the flight crew and it was likely that deviations from those checklist items were occurring throughout the operator's fleet of B737 aircraft. As a result of this investigation, the operator has instigated safety action to change the Before Star and Before Taxi procedures and checklists.
AO-2007-044	**Go-around event - Melbourne Airport, Victoria - 21 Jul 2007, VH-VQT, Airbus Industrie A320-232**
Date completed: 05/03/2009	On 21 July 2007, an Airbus Industrie A320-232 aircraft was being operated on a scheduled international passenger service between Christchurch, New Zealand and Melbourne, Australia. At the decision height on the instrument approach into Melbourne, the crew conducted a missed approach as they did not have the required visual reference because of fog. The pilot in command did not perform the go-around procedure correctly and, in the process, the crew were unaware of the aircraft's current flight mode. The aircraft descended to within 38 ft of the ground before climbing. The aircraft operator had changed the standard operating procedure for a go-around and, as a result, the crew were not prompted to confirm the aircraft's flight mode status until a number of other procedure items had been completed. As a result of the aircraft not initially climbing, and the crew being distracted by an increased workload and unexpected alerts and warnings, those items were not completed. The operator had not conducted a risk analysis of the change to the procedure and did not satisfy the incident reporting requirements of its safety management system (SMS) or of the Transport Safety Investigation Act 2003. As a result of this occurrence, the aircraft operator changed its go-around procedure to reflect that of the aircraft manufacturer, and its SMS to require a formal risk management process in support of any proposal to change an aircraft operating procedure. In addition, the operator is reviewing its flight training requirements, has invoked a number of changes to its document control procedures, and has revised the incident reporting requirements of its SMS. In addition to the safety action taken by the aircraft operator the aircraft manufacturer has, as a result of the occurrence, enhanced its published go-around procedures to emphasise the critical nature of the flight crew actions during a go-around.

AO-2007-046	**Collision with terrain - Doongan Station, WA 25 September 2007 VH-HCN Robinson Helicopter Company R22 Beta II**
Date completed: 22/12/2009	On 25 September 2007 at about 0600 Western Standard Time, a Robinson Helicopter Company R22 Beta II helicopter, registered VH-HCN, departed under the visual flight rules (VFR) from Doongan Station in the Kimberley region of Western Australia. The purpose of the flight was to conduct a stock survey in the vicinity of the station. On board the helicopter were the pilot and one passenger. About 5 to 10 minutes into the flight, the passenger detected a rubber-like burning smell, combined with a smell he associated with hot metal. The passenger informed the pilot who immediately landed the helicopter in a clear area adjacent to a nearby road. The pilot visually inspected the helicopter with the engine and rotor turning, and remarked that one of the rotor system drive belts appeared to be damaged. The pilot decided to return the helicopter to the station, while the passenger elected to remain at the landing site and await recovery by motor vehicle. The passenger watched the helicopter take off and, owing to the calm conditions, continued to hear the engine noise of the helicopter for some time. The passenger reported hearing variation in the engine noise before it ceased abruptly. In response, the passenger began walking along the road in the direction of the station and discovered the wreckage of the helicopter adjacent to the road. The helicopter had been destroyed by impact forces and fire and the pilot had been fatally injured. The investigation determined that the helicopter's main rotor system drive belts probably failed or were dislodged, resulting in a loss of drive to the rotor system that necessitated an autorotative landing over inhospitable terrain. The investigation also identified a number of safety factors relating to unsafe decision making, including the operation of the helicopter beyond the allowable weight and centre of gravity limits, as well as evidence of the recent use of cannabis by the pilot. As a result of this accident, and a number of other similar events that were identified during this investigation, the Australian Transport Safety Bureau has commenced a Safety Issue investigation to determine if there are any design, manufacture, maintenance or operational issues that increase the risk of a failure of the rotor system drive belt in the R22 helicopter.
AO-2007-047	**Aircraft loss of control - 255 km SW of Warburton, WA - 17 October 2007 - VH-WXC, Cessna Aircraft Company 210M**
Date completed: 22/04/2009	During the early evening of 17 October 2007, the pilot of a Cessna Aircraft Company C210M, registration VH-WXC, was fatally injured when his aircraft impacted terrain during a flight from Warburton to Kalgoorlie, Western Australia. That flight was being conducted at night under the visual flight rules and the pilot was the sole aircraft occupant. The aircraft was seriously damaged by impact forces. There was evidence that the engine was producing significant power at that time. The aircraft was inverted when it collided with terrain, which was consistent with an in-flight loss of control. The accident was not survivable. Examination of the aircraft wreckage found evidence that the aircraft's suction-powered gyroscopic flight instruments were in a low energy state. That was most probably because the vacuum relief valve was at a low suction setting. There was no lockwire fitted to the associated lock nut that would have ensured the security of the vacuum relief valve's adjustment spindle. The design of the valve was such that any in-service loss of friction on the lock nut could allow the spindle to move to a lower suction setting. In consequence, the aircraft's suction-powered gyroscopic flight instruments may not have been providing reliable indications to the pilot. The pilot was appropriately qualified to conduct the flight. However, dark night conditions probably prevailed in the vicinity of the accident site which meant that the pilot would have had few external visual cues. In such conditions, the pilot was reliant on the indications from the aircraft's flight instruments to maintain control of the aircraft. The pilot would have had limited time to identify and react to any unreliable indications from the suction-powered flight instruments.

AO-2007-062	**Depressurisation event - 246 km south-west of Coolangatta, Qld - 17 November 2007 - VH-VBC - Boeing Company 737-7Q8**
Date completed: 29/04/2009	On 17 November 2007 a Boeing Company 737-7Q8 aircraft, registered VH-VBC, with two flight crew, four cabin crew and 145 passengers was being operated on a scheduled passenger service from Coolangatta, Queensland to Melbourne, Victoria. During the takeoff, the Master Caution system activated and the right BLEED TRIP OFF light illuminated. The pilot in command, who was the pilot flying, elected to continue the takeoff. Once airborne the Bleed Trip Off non-normal checklist was actioned. The right engine bleed could not be reset with the effect that, when above flight level (FL) 170 (17,000 ft above mean sea level), only the left engine bleed air was available for airconditioning and cabin pressurisation. At FL318 during the climb, the flight crew observed the left PACK TRIP OFF light illuminate, followed by a rapid loss in cabin pressure and the cabin rate of climb indicator showing a rate of climb of about 2,000 ft/min. The crew fitted their emergency oxygen masks, commenced the Emergency Descent checklist and began a rapid descent to 10,000 ft. During the descent, the cabin altitude exceeded 14,000 ft, at which time the passenger oxygen masks deployed automatically. The aircraft was diverted to Brisbane for landing. There were no reported injuries to passengers or crew and no damage to the aircraft. The investigation found that a combination of technical faults contributed to the loss of pressurisation and identified a number of other safety factors relating to operational procedures and cabin crew knowledge of the passenger oxygen system. The operator conducted an internal investigation of the incident and carried out a number of safety actions as a result. Those actions included the enhancement of a number of the operator's manuals and the amendment of the operator's cabin safety recurrent training. In addition, the operator's passenger oxygen use in-cabin brief was enhanced to include advice that oxygen would flow to passengers' masks even if the associated bag was not inflated..
AO-2007-064	**Operational event - Brisbane Airport, Queensland - 25-Nov-07**
Date completed: 21/04/2009	On 25 November 2007, a Gulfstream Aerospace Corporation G-IV aircraft, registered HB-IKR, was being operated on a charter flight from Brisbane Airport, Queensland to Sydney, New South Wales. At about 2225 Eastern Standard Time the pilot in command of the aircraft commenced a take-off run on taxiway Alpha, adjacent to the active runway 01. The aerodrome controller (ADC) instructed the pilot to cancel the take-off clearance. The crew stopped the takeoff and the ADC instructed them to taxi to the end of the runway for a takeoff using the full runway length. There were no injuries, or damage to the aircraft or airport infrastructure. The investigation found that a combination of a cockpit equipment failure, inadequate pilot rest, deficient cockpit resource management practices and unfamiliarity with the airport layout were likely factors that lead to the occurrence.
AO-2007-070	**Airframe event - Norfolk Island Aerodrome - 29-Dec-07**
Date completed: 08/02/2010	On 29 December 2007, a Boeing Company 737-229 aircraft, registered VH-OBN, was being operated on a scheduled passenger service from Brisbane, Qld to Norfolk Island, At approximately 0352 UTC the flight crew conducted a missed approach at Norfolk Island due to poor weather. During the flap retraction, the flight crew felt high frequency vibration through the airframe, while observing control yoke deflection to the left. That condition increased until at approximately 40 degrees control yoke deflection, a continual buffeting and uncommanded roll and yaw occurred. Controlled flight was manually maintained with difficulty. Due to the vibration, the aircraft autopilot system could not be engaged. The flight crew elected to continue on to the designated alternate airport at Nouméa, New Caledonia, where an uneventful landing was carried out. During that diversion flight, the cabin crew prepared the passengers for a possible ditching. A subsequent inspection determined that the number-4 leading edge slat, inboard main track had failed. An examination of the failed track identified fatigue cracking originating at the intersection of diverging machining marks at the fracture site. Further inspection of the number-4 slat found corrosion damage on the outboard auxiliary track, with the inboard auxiliary track adjacent to the failed main track having failed in overload at the slat attachment. The investigation also found a number of deficiencies within the cabin during the diversion flight, and poor passenger handling after the subsequent landing at Nouméa. As a result of this investigation, the aircraft operator advised the Australian Transport Safety Bureau that they had implemented a number of safety actions including: • revision of flight crew flight planning - alternate fuel load provisions • revision of cabin crew equipment and procedures • review of company emergency response procedures.

AO-2008-007	**Hard landing, VH-NXE, B717, Darwin Aerodrome, NT. 07-Feb-08**
Date completed: 14/05/2010	On 7 February 2008, a Boeing Company 717–200 aircraft, registered VH-NXE, was being operated on a scheduled passenger service from Cairns, Queensland via Nhulunbuy (Gove) to Darwin, Northern Territory with six crew and 88 passengers. The flight crew were cleared by air traffic control to fly a visual approach to runway 29 at Darwin Airport and elected to follow the instrument landing system to the runway. The aircraft was above the glideslope for the majority of its approach and temporarily exceeded the operator's stabilised approach criteria shortly before landing. The aircraft sustained a hard landing resulting in structural damage. The flight crew completed the landing roll and taxied the aircraft to the terminal without further incident. There were no reported injuries; however, the extent of the damage to the aircraft led the ATSB to classify the occurrence as an accident. The investigation identified a number of relevant safety factors, including the flight crew's actions and control inputs, the aircraft operator's stabilised approach criteria and operational documentation, and the visual cues associated with runway 11/29 at Darwin Airport. As a result of this occurrence, the aircraft operator implemented a number of safety actions in relation to enhancing their stabilised approach criteria and pilot training, the monitoring of third party training providers, and the amendment of relevant operational documentation. In addition, the Civil Aviation Safety Authority undertook to prioritise the completion of proposed legislation in relation to third party training providers.
AO-2008-008	**Total power loss - Jabiru (ALA) - 11-Feb-08**
Date completed: 17/07/2010	On 11 February 2008, at about 0720 Central Standard Time, following takeoff from runway 27 at Jabiru Airport, NT, a Beech Aircraft Corporation 1900D, registered VH-VAZ, sustained an auto-feather of the left propeller and subsequent left engine failure. The aircraft was being operated on a charter flight to Darwin with two pilots and a passenger on board. The pilots reported that, following the engine failure, they completed a single-engine circuit and landing at Jabiru. Subsequent examination of the left engine revealed catastrophic internal damage to the power section of the engine. The initiator of the damage was the release of a power turbine second-stage blade. Metallurgical examination determined that the failure of the second-stage turbine blade had occurred as a consequence of the initiation and growth of a high-cycle fatigue cracking mechanism from the downstream trailing corner of the blade fir-tree root post. At the time of blade fracture, approximately 25% of the root cross-section had been compromised by fatigue cracking. The investigation found that during the most recent overhaul of the engine, the overhaul facility did not comply with the engine manufacturer's service bulletin regarding second-stage turbine blade replacement. Consequently, outdated blades were installed.
AO-2008-009	**Runway excursion, VH-UZD - Thangool Aerodrome, Queensland - 12 February 2008**
Date completed: 25/06/2010	On 12 February 2008, a Fairchild Industries SA227-AC (Metro III) aircraft, registered VH-UZD, was being operated on a freight service between Emerald and Thangool, Queensland with two pilots. The approach and landing into Thangool was conducted after last light in conditions of scattered low cloud and rain showers. At a speed of about 40 kts after touchdown, the aircraft suddenly veered uncontrollably to the right, departed the runway and became bogged in wet grass. There was no damage to the aircraft or injuries to the flight crew. The investigation determined that the runway excursion was probably a result of a directional upset at a time when the nosewheel was in castor mode. The reason for the nosewheel being in the castor mode could not be determined with certainty and may have been the result of an intermittent fault or the inadvertent failure by the flight crew to arm the system. It was also determined that the aircraft's rate of descent during the latter stages of the approach was significantly higher than for a normal stabilised approach. In addition, the aircraft operator's stabilised approach criteria did not provide flight crew with information on maximum permitted rates of descent. The aircraft operator has advised that, as a result of the investigation, it has redefined its stabilised approach criteria.

AO-2008-030	**Aircraft proximity event - Launceston Airport, Tasmania - 1-May-08**
Date completed: 30/06/2010	On 1 May 2008 at about 2216 Eastern Standard Time, an Airbus Industrie A320 aircraft, registered VH-VQS, was conducting the runway 32L (left) instrument landing system missed approach procedure at Launceston Aerodrome, Tasmania. During the climb, the A320 came into close proximity with a Boeing Company 737 that was manoeuvring at 3,100 ft above mean sea level about 5 NM (9 km) to the north-west of the aerodrome. The lateral separation between the aircraft reduced to within 3 NM (5 km) and zero vertical separation as the A320 climbed through 3,100 ft. No Traffic Alert and Collision Avoidance System alerts were generated during the occurrence. Both aircraft were operating scheduled passenger services from Melbourne, Victoria and had arrived at Launceston outside the normal operating hours of the Launceston air traffic control tower. Separation between the aircraft was therefore the responsibility of the respective flight crews. In this instance, a breakdown in the communication and interpretation of the respective flight crews' separation planning contributed to the proximity event.
AO-2008-039	**Airframe Vibration - VH-UAH - Bell 412 - Wollongong Aerodrome - 11-Jun-08**
Date completed: 30/06/2010	On the morning of 11 June 2008, a Bell 412 helicopter, registered VH-UAH, was being used to conduct training operations from Wollongong Aerodrome, NSW. Shortly after landing on the runway, the helicopter developed severe vertical airframe vibrations that resulted in reduced pilot control. In an attempt to mitigate the vibrations, the pilot raised the helicopter into the hover, however the vibrations continued to increase in severity, and in response, the pilot lowered the collective to set the helicopter back down onto the runway. The resulting heavy landing caused serious damage to the helicopter, but the crew were not injured. A subsequent examination of the helicopter's flight control system revealed an anomaly with the collective hydraulic actuator. Excessive free play was found to have developed in the bolted joint between the pivot bolt and the pilot input lever, which then allowed vertical vibrations and controllability issues to develop. It is likely that free play at the bolted joint was introduced when the collective actuator was last overhauled. As a result of this occurrence, the collective actuator manufacturer revised the tensioning procedures and requirements for the pivot bolt assembly during the overhaul process.
AO-2008-042	**Powerplant / propulsion event - 84 km north of Lockhart River Aerodrome, Qld - 20-Jun-08**
Date completed: 25/06/2010	On 20 June 2008, a Bombardier DHC-8-402 aircraft, registered VH-QOA, with four crew and 59 passengers on board, departed Horn Island for Cairns, Queensland on a scheduled passenger flight. During the climb, the right propeller electronic control (PEC) caution light illuminated with an associated right propeller overspeed warning. The right engine was shutdown in accordance with the operator's Quick Reference Handbook and the crew diverted the aircraft to Weipa. During the approach to Weipa, the aircraft's right hydraulic system failed requiring the landing gear to be manually lowered. Due to the loss of hydraulic system services, the nosewheel steering was not available and the aircraft required ground crew assistance to tow the aircraft to the parking area. As a result of a number of similar occurrences experienced by international and domestic operators , the propeller manufacturer developed a number of software changes which, when introduced, will allow the continued operation of an engine by the crew after the primary propeller speed signal is lost. The aircraft operator intends incorporating that modification into its DHC-8 fleet once training and other resource considerations are satisfied. In addition, the aircraft manufacturer has incorporated a modification in the aircraft to ensure that the power transfer unit is started before the loss of the No. 2 hydraulic system pressure.

AO-2008-043	**Collision with terrain 10 km east of Cairns Airport, Qld 18 June 2008 VH RYW, Robinson Helicopter Company R44 Clipper II**
Date completed: 09/12/2009	At 1026 Eastern Standard Time on 18 June 2008, a Robinson Helicopter Company R44 Clipper II helicopter, registered VH-RYW, departed Cairns Airport, Qld, to film a residential development site that was located in the vicinity of False Cape, about 10 km east of the airport. On board the helicopter were the pilot and three passengers. The occupants of the helicopter reported that while conducting the second period of filming, there was a sudden and violent movement of the nose of the helicopter to the right, which continued into a rapid rotation of the helicopter. The pilot's reported attempt to reduce the rate of right yaw was unsuccessful, and he entered autorotation and attempted to reach a clear area. The helicopter subsequently collided with trees before impacting the ground, seriously injuring the pilot and front seat passenger. This accident highlighted the risk of loss of tail rotor effectiveness associated with the conduct of aerial filming/photography and other similar flights involving high power, low forward airspeed and the action of adverse airflow on a helicopter. The investigation also identified that the lack of the nomination of a search and rescue or scheduled reporting time for the flight, decreased the likelihood of a timely response in the case of an emergency. In response to this accident, the helicopter manufacturer advised that it was considering a revision to the aerial survey and photography flights safety notice that was contained in the R44 Pilot's Operating Handbook. That revision would, if adopted, include a discussion of the risk of unanticipated right yaw associated with the conduct of those flights.
AO-2008-063	**Collision with terrain - VH-JDQ, Cessna Aircraft 206, 56 km NNE Scone Airport, NSW - 14-Sep-08**
Date completed: 31/07/2009	On 14 September 2008, a Cessna Aircraft Co. U206A aircraft, registered VH-JDQ, with a pilot and two passengers on board, was on a private flight under the visual flight rules (VFR) from Bankstown, NSW to Archerfield, Qld with a planned stop at Scone, NSW. The aircraft was reported missing when it did not arrive at Archerfield as expected later that day. Australian Search and Rescue were notified and, during the subsequent search, the wreckage of the aircraft was located the following day on top of a 3,800 ft ridge in rugged terrain, approximately 56 km (30 NM) north-north-east of Scone Airport. All three occupants were fatally injured and the aircraft was destroyed. The weather in the area at the time of the occurrence was not suitable for VFR flight and included low cloud, rain showers and high winds. Inspection of the accident site indicated that the aircraft was tracking towards Scone prior to impact with terrain. The circumstances of this occurrence were consistent with controlled flight into terrain, probably as a result of the pilot encountering instrument meteorological conditions as he attempted to return to Scone.
AO-2008-067	**Total power loss, Talbot Bay, Western Australia, 25 September 2008, VH-NSH, Bell Helicopter Co 407**
Date completed: 28/06/2010	On 25 September 2008, a Bell Helicopter Co 407 helicopter, registered VH-NSH, with a pilot and six passengers onboard, lifted off from the helideck of the cruise ship True North on a 45-minute tourist flight. As the pilot moved the helicopter clear of the right of the ship, and at a height of about 10 m above the surface of the sea, a loud bang was heard followed by a total power loss. The helicopter rapidly descended to the water, where it rolled onto its side before inverting. Despite two of the occupants, one of whom was unconscious, requiring assistance to exit the partially-submerged aircraft, all of the occupants survived the accident. Sometime later, the helicopter sank. The investigation found that there had been a 'burst' failure of the engine outer combustion case as a result of ongoing high-cycle fatigue cracking during normal engine operation. As a result of this occurrence, the engine manufacturer conducted a computerised analysis of the design of the combustion case in an effort to more effectively address the relevant areas of high stress. In response to this, and a similar failure in another helicopter 2 weeks earlier, the Civil Aviation Safety Authority released an Airworthiness Bulletin highlighting the circumstances of the occurrence to Australian helicopter operators. The operator of the helicopter has also advised its intention to change a number of the operational procedures employed during shipborne helicopter operations to better ensure passenger safety.

AO-2008-068	**Tail Rotor Pitch Link failure - VH-BUK - Eurocopter AS.350BA - 6 km SE Hoxton Park Aerodrome - 19-Sep-08**
Date completed: 23/11/2009	On 19 September 2008, during a flight from Fitzroy Falls to Rosehill, NSW, the pilot of a Eurocopter AS350 BA helicopter, registered VH-BUK, experienced the onset of severe vibration within the tail rotor controls and made an emergency landing at Casula High School. Subsequent examination of the aircraft revealed that one of the tail rotor pitch change links had fractured, resulting in lateral movement of the tail rotor and damage to the tail boom and tail cone. The pitch link had fractured from fatigue cracking that was the result of stresses induced in the link by excessive play in the heavily-worn spherical bearing. It was probable that bearing wear outside of maintenance manual limits existed, but was not detected, during the most recent after last flight (ALF) inspection. As a result of this occurrence, the helicopter manufacturer released Safety Information Notice (No. 2000-S-65) and the Civil Aviation Safety Authority released an Airworthiness Bulletin (AWB 27-009) to remind operators, pilots and maintenance personnel of the requirements for ALF inspections for pitch link condition and bearing play.
AO-2008-069	**Collision with terrain - Pilton Valley, Queensland - 29 September 2008**
Date completed: 24/05/2010	At about 1440 Eastern Standard Time on 29 September 2008, the pilot of a Piper Aircraft PA36-375 Pawnee Brave, registered VH-FXE, was conducting aerial baiting operations in the Pilton Valley, Queensland when the aircraft collided with terrain. The aircraft was seriously damaged by impact forces and a post–impact, fuel and magnesium-fed fire. The pilot was fatally injured. The pilot had flown the aircraft for about 3 hours that day, conducting baiting operations at a number of properties in the region. The investigation found that the topography of the area in which the pilot was operating, and the strong gusty wind conditions at the time, probably resulted in turbulence that increased the hazardous nature of the low-level application task. It is likely that the pilot lost control of the aircraft as a result of that turbulence, at a height from which recovery was not possible before the aircraft struck the ground.
AO-2008-076	**Collision with terrain - VH-OPC, Piper Aircraft Corp PA-31-350, 6 km N Bathurst Airport, NSW, 7 Nov 08**
Date completed: 22/01/2010	On 7 November 2008, a Piper Aircraft Corp. PA-31-350 Chieftain, registered VH-OPC, was being operated on a private flight under the instrument flight rules from Moorabbin Airport, Vic. to Port Macquarie via Bathurst, NSW. On board the aircraft were the owner-pilot and three passengers. The flight from Moorabbin to Bathurst was conducted in accordance with the pilot's flight plan and a review of recorded air traffic control data and communications did not reveal any problems during that flight. After refuelling at Bathurst Airport, the pilot departed from runway 35 for Port Macquarie in dark-night conditions with light rain in the area. At about 2024, some 2½ minutes after reporting airborne, residents of Forest Grove to the north of Bathurst Airport, heard a sudden loud noise from an aircraft at low altitude. Shortly after, there was the sound of an explosion and the glow of a fire. The aircraft was found to have impacted terrain resulting in serious damage to the aircraft. The four occupants were fatally injured. The aircraft had impacted the ground upright, slightly right wing low, at a descent angle greater than 20°. The wreckage trail, oriented on a ground track of 165° M, extended for about 300 m. Almost all of the major aircraft parts were seriously impact and fire damaged. The propellers indicated high rotational energy. The landing gear and wing flaps were retracted. Due to fire and impact damage, and limited information about the sequence of events after takeoff, the evidence available to the investigation was limited. There were no indicators of aircraft malfunction or pilot impairment prior to the accident. After extensive examination, the investigation found there was no evidence of any aircraft unserviceability and that airworthiness was not likely to have been a contributing factor in the accident. The investigation was unable to establish why the aircraft collided with terrain; however, pilot spatial disorientation or pilot incapacitation could not be discounted.

AO-2008-077	**Wake turbulence event - Sydney Airport, NSW - 03-Nov-08 - VH-ORX, SAAB 340B**
Date completed: 09/12/2009	On 3 November 2008, a SAAB Aircraft Company 340B-229 (SAAB), registered VH-ORX, was conducting a regular public transport flight from Orange, NSW to Sydney. The crew reported that, at about 0724 Eastern Daylight-saving Time, when tracking to join a 7 NM (13 km) final for runway 34 Right (34R), a passenger sustained minor injuries following a possible wake turbulence event that resulted in a momentary loss of control of the aircraft. Examination of the available radar, meteorological and aircraft operational data identified that the momentary upset probably resulted from wake turbulence, which was generated by an Airbus Industrie A380-800 (A380) that was conducting a parallel approach to runway 34 Left (34L). There was a 35 kt left crosswind affecting both aircraft's approaches. Airservices Australia (Airservices) reported to the SAAB operator that, as a result of this incident, they had introduced a number of interim minor changes to Sydney parallel runway operational procedures during high crosswind conditions. Those minor changes would have effect while Airservices carried out a review of A380 operations. In addition, the Civil Aviation Safety Authority has opened a regulatory change project to review and update wake turbulence separation information in the Manual of Standards Part 172.
AO-2009-001	**Unstable approach - VH-TQL, Bombardier Dash 8-300, Sydney Airport, NSW – 26-Dec-08**
Date completed: 08/06/2010	On 26 December 2008, a Bombardier Inc DHC-8-315 (DHC8), registered VH-TQL, was conducting a regular public transport flight from Moree to Sydney Aerodrome, New South Wales. While on final approach, and after capturing the glideslope for the runway 34 Left (34L) instrument landing system approach, the autopilot commanded the aircraft to descend. This prompted the crew to make a number of configuration changes in an effort to continue the approach. Those changes destabilised the aircraft and diminished its performance, which lead to the activation of the aircraft's stickshaker. Shortly after, a missed approach was commenced by the flight crew. In this occurrence, the crew continued the approach despite becoming aware of the unstable aircraft state. Positive action to avoid a stickshaker could have been taken if the crew communicated to each other the inappropriate aircraft configuration as it progressed along the approach. As a result of this occurrence, the operator has proactively; implemented changes to its DHC-8 training syllabus, highlighted to its crews the destabilising effects of changes to an aircraft's configuration during an approach, and emphasised to crews the importance of good communication in a multi-crew environment.
AO-2009-002	**Main rotor blade skin debonding, 29 December 2008, 135 km NE Alice Springs, NT, VH-HZB, Robinson Helicopter Company R22 Beta**
Date completed: 23/12/2009	While conducting a survey flight at Ambalindum Station (approximately 135 km north-east of Alice Springs, NT), the pilot of a Robinson R22 Beta helicopter, registered VH-HZB, noticed severe vibration of the main rotor assembly and cyclic controls. The pilot landed the helicopter immediately, and a subsequent inspection revealed that a length of aerofoil skin had peeled back from the leading edge on the underside of one of the main rotor blades. A review of the current information surrounding Robinson helicopter blade debonds found a number of previous incidents involving a similar failure mechanism. Additionally, the issue of main rotor debond had been addressed by a number of airworthiness directives (ADs) issued by the Civil Aviation Safety Authority (CASA) and the Federal Aviation Authority (FAA), along with a number of safety alerts and service letters issued by the manufacturer. Debonding of the main rotor blade skin was considered to have been influenced by extensive surface erosion observed around the leading edges of the blade. Additionally, the investigation found no evidence to suggest that the actions contained within the current CASA Airworthiness Directive addressing blade debonding issues (AD/R22/54) had been integrated into the helicopter's maintenance routine. The logbooks and maintenance release documents for the helicopter have since been updated to include reference to AD/R22/54 Amdt 3.

AO-2009-005	**Mid-air collision - VH-TGM , Grob 115/VH-YTG, Tobago, Parafield Airport, SA, 7 Feb 09**
Date completed: 09/07/2009	On 7 February 2009, five aircraft were engaged in circuit training and one aircraft was departing runway 03 left (03L) at Parafield Airport, SA. All of the aircraft in the circuit at the time were operated by a local flight school. The control tower was not open and Common Traffic Advisory Frequency - carriage and use of radio required, CTAF (R), procedures were in place. At about 0736 Central Daylight-saving Time, a S.O.C.A.T.A.-Groupe Aerospatiale TB-10 (Tobago), registered VH-YTG, with an instructor and student on board, was on final approach for a practice short field landing. In the circuit behind the Tobago was a Grob - Burkhaart Flugzeugbau G-115 (Grob), registered VH-TGM, with an instructor and student on board. The Grob was on final approach for a practice flapless approach and landing. The Grob collided with the Tobago from behind, damaging the Tobago's rudder with the Grob's right wing. Both aircraft remained controllable and were landed on runway 03L and 03 right. The investigation found that the pilots of the Grob experienced sun glare and background visual clutter on the base leg for runway 03L and were unable to sight the preceding Tobago. The pilots of the Grob did not discern some broadcasts from the Tobago pilots, significantly diminishing their situational awareness. The pilots of the Grob continued the approach without positively identifying the preceding aircraft in the circuit. Soon after the accident, the aircraft operator's flight safety officer produced a comprehensive accident investigation report that captured the key aspects of the accident. Included in the report were a number of recommendations, which were implemented by the operator. The investigation identified a safety issue regarding definition of the circuit traffic limit in CTAF(R) and a safety issue related to the positive identification of traffic before turning final.
AO-2009-006	**Main landing gear wheel failure, Sydney Airport, NSW, 6 February 2009, VH-KDQ, Saab 340B09**
Date completed: 17/02/2010	During the post-flight inspection of a Saab 340B passenger aircraft, the number-two outboard main landing gear wheel was observed to have sustained noticeable damage. The flight crew reported that there was no prior indication of the failure, as the aircraft had handled normally during the landing and taxiing phase of the flight. Subsequent examination found that the wheel inner rim had fractured away from the hub for approximately one-half of the total circumference. A circumferential fatigue crack had initiated at a location at the bead seat radius, and had propagated until a final ductile overload failure caused a section of the wheel rim to separate. During the course of the investigation, it was found that the particular wheel design was being phased out due to recognised fatigue problems identified at the bead seat area. Both the manufacturer and operator were aware of the increased fatigue susceptibility of the earlier wheel design, and had established increased inspection regimes for those wheels remaining in service.
AO-2009-009	**Collision with terrain - VH-DAC, PA28, 120 km SW Normanton Aerodrome, Qld, 24-Feb-09**
Date completed: 25/01/2010	On 24 February 2009, at 1417 Eastern Standard Time, a Piper Aircraft PA28-180 Cherokee aircraft, registered VH-DAC, departed Normanton Airport, Qld on a visual flight rules private flight to Mount Isa with the pilot as the sole occupant. The aircraft did not arrive at Mount Isa as expected, and was later found to have impacted terrain at a location adjacent to the planned track. The aircraft was seriously damaged and the pilot was fatally injured. Examination of the wreckage did not indicate any pre-existing technical fault that may have contributed to the accident. The pilot was not qualified to fly in instrument meteorological conditions (IMC). He may have inadvertently entered IMC while attempting to avoid rain and cloud associated with a weather system that was moving over the intended route at the time.
AO-2009-010	**Collision with terrain - Proserpine / Whitsunday Coast Aerodrome - 02-Apr-09**
Date completed: 11/12/2009	On 2 April 2009, a flight instructor and student pilot in a Robinson Helicopter Company R22, registered VH-YDA, were conducting normal circuit and autorotation training at Proserpine/Whitsunday Coast Airport, Qld. At 1400 Eastern Standard Time, the helicopter collided with terrain on the grass at the side of the departure end of runway 11. The helicopter was seriously damaged and the instructor was seriously injured. After the accident, neither pilot could recall any of the flight sequence immediately before the impact. There were no witnesses to the accident and no relevant recorded data. An examination of the helicopter wreckage indicated that there were no pre-impact defects. Due to a lack of information, the investigation was unable to determine why the helicopter collided with terrain. The investigation found that the use of safety helmets would reduce the risk of pilot injury during door(s)-off operations. The investigation also found that the helicopter was about 11 kg overweight on takeoff for the flight.

AO-2009-013	**Avionics system event - Sydney Aerodrome - 07-Apr-09**
Date completed: 01/02/2010	On 7 April 2009, at about 1210 Eastern Standard Time, the flight crew of a Boeing 737-800 aircraft, registered VH-VYL, received an enhanced ground proximity warning system alert during an approach to land at Sydney Airport, NSW. At the same time, the autopilot disconnected and the engine thrust levers moved towards idle. The handling pilot corrected the engine thrust levers immediately and conducted an uneventful landing. The investigation determined that spurious data from the left radio altimeter (RA) provided an indicated altitude of minus 7 ft, resulting in the autopilot disconnecting and the thrust lever movement. An examination found that the left RA receive antenna displayed rubbing wear adjacent to the attachment screw inserts. A bonding check of the antenna indicated that the antenna's resistance was outside the aircraft manufacturer's limits. The antenna was replaced and the aircraft was returned to service. Three months after the occurrence, a further RA warning flag event was experienced by another crew in this aircraft. As a result of that event, the left and right RA transceivers were removed and tested with internal faults found on the left unit.
AO-2009-018	**Mid-air collision - 15 km SE Springvale Station, WA, 5 May 2009, VH-PHT, Robinson Helicopter Company R22 Beta II, VH-HCB, Robinson Helicopter Company R22 Beta II**
Date completed: 17/02/2010	On 5 May 2009, two Robinson Helicopter Company R22 Beta II helicopters, registered VH-PHT and VH-HCB collided midair about 15 km south-east of Springvale Station, Western Australia. Both helicopters had departed the station just prior to sunrise that morning to conduct mustering operations. The first helicopter was observed departing to the east in order to make radio contact with an adjoining station prior to heading for the mustering area. The other helicopter departed about 10 minutes later and was observed heading to the south-east, the general direction to the area that was to be mustered. The helicopters were due to refuel at about 0830 at a place to be arranged, depending on the progress of the mustering operation. When the pilots failed to respond to radio calls from ground personnel, a pilot from a nearby station was tasked to conduct a search by helicopter. The helicopters were subsequently located about 15km to the south-east of Springvale Station and about 2km north of the planned mustering area. The circumstances of the accident were consistent with a midair collision while the pilots were positioning to commence the muster. The converging flight paths of the helicopters, pilot fatigue and sun glare from the rising sun are identified as contributing safety factors.
AO-2009-019	**Engine cooling fan fracture - Rolleston, Qld, 3 May 2009 Bell Helicopter Company 47G-2A-1, VH-IDU**
Date completed: 21/05/2010	On 3 May 2009 at approximately 0620 Eastern Standard Time1, a Bell Helicopter Company model 47G-2A-1 helicopter departed Rolleston aircraft landing area on a private flight. At an altitude of approximately 200 ft during the climb-out, the pilot reported hearing a very loud bang and feeling a jolt through the airframe. The helicopter immediately started descending and the pilot noted that the forward/aft cyclic control was unresponsive. The helicopter subsequently landed heavily, resulting in the main rotor blades severing the tail boom and causing some structural damage to the airframe. The Australian Transport Safety Bureau's (ATSB's) examination of the helicopter revealed that two blades had separated from the engine cooling fan as a result of fatigue fracture. The fan cowling had fractured and separated from the engine and there was impact damage to the flight control linkages. The ATSB examination determined that the fan unit was not correctly assembled in accordance the Bell 47 aircraft maintenance manual, and that this probably had an effect on the vibration and resonance characteristics of the fan, which in turn may have increased the susceptibility of the fan to fatigue failure. As a result of this occurrence, the Civil Aviation Safety Authority (CASA) released Airworthiness Bulletin AWB 63-007, reminding operators and maintainers of the importance of adhering to all current manufacturer's approved data for sheet metal cooling fans and their drive assemblies.
AO-2009-022	**Fuel related event, Piper Navajo PA-31, VH-WAL, 50 Km SW Canberra, ACT, 21 May 2009**
Date completed: 14/012/2009	On 21 May 2009, the pilot of a Piper PA-31 Navajo, registered VH-WAL, was conducting a flight under the instrument flight rules from Albury, NSW to Canberra, ACT with one passenger on board. Approximately half way through the flight, the pilot became concerned about the quantity of fuel remaining and subsequently conducted a precautionary landing 50 km south-west of Canberra. There was no reported damage to the aircraft or injuries to the occupants. The aircraft operator has advised the ATSB that, as a result of this occurrence, it has implemented a requirement for all of its pilots to use a documented fuel plan in all circumstances when flying from one location to another.

AO-2009-029	**Turbulence event - 58km N Kota Kinabalu International Airport - 21 June 2009**
Date completed: 30/06/2010	In the early hours of 22 June 2009, an Airbus Industrie A330 (A330), registered VH-QPI (QPI), encountered an area of severe turbulence associated with convective activity while en route from Hong Kong to Perth, Western Australia. As a result of the incident, a combined total of seven passengers and crew members received minor injuries. After consultation with medical and operational personnel, the pilot in command continued the flight to Perth. The aircraft suffered minor internal damage and, after a maintenance check, was returned to service. The cloud associated with the convective activity consisted of ice crystals; a form of water that has minimal detectability by aircraft weather radar. Consequently, the convective activity itself was not detectable by QPI's radar. As the event occurred at night with no moon, there was little opportunity for the crew to see the weather. The operator intends to upgrade the weather radar fitted to its A330 fleet, which will increase the fleet's capability to detect convective turbulence. Two other minor safety issues were identified during the investigation relating to the risks associated with the use of the pilot flight library when turbulent conditions are encountered, and the engagement of the manual latch to the cockpit door preventing timely access to the flight deck by other operational staff. The operator has taken, or is proposing, relevant safety action to address those issues.
AO-2009-051	**Collision with terrain - VH-KVT - 81 km NE Winton, Queensland - 17 August 2009**
Date completed: 28/06/2010	At about 1730 Eastern Standard Time on 17 August 2009, a Cessna Company U206G aircraft, registered VH-KVT, was being operated on a local flight on a property 81 km north-east of Winton, Queensland. The pilot was the only person on board. The only witness reported seeing the aircraft in a steep dive before losing sight of it behind slightly rising ground. The aircraft was later found to have collided with flat, open terrain in a steep nose-low attitude, resulting in serious damage. The pilot received fatal injuries. Due to the limited evidence available, the investigation was unable to establish the reason(s) why the aircraft departed controlled flight and impacted the ground.

Marine

MO-2008-003	**Independent investigation into the grounding of the Sierra Leone products tanker at Cocos Island on 12 February 2008**
Date completed: 09/04/2010	In September 2007, the crew of the Sierra Leone registered tanker *Breakthrough* joined the ship in China to prepare it for delivery to its new Nigerian owner. On 7 January 2008, the ship sailed from China. On 20 January, the main engine was changed over from diesel to intermediate fuel oil but the engine operated poorly because the fuel had not been effectively heated or purified. During attempts to rectify the problem, most of the remaining diesel fuel was contaminated with intermediate fuel oil after the crew opened the incorrect tank valves. After drifting in the Indian Ocean for 21 days, the ship made its way to the Cocos (Keeling) Islands. At 1350 on 11 February, *Breakthrough* anchored off Direction Island in the Cocos Island group. On 12 February, the weather deteriorated significantly and the ship started to drag its anchor. The master ordered a second anchor let go and ran the main engine to ease the load on the anchor cables. However, at 1545, *Breakthrough*'s stern grounded, damaging the steering gear. On 13 February, the ship was successfully refloated and on 28 February, it was towed to Singapore for repairs. The ATSB investigation found that the ship's officers did not have adequate knowledge and experience to undertake the delivery voyage and did not effectively utilise their time in China to familiarise themselves with the ship and its systems. The ship's owner did not implement an effective safety management system and the flag State's statutory certificates did not appropriately represent the ship's ownership, operation or management.
MO-2008-008	**Independent investigation into the grounding of the Isle of Man registered bulk carrier Iron King at Port Hedland, Western Australia, on 31 July 2008**
Date completed: 13/10/2009	At 2142 on 31 July 2008, the fully laden cape-sized bulk carrier *Iron King* departed from its berth in Port Hedland, Australia, with a harbour pilot on board. *Iron King* made its way through the harbour and while the assisting tugs had been let go by 2217, just before the ship reached Hunt Point, they continued to escort it. Shortly afterwards, at 2219 and again at 2222½, the ship's rudder failed to respond to port helm orders as the pilot attempted to steady the ship's heading on the Spoil Lead. The master switched the steering control switch between the two follow-up control systems and informed the pilot that steering control had been restored. The ship was still turning to starboard, so the pilot

	ordered full ahead and hard-to-port in an attempt to keep the ship in the channel and thus avoid grounding. He also directed the tugs to make fast to the ship as soon as possible. However, the tugs were unable to provide much assistance and by 2225, the ship had collided with Beacon 44 and grounded. The ship remained aground until the next high tide, when it was successfully refloated. The investigation found that the steering gear failed to respond to the helm orders because a leaking actuator relief valve was limiting the steering gears hydraulic system pressure. It was also found that; it was normal practice for assisting tugs to be let go before departing ships reached Hunt Point; the pilot directed the tugs to make fast to the ship, but they were unable to do so before it grounded; the master was not aware of the appropriate emergency steering system change-over procedure; and that the pilot had not been provided with training in the implementation of a suite 'risk analysed' responses to predictable emergency scenarios in a simulated environment.
MO-2008-009 **Date completed: 29/09/2009**	**Investigation into the engine room flooding on board the Hong Kong registered bulk carrier Great Majesty in Port Kembla on 27 October 2008** At about 1745 on 27 October 2008, during cargo discharge operations whilst alongside in Port Kembla NSW, the chief mate of *Great Majesty* remotely opened two valves adjacent to the number two water ballast pump (no. 2 WB P/P) to gravitate seawater into the number one water ballast tank (no. 1 WBTK). About ten minutes later, the bilge alarm sounded and the duty motorman found seawater flooding into the engine room through the open casing of no. 2 WB P/P. Work had been done with no. 2 WB P/P but the suction inlet had not been blanked off. The inflow was stopped after the alarm was raised. After the problem was identified, about 390 m3 of seawater that had entered the engine room was pumped to the after peak tank to drain the engine room spaces. It was subsequently found that a total of 22 electric motors located on the lower levels of the engine room had been damaged by water ingress.
MO-2008-010 **Date completed: 22/10/2009**	**Investigation into the boiler blow back and crew injury on board the Maltese registerd bulk carrier *Saldanha* off Newcastle on 18 November 2008** On 18 November 2008, while the Maltese registered bulk carrier *Saldanha* was anchored off Newcastle, NSW, a ship's engineer was burned when the auxiliary boiler furnace 'flashed back' during a routine boiler oil firing unit burner exchange. The ATSB investigation into the incident found that the ship's crew were not aware of all of the hazards associated with maintaining the boiler burner; were not aware of previous flashbacks involving similar burners; and were not aware of the appropriate first aid treatment required for burn injuries. The investigation also found that the safety bulletin that had been previously issued by the manufacturer did not inform operators that the oil firing unit could be modified. The ATSB has acknowledged the proactive industry safety action taken by the responsible organisations in relation to the identified safety issues. The ATSB has also issued one safety recommendation and one safety advisory notice.
MO-2008-011 **Date completed: 14/042010**	**Independent investigation into the fatal injury on board the Maltese registered container ship *Spirit of Esperance* in Townsville on 24 November 2008** At about 2117 on 24 November 2008, a crew member on board the Maltese registered container ship *Spirit of Esperance* fell about 4 m during an operation to stow a cargo crane hook, which did not align with its cradle, as the ship was preparing to sail from Townsville, Queensland. Immediately following the fall, he was treated on board by crew and ambulance officers. He transferred to hospital where he later died as a result of the injuries he sustained. The ATSB investigation found that there were no guidelines, procedures or equipment available on board to assist the crew with the task of stowing the hook when it was misaligned from its cradle and that no job safety analysis had been undertaken for the task. The investigation also found that the ship's crew had also routinely violated the working at height and aloft procedures by climbing the emergency ladder adjacent to the hook's cradle without using appropriate personal protective equipment and that the company's alcohol policy had not been effectively implemented on board the ship.
MO-2008-012 **Date completed: 27/042010**	**Independent investigation into the rupture of a submarine gas pipeline by the Hong Kong registered container ship *APL Sydney* in Port Phillip, Victoria on 13 December 2008** At 1428 on 13 December 2008, the Hong Kong registered container ship *APL Sydney*'s starboard anchor was let go in Melbourne anchorage. Four minutes later, the pilot left the bridge and by 1436, he had disembarked the ship. The 35 knot south-southwest wind was gusting to 48 knots. A submarine gas pipeline lay 6 cables (1.1 km) downwind. By 1501, after dragging its anchor, the ship was outside the anchorage boundary. The master advised harbour control he intended to weigh anchor and was instructed to maintain position and wait for a pilot. At 1527, when weighing anchor was started after

	receiving permission from harbour control, the ship was within 50 m of the pipeline. While weighing anchor, the anchor dragged across the pipeline, snagged it at about 1544 and, subsequently, the anchor windlass failed. At 1603, the pilot returned to the ship and, after discussions with the master and harbour control, he decided to dredge the anchor clear. At 1621, less than 1 minute after *APL Sydney*'s main engine was run ahead, the pipeline ruptured. There were no injuries and the pipeline was isolated. The investigation found that the rupture was the result of attempting to dredge the anchor instead of slipping it. The anchor had also been let go too close to the pipeline in the poor weather conditions. The report identifies safety issues in relation to: the port's risk management with respect to the pipeline and anchorage boundaries and its shipping control procedures; the ship's safety management system with respect to passage planning, the master's authority, crew familiarisation and the working language; the pilotage company's procedures for anchoring and mobile telephone use; and the windlass failure. Safety action to address all the issues has been taken or proposed by the relevant parties.
MO-2009-003 **Date completed: 16/03/2010**	**Investigation into the collision between the Hong Kong registered bulk carrier *F & K* and the Australian fishing vessel *Jolly Roger* on 16 April 2009.** At about 0100 on 16 April 2009, the bulk carrier *F & K* collided with the Australian fishing vessel *Jolly Roger* off Groote Eylandt, Northern Territory. While *F & K* was undamaged, *Jolly Roger* listed heavily to port as a result of the collision and its crew of three had to abandon the vessel. The ATSB investigation found that despite *Jolly Roger* being the 'give-way vessel', its skipper took no action to avoid the collision because there was no lookout being kept on board. Consequently, he was not aware of the ship's presence until immediately before the collision. The investigation also found that F & K's bridge team had detected *Jolly Roger* 20 minutes before the collision. However, they mistakenly assumed that their ship was overtaking the fishing vessel because they had not used appropriate means to determine whether a risk of collision existed.
MO-2009-004 **Date completed: 16/12/2009**	**Independent investigation into the fatality on board the Danish registered general cargo ship *Thor Gitta* at sea off Western Australia on 21 May 2009.** At about 0930 on 21 May 2009, a crew member on board the general cargo ship *Thor Gitta* was fatally injured while attempting to secure lashing bins in the cargo hold. At the time, the ship was about 390 miles northwest of Fremantle, Western Australia. The investigation found that a risk analysis had not been undertaken before the bins were introduced into service and that the bins had been inadequately secured in an area where there were no dedicated lashing points. It also found that the crew member was probably affected by fatigue as a result of the duty roster and the ship's movement in the heavy seas. As a result of this accident, the ship's manager has implemented a range of measures on all its vessels to improve the security of bin lashing arrangements and manage the risks of carrying out tasks associated with operation of the bins. The company has also introduced a different rostering system to better manage the fatigue of watchkeepers when the ship is at sea. The ATSB has issued one safety recommendation to the Danish Maritime Authority relating to the use of the 6 hour on/6 hour off work routine and the effect that that work routine has on a crew member's level of fatigue.
MO-2009-007 **Date completed: 24/09/2009**	**Second supplement to the independent investigation into the loss of the DIMIA vessel *Malu Sara* in Torres Strait, Queensland, on 15 October 2005** This supplementary report replaces Section 4.7 (Lost) and some conclusions and safety actions recorded in the ATSB Transport Safety Investigation Report No. 222: Independent investigation into the loss of the Department of Immigration and Multicultural and Indigenous Affairs vessel, Malu Sara, in Torres Strait, Queensland, Australia, 15 October 2005, which was released on 19 May 2006. This supplementary report has been published following the release, and subsequent analysis, of significant new information that was provider to the Coroner during the coronial inquest into the loss of *Malu Sara* and its five occupants on 15 October 2005 and which related to the initial search and rescue response. This supplementary report should be read in conjunction with the original ATSB report which can be found at: http://www.atsb.gov.au/publications/investigation_reports/2005/MAIR/mair222.aspx This report may contain times that differ from those associated with the same occurrence in the original ATSB report. This is the result of the evidence provided to the coronial inquest. This report identifies the following safety issues: the lack of follow-up and reporting procedures for immigration response vessels which were not engaged on patrol activities in the Torres Strait; the lack of procedures dealing with an immigration vessel which was overdue at its destination or reported being lost; the absence of training for immigration staff in the reporting and follow-up procedures and general search and rescue overview training; search and rescue coordination responsibility for small Commonwealth vessels; and post search and rescue incident analysis practices. This report acknowledges the actions taken by the Department of Immigration and Citizenship and the Australian Maritime Safety Authority to address the identified safety issues.

MO-2009-008	**Independent investigation into the collision between the Hong Kong registered bulk carrier Silver Yank and the Australian yacht *Ella's Pink Lady* off Point Lookout, QLD on 9 September 2009.**
Date completed: 15/06/2010	At 0150½ on 9 September 2009, in a position about 15 miles to the east of Point Lookout, North Stradbroke Island, Queensland, the Australian registered single-handed yacht *Ella's Pink Lady* collided with the Hong Kong registered bulk carrier Silver Yang. At the time of the collision, *Silver Yang* was en-route to China and travelling at a speed of about 9 knots on a northerly heading. *Ella's Pink Lady* was under sail on a voyage from Mooloolaba, Queensland, to Sydney, New South Wales. The yacht was making good a south-easterly course at a speed of about 7 knots. *Ella's Pink Lady* was dismasted as a result of the collision, but the skipper was able to cut the headsail free, retrieve the mast, the mainsail and the rigging on board and motor the damaged yacht to Southport, Queensland. The Australian Transport Safety Bureau (ATSB) investigation found that *Ella's Pink Lady* was not fitted with a passive radar reflector and that, at the time of the collision, neither the yacht's skipper nor the ship's watch keepers were keeping a proper lookout or appropriately using the available electronic aids to navigation to make a full appraisal of the situation and the risk of collision. The investigation also found that, following the collision, the ship's watch keeper did not initiate contact or offer any form of assistance to the yacht's crew and that, when contacted by the yacht's skipper via VHF radio, he could not be clearly understood. The ATSB acknowledges the safety actions taken to address these safety issues and, in addition, has issued two safety advisory notices. As a consequence, the visibility of *Ella's Pink Lady* was enhanced, attention has been drawn to limits in the detectability of Class B AIS transmissions and the international requirement to render assistance following a collision has been highlighted.

Rail

RE-2008-014	**Queensland Transport investigation of fatal collision on Rungoo level crossing on 27 November 2008** At 1447 on Thursday 27 November 2008, the northbound Cairns Tilt Train (CTT) collided with a loaded B-double truck at the Rungoo level crossing, about 19.5 km north of the township of Ingham in north Queensland. On board the CTT were 81 passengers and seven train crew. The truck driver was the sole occupant of the B-double truck. The two train drivers were fatally injured as a result of the collision, the truck driver sustained moderate injuries. In addition, injuries were incurred by nine passengers. The investigation was conducted by the Department of Transport and Main Roads in accordance with provisions of Queensland's Transport Infrastructure Act 1994 (the Act), independently chaired by a senior rail safety investigator of the Australian Transport Safety Bureau. Rail safety in Queensland is regulated by the Department of Transport and Main Roads. All railway managers and/or railway operators within Queensland are required to be accredited in accordance with the Act. The Department of Transport and Main Roads' role in rail safety also includes the investigation of railway incidents.
Date completed: 29/10/2009	
RE-2009-001	**ATSB chaired, Queensland Transport investigation of fatal collision on Aerodrome Road, Mundoo, level crossing on 1 January 2009** At 1118 Eastern on 1 January 2009 a laden waste disposal truck drove into the path of The Sunlander passenger train at the Aerodrome Road level crossing, Mundoo (near Innisfail) North Queensland. The two lead locomotives and following six carriages derailed in the collision. As a result of the collision the truck driver was fatally injured. Both of the train drivers, nine passengers and four QR on-board staff members sustained minor to moderate injuries. Of those injured, six passengers and one QR employee were taken to hospital for observation. The investigation was conducted by the Department of Transport and Main Roads in accordance with provisions of Queensland's Transport Infrastructure Act 1994 (the Act), independently chaired by a senior rail safety investigator of the Australian Transport Safety Bureau. Rail safety in Queensland is regulated by the Department of Transport and Main Roads. All railway managers and/or railway operators within Queensland are required to be accredited in accordance with the Act. The Department of Transport and Main Roads' role in rail safety also includes the investigation of railway incidents. The final report is available on the Queensland Transport website.
Date completed: 13/08/2009	
RO-2008-001	**Level crossing collisions between freight train 4A13 and a road-train at Birkenhead SA 5 Mar 08** At about 1448 on Wednesday 5 March 2008, a double road-train loaded with bulk cement drove into the path of a train that was conveying four empty fuel tankers at the Stirling Street level crossing, Birkenhead, SA. The impact speed of both the train and road-train was low (about 15 km/h) but nevertheless sufficient to roll the prime mover and the first semitrailer onto their sides and to derail the lead bogie of the train's locomotive. The road-train driver was slightly injured; the two train drivers were shaken but otherwise unhurt. Road traffic at the Stirling Street level crossing was controlled by 'Stop' sign assemblies. At the time of the collision, the level crossing was in the process of being converted from passive (Stop sign) to active control (flashing lights and boom barriers) as part of a major road upgrade called the 'Port River Expressway Project'. The investigation found that the Stop sign assembly was moved from its original position sometime during the upgrade and a 'Stop' line was not visible on the road surface. In the absence of a Stop line, visibility along the rail line was, at best, intermittent. The investigation concluded that it is likely the road-train did not stop at the Stop sign assembly and travelled over the Stirling Street level crossing at a relatively constant speed of about 15 km/h. The investigation also found that the road-train involved in the collision was not authorised to operate on Stirling Street as no Heavy Vehicle Permit (HVP) for this vehicle had been issued by the Department for Transport, Energy and Infrastructure. Safety issues identified by the investigation relate to compliance of the level crossing with relevant standards, notification to the rail infrastructure manager of a non-compliance identified at audit and the issuing of HVP's for road-train routes that involve level crossings. The ATSB has acknowledged proactive industry safety action taken by relevant parties in response to those identified safety issues. In addition, the ATSB has issued four safety recommendations.
Date completed: 06/10/2009	

RO-2008-005	**Derailment near Bates SA, 19 April 2008**
Date completed: 03/02/2009	At approximately 0650 on 19 April 2008, freight train 5PS6, travelling from Perth to Sydney, derailed near Bates, SA. The derailment occurred about 13 track kilometres east of Bates. Thirteen wagons were derailed and about 800 m of track was damaged. There were no injuries. The investigation concluded that an undetected crack at an unused bolt-hole increased in size until the rail completely fractured. The rail probably failed under the previous train (5MP5). As the wheels of train 5PS6 passed over the fracture, the impact forces caused the progressive failure of sleepers, a secondary rail fracture and the ejection of a small section of rail. Once a section of rail was missing, the impact forces on the rail increased significantly, causing the progressive failure of rail and sleepers until the freight wagons inevitably derailed. The investigation acknowledged that new maintenance procedures were issued to reduce the risks related to bolt-hole cracks. However, the Australian Transport Safety Bureau has issued two safety advisory notices, concluding that there were further opportunities for improvement relating to: • additional development of the ultrasonic testing process aimed at reducing operator dependence; and • the relationship between heat-affected metal and stress concentration when specifying how far a bolt-hole should be from the rail ends before welding.
RO-2008-009	**Derailment of Train 5WX2N near Winton, Victoria 31 July 2008**
Date completed: 21/12/2009	At approximately 2030 on 31 July 2008, freight train 5WX2 derailed near Winton, Vic. (between Glenrowan and Benalla). The derailment occurred about 10 track km north of Benalla. Thirteen freight wagons were derailed but there were no injuries. The investigation concluded that both rolling stock and track related factors combined to increase the likelihood of a flange-climb derailment, although individually, these factors did not exceed the acceptable limits documented in the relevant standards. The ATSB identified and recommended that action be taken to address a number of safety issues relating to: • the documented process for inspection and assessment of track irregularities with consideration to the possibility for some rail vehicles to develop an undesirable harmonic response; and • the condition of rolling stock suspension components.
RO-2008-010	**Derailment of Train 1PM9 at Mt Christie SA on 1 Sep 08**
Date completed: 22/06/2010	At approximately 2130 on 1 September 2008, 13 wagons on freight train 1MP9, owned and operated by SCT Logistics (SCT), derailed near Mt Christie, South Australia. There were no injuries, but about 4.5 km of track was damaged. The investigation concluded that an axle-box bearing on wagon VQCY 0824U had failed and completely seized, causing the bearing journal to separate from the axle (commonly referred to as a screwed journal). Examination of the bearings suggested that inadequate lubrication had contributed to cage failure with the subsequent misalignment of the rollers and jamming of broken cage material in the rolling surfaces causing the bearing to seize. Maintenance records showed that the bearings on wagon VQCY 0824U were new in July 2004 and the wagon underwent servicing in May 2006 and May 2007. However, it is unlikely that the axle-boxes were re-greased during servicing as required by the maintenance procedures. SCT has implemented a number of actions aimed at reducing their risk of future derailments due to axle-box bearing failures. Those actions included immediate scheduling for regreasing, a program to remove all axle-box equipped bogies from SCT's service and a trial to install on-board monitoring for hot bearings on their freight rolling stock. Though not contributing directly to the derailment sequence, a minor safety issue was identified in relation to documented procedures at crossing loops. ARTC has proposed relevant safety action to address the issue.
RO-2008-013	**Derailment of train 2PM6 near Loongana WA on 11 November 2008**
Date completed: 07/04/2010	At about 1655 on Tuesday 11 November 2008, freight train 2PM6 derailed on the Nullarbor Plain approximately 11 km west of Loongana in Western Australia. There were no injuries as a result of the derailment but there was significant damage to rolling stock and track. The investigation found that the combined effects of atmospheric wind and induced wind due to train movement was likely to have been sufficient to initiate the overturning and subsequent derailment of a lightly loaded, double stacked wagon and other vehicles. Two safety issues were identified relating to the suitability for double stacking of certain wagon types, particularly in high-wind operations, and maintenence of container securing mechanisms. The train operator has taken safety action to address those issues.
RO-2009-002	**Safeworking Irregularity Incident involving XPT and Indian Pacific at Tarana, NSW on 14 January 2009**
Date completed: 11/12/2009	At about 1858 on 14 January 2009, a safeworking irregularity occurred involving two passenger trains, 4SA8, the Indian Pacific, and WT28, an XPT, at Tarana in NSW. Both trains had been authorised to occupy the single line within the Tarana interlocked area at the same time. Fortunately, each driver saw the opposing movement and brought their trains to a stand about 524 m apart. After a short wait, the trains were authorised to continue their respective journeys. The investigation determined that the West Board network controller located at Broadmeadow train control centre, did not adequately plan the

	intended train movements through the sections Wallerawang to Tarana and Bathurst to Tarana or determine a specific limit of authority on the Special Proceed Authority (SPA) number 37 issued to the driver of the XPT, WT28. The West Board network controller also issued SPA number 38 to the driver of train 4SA8, even though it overlapped the authority of SPA number 37. The investigation report indentified three safety issues relating to the risks of using a manual train management system, inadequate auditing of safeworking systems, and ambiguous authority limits.
RO-2009-003 **Date completed: 26/05/2010**	**Derailment of Train 5PS6 near Golden Ridge WA 30 Jan 09** At approximately 10311 on Friday 30 January 2009, freight train 5PS6, operated by Pacific National (PN), derailed near Golden Ridge, (Figure 1) about 43 km east of Kalgoorlie in Western Australia. The two locomotives, the crew van and 18 wagons (including 7 multiple platform freight wagons) derailed. There were only minor injuries to the train crew as a result of the derailment. However, there was significant damage to the derailed rolling stock and about 200 m of track was destroyed. The investigation determined that heavy rainfall to the east of Golden Ridge on the morning of 30 January 2009 led to localised flash flooding which damaged the track formation and ballast, resulting in the derailment of train 5PS6. A number of minor safety issues were identified during the investigation and have been brought to the attention of the track manager and train operator. Those issues relate to track drainage, identification of severe weather events, availability of hand-held communication devices and escape from the damaged locomotive cabin. The train operator has taken or proposed safety action in relation to train evacuation and communication issues. In addition, the Australian Transport Safety Bureau has issued three safety advisory notices to the track owner.
RO-2009-005 **Date completed: 29/06/2010**	**Level Crossing Collision near Moorine Rock WA on 23 March 2009** At about 1540 on 23 March 2009, freight train 7GP1 collided with a school bus after the bus drove onto, and became stuck on, an excavated section of railway track at the Nulla Nulla South Road level crossing near Moorine Rock, Western Australia. There were no injuries as a result of the collision but there was significant damage to the school bus. The investigation determined that the collision occurred as a result of the bus being driven around road closure signs and onto a level crossing worksite which was closed for the purpose of replacing rail that was embedded in the road surface. A minor safety issue, unrelated to the development of the accident sequence, was identified during the investigation and has been brought to the attention of the train operator. That safety issue relates to overdue safe working qualifications of train staff. The ATSB is satisfied that the action taken and proposed by the train owner, including the introduction of more robust procedures for checking the currency of operator competencies, will adequately address the safety issue.
RO-2009-006 **Date completed: 25/05/2010**	**Level Crossing collision, Train 5PM5 & Utility at Bumbunga SA, 1 August 2009** At about 1535 on Saturday 1 August 2009, the lead locomotive of Pacific National (PN) freight train 5PM5 collided with a utility motor vehicle at the Bumbunga level crossing in South Australia (SA). The utility vehicle was seriously damaged as a result of the collision and the male driver and a female passenger were fatally injured. The train driver was uninjured. The lead locomotive of the train incurred minor damage, mainly to the headstock/pilot at the front of locomotive. The track and level crossing infrastructure incurred moderate damage that consisted of damaged rail fasteners and gouging of the road surface at the level crossing. Toxicology tests conducted on the occupants of the utility vehicle revealed high levels of the drug MDMA (commonly known as 'Ecstasy') and Methylamphetamine (commonly known as 'Ice', 'Speed' or 'Meth'); both are illicit drugs in Australia. It is likely that the driver of the utility vehicle did not stop at the level crossing as the vehicle occupants failed to perceive and react to the oncoming train due to the effects of those drugs.

APPENDIX B: ATSB SAFETY RECOMMENDATIONS

Aviation

Investigation: AO-2007-017: Fuel starvation - Jundee Airstrip, WA, 26 June 2007, VH-XUE, Empresa Brasileira de Aeronautics S.A., EMB-120ER

Safely action number	AO-2007-017-SR-084
Risk category	Significant
Safety issue description	There was no regulatory requirement for simulator training in Australia
Action organisation	Civil Aviation Safety Authority
Safety Recommendation outcomes	08/07/2009 - The activities undertaken by CASA appear to have facilitated increased use of simulators for endorsement and other training. However, the ATSB remains concerned that there is no regulatory requirement for simulator training when a suitable simulator is available in Australia. ATSB safety recommendation AO-2007-017-SR-084 The Australian Transport Safety Bureau recommends that the Civil Aviation Safety Authority address this safety issue. 31/08/2009 - CASA will address this issue and will commence a review of the legislation. In the course of that review, we will consider whether there is a need to mandate the use of simulators in connection with certain flight crew training requirements in the air transport sector, and other sectors where this may be appropriate. This work will commence immediately. It will certainly involve consultation with industry and may come to involve a risk assessment, a cost-benefit analysis and the preparation of a regulatory impact statement. As this is likely to be a protracted process, CASA is not in a position to specify a specific completion date at this time 12/04/2010 - CASA released a Discussion Paper (DP) in December 2009 on the subject of mandatory flight simulator training. The DP put forward a range of options to canvas the views of industry participants. Responses to this DP closed in February 2010. Numerous responses were received from a variety of organisations and individuals including airlines, pilots and flight simulator training providers. These responses are currently being reviewed and policy proposals are being developed. The subject of mandatory flight simulator training is a high priority for CASA and as such it is expected that a Notice of Proposed Rule Making (NPRM) will be published in the 2nd quarter of 2010. This NPRM will put forward CASA's proposed policy on this issue which will in part be derived from the comments received on the DP. Depending on the results of an assessment of business compliance costs, the proposal may be subject to a formal Regulation Impact Statement (RIS) which may prolong the rule making process. 05/07/2010 - Advice from Adrian Roland, Acting manager AALU. NPRM is on track for release by end July. Parties will have 6 weeks to respond. Final rule making is expected. 26/10/2010- On 26 October 2010, CASA issued Notice of Proposed Rule Making - NPRM 1007OS 'Mandatory Flight Simulator Training - Proposed amendments to Civil Aviation Orders (CAOs) 40.0 and 82.0' for industry comment by 21 January 2011.
Safety action release date	8/07/2009
Safety action status	Monitor
Investigation complete date	8/07/2009

Marine

Investigation: MO-2008-003: Independent investigation into the drifting and subsequent grounding of the Sierra Leone registered products tanker *Breakthrough* at the Cocos (Keeling) Islands on 12 February 2008.

Safely action number	MO-2008-003-SR-049
Risk category	Significant
Safety issue description	The ship's certification was issued by a management company to itself on behalf of the Republic of Sierra Leone, solely with the purpose of allowing the ship to sail on an international voyage and did not represent the ship's actual management or that any effective inspections of the ship or audits of the ship's safety management system had taken place.
Action organisation	Sierra Leone International Ship Registry
Safety Recommendation outcomes	Sierra Leone Flag Administration has reviewed this case in order to establish an understanding of the situation. The vessel was registered with Sierra Leone Flag with a special registration for one single voyage from Singapore to Nigeria (duration of the special registration is three months). The Recognized Organization, New United, issued the statutory certificates also for one voyage (duration of three months). In view of the grounding of the vessel in February 2008, we have requested the Recognized Organization to supply all information in regards to this vessel. Kindly note that all statutory certificates issued on behalf of the Republic of Sierra Leone are duly reviewed by this Administration and any questions / concerns that the Administration could have about those certificates are presented to the issuing Recognized Organization and are duly explained to this Administration.
Safety action release date	9/04/2010
Safety action status	Closed - action taken Safety action complete date: 13/07/2010
Investigation complete date	9/04/2010

Investigation: MO-2008-009: Engine room flooding on board Great Majesty in Port Kembla, New South Wales, 27 October 2008

Safely action number	MO-2008-009-SR-020
Risk category	Significant
Safety issue description	The work permit system had not been effectively implemented on board the ship. Consequently, most maintenance and repair work was being carried out by ship's personnel without the work permits and 'Danger: Do Not Operate' tags that were required by the ship's procedures.
Action organisation	Parakou Shipping
Safety Recommendation outcomes	11/11/2009 - The company has revised its ballast water and work permit procedures and has advised ship's crews of these changes. The company also intends to measure the implementation of these procedures through on board inspections and audits.
Safety action release date	29/09/2009
Safety action status	Closed - action taken 11/11/2009
Investigation complete date	29/09/2009

Investigation: MO-2008-010: Auxiliary boiler explosion on board *Saldanha* off Newcastle, 18 November 2008

Safely action number	MO-2008-010-SR-039
Risk category	Significant
Safety issue description	While the Volcano Company safety bulletin warned of the dangers associated with servicing the VJ type burner, it did not inform operators that the burner could be replaced with a VJP burner (a similar burner fitted with a diesel pilot burner), or recommend that existing oil firing units could be modified.
Action organisation	Volcano Company
Safety Recommendation outcomes	05/01/2010 - The Volcano Company has advised the ATSB that they will: 1. Advise all operators of the occurrence of accIdent on board the bulk carrier "*Saldanha*" . 2. Advise all operators of the importance of adhering to the safety bulletin, regardless of the type of burner, and the fact that if the operation and servicing are not done as per our safety bulletin, ship crews will be exposed to the same risks as those seen on board "*Saldanha*". 3. Advise all operators that the "VJ" burner is a direct ignition type and that there is also another type of burner "VJP" fitted with pilot burner. If operators wish to have a burner fitted with a pilot burner, we will advise them that the existing burner could be replaced with VJP type burner or that it can be modified. 4. We will also put the same advice on our homepage for a certain period.
Safety action release date	22/10/2009
Safety action status	Closed - action taken 05/01/2010
Investigation complete date	22/10/2009

Investigation: MO-2009-004: Fatality on board *Thor Gitta* at sea off Western Australia, 21 May 2009

Safely action number	MO-2009-004-SR-008
Risk category	Significant
Safety issue description	Both the 6 hours on/6 hours off work routine for watchkeepers and the modified work routine for deck ratings used on board Thor Gitta, while complying with the ILO 180 and STCW requirements for rest, probably resulted in a cumulative level of fatigue in the crew.
Action organisation	Danish Maritime Authority
Safety Recommendation outcomes	06/11/2009 - We recognize the use of programs like FAID to indicate the possibility of fatigue, but we regard the indications given by such programs only as normative and not as given proof. It is our opinion that the 6 hours on/off work routine for watchkeepers and the modified routine for deck ratings on board *Thor Gitta* does not constitute a problem as long as the hours of rest are in compliance with the Order, ILO Convention 180 and part A, Chapter VIII of the STCW code for crewmembers engaged in watchkeeping. The Danish Maritime Authority disagrees with the statements indicating that the roster of the AB and the work routine for watchkeepers probably results in a cumulative level of fatigue in the crew. 08/01/2010 – The DMA has, in 2008, established a procedure on examination of rest and work hours, as well as outlook whenever a Danish or Greenlandic ship is involved in grounding or collision or has a very serious accident. In these cases, the Investigation Division gather relevant information and evaluate the information before forwarding them to various departments within the DMA for further consideration. The considerations focus on whether there have been violations of rules in force. Consideration is also focusing on questions in relation to the manning of ships and possible ned of changes.
Safety action release date	16/12/2009
Safety action status	Closed - partial action 02/02/2010
Investigation complete date	16/12/2009

Rail

Investigation: RO-2008-001: Level Crossing Collision, Birkenhead, South Australia, 5 March 2008

Safely action number	RO-2008-001-SR-021
Risk category	Minor
Safety issue description	At the time of the collision the Australian Rail Track Corporation and the Port Adelaide Enfield Council did not have an interface coordination plan that defined each organisation's resposibilities with respect to the mainatenance of the Stirling Street level crossing.
Action organisation	Port Adelaide Enfield City Council
Safety Recommendation outcomes	8/11/2010 - The Port Adelaide Enfield City Council has advised that the recommendation is accepted. The Council is awaiting the drafting of Interface Agreements by the SA State Level Crossing Advisory Committee. Also, the Council has advised that they are currently working with the Department of Transport, Energy and Infrastructure's (DTEI) Level Crossing Unit in relation to DTEI's survey and assessment of level crossings in SA. ATSB Response: After monitoring the response to the recommendations issued to the ARTC and the Port Adelaide Enfield City Council for 12 months, the latest advice received from the relevant SA Department is that it is anticipated that a Bill amending the SA Rail Safety Act 2007 that will mandate Level Crossing Interface Agreements between the rail track owner and the relevant road authority will be enacted during 2011. Given that both the ARTC and the Port Adelaide Enfield City Council have agreed to the recommendations and because the ramifications pertaining to level crossings are State-wide rather than any given level crossing, the ATSB considers that the matter is being dealt with at the appropriate level.
Safety action release date	6/10/2009
Safety action status	Closed - partial action 8/11/2010
Investigation complete date	6/10/2009

Safely action number	RO-2008-001-SR-022
Risk category	Significant
Safety issue description	At the time of the collision and at times in the past, the required road pavement markings have not been present or appropriately maintained on the sealed surface of Stirling Street.
Action organisation	Port Adelaide Enfield City Council
Safety Recommendation outcomes	The Port Adelaide Enfield City Council has advised that the recommendation is accepted. The Council has advised that immediately after the Department of Transport, Energy and Infrastructure (DTEI) works associated with the Port River Bridge were completed that the pavement line marking was completed by agencies other then the Port Adelaide Enfield City Council.
Safety action release date	6/10/2009
Safety action status	Closed - action taken 15/03/2010
Investigation complete date	6/10/2009

Safely action number	RO-2008-001-SR-025
Risk category	Minor
Safety issue description	At the time of the collision the Australian Rail Track Corporation and the Port Adelaide Enfield Council did not have an interface coordination plan that defined each organisation's responsibilities with respect to the maintenance of the Stirling Street level crossing.
Action organisation	ARTC
Safety Recommendation outcomes	07/01/2010- The ARTC advised via correspondence dated 20 October 2009: The ARTC accepts the above recommendation. The ARTC has been working towards establishing an interface agreement with the SA Department for Transport, Energy and Infrastructure for several years. It is anticipated that once a model agreement is established negotiations with Local Government agencies will progress at a significantly faster rate. Negotiations with Local Government organisations if not progressed as a block via the Local Government Association will need to be progressed by individual negotiation with each interfacing Council. If the latter situation is the case ARTC reserves the right to prioritise negotiations based on a number of interfaces and perceived risk to the safety of rail operations. 08/01/2010 - After monitoring the response to the recommendations issued to the ARTC and the Port Adelaide Enfield City Council for 12 months, the latest advice received from the relevant SA Department is that it is anticipated that a Bill amending the SA Rail Safety Act 2007 that will mandate Level Crossing Interface Agreements between the rail track owner and the relevant road authority will be enacted during 2011. Given that both the ARTC and the Port Adelaide Enfield City Council have agreed to the recommendations and because the ramifications pertaining to level crossings are State-wide rather than any given level crossing, the ATSB considers that the matter is being dealt with at the appropriate level.
Safety action release date	06/10/2009
Safety action status	Closed – Partial action 12/11/2010
Investigation complete date	06/10/2009

Safely action number	RO-2008-001-SR-026
Risk category	Significant
Safety issue description	The Australian Rail Track Corporation have not been approached to issue clearances for level crossings in South Australia by either the permit applicant or the Department of Transport Energy and Infrastructure when Heavy Vehicle Permits were issued for routine 'fixed term' Restricted Access Vehicle operations.
Action organisation	Department for Transport, Energy and Infrastructure (SA)
Safety Recommendation outcomes	08/08/2009 - Response by the Department for Transport, Energy and Infrastructure The Department for Transport, Energy and Infrastructure advised that the route over the Stirling Street level crossing had been assessed in 1999 under the standards relevant at that time. They advised that permits for over size or over mass vehicles would be negotiated with rail authorities on a per request basis. However, if a route had already been assessed as suitable for issuing Heavy Vehicle Permits, it was not normal practice to reassess that route every time a new Heavy Vehicle Permit was requested. ATSB assessment of response/action While it is acknowledged that transport routes need not be reassessed every time a Heavy Vehicle Permit is requested, it should also be recognised that elements of that route may change over time. In this case, the route over the Stirling Street level crossing had not been reassessed for almost 10 years. It would be reasonable to assume that local conditions and/or standards may have changed over this time which may affect the route assessment. 21/01/2010 – • Non general access vehicles, such as B-Doubles, can access parts of the road network if provided with an exemption from the the mass and / or dimension limits of the Road Traffic Act by a permit or through a general exemption via a government gazette notice. • Under the Department's Heavy Vehicle Access Framework, which was updated in April 2009 (see http://www.transport.sa.gov.au/freight/road/vehicle_configuration/heavy_vehicle_access_framework/index.asp), exemptions by permit are now only being provided in limited circumstances, generally on a one off basis. • DTEI is currently reviewing all routes where permits are being used to provide access over level crossings. The objective of this review is to identify works required to upgrade the route so that there is no longer a need to issue permits for access but to have the route exemption provided by government gazette notice subject to rail authority agreement. • In addition, DTEI currently undertakes a rolling level crossing survey and assessment program which sees each individual crossing re-assessed approximately once every three years. Any issues that are found during the assessment process is brought to the attention of the relevant infrastructure manager. • In relation to Stirling Street, DTEI has worked with the ARTC to ensure all issues have been addressed. DTEI is currently in the process of securing ARTC agreement to have route gazetted thereby eliminating the need for permits
Safety action release date	06/10/2009
Safety action status	Closed - action taken 27/01/2010
Investigation complete date	06/10/2009

Investigation: RO-2008-009: Derailment of Train 5WX2 near Winton, Victoria, 31 July 2008

Safely action number	RO-2008-009-SR-030
Risk category	Significant
Safety issue description	The trailing bogie of wagon RCPF-31882C was found to have loose and broken wedge wear plates. While it could not be verified whether the wedge wear plates had broken free before the derailment or during the derailment sequence, if the condition had existed prior to the derailment, it is likely that body roll induced while traversing a series of track irregularities could result in un-damped harmonic oscillations. The ATSB recommends that the Pacific National Pty Ltd should address this safety issue.
Action organisation	Pacific National Pty Ltd
Safety Recommendation outcomes	27/04/2010 – PNL has train examination procedures in place for these items. It is also included in the new version of the Pacific National Wagon Pocket Field Manual The ATSB is satisfied that the intended action by PNL would adequately address the safety issue.
Safety action release date	21/12/2009
Safety action status	Closed – action taken 27/04/2010
Investigation complete date	21/12/2009

Safely action number	RO-2008-009-SR-030
Risk category	Significant
Safety issue description	Examination of wagon RCPF-31882C revealed a crack on the tread of a wheel on the second axle of the leading bogie. While not contributing to this derailment, if the crack were to develop to such an extent that the wheel tread completely fractured, the risk of derailment would increase significantly.
Action organisation	Pacific National Pty Ltd
Safety Recommendation outcomes	27/04/2010 - PNL has train examination procedures in place for these items. It is also included in the new version of the Pacific National Wagon Pocket Field Manual The ATSB is satisfied that the intended action by PNL would adequately address the safety issue.
Safety action release date	21/12/2009
Safety action status	Closed – action taken 27/04/2010
Investigation complete date	21/12/2009

Safely action number	RO-2008-009-SR-029
Risk category	Significant
Safety issue description	The ARTC Code of Practice does not clearly address the possibility that a series of track irregularities, even minor ones which do not exceed intervention limits, could cause an undesirable harmonic response in some rail vehicles.
Action organisation	ARTC
Safety Recommendation outcomes	09/07/2010- Australian Rail Track Corporation recognises the issue identified by the Australian Transport Safety Bureau investigation and is undertaking research to identify a sustainable and practical approach to address the issue. Australian Rail Track Corporation accepts that the track maintenance standard as currently applied treats each identified track geometry deficiency as a separate entity and may not fully recognise that there may be rare but possible combinations of track geometry deficiencies and rail vehicle ride characteristics that can unite to initiate a derailment. The identified deficiency relates more the spacing of minor track geometry deficiencies in combination with rail vehicle characteristics including bogie spacing and type, wheel profile and load placement than the size of the individual geometry deficiencies. Australian Rail Track Corporation has a robust electronic track geometry measuring system in place with significant data captured and processed to generate a Track Quality Index (TQI) for any given track section. Research undertaken to date indicates the problem is not unique to the NCoP applied by Australian Rail Track Corporation, a review indicates that other codes applied within Australia and overseas have yet to define a systemic and sustainable long term solution to the problem. Australian Rail Track Corporation considers that the issue is worthy of further consideration and has established a project group to review current standards and practices including the concerns raised by Australian Transport Safety Bureau. The ATSB is satisfied that the intended action by the ARTC would adequately address the safety issue.
Safety action release date	21/12/2009
Safety action status	Closed – action taken 09/07/2010
Investigation complete date	21/12/2009

Investigation: RO-2009-002: Safeworking irregularity involving Indian Pacific (4SA8) and XPT (WT28) Tarana, NSW, 14 January 2009

Safely action number	RO-2009-002-SR-011
Risk category	Significant
Safety issue description	Manual systems of train management, such as Special Proceed Authority working, are used when interlocked/engineered systems are not available. However, manual systems are subject to human error and increase the risk of safeworking irregularities/incidents when compared to interlocked/engineered systems of safeworking.
Action organisation	ARTC
Safety Recommendation outcomes	09/11/2009 - Special Proceed Authorities (SPAs) are a paper-based safe working system, not unlike Train Orders. Paper-based systems such as Train Orders are used to authorise train movements over a significant part of Australia's national rail network. The incident at Tarana occurred in the execution of the SPA, not as a result of a problem with the safe working system 27/11/2009 - The Australian Transport Safety Bureau notes ARTC's response, however the risk of safeworking irregularities is greater with manual systems of safeworking. The ATSB urges the ARTC to explore further opportunities to mitigate the risks of human error when using a paper-based system in addition to considering alternative risk controls that may reduce or eliminate human error. 11/05/2010 - The report into the Tarana safeworking irregularity was released by the ATSB on the 11 December 2009. The report contained one recommendation which was directed to the Australian Rail Track Corporation (ARTC). I am pleased to advise that this recommendation has been addressed by the responsible organisation and are considered closed by my Officers. The final recommendation was closed on 3 May 2010.
Safety action release date	11/12/2009
Safety action status	Closed - action taken 11/05/2010
Investigation complete date	11/12/2009

APPENDIX C: ATSB SAFETY ADVISORY NOTICES

Aviation

Investigation: AO-2007-029: In-flight break-up - Clonbinane, Vic; 31 July 2007, VH-YJB, Rockwell, Commander 500S

Safely action number	AO-2007-029-SAN-097
Risk category	Minor
Safety issue description	The aircraft manufacturer's documentation did not provide information or guidance to pilots for flight in turbulent conditions, increasing the risk of an inadequate pilot response to an encounter with severe turbulence.
SANs description	The Australian Transport Safety Bureau draws the attention of all operators to the contributory and other factors identified by this investigation. Operators are encouraged to review their procedures to ensure an appropriate awareness amongst operating personnel of the implications for aircraft performance of the combination of aircraft weights and speed, and of the ambient conditions.
Action organisation	All operators
Safety action release date	9/11/2009
Safety action status	Closed Safety action complete date: 9/11/2009
Investigation complete date	9/11/2009

Investigation: AO-2007-044: Go-around event Melbourne Airport, Victoria, 21 July 2007, VH-VQT, Airbus Industrie A320-232

Safely action number	AO-2007-044-SAN-110
Risk category	Significant
Safety issue description	The aircraft operator did not conduct a risk analysis when changing the go-around procedure, nor did its safety management system require one to be conducted.
SANs description	The aircraft operator had changed the standard operating procedure for the go-around. The change resulted in the flight crew being unaware of the flight mode status of the aircraft during the first part of the first missed approach. This incident highlights the potential for unintended consequences when changes to standard operating procedures are introduced without first conducting an appropriate risk analysis. Therefore, the Australian Transport Safety Bureau advises that all aircraft operators should consider the safety implications of this safety issue and take action where considered appropriate.
Action organisation	All operators
Safety action release date	1/03/2010
Safety action status	Closed Safety action complete date: 1/03/2010
Investigation complete date	5/03/2010

Marine

Investigation: MO-2008-003: Independent investigation into the drifting and subsequent grounding of the Sierra Leone registered products tanker *Breakthrough* at the Cocos (Keeling) Islands on 12 February 2008.

Safely action number	MO-2008-003-SAN-050
Risk category	Significant
Safety issue description	The operation of the ship's systems and the decisions made by the ship's senior officers suggests that they did not have appropriate knowledge and experience to safely undertake *Breakthrough*'s delivery voyage and that they did not effectively use the time spent in China, standing by the ship, to acquire the necessary knowledge.
SANs description	The Australian Transport Safety Bureau advises ship owners, operators and masters should consider the safety implications of this safety issue and take action where considered appropriate.
Action organisation	Ship owners, managers and masters
Safety action release date	09/04/2010
Safety action status	Closed Safety action complete date: 09/04/2010
Investigation complete date	09/04/2010

Safely action number	MO-2008-003-SAN-047
Risk category	Minor
Safety issue description	The International Safety Management (ISM) Code requires ship owners to ensure that each ship's master is given all necessary support to fulfil their duties. However, Jevkon Oil and Gas did not provide the necessary support either before the commencement of the delivery voyage or after the ship's crew began having difficulties using the intermediate fuel oil in the main engine and started drifting in the Indian Ocean.
SANs description	The ATSB advises that Jevkon Oil and Gas should consider the implications of this Safety Issue and take action where considered appropriate.
Action organisation	Jevkon Oil and Gas
Safety action release date	09/04/2010
Safety action status	Closed Safety action complete date: 09/04/2010
Investigation complete date	09/04/2010

Safely action number	MO-2008-003-SAN-048
Risk category	Minor
Safety issue description	The ship's safety management system was inadequate. Had Jevkon Oil and Gas implemented an effective safety management system on board *Breakthrough*, the risk of an incident such as the one that occurred on the delivery voyage would have been reduced.
SANs description	The ATSB advises that Jevkon Oil and Gas should consider the implications of this Safety Issue and take action where considered appropriate.
Action organisation	Jevkon Oil and Gas
Safety action release date	09/04/2010
Safety action status	Closed Safety action complete date: 09/04/2010
Investigation complete date	09/04/2010

Investigation: MO-2008-008: Independent investigation into the grounding of the Isle of Man registered bulk carrier Iron King at Port Hedland, Western Australia, on 31 July 2008

Safely action number	MO-2008-003-SAN-025
Risk category	Significant
Safety issue description	Iron King's safety management system did not include procedures that adequately ensured that the ship's master and crew were aware of, and drilled in, the emergency steering system change over procedure to be followed in the event of steering control loss.
SANs description	The Australian Transport Safety Bureau advises that owners, operators and masters should consider the safety implications of this safety issue and take action where considered appropriate.
Action organisation	Ship owners, managers and masters
Safety action release date	13/10/2009
Safety action status	Closed Safety action complete date: 13/10/2009
Investigation complete date	13/10/2009

Investigation: MO-2008-010: Auxiliary boiler explosion on board *Saldanha* off Newcastle, 18 November 2008

Safely action number	MO-2008-010-SAN-041
Risk category	Significant
Safety issue description	*Saldanha*'s master and crew were not aware of the appropriate first aid treatment required for burn injuries. As a result, the third engineer was not immediately provided with appropriate first aid.
SANs description	The ATSB advises that flag States, owners, operators and masters should consider the safety implications of this safety issue and take action where considered appropriate.
Action organisation	Flag States, ship owners, operators and masters
Safety action release date	22/10/2009
Safety action status	Closed Safety action complete date: 22/10/2009
Investigation complete date	22/10/2009

Investigation: MO-2008-011: Independent investigation into the fatal injury on board the Maltese registered container ship *Spirit of Esperance* in Townsville, Queensland on 24 November 2008

Safely action number	MO-2008-010-SAN-019
Risk category	Significant
Safety issue description	The design of the cradle for the crane's hook did not allow for unassisted stowage of the hook when the ship had a stern trim in excess of 2.1 m.
SANs description	The Australian Transport Safety Bureau advises that Marlow Navigation should consider the safety implications of this safety issue and take action where considered appropriate.
Action organisation	Marlow Navigation
Safety action release date	14/04/2010
Safety action status	Closed Safety action complete date: 14/04/2010
Investigation complete date	14/04/2010
Investigation number	MO-2008-011
Safely action number	MO-2008-010-SAN-045
Risk category	Significant
Safety issue description	The ship's health, safety, security and environment meetings and job hazard opportunity log were not effectively used to raise and discuss safety issues associated with cargo crane operations.
SANs description	The Australian Transport Safety Bureau advises that ASP Ship Management should consider the safety implications of this safety issue and take action where considered appropriate.
Action organisation	ASP Ship Management
Safety action release date	14/04/2010
Safety action status	Closed Safety action complete date: 14/04/2010
Investigation complete date	14/04/2010

Safely action number	MO-2008-010-SAN-042
Risk category	Minor
Safety issue description	The ship's safety management system working aloft procedure was not effectively implemented on board the ship and was not routinely followed when crew members climbed the emergency ladder to assist with the stowage of the cargo crane hook.
SANs description	The Australian Transport Safety Bureau advises that ASP Ship Management should consider the safety implications of this safety issue and take action where considered appropriate.
Action organisation	ASP Ship Management
Safety action release date	14/04/2010
Safety action status	Closed Safety action complete date: 14/04/2010
Investigation complete date	14/04/2010

Investigation: MO-2009-008: Collision between *Silver Yang* and *Ella's Pink Lady* off Point Lookout, Queensland, 9 September 2009

Safely action number	MO-2009-008-SAN-012
Risk category	Significant
Safety issue description	While most flag States have laws in place that implement the UNCLOS requirement for a ship's master to render assistance to the crew of another vessel following a collision, these laws are not being effectively implemented on board all ships.
SANs description	The Australian Transport Safety Bureau advises that all flag States should consider the safety implications of this safety issue and take action where considered appropriate.
Action organisation	Flag States
Safety action release date	15/06/2010
Safety action status	Closed Safety action complete date: 15/06/2010
Investigation complete date	15/06/2010

Rail

Investigation: RO-2008-005: Derailment of Train 5PS6, Bates, South Australia, 19 April 2008

Safely action number	RO-2008-005-SAN-035
Risk category	Significant
Safety issue description	The process for identifying potential rail defects is limited by the ultrasonic test vehicle operator's ability to detect and assess the echo patterns correctly.
SANs description	Action taken by the ARTC Rail Technology International (RTI) is actively conducting further development of their ultrasonic testing process. For example, RTI are developing software based on 'Artificial Neural Networks' for recognising ultrasonic reflection patterns that represent potential rail defects such as bolt-hole cracks. RTI have conducted post test re-analysis of ultrasonic test data using the neural network software to identify any defects that may have been missed during the test run. RTI's plan is to run the neural network software in the background and conduct this analysis while ultrasonic testing is being undertaken. RTI have indicated that implementation is planned for early 2010. ATSB assessment of action The ATSB acknowledges that the ARTC and RTI are developing processes to reduce the risks associated with operator dependence. While some of those initiatives have been introduced, especially in relation to bolt-hole cracks, other rail defects are also exposed to the issue of operator dependence. The opportunity exists for continued development and implementation of strategies aimed at reducing operator dependence.
Action organisation	ARTC
Safety action release date	03/02/2010
Safety action status	Closed Safety action complete date: 03/02/2010
Investigation complete date	03/02/2010

Safely action number	RO-2008-005-SAN-036
Risk category	Minor
Safety issue description	The ARTC Code of Practice does not recognise the relationship between heat-affected metal and stress concentration when specifying how far a bolt-hole should be from the rail ends before welding.
SANs description	The Australian Transport Safety Bureau advises that the ARTC should consider the implications of this safety issue and take action where considered appropriate.
Action organisation	ARTC
Safety action release date	03/02/2010
Safety action status	Closed Safety action complete date: 03/02/2010
Investigation complete date	03/02/2010

Investigation: RO-2009-003: Derailment of train 5PS6 near Golden Ridge WA, 30 January 2009

Safely action number	RO-2009-003-SAN-018
Risk category	Minor
Safety issue description	The ARTC had not undertaken an audit of track drainage arrangements for the Trans-Australian Railway to verify that the track complied with the relevant standard and that the standard was appropriate.
SANs description	The Australian Transport Safety Bureau advises that the Australian Rail Track Corporation should consider the implications of this safety issue and take action where considered appropriate.
Action organisation	ARTC
Safety action release date	26/05/2010
Safety action status	Closed Safety action complete date: 26/05/2010
Investigation complete date	26/05/2010

Safely action number	RO-2009-003-SAN-019
Risk category	Minor
Safety issue description	The ARTC Code of Practice, with respect to Flooding, 'ETG-10-01', does not specify hydrological design parameters, including height of water ponding against the formation layer for a design precipitation event and this could lead to under specified track drainage arrangements, and an increased risk of track damage arising from flash flood events.
SANs description	The Australian Transport Safety Bureau advises that the Australian Rail Track Corporation should consider the implications of this safety issue and take action where considered appropriate.
Action organisation	ARTC
Safety action release date	26/05/2010
Safety action status	Closed Safety action complete date: 26/05/2010
Investigation complete date	26/05/2010

Safely action number	RO-2009-003-SAN-020
Risk category	Minor
Safety issue description	At the time of the derailment the ARTC did not have timely access to reliable weather information and may benefit by building closer relationships with the Bureau of Meteorology and local observers (councils, farmers, etc.) who could pass information to assist them with the identification of localised severe weather events that may potentially affect the safety of their track.
SANs description	The Australian Transport Safety Bureau advises that the Australian Rail Track Corporation should consider the implications of this safety issue and take action where considered appropriate.
Action organisation	ARTC
Safety action release date	26/05/2010
Safety action status	Closed Safety action complete date: 26/05/2010
Investigation complete date	26/05/2010

APPENDIX D: PROACTIVE INDUSTRY SAFETY ACTIONS

Aviation

Investigation: AI-2008-038: Instrument departure procedure design

Safely action number	AI-2008-038-NSA-080
Risk category	Minor
Safety issue description	Ambiguities existed in the guidance used in the design of omnidirectional Standard Instrument Departure procedures. Such ambiguities may lead to an increased risk of inconsistent procedure design or application and an increased risk of collision for an aircraft following an instrument departure procedure.
Proactive industry safety action description	As a result of this safety issue, Airservices Australia (Airservices) advised the ATSB that they had reviewed the Standard Instrument Departure procedure affecting runway 28 right (28R) at Archerfield Airport and, following clarification from CASA, that they intended to remove the requirements of NOTAM C250/07. In addition, Airservices will modify the instrument departure procedure to require that the hangar to the right of the runway 28R flight strip must be visible to a pilot before commencing takeoff. Consistent with that modification, lighting will be required on the hangar to improve its visibility. ATSB assessment of safety action taken - The ATSB is satisfied that the action taken by Airservices adequately addresses the safety issue.
Action organisation	Airservices Australia
Safety action release date	9/04/2010
Safety action status	Closed 9/04/2010
Investigation complete date	9/04/2010

Safely action number	AI-2008-038-NSA-081
Risk category	Minor
Safety issue description	Ambiguities existed in the guidance used in the design of omnidirectional Standard Instrument Departure procedures. Such ambiguities may lead to an increased risk of inconsistent procedure design or application and an increased risk of collision for an aircraft following an instrument departure procedure.
Proactive industry safety action description	As a result of this safety issue, the Civil Aviation Safety Authority (CASA) presented a submission to the International Civil Aviation Organization instrument flight procedures panel. The submission highlighted the potential for ambiguity in the interpretation of the standards for the design of omnidirectional Standard Instrument Departures. The intent of the submission was to raise awareness of the issue and to seek changes to improve the consistency of the relevant PANS-OPS guidance material. In the interim, CASA has taken action to clarify the purpose of the rectangular areas to the sides of the runway and to provide additional procedures – including the provision of obstacle lighting to ensure obstacle clearance during instrument departures – to address the risk of a collision with obstacles. ATSB assessment of safety action taken - The ATSB is satisfied that the action taken by CASA will adequately address the safety issue.
Action organisation	Civil Aviation Safety Authority
Safety action release date	9/04/2010
Safety action status	Closed 9/04/2010
Investigation complete date	9/04/2010

Investigation: AO-2007-001: Microburst event - Sydney Airport, NSW, 15 April 2007, VH-OJR Boeing Company 747-438

Safely action number	AO-2007-001-NSA-098
Risk category	Minor
Safety issue description	There was no ground-based automatic low-level windshear warning system at Sydney Airport.
Proactive industry safety action description	04/11/2009 - On 5 November 2009, the Bureau of Meteorology (BoM) provided the following information regarding the Sydney Airport WindshearStudy: The Bureau of Meteorology has advised that it is undertaking the Sydney Airport Wind Shear Scoping Study. The objective of the Scoping Study is to assess the options for providing the aviation industry with low altitude wind shear alerts, focusing on Sydney Airport. A planned outcome from the Scoping Study is that the aviation industry, including airlines, Airservices Australia (AsA), Civil Aviation Safety Authority (CASA), Sydney Airport Corporation Limited (SACL) and the Bureau of Meteorology, has sufficient information (scientific, technical, performance, costs, infrastructure requirements) to make an informed decision on the requirement for and selection of a wind shear alert system for Sydney Airport with some consideration for other airports across Australia. This Scoping Study was initiated in 2008 following discussions between aviation industry representatives and the Bureau of Meteorology. In these negotiations it was noted that the Bureau of Meteorology has limited capacity to undertake all components of the Scoping Study in the time requested and employment of a consultant was recommended. The USA National Center for Atmospheric Research (NCAR) was selected as the consultant to assist in undertaking this Scoping Study. NCAR scientists have considerable expertise and experience in the scientific investigation of wind shear, the impacts of wind shear on aviation, development of wind shear detection systems and the implementation of these systems. They also have extensive international experience in assisting with the procurement and implementation of wind shear detection systems. The contract with NCAR for the Consultancy was finalised in Jan 2009 and target dates for the remaining tasks and deliverables from the Scoping Study are set between April 2009 and April 2010. Deliverables from the Scoping Study include: • An assessment of the meteorological risk factors associated with wind shear for operations at Sydney Airport, including the factors that may influence the choice of a wind shear alert system. • A report on available technologies, including system performance, limitations and costs, for providing low altitude wind shear alerts for aviation. • A procurement options report based on international experience that includes discussion on the installation, integration and acceptance process. • A functional requirements document that provides details on specific technology options taking account of factors specific to Sydney Airport. • Workshops and seminars on wind shear and the impacts on aviation. The technology report “Preliminary Assessment of Wind Shear Events, Detection System Options and Issues, and Applicability of Existing Sensors” was completed in March 2009 and circulated to industry stakeholders. A site visit to Sydney Airport to assess potential sites for sensors for wind shear alert systems was conducted in the week 22-26 June 2009. During this period a meeting with industry stakeholders was held to provide a detailed briefing on the technology report and discuss technology options, instrument site issues and implementation issues. The meeting was attended by representatives from NCAR, SACL, Qantas, Virgin Blue, AsA, CASA and the Bureau of Meteorology. Outstanding deliverables include the procurement options report, functional requirements document and the conduct of workshops.
Action organisation	Bureau of Meteorology

Safety action release date	21/12/2009
Safety action status	Monitor
Investigation complete date	21/12/2009

Investigation: AO-2007-008: Engine failure, 259 km SSE of Broome, WA, 24 May 2007, VH-IWO, Raytheon Beechcraft B200 King Air

Safely action number	AO-2007-008-NSA-113
Risk category	Significant
Safety issue description	The default alert trigger of 30 days that was set by the engine manufacturer's Designated Analysis Centre meant that there was no indication to the operator of the interruption in the transfer of the engine condition trend monitoring (ECTM) data in the 21 days leading up to the incident.
Proactive industry safety action description	23/12/2009 - In response to this incident, the engine manufacturer advised that: As a result of the cooperative review and consultation process between the [engine manufacturer] and the ATSB, the [engine manufacturer's] DAC has undertaken to systematically set the upload failure alerting feature of the ECTM software program to all its customers to ensure that prompt corrective action may be taken by those customers in the event of an interruption to the ECTM data upload stream.The ECTM system is set to a initial trigger value of 30 days but can also be set to shorter or longer trigger delays depending on the Operator and its operation. The engine manufacturer subsequently clarified that: ...in the past the [engine manufacturer's] DAC would only set-up notifications for interrupted data stream for customers who are committed by their fleet maintenance contract with the manufacturer to provide them ECTM data on a monthly basis. It became apparent from this event that using these notifications could also help the manufacturer ensure that the data transfer unit (DTU) system is serviceable and should also be set systematically for DTU operators. The default trigger of 30 days and the reminder of 14 days will now be set systematically for all new DTU equipped aircraft. This is also a good opportunity for the DAC to review the existing accounts and ensure they all have an alert. The customers will still have the option of setting shorter or even longer delays depending on their operation. But at least all DTU operators will begin with an alert which we can use to ensure the system is operating normally.
Action organisation	Pratt and Whitney (Canada)
Safety action release date	23/12/2009
Safety action status	Closed 23/12/2009
Investigation complete date	23/12/2009

Safely action number	AO-2007-008-NSA-114
Risk category	Significant
Safety issue description	The default alert trigger of 30 days that was set by the engine manufacturer's Designated Analysis Centre meant that there was no indication to the operator of the interruption in the transfer of the engine condition trend monitoring (ECTM) data in the 21 days leading up to the incident.
Proactive industry safety action description	The aircraft operator contacted the engine manufacturer's DAC and requested that all available ECTM alerts be activated to allow the company to be promptly alerted to, and rectify any data link failures.
Action organisation	RFDS
Safety action release date	23/12/2009
Safety action status	Closed 23/12/2009
Investigation complete date	23/12/2009

Investigation: AO-2007-017: Fuel starvation - Jundee Airstrip, WA, 26 June 2007, VH-XUE, Empresa Brasileira de Aeronautics S.A., EMB-120ER

Safely action number	AO-2007-017-NSA-076
Risk category	Significant
Safety issue description	There was no regulatory requirement for simulator training in Australia
Proactive industry safety action description	A summary of CASA activities to facilitate the use of full flight simulators and/or flight training devices follows: The following inter-related activities are in the process of implementation: • A combined workshop activity with Ansett Aviation Training, Capiteq Limited trading as AirNorth, Network Aviation Pty Ltd, Skippers Aviation Pty Ltd, PelAir Aviation Pty Ltd and CASA was held on 27, 28 April 2009. • CASA has initiated a review of CAR 217 Training Organisations and Training Centres. This programme of review was prompted following investigations that revealed AOC holder training inconsistencies. • A Component of the 'CAR 217 Training Organisations and Training Centres Special Emphasis Review' is to establish the level of company oversight and involvement with training and simulation, programmes that have been outsourced. • Civil Aviation Order 40.2.1 - Instrument Rating, Section 12A, `Renewal using an overseas flight simulator training provider' has been added to include the option of instrument proficiency checks being conducted by an overseas simulator provider. This is to enable an instrument rating renewal where a specific type simulator is not available in Australia. o This amendment needs to read in conjunction with Advisory Circular AC 60-2 (1) of May 2007. o The Advisory Circular identifies that CASA recognises the flight simulator qualifications certificates issued by Canada, Hong Kong (Special Administrative Region of China), New Zealand, the United States of America, Belgium, the Czech Republic, Denmark, Finland, France, Germany, Ireland, Italy, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom. o Civil Aviation Order 40.1.0 - Aircraft Endorsement - Aeroplanes, Section 6. This facilitates an option for instrument rating renewals to be associated with the issue of an aircraft type rating.
Action organisation	Civil Aviaiton Safety Authority
Safety action release date	8/07/2009
Safety action status	Closed 8/07/2009
Investigation complete date	8/07/2009

Safely action number	AO-2007-017-NSA-099
Risk category	Minor
Safety issue description	The certification standard to which the aircraft was built did not require the aircraft to be equipped with a fuel low level warning system.
Proactive industry safety action description	08/07/2009 - The investigation of a number of similar occurrences by the Irish Air Accident Investigation Unit (AAIU), the Italian Agenzia Nazionale per la Sicurezza del Volo (ANSV), and the UK Air Accident Investigation Branch (AAIB) identified a similar safety issue. In each case, the response by those investigation agencies was to issue safety recommendations that sought the enhancement of the relevant certification standards to require the installation of independent fuel low level warning systems in turboprop and turbojet aircraft. ATSB assessment of response/action: The recommendations by the Irish AAIU, Italian ANSV, and the UK AAIB appear to adequately address this safety issue.
Action organisation	Aircraft certification authorities
Safety action release date	8/07/2009
Safety action status	Closed 8/07/2009
Investigation complete date	8/07/2009

Safely action number	AO-2007-017-NSA-100
Risk category	Significant
Safety issue description	Regulatory guidance regarding the measurement of fuel quantity before flight lacked clarity and appropriate emphasis and did not ensure that the fuel quantity measurement procedures used by operators included two totally independent methods.
Proactive industry safety action description	08/07/2009 - The status of CASA's review of its guidance material relating to separate processes for fuel quantity measurement checks The second edition of the Air Transport Communication (AT com) advised of impending amendments to Civil Aviation Advisory Publication (CAAP) 234. In amending CAAP 234, clear guidance will be given to industry regarding the two independent means of ensuring the correct amount of fuel is onboard an aircraft. The amended CAAP 234 will emphasise the responsibilities of the Pilot-in-Command and the operator in adhering to the manufacturer's guidance in determining the amount of fuel onboard an aircraft. CASA would like to emphasise the point that crews utilise all means provided by the manufacturer to ascertain correct fuel quantity. In this instance there was a manufacturer's recommended procedure that aircraft fuel quantity is independently confirmed using a separate facility incorporated into the aircraft. Had this crew followed that guidance, the incident would not have experienced its near catastrophic outcome. The second edition of the AT com advised industry that changes to CAAP 234 were forthcoming. The AT com is intended as an informal means of raising topical issues inclusive of alerting operators of intended changes. CASA is not reliant on it to convey the information as variations documentation is undertaken through our formal process. The process of amending CAAP 234 is currently being undertaken and this involves detailed consultation with various stakeholders. A summary of any changes to CASA regulatory oversight activities relating to fuel management or fuel quantity cross-checking processes Fuel quantity cross-checking processes have been added as a distinct element within operational surveillance activities. Where a deficiency in the fuel cross checking procedures is identified, it is raised with the operator. The matter remains under close scrutiny until resolved to the satisfaction of CASA. 08/07/2009 - The ATSB is concerned that, at the time of publication of this report, the CAAP 234-1(1) amendment had still not been released. The ATSB will continue to monitor the progress of the CAAP review. In addition to the occurrence involving VH-XUE, the ATSB is aware of two other occurrences involving Australian-registered aircraft since January 2005 involving engine power loss due to fuel starvation in turboprop aircraft with a maximum take-off weight (MTOW) above 5,700 kg. In each case, the practices used by the flight crew to establish fuel quantity did not detect erroneous fuel quantity indications. The operators involved subsequently amended their procedures to include dripstick checks as a mandatory part of their procedures for establishing the quantity of fuel on board the aircraft. It is possible that there are other examples among turboprop operators of aircraft with a MTOW greater than 5,700 kg where the procedures used to determine the quantity of fuel on board the aircraft do not include independent, comparative checks of fuel quantity. On 14 September 2007, the ATSB issued AO-2007-017-Safety Advisory Notice-013, which stated: The ATSB suggests that all turboprop operators take note of the following safety issue and review their processes accordingly: The processes used by some turboprop operators for checking the fuel quantity on board prior to flight have not used two methods of sufficient independence. In particular, the practice of using a comparison of a gauge indication after refuelling with the gauge indication prior to refuelling plus the fuel added is not adequate to detect gradually developing errors in gauge indications. On 25 February 2008, the ATSB advised CASA and all Australian operators of EMB-120 aircraft of the investigation report regarding the EMB-120 engine power loss occurrence in Europe on 20 February 2008. In the meantime, the ATSB re-emphasises AO-2007-017-Safety Advisory Notice-013 (above), which was initially issued on 14 September 2007. 12/04/2010 - CASA has a standards development project underway to review its regulations and guidance concerning fuel planning and alternate aerodrome considerations. This project is being conducted in two phases. Phase 1 involves reviewing the requirements for operations to remote islands. It is proposed to require fuel for flight to an alternate aerodrome (from the destination aerodromes) for passenger-carrying commercial flights to a remote island regardless of the meteorological conditions. This will involve amendments to section 82.0 of the Civil Aviation Orders and also the addition of guidance in CAAP 234-1. The CAAP will also be enhanced by providing material on considerations necessary for flights to any remote aerodrome and in particular, when and under what circumstances a pilot should consider a diversion. Phase 2 will involve a more comprehensive review of CAAP 234-1, with an emphasis on in-flight fuel management. Regulatory cha"nges are also being considered to further strengthen the requirements for in-flight fuel management, including a requirement that a pilot must not continue a flight to its intended destination if a safe landing can not be performed (with fuel reserves remaining intact), when an alternate

	aerodrome is available.
Action organisation	Aircraft certification authorities
Safety action release date	8/07/2009
Safety action status	Monitor
Investigation complete date	8/07/2009

Safely action number	AO-2007-017-NSA-101
Risk category	Significant
Safety issue description	The absence of simulator training meant that the endorsement and other training the flight crew had undergone did not adequately prepare them for the event.
Proactive industry safety action description	8/07/2009 - In April 2009, following the certification of an Empresa Brasileira de Aeronáutica S.A., EMB-120 flight simulator in Melbourne, Vic., the operator began utilising the simulator for its EMB-120 flight crew training. ATSB assessment of response/action The action taken by the operator appears to adequately address the safety issue.
Action organisation	Skippers Aviation
Safety action release date	8/07/2009
Safety action status	Closed 8/07/2009
Investigation complete date	8/07/2009

Safely action number	AO-2007-017-NSA-102
Risk category	Minor
Safety issue description	The aircraft operator was not aware of important safety related information regarding the EMB-120 fuel system.
Proactive industry safety action description	08/07/2009 - On 28 April 2009, CASA advised: The CASA Communication (CASACom) publication, previously known as the Air Transport Communication (ATCom) has been developed to allow the Civil Aviation Safety Authority to promptly communicate identified safety and operational issues to all Air Operator Certificate holders and is available on the CASA website. ATSB assessment of response/action: The action taken by CASA appears to adequately address the safety issue.
Action organisation	Civil Aviation Safety Authority
Safety action release date	8/07/2009
Safety action status	Closed 8/07/2009
Investigation complete date	8/07/2009

Safely action number	AO-2007-017-NSA-103
Risk category	Minor
Safety issue description	The aircraft operator was not aware of important safety related information regarding the EMB-120 fuel system.
Proactive industry safety action description	08/07/2009 - The aircraft manufacturer confirmed that any issues submitted to the Air Safety Department were analysed for possible impact on other operators and disseminated via Air Safety Representative located around the world. They disseminated information, to all operators, of the two events that were advised of and subsequently sought details of the third event once there were aware of it. ATSB assessment of response/action: The action taken by Empresa Brasileira de Aeronáutica S.A. appears to adequately address the safety issue.
Action organisation	Empresa Brasileira de Aeronautica S.A.
Safety action release date	8/07/2009
Safety action status	Closed 8/07/2009
Investigation complete date	8/07/2009

Safely action number	AO-2007-017-NSA-104
Risk category	Significant
Safety issue description	The minimum requirements for endorsement training where simulator training was not involved did not ensure pilots were aware of indicators and/or aircraft behaviour during critical emergency situations.
Proactive industry safety action description	On 28 April 2009, CASA advised as follows: CASA has identified that there is a risk of interpretive conflict within [Civil Aviation Order] CAO 40.1.0. As a result, this CAO is under review to identify further areas of similar risk. Once complete, the results of this review will be dealt with at the Executive level of CASA. In amplification of its response, CASA advised that the reference to 'interpretative conflict' related to the requirements in CAO 40.1.0 that made reference to aspects associated with aircraft complexity (including familiarity 'with the systems, the normal and emergency flight manoeuvres and aircraft performance, the flight planning procedures, the weight and balance requirements and the practical application of take-off and landing charts of the aircraft to be flown') compared to the minimum conditions (flying time) for acting as pilot in command and co-pilot (see 1.16.1). The ATSB will monitor progress of the progress of the review of CAO 40.1.0
Action organisation	Civil Aviation Safety Authority
Safety action release date	8/07/2009
Safety action status	Monitor
Investigation complete date	8/07/2009

Investigation: AO-2007-036 : Fuel related event - 50 km NW of Swan Hill, Vic; 11 August 2007; VH-TJE, Boeing 737-476

Safely action number	AO-2007-036-NSA-059
Risk category	Minor
Safety issue description	The Before Start checklist did not distinguish between the various fuel pump selection options. The checklist just called for fuel quantity and Pumps ON.
Proactive industry safety action description	On 27 November 2007, the Chief Pilot for the operator issued a Flight Standing Order that included the following: Effective immediately, the BEFORE START and BEFORE TAXI Procedures and Checklists have been revised as follows: 1. The Captain, in addition to the First Officer, is now required to respond to the “Fuel” challenge item in the BEFORE START Checklist and the “Anti-ice” challenge item in the BEFORE TAXI Checklist; 2. The Fuel checklist item also includes a procedural memory aid (which does not need to be verbalized) that states “Verify CENTRE TANK FUEL PUMPS (as required)….ON.” On 15 June 2009, the operator advised the following: The [Operator] Flight Administration Manual (FAM) 21.2 (Adherence to Standard Operating Procedures) and 21.8 (Checklist Philosophy) clearly details the policy regarding adherence to Aircraft Operations Manual (FCOM) checklists. The standard checklist philosophy is articulated in the QRH [Quick Reference handbook], which forms part of the FCOM. This section (QRH CI.1.1) states that "Both pilots visually verify that each item is in the needed configuration or that the step is done." This fact is acknowledged as the relevant page appears as page 37 of the ATSB report. This policy ensures that Flight Crew are aware of the switch positions and is standard philosophy across all Boeing models. The suggestion of touching the respective switches is not standard Airbus or Boeing practice, nor part of their recommendations. We will discuss the matter directly with the OEM [original equipment manufacturer] but have no intention to adopt this procedure at this time. ATSB assessment of the operator’s response/action The ATSB notes the action proposed by the operator and will continue to monitor this safety issue | The operator's Flight Operations confirmed that they have discussed the suggested procedure with Boeing who advised that although interested, have no intention of adopting this procedure at this time. As a result, the operator confirms that their position has not changed [that is, they do not intend to introduce a requirement to touch switches during checklists]. | The ATSB ackowledges that the operator has followed-up this issue with Boeing and that Boeing is currently not interested in altering their checklist philosophy. In light of wanting to remain consistent with the current Boeing checklist philosophy, the ATSB understands that the operator is not willing to change their checklist practices at this time to introduce the touching of switch positions. This safety action has been closed.
Action organisation	Qantas Airways
Safety action release date	28/07/2009
Safety action status	Closed 28/07/2009
Investigation complete date	28/07/2009

Safely action number	AO-2007-036-NSA-060
Risk category	Significant
Safety issue description	During the checklist procedure, the copilot would call the check item and then the copilot would check it. There was no crosscheck required by the pilot in command.
Proactive industry safety action description	28/07/2009 - On 15 June 2009, the operator advised the following:In addition to the information provided in response to item 4.1.2, the Normal Checklist was amended to require that the Captain also respond to the "Fuel" challenge item contained in the BEFORE START checklist. The "Fuel" item itself was also expanded to include an additional memory aid (not verbalised) that stated "...Verify CENTRE TANK FUEL PUMPS (as required)...ON." ATSB assessment of response/action The action taken by the operator appears to adequately address the safety issue.
Action organisation	Qantas Airways
Safety action release date	28/07/2009
Safety action status	Closed 28/07/2009
Investigation complete date	28/07/2009

Safely action number	AO-2007-036-NSA-077
Risk category	Significant
Safety issue description	The checklist procedure did not require flight crew to touch the switches of the fuel pumps to ensure that they were aware of the position of the switches.
Proactive industry safety action description	28/07/2009- On 15 June 2009, the operator advised the following: The [Operator] Flight Administration Manual (FAM) 21.2 (Adherence to Standard Operating Procedures) and 21.8 (Checklist Philosophy) clearly details the policy regarding adherence to Aircraft Operations Manual (FCOM) checklists. The standard checklist philosophy is articulated in the QRH [Quick Reference handbook], which forms part of the FCOM. This section (QRH CI.1.1) states that "Both pilots visually verify that each item is in the needed configuration or that the step is done." This fact is acknowledged as the relevant page appears as page 37 of the ATSB report. This policy ensures that Flight Crew are aware of the switch positions and is standard philosophy across all Boeing models. The suggestion of touching the respective switches is not standard Airbus or Boeing practice, nor part of their recommendations. We will discuss the matter directly with the OEM [original equipment manufacturer] but have no intention to adopt this procedure at this time. ATSB assessment of the operator's response/action The ATSB notes the action proposed by the operator and will continue to monitor this safety issue 30/08/2010 - The operator's Flight Operations confirmed that they have discussed the suggested procedure with Boeing who advised that although interested, have no intention of adopting this procedure at this time. As a result, the operator confirms that their position has not changed [that is, they do not intend to introduce a requirement to touch switches during checklists]. 06/09/2010 - The ATSB ackowledges that the operator has followed-up this issue with Boeing and that Boeing is currently not interested in altering their checklist philosophy. In light of wanting to remain consistent with the current Boeing checklist philosophy, the ATSB understands that the operator is not willing to change their checklist practices at this time to introduce the touching of switch positions. This safety action has been closed.
Action organisation	Qantas Airways
Safety action release date	28/07/2009
Safety action status	Closed 6/09/2010
Investigation complete date	28/07/2009

Safely action number	AO-2007-036-NSA-105
Risk category	Significant
Safety issue description	The checklist procedure did not require flight crew to touch the switches of the fuel pumps to ensure that they were aware of the position of the switches.
Proactive industry safety action description	On 16 June 2009, CASA advised the following: CASA will follow up with the operator regarding their action on “4.1.2 Inadequate checklist procedures to verify position of switches” and “4.1.3 Absence of crosscheck in checklist". 24/09/2010 - CASA has followed up with the operator and is satisfied with the operator's responses provided in the final report in relation to: i) the inadequate checklist procedures to verify the position of switches; and ii) the absence of a check item crosscheck in the checklist. No further action will be taken by CASA. 28/09/2010 - The ATSB is satisfied that CASA has undertaken the safety action as intended and closed this safety action.
Action organisation	Civil Aviation Safety Authority
Safety action release date	28/07/2009
Safety action status	Closed 28/07/2009
Investigation complete date	28/07/2009
Investigation number	AO-2007-036

Safely action number	AO-2007-036-NSA-107
Risk category	Significant
Safety issue description	During the checklist procedure, the copilot would call the check item and then the copilot would check it. There was no crosscheck required by the pilot in command.
Proactive industry safety action description	On 16 June 2009, CASA advised the following: CASA will follow up with the operator regarding their action on “4.1.2 Inadequate checklist procedures to verify position of switches” and “4.1.3 Absence of crosscheck in checklist". 24/09/2010 - CASA has followed up with the operator and is satisfied with the operator's responses provided in the final report in relation to: i) the inadequate checklist procedures to verify the position of switches; and ii) the absence of a check item crosscheck in the checklist. No further action will be taken by CASA. 28/09/2010 - The ATSB is satisfied that CASA has undertaken the safety action as intended and closed this safety action.
Action organisation	Civil Aviation Safety Authority
Safety action release date	28/07/2009
Safety action status	Closed 28/07/2009
Investigation complete date	28/07/2009

Investigation: AO-2007-044: Go-around event Melbourne Airport, Victoria, 21 July 2007, VH-VQT, Airbus Industrie A320-232

Safely action number	AO-2007-044-NSA-073
Risk category	Significant
Safety issue description	The aircraft operator had changed the standard operating procedure for the go-around. The change resulted in the flight crew being unaware of the flight mode status of the aircraft during the first part of the first missed approach.
Proactive industry safety action description	The operator has advised that the standard operating procedure for a go-around has been modified in line with the procedure promulgated by the aircraft manufacturer. ATSB assessment of action taken - The ATSB is satisfied that the action taken by the aircraft operator adequately addresses the safety issue.
Action organisation	Jetstar Airways
Safety action release date	1/03/2010
Safety action status	Closed 1/03/2010
Investigation complete date	5/03/2010

Safely action number	AO-2007-044-NSA-085
Risk category	Significant
Safety issue description	The aircraft operator did not conduct a risk analysis when changing the go-around procedure, nor did its safety management system require one to be conducted.
Proactive industry safety action description	The operator has introduced a change to the safety management system such that any change to an aircraft operating procedure requires the completion of a formal risk analysis prior to that change being implemented. ATSB assessment of action taken - The ATSB is satisfied that the action taken by the aircraft operator adequately addresses the safety issue.
Action organisation	Jetstar Airways
Safety action release date	1/03/2010
Safety action status	Closed 1/03/2010
Investigation complete date	5/03/2010

Safely action number	AO-2007-044-NSA-087
Risk category	Minor
Safety issue description	Flight crew undergoing initial endorsement training with the third party training provider were not trained to the procedures and systems used by the operator.
Proactive industry safety action description	The operator has reported that it is conducting a review of existing flight training arrangements. ATSB assessment of action taken - The ATSB is satisfied that the action proposed by the aircraft operator will adequately address the safety issue.
Action organisation	Jetstar Airways
Safety action release date	1/03/2010
Safety action status	Closed 1/03/2010
Investigation complete date	5/03/2010

Safely action number	AO-2007-044-NSA-088
Risk category	Minor
Safety issue description	The aircraft operator did not comply with accepted document change procedures when modifying the standard operating procedure for the go-around.
Proactive industry safety action description	The operator has implemented changes to its document control procedure to indicate when specific operator initiated changes to procedures are made. ATSB assessment of response/action - The ATSB is satisfied that the action taken by the aircraft operator adequately addresses the safety issue.
Action organisation	Jetstar Airways
Safety action release date	1/03/2010
Safety action status	Closed 1/03/2010
Investigation complete date	5/03/2010

Safely action number	AO-2007-044-NSA-111
Risk category	Significant
Safety issue description	The aircraft operator had changed the standard operating procedure for the go-around. The change resulted in the flight crew being unaware of the flight mode status of the aircraft during the first part of the first missed approach.
Proactive industry safety action description	Although this safety issue arose out of a change that was made to the go-around procedure by the aircraft operator, as a result of this occurrence, the aircraft manufacturer consulted with the aircraft operator. Following that consultation, the aircraft manufacturer revised the go-around procedure within the manufacturer's Flight Crew Operating Manual. The aim of that revision was to emphasise the critical nature of the actions by flight crew during a go-around. The revised go-around procedure is at Figure 8 of the report. ATSB assessment of response/action - The ATSB is satisfied that the action taken by the aircraft manufacturer adequately addresses the safety issue.
Action organisation	Airbus Industrie
Safety action release date	1/03/2010
Safety action status	Closed 1/03/2010
Investigation complete date	5/03/2010

Safely action number	AO-2007-044-NSA-112
Risk category	Minor
Safety issue description	There was no provision in the current CASA Regulations or Orders for third party flight crew training providers. As such, the responsibility for training outcomes was unclear.
Proactive industry safety action description	CASA has advised the ATSB that the proposed CASR Part 142 is under review as a matter of priority and has now been progressed to the Office of Legislative Drafting and Publishing. ATSB assessment of response/action - The action taken by CASA appears to adequately address the safety issue.
Action organisation	Civil Aviation Safety Authority
Safety action release date	1/03/2010
Safety action status	Closed 1/03/2010
Investigation complete date	5/03/2010

Investigation: AO-2007-046: Collision with terrain, Doongan Station, WA, 25 September 2007, VH-HCN, Robinson Helicopter Company R22 Beta II

Safely action number	AO-2007-046-NSA-074
Risk category	Significant
Safety issue description	V-belt failure or dislodgement was identified as a factor in a number of overseas and Australian R22 accidents.
Proactive industry safety action description	Safety action taken by the Civil Aviation Safety Authority In response to a number of R22 helicopter rotor drive system failures, on 14 August 2009, the Civil Aviation Safety Authority (CASA) issued airworthiness bulletin, AWB 63-006 Issues related to the Robinson Helicopter Corporation (RHC) R22 main rotor drive system. The purpose of the bulletin was to: a. Provide Operators and Maintainers' a consolidated summary of investigations carried out by CASA Airworthiness Specialists based on several information resources including CASA received SDRs, b. to remind maintainers and operators of the need to strictly adhere to the requirements of all current RHC approved data for the operation and maintenance of the R22, and c. provide a guide to the information available, including RHC data in relation to main rotor drive system with emphasis on the main rotor drive veebelts (also known as the main drive belts). CASA also advised that future relevant operational information regarding rotor drive systems failures would continue to be disseminated through advisory material and Directives. ATSB assessment of action The ATSB is satisfied that the action taken by CASA adequately addresses the safety issue.
Action organisation	Civil Aviation Safety Authority
Safety action release date	22/12/2009
Safety action status	22/12/2009
Investigation complete date	Closed 22/12/2009

Investigation: Leading edge device failure, Norfolk Island, 29 December 2007, VH-OBN, Boeing 737-229

Safely action number	AO-2007-070-NSA-048
Risk category	Minor
Safety issue description	The extent of the emergency procedures cards (EPC), and failure of two of the EPC cards'bindings rendered them difficult to use, and resulted in the affected cabin crew carrying out the emergency procedures by memory.
Proactive industry safety action description	The operator advised the ATSB that it had reviewed the construction of the EPC booklets, and that they have been replaced. ATSB assessment of action - The ATSB is satisfied that the action taken by the aircraft operator adequately addresses the safety issue.
Action organisation	OzJet Airlines Pty Ltd
Safety action release date	8/02/2010
Safety action status	8/02/2010
Investigation complete date	8/02/2010

Safely action number	AO-2007-070-NSA-095
Risk category	Significant
Safety issue description	The operator did not have a process in place to ensure that crew members were in a fit state to resume operations after such an event, or to assist the crew to recover from their experiences during an occurrence.
Proactive industry safety action description	The operator advised the ATSB that it had reviewed the construction of the EPC booklets, and that they have been replaced. ATSB assessment of action - The ATSB is satisfied that the action taken by the aircraft operator adequately addresses the safety issue.
Action organisation	OzJet Airlines Pty Ltd
Safety action release date	8/02/2010
Safety action status	Closed 8/02/2010
Investigation complete date	8/02/2010

Investigation: AO-2008-007: Hard landing - Darwin Airport, Northern Territory, 7 February 2008, VH-NXE, Boeing Company 717–200

Safely action number	AO-2008-007-NSA-060
Risk category	Minor
Safety issue description	The allowance of momentary excursions in the aircraft operator's stabilised approach criteria that were caused by wind gusts or turbulence increased risk by permitting flight crew discretion to continue approaches at or beyond those criteria
Proactive industry safety action description	The aircraft operator has advised the ATSB that the stabilised approach criteria has been amended to remove the reference to "'momentary" 'excursions. The action taken by the operator appears to address the safety issue.
Action organisation	National Jet Systems
Safety action release date	14/05/2010
Safety action status	Closed 14/05/2010
Investigation complete date	14/05/2010

Safely action number	AO-2008-007-NSA-061
Risk category	Minor
Safety issue description	The operator's procedures for the use of the autothrottle in response to high rates of descent when below 30 ft during landing was not included in the operator's standard operating procedures.
Proactive industry safety action description	The aircraft operator has advised the ATSB that: The Head of Pilot Training and Checking 717 will ensure all flight crew are aware if the airspeed is lagging, or a sink rate develops just prior to the flare, delaying the thrust reduction or even increasing thrust, may be necessary during the autothrottle retard mode. This technique will be included in the training provided by Training Captains. The technique will also be further emphasised to crew during recurrent simulator and line checks. The action taken by the operator appears to address the safety issue.
Action organisation	National Jet Systems
Safety action release date	14/05/2010
Safety action status	Closed 14/05/2010
Investigation complete date	14/05/2010

Safely action number	AO-2008-007-NSA-062
Risk category	Minor
Safety issue description	The operator's process for reporting 717 pilot training issues to senior managers was not utilised by all flight crew, reducing the potential for the communication of fleet-wide issues to all 717 crews.
Proactive industry safety action description	The aircraft operator advised the ATSB that: The position of Head of Pilot Training 717 has been filled with an experienced 717 check-and-training captain. The operator's Flight Operations department has appointed a check-and-training captain to the position of Head of Pilot Training – B717. All 717 flight crew are able to report inconsistencies in flight standards by individual crew members in a non-jeopardy manner to the Head of Pilot Training – B717. He will address such inconsistencies and determine any extra training considered necessary. The operator's Flight Operations department will reiterate their 'just culture' policy to all flight crew. The company CAR 217 organisation will increase the frequency of check-and-training meetings and hold them quarterly. Flight standards and operational standardisation will be discussed. 17/08/2009 - The action taken by the operator appears to adequately address the safety issue.
Action organisation	National Jet Systems
Safety action release date	14/05/2010
Safety action status	Closed 14/05/2010
Investigation complete date	14/05/2010

Safely action number	AO-2008-007-NSA-063
Risk category	Minor
Safety issue description	There was no clear division of responsibilities between the aircraft operator and the third party training provider in regard to ensuring the standards of flight training met all of the operator's requirements, which had the potential of reducing training effectiveness.
Proactive industry safety action description	The operator's training organisation is to review the 717 training provided by their third party training provider. The review will ensure the syllabus matches the operator's requirements and that it is flexible enough to ensure that less experienced trainees, who may need more time under training, receive the extra training they need to meet the required standard. A detailed briefing and PowerPoint™ presentation dealing with 717 landing technique will be provided to all company flight crew, including trainee pilots undergoing conversion training to the 717. The visual circuit practice simulator session, currently conducted after completion of the initial 717 training simulator sessions, will be made more flexible on a level-of-performance basis so that trainee pilots are given tailored training to meet their individual requirements. Following the simulator training, an initial demonstration and instruction of the correct landing technique will be conducted by a Check Captain. 17/08/2009 - The actions taken by the operator and CASA appear to adequately address the safety issue.
Action organisation	National Jet Systems
Safety action release date	14/05/2010
Safety action status	Closed 14/05/2010
Investigation complete date	14/05/2010

Safely action number	AO-2008-007-NSA-065
Risk category	Minor
Safety issue description	There was no provision in the current Civil Aviation Safety Authority regulations or orders regarding third party flight crew training providers, with the effect that the responsibility for training outcomes was unclear.
Proactive industry safety action description	CASA has advised the ATSB that the proposed Civil Aviation Safety Regulation (CASR) Part 142 is under review as a matter of priority and has been progressed to the Office of Legislative Drafting and Publishing. In addition, in July 2009, CASA issued a Civil Aviation Advisory Publication (CAAP)24 that provided guidance to the aviation industry in regard to competency based training. 17/08/2009 - The action taken by CASA appears to adequately address the safety issue.
Action organisation	Civil Aviation Safety Authority
Safety action release date	14/05/2010
Safety action status	Closed 14/05/2010
Investigation complete date	14/05/2010

Safely action number	AO-2008-007-NSA-066
Risk category	Minor
Safety issue description	There was no aircraft operator's or manufacturer's 717 pilot training manual that provided for the standardisation of instructional technique and provided a reference document for pilots during and following training.
Proactive industry safety action description	The aircraft operator has advised the ATSB of the production of a manual titled B717P – Aircraft Operating Procedures Manual as a reference document for pilots and, in consultation with the aircraft manufacturer, are compiling a separate Boeing 717 Training Manual. 18/08/2009 - The action taken by the operator appears to adequately address the safety issue.
Action organisation	National Jet Systems
Safety action release date	14/05/2010
Safety action status	Closed 14/05/2010
Investigation complete date	14/05/2010

Safely action number	AO-2008-007-NSA-068
Risk category	Minor
Safety issue description	The aircraft operator's Route Manual did not include all relevant information on the potential for visual illusions during a night approach to runway 29 at Darwin Airport that would have improved the awareness of flight crews.
Proactive industry safety action description	The aircraft operator advised the ATSB that: The company's Route Manual - Domestic Operations has been expanded to provide more information on runway approaches at all aerodromes used by company aircraft. The operator's Flight Operations department will consider providing audio-visual presentations for all company aerodromes. This will meet CAR 218 Route Qualification Requirements and enable flight crew to familiarise themselves with aerodromes into which they have not flown previously. 18/08/2009 - The action taken by the operator appears to adequately address the safety issue.
Action organisation	National Jet Systems
Safety action release date	14/05/2010
Safety action status	Closed 14/05/2010
Investigation complete date	14/05/2010

Safely action number	AO-2008-007-NSA-069
Risk category	Minor
Safety issue description	The Jeppesen-Sanderson Inc. approach chart titled Darwin, NT Australia ILS-Z or LOC-Z Rwy 29 dated 21 SEP 07 incorrectly depicted a level flight segment after the Howard Springs non-directional beacon that could have been misinterpreted by flight crews.
Proactive industry safety action description	On 27 June 2008, Jeppesen issued an updated Darwin ILS-Z or LOC-Z Rwy 29 chart which correctly shows the descent commencing overhead the Howard Springs NDB.18/08/2009 - The action taken by the operator appears to adequately address the safety issue. 18/08/2009 - The action taken by Jeppesen appears to adequately address the safety issue.
Action organisation	Jeppesen
Safety action release date	14/05/2010
Safety action status	Closed 14/05/2010
Investigation complete date	14/05/2010

Safely action number	AO-2008-007-NSA-101
Risk category	Minor
Safety issue description	There was no clear division of responsibilities between the aircraft operator and the third party training provider in regard to ensuring the standards of flight training met all of the operator's requirements, which had the potential of reducing training effectiveness.
Proactive industry safety action description	The Civil Aviation Safety Authority (CASA) has advised the ATSB that, as a result of this occurrence: CASA will review, with operators, their oversight responsibilities in this area. The air operator is responsible for all activities conducted under its Air Operators Certificate, including contracted training.
Action organisation	Civil Aviation Safety Authority
Safety action release date	14/05/2010
Safety action status	Closed 14/05/2010
Investigation complete date	14/05/2010

Investigation: AO-2008-039: Airframe vibration Wollongong Aerodrome, NSW, 11 June 2008, VH-UAH, Bell Helicopter Co. 412

Safely action number	AO-2008-039-NSA-087
Risk category	Minor
Safety issue description	The component overhaul manual did not specifically identify an allowance for positive running torque of the castellated nut, potentially allowing for inadequate tensioning of the pivot bolt and adjustable bushings during reassembly of the collective actuator.
Proactive industry safety action description	Following this incident, the actuator manufacturer reviewed the torque requirements for installing the castellated nut onto the pivot bolt assembly. In order to ensure proper clamping and cotter pin installation, it was determined that the torque callout range could be increased to 30-50 inch-pounds (previously 15-25 inch-pounds). An amendment to the collective actuator Component Maintenance Manual and the collective actuator assembly test and inspection procedures (ATIP) reflecting the torque revision was published in September 2009.
Action organisation	HR Textron
Safety action release date	30/06/2010
Safety action status	Closed 30/06/2010
Investigation complete date	30/06/2010

Safely action number	AO-2008-039-NSA-088
Risk category	Minor
Safety issue description	The component overhaul manual did not specifically identify an allowance for positive running torque of the castellated nut, potentially allowing for inadequate tensioning of the pivot bolt and adjustable bushings during reassembly of the collective actuator.
Proactive industry safety action description	After the incident, the operator performed an initial non-standard fleet wide inspection of Bell 412 collective servo hydraulic actuator units for evidence of security or free-play within the pilot input lever/pivot bolt joint. The operator introduced a repetitive, non-standard inspection of the collective servo hydraulic actuator units within their Bell 412 fleet. The operator released a flight staff instruction to company Bell 412 pilots, communicating that should they experience unusual or excessive vibrations during flight, that they land the helicopter and notify the company engineering personnel.
Action organisation	CHC Helicopters
Safety action release date	30/06/2010
Safety action status	Closed 30/06/2010
Investigation complete date	30/06/2010

Investigation: AO-2008-042: In-flight shutdown, VH-QOA, 84 km N of Lockhart River Aerodrome, Queensland, 20 June 2008

Safely action number	AO-2008-042-NSA-072
Risk category	Minor
Safety issue description	The aircraft manufacturer's desire for standard operating procedure commonality between its DHC-8 models required the flight crew to shut down the otherwise serviceable engine, with the effect that the flight was completed with one engine operating.
Proactive industry safety action description	18/09/2009 - As a result of this investigation the propeller manufacturer issued a Service Letter DH8-400-SL-61-008A dated 7 May 2009 outlined a software upgrade that will derive propeller RPM from the propeller gearbox when the magnetic pick-up unit signal is lost. This will negate the operation of the propeller at the overspeed governor setting of 104 % and should minimise the potential for nuisance overspeed triggers and attendant in flight shutdowns. 13/04/2010 - The aircraft operator advised the ATSB that the software upgrade would be incorporated into the company's aircraft once appropriate operator personnel training had been conducted and specialist hardware was available. The operator also advised that all spare propeller gearboxes would be modified at overhaul to incorporate the upgrade.
Action organisation	Bombardier Aerospace
Safety action release date	25/06/2010
Safety action status	Closed 25/06/2010
Investigation complete date	25/06/2010

Safely action number	AO-2008-042-NSA-100
Risk category	Minor
Safety issue description	The aircraft manufacturer's desire for standard operating procedure commonality between its DHC-8 models required the flight crew to shut down the otherwise serviceable engine, with the effect that the flight was completed with one engine operating.
Proactive industry safety action description	The aircraft operator advised the ATSB that the software upgrade would be incorporated into the company's aircraft once appropriate operator personnel training had been conducted and specialist hardware was available. The operator also advised that all spare propeller electronic control units would be modified at the propeller manufacturer's facility to incorporate the upgrade. On 21 June 2010, the operator advised the ATSB that the software upgrade has been incorporated into the company's aircraft following the manufacturer's new personnel training on pecialised hardware. The operator also advised hat all spare propeller electronic control units have been modified at the propeller manufacturer's facility to incorporate the upgrade.
Action organisation	Qantaslink
Safety action release date	25/06/2010
Safety action status	Closed 25/06/2010
Investigation complete date	25/06/2010

Investigation: AO-2008-067: Total power loss, Talbot Bay, Western Australia, 25 September 2008, VH-NSH, Bell Helicopter Co 407

Safely action number	AO-2008-067-NSA-070
Risk category	Minor
Safety issue description	The design of the wire patches on the outer combustion case was ineffective in reducing operating stresses.
Proactive industry safety action description	Following this accident Rolls Royce, the engine manufacturer, re-assessed the structural integrity of the outer combustion casing. The results of that testing has shown a deficiency in the wire mesh patch. The manufacturer provided the ATSB with the following advice: Cyclic pressure testing was originally conducted on the OCC to assess life. However, a finite element analysis has recently been performed on the OCC as part of the investigation into the subject failure [VH-NSH]. This analysis revealed that the patch does not optimally cover the peak stress areas in the armpit due to the size of the patch and the relative location of the peak stresses in the armpit. Consequently, the design group responsible for this part is currently looking at modifying the size and shape of the patch for an improved and more optimal area of coverage. This work is in progress and will be released to the field once the redesign has been tested and verified.
Action organisation	Rolls-Royce Allison
Safety action release date	28/06/2010
Safety action status	Closed 28/06/2010
Investigation complete date	28/06/2010

Safely action number	AO-2008-067-NSA-076
Risk category	Minor
Safety issue description	The nature of the fatigue crack in the outer combustion case meant that it could be difficult to detect directly, or as a result of degraded engine performance, until catastrophic failure.
Proactive industry safety action description	During the investigation, the ATSB alerted the Civil Aviation Safety Authority (CASA) of this safety issue. As a result of those discussions, CASA issued Airworthiness Bulletin AWB 72-003 Issue 1, Rolls Royce 250 Engine Outer Combustion case (OCC) Failure dated 23 October 2008 (Appendix B). The AWB sought to urgently advise operators and maintainers of the possibility of an unusual and catastrophic failure of the combustion case in that engine type, and to recommend a means and periodicity for the inspection of that area of the engine.
Action organisation	Civil Aviation Safety Authority
Safety action release date	28/06/2010
Safety action status	Closed 28/06/2010
Investigation complete date	28/06/2010

Safely action number	AO-2008-067-NSA-078
Risk category	Minor
Safety issue description	The nature of the fatigue crack in the outer combustion case meant that it could be difficult to detect directly, or as a result of degraded engine performance, until catastrophic failure.
Proactive industry safety action description	The engine manufacturer has advised that, following this occurrence, the inspection method for application to the wire patch and surrounding area is being re-evaluated. The process is ongoing.
Action organisation	Rolls-Royce Allison
Safety action release date	28/06/2010
Safety action status	Closed 28/06/2010
Investigation complete date	28/06/2010

Investigation: AO-2008-068: Tail rotor pitch link failure near Hoxton Park Aerodrome, NSW, 19 September 2008 VH-BUK Eurocopter AS350 BA

Safely action number	AO-2008-068-NSA-054
Risk category	Minor
Safety issue description	It was probable that bearing wear outside of maintenance manual limits existed, but was not be detected, during the most recent ALF inspections
Proactive industry safety action description	As a result of this incident, the aircraft manufacturer released Safety Information Notice 2000-S-65 on 9 October 2008, to remind AS 350/355-550/555 customers of the tail rotor pitch link inspection and maintenance requirements. Eurocopter has also considered the probability that the bearing was worn in excessof maintenance manual limits but was not detected at the last inspection, and has been working with the European Aviation Safety Agency (EASA) on complementing and adding some precision to the present wording and figure related to the pitch link inspection.
Action organisation	Eurocopter
Safety action release date	20/11/2009
Safety action status	Closed 20/11/2009
Investigation complete date	23/11/2009

Safely action number	AO-2008-068-NSA-055
Risk category	Minor
Safety issue description	It was probable that bearing wear outside of maintenance manual limits existed, but was not be detected, during the most recent ALF inspections
Proactive industry safety action description	As a result of this incident, the Civil Aviation Safety Authority released Airworthiness Bulletins 27-009 Issue 2 (AS 350) and AWB 27-010 Issue 1 (AS 355 and AS 550) on 10 October 2008. The purpose of those bulletins was to remind operators, pilots and maintainers of inspection requirements relating to the tail rotor pitch change links and the importance of frequently checking for pitch link wear.
Action organisation	Civil Aviation Safety Authority
Safety action release date	20/11/2009
Safety action status	Closed 20/11/2009
Investigation complete date	23/11/2009

Investigation: AO-2008-077: Wake turbulence event, Sydney Airport, NSW, 3 November 2008

Safely action number	AO-2008-077-NSA-082
Risk category	Minor
Safety issue description	There was no requirement for wake turbulence separation to be provided by Air Traffic Control in respect of aircraft operations on the adjacent parallel runway.
Proactive industry safety action description	In response to this occurrence, Airservices Australia (Airservices) conducted a review of parallel runway operations at Sydney involving the Airbus Industrie A380 800. Airservices subsequently issued the following instruction to controllers: Parallel Approach Limitations When a Super wake turbulence category aircraft is making an approach to a parallel runway, provide wake turbulence distance separation to the adjacent runway when the aircraft making an approach to the adjacent runway has a MTOW less than 25,000 kg. ATSB assessment of safety action taken by Airservices Australia. The ATSB is satisfied that the action taken by Airservices adequately addresses the safety issue.
Action organisation	Airservices Australia
Safety action release date	9/12/2009
Safety action status	Closed 9/12/2009
Investigation complete date	9/12/2009

Safely action number	AO-2008-077-NSA-083
Risk category	Minor
Safety issue description	There was no requirement for wake turbulence separation to be provided by Air Traffic Control in respect of aircraft operations on the adjacent parallel runway.
Proactive industry safety action description	In response to this occurrence, the Civil Aviation Safety Authority has opened a regulatory change project to review and update wake turbulence separation information in the Manual of Standards Part 172. ATSB assessment of safety action taken by the Civil Aviation Safety Authority The ATSB is satisfied that the action taken by the Civil Aviation Safety Authority adequately addresses the safety issue.
Action organisation	Civil Aviation Safety Authority
Safety action release date	9/12/2009
Safety action status	Closed 9/12/2009
Investigation complete date	9/12/2009

Investigation: AO-2009-002: Main rotor blade skin debonding - NT VH-HZB, Robinson helicopter R22 Beta, 135 km NE Alice Springs, 29 December 2008

Safely action number	AO-2009-002-NSA-017
Risk category	Minor
Safety issue description	No evidence of the relevant airworthiness directive, AD/R22/54, was found in the logbooks or maintenance release documents for VH-HZB. AD/R22/54 gave specific instructions on the pre-flight inspection requirements for Robinson R22 main rotor blades. It was also reported that the pilot operating handbook (POH) and approved flight manual were not current for the helicopter at the time of the incident.
Proactive industry safety action description	The maintenance provider at the time of the incident did not provide the ATSB with details of any specific actions taken with respect to the out-of-date flight documents. It should be noted that the helicopter has since been sold to another party, and the logbooks and maintenance release documents for the helicopter have been updated to include reference to AD/R22/54 Amdt 3.
Action organisation	Central Australian Aircraft Maintenance
Safety action release date	23/12/2009
Safety action status	Closed 23/12/2009
Investigation complete date	23/12/2009

Investigation: AO-2009-005: Midair collision - Parafield Airport, SA, 7 February 2009, VH-TGM, Grob - Burkhaart Flugzeugbau G-115 Grob, VH-YTG, S.O.C.A.T.A. - Groupe Aerospatiale TB-10 Tobago

Safely action number	AO-2009-005-NSA-001
Risk category	Minor
Safety issue description	The limit of five aircraft in the circuit during Common Traffic Advisory Frequency - carriage and use of radio required, CTAF (R), operations at certain airports was not well defined, resulting in potentially more aircraft operating in the circuit than intended.
Proactive industry safety action description	The limit for five aircraft in the circuit outside of tower hours was documented in ERSA [En route Supplement Australia]. It is not clear from the report why the school did not comply with these guidelines. The statements “A MAX of 5 ACFT are permitted in the circuit at any one time” and CTAF(R) radio carriage and use requirements do not seem ambiguous or unclear. A number of these issues relating to operations at such aerodromes will be addressed in the findings of CASA’s GAAP reviews.
Action organisation	Civil Aviation Safety Authority
Safety action release date	7/07/2009
Safety action status	Closed 7/07/2009
Investigation complete date	9/07/2009

Safely action number	AO-2009-005-NSA-002
Risk category	Minor
Safety issue description	The operator did not provide guidance, and there was no generally available guidance, to pilots regarding the appropriate course of action should preceding traffic in the circuit not be sighted before the final approach is intercepted.
Proactive industry safety action description	29/06/2009 - CASA developed safety cards with guidance regarding need to sight traffic before turning final approach.
Action organisation	Civil Aviation Safety Authority
Safety action release date	7/07/2009
Safety action status	Closed 7/07/2009
Investigation complete date	9/07/2009

Safely action number	AO-2009-005-NSA-003
Risk category	Minor
Safety issue description	The operator did not provide guidance, and there was no generally available guidance, to pilots regarding the appropriate course of action should preceding traffic in the circuit not be sighted before the final approach is intercepted.
Proactive industry safety action description	29/06/2009 - The aircraft operator amended their flying training syllabus to include the following item within their threat and error management training: Circuit flying – awareness of other aircraft in the circuit. When and how to go around.
Action organisation	Flight Training Adelaide Pty Ltd
Safety action release date	7/07/2009
Safety action status	Closed 7/07/2009
Investigation complete date	9/07/2009

Investigation: AO-2009-006: Main Landing gear wheel failure - Sydney Airport, NSW 6 February 2009 VH-KDQ Saab 340B

Safely action number	AO-2009-006-NSA-010
Risk category	Minor
Safety issue description	The design of the wheel rim had been shown to be susceptible to fatigue cracking in the bead seat region
Proactive industry safety action description	In 1995, the manufacturer introduced a new main wheel assembly, which incorporated an improved bead seat radius profile that increased the fatigue resistance of the components. While the original rim assembly was no longer supplied, there was no requirement to replace the existing wheel assemblies with the new items. The manufacturer has amended the component maintenance manual and issued a service letter with mandatory inspection intervals for wheels manufactured prior to October 1995. 19/02/2010 - ATSB assessment of response/action - The ATSB is satisfied that the action taken by the wheel manufacturer adequately addresses the safety issue.
Action organisation	Meggitt Aircraft Braking Systems
Safety action release date	17/02/2010
Safety action status	Closed 17/02/2010
Investigation complete date	17/02/2010

Safely action number	AO-2009-006-NSA-015
Risk category	Minor
Safety issue description	The design of the wheel rim had been shown to be susceptible to fatigue cracking in the bead seat region
Proactive industry safety action description	In response to the occurrence, the operator conducted a review of its current wheel inspection practices and schedules. Responding to the ATSB, the operator indicated that all procedures used were found satisfactory and compliant with the wheel manufacturer's guidelines. The operator also advised that a third party audit of the non-destructive inspection (NDI) facility was commissioned and carried out, with no major deficiencies identified during that audit. Personnel qualifications and currency were also examined and found satisfactory. In view of the level of risk presented by the development of wheel cracking, and the fact that this instance of failure was the first sustained in a long history of wheel maintenance, the operator indicated they were not planning any specific revisions to their maintenance procedures and practices. ATSB assessment of response/action - The ATSB is satisfied that the action taken by the wheel manufacturer adequately addresses the safety issue. 19/02/2010 - ATSB assessment of response/action - The ATSB is satisfied that the action taken by the wheel manufacturer adequately addresses the safety issue.
Action organisation	Regional Express
Safety action release date	17/02/2010
Safety action status	Closed 17/02/2010
Investigation complete date	17/02/2010

Investigation: AO-2009-019: Engine cooling fan fracture - VH-IDU, Rolleston Queensland, 3 May 2009

Safely action number	AO-2009-019-NSA-025
Risk category	Minor
Safety issue description	The co-location of the engine cooling fan and flight control systems increased the susceptibility of the helicopter to control problems in the event of a cooling fan failure.
Proactive industry safety action description	As a result of this occurrence CASA released airworthiness bulletin AWB 63-007 on 20 January 2010, reminding operators and maintainers of the importance of adhering to all current manufacturer's approved data for cooling fans manufactured from sheet metal and their drive assemblies. CASA also advised that the European Aviation Safety Agency (EASA) has identified AWB 63-007 for wider distribution.
Action organisation	Civil Aviation Safety Authority
Safety action release date	21/05/2010
Safety action status	Closed 21/05/2010
Investigation complete date	21/05/2010

Investigation: AO-2009-029: Turbulence event - VH-QPI, 58km N of Kota Kinabalu, Malaysia, 22 June 2009

Safely action number	AO-2009-029-NSA-007
Risk category	Minor
Safety issue description	The aircraft radar had limited capability to detect cloud that comprised ice crystals.
Proactive industry safety action description	The aircraft manufacturer has certified the equivalent of Rockwell Collins SB No.4 for use on Airbus Industrie A330 type aircraft. The aircraft operator is modifying all company aircraft radars of this type to be capable of operating in the full MultiScan mode as well as incorporating SB No.4. 27/08/2009 - All A330 aircraft (Qantas and Jetstar) will have their radars upgraded to full WXR-2100 Multi-scan capability with SB#4 software. This will greatly enhance the detection capability of the aircraft radar against convective turbulent conditions.
Action organisation	Qantas Airways
Safety action release date	30/06/2010
Safety action status	Closed 30/06/2010
Investigation complete date	30/06/2010

Safely action number	AO-2009-029-NSA-008
Risk category	Minor
Safety issue description	The pilot's flight library represents a potential hazard on the flight deck when left open and turbulent conditions are encountered.
Proactive industry safety action description	09/04/2010 - The aircraft operator advised that the first electronic flight bag (EFB) would be installed on each A330 by May 2010 and the second in July 2010. Once fitted, the crew will be restricted from using the EFB unless all crew members on board for a flight have been trained in its use. All A330 flight crew are undergoing training in the use of the EFB. The operator has not committed to removing any manuals from the flight deck, but will be attempting to do so over the next few months.
Action organisation	Qantas Airways
Safety action release date	30/06/2010
Safety action status	Closed 30/06/2010
Investigation complete date	30/06/2010

Safely action number	AO-2009-029-NSA-009
Risk category	Minor
Safety issue description	There was no documentation to alert crews of the potential for the latch to engage if not stowed correctly.
Proactive industry safety action description	The operator has issued a Flight Standing Order advising all A330 flight crew of new procedures to ensure the correct stowage of the cockpit door back-up locking mechanism. The operator will amend the appropriate operating manuals to reflect the new procedural requirement during the next amendment cycle. 14/07/2009 - The operator has issued a Flight Standing Order to all A330 crews advising of the correct stowage position of the deadbolt and the possibility of inadvertent engagement in turbulent conditions if not correctly stowed. The operator has advised of its intention to amend the Flight Crew Operating Manual to include preflight check of deadbolt position.
Action organisation	Qantas Airways
Safety action release date	30/06/2010
Safety action status	Closed 30/06/2010
Investigation complete date	30/06/2010

Marine

Investigation: MO-2008-008: Independent investigation into the grounding of the Isle of Man registered bulk carrier Iron King at Port Hedland, Western Australia, on 31 July 2008

Safely action number	MO-2008-008-NSA-034
Risk category	Significant
Safety issue description	Although the assistance of tugs may be required by the pilots of outbound ships after they had passed Hunt Point, it was normal practice for the tugs to be let go before ships reached Hunt Point.
Proactive industry safety action description	26/08/2009 - The Port Hedland Port Authority has advised the ATSB that since the *Iron King* incident, pilots departing the port have kept the tug aft fast beyond Hunt Point until around the bend and into the channel straights between Beacons 36 and 38. Port and starboard shoulder tugs are now kept fast for as long as conditions permit safe tug operations. At present the port has limited this to a recommendation to pilots rather than mandated due to the fact that there are many occasions where keeping the tugs fast presents a risk to the tugs and crews as great as, or greater than, the risk being mitigated. In August 2008, the port authority commissioned a simulation of the *Iron King* incident on the Pivot Maritime/Broome TAFE simulator. With the participation of senior pilots and the utilisation of VTS data, we were able to accurately simulate the incident. This simulation was used over two one week sessions to firstly evaluate the use of tugs to mitigate the original outcome and to develop standard emergency response practices that would lead to a more acceptable outcome.
Action organisation	Port Hedland Port Authority
Safety action release date	13/10/2009
Safety action status	Closed 13/10/2009
Investigation complete date	13/10/2009

Safely action number	MO-2008-008-NSA-035
Risk category	Significant
Safety issue description	Although the assistance of tugs may be required by the pilots of outbound ships after they had passed Hunt Point, it was normal practice for the tugs to be let go before ships reached Hunt Point.
Proactive industry safety action description	26/08/2009 - The ATSB has been advised by Port Hedland Pilots that it is now standard practice to keep the stern tug fast until the vessel has made the Goldsworthy Leads in the vicinity of Beacons 36/37. Trials are also being undertaken whereby tugs that are fast on the shoulders transiting the harbour are retained fast towards Beacons 36/37, depending on weather conditions and tug/vessel interaction. Where conditions make it unsafe for these tugs to remain fast, they are kept in the immediate vicinity ready to make fast if necessary.
Action organisation	Port Hedland Pilots
Safety action release date	13/10/2009
Safety action status	Closed 13/10/2009
Investigation complete date	13/10/2009

Safely action number	MO-2008-008-NSA-036
Risk category	Significant
Safety issue description	The pilot had received what has traditionally been considered to be appropriate pilot training. However, as part of its risk management strategy, the pilotage company had not developed a suite of 'risk analysed' best responses to reasonably foreseeable emergency scenarios and provided the pilot with experience in implementing these responses in a simulated environment.
Proactive industry safety action description	26/08/2009 - Port Hedland Pilots have advised the ATSB that they are now in the process of, and will continue, reviewing 'risk analysed' best responses to foreseeable emergency scenarios in conjunction with the Port Hedland Port Authority. The importance of emergency procedure simulations is also recognised and will now be undertaken by trainee pilots in three phases; prior to the granting of an initial tonnage licence; prior to the granting of a cape size tonnage licence; and prior to the granting of an unrestricted licence. Unrestricted pilots will also undergo refresher simulations every 2 years.
Action organisation	Port Hedland Pilots
Safety action release date	13/10/2009
Safety action status	Closed 13/10/2009
Investigation complete date	13/10/2009

Safely action number	MO-2008-008-NSA-037
Risk category	Significant
Safety issue description	Iron King's safety management system did not include procedures that adequately ensured that the ship's master and crew were aware of, and drilled in, the emergency steering system change over procedure to be followed in the event of steering control loss.
Proactive industry safety action description	26/08/2009 - Enterprises Shipping and Trading has advised the ATSB that the company has revised its safety management system with regards to steering drills. It now states that 'the master must ensure that during steering drills relevant personnel are familiar with the manufacturer's instruction manual and their responsibilities.' Ship's masters have also been instructed to ensure that instruction tables, in line with the manufacturer's manual, are posted in the steering gear room and on the bridge. The company has also implemented a system whereby suitably trained ship's masters visit the company's ships as 'training officers'. Their role is to carryout internal audits and to train the crews in accordance with specific company guidelines. The training officers will also be required to focus on emergency steering drills and to provide the company with a written report covering their activities.
Action organisation	Enterprises Shipping and Trading
Safety action release date	13/10/2009
Safety action status	Closed 13/10/2009
Investigation complete date	13/10/2009

Investigation: MO-2008-009: Engine room flooding on board Great Majesty in Port Kembla, New South Wales, 27 October 2008

Safely action number	MO-2008-009-NSA-021
Risk category	Significant
Safety issue description	The work permit system had not been effectively implemented on board the ship. Consequently, most maintenance and repair work was being carried out by ship's personnel without the work permits and 'Danger: Do Not Operate' tags that were required by the ship's procedures.
Proactive industry safety action description	ATSB has been advised that the following safety actions have been taken by Parakou Shipping following the engine room flooding onboard Great Majesty: • Issued company circulars to all company vessels, pertaining to the case of *Great Majesty* engine room flooding. • Strengthened communication between respective departments. • Regular attendances and audits on the vessel to monitor their performance and progress.
Action organisation	Parakou Shipping
Safety action release date	28/09/2009
Safety action status	Closed 29/09/2009
Investigation complete date	29/09/2009

Safely action number	MO-2008-009-NSA-033
Risk category	Significant
Safety issue description	The ballast operations procedure did not provide a sufficient level of guidance for the chief mate to establish whether the ballast system could be used in the way he intended, given the situation with No. 2 WB P/P.
Proactive industry safety action description	ATSB has been advised that the following safety action have been taken by Parakou Shipping following the engine room flooding onboard Great Majesty: • Ballast operation procedures have been modified and compliance with these procedures is being monitored. • The company has developed a ballast operations checklist to ensure that all risks associated with ballast operations are identified.
Action organisation	Parakou Shipping
Safety action release date	28/09/2009
Safety action status	Closed 29/09/2009
Investigation complete date	29/09/2009

Investigation: MO-2008-010: Auxiliary boiler explosion on board *Saldanha* off Newcastle, 18 November 2008

Safely action number	MO-2008-010-NSA-038
Risk category	Significant
Safety issue description	*Saldanha*'s watch keeping engineers and oilers were not aware of any similar previous flashbacks involving Volcano VJ type burners and they were not aware of all of the hazards associated with operating and maintaining the burner.
Proactive industry safety action description	27/08/2009 Cardiff Marine has advised the ATSB that the boiler's instruction manual and the relevant maker's safety bulletin have been reviewed on board *Saldanha* and discussed during safety meetings. A fleet safety bulletin was issued in order to communicate the incident to all ships under the company's management and an extra warning was sent to all ship's fitted with VJ type burners. The company has confirmed that chief engineers have trained engineering crews on the procedures and precautions to be taken when servicing the burner. The company's training officer agenda has been amended to include verification of circulation, understanding and compliance with fleet safety circulars and bulletins. The company also stated that it is in the process of investigating the possibility of modifying *Saldanha*'s oil firing unit.
Action organisation	Cardiff Marine
Safety action release date	22/10/2009
Safety action status	Closed 22/10/2009
Investigation complete date	22/10/2009

Safely action number	MO-2008-010-NSA-040
Risk category	Significant
Safety issue description	*Saldanha*'s master and crew were not aware of the appropriate first aid treatment required for burn injuries. As a result, the third engineer was not immediately provided with appropriate first aid.
Proactive industry safety action description	27/08/2009 - Cardiff Marine has advised the ATSB that the company has amended the training officer agenda to include the verification of shipboard first aid skills and where necessary to carry out on board first aid training.
Action organisation	Cardiff Marine
Safety action release date	22/10/2009
Safety action status	Closed 22/10/2009
Investigation complete date	22/10/2009

Investigation: MO-2008-011: Independent investigation into the fatal injury on board the Maltese registered container ship *Spirit of Esperance* in Townsville, Queensland on 24 November 2008

Safely action number	MO-2008-011-NSA-030
Risk category	Significant
Safety issue description	The design of the cradle for the crane's hook did not allow for unassisted stowage of the hook when the ship had a stern trim in excess of 2.1 m.
Proactive industry safety action description	ASP Ship Management has advised the ATSB that investigations into modifications to the cradle were initiated but changes could not to be made before the vessel departed Australia in January 2009 and subsequently changed name and managers in May 2009. ASP Ship Management has also advised the ATSB that Marlow Navigation, the ship's new management company, have been advised of this safety issue.
Action organisation	ASP Ship Management
Safety action release date	14/04/2010
Safety action status	Closed 14/04/2010
Investigation complete date	14/04/2010

Safely action number	MO-2008-011-NSA-043
Risk category	Minor
Safety issue description	The ship's safety management system crane operation procedure did not provide the crew with sufficient guidance in stowing the hook when the ship's stern trim was in excess of 2.1 m.
Proactive industry safety action description	ASP Ship Management has advised the ATSB that this procedure was amended and remained on board the vessel on change of management. The company also advised that the cargo stowage plan was amended following the accident so that the crane operator would have a full view of the cradle and hook at all times whilst stowing the hook.
Action organisation	ASP Ship Management
Safety action release date	14/04/2010
Safety action status	Closed 14/04/2010
Investigation complete date	14/04/2010

Safely action number	MO-2008-011-NSA-044
Risk category	Minor
Safety issue description	The cargo crane operations 'Job Safety Analysis' did not identify the potential hazards associated with stowing the hook and had not been effectively reviewed by the ship's crew.
Proactive industry safety action description	ASP Ship Management has advised the ATSB that the cargo crane operations 'Job Safety Analysis' was reviewed by the crew following the accident and subsequently amended.
Action organisation	ASP Ship Management
Safety action release date	14/04/2010
Safety action status	Closed 14/04/2010
Investigation complete date	14/04/2010

Safely action number	MO-2008-011-NSA-046
Risk category	Minor
Safety issue description	On 24 November 2008, the deceased crew member went on duty with a BAC in excess of the standard set out in the company's alcohol policy. However, his actions were not challenged by any other crew member. While, this may have been an isolated incident, it may also be indicative of a policy and a set of underlying procedures that had not been effectively implemented
Proactive industry safety action description	ASP Ship Management has advised the ATSB that random drug and alcohol testing is taking place fleet wide. The testing regime also includes 3 monthly alcohol testing of the crew by the master and testing in cases where the master has grounds to believe that an alcohol (or drug) test is required. Due to this policy there is now increased awareness by the ships complement on the strict drug and alcohol policy implemented by ASP Ship Management.
Action organisation	ASP Ship Management
Safety action release date	14/04/2010
Safety action status	Closed 14/04/2010
Investigation complete date	14/04/2010

Investigation: MO-2008-012: Independent investigation into the rupture of a submarine gas pipeline by the Hong Kong registered container ship *APL Sydney* in Port Phillip, Victoria on 13 December 2008

Safely action number	MO-2008-012-NSA-051
Risk category	Significant
Safety issue description	An appropriate risk assessment to determine safe limits for the Melbourne anchorage boundaries from the gas pipeline had not been carried out. The events of 13 December 2008 indicate that a limit of about 3 cables was not a safe clearance for all ships in all conditions.
Proactive industry safety action description	24/12/2009 The Port of Melbourne Corporation (PoMC) has advised the ATSB that as a result of the incident a formal risk assessment was undertaken to address matters related to this safety issue. A review of the risks, in consultation with Port Phillip Sea Pilots (PPSP) and Maritime Heritage Victoria, was completed in April 2009. The review took into account the circumstances of another recent incident and focused on a number of shipboard and external issues and a wide range of hazards were considered and practical solutions identified for implementation. In April 2009, interim measures were introduced by PoMC to address the risks until intended safety actions could be fully implemented. The measures included a requirement for ships to anchor no closer than 8 cables from the gas pipeline and for the vessel traffic service (VTS) to confirm anchored ships had received strong wind warnings. These requirements supplemented existing risk controls in the form of Harbour Master's Directions, services provided by VTS and PPSP and guidance available in marine notices, publications and shipboard safety management systems. A significant outcome of the risk assessment was the implementation of agreed changes to the anchorages. In September 2009, the location of the Inner and Outer Anchorages was revised to increase the margin of safety from environmentally and commercially sensitive areas and infrastructure such as historic wrecks, submarine pipelines and spoil grounds. The revised locations were endorsed by Marine Safety Victoria. The ATSB has included a chart section showing the changes. In addition to revising the anchorages, a number of related measures have been implemented. These include a requirement for masters and pilots to report their intended anchorage berth to VTS. It is expected that marking berth boundaries on VTS electronic displays will enable improved traffic monitoring and control by VTS officers since a ships position, in relation to its berth, should be readily apparent. Individual berth boundaries are also expected to provide masters a clear indication of the specific area in which their ships should remain. The southern outer berths are anticipated to be used by ships requiring long-term anchorage. To address weather related issues there is now a requirement for the harbour master to be informed when winds exceed 30 knots so that a comprehensive dynamic risk assessment is undertaken before navigating the inner port. This is in addition to the procedures to confirm strong wind warnings are received on board anchored ships. Risk control measures to be considered by PoMC include a review of VTS operator training for monitoring anchored ships so that an early warning can be given to any that do not maintain position. The introduction of standard procedures for anchoring ships in heavy weather is also to be considered and agreed with PPSP.
Action organisation	Port of Melbourne Corporation
Safety action release date	27/04/2010
Safety action status	Closed 27/04/2010
Investigation complete date	27/04/2010

Safely action number	MO-2008-012-NSA-052
Risk category	Significant
Safety issue description	The Port of Melbourne Corporation's safety and environmental management systems did not adequately address the risk of an incident involving the ethane gas pipeline and shipping.
Proactive industry safety action description	24/12/2009 - The Port of Melbourne Corporation has advised the ATSB that its safety and environmental emergency plan will be reviewed to ensure the specific risk of an anchor drag incident resulting in a vessel fouling the ethane pipeline is highlighted. 21/06/2010 - The Port of Melbourne Corporation has provided the ATSB details of the safety actions taken by email of 4 June 2010.
Action organisation	Port of Melbourne Corporation
Safety action release date	27/04/2010
Safety action status	Closed 27/04/2010
Investigation complete date	27/04/2010

Safely action number	MO-2008-012-NSA-053
Risk category	Significant
Safety issue description	The Port of Melbourne Corporation's shipping control safe operating procedures, the port operations handbook and shipping control staff training did not provide the control officer with adequate guidance and information to allow him to safely manage the events of 13 December 2008 and give appropriate instructions, advice and information to *APL Sydney*'s master and pilot.
Proactive industry safety action description	24/12/2009 - The Port of Melbourne Corporation has advised the ATSB that the current vessel traffic service operations manual introduced as a result of the Marine (Vessel Traffic Services Standards) Determination 2008 (effective 1 March 2009) will be reviewed to confirm the guidance given to control officers adequately equips them for their task. 21/06/2010 - The Port of Melbourne Corporation has provided the ATSB details of the safety actions taken by email of 4 June 2010.
Action organisation	Port of Melbourne Corporation
Safety action release date	27/04/2010
Safety action status	Closed 27/04/2010
Investigation complete date	27/04/2010

Safely action number	MO-2008-012-NSA-054
Risk category	Significant
Safety issue description	*APL Sydney*'s standard berth to berth passage plan form did not make adequate provision to consider anchoring-related details. The ship's plan did not contain any detail for anchoring off Melbourne indicating that an appropriate, independent and unhurried risk assessment for anchoring was not completed beforehand. As a result, the pilot's anchoring plan was accepted without properly assessing all the risks.
Proactive industry safety action description	20/01/2010 - Bernhard Schulte Shipmanagement Company has advised the ATSB that it will issue 'fleet instructions' to revise passage planning procedures and practices to include anchoring in berth to berth plans. 21/06/2010 - Bernhard Schulte Shipmanagment Company has provided the ATSB with details of the safety actions taken.
Action organisation	Bernhard Schulte Shipmanagement Company, China
Safety action release date	27/04/2010
Safety action status	Closed 27/04/2010
Investigation complete date	27/04/2010

Safely action number	MO-2008-012-NSA-055
Risk category	Significant
Safety issue description	*APL Sydney*'s safety management system did not adequately ensure that the master was certain about his overriding authority and responsibility with respect to decisions and actions aimed at ensuring the safety of the ship.
Proactive industry safety action description	20/01/2010 - Bernhard Schulte Shipmanagement Company has advised the ATSB that to supplement the current practice of posting the master's overriding authority policy statement from the safety management system policy manual in prominent locations on board ships, masters will be reminded about their authority, as described in the policy statement, during briefings at its Shanghai office before they join ships. 21/06/2010 - Bernhard Schulte Shipmanagment Company has provided the ATSB with details of the safety actions taken.
Action organisation	Bernhard Schulte Shipmanagement Company, China
Safety action release date	27/04/2010
Safety action status	Closed 27/04/2010
Investigation complete date	27/04/2010

Safely action number	MO-2008-012-NSA-056
Risk category	Significant
Safety issue description	The ship's crew were not sufficiently familiar with its anchoring equipment, including the anchor cable bitter end release arrangement and hence undertook unnecessary and dangerous operations.
Proactive industry safety action description	20/01/2010 - Bernhard Schulte Shipmanagement Company has advised the ATSB that although crew, appropriate to their responsibility on board the ship, are aware of the anchor cable release procedure; placards with clear directions to release the cable will be posted at bitter end locations and chief mates will personally familiarise all deck department crew with the procedure. 21/06/2010 - Bernhard Schulte Shipmanagment Company has provided the ATSB with details of the safety actions taken.
Action organisation	Bernhard Schulte Shipmanagement Company, China
Safety action release date	27/04/2010
Safety action status	Closed 27/04/2010
Investigation complete date	27/04/2010

Safely action number	MO-2008-012-NSA-057
Risk category	Significant
Safety issue description	The ship's working language, English, was not used by its crew for all communications on the bridge indicating that the procedure had not been effectively implemented on board the ship. This limited the pilot's awareness, impeded teamwork, caused delays and increased risks, particularly those associated with releasing the anchor cable.
Proactive industry safety action description	20/01/2010 - Bernhard Schulte Shipmanagement Company has advised the ATSB that to supplement regular English language classes conducted ashore for Chinese masters and crew, it will follow up with classroom sessions on board ships. The company's sees its current practice of Chinese and other nationalities sailing together on ships as a practical way to improve the conversational English of Chinese crews. 21/06/2010 - Bernhard Schulte Shipmanagment Company has provided the ATSB with details of the safety actions taken.
Action organisation	Bernhard Schulte Shipmanagement Company, China
Safety action release date	27/04/2010
Safety action status	Closed 27/04/2010
Investigation complete date	27/04/2010

Safely action number	MO-2008-012-NSA-058
Risk category	Significant
Safety issue description	The Port Phillip Sea Pilots pilotage safety management system did not provide *APL Sydney*'s pilot with adequate guidance with regard to anchoring in Melbourne anchorage or the risks associated with the gas pipeline.
Proactive industry safety action description	04/01/2010 - Port Phillip Sea Pilots (PPSP) has advised the ATSB that the guidance in its pilotage safety management system with respect to anchor positions will be reviewed taking into account the existing qualifications and training of pilots and the need to prevent a further incident of this type. In relation to this safety issue, PPSP also advised that since the incident it has worked with the Port of Melbourne Corporation to mitigate risks associated with anchoring off Melbourne. It confirmed that the changes to the anchorages off Melbourne were a direct result of the *APL Sydney* incident in December 2008 and the other anchor dragging incident in March 2009. According to PPSP, the anchorage berths were developed to position them away from the pipeline and ensure appropriate manoeuvring room for ships. It noted that rather than designating large areas for general anchorage, the new system provides an anchor position for each ship.
Action organisation	Port Phillip Sea Pilots
Safety action release date	27/04/2010
Safety action status	Closed 27/04/2010
Investigation complete date	27/04/2010

Safely action number	MO-2008-012-NSA-059
Risk category	Significant
Safety issue description	The Port Phillip Sea Pilots pilotage safety management system policy to prevent mobile telephone use from interfering with safe navigation did not refer to any standard procedures or guidelines which could be followed by its pilots.
Proactive industry safety action description	16/02/2010 - Port Phillip Sea Pilots has advised the ATSB that its pilotage safety management system will be reviewed with regard to its policy for mobile telephone use. The matter will also be raised with the Port of Melbourne Corporation at the next navigational safety quarterly meeting. 21/06/2010 - Port phillip Sea Pilots have provided the ATSB with deatils of the safety actions taken.
Action organisation	Port Phillip Sea Pilots
Safety action release date	27/04/2010
Safety action status	Closed 27/04/2010
Investigation complete date	27/04/2010

Safely action number	MO-2008-012-NSA-060
Risk category	Significant
Safety issue description	*APL Sydney*'s windlass failed and its hydraulic motor casing shattered as a result of heavy load when the crew attempted to heave in the anchor shortly after it had snagged the pipeline. Fragments and debris from the shattered motor casing had the potential to cause injury.
Proactive industry safety action description	17/01/2010 - The ATSB has been advised by TTS Kocks that its view that *APL Sydney*'s windlass failure probably resulted from over speed of its hydraulic motor's internal parts is supported by the classification society, Germanischer Lloyd (GL), which has consulted TTS Kocks with the aim of addressing this safety issue by considering changes to class rules. According to TTS Kocks, the windlass complies with current class rules and even if these were changed it would be impossible to make hydraulic windlass motors fail-safe in all conditions. Increasing equipment and pressure relief valve limits will have limited success since it would be impractical to allow for the enormous loads placed on anchor cables in extreme conditions. Therefore, it agrees with a proposal by GL to provide protection covers for windlass operators and has suggested that another option would be the provision of a remote control stand in a safe position. In addition, TTS Kocks has advised that the only way to avoid excessive loads on windlasses is to operate them using basic seamanship bearing in mind that they are not designed to hold a ship at anchor like a chain stopper is. However, the company is prepared to emphasize such operational considerations through instructions for operators of its windlasses. Consultation by GL with TTS Kocks and other windlass manufacturers indicates that progress in addressing this safety issue is possible through a change in class rules to supplement guidance to ships crews included in the Marine Accident Investigation Branch's Safety Bulletin 1/2009 and from TTS Kocks and other windlass manufacturers. 21/06/2010 - TTS Kocks, Germany has acknowledged the inclusion of satey action taken in the ATSB report (see link to email of 27 April 2010 above). TTS Kocks has also provided further details of action taken (see link to email of 21 June 2010 above)
Action organisation	TTS KOCKS, Germany
Safety action release date	27/04/2010
Safety action status	Closed 27/04/2010
Investigation complete date	27/04/2010

Investigation: MO-2009-004: Fatality on board *Thor Gitta* at sea off Western Australia, 21 May 2009

Safely action number	MO-2009-004-NSA-006
Risk category	Minor
Safety issue description	There were no shipboard procedures to provide the crew with guidance as to where and how to secure the movable lashing bins.
Proactive industry safety action description	26/11/2009 - The company has directed that the lashing bins be now stored inside open top containers with wooden flooring and the containers can be secured with twistlocks in any 20 foot bay. Additionally, the involved vessel, and other vessels with similar lashing bins, will be asked to mount wooden planks underneath the bins to increase the friction between the lashing bin and steel decks.
Action organisation	T-Red
Safety action release date	16/12/2009
Safety action status	Closed 16/12/2009
Investigation complete date	16/12/2009

Safely action number	MO-2009-004-NSA-007
Risk category	Minor
Safety issue description	Given the work roster of the AB, the cumulative effect of his hours of duty and the movement of the ship on the night before the accident, it is possible that the AB had a reduced level of alertness and impaired performance on the morning of 21 May because he was affected by fatigue.
Proactive industry safety action description	The master of *Thor Gitta* will implement a 3-shift watch routine for the deck department while the vessel is at sea.
Action organisation	T-Red
Safety action release date	16/12/2009
Safety action status	Closed 16/12/2009
Investigation complete date	16/12/2009

Safely action number	MO-2009-004-NSA-009
Risk category	Minor
Safety issue description	There were no shipboard procedures to provide the crew with guidance as to where and how to secure the movable lashing bins.
Proactive industry safety action description	06/11/2009 - The company has directed that the lashing bins be now stored inside open top containers with wooden flooring and the containers can be secured with twistlocks in any 20 foot bay. Additionally, the involved vessel, and other vessels with similar lashing bins, will be asked to mount wooden planks underneath the bins to increase the friction between the lashing bin and steel decks. T-Red has also advised the Danish Maritime Authority that: • Fall arrest systems have been mounted in the access shafts to the holds both fore and aft. • The safety instructions and workplace risk assessments for entering the holds have been revised. • To enhance safety, extraordinary safety meetings will be held and work instructions given. • These preventive measures are also being implemented on Thor Gitta's sister ship, Thor Ingeborg. The other ships in the fleet have received information (lesson to be learned) about the fatality and injury. Where steel drums are used for storage of lashing gear, they are to be replaced by metal bins.
Action organisation	T-Red
Safety action release date	16/12/2009
Safety action status	Closed 16/12/2009
Investigation complete date	16/12/2009

Safely action number	MO-2009-004-NSA-010
Risk category	Minor
Safety issue description	There were no shipboard procedures to provide the crew with guidance as to where and how to secure the movable lashing bins.
Proactive industry safety action description	06/11/2009 - The other ships in the fleet have received information (lesson to be learned) about the fatality and injury. Where steel drums are used for storage of lashing gear, they are to be replaced by metal bins.
Action organisation	T-Red
Safety action release date	16/12/2009
Safety action status	Closed 16/12/2009
Investigation complete date	16/12/2009

Investigation: MO-2009-007: Second supplement to the independent investigation into the loss of the Department of Immigration and Multicultural and Indigenous Affairs vessel *Malu Sara* in Torres Strait, Queensland on 15 October 2005

Safely action number	MO-2009-007-NSA-001
Risk category	Significant
Safety issue description	Post incident analysis of SAR practices after the search for *Malu Sara* did not specifically include a review of the processes by which sighting reports were assessed and classified during the search. Consequently, it is possible that improvement opportunities in the SAR system were missed
Proactive industry safety action description	9/06/2009 - AMSA has taken action to develop a revised sighting assessment procedure to expand upon the existing guidance in the International Aeronautical and Maritime Search and Rescue Manual about the evaluation and analysis of information gathered during a search operation. This is to be submitted to the next meeting of the National Search and Rescue Council with the aim of being accepted into Australian usage. Then AMSA intends seeking to have the revised procedure recognised internationally. Guidance in the NATSARMAN about the conduct of debriefing sessions following a search operation is to be considered by the National Search and Rescue Council, with a view to including a checklist of items to be discussed at a post incident debriefing, including sighting assessment reports. In the interim before any relevant amendments to the NATSARMAN are finalised by the Council, any post incident debriefing conducted by AMSA will include a review of the assessment of sighting reports to identify any opportunities for improvement in search and rescue practices.
Action organisation	Australian Maritime Safety Authority (AMSA)
Safety action release date	24/09/2009
Safety action status	Closed 24/09/2009
Investigation complete date	24/09/2009

Safely action number	MO-2009-007-NSA-002
Risk category	Minor
Safety issue description	As a result of possible ambiguities in the NATSARMAN regarding coordination arrangements for small vessels, the Australian Maritime Safety Authority, as the 'Responsible SAR Authority' for Commonwealth vessels, did not take overall coordination of the incident, by mutual agreement with the Queensland Police, during the first night, when *Malu Sara* was lost and after the EPRIB had been activated.
Proactive industry safety action description	9/06/2009 - The Australian Maritime Safety Authority (AMSA) has taken action to clarify the provisions in the NATSARMAN concerning coordination arrangements between AMSA and the police services to address the ambiguity identified in the NATSARMAN during the Coronial inquest compared to the guidance provided in the Inter-Governmental Agreement on National Search and Rescue Arrangements. In November 2008, the National Search and Rescue Council approved revisions to the NATSARMAN, at AMSA's instigation, to address these coordination issues and clarify provisions covering coordination of incidents between AMSA and the police services, including the removal of ambiguities between different sections of the manual. The NATSARMAN now allows for the continued overall coordination of a maritime incident by the search and rescue agency first advised of the incident, where that agency is best placed to respond, irrespective of the type of vessel involved. AMSA's established program of an annual workshop with each state/territory police service continues to allow for discussion of these coordination and response issues. In August 2008, AMSA and the Queensland Police convened a special workshop for senior police officers in North Queensland as refresher training on coordination arrangements and discharge of responsibilities to supervise and support specialist search and rescue officers during maritime incidents.
Action organisation	Australian Maritime Safety Authority (AMSA)
Safety action release date	24/09/2009
Safety action status	Closed 24/09/2009
Investigation complete date	24/09/2009

Safely action number	MO-2009-007-NSA-003
Risk category	Minor
Safety issue description	The then Department of Immigration and Multicultural and Indigenous Affairs (DIMIA) had no reporting and follow-up procedures in place for immigration response vessels transiting between islands in the Torres Strait when not on a DIMIA patrol.
Proactive industry safety action description	05/06/2009 - Following the loss of Malu Sara, the department immediately withdrew her sister immigration response vessels from service and has not utilised the vessels since. The department is not presently intending to own marine assets or engage Movement Monitoring Officers (MMO's) in marine patrols. The department's current view is that it does not require marine vessels to acquit its responsibilities, and can more practicably and efficiently utilise resources and expertise of other agencies operating in the region. The Australian Customs and Border Protection Service (Customs) now has a significant presence in the Torres Strait and regularly undertake marine patrols. The department also has a Memorandum of Understanding (MOU) in place with Customs, the Department of Foreign Affairs and Trade (DFAT) and the Australian Quarantine and Inspection Service (AQIS) in respect of the operation and sharing of marine assets. This MOU sets out more stringent standards for the operation of small vessels than previously existed. The MOU provides for the carriage of departmental staff on other agency vessels and details the survey requirements, safety standards, qualifications of crew and standard operating procedures to be applied including when carrying other agency personnel. Should the department ever return to marine operations in the Torres Strait, the ATSB's recommendations in its report of 19 May 2006 and this supplementary report in respect of training, standard operating procedures and appropriate resources will be fully employed. The department will also implement the recommendations made by the Queensland State Coroner in regard to these matters.
Action organisation	Department of Immigration and Multicultural and Indigenous Affairs (DIMIA)
Safety action release date	24/09/2009
Safety action status	Closed 24/09/2009
Investigation complete date	24/09/2009

Safely action number	MO-2009-007-NSA-004
Risk category	Minor
Safety issue description	The Department of Immigration and Multicultural and Indigenous Affairs (DIMIA) had no procedures in place to cover the situation in which one of their small vessels was lost, or reported overdue, during operations in the Torres Strait.
Proactive industry safety action description	05/06/2009 - Following the loss of Malu Sara, the department immediately withdrew her sister immigration response vessels from service and has not utilised the vessels since. The department is not presently intending to own marine assets or engage Movement Monitoring Officers (MMO's) in marine patrols. The department's current view is that it does not require marine vessels to acquit its responsibilities, and can more practicably and efficiently utilise resources and expertise of other agencies operating in the region. The Australian Customs and Border Protection Service (Customs) now has a significant presence in the Torres Strait and regularly undertake marine patrols. The department also has a Memorandum of Understanding (MOU) in place with Customs, the Department of Foreign Affairs and Trade (DFAT) and the Australian Quarantine and Inspection Service (AQIS) in respect of the operation and sharing of marine assets. This MOU sets out more stringent standards for the operation of small vessels than previously existed. The MOU provides for the carriage of departmental staff on other agency vessels and details the survey requirements, safety standards, qualifications of crew and standard operating procedures to be applied including when carrying other agency personnel. Should the department ever return to marine operations in the Torres Strait, the ATSB's recommendations in its report of 19 May 2006 and this supplementary report in respect of training, standard operating procedures and appropriate resources will be fully employed. The department will also implement the recommendations made by the Queensland State Coroner in regard to these matters.
Action organisation	Department of Immigration and Multicultural and Indigenous Affairs (DIMIA)
Safety action release date	24/09/2009
Safety action status	Closed 24/09/2009
Investigation complete date	24/09/2009

Safely action number	MO-2009-007-NSA-005
Risk category	Minor
Safety issue description	The DIMIA duty officer had received no relevant training in search and rescue (SAR) management, or in the DIMIA procedures which were in place at the time of the incident.
Proactive industry safety action description	05/06/2009 - The Thursday Island office has commenced consultations with AQIS in respect of developing an emergency response plan, and proposes further engagement with other agencies operating in this environment. The plan will be reviewed and endorsed by an appropriate departmental governance committee and is expected to be operational by 30 June 2009. Relevant staff will be fully trained in its operation.
Action organisation	Department of Immigration and Multicultural and Indigenous Affairs (DIMIA)
Safety action release date	24/09/2009
Safety action status	Closed 24/09/2009
Investigation complete date	24/09/2009

Investigation: MO-2009-008: Collision between *Silver Yang* and *Ella's Pink Lady* off Point Lookout, Queensland, 9 September 2009

Safely action number	MO-2009-008-NSA-011
Risk category	Significant
Safety issue description	*Ella's Pink Lady* was not fitted with a passive radar reflector and, at the time of the collision, the yacht's active radar reflector was turned off
Proactive industry safety action description	Following the collision, *Ella's Pink Lady* was fitted with a passive radar reflector.
Action organisation	Ella's Pink Lady's skipper
Safety action release date	15/06/2010
Safety action status	Closed 15/06/2010
Investigation complete date	15/06/2010

Safely action number	MO-2009-008-NSA-015
Risk category	Significant
Safety issue description	While most flag States have laws in place that implement the UNCLOS requirement for a ship's master to render assistance to the crew of another vessel following a collision, these laws are not being effectively implemented on board all ships.
Proactive industry safety action description	China Shipping Development has advised personnel on board all their managed ships that when a collision has, or may have, occurred, the bridge watch keeper should stop the ship on the spot to further check. When necessary, they should take proactive rescue measures and record the time and ship's position. In any case, they must call the master at once and report to the company to seek support.
Action organisation	China Shipping Development
Safety action release date	15/06/2010
Safety action status	Closed 15/06/2010
Investigation complete date	15/06/2010

Safely action number	MO-2009-008-NSA-016
Risk category	Minor
Safety issue description	While it appears that the second mate was able to understand messages received in English over the VHF radio, he demonstrated that he could not effectively use the IMO's Standard Marine Communication Phrases (SMCP) to make his own messages clearly understandable.
Proactive industry safety action description	China Shipping Development intends to undertake further training of deck officers, especially in the area of language (English) and collision avoidance techniques.
Action organisation	China Shipping Development
Safety action release date	15/06/2010
Safety action status	Closed 15/06/2010
Investigation complete date	15/06/2010

Rail

Investigation: RO-2008-001: Level Crossing Collision, Birkenhead, South Australia, 5 March 2008

Safely action number	RO-2008-001-NSA-023
Risk category	Minor
Safety issue description	Despite various processes to manage responsibilities, the Commissioner of Highways and its contractors did not ensure that the projects works associated with the Stirling Street level crossing were conducted in accordance with all relevant standards, as required by section 5.1 of the site license agreement.
Proactive industry safety action description	28/08/2009 - Response by the Department for Transport, Energy and Infrastructure The project works involved upgrading the level crossing to incorporate active traffic control devices. These works have been completed. ATSB assessment of response/action The main area of non-compliance against standards was related to inadequate sight distance. The installation of active traffic control devices (flashing lights and boom gates) removes the requirement for a road user to see an approaching train. The road user must be able to see and respond accordingly to the flashing lights. It is likely that completion of the upgrade project would result in an installation that complied with the requirements of the Australian Standard.
Action organisation	Department for Transport, Energy and Infrastructure (SA)
Safety action release date	6/10/2009
Safety action status	Closed 6/10/2009
Investigation complete date	6/10/2009

Safely action number	RO-2008-001-NSA-024
Risk category	Minor
Safety issue description	On 6 February 2008 officers of the Department for Transport Energy and Infrastructure's Level Crossing Safety Unit identified visibility of trains by vehicle drivers stopped at the level crossing as having a significantly high risk. The assessment noted that the crossing did not comply with AS 1742.7 and the lack of pavement markings was highlighted. However, the results of the ALCAM assessment were not communicated to Port River Expressway Project management until 5 March 2008 (Four weeks after the site survey).
Proactive industry safety action description	28/08/2009 - Response by the Department for Transport, Energy and Infrastructure The Department for Transport, Energy and Infrastructure acknowledged that the ALCAM assessor should have communicated the identified issues earlier than occurred in this case. To assist in resolving this safety issue, a process has been implemented whereby the auditor initiates action using a defects report, particularly where safety critical issues have been found. ATSB assessment of response/action It is likely that the new process and defects report form will encourage prompt action if safety critical issues are identified during an ALCAM assessment.
Action organisation	Department for Transport, Energy and Infrastructure (SA)
Safety action release date	6/10/2009
Safety action status	Closed 6/10/2009
Investigation complete date	6/10/2009

Safely action number	RO-2008-001-NSA-027
Risk category	Minor
Safety issue description	The double trailer road-train involved in the collision on 5 March 2008 did not have authorisation (a Heavy Vehicle Permit) to travel on Stirling Street.
Proactive industry safety action description	28/08/2009 - Action taken by Golding Transport Industries Pty Ltd A Heavy Vehicle Permit was issued by the Department of Transport, Energy and Infrastructure to Golding Transport Industries Pty Ltd on 16 April 2008 applicable to the accident road-train.
Action organisation	Department for Transport, Energy and Infrastructure (SA)
Safety action release date	6/10/2009
Safety action status	Closed 6/10/2009
Investigation complete date	6/10/2009

Investigation: RO-2008-005: Derailment of Train 5PS6, Bates, South Australia, 19 April 2008

Safely action number	RO-2008-005-NSA-017
Risk category	Significant
Safety issue description	The ARTC Code of Practice at the time of the derailment did not categorise bolt-hole cracks as defects requiring action unless they exceeded 20 mm in length.
Proactive industry safety action description	The Australian Rail Track Corporation (ARTC) Code of Practice at the time of the derailment did not categorise bolt-hole cracks as defects requiring action unless they exceeded 20 mm in length. Action taken by the Australian Rail Track Corporation - The ARTC initiated a review of their standards relating to inspection and assessment of bolt-hole cracks. In December 2008, the ARTC issued Engineering(Track & Civil) Instruction, ETI-01-05, Bolt-hole Crack Limits. Under this instruction, all bolt-hole cracks are recorded as defects and require removal, irrespective of the crack size. ATSB assessment of action - The ATSB is satisfied that the action taken by the ARTC adequately addresses the safety issue.
Action organisation	ARTC
Safety action release date	3/02/2010
Safety action status	Closed 3/02/2010
Investigation complete date	3/02/2010

Safely action number	RO-2008-005-NSA-032
Risk category	Significant
Safety issue description	The process for identifying potential rail defects is limited by the ultrasonic test vehicle operator's ability to detect and assess the echo patterns correctly.
Proactive industry safety action description	The process for identifying potential rail defects is limited by the ultrasonic test vehicle operator's ability to detect and assess the echo patterns correctly. Rail Technology International (RTI) is actively conducting further development of their ultrasonic testing process. For example, RTI are developing software based on 'Artificial Neural Networks' for recognise ultrasonic reflection patterns that represent potential rail defects such as bolt-hole cracks. RTI have conducted post test re-analysis of ultrasonic test data using the neural network software to try and identify any defects that may have been missed during the test run. RTI's plan is to run the neural network software in the background and conduct this analysis while ultrasonic testing is being undertaken. RTI have indicated that implementation is planned for early 2010. ATSB assessment of safety action taken - The ATSB acknowledges that the ARTC and RTI are developing processes to reduce the risks associated with operator dependence. While some of thoseinitiatives have been introduced, especially in relation to bolt-hole cracks, other rail defects are also exposed to the issue of operator dependence. The opportunity exists for continued development and implementation of strategies aimed at reducingoperator dependence.
Action organisation	ARTC
Safety action release date	3/02/2010
Safety action status	Closed 3/02/2010
Investigation complete date	3/02/2010

Investigation: RO-2008-010: Derailment of train 1MP9, Mt Christie, South Australia, 1 September 2008

Safely action number	RO-2008-010-NSA-038
Risk category	Significant
Safety issue description	Inspections on wagon VQCY0824U, both in-service and at scheduled maintenance, did not identify that the colour coded axle-box housings required re-greasing. This indicates that the operator's system for inspection and maintenance of wheel bearings was not sufficiently robust to adequately manage the risks.
Proactive industry safety action description	Following the derailment of train 1MP9, SCT immediately scheduled their entire fleet of axle-box configured rolling stock to be regreased. During this process, no other axle-boxes were found to have expired colour codes that would indicate any further lapses in maintenance procedures. It appeared as though the failure to regrease the axle-box on wagon VQCY 0824U was an isolated case. In addition, SCT has accelerated its schedule to replace the 50 tonne bogies with 70 tonne bogies. Under this process, all SCT freight wagons fitted with 50 tonne bogies and axle-box bearings were removed from service. The wagons were fitted with 70 tonne bogies and packaged bearings before being returned to service. The packaged bearings, being a sealed unit, do not require in-service regreasing thereby removing the risk of inadequate lubrication due to inadequate maintenance practices. SCT has also invested in a trial to install on-board monitoring for hot bearings on their freight rolling stock. The initial trial (scheduled for 2010) involves installation of communication equipment on their locomotives and monitoring equipment on 10 wagons. If successful, the intent is to expand the system to cover more of SCT's rolling stock and is likely to significantly reduce SCT's risk of derailment due to bearing failure.
Action organisation	SCT
Safety action release date	22/06/2010
Safety action status	Closed 22/06/2010
Investigation complete date	22/06/2010

Safely action number	RO-2008-010-NSA-039
Risk category	Significant
Safety issue description	The rules and instruction relating to crossing loop operation, including equipment failure, were distributed over a number of documents and slightly ambiguous. Without any consolidation or cross-referencing, it is possible that training of operational staff could be inefficient or at worst, incomplete.
Proactive industry safety action description	The ARTC agreed that there is a need to consolidate all instructions relating to the Self Restoring Points System and ICAPS control system into one document and add clarification regarding the requirements for both facing and trailing movements over points when in failure mode..
Action organisation	SCT
Safety action release date	22/06/2010
Safety action status	Closed 22/06/2010
Investigation complete date	22/06/2010

Investigation: RO-2008-013: Derailment of train 2PM6 - near Loongana, Western Australia, 11 November 2008

Safely action number	RO-2008-013-NSA-028
Risk category	SIgnificant
Safety issue description	The Pacific National Freight Loading Manual FLM03-09 did not comprehensively consider lightly loaded or empty double stacked container vehicles or identify classes of other freight vehicles that exhibit a large vertical surface area and their suitability for operation under high wind conditions.
Proactive industry safety action description	23/12/2009 Pacific National has amended its procedures to specifically identify each class of wagon and its suitability for double stacking. As a result of Pacific National's investigations into this incident, Pacific National has now prohibited RQPW wagons being loaded with double stacked containers. In addition, Pacific National is reviewing options to modify its Train Management System (TMS) to alert Train Planners and thereby prevent train consists from being confirmed if RQPW and similar wagons are double stacked. Pacific National to update current Freight Loading instruction FLM03-09 to specifically exclude double stack loading of RQJW, RQNW, RQPW, RQDY and VQDY wagons and any other wagons of similar design which have the capacity to carry 2 x 40' containers in tandem on a single deck. Pacific National to update current Freight Loading instructions to address the requirements of the new RISSB standard AS7509.2 which now include a requirement to wind loading. Pacific National to introduce an early warning system for double stack trains operating under high wind conditions. Pacific National to amend standard driver's instructions to slow trains and be prepared to stop when high winds are observed. The ATSB is satisfied that the action taken and actions proposed by Pacific National adequately addresses the safety issue.
Action organisation	Pacific National Pty Ltd
Safety action release date	8/04/2010
Safety action status	Closed 8/04/2010
Investigation complete date	7/04/2010
Investigation number	RO-2008-013
Safely action number	RO-2008-013-NSA-040
Risk category	Minor
Safety issue description	Previous maintenance work to replace one twist lock on wagon RQPW 60065Q was not carried out in accordance with the original design. Welds securing the twist lock casting were superficial and structurally unsound allowing the twist lock assembly to be torn from the wagon body during the derailment.
Proactive industry safety action description	23/12/2009 Pacific National has amended its procedures to specifically identify each class of wagon and its suitability for double stacking. As a result of Pacific National's investigations into this incident, Pacific National has now prohibited RQPW wagons being loaded with double stacked containers. In addition, Pacific National is reviewing options to modify its Train Management System (TMS) to alert Train Planners and thereby prevent train consists from being confirmed if RQPW and similar wagons are double stacked.

	Pacific National to update current Freight Loading instruction FLM03-09 to specifically exclude double stack loading of RQJW, RQNW, RQPW, RQDY and VQDY wagons and any other wagons of similar design which have the capacity to carry 2 x 40' containers in tandem on a single deck. Pacific National to update current Freight Loading instructions to address the requirements of the new RISSB standard AS7509.2 which now include a requirement to wind loading. Pacific National to introduce an early warning system for double stack trains operating under high wind conditions. Pacific National to amend standard driver's instructions to slow trains and be prepared to stop when high winds are observed. The ATSB is satisfied that the action taken and actions proposed by Pacific National adequately addresses the safety issue.
Action organisation	Pacific National Pty Ltd
Safety action release date	8/04/2010
Safety action status	Closed 8/04/2010
Investigation complete date	7/04/2010

Investigation: RO-2009-002: Safeworking irregularity involving Indian Pacific (4SA8) and XPT (WT28) Tarana, NSW, 14 January 2009

Safely action number	RO-2009-002-NSA-003
Risk category	Minor
Safety issue description	The ARTC's system of auditing safeworking processes did not detect errors existing between train control graphs and safeworking forms. These errors were not identified until a serious occurence highlighted the deficiency.
Proactive industry safety action description	09/11/2009 ARTC have advised that all Special Proceed Authorities (SPAs) and Train Occupancy Authorities (TOAs) are now audited against the train graphs on a daily basis by the Train Transit Manager (TTM) at all ARTC NSW Train Control CentresAn audit on the issue of SPA forms at Broadmeadow train control centre will be completed by the compliance officer and this will be ongoing. A similar audit process is in place at ARTC's Train Control Centre at Mile End in SA. ATSB assessment of action The Australian Transport Safety Bureau notes that the ARTC has taken action to address this safety issue.
Action organisation	ARTC
Safety action release date	11/12/2009
Safety action `status	Closed 11/12/2009
Investigation complete date	11/12/2009

Safely action number	RO-2009-002-NSA-007
Risk category	Significant
Safety issue description	An examination of available evidence showed that from 31 December 2008 until 14 January 2009, 37 per cent of Special Proceed Authorties issued at ARTC's Network Control Centre at Broadmeadow for the Bathurst-to-Tarana section were issued with inadequate or ambiguous limits of authority specified on the form, increasing the risk of a train overrunning an intended limit of authority.
Proactive industry safety action description	09/11/2009 ITSRR issued an Improvement Notice on ARTC in January 2009 specifying the need to define limits of authority within SPA notices, which in part states: The practice of stating only location names in the specified limits boxes in section 3 of the Special Proceed Authority is not adequate. You must clearly identify on the form the specific limits of the authority or kilometrages in the case of failed trains or when clearing sections due to failures. As a result, tThe ARTC has issued a Safety Alert Notice 1/2009 in response to this requirement. The ARTC have commenced auditing SPA forms at Broadmeadow train control centre. ATSB assessment of action: The Australian Transport Safety Bureau notes that the ARTC has taken action to address this safety issue.
Action organisation	ARTC
Safety action release date	11/12/2009
Safety action `status	Closed 11/12/2009
Investigation complete date	11/12/2009

Investigation: RO-2009-003: Derailment of train 5PS6 near Golden Ridge WA, 30 January 2009

Safely action number	RO-2009-003-NSA-021
Risk category	Minor
Safety issue description	There is no equipment stored in the drivers' cabin of an NR class locomotive that can be used to exit the cabin in the case of train crew entrapment.
Proactive industry safety action description	Pacific National has advised it will investigate the most practical arrangements to enable train crews to exit the locomotive in the case of entrapment. ATSB assessment of action taken The ATSB is satisfied that the action proposed by Pacific National will adequately address the safety issue.
Action organisation	Pacific National Pty Ltd
Safety action release date	26/05/2010
Safety action `status	Closed 26/05/2010
Investigation complete date	26/05/2010

Safely action number	RO-2009-003-NSA-022
Risk category	Minor
Safety issue description	On an NR class locomotive the hand-held radio is normally located in a locked equipment cabinet in the vestibule rather than in the drivers cabin.
Proactive industry safety action description	Pacific National has advised that it will identify an appropriate position within the locomotive drivers' cab to locate a hand held radio. ATSB assessment of action taken The ATSB is satisfied that the action taken and proposed by Pacific National will adequately address the safety issue.
Action organisation	Pacific National Pty Ltd
Safety action release date	26/05/2010
Safety action `status	Closed 26/05/2010
Investigation complete date	26/05/2010

Investigation: RO-2009-005: Level crossing collision between a school bus and train 7GP1 near Moorine Rock, Western Australia, 23 March 2009

Safely action number	RO-2009-005-NSA-009
Risk category	Minor
Safety issue description	The second driver of train 7GP1 on 23 March 2009 was overdue for reassessment of their WestNet Rail Track Access Permit. An overdue safe working qualification may increase the possibility of an individual acting or making decisions that increase the risk of harm to themselves and others. It is apparent that the train operator's arrangements for ensuring that all relevant staff retain current safe working qualifications are not sufficiently robust.
Proactive industry safety action description	10/05/2010 Refresher training and a formal reassessment of network rules knowledge was completed by the second driver on 27 March 2009 and a WestNet Rail Track Access Permit was issued to the driver for a further three years. SCT has reviewed the competencies required by GWA drivers and developed a training matrix. The matrix of competencies has been forwarded to GWA management for updating on the SCT Operator Qualification Register (OQR). SCT has further developed the OQR to link to the train consist program for automatic checking of the currency of driver competencies. This function has been trialled and is ready to be put into practice; however until GWA update all route competencies on the SCT OQR, daily manual checking of operator's competencies will be carried out by SCT.
Action organisation	SCT
Safety action release date	29/06/2010
Safety action `status	Closed 29/06/2010
Investigation complete date	29/06/2010

Safety issues and safety actions identified through ATSB transport safety investigations: 2009-2010 financial year