Aviation Industry Safety Update

Intelligence, Safety and Risk Analysis Unit

1 January 2013 to 31 December 2013

CIVIL AVIATION AUTHORITY
OF NEW ZEALAND
Te Mana Rererangi Tūmatanui o Aotearoa

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Introduction and Executive Summary

Introduction

This safety report is produced using data from the Civil Aviation Authority Management Information System. It primarily covers the one year period ending 31 December 2013.[1] Note this is the third Safety Summary Report that covers the previous 12 months. Feedback suggests that a 'last 12 months' or 'per year' basis enables better comparisons between periods than the 6 monthly basis of the previous twice yearly summary reports.

Key Indicators

- Measures of industry activity such as numbers of aircraft, air transport flights, seat hours and total hours flown have continued to increase.
    - Aircraft on the Register increased slightly by 0.42%
    - Air transport flights decreased slightly by 0.9% (excluding 134,000 thousand Part 115 flights, of which approximately 60% were parachute jumps),
    - Seat hours increased by 3.5% and,
    - Total hours flown by 1.3%.
- The number of certified organisations has decreased by 1.1 % to 956 certificates.
- The number of aircraft movements at principal aerodromes has decreased by 3.1% in this period and the trend over three years reflects a downward trend in number of air transport flights from principal aerodromes.
- The number of accidents in the period was 115 up from 88 in the last period, and the trend is slightly up relative to the average of the last three years (109 accidents/pa).
- There were 7 fatalities, an improvement on 21 in the previous 12 months which included 11 balloon fatalities, but more significantly it's an improvement on the average of the last three years (13/pa).
- The accident, fatalities and social cost statistics continue to be led by private sport aircraft, private aircraft and private helicopters, but several accidents, fatal and non-fatal, have seen airline helicopters (part 135), approaching the level of social cost per seat hour associated with with agricultural aeroplanes and helicopters, while Other Commercial Helicopter operations are running at twice the social cost per hour of the agricultural sector.
- Airspace occurrence are increasing faster than air traffic. This period the number of airspace occurrences (all types) has increased by 12.4% on the last 12 months. Total flying hours in the same period increased by 1.3% Almost all of the increase occurred in events classified as minor, but as these can be precursors to major events, the ISRA unit is carrying out more work to understand the drivers and implications of this increase.

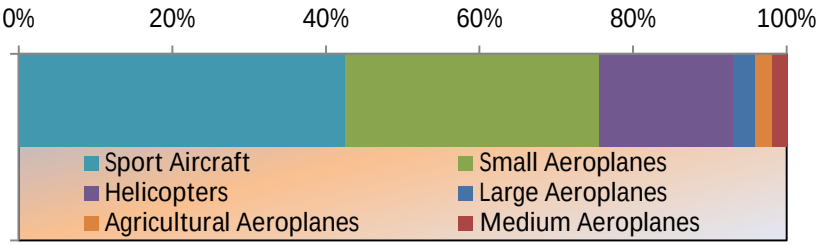
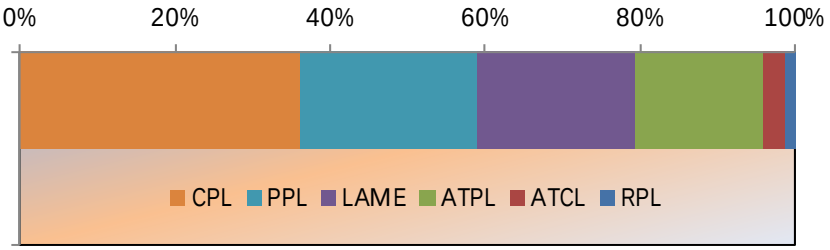
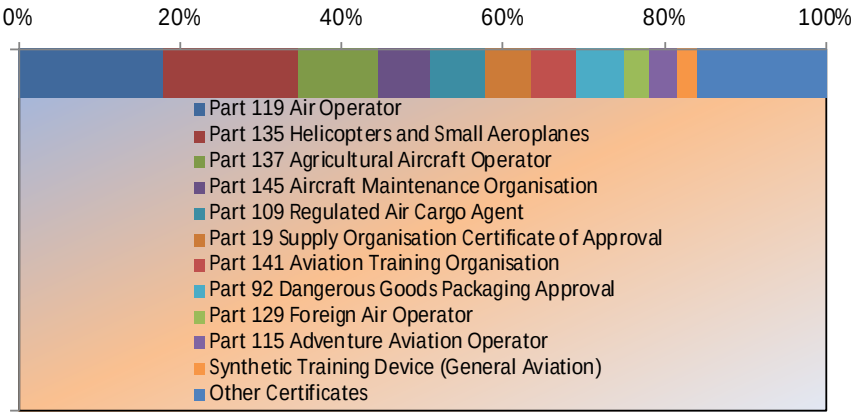
J.D. Stanton
Manager Intelligence Safety and Risk Analysis

[1] This report uses calendar years. Where quarters are referred to the first quarter is 1 January to 31 March.
Data in tables may not sum exactly to the total shown due to rounding

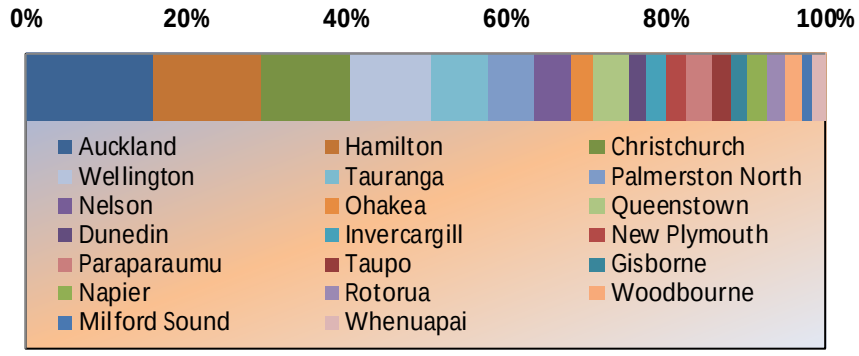
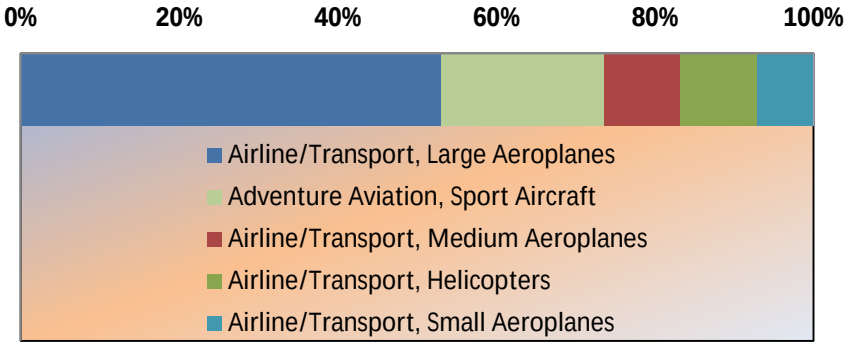
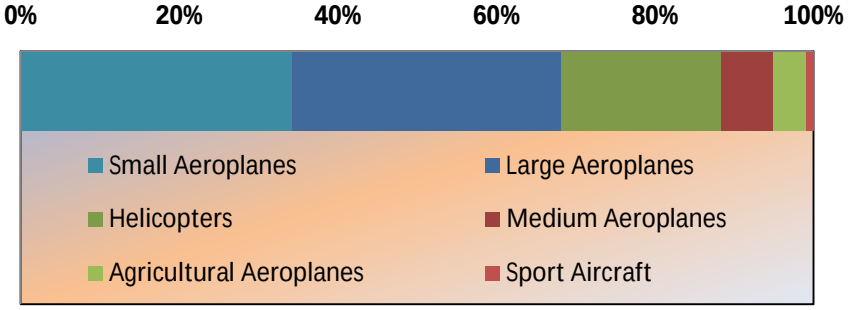
Executive Summary - Status as at 31 December 2013

This section is organised into three parts: Industry Size, Industry Activity and Safety Outcomes

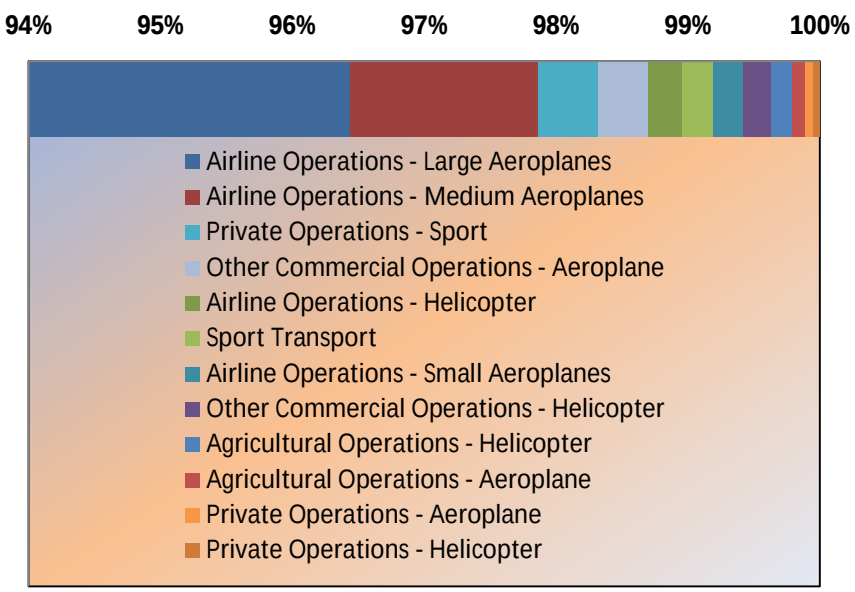
Part 1 - Industry Size
(See here for more information)

Measure	*Current Contributors*
Registered Aircraft as at 31 Dec 2013 4,562 1 Year prior 4,581 31 Dec average for 3 prior years 4,452.0	
Licences on Issue as at 31 Dec 2013 13,099 1 Year prior 13,473 31 Dec average for 3 prior years 13,228.7	
Certificates Current as as at 31 Dec 2013 956 1 Year prior 967 31 Dec average for 3 prior years 945.7	

Part 2 - Industry Activity – Movements, Flights, Hours
(See here for more information)

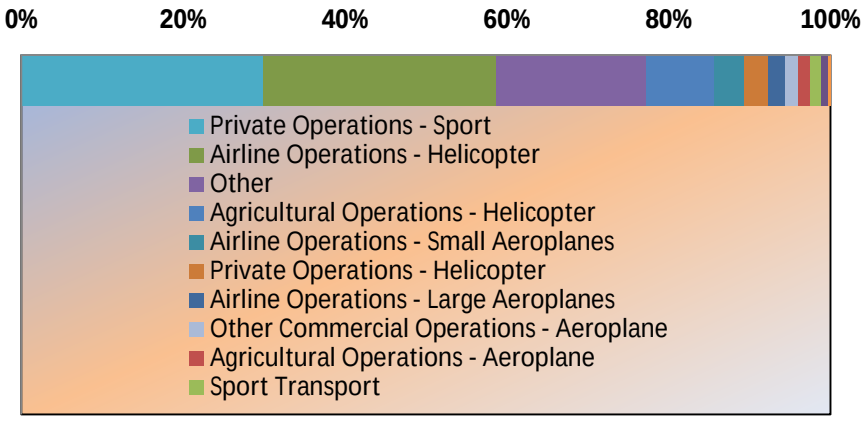
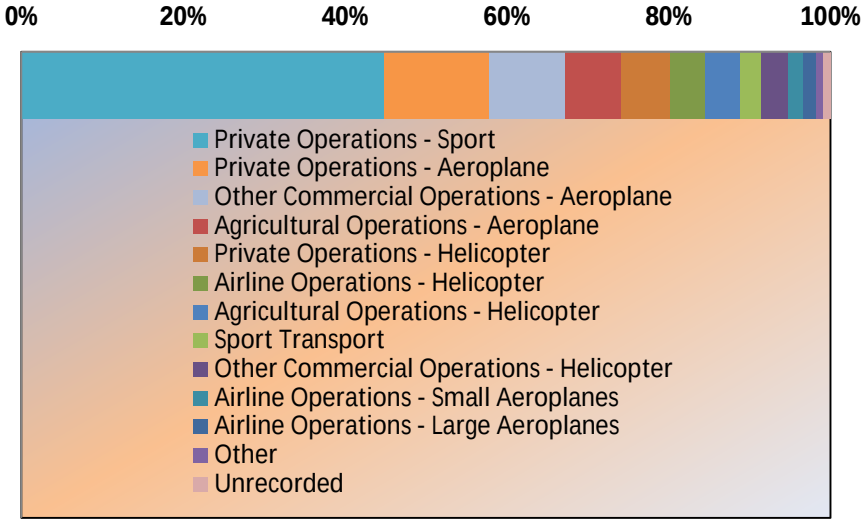
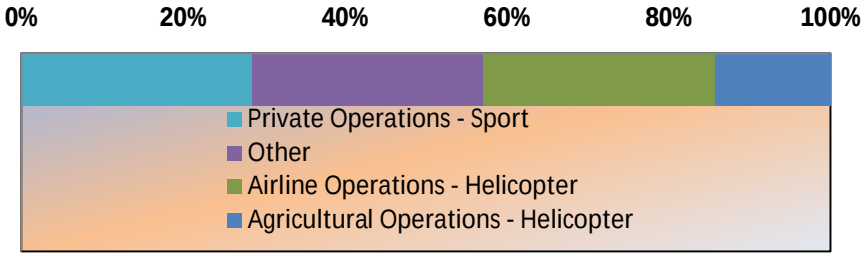
Measure	*Current Contributors*
Aircraft Movements at Aerodromes Year ending 31 Dec 2013 988,755 Previous year 1,020,857 Average for 3 prior years 1,082,675.3	 **Aircraft Movements from Aerodromes** **Year ending Dec 2013, Percentages by Aerodrome**
Air Transport Flights (Thousands) Year ending 31 Dec 2013 502 (includes 134,000 Part 115 flights of which approximately 58% were parachute jumps) Previous year 447 (includes 75,700 Part 115 flights of which approximately 57% were parachute jumps) Average for 3 prior years 375	 **Air Transport Flights** **Year ending Dec 2013** **Percentages by Operation Type**
Hours Flown (all operations) (Thousands) Year ending 31 Dec 2013 993 Previous year 979 Average for 3 prior years 958	 **Hours Flown** **Year ending Dec 2013** **Percentages by Aircraft Type**

Part 2 - Industry Activity – Seat-Hours
(See here for more information)

Measure	*Current Contributors*
Seat Hours (Millions) Year ending 31 Dec 2013 56.4 Previous year 54.5 Average for 3 prior years 49.0	 **Seat Hours Occupied for year ending Dec 2013** **Percentages by Safety Outcome Target Group** (Note the False Zero on the percentage scale, The Airline Operations – Large Aeroplanes group contributes 96.59% to the seat-hour total)

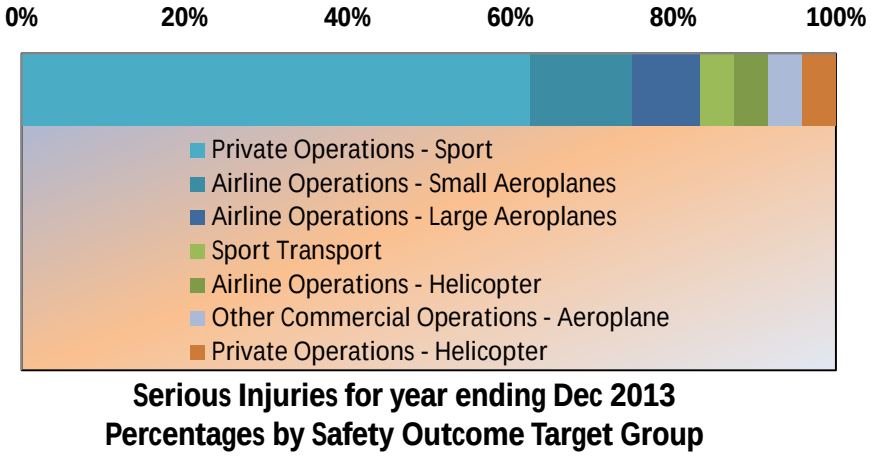
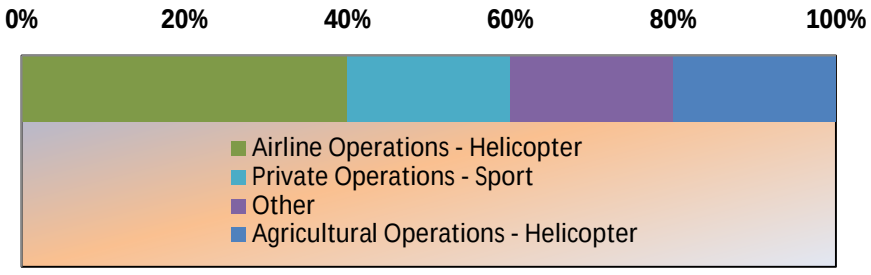
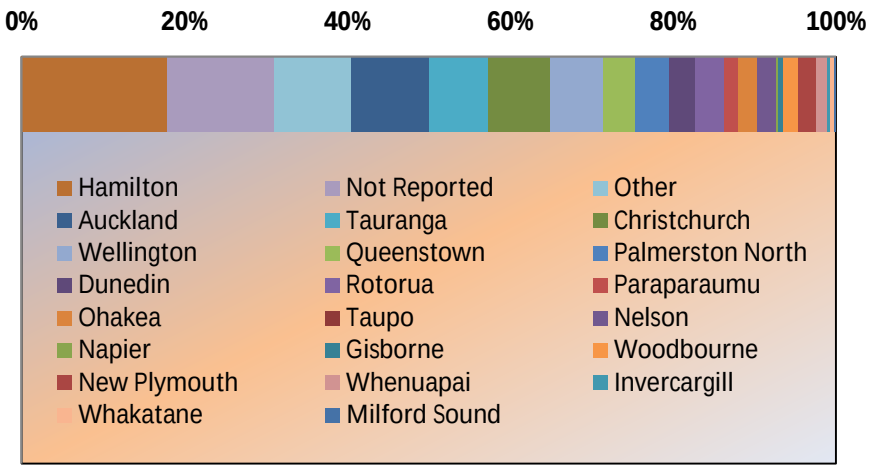
Part 3 - Safety Outcomes – Social Cost, Accidents, Fatalities

(See here for more information)

Measure	*Current Contributors*
Social Cost (2013 dollars) Year ending 31 Dec 2013 $M 46.1 Previous year $M **91.7** Average for 3 prior years $M 64.3	 **Social Cost for year ending Dec 2013** **Percentages by Safety Outcome Target Group**
Accidents Year ending 31 Dec 2013 115 Previous year 88 Average for 3 prior years 109.3	 **Accidents for year ending Dec 2013** **Percentages by Safety Outcome Target Group**
Fatalities Year ending 31 Dec 2013 7 Previous year **21** Average for 3 prior years 13.0	 **Fatalities for year ending Dec 2013** **Percentages by Safety Outcome Target Group**

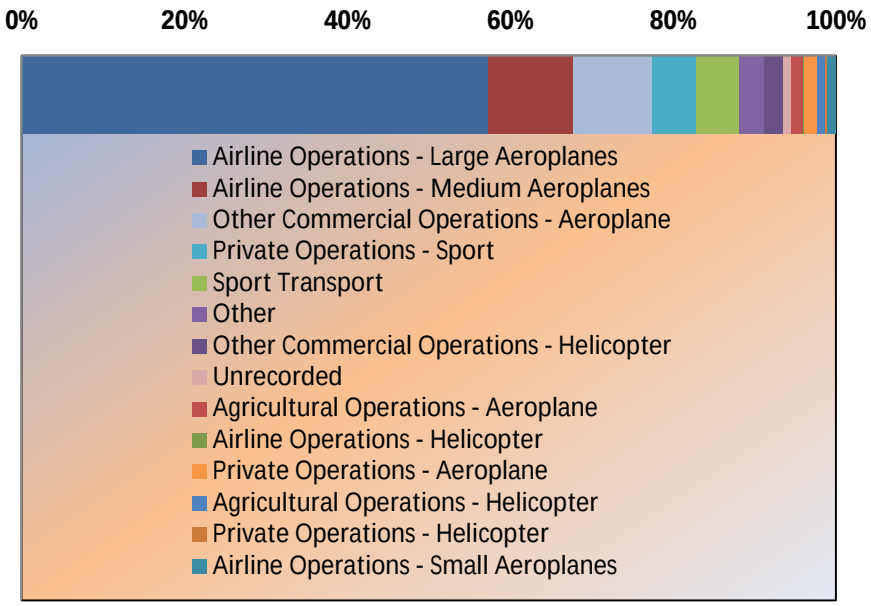
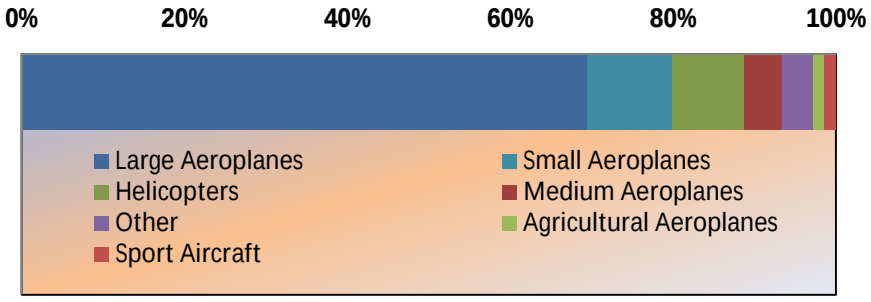
Part 3 - Safety Outcomes – Serious Injuries, Fatal Accidents, Airspace Incidents

(See here for more information)

Measure	*Current Contributors*
Serious Injuries Year ending 31 Dec 2013 24 Previous year 17 Average for 3 prior years 18.0	 **Serious Injuries for year ending Dec 2013** **Percentages by Safety Outcome Target Group**
Fatal Accidents Year ending 31 Dec 2013 5 Previous year 9 Average for 3 prior years 8.0	 **Fatal Accidents for year ending Dec 2013** **Percentages by Safety Outcome Target Group**
Airspace Incidents Reported Year ending 31 Dec 2013 1431 (16 Critical) Previous year 1273 (8 Critical) Average for 3 prior years 930.7 (16.7 Critical)	 **Airspace Incidents for year ending Dec 2013** **Percentages by Nearest Reporting Point**

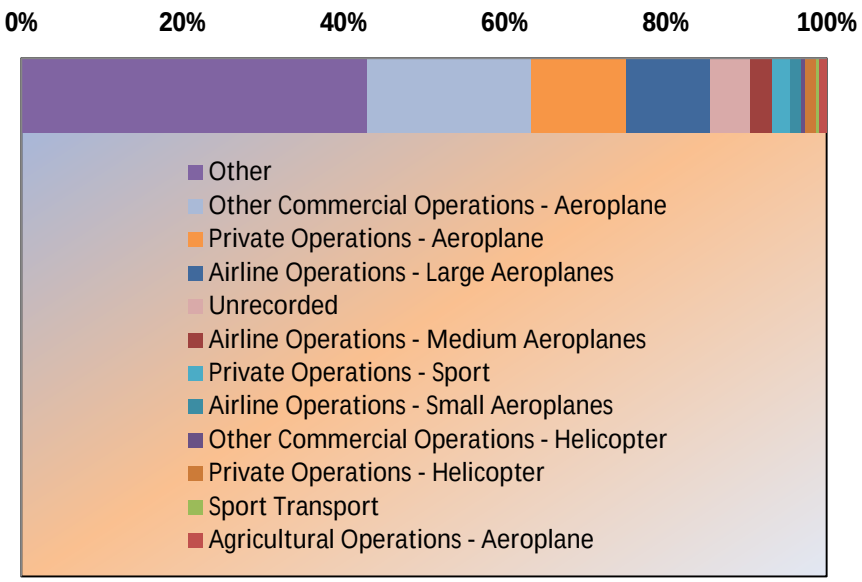
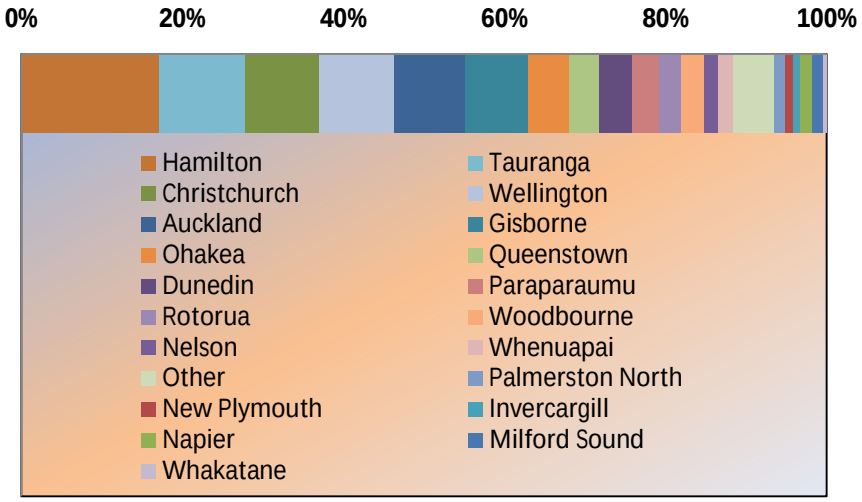
Part 3 - Safety Outcomes – Operational Incidents, Defect Incidents

(See here for more information)

Measure	***Current Contributors***
Operational Incidents Reported Year ending 31 Dec 2013 801 (10 Critical) Previous year 721 (8 Critical) Average for 3 prior years 713.3 (3.3 Critical)	 **Operational Incidents for year ending Dec 2013** **Percentages by Safety Outcome Target Group**
Defect Incidents Reported Year ending 31 Dec 2013 1820 (1 Critical) Previous year 1461 (6 Critical) Average for 3 prior years 1349.7 (1.0 Critical)	 **Defect Incidents for year ending Dec 2013** **Percentages by Aircraft Type**

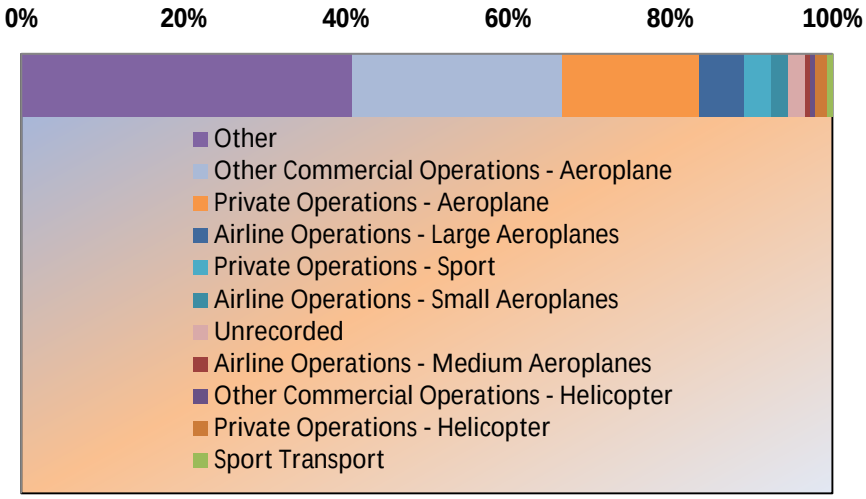
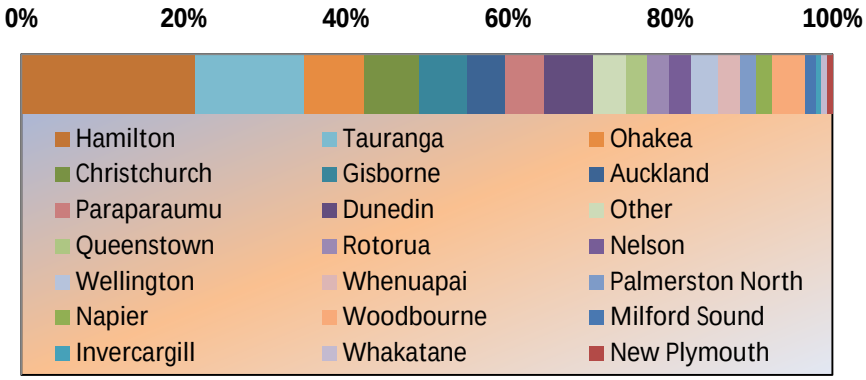
Part 3 - Safety Outcomes – Aerodrome Incidents

(See here for more information)

Measure	***Current Contributors***
Aerodrome Incidents Reported Year ending 31 Dec 2013 221 (2 Critical) Previous year 205 (2 Critical) Average for 3 prior years 138.3 (0.7 Critical)	 **Aerodrome Incidents for year ending Dec 2013** **Percentages by Safety Outcome Target Group**  **Aerodrome Incidents for year ending Dec 2013** **Percentages by Nearest Reporting Point**

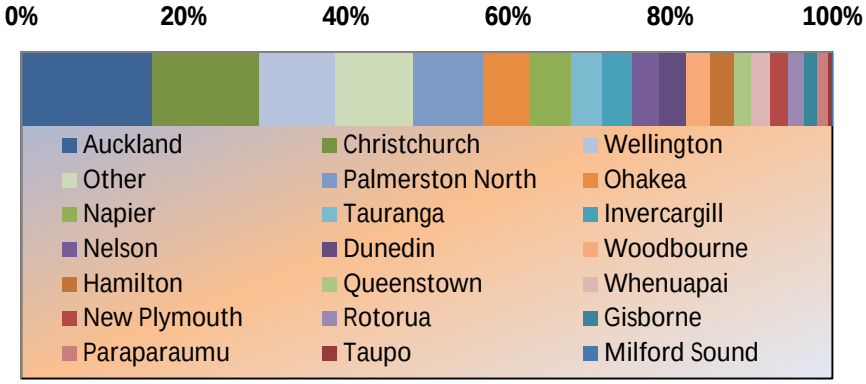
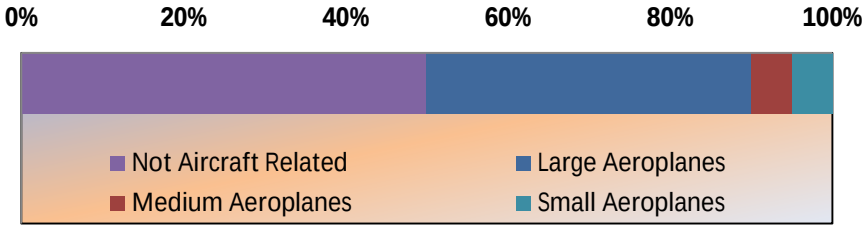
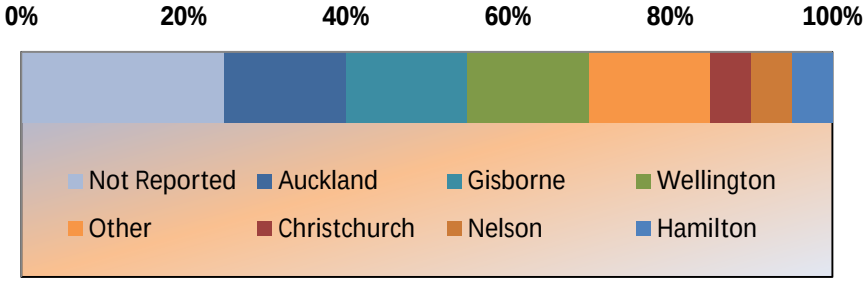
Part 3 - Safety Outcomes – Runway Incursions

(See here for more information)

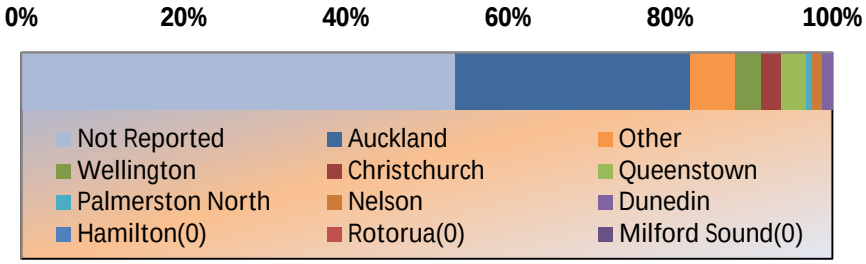
Measure	***Current Contributors***
Runway Incursions Reported Year ending 31 Dec 2013 147 (2 Critical) Previous year 145 (2 Critical) Average for 3 prior years 77.0 (0.3 Critical)	 **Runway Incursions for year ending Dec 2013** **Percentages by Safety Outcome Target Group**  **Runway Incursions for year ending Dec 2013** **Percentages by Nearest Reporting Point**

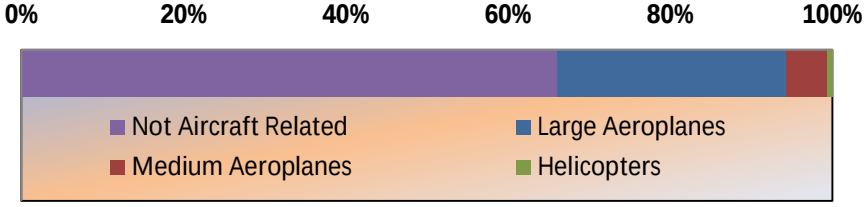
Part 3 - Safety Outcomes – Bird Hazard Incidents, Security Incidents

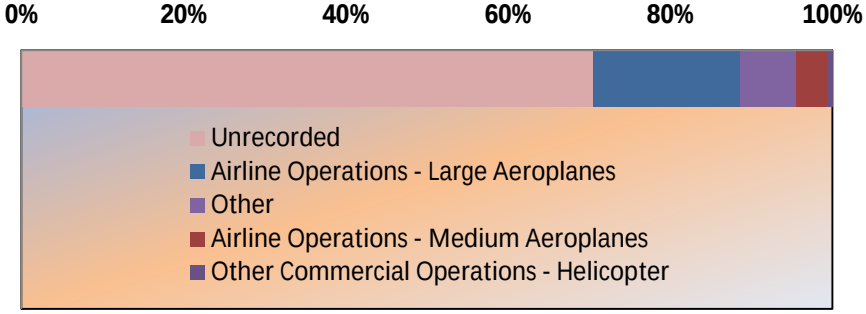
(See here for more information)

Measure	***Current Contributors***
Bird Hazard Incidents Reported Year ending 31 Dec 2013 1251 (518 Strikes) Previous year 1300 (485 Strikes) Average for 3 prior years 1314.7 (481.7 Strikes) (No Bird Hazard incident reported during the period covered by this report was Critical)	 **Bird Hazard Incidents for year ending Dec 2013** **Percentages by Nearest Reporting Point**
Security Incidents Reported Year ending 31 Dec 2013 20 (0 Critical) Previous year 21 (0 Critical) Average for 3 prior years 77.7 (0.0 Critical)	 **Security Incidents for year ending Dec 2013** **Percentages by Aircraft Type**  **Security Incidents for year ending Dec 2013** **Percentages by NRP**

<table>
<tr><th colspan="2">Part 3 - Safety Outcomes – ARCs, Other Incidents</th></tr>
<tr><th>Measure</th><th>Current Contributors</th></tr>
<tr><td>Aviation Related Concerns Reported
Year ending 31 Dec 2013
810
(2 Critical)
Previous year
789
(1 Critical)
Average for 3 prior years
636.3
(0.3 Critical)</td><td>· The coding of ARCs is such that no useful analysis is currently possible
· Approximately 27% of ARCs received are actually Section 13A notifications that are treated as ARCs because there is no other procedure defined for processing them.</td></tr>
<tr><td>All Other Incidents Reported
(Dangerous Goods, Facility Malfunction, Cargo Security, Promulgated Information)

Year ending 31 Dec 2013
159
(0 Critical)
Previous year
92
(0 Critical)
Average for 3 prior years
122.0
(0.3 Critical)</td><td> 

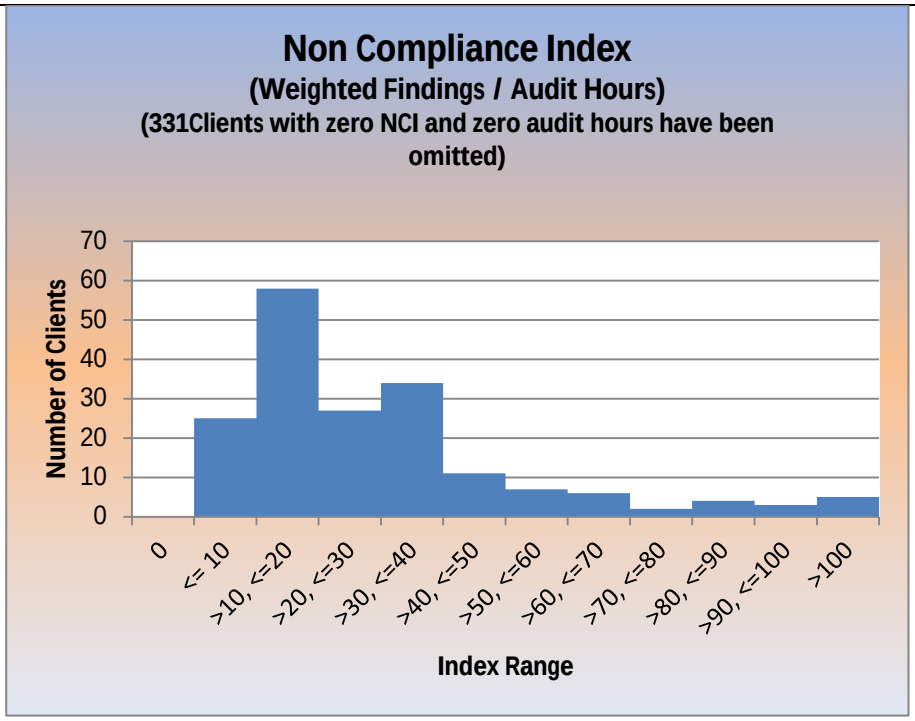
All Other Incidents for year ending Dec 2013
Percentages by NRP
 

All Other Incidents for year ending Dec 2013
Percentages by Aircraft Type
 

All Other Incidents for year ending Dec 2013
Percentages by Safety Outcome Target Group</td></tr>
</table>

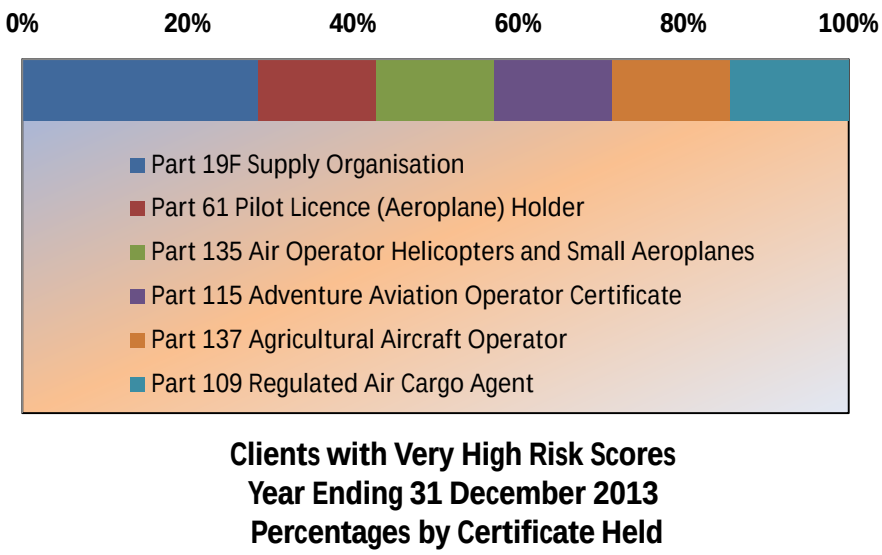
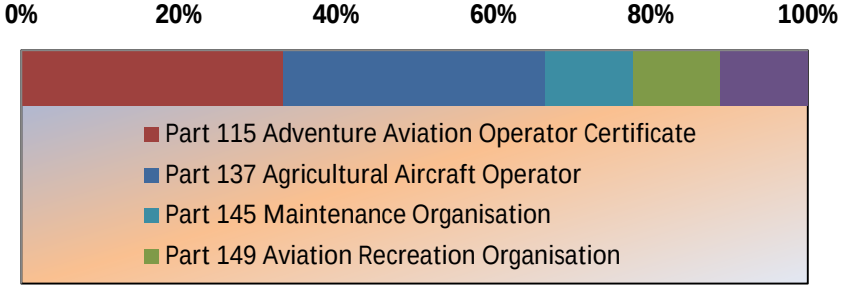
Part 3 - Safety Outcomes – Non Compliance

(See here for more information)

Measure	***Current Contributors***
Median Non-Compliance Index Year ending 31 Dec 2013 23.1 Previous year 20.0 Average for 3 prior years 30.2	

Part 3 - Safety Outcomes – Risk Scores

(See here for more information)

Measure	*Current Contributors*
Number of Clients with Risk Score of 'Very High' Year ending 31 Dec 2013 7 Previous year 8 (Pt 115 Operations in their infancy) Average for 3 prior years 5.7	 **Clients with Very High Risk Scores** **Year Ending 31 December 2013** **Percentages by Certificate Held**
Number of Clients with Risk Score of 'High' Year ending 31 Dec 2013 9 Previous year 11 Average for 3 prior years 10.7	 **Clients with High Risk Scores** **Year Ending 31 December 2013** **Percentages by Certificate Held**

All values quoted are based on data as reported to the CAA

Reporting rates vary widely depending on the nature and severity of incidents

Activity data reporting varies widely between sectors in both accuracy and completeness

Air Transport Flights and All Hours Flown values have been adjusted to allow for the probable activity levels of aircraft for which an expected Aircraft Operations Statistics return has not been received

Industry Size and Activity Data

Registered Aircraft

The following table summarises the number of aircraft on the register by Aircraft Category at 31 Dec 2013, 31 Dec 2012 and the average of the numbers at the end of each of the three prior years.

Aircraft Category	31 Dec 2013	31 Dec 2012	Average 3 Prior Yrs
Large Aeroplanes	128	125	121.3
Medium Aeroplanes	85	86	84.0
Small Aeroplanes	1,506	1,523	1,513.7
Helicopters	797	787	762.7
Sport Aircraft	1,942	1,953	1,860.7
Agricultural Aeroplanes	104	107	109.7
Total	4,562	4,581	4,452.0

The total number of aircraft on the register has decreased by 19 aircraft (0.42%). In previous years sport aircraft numbers grew rapidly but this has slowed and their numbers are now declining slightly. The number of small aeroplane has also plateaued after increasing through 2000-2008 and is now falling slightly. Helicopter numbers are increasing but more slowly than in previous years.

Licences

The following table summarises the number of airline transport, commercial, private and recreational pilot, air traffic controller, and aircraft maintenance engineer licences on the register at 31 Dec 2013, 31 Dec 2012 and the average of the numbers at the end of each of the three prior years.

Licences	31 Dec 2013	31 Dec 2012	Average 3 Prior Yrs
RPL	149	240	161.3
ATCL	380	363	362.3
ATPL	2,172	2,112	2,069.0
LAME	2,660	2,611	2,489.7
PPL	3,017	3,361	3,665.7
CPL	4,721	4,786	4,480.7
Total	13,099	13,473	13,228.7

Note — the statistics above for pilot licences count only those with active class 1 or active class 2 medical certificates or, for RPL holders, a certificate, issued in accordance with the NZTA medical fitness standards that are applicable for a Class 2, 3, 4 or 5 driver licence with passenger endorsement. This means that for CPL and ATPL licences, the number with a class 2 medical only, must only be exercising PPL privileges (or not flying at all). The statistics for ATCL holders count only those with an active class 3 medical certificate.

These statistics do not show the total number of licence holders as each holder may hold more than one licence.

Certificated Operators

The following tables show the number of Civil Aviation Rule Part certificate holders at 31 Dec 2013, 31 Dec 2012 and the average of the numbers at the end of each of the three prior years.

RulePart	31 Dec 2013	31 Dec 2012	Average 3 Prior Yrs
Part109RegulatedAirCargoAgent	66	65	63.0
Part115AdventureAviationOperator	34	33	0.3
Part119AirOperator	178	179	185.3
Part129ForeignAirOperator	31	32	34.0
Part137AgriculturalAircraftOperator	99	104	106.7
Part139Aerodromes	27	27	25.7
Part140AviationSecurityService	1	1	1.0
Part141AviationTrainingOrganisation	56	59	56.0
Part145AircraftMaintenanceOrganisation	63	67	60.0
Part146AircraftDesignOrganisation	14	14	13.0
Part148AircraftManufacturingOrganisation	20	20	22.0
Part149AviationRecreationOrganisation	8	7	8.3
Part171AeronauticalTelecommunicationServiceOrganisation	2	2	2.0
Part172AirTrafficService	2	2	2.0
Part173InstrumentFlightProcedureServiceOrganisation	3	3	3.0
Part174MeteorologicalServiceOrganisation	2	2	2.0
Part175AeronauticalInformationServiceOrganisation	1	1	1.3
Part19SupplyOrganisationCertificateofApproval	56	56	58.7
Part92DangerousGoodsPackagingApproval	59	58	57.0
AustralianAOCOperatingwithANZAPrivileges	2	2	1.7
PilotlessAircraftAuthorisation	8	3	-
Total	**724**	**734**	**702.7**

* Notes:

- For organisations with Part 92 and for those with Part 172 certificates the figures show the total number of approvals held.
- Part 109 Certificate holder data is not available prior to 2009 so the prior period averaging for this certificate has been done over two years

Part 119 Air Operator	31 Dec 2013	31 Dec 2012	Average 3 Prior Yrs
Part 108 Security Programme	19	18	18.7
Part 121 Large Aeroplanes	9	9	9.7
Part 125 Medium Aeroplanes	15	15	15.3
Part 135 Helicopters and Small Aeroplanes	166	168	174.3

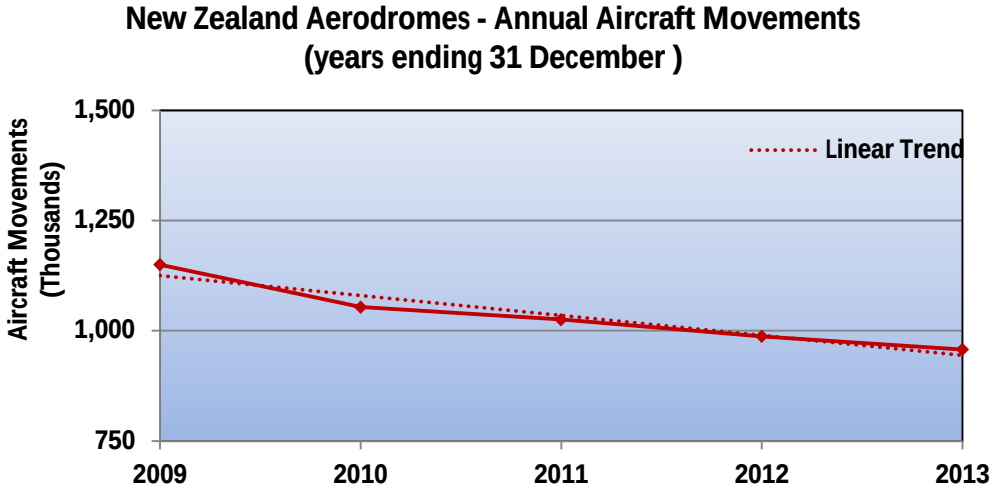
Part 129 Air Operator	31 Dec 2013	31 Dec 2012	Average 3 Prior Yrs
Part 108 Security Programme	23	23	25.0

Aircraft Movements

The following graph and table show the number of aircraft movements at the following aerodromes: Auckland, Christchurch, Dunedin, Gisborne, Hamilton, Invercargill, Milford Sound, Napier, Nelson, New Plymouth, Ohakea, Palmerston North, Kapiti Coast, Queenstown, Rotorua, Taupo, Tauranga, Wellington, Whenuapai and Woodbourne. These figures are as reported to CAA by Airways Corporation and Taupo Airport.

Long-Term Change in Aircraft Movements

The following graph shows the annual number of aircraft movements for the five-year period ending 31 December 2013. Kapiti Coast Airport has been omitted from this long term analysis because the available data is incomplete because there has only been a flight information service available since October 2011.



The average annual decrease in the number of aircraft movements was 4.5% from the year ended 31 December 2009 until the year ended 31 December 2013 during which 957514 movements were recorded.

Yearly Comparison

The following table shows the number of Aerodrome movements in the period 1 January to 31 December 2013, the previous year and the average of the movement numbers during the prior 3 years. For consistency Kapiti Coast Airport movements have also been omitted from this table

Activity	Year Ending Dec 2013	Year Ending Dec 2012	Average 3 Prior Yrs
Aircraft Movements	957514	987155	1076975.0

Aircraft Movements at Aerodromes

The aerodromes are shown in descending order of the number of aircraft movements for the year ending 31 December 2013. The figures all relate to years ending 31 December.

Aerodrome	2009	2010	2011	2012	2013
Auckland	156,325	157,201	156,655	156,062	**157,141**
Hamilton	148,380	99,308	110,419	128,744	**135,404**
Christchurch	136,249	125,611	121,469	109,444	**107,754**
Wellington	111,969	109,193	105,988	102,488	**101,279**
Tauranga	97,144	86,935	74,400	72,652	**70,450**
Palmerston North	58,761	56,439	65,708	67,395	**55,960**
Nelson	48,273	51,570	50,094	48,073	**45,677**
Queenstown	45,966	42,347	41,769	43,776	**43,012**
Paraparaumu	6,305	0	12,832	33,702	**31,241**
Ohakea	72,997	61,896	55,726	30,959	**28,807**
Taupo	30,680	28,774	26,376	25,536	**25,988**
New Plymouth	43,518	37,097	32,791	30,773	**24,910**
Napier	24,114	27,172	27,332	25,242	**24,386**
Invercargill	25,805	29,279	30,840	28,491	**23,058**
Dunedin	53,602	44,003	29,229	25,328	**22,758**
Rotorua	20,734	23,380	22,682	22,092	**22,532**
Woodbourne	24,058	22,829	23,660	22,689	**21,826**
Gisborne	23,955	22,174	22,459	19,594	**17,671**
Whenuapai	13,220	14,347	14,675	14,915	**15,419**
Milford Sound	14,227	14,042	13,043	12,902	**13,482**

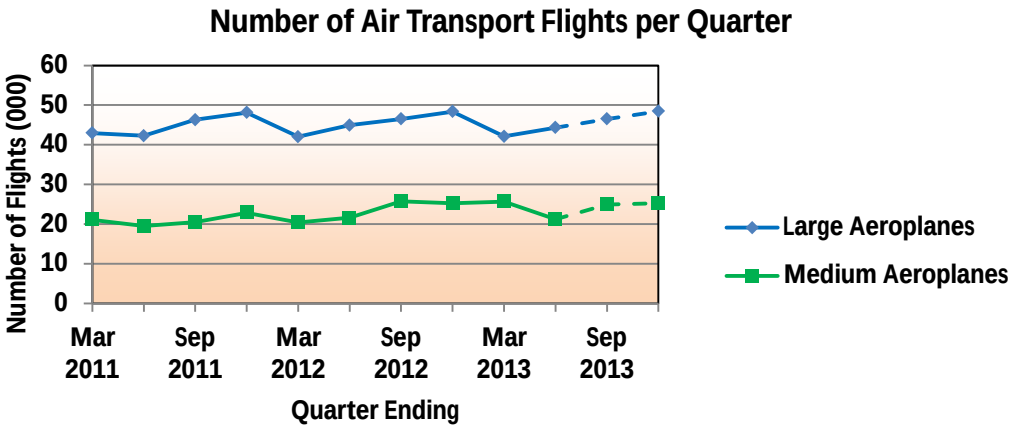
The 2009 figure for Paraparaumu is an estimate provided by that airport for that year. Data for Paraparaumu from 2011 onwards has been supplied by Airways Corporation. The value for 2011 relates only to the portion of the year when the Information Service was active.

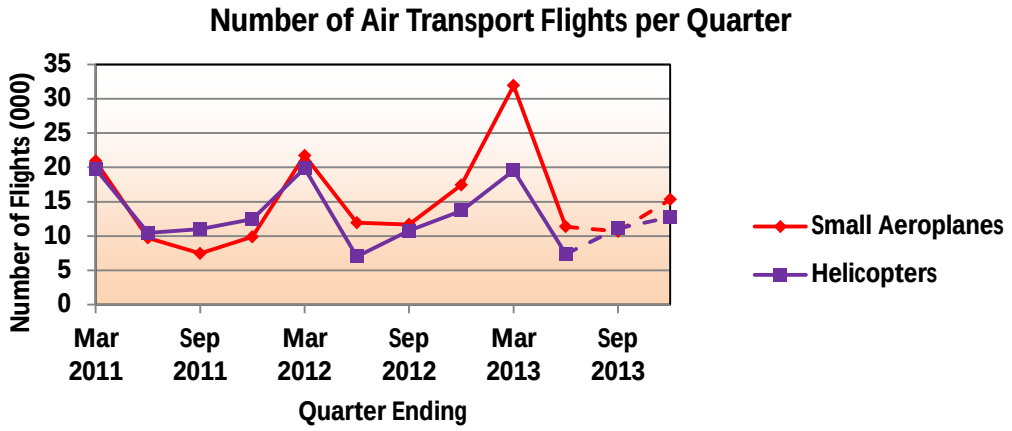
No information is available for Ardmore aerodrome although it is reported in the AIP as NZ's busiest aerodrome. The recent increase in movements at Hamilton is noteworthy and it is now the 2nd busiest airport for which a data is available.

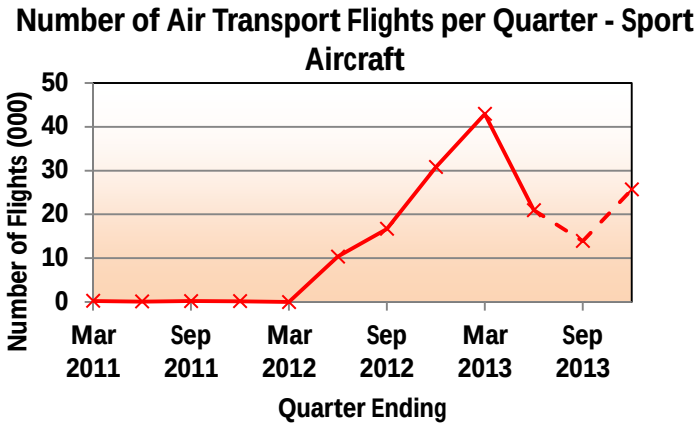
Air Transport Flights

Note that these graphs exclude foreign registered aircraft that are operated in New Zealand.

The following graphs show the estimated number of air transport flights per quarter during the three year period ending 31 December 2013. The estimates are based on the reported numbers of flights with an allowance for aircraft for which reports were not received. Insufficient data exists for the last two quarters so those values are forecasts.

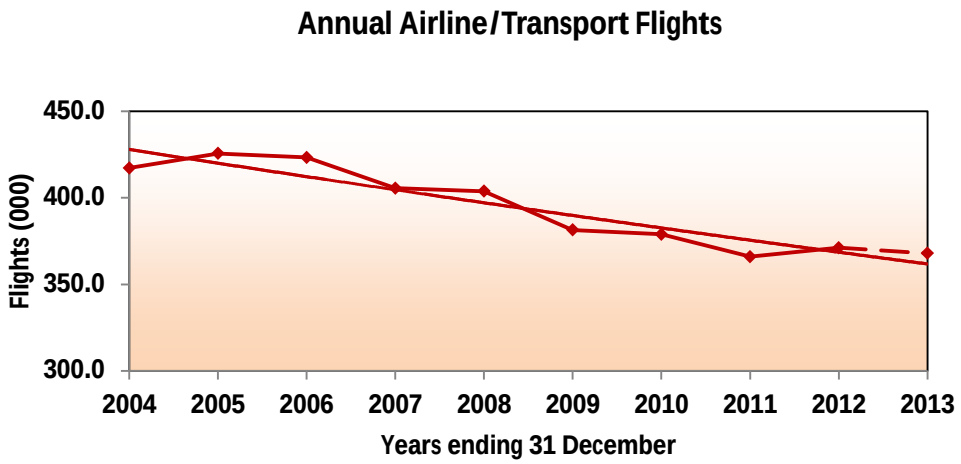






Long-Term Change in Airline/Transport Flights

The following graph shows the estimated number of airline/transport flights for the 10-year period ending 31 December 2013



The change in the estimated number of annual airline/transport flights across this period is equivalent to an annual decrease of 1.39%. The linear trend in these reported flights is equivalent to an annual decrease of 1.82%.

Yearly Comparison

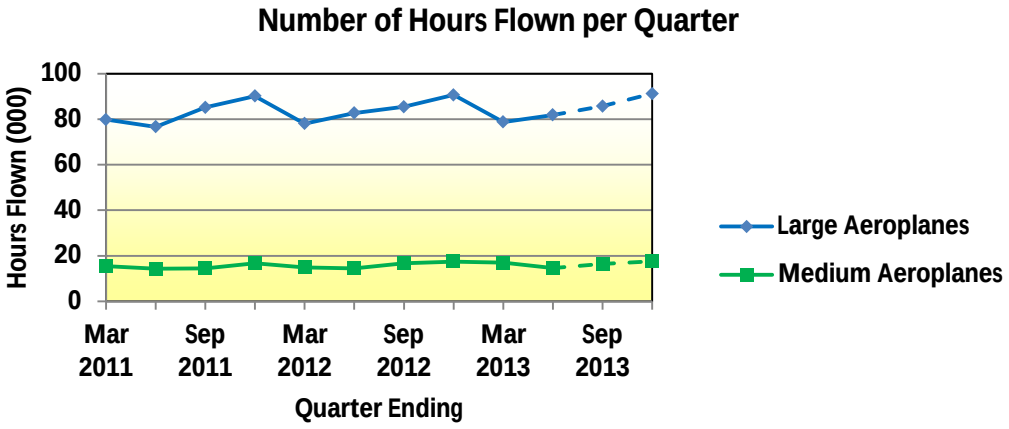
Number of Airline/Transport Flights

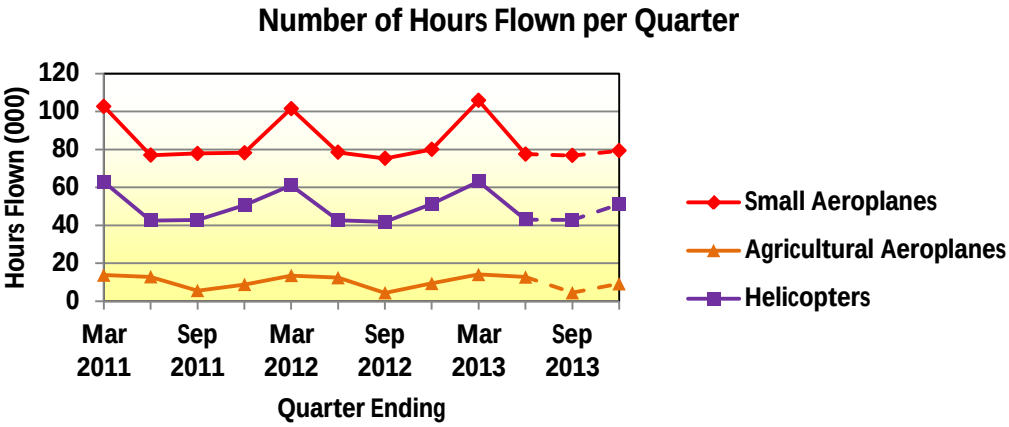
Aircraft Category	Year Ending Dec 2013	Year Ending Dec 2012	Average 3 Prior Yrs
Large Aeroplanes	181367	181835	180989.3
Medium Aeroplanes	87640	87747	83256.3
Small Aeroplanes	47950	49847	53794.4
Helicopters	50756	51375	56800.7
Sport Aircraft	206	360	618.9
Total	367919	371165	375459.7

Hours Flown

Note that these graphs exclude the aircraft statistics categories Sport Aircraft, Hang Gliders and Parachutes, and foreign registered aircraft that are operated in New Zealand.

The following graphs show the estimated number of hours flown per quarter during the three year period ending 31 December 2013. The estimates are based on the reported hours with an allowance for aircraft for which reports were not received. Insufficient data exists for the last two quarters so those values are forecasts.





Comment on Estimated Activity Data

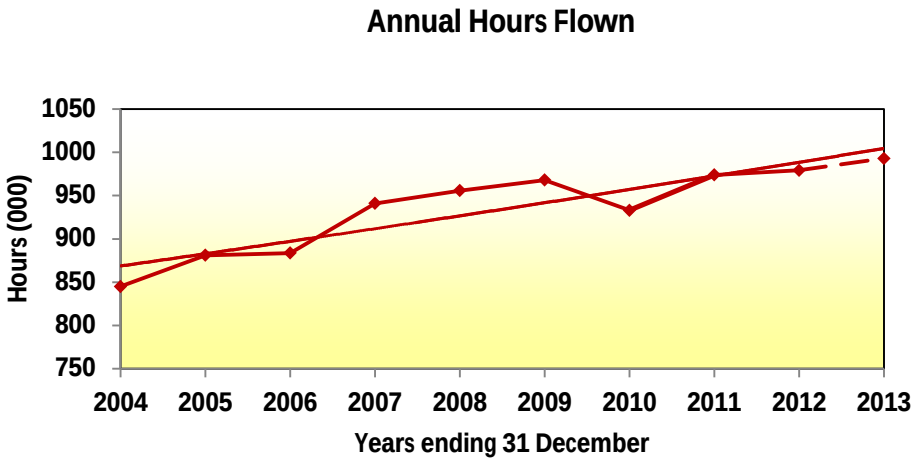
Not all operators comply with the requirements of CAR 12.151 to report hours and flights data. An allowance is made for the 'missing' data by applying a statistical estimating process to each quarter's data. The following table shows the percentage of aircraft for which returns had been entered for the January to December 2013 period at the time of compilation, which is at least 5 weeks after the last of the returns were due.

Aircraft Category	Percentage of Expected Returns Received and Entered
Large Aeroplanes	39.6%
Medium Aeroplanes	23.8%
Small Aeroplanes	7.6%
Helicopters	13.2%
Sport Aircraft - Aeroplanes	3.6%
Sport Aircraft - Balloons	2.7%
Sport Aircraft - Hang Gliders	19.7%
Sport Aircraft - Helicopters	0.0%
Sport Aircraft - Parachutes	42.1%
Sport Aircraft - Paragliders	24.9%
Agricultural Aeroplanes	24.3%

Helicopters, small and medium aircraft are struggling to achieve a return rate of 50%. To address this issue the CAA sent a reminder letter on the 2 May 2014 to 1556 operators to draw their attention to CAR 12.151. There was a large increase in the number of returns through May and June 2014. Accordingly the return rate for 2014 should increase and reduce the dependence on estimation.

Long-Term Change in Hours Flown

The following graph shows the annual hours flown (includes the aircraft classes aeroplane, helicopter and balloon only; excludes other aircraft classes, hang gliders and parachutes) for the 10-year period ending 31 December 2013.



The change in the estimated number of annual hours flown across this period is equivalent to an annual increase of 1.81%. The linear trend in these reported hours is equivalent to an annual increase of 1.63%.

Yearly Comparison

Hours Flown

Aircraft Category	Year Ending Dec 2013	Year Ending Dec 2012	Average 3 Prior Yrs
Large Aeroplanes	**337486.8**	336810.5	324277.0
Medium Aeroplanes	**65496.1**	63505.5	58161.4
Small Aeroplanes	**339458.7**	335249.9	346884.2
Helicopters	**200020.1**	196738.5	187396.1
Sport Aircraft	**9819.8**	7395.9	5085.1
Agricultural Aeroplanes	**40577.6**	39570.5	36489.7
Total	**992859.2**	979270.7	958293.6

Seat-Hours

The following table indicates the size of the aviation industry as determined from Aircraft Operating Statistics in the relevant 2010 Safety Target Group categories for the year ending 31 December 2013. A seat-hours measure is used as an indication of person exposure. For each Safety Target Group the total number of hours flown is multiplied by the average number of seats and an appropriate load factor, to give the number of seat hours utilised by the group (person exposure). For Safety Target Groups that are not predominantly passenger carrying a surrogate of 500 kg of aircraft weight is used instead of seat hours. The values are millions of seat-hours.

Safety Outcome Target Group	Year Ending Dec 2013	Year Ending Dec 2012	Average 3 Prior Yrs
Airline Operations - Large Aeroplanes	54 (96.4%)	53 (96.5%)	47 (96.2%)
Airline Operations - Medium Aeroplanes	0.81 (1.4%)	0.77 (1.4%)	0.72 (1.5%)
Airline Operations - Small Aeroplanes	0.13 (0.2%)	0.12 (0.2%)	0.10 (0.2%)
Airline Operations - Helicopter	0.15 (0.3%)	0.14 (0.2%)	0.12 (0.3%)
Sport Transport	0.13 (0.2%)	0.09 (0.2%)	0.11 (0.2%)
Other Commercial Operations - Aeroplane	0.21 (0.4%)	0.22 (0.4%)	0.26 (0.5%)
Other Commercial Operations - Helicopter	0.12 (0.2%)	0.11 (0.2%)	0.10 (0.2%)
Agricultural Operations - Aeroplane	0.05 (0.1%)	0.06 (0.1%)	0.04 (0.1%)
Agricultural Operations - Helicopter	0.09 (0.2%)	0.08 (0.1%)	0.10 (0.2%)
Private Operations - Aeroplane	0.04 (0.1%)	0.04 (0.1%)	0.05 (0.1%)
Private Operations - Helicopter	0.03 (0.0%)	0.03 (0.1%)	0.04 (0.1%)
Private Operations - Sport	0.25 (0.4%)	0.25 (0.5%)	0.21 (0.4%)
Total (Millions of seat hours)	56 (100.0%)	54 (100.0%)	49 (100.0%)

* most sport aircraft do not report hours or seats, so a standard estimate of seat hours offered is used as well as reported data for such aircraft in these groups.

Note that the percentages may not sum exactly to 100.0% due to rounding.

This table shows that approximately 96.4% of seat hours were offered by the Airline Operations – Large Aeroplanes group, approximately 1.4% by the Airline Operations – Medium Aeroplanes group, with the remaining 2.2% of seat hours offered being split between the other safety target groups.

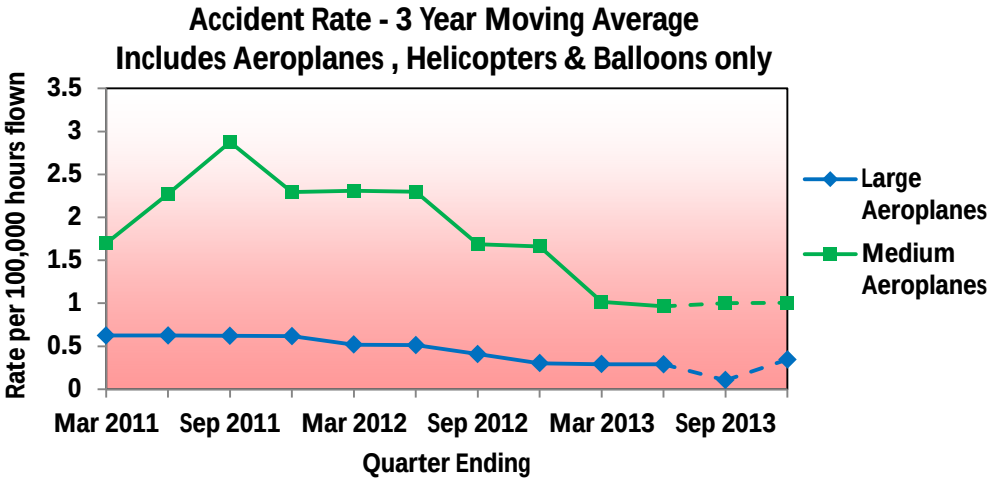
By comparison the 337,486 hours flown by the 128 large aircraft is similar to the 339,458 hours flown by the 1,506 small aeroplanes on the register. The difference in passenger exposure is largely a function of the seating capacity.

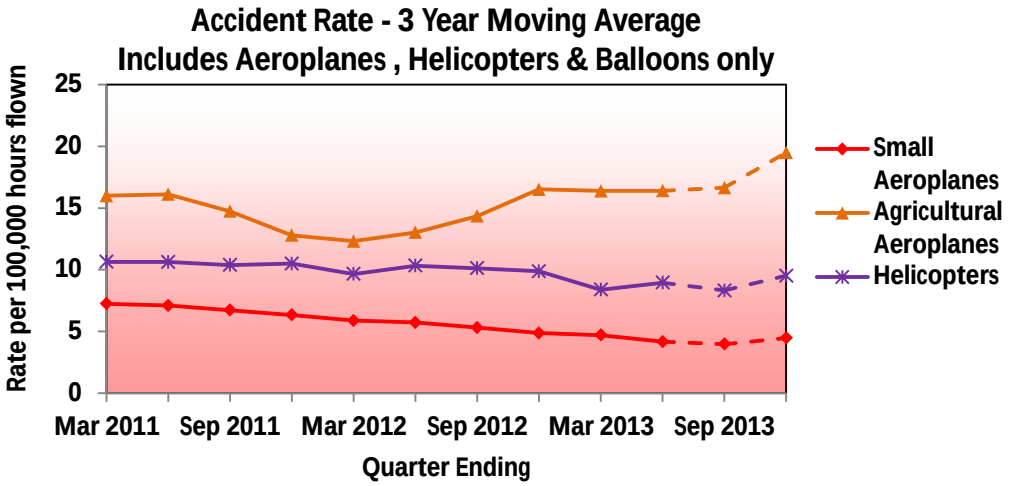
Occurrence Analysis

Aircraft Accidents

The following graphs show the aircraft accident rates (accidents per estimated 100,000 hours flown) three year moving average for the three-year period ending 31 December 2013 (excluding the aircraft statistics categories Sport Aircraft, Hang Gliders and Parachutes). Trends for each group are shown immediately following the group. Dashed segments indicate significant use of forecasting.

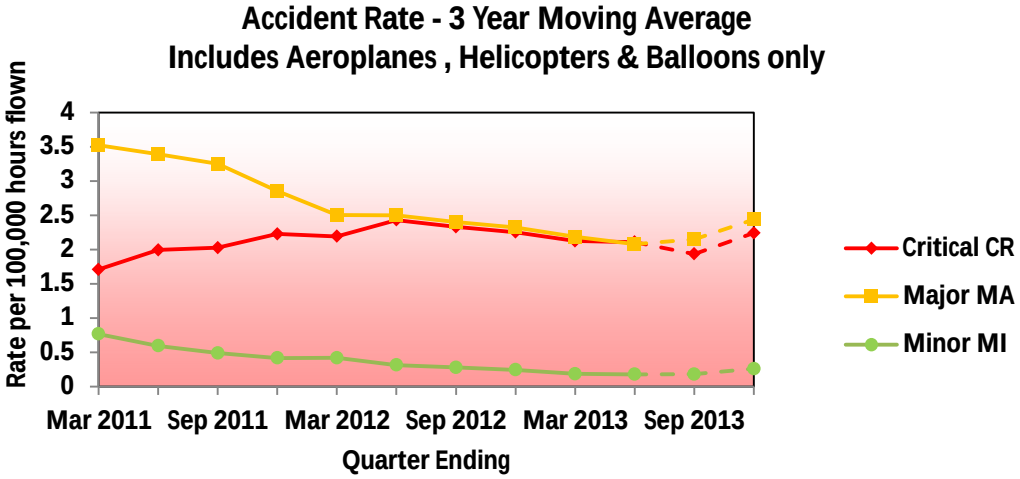
Breakdown by Aircraft Category





Aircraft Category	Straight Line Trend of 3 Year Moving Average
Large Aeroplanes	Trending Down
Medium Aeroplanes	Trending Down
Small Aeroplanes	Trending Down
Agricultural Aeroplanes	Trending Up
Helicopters	Trending Down

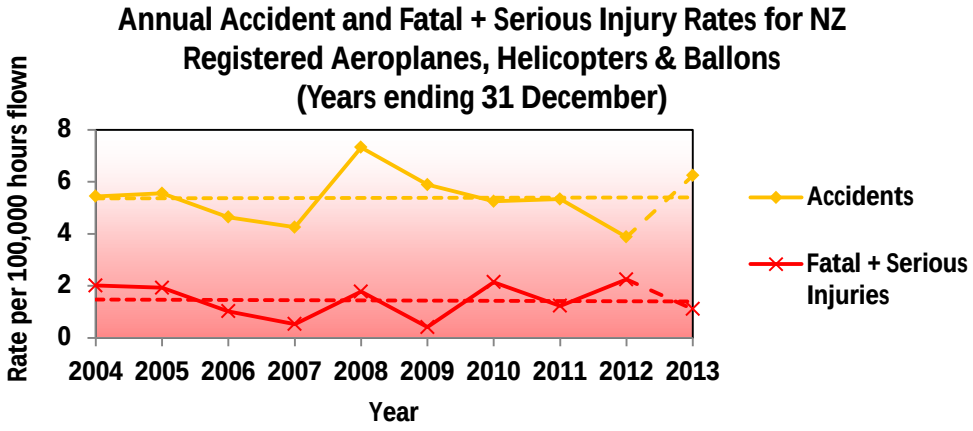
Breakdown by Severity



Severity	Straight Line Trend of 3 Year Moving Average
Critical	Constant
Major	Trending Down
Minor	Trending Down

Long-Term Accident Rate

The following graph shows the overall annual accident rate per 100,000 hours flown for the 10 year period ending 31 December 2013. Hang gliders and parachutes are excluded because no reliable hours flown data is available for those classes.



Note that this graph does not show a moving average and because it also includes some but not all sport aircraft it is not appropriate to compare it to the other accident rate graphs in the report.

Yearly Comparisons – counts, not rates

Critical Accidents

Aircraft Category	Year Ending Dec 2013	Year Ending Dec 2012	Average 3 Prior Yrs
Large Aeroplanes	1	0	0.0
Medium Aeroplanes	0	0	0.3
Small Aeroplanes	8	2	8.3
Helicopters	10	9	11.0
Sport Aircraft	12	15	15.7
Agricultural Aeroplanes	2	3	1.3
Hang Gliders	9	8	5.0
Parachutes	1	5	2.0
Unknown	1	0	0.0
Total	44	42	43.7

Major Accidents

Aircraft Category	Year Ending Dec 2013	Year Ending Dec 2012	Average 3 Prior Yrs
Large Aeroplanes	1	0	0.7
Medium Aeroplanes	0	0	0.7
Small Aeroplanes	18	7	12.0
Helicopters	9	6	8.7
Sport Aircraft	18	13	17.3
Agricultural Aeroplanes	6	5	2.7
Hang Gliders	2	2	5.7
Parachutes	2	6	3.7
Unknown	0	0	0.0
Total	56	39	51.3

Minor Accidents

Aircraft Category	Year Ending Dec 2013	Year Ending Dec 2012	Average 3 Prior Yrs
Large Aeroplanes	0	0	1.3
Medium Aeroplanes	0	0	0.3
Small Aeroplanes	2	2	1.7
Helicopters	1	0	0.0
Sport Aircraft	5	2	1.7
Agricultural Aeroplanes	1	0	0.7
Hang Gliders	4	2	7.3
Parachutes	1	1	1.3
Unknown	1	0	0.0
Total	15	7	14.3

All Accidents

Aircraft Category	Year Ending Dec 2013	Year Ending Dec 2012	Average 3 Prior Yrs
Large Aeroplanes	2	0	2.0
Medium Aeroplanes	0	0	1.3
Small Aeroplanes	28	11	22.0
Helicopters	20	15	19.7
Sport Aircraft	35	30	34.7
Agricultural Aeroplanes	9	8	4.7
Hang Gliders	15	12	18.0
Parachutes	4	12	7.0
Unknown	2	0	0.0
Total	115	88	109.3

Safety Target Structure

The 2010 Safety Targets classify all New Zealand aviation under three broad group headings: Public Air Transport, Other Commercial Operations, and Non-commercial Operations. Thirteen further sub-groups enable differentiation between aeroplanes, helicopters, and sport aircraft, and also allow for different weight groups. This section presents the same accidents as the previous section but classified by type of operation (sector) rather than type of aircraft.

Number of Accidents

The following table shows, for each safety target group, the number of accidents each year for the one year period ending 31 December 2013, the previous year and the annual average for the three prior years. All aircraft types are included

Safety Outcome Target Group	Year Ending Dec 2013	Year Ending Dec 2012	Average 3 Prior Yrs
Airline Operations - Large Aeroplanes	**2**	0	2.0
Airline Operations - Medium Aeroplanes	**0**	0	1.3
Airline Operations - Small Aeroplanes	**3**	0	2.3
Airline Operations - Helicopter	**5**	3	2.0
Sport Transport	**3**	7	12.0
Other Commercial Operations - Aeroplane	**10**	3	10.3
Other Commercial Operations - Helicopter	**4**	3	6.3
Agricultural Operations - Aeroplane	**8**	8	4.3
Agricultural Operations - Helicopter	**4**	7	4.3
Private Operations - Aeroplane	**15**	7	8.7
Private Operations - Helicopter	**7**	2	7.0
Private Operations - Sport	**52**	48	48.7
Other	**2**	1	1.0
Total	**115**	**89**	**110.3**

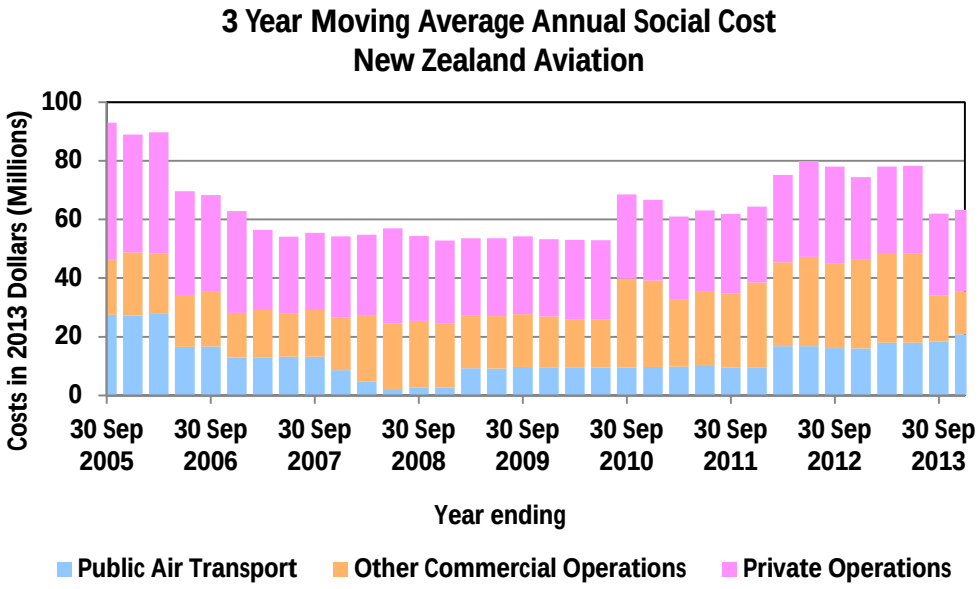
Social Cost

Social cost is the cost of fatal, serious and minor injuries and aircraft destroyed. The following table displays the social cost in millions of dollars (2013$) for each safety target group for the year ending 31 December 2013, the previous year and the annual average for the three prior years.

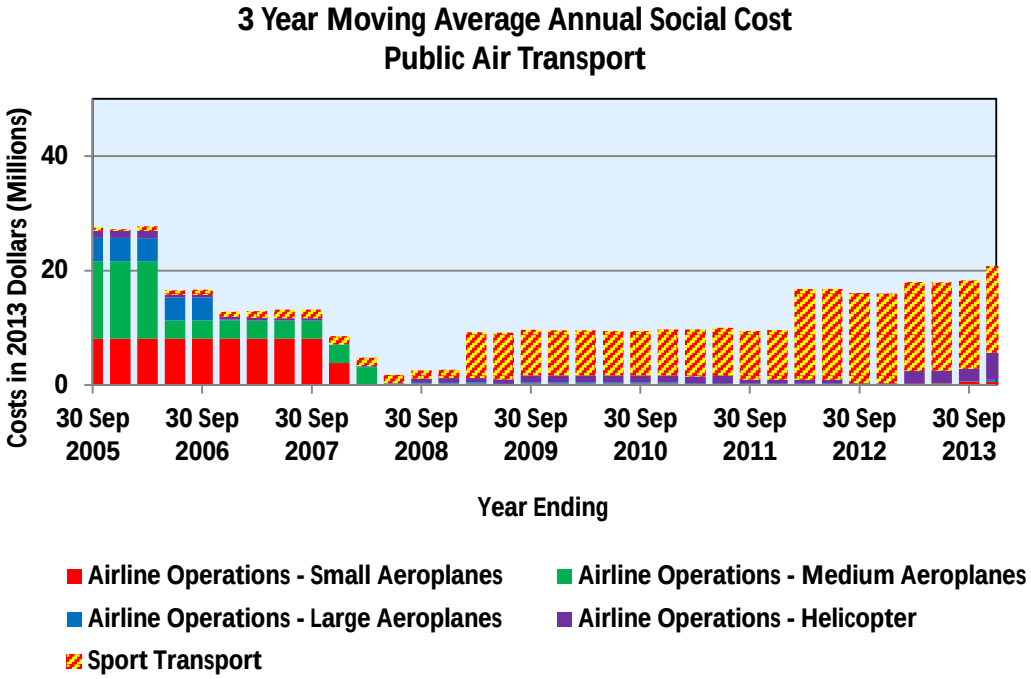
Safety Outcome Target Group	Year Ending Dec 2013	Year Ending Dec 2012	Average 3 Prior Yrs
Airline Operations - Large Aeroplanes	**0.96**	0.05	0.03
Airline Operations - Medium Aeroplanes	**0.00**	0.00	0.02
Airline Operations - Small Aeroplanes	**1.70**	0.00	0.26
Airline Operations - Helicopter	**13.27**	0.00	0.68
Sport Transport	**0.64**	43.14	8.64
Other Commercial Operations - Aeroplane	**0.76**	0.00	16.45
Other Commercial Operations - Helicopter	**0.35**	0.40	11.32
Agricultural Operations - Aeroplane	**0.65**	5.54	0.57
Agricultural Operations - Helicopter	**3.89**	5.13	0.54
Private Operations - Aeroplane	**0.17**	1.57	4.37
Private Operations - Helicopter	**1.38**	4.19	3.19
Private Operations - Sport	**13.78**	31.66	18.27
Other	**8.50**	0.02	0.00
Total	**46.05**	**91.7**	**64.35**

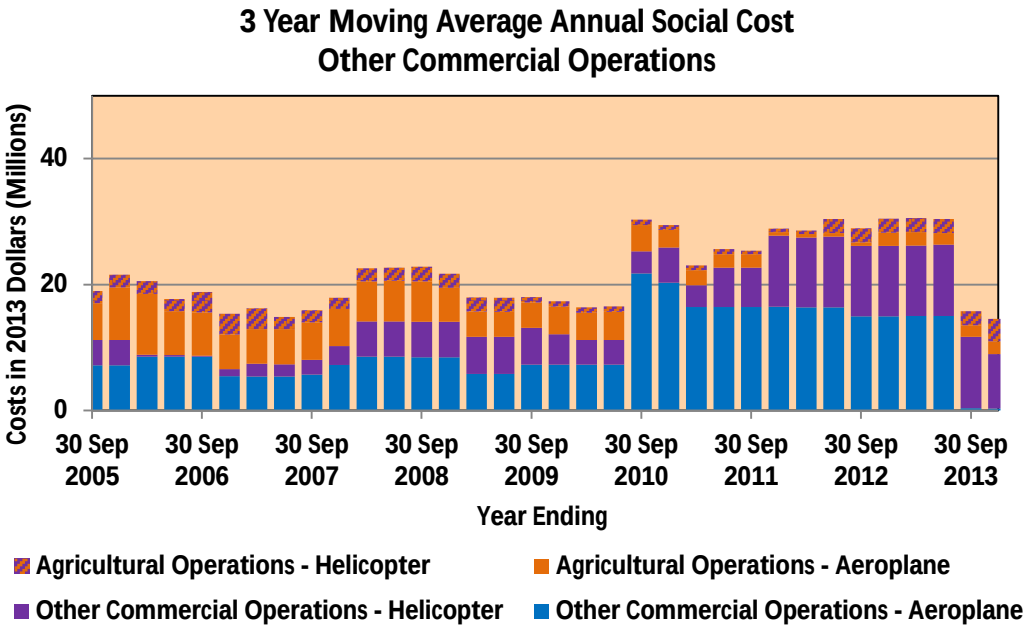
The following charts show the annual social cost (3 year moving average) for each Safety Target Group for the period 1 October 2005 to 31 December 2013. Social cost is the cost of fatal, serious and minor injuries, and aircraft destroyed, expressed in 2013 dollars. Note that the Sport groups include hang gliders and parachutes.

The first chart shows a breakdown into the three major groupings, Public Air Transport, Other Commercial and Private operational groupings.

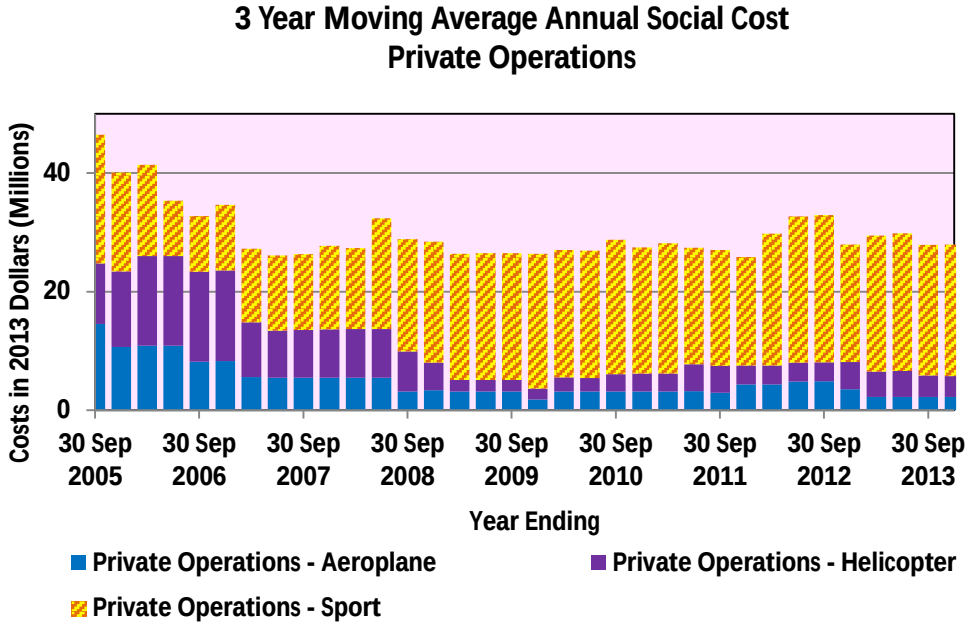


The next three charts show breakdowns of each of the major groupings into their individual Safety Outcome Target Groups



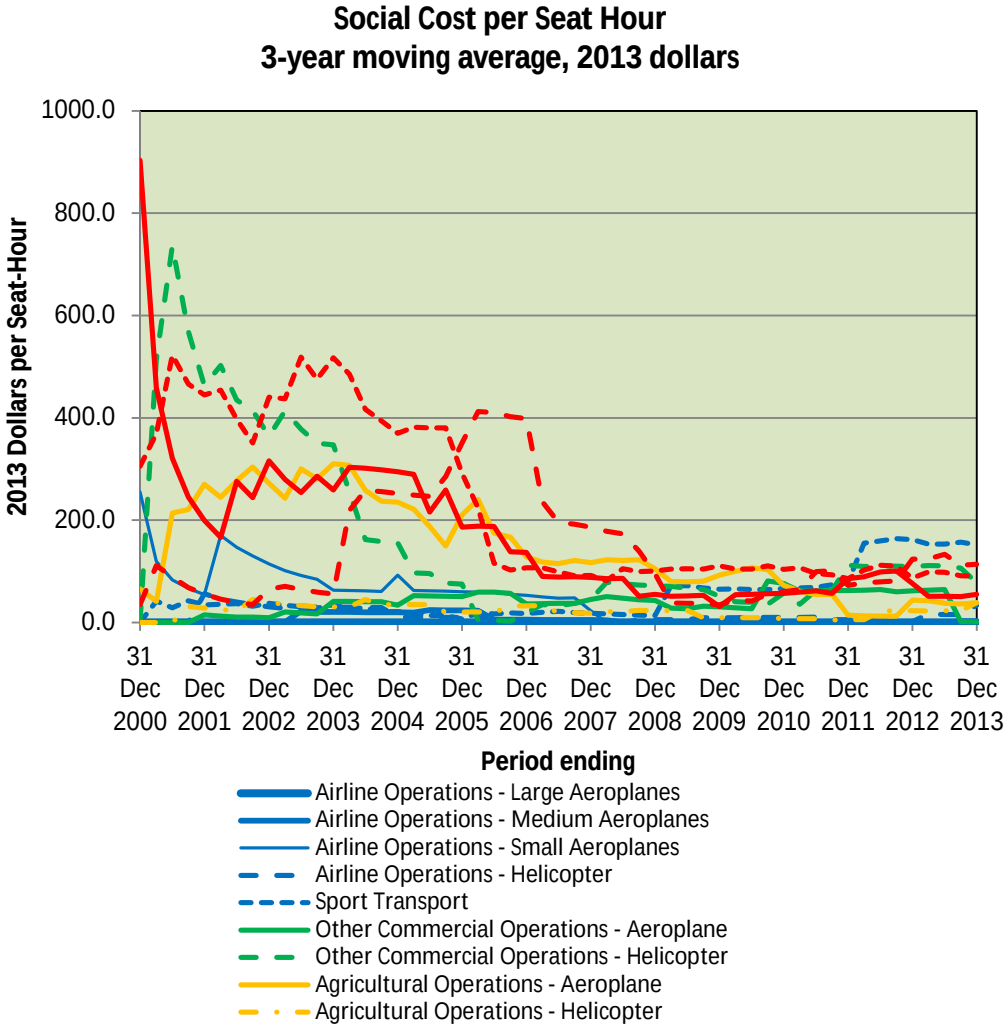


The sudden drop to zero for the 'Other Commercial Aeroplane' series is due to the Fox Glacier accident dropping out of the 3 year averaging process. Note that Other Commercial – Helicopters (purple) remains a significant component of social cost.

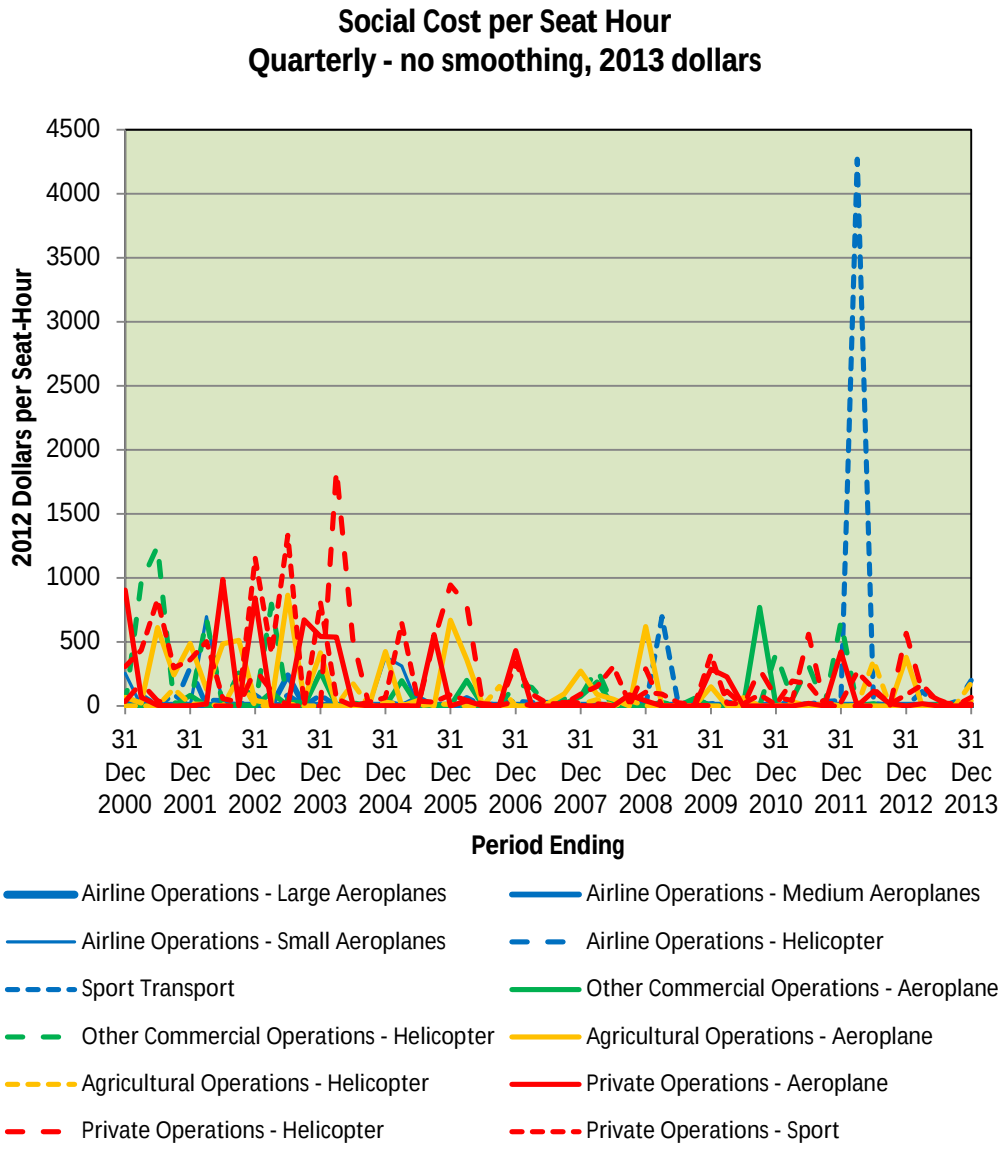


Note 'Private Operations –Sport' includes aircraft types microlight, amateur built and parachute paraglider and accordingly represents a large number of aircraft

The following graph illustrates an apparent steady decline in the Social Cost **per Seat-Hour** (three year moving average) over the period since the 3rd quarter of 2000. Since the 4th quarter of 2008 the decline has become relatively indiscernible and it may be that social cost levels have reached or are approaching a practical minimum for the current intervention practices. The recent increase in 'Sport Transport (Pt 115) is still showing the effect of the Carterton Balloon Accident (3 year averaging).



However the use of 3-year moving average smoothing to render the graphs more readable has the side effect of masking any abrupt changes in the data. The following graph of the same data with all the smoothing removed shows that major unexpected downturns can occur with no prior warning from this kind of analysis.


Social Cost per Seat Hour
Quarterly - no smoothing, 2013 dollars
2012 Dollars per Seat-Hour
4500
4000
3500
3000
2500
2000
1500
1000
500
0
31 Dec 2000
31 Dec 2001
31 Dec 2002
31 Dec 2003
31 Dec 2004
31 Dec 2005
31 Dec 2006
31 Dec 2007
31 Dec 2008
31 Dec 2009
31 Dec 2010
31 Dec 2011
31 Dec 2012
31 Dec 2013
Period Ending
Airline Operations - Large Aeroplanes
Airline Operations - Medium Aeroplanes
Airline Operations - Small Aeroplanes
Airline Operations - Helicopter
Sport Transport
Other Commercial Operations - Aeroplane
Other Commercial Operations - Helicopter
Agricultural Operations - Aeroplane
Agricultural Operations - Helicopter
Private Operations - Aeroplane
Private Operations - Helicopter
Private Operations - Sport

Safety Outcome Targets

Each target group has its own target level expressed as social cost per unit of passenger exposure, the unit being one seat hour. For target groups that are not predominantly passenger carrying a surrogate of 500 kg of aircraft weight is used instead of passenger exposure. These outcome targets represent the maximum level of social cost considered acceptable for each group.

The table below shows the average Safety Outcomes in 2013 dollars per seat-hour (including the cost of aircraft destroyed) for the three year period ending 31 December 2013. Target groups highlighted in yellow are groups where major safety improvements need to be achieved as the sector is significantly above the target level . Red text has been used to draw attention to groups with significant recent safety failures (accidents).

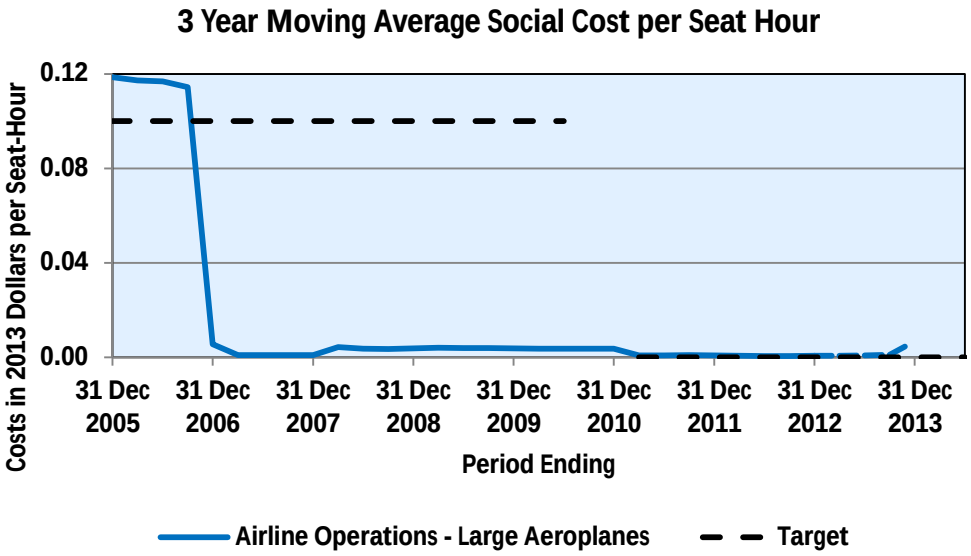
Safety Target Group	Current Estimate	Target
Airline Operations - Large Aeroplanes	0.01	0.00
Airline Operations - Medium Aeroplanes	0.00	0.02
Airline Operations - Small Aeroplanes	5.15	2.34
Airline Operations - Helicopter	33.67	6.50
Sport Transport	151.74	13.00
Other Commercial Operations - Aeroplane	1.36	6.50
Other Commercial Operations - Helicopter	77.73	6.50
Agricultural Operations - Aeroplane	38.67	14.00
Agricultural Operations - Helicopter	38.70	8.56
Private Operations - Aeroplane	54.99	10.00
Private Operations - Helicopter	113.83	10.00
Private Operations - Sport	90.64	20.00

Current Estimate:

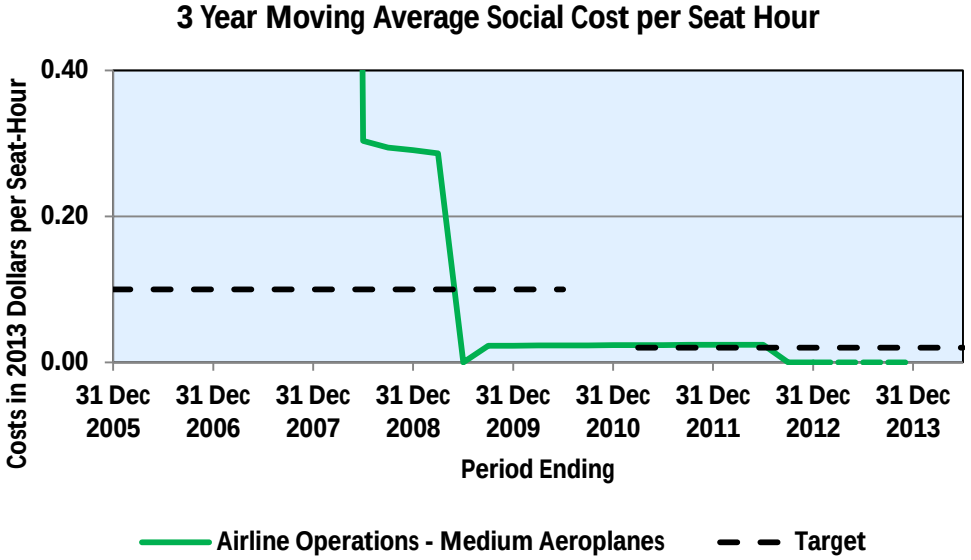
This is the estimated social cost of injuries and aircraft destroyed per seat hour for the three year period. Note: Aviation Safety reports prior to July to December 2008 used a 10 year averaging period for large and medium aeroplanes and a one year period for all others.

Safety Target Graphs

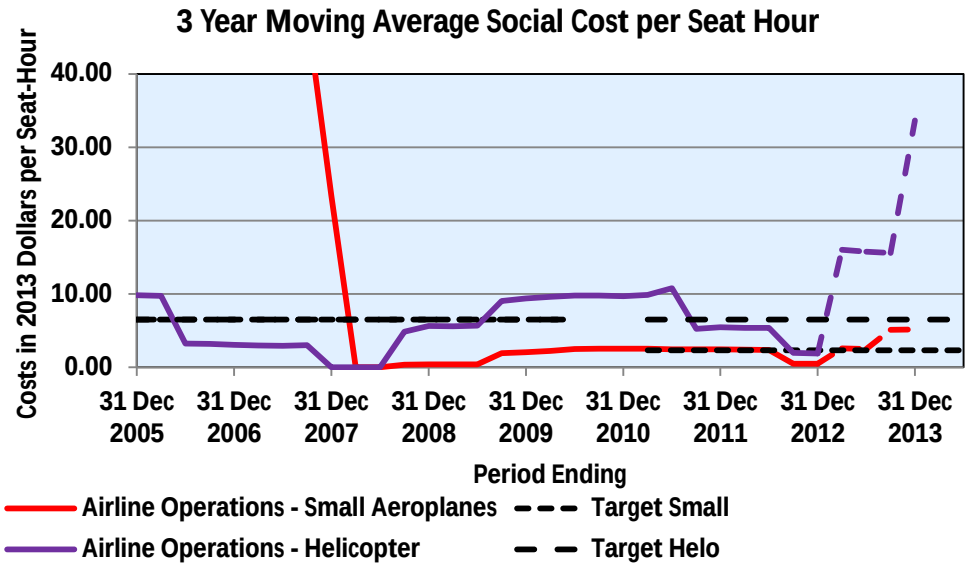
Graphs displaying the Safety Outcome Targets and the quarterly progress of Safety Outcomes derived using 3 year averages are shown on the following pages. These graphs span the period from 1 October 2005 when Social Cost targets were introduced to 30 June 2014 when the current targets are due for review.



The outcome for Airline Operations – Large Aeroplanes remained well below the initial target level of $0.10 per seat hour of exposure from late 2006 until the targets were revised in 2011. The new target appears on the graph as 0 but is actually $0.0034 and the current performance has been significantly below the target. There is no significant recent trend either up or down. No fatal, 2 serious and 14 minor injuries were reported in this group during the 3 year period ending 31 December 2013.

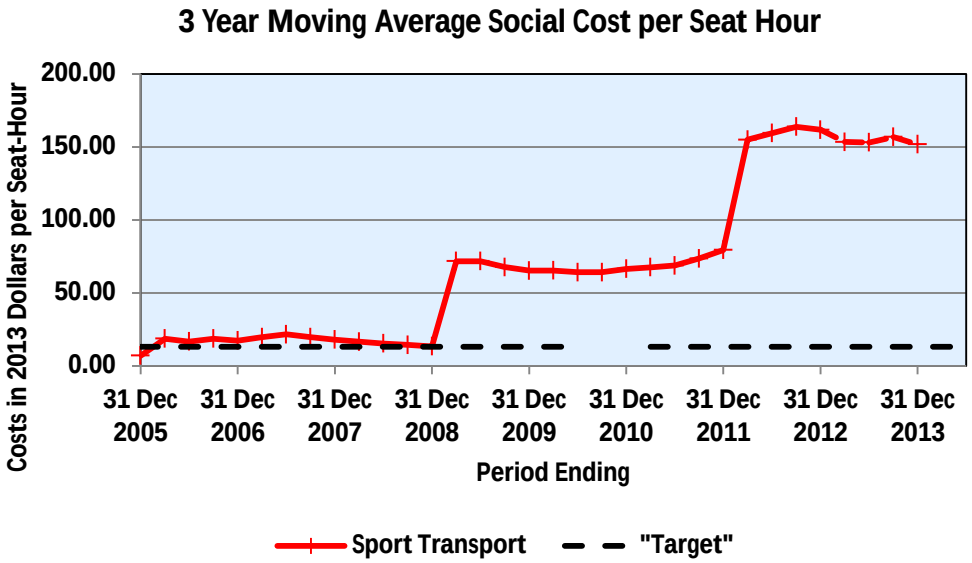


The outcome for Airline Operations – Medium Aeroplanes dropped below the initial target during the second quarter of 2009 and is trending down. The outcome is now below the new target of $0.02 per seat hour. No fatal, no serious and no minor injuries were reported in this group during the 3 year period ending 31 December 2013.



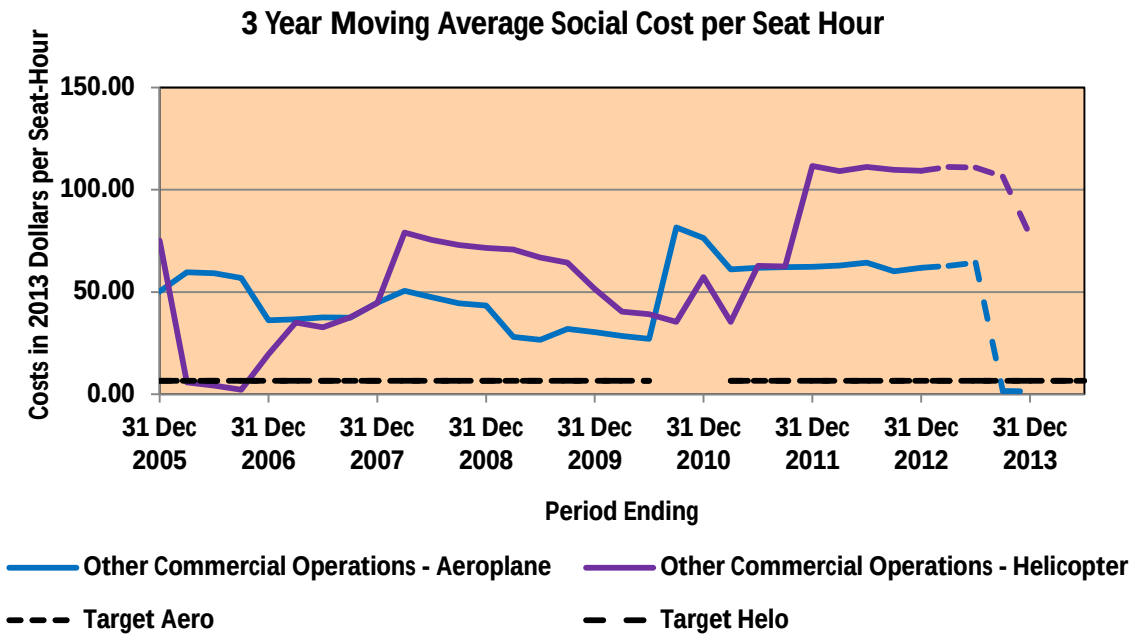
The outcome for Airline Operations – Small Aeroplanes shows a significant long term downward trend from the high starting point of $45.64 per seat-hour of exposure in the three years to September 2007. The safety outcome for this group has been below the initial target level since the January to March 2008 quarter but exceeded the new target of $2.34 by a very small amount until the July to August quarter of 2012 when it fell below the target where it remained until the January to March quarter of 2013 when it again exceeded the target which it has continued to do. No fatal, 3 serious and no minor injuries were reported in this group during the 3 year period ending 31 December 2013.

The outcome for Airline Operations – Helicopter exceeded the target level until the second quarter of 2006 and it has done so again since the 3rd quarter of 2009. A small upward trend is evident. The new target of $6.50 per seat hour is the same as the old value and was achieved again from the 3rd quarter of 2011 until the 1st quarter of 2013 since when two fatal injuries have caused the target to be exceeded. 2 fatal, 2 serious and 7 minor injuries were reported in this group during the 3 year period ending 31 December 2013.



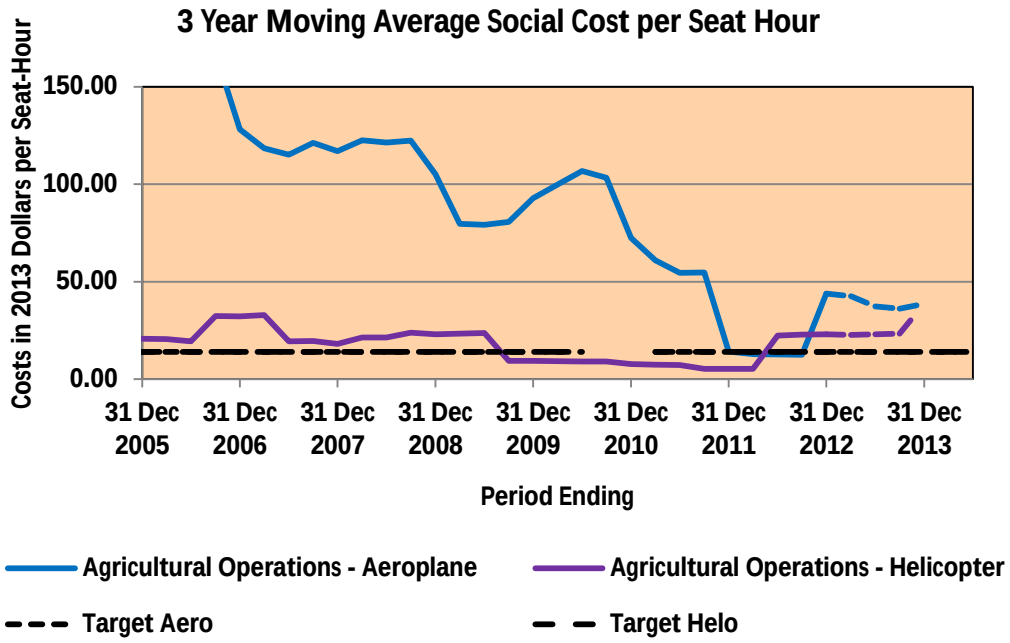
Two hang glider, two microlight and one glider fatalities during the first quarter of 2009 and 11 balloon fatalities in 2012 have contributed to a significant increase in the upward trend displayed by this group. The outcome exceeds the target of $13.00 by a large margin. 11 fatal, 6 serious and 14 minor injuries were reported in this group during the 3 year period ending 31 December 2013.

Note that this group includes hang gliders and parachutes used on Part 115 air transport operations.



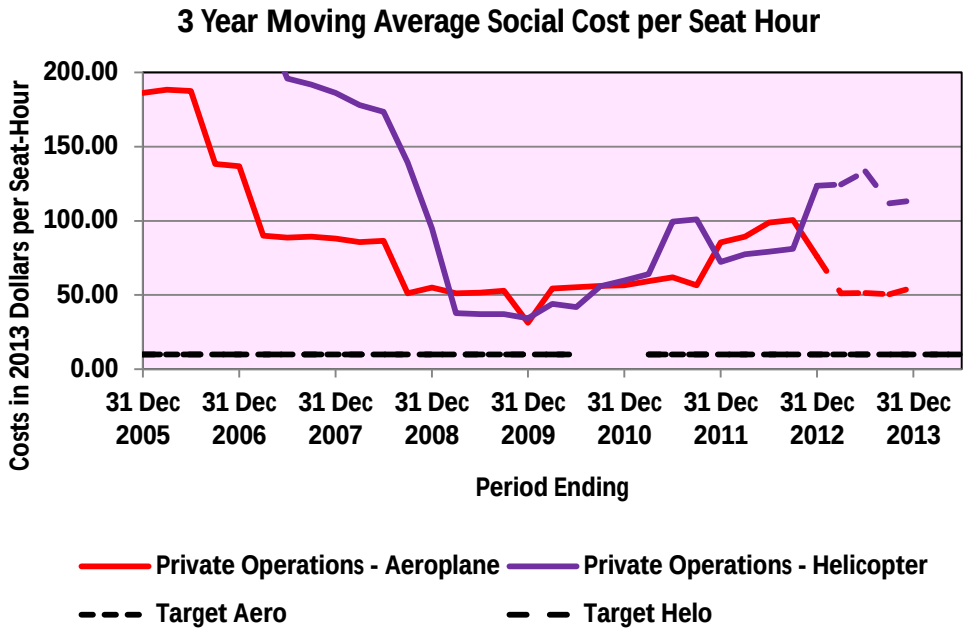
The outcome for Other Commercial Operations – Aeroplane has again fallen below the target of $6.50 per seat hour as a result of the Fox Glacier accident with 7 fatalities that has worked its way out of the 3 year averaging period. **No fatal**, 1 serious and 1 minor injuries were reported in this group during the 3 year period ending 31 December 2013.

The outcome for Other Commercial Operations – Helicopter turned sharply upwards during the first quarter of 2008 and again in the 3rd quarter of 2011. It remains well above the target level of $6.50 per seat hour. **5 fatal**, 2 serious and 4 minor injuries were reported in this group during the 3 year period ending 31 December 2013.



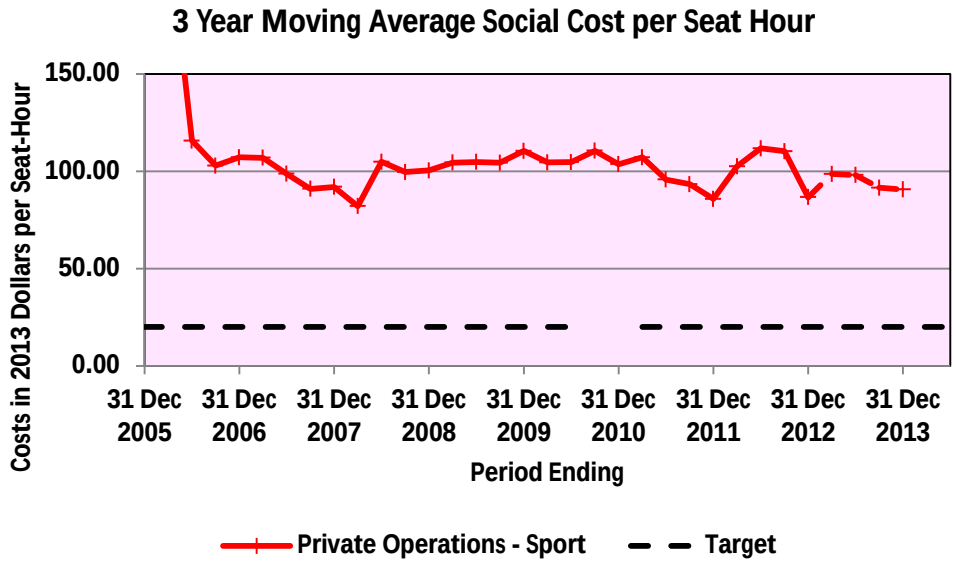
The outcome for Agricultural Operations – Aeroplanes has been well above the target level of $14.00 per seat hour but has been steadily trending down and this group achieved its target in the 4th quarter of 2011. A fatality in the 4th quarter of 2012 again took the outcome above the target. **1 fatal**, 1 serious and 1 minor injuries were reported in this group during the 3 year period ending 31 December 2013.

The outcome for Agricultural Operations – Helicopter was below the target level of $8.56 per seat hour from the 3rd quarter of 2009 until the 2nd quarter of 3011 but a fatality during that quarter resulted in the target again being exceeded from the 2nd quarter of 2012. **2 fatal**, no serious and 1 minor injuries were reported in this group during the 3 year period ending 31 December 2013.



The outcome for Private Operations – Aeroplanes had been slowly trending down since late 2005 but remained well above the target of $10.00 per seat hour. The downward trend reversed in the first quarter of 2010 although the upward trend has now been arrested. 1 fatal, 5 serious and 1 minor injuries were reported in this group during the 3 year period ending 31 December 2013.

The outcome for Private Operations – Helicopters was trending down from early 2006 but remained above the target of $10.00 per seat hour. From the first quarter of 2009 the downward trend has reversed. 2 fatal, 2 serious and 4 minor injuries were reported in this group during the 3 year period ending 31 December 2013.

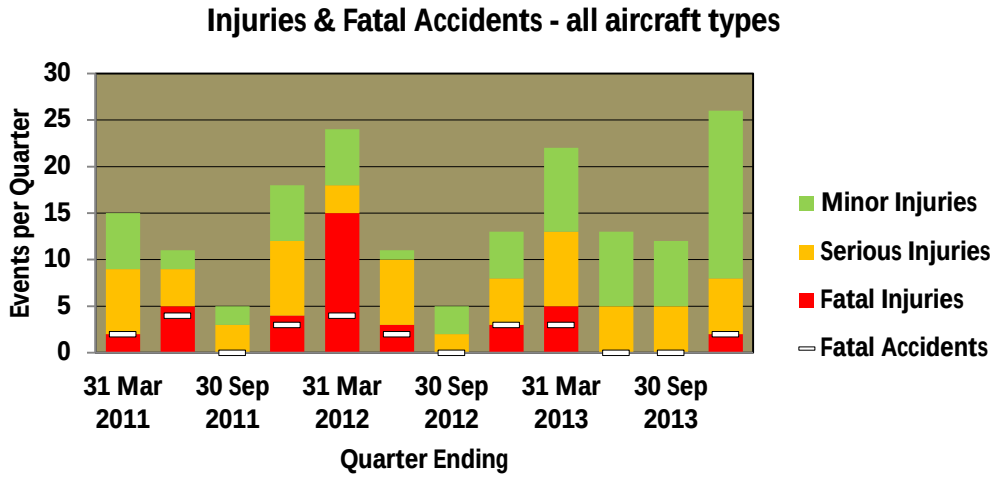


The outcome for Private Operations – Sport is well above the target level of $20.00 per seat hour and shows no significant trend. 13 fatal, 39 serious and 26 minor injuries were reported in this group during the 3 year period ending 31 December 2013.

Note that this group includes hang gliders and parachutes used on private operations.

Injury Accidents

The following chart shows the number of injuries, broken down by severity (fatal, serious or minor) in each quarter of the 3-year period ending 31 December 2013. All aircraft types are included. The chart also shows the number of fatal accidents.



A breakdown of the same three years' data by Safety Outcome Target Group is shown in the table below.

Safety Target Group	Injuries			Fatal Accidents
	Fatal	Serious	Minor	
Airline Operations - Large Aeroplanes	0	2	14	0
Airline Operations - Medium Aeroplanes	0	0	0	0
Airline Operations - Small Aeroplanes	0	3	0	0
Airline Operations - Helicopter	2	2	7	2
Sport Transport	11	6	14	1
Other Commercial Operations - Aeroplane	0	1	1	0
Other Commercial Operations - Helicopter	5	2	4	3
Agricultural Operations - Aeroplane	1	1	1	1
Agricultural Operations - Helicopter	2	0	1	2
Private Operations - Aeroplane	1	5	1	1
Private Operations - Helicopter	2	2	4	2
Private Operations - Sport	13	39	26	10
Other	2	0	0	1

Yearly Comparison

The following table displays the number of fatalities for each safety target group for the year ending 31 December 2013, the previous year and the average of the three prior years.

Safety Outcome Target Group	Year Ending Dec 2013	Year Ending Dec 2012	Average 3 Prior Yrs
Airline Operations - Large Aeroplanes	**0**	0	0.00
Airline Operations - Medium Aeroplanes	**0**	0	0.00
Airline Operations - Small Aeroplanes	**0**	0	0.00
Airline Operations - Helicopter	**2**	0	0.00
Sport Transport	**0**	11	1.67
Other Commercial Operations - Aeroplane	**0**	0	4.00
Other Commercial Operations - Helicopter	**0**	0	2.33
Agricultural Operations - Aeroplane	**0**	1	0.00
Agricultural Operations - Helicopter	**1**	1	0.00
Private Operations - Aeroplane	**0**	0	1.00
Private Operations - Helicopter	**0**	1	0.33
Private Operations - Sport	**2**	7	3.67
Other	**2**	0	0.00
Total	**7**	**21**	**13.00**

The fatalities for the last 12 months have decreased markedly partly due to the Carterton Balloon accident falling outside the range, but notice also the reduction within the Private – Sport Sector. (the ‘Other’ sector relates to the US registered Beech B58 aircraft that crashed near Raglan) The reduction in sport aircraft fatalities is offset by 2 fatalities in Airline – Helicopter operations.

Flight Phase

The following table shows the flight phase recorded for accidents for the year ending 31 December 2013, the previous year and the average of the three prior years. The figures include all aircraft types.

Flight Phase	Year Ending Dec 2013	Year Ending Dec 2012	Average 3 Prior Yrs
Aerobatics	0	1	0.0
Agricultural Manoeuvres	2	5	2.7
Approach	5	5	5.3
Circuit	0	0	0.7
Climb	6	2	7.7
Cruise	14	7	11.3
Descent	3	6	3.3
Holding	0	0	0.0
Hover	4	2	3.7
Hover Taxi	2	1	0.0
Landing	47	35	37.3
Parked	5	5	2.7
Takeoff	16	11	22.3
Taxiing	3	3	4.3
Unknown	8	6	9.0
Total	115	89	110.3

The most common phase of flight during which accidents occurred in the year ending 31 December 2013 was the Landing phase (41%)

The most common descriptor associated with Landing phase accidents during the year ending 31 December 2013 was 'Hard Landing' (24%)

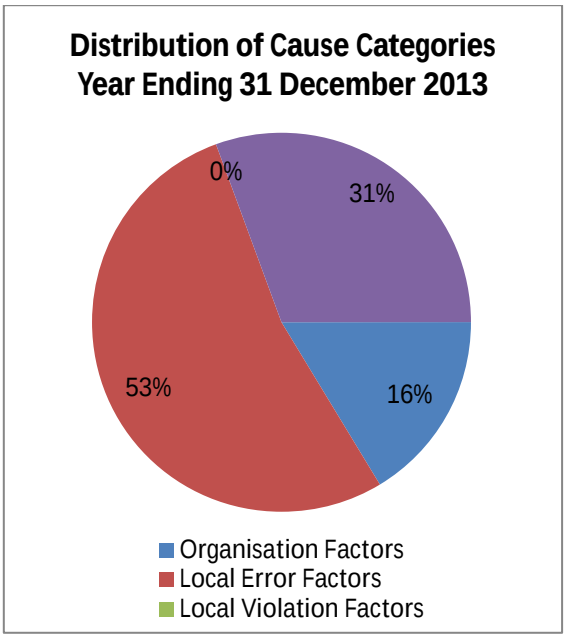
The most common cause (at 16.7%) recorded for Landing phase accidents during the year ending 31 December 2013 was 'Local Error Factors - RISK MISPERCEPTION'

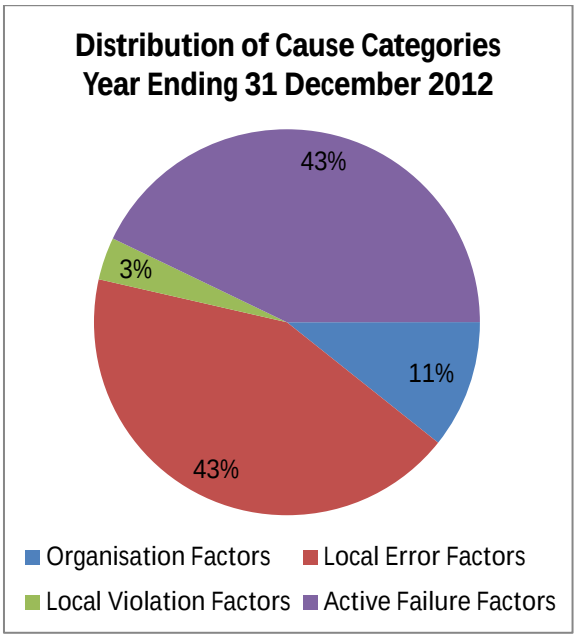
This ratio of accident by flight phase is largely unchanged from previous years and reflects the fact that landing is the highest risk phase of flight.

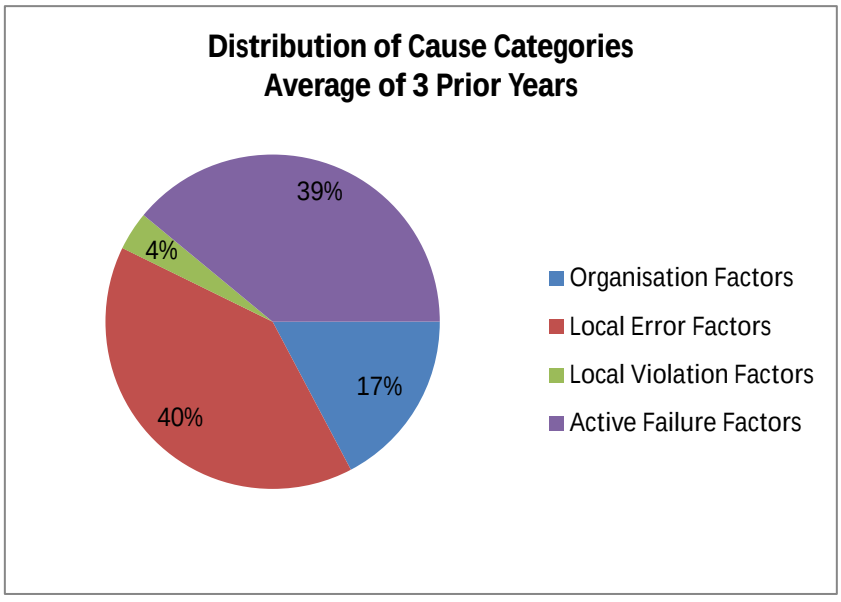
Accident Causal Factors

Causal factors have been assigned to 31 (27%) of the 115 accidents that were reported as occurring during the year ending 31 December 2013. This compares with 42% for the same period in the previous year and an average of 66% over the last three years. In making this comparison it is important to remember that the assignment of causal factors is an outcome of an investigation and for the current period may not be completed in time for inclusion in this report

The following charts show the distribution of cause categories (groupings of causal factors) recorded for accidents that occurred during the year ending 31 December 2013, the same period for the previous year and the average for the last three years.



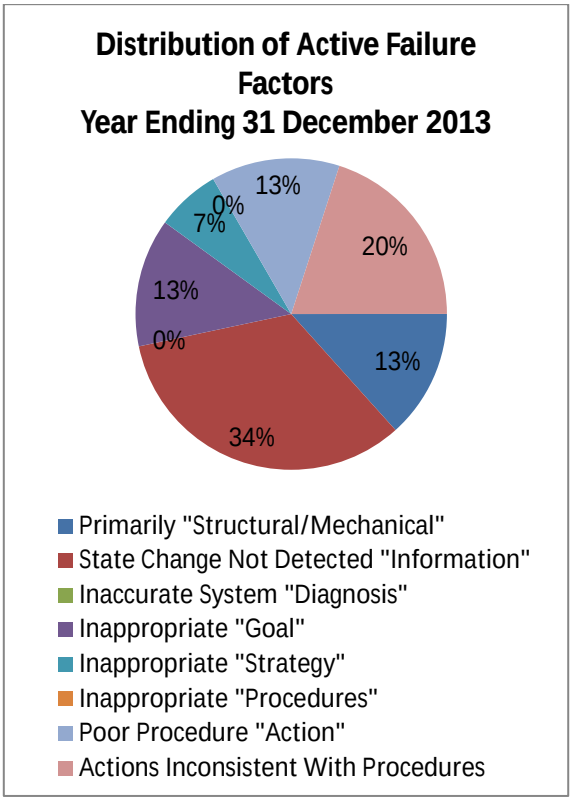


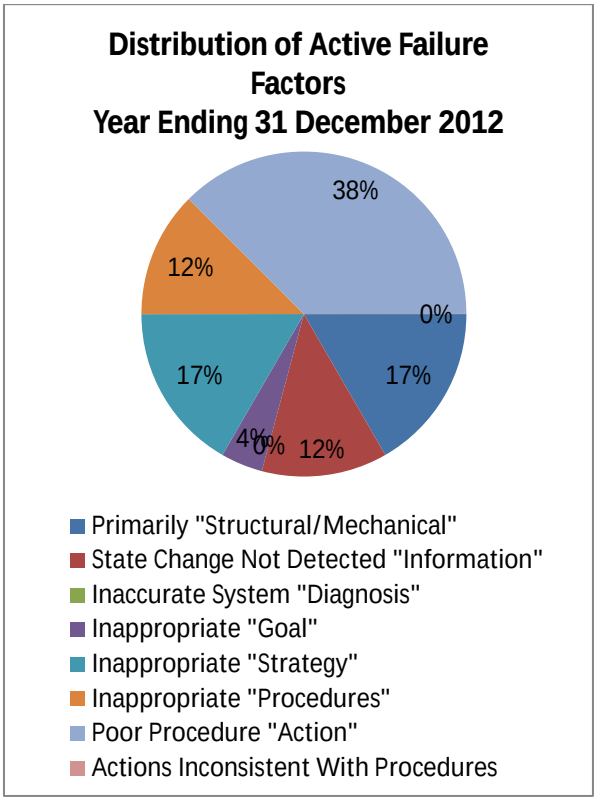


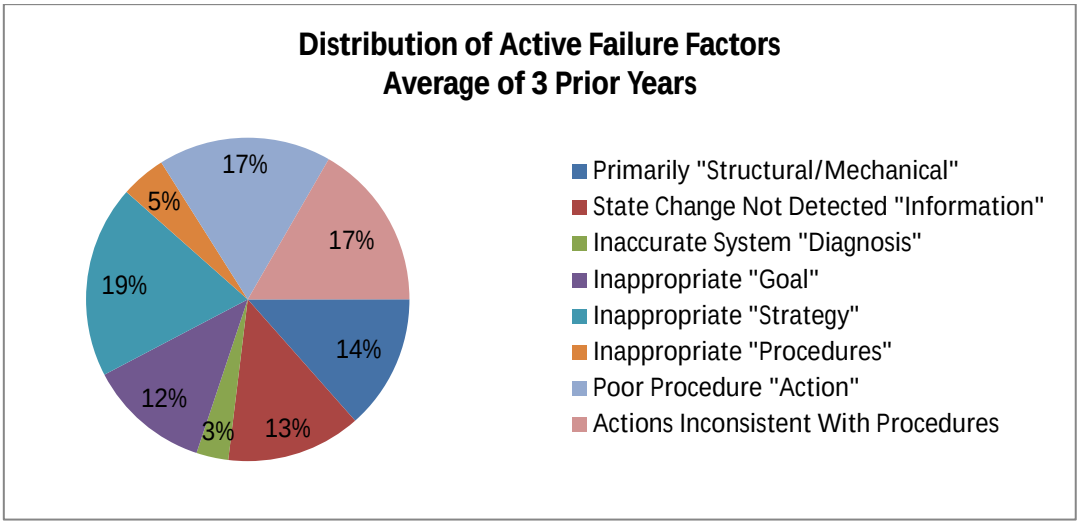
Active Failure Factors

The Active Failure cause category has been further analysed on the grounds that whatever precursor latent failures may exist and be discovered during a subsequent investigation, at least one 'Unsafe Act' (e.g. Omitted checklist item, Exceeded ability etc.) must occur for an accident to result. These unsafe acts are collectively grouped as Active Failure Factors.

The following charts show the distribution of Active Failure causes during the same periods as above.



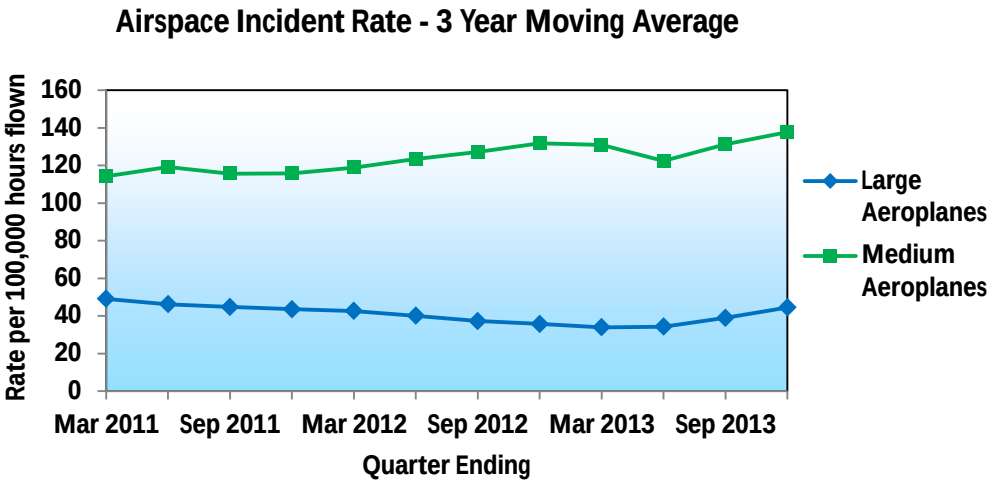


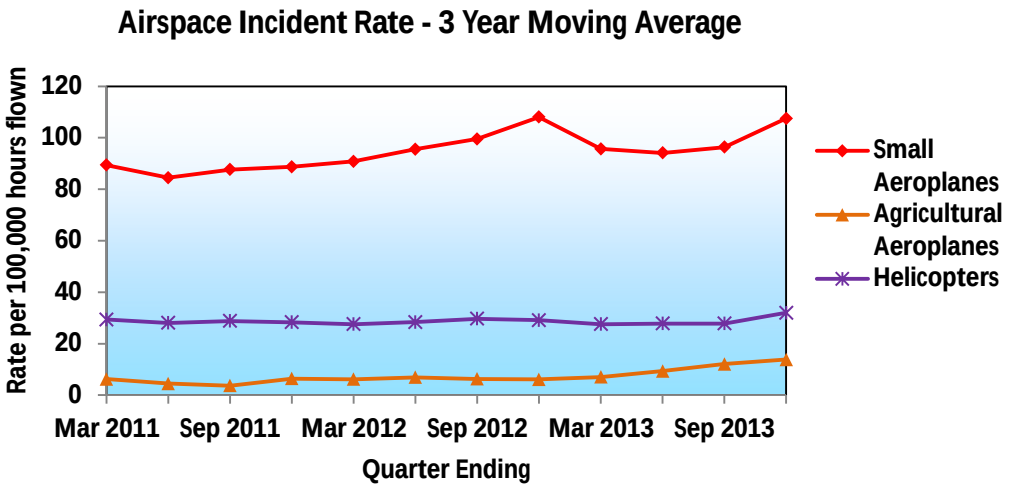


Airspace Incidents

The following graphs show the airspace incident reporting rates (incidents per 100,000 hours flown) three year moving average for the three-year period ending 31 December 2013 (excluding the Sport Aircraft category). The graphs do not differentiate between incidents that are pilot or ATS attributable.

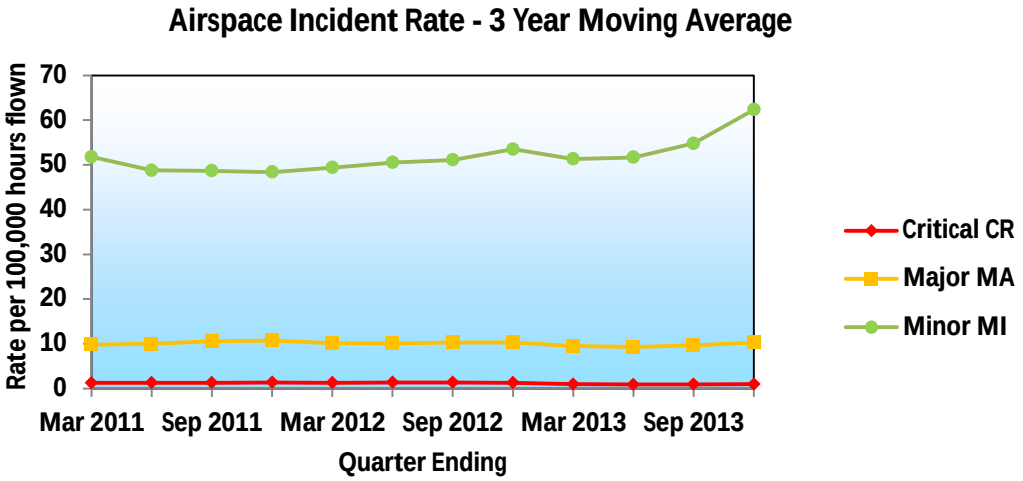
Breakdown by Aircraft Category





Aircraft Category	Straight Line Trend of 3 Year Moving Average
Large Aeroplanes	Trending Down
Medium Aeroplanes	Constant
Small Aeroplanes	Constant
Agricultural Aeroplanes	Trending Up
Helicopters	Constant

Breakdown by Severity



Severity	Straight Line Trend of 3 Year Moving Average
Critical	Trending Down
Major	Constant
Minor	Constant

Although the three year trend for minor airspace events is approximately constant when averaged this way, the last 12 months has seen an increase which is being investigated to determine underlying causes before a 3 year trend is evident.

Yearly Comparisons

By Aircraft Category

Critical Airspace Incidents

Aircraft Category	Year Ending Dec 2013	Year Ending Dec 2012	Average 3 Prior Yrs
Large Aeroplanes	0	0	1.0
Medium Aeroplanes	2	0	0.3
Small Aeroplanes	7	6	8.0
Helicopters	1	1	3.3
Sport Aircraft	2	1	1.3
Agricultural Aeroplanes	0	0	0.3
Not Recorded	4	0	2.3
Total	16	8	16.7

Major Airspace Incidents

Aircraft Category	Year Ending Dec 2013	Year Ending Dec 2012	Average 3 Prior Yrs
Large Aeroplanes	14	17	14.7
Medium Aeroplanes	10	12	11.0
Small Aeroplanes	62	61	63.7
Helicopters	15	10	10.7
Sport Aircraft	9	7	10.0
Agricultural Aeroplanes	1	0	0.3
Not Recorded	38	55	38.0
Total	149	162	148.3

Minor Airspace Incidents

Aircraft Category	Year Ending Dec 2013	Year Ending Dec 2012	Average 3 Prior Yrs
Large Aeroplanes	139	99	125.7
Medium Aeroplanes	78	98	56.0
Small Aeroplanes	463	403	236.0
Helicopters	65	53	39.0
Sport Aircraft	86	59	37.0
Agricultural Aeroplanes	11	1	1.7
Not Recorded	424	390	270.3
Total	1266	1103	765.7

All Airspace Incidents

Aircraft Category	Year Ending Dec 2013	Year Ending Dec 2012	Average 3 Prior Yrs
Large Aeroplanes	153	116	141.3
Medium Aeroplanes	90	110	67.3
Small Aeroplanes	532	470	307.7
Helicopters	81	64	53.0
Sport Aircraft	97	67	48.3
Agricultural Aeroplanes	12	1	2.3
Not Recorded	466	445	310.7
Total	1431	1273	930.7

The highest number and greatest increase in airspace occurrence appears to be within the Small aircraft Sector. Most but not all of this is due to training flights.

By Nearest Airways Monitored Aerodrome

All Airspace Incidents	Year Ending Dec 2013	Year Ending Dec 2012	Average 3 Prior Yrs
Hamilton	**243**	**255**	97.0
Auckland	**131**	**104**	105.0
Christchurch	**105**	**77**	79.7
Tauranga	**98**	**74**	42.7
Wellington	**88**	**64**	65.7
Palmerston North	**57**	**39**	45.7
Queenstown	**53**	**48**	37.3
Rotorua	**47**	**40**	29.0
Dunedin	**45**	**27**	16.3
Napier	**33**	**21**	16.7
Nelson	**32**	**32**	42.0
Ohakea	**31**	**38**	28.7
New Plymouth	**30**	**19**	17.0
Paraparaumu	**25**	**52**	11.7
Woodbourne	**25**	**14**	23.0
Taupo	**24**	**32**	20.3
Gisborne	**23**	**15**	10.3
Whenuapai	**18**	**13**	7.3
Whakatane	**7**	**2**	2.0
Invercargill	**5**	**5**	7.3
Milford Sound	**3**	**2**	0.7
Other	**129**	**141**	129.3
Not Reported	**179**	**159**	96.0
Total	**1431**	**1273**	**930.7**

The relative positions of Hamilton and Auckland compared with their movements (page 23) is likely to reflect the involvement of training aircraft in airspace occurrences as Hamilton is reporting a much greater number of airspace occurrences despite comparable aircraft movements.

Air Traffic Service (ATS) and Pilot Attributable Airspace Incidents

Introduction

Airspace incidents are categorised as ATS, pilot, or ATS and pilot attributable. For the purposes of this analysis airspace incidents have been divided into those that have been identified to have an ATS attributable element and those that have a pilot attributable element. Accordingly there is some overlap in the number of occurrences reported where both ATS and pilot elements are involved. The following pages of this section report on apparent trends in ATS and pilot attributable occurrences.

ATS attributable airspace occurrences include those that are attributable to both New Zealand and external ATS organisations. External ATS organisations are included where information coordination problems have arisen or where a New Zealand registered aircraft has reported a conflict in non-NZ airspace.

Descriptors

Occurrence descriptors have been established for 1424 of the 1431 reported airspace incidents in the period Year Ending 31 December 2013

Note: each airspace incident may have more than one airspace occurrence descriptor.

Yearly Comparison

The following table shows the assignment of airspace occurrence descriptors that are associated with ATS attributable occurrences.

Descriptor	Year Ending Dec 2013	Year Ending Dec 2012	Average 3 Prior Yrs
ATS clearance/instruction deficiency	123	93	50.0
ATS coordination deficiency	132	111	68.3
ATS flight information deficiency	15	16	9.3
ATS flight planning system deficiency	18	25	15.7
Total	288	245	143

The following table shows the assignment of airspace occurrence descriptors that are associated with pilot attributable occurrences.

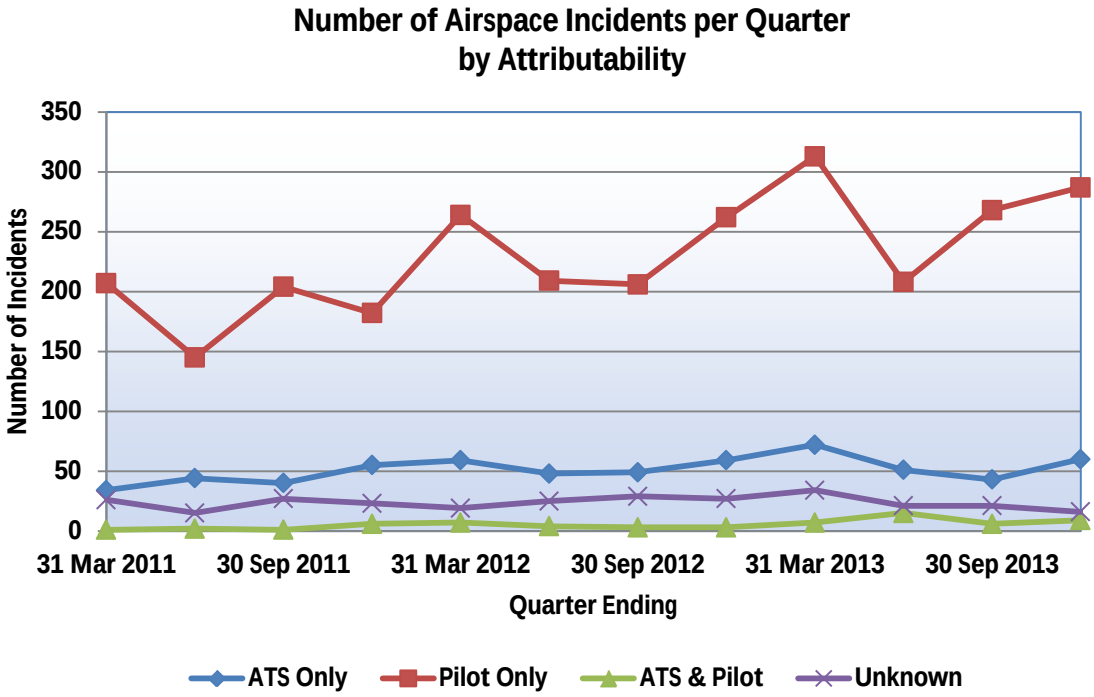
Descriptor	Year Ending Dec 2013	Year Ending Dec 2012	Average 3 Prior Yrs
Breach of other clearance	416	290	149.3
Flight assist	2	3	5.3
Pilot flight planning deficiency	35	26	16.7
Pilot position reporting deficiency	128	89	52.0
Pilot readback deficiency	8	5	3.7
Unauth airspace incursion	515	347	282.7
Unauth altitude penetration	228	157	80.7
Total	1332	917	419

The following table shows the assignment of airspace occurrence descriptors that could be associated with either ATS or pilot attributable occurrences.

Descriptor	Year Ending Dec 2013	Year Ending Dec 2012	Average 3 Prior Yrs
Controller/pilot datalink communications	0	2	0.3
Loss of separation	78	53	44.0
Near collision	19	14	35.3
Other	46	41	30.3
Reduced vertical separation minima	2	2	1.0
Short term conflict alert	6	7	1.7
Traffic collision avoidance system	98	80	113.0
Total	249	199	146

Trend

The following graph shows the quarterly numbers of airspace incident reports and their attributability for the three year period ending 31 December 2013.



Quarterly ASP incident report numbers show an upward trend for all attributabilities.

The number of "unknown" attributable airspace incidents reflects difficulties with coding of reports received by the CAA. Note that there is often a time delay between incidents occurring, being investigated, and attributability being assigned to either ATS or Pilot.

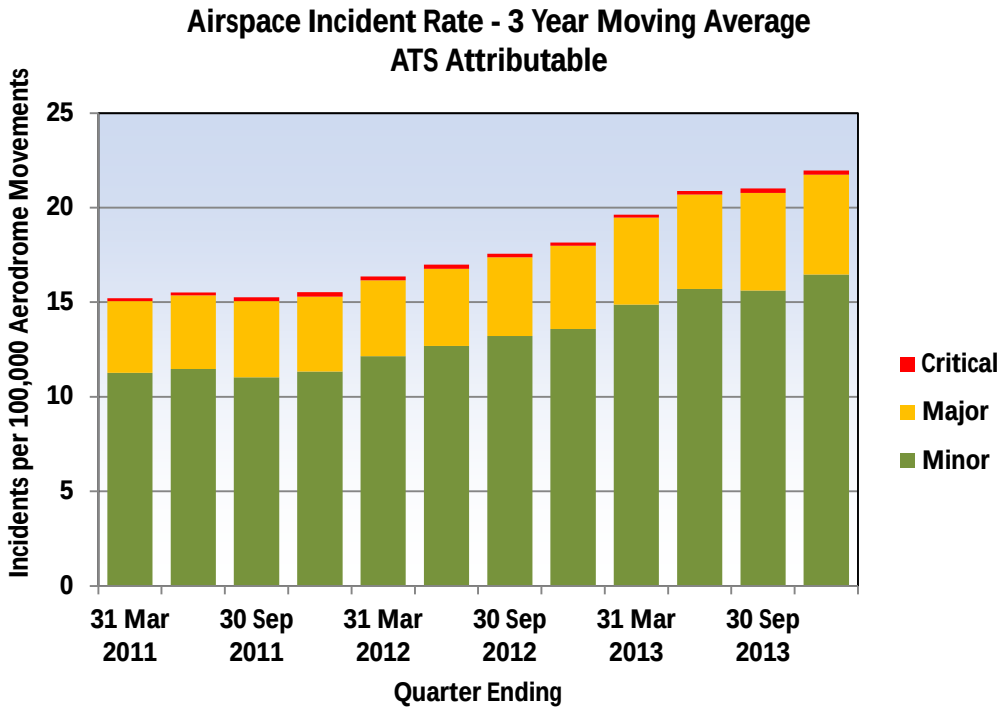
The following table shows the attributability of airspace incidents.

Attributability	Year Ending Dec 2013	Year Ending Dec 2012	Average 3 Prior Yrs
ATS Only	226	215	164.7
Pilot Only	1076	941	673.3
ATS & Pilot	37	17	5.3
Unknown	92	100	87.3
Total	1431	1273	931

ATS Attributable ASP Incidents

Occurrence Trend

The following chart shows the airspace incident reporting rate for Air Traffic Service (ATS) attributable incidents. The values are incidents per 100,000 reported aircraft movements, 12 month moving average for the 3 year period ending 31 December 2013.

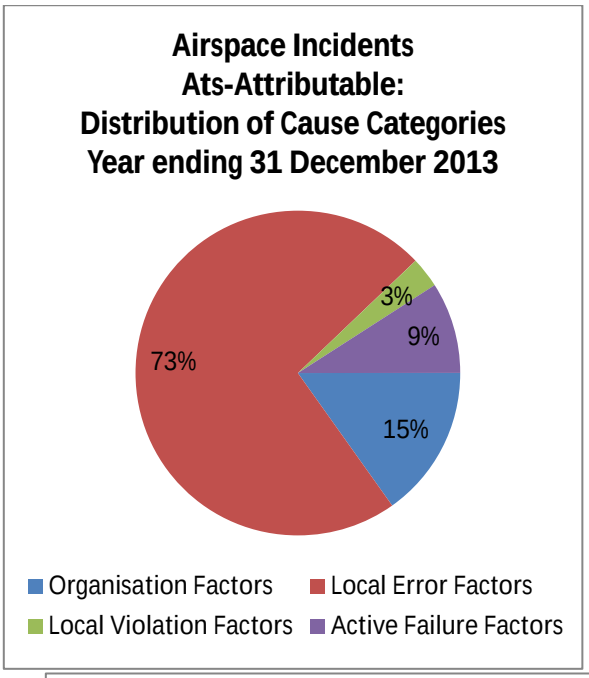


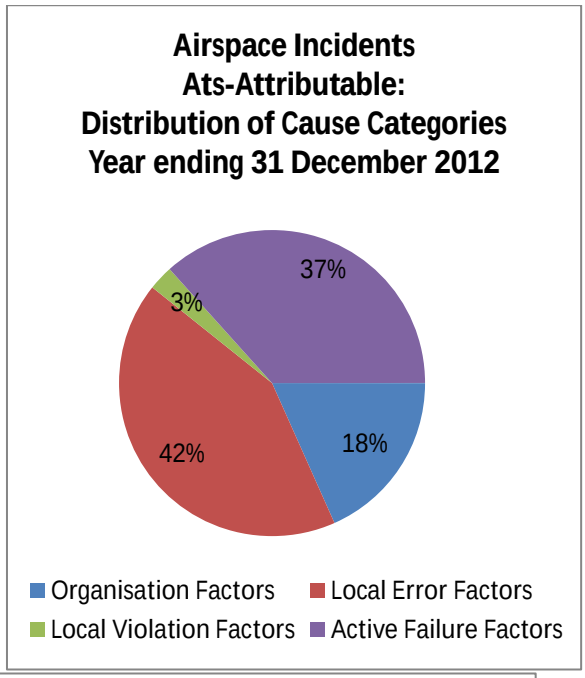
The ATS attributable airspace incident rate over the three year period is trending upwards.

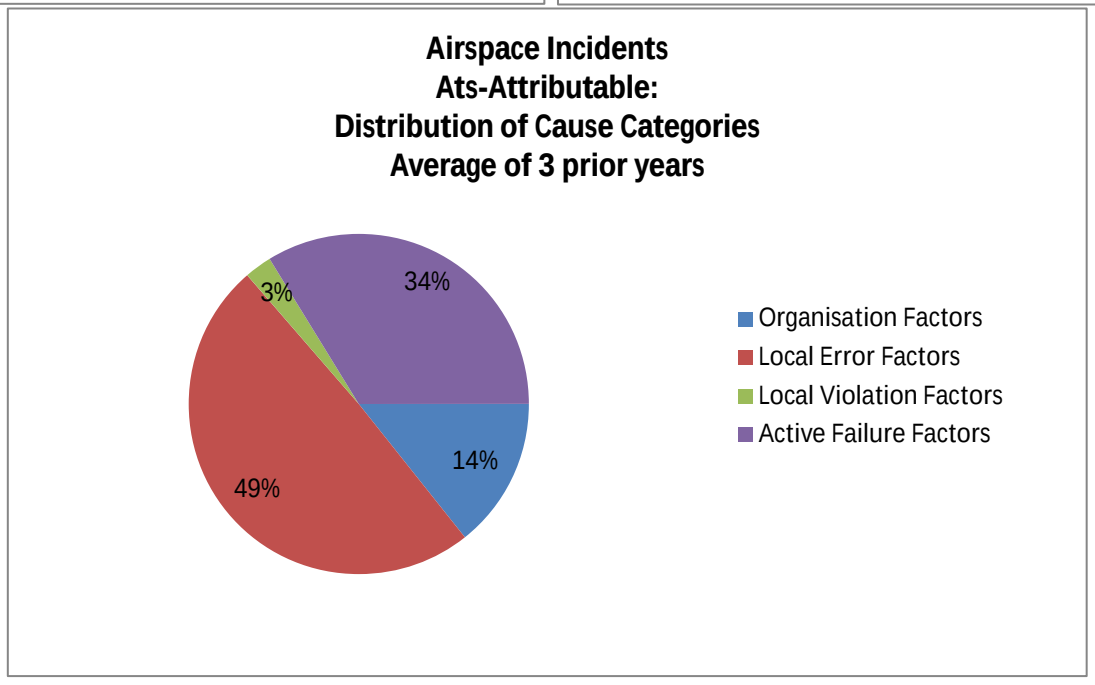
Causal Factors

Causal factors have been assigned to 86 (6%) of the 1431 airspace incidents that were reported as occurring during the year ending 31 December 2013. This compares with 8% for the previous year and an average of 10% over the three prior years. In making this comparison it is important to remember that the assignment of causal factors is an outcome of an investigation and for the current period may not be completed in time for inclusion in this report.In addition the distibution of causal factors is influenced by the selection of incidents for Investigations. Inncident are investigated where local errors or active failures are apparent.

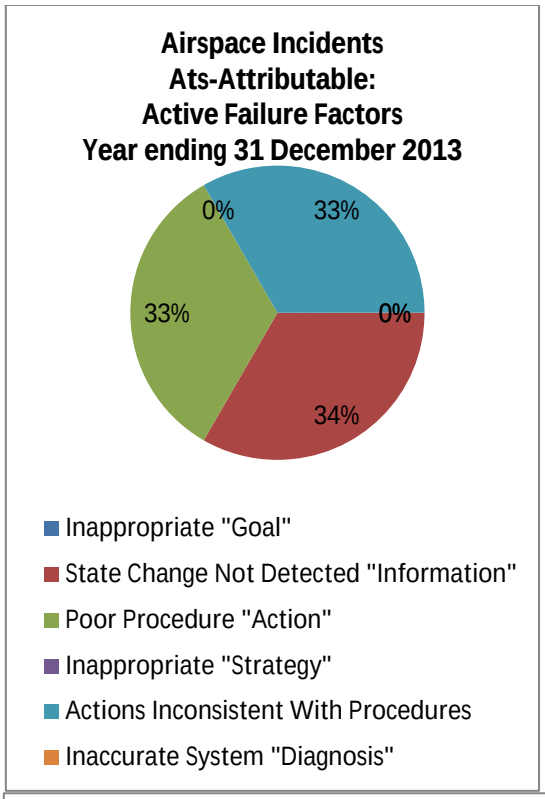
The following charts show the distribution of cause categories (groupings of causal factors) recorded for ATS attributable airspace incidents that occurred during the year ending 31 December 2013, the same period for the previous year and the average for the last three years.

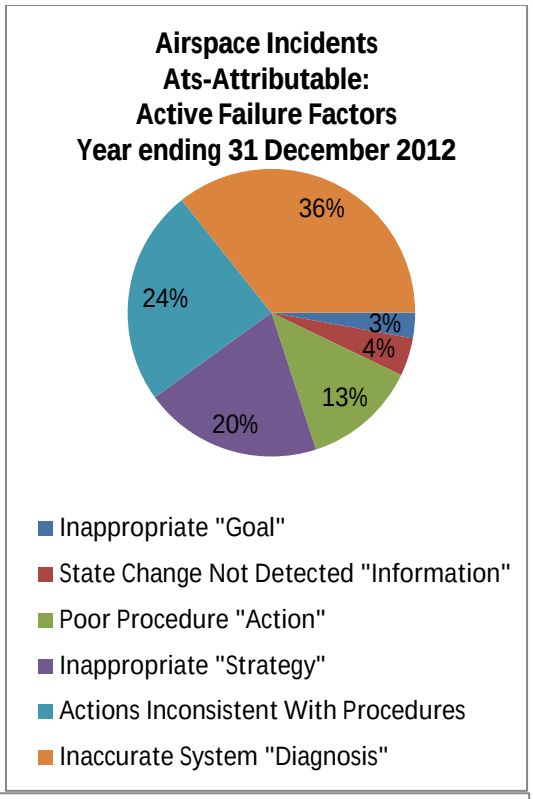


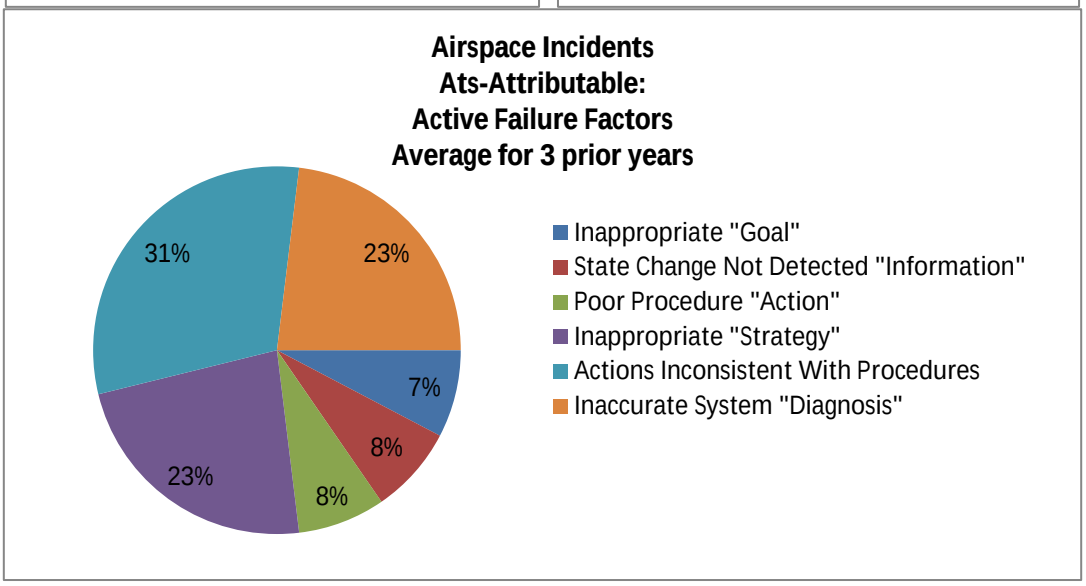




Active Failure Factors



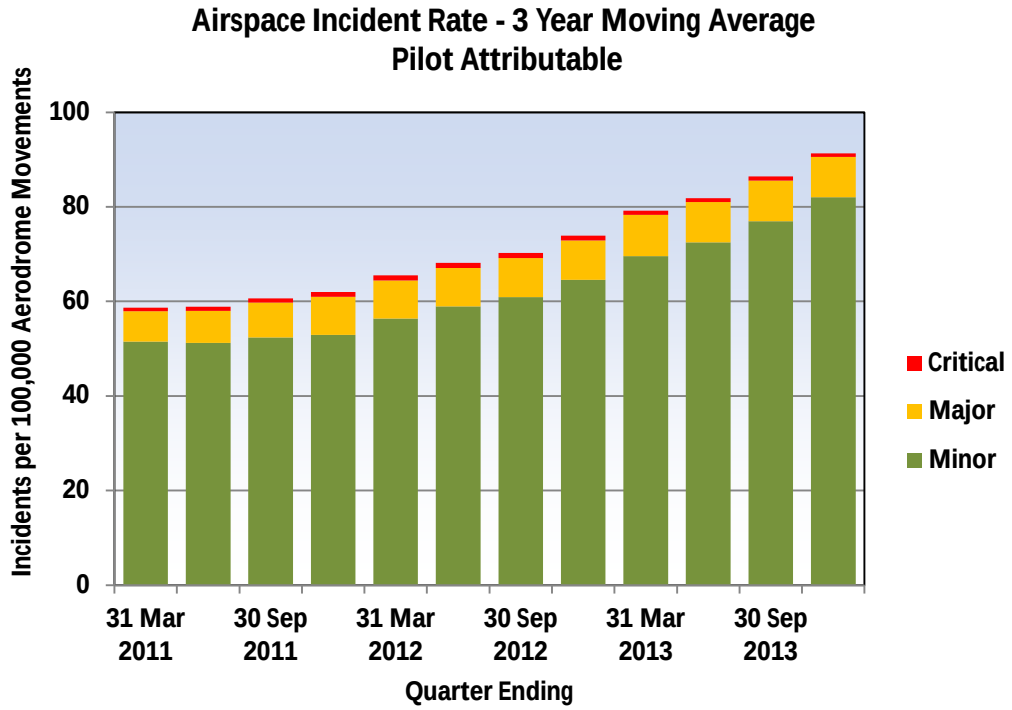




Pilot Attributable ASP Incidents

Occurrence Trend

The following graph shows the airspace incident reporting rate for pilot attributable incidents. The values are incidents per 100,000 reported aircraft movements, 12 month moving average for the three-year period ending 31 December 2013.

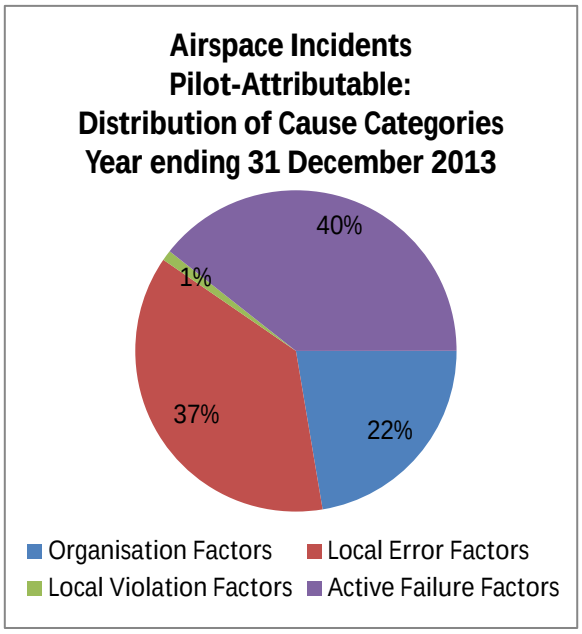


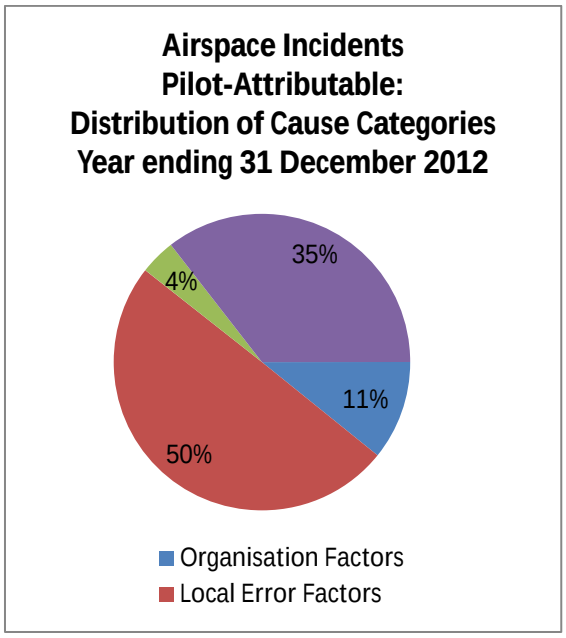
The Pilot attributable airspace incident rate over the three year period is trending upwards.

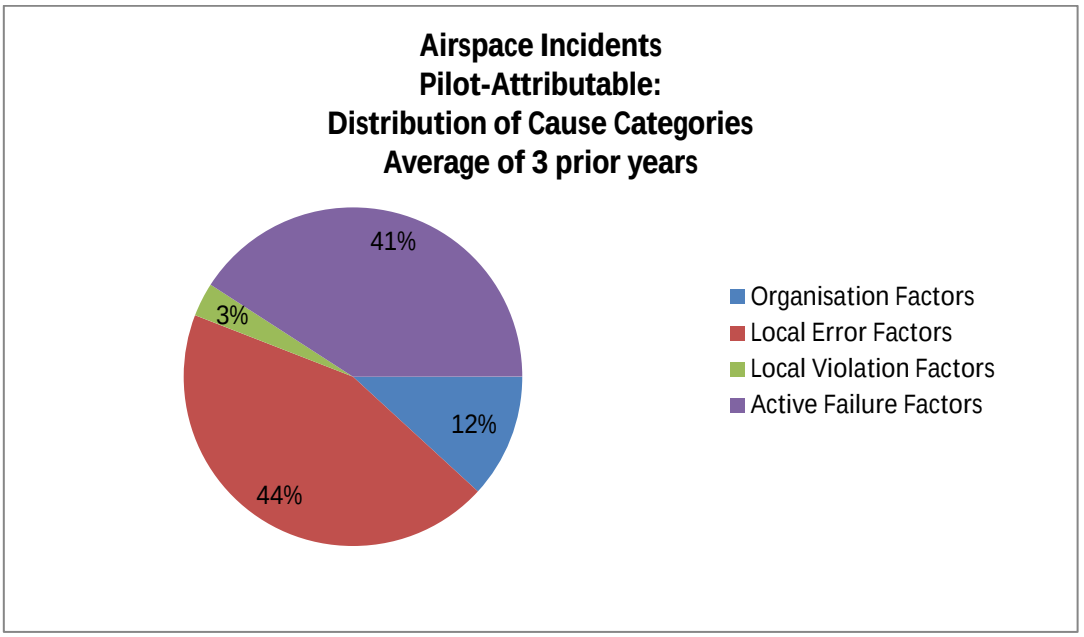
In early 2011 a system of follow-up letters was introduced for operators of aircraft who didn't report Airspace incidents that were reported by the ATS provider. Since the introduction of this system there has been a noticeable increase in the number of Airspace incidents that are reported by both parties.

Causal Factors

The following charts show the distribution of cause categories (groupings of causal factors) recorded for Pilot attributable airspace incidents that occurred during the year ending 31 December 2013, the same period for the previous year and the average for the last three years.



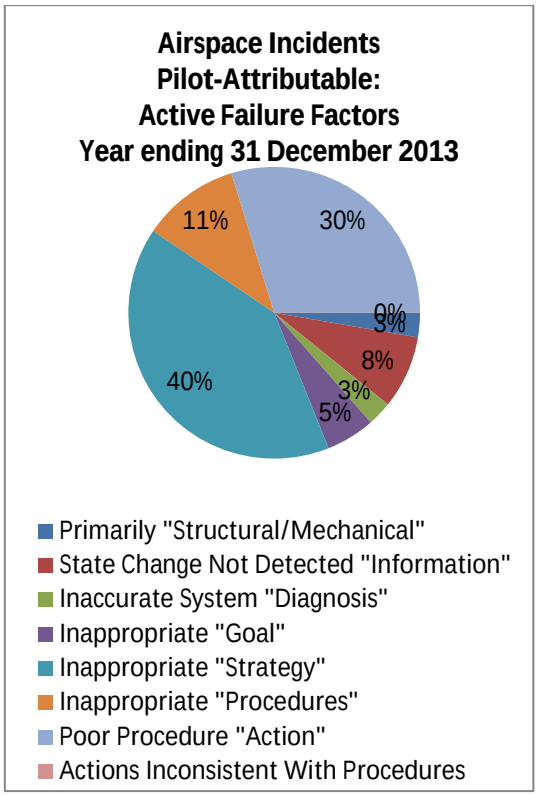


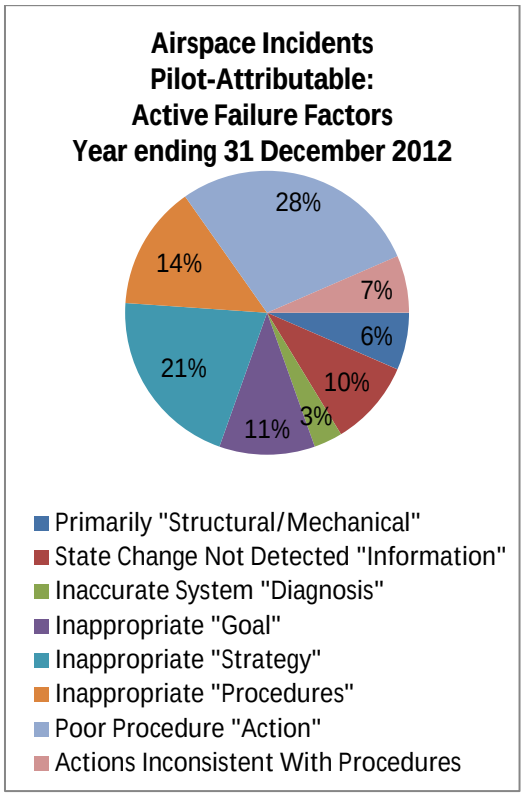


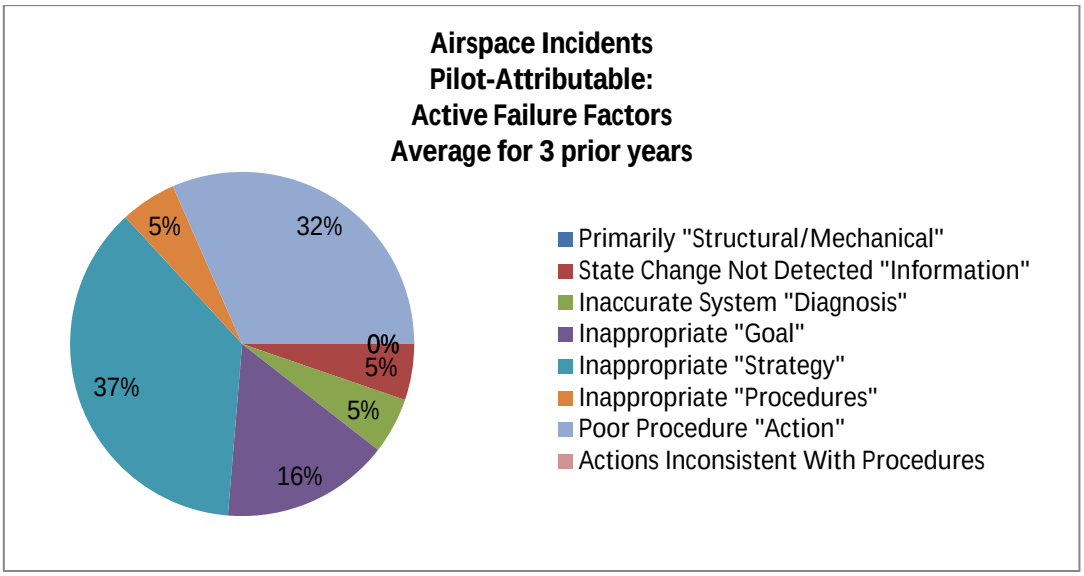
Active Failure Factors

The Active Failure cause category has been further analysed on the grounds that whatever precursor latent failures may exist and be discovered during a subsequent investigation, at least one 'Unsafe Act' (e.g. Omitted checklist item, Exceeded ability etc.) must occur for an incident to result. These unsafe acts are collectively grouped as Active Failure Factors.

The following charts show the distribution of Active Failure causes during the same periods as above.



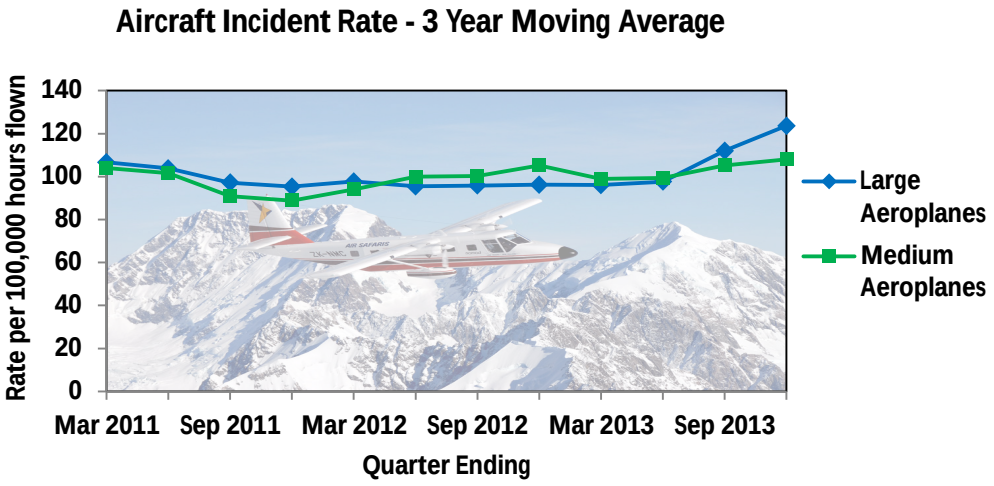


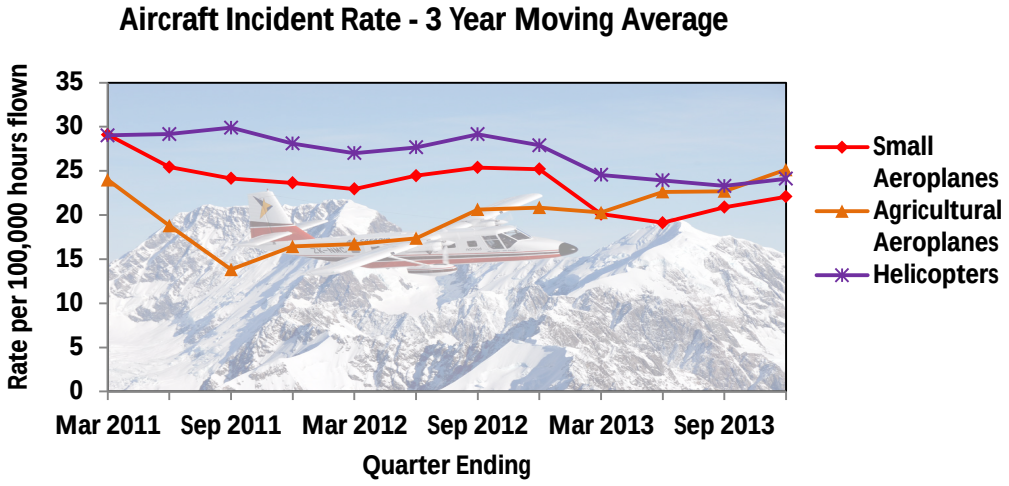


Operational (Aircraft) Incidents

The following graphs show the reported operational incident rates (incidents per 100,000 hours flown) three year moving average for the three-year period ending 31 December 2013.

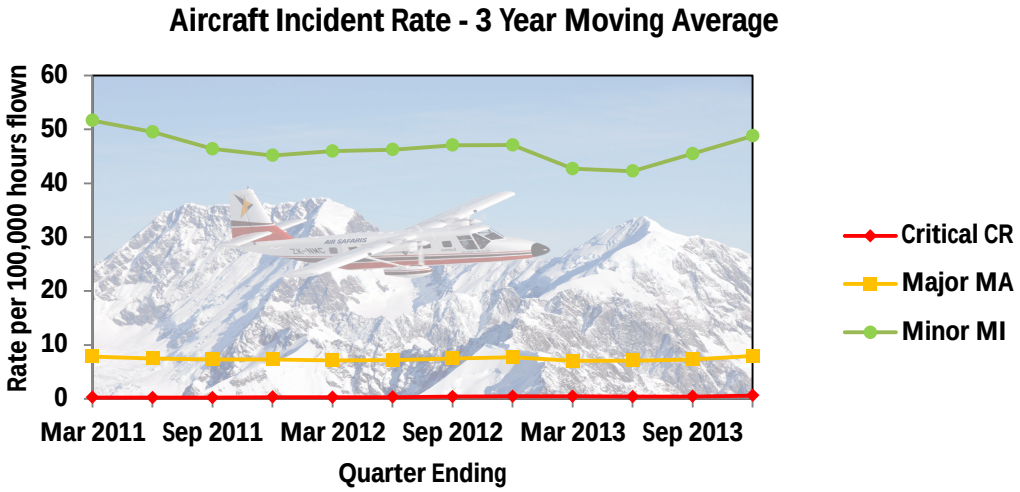
Breakdown by Aircraft Category





Aircraft Category	Straight Line Trend of 3 Year Moving Average
Large Aeroplanes	Constant
Medium Aeroplanes	Constant
Small Aeroplanes	Trending Down
Agricultural Aeroplanes	Trending Up
Helicopters	Trending Down

Breakdown by Severity



Severity	Straight Line Trend of 3 Year Moving Average
Critical	Trending Up
Major	Constant
Minor	Constant

Yearly Comparisons

Critical Operational Incidents

Aircraft Category	Year Ending Dec 2013	Year Ending Dec 2012	Average 3 Prior Yrs
Large Aeroplanes	1	0	0.7
Medium Aeroplanes	0	0	0.7
Small Aeroplanes	1	0	1.0
Helicopters	5	4	1.0
Sport Aircraft	0	0	0.0
Agricultural Aeroplanes	0	3	0.0
Not Recorded	4	1	0.0
Total	11	8	3.3

Major Operational Incidents

Aircraft Category	Year Ending Dec 2013	Year Ending Dec 2012	Average 3 Prior Yrs
Large Aeroplanes	35	20	24.3
Medium Aeroplanes	7	8	7.7
Small Aeroplanes	26	28	20.0
Helicopters	14	25	13.3
Sport Aircraft	11	9	8.3
Agricultural Aeroplanes	3	1	3.0
Not Recorded	12	16	0.0
Total	108	107	92.3

Minor Operational Incidents

Aircraft Category	Year Ending Dec 2013	Year Ending Dec 2012	Average 3 Prior Yrs
Large Aeroplanes	363	316	284.0
Medium Aeroplanes	77	76	43.3
Small Aeroplanes	65	78	61.0
Helicopters	24	22	38.3
Sport Aircraft	44	28	11.7
Agricultural Aeroplanes	9	4	3.0
Not Recorded	100	82	0.0
Total	682	606	617.7

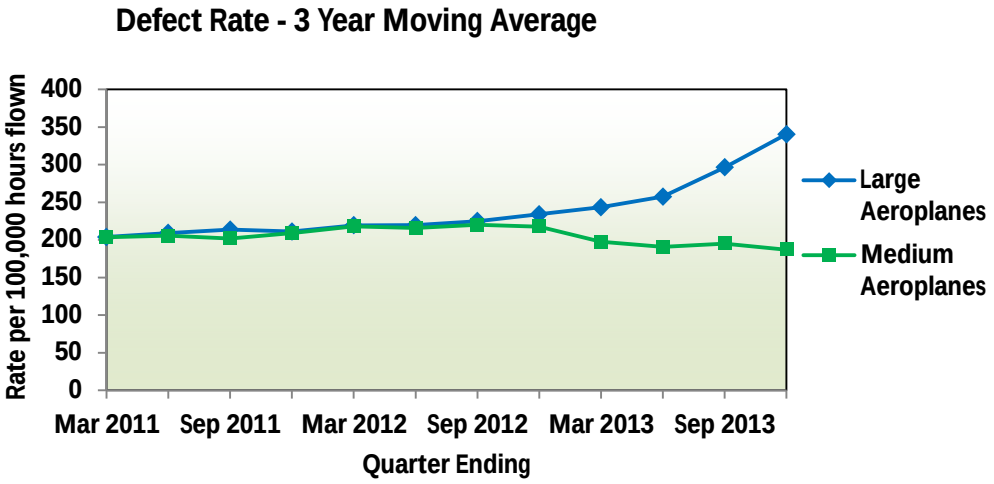
All Operational Incidents

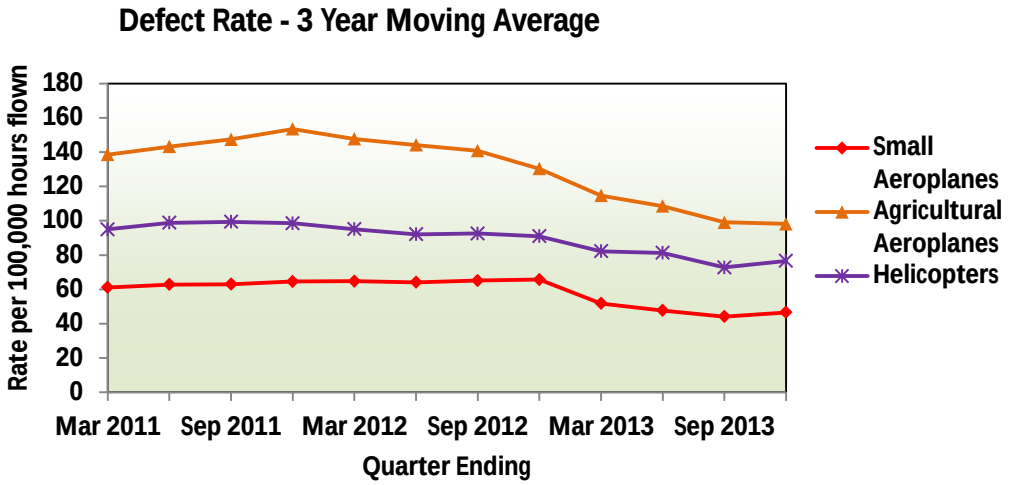
Aircraft Category	Year Ending Dec 2013	Year Ending Dec 2012	Average 3 Prior Yrs
Large Aeroplanes	399	336	309.0
Medium Aeroplanes	84	84	51.7
Small Aeroplanes	92	106	82.0
Helicopters	43	51	52.7
Sport Aircraft	55	37	20.0
Agricultural Aeroplanes	12	8	6.0
Not Recorded	116	99	0.0
Total	801	721	713.3

Defect Incidents

The following graphs show the aircraft defect incident reporting rates (incidents reported per 100,000 hours flown) three year moving average for the three-year period ending 31 December 2013.

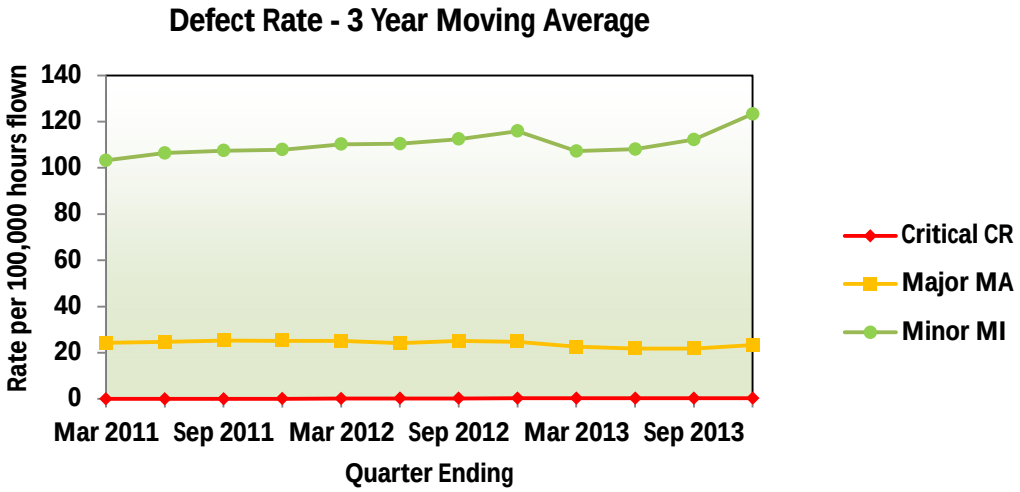
Breakdown by Aircraft Category





Aircraft Category	Straight Line Trend of 3 Year Moving Average
Large Aeroplanes	Trending Up
Medium Aeroplanes	Constant
Small Aeroplanes	Trending Down
Agricultural Aeroplanes	Trending Down
Helicopters	Trending Down

Breakdown by Severity



Severity	Straight Line Trend of 3 Year Moving Average
Critical	Trending Up
Major	Constant
Minor	Constant

Yearly Comparisons

Critical Defect Incidents

Aircraft Category	Year Ending Dec 2013	Year Ending Dec 2012	Average 3 Prior Yrs
Large Aeroplanes	0	1	0.0
Medium Aeroplanes	0	0	0.7
Small Aeroplanes	1	1	0.0
Helicopters	0	0	0.3
Sport Aircraft	0	1	0.0
Agricultural Aeroplanes	0	3	0.0
Not Recorded	0	0	0.0
Total	1	6	1.0

Major Defect Incidents

Aircraft Category	Year Ending Dec 2013	Year Ending Dec 2012	Average 3 Prior Yrs
Large Aeroplanes	93	93	102.0
Medium Aeroplanes	29	36	22.3
Small Aeroplanes	59	56	63.3
Helicopters	63	42	35.0
Sport Aircraft	12	17	10.7
Agricultural Aeroplanes	7	15	17.0
Not Recorded	12	13	7.7
Total	275	272	258.0

Minor Defect Incidents

Aircraft Category	Year Ending Dec 2013	Year Ending Dec 2012	Average 3 Prior Yrs
Large Aeroplanes	1172	804	582.3
Medium Aeroplanes	57	90	98.7
Small Aeroplanes	129	139	160.7
Helicopters	98	90	149.3
Sport Aircraft	13	15	17.7
Agricultural Aeroplanes	20	17	39.0
Not Recorded	55	28	43.0
Total	1544	1183	1090.7

All Defect Incidents

Aircraft Category	Year Ending Dec 2013	Year Ending Dec 2012	Average 3 Prior Yrs
Large Aeroplanes	1265	898	684.3
Medium Aeroplanes	86	126	121.7
Small Aeroplanes	189	196	224.0
Helicopters	161	132	184.7
Sport Aircraft	25	33	28.3
Agricultural Aeroplanes	27	35	56.0
Not Recorded	67	41	50.7
Total	1820	1461	1349.7

ATA Chapters

Defect Incidents reported as occurring during the year ending 31 December 2013 were associated with the following ATA component code chapters.

Large Aeroplanes

Chapter 21 (AIR CONDITIONING - GENERAL) was the most common with 142 defects, up from 98 in the previous period.

The next most common chapter was Chapter 49 (AUXILIARY POWER - GENERAL) with 125 defects, up from 83 in the previous period.

Medium Aeroplanes

Chapter 32 (LANDING GEAR (LG) - GENERAL) was the most common with 20 defects, up from 19 in the previous period.

The next most common chapter was Chapter 27 (AEROPLANE FLIGHT CONTROL - GENERAL) with 15 defects, down from 24 in the previous period.

Small Aeroplanes

Chapter 32 (LANDING GEAR (LG) - GENERAL) was the most common with 36 defects, up from 34 in the previous period.

The next most common chapter was Chapter 74 (IGNITION SYSTEM) with 19 defects, up from 12 in the previous period.

Agricultural Aeroplanes

Chapter 27 (AEROPLANE FLIGHT CONTROL - GENERAL) was the most common with 6 defects, up from 5 in the previous period.

The next most common chapter was Chapter 25 (AIRCRAFT FURNISHING - GENERAL) with 6 defects, the same as in the previous period.

Helicopters

Chapter 63 (MAIN ROTOR DRIVE - GENERAL) was the most common with 19 defects, down from 20 in the previous period.

The next most common chapter was Chapter 25 (AIRCRAFT FURNISHING - GENERAL) with 13 defects, down from 14 in the previous period.

Sport Aircraft

Chapter 23 (COMMUNICATION SYSTEMS - GENERAL) was the most common with 3 defects, the same as in the previous period.

The next most common chapter was Chapter 78 (ENGINE EXHAUST SYSTEM) with 2 defects, up from 1 in the previous period.

Defect Incident Rates

Summary of Defect Rate Standard

Three levels have been defined for categorising quarterly defect rates. The current levels are:

Normal – less than 4.25 defect incidents per 1,000 hours flown.

Alert – between 4.25 and 6 defect incidents per 1,000 hours flown.

High – above 6 defect incidents per 1,000 hours flown.

The current levels were set in July 2002. They are based on data from the three years to 30 June 2002, excluding B747-200 aircraft since that type was removed from service during the quarter 1 July to 30 September 1999.

CAA Actions

The following table shows how the current values of defect rates will be used to determine CAA action.

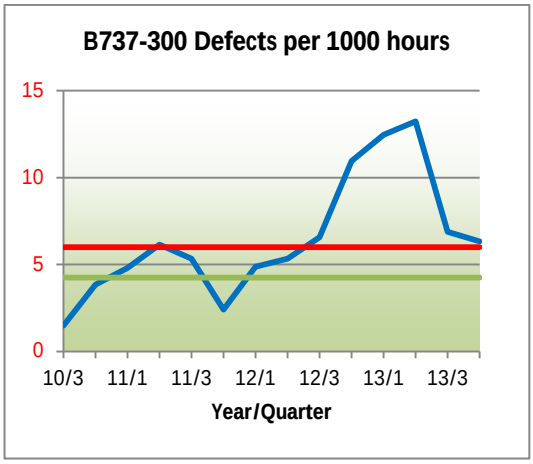
Defect Rate	CAA Action
Normal	Monitor
Alert	Notify appropriate General Manager
High	Notify appropriate General Manager

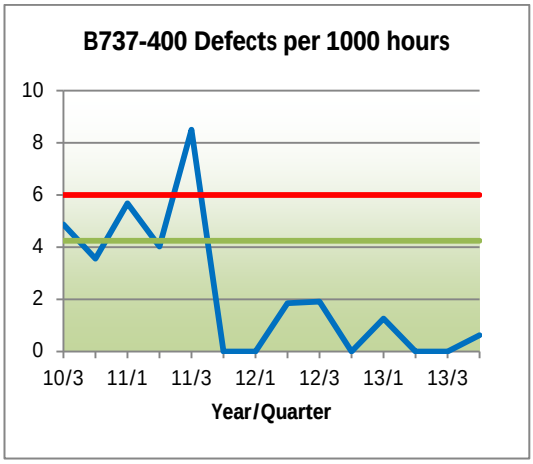
The timing of defect reports is often considerably later than what is mandated by Rule Part 12 and likewise a small number of operators of large and medium aeroplanes are persistently late with their hours and flights data returns. As a result the last two quarters of following defect rate graphs are based on forecasts of hours flown and must be interpreted with caution.

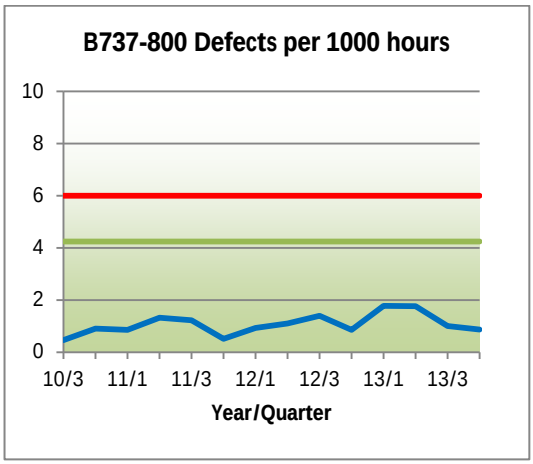
Analysis

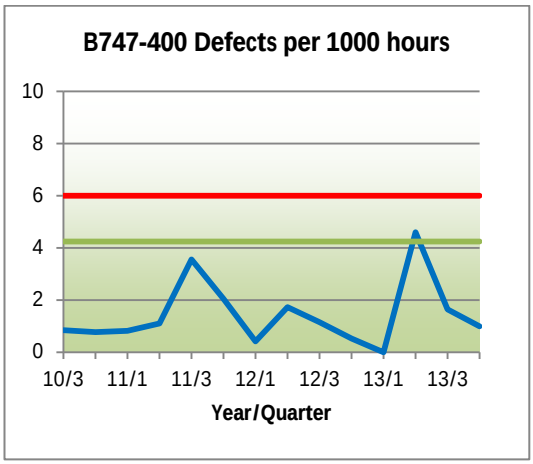
The top line on each graph shows the High defect rate. The next line shows the Alert defect rate. The Manager Airline Maintenance is notified of all high and alert rates on a quarterly basis.

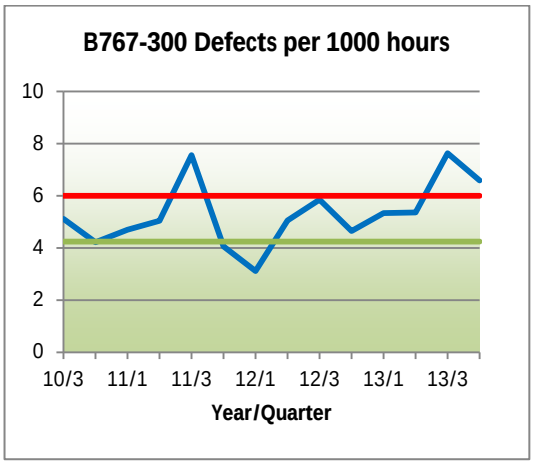
Large Aeroplanes

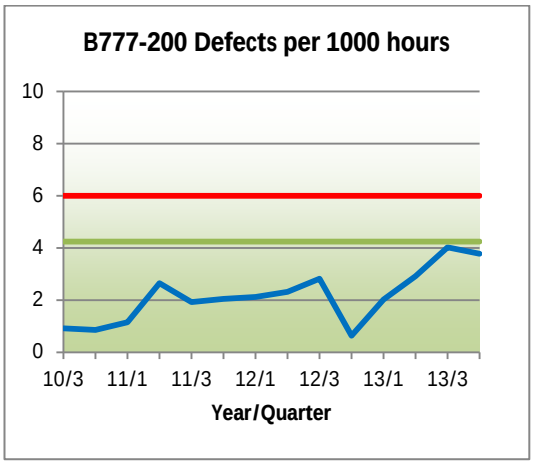


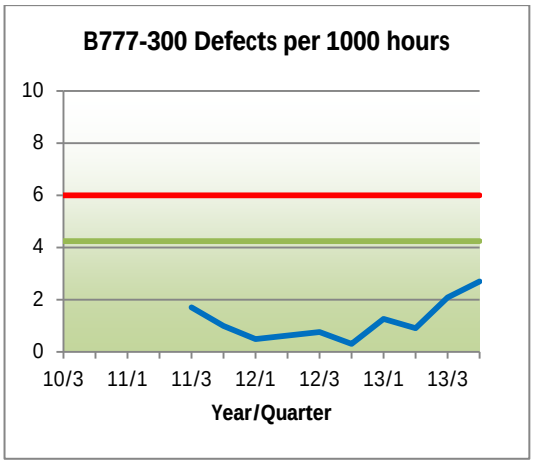


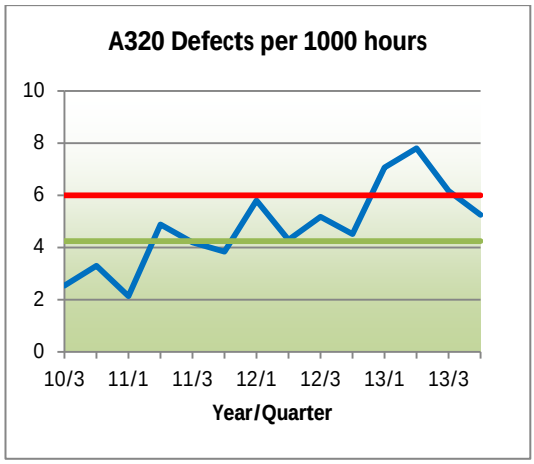


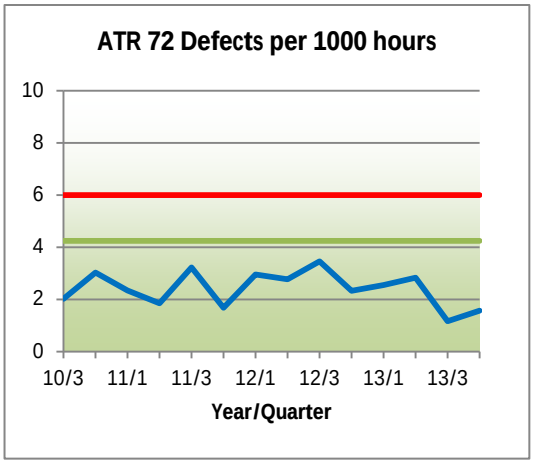


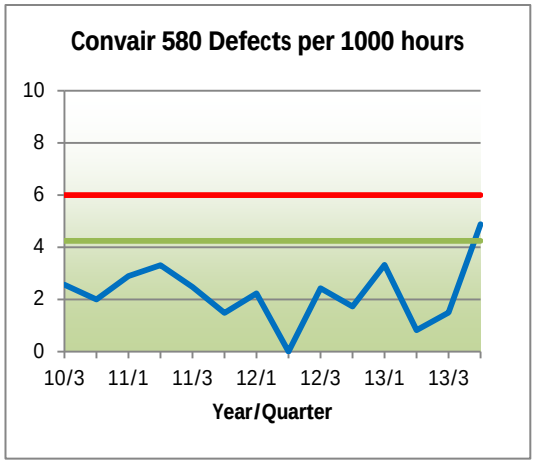


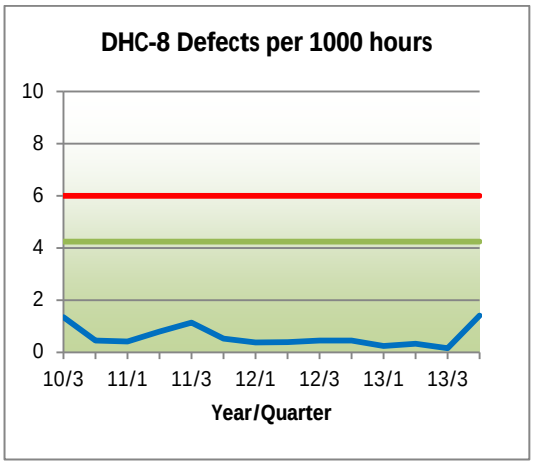



B777-300 Defects per 1000 hours
10
8
6
4
2
0
10/3
11/1
11/3
12/1
12/3
13/1
13/3
Year/Quarter

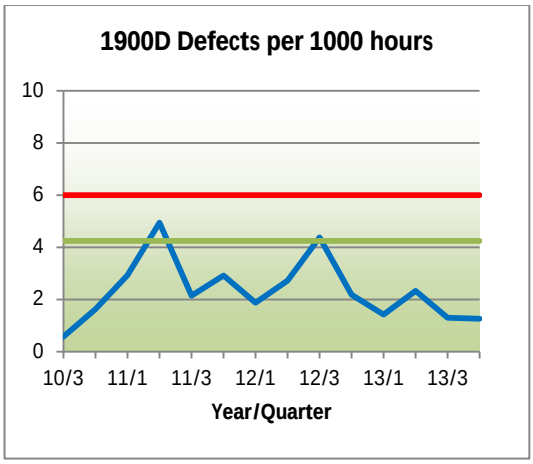

A320 Defects per 1000 hours
10
8
6
4
2
0
10/3
11/1
11/3
12/1
12/3
13/1
13/3
Year/Quarter

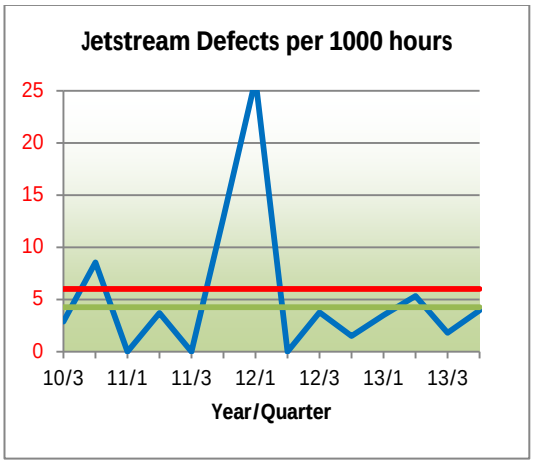

ATR 72 Defects per 1000 hours
10
8
6
4
2
0
10/3
11/1
11/3
12/1
12/3
13/1
13/3
Year/Quarter

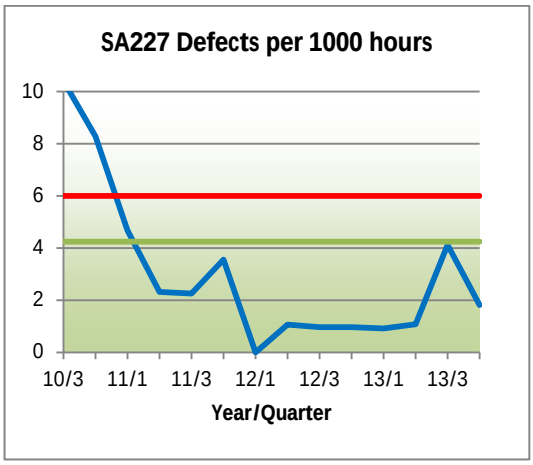

Convair 580 Defects per 1000 hours
10
8
6
4
2
0
10/3
11/1
11/3
12/1
12/3
13/1
13/3
Year/Quarter


DHC-8 Defects per 1000 hours
10
8
6
4
2
0
10/3
11/1
11/3
12/1
12/3
13/1
13/3
Year/Quarter

Medium Aeroplanes







Bird Incident Rates

12-Month Moving Average Strike Rate

Bird occurrence reporting rates are measured quarterly by aerodrome. This is achieved by querying the database for the number of strikes reported at aerodromes by quarter. The results of this query are then divided by the aircraft movements at each aerodrome and multiplied by 10,000 to give strikes per 10,000 aircraft movements. Aircraft movements at aerodromes are obtained from the ACNZ, and, where available, from individual airport companies.

The following table shows the 12-month moving average strike rates for identified aerodromes for each quarter of the three year period ending 31 December 2013.

	Quarter											
Aerodrome	**11/1**	**11/2**	**11/3**	**11/4**	**12/1**	**12/2**	**12/3**	**12/4**	**13/1**	**13/2**	**13/3**	**13/4**
Auckland	3.2	2.8	2.9	3.4	3.4	3.2	3.0	2.4	2.6	3.4	3.5	3.6
Chatham Islands	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.0	10.0
Christchurch	3.4	3.4	3.2	3.3	3.2	3.9	4.1	3.7	3.7	3.3	2.8	3.0
Dunedin	4.8	5.1	4.9	6.2	5.4	5.3	4.4	5.1	4.1	6.0	6.6	5.4
Gisborne	4.2	5.8	5.7	5.8	7.1	7.4	7.4	7.1	6.9	6.6	7.2	6.0
Hamilton	1.9	1.9	1.5	1.4	1.3	1.2	1.2	1.4	1.4	1.2	0.9	1.2
Hokitika	3.7	3.6	3.6	0.0	3.6	3.6	3.6	3.6	0.0	0.0	0.0	0.0
Invercargill	5.8	6.4	7.2	6.8	5.9	3.8	1.9	2.5	3.8	3.6	3.4	2.2
Kerikeri	11.3	8.8	10.0	12.5	8.8	7.5	8.8	10.0	10.0	13.8	10.0	8.8
Manapouri	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Napier	11.4	7.2	6.2	9.1	7.5	9.3	11.9	8.7	11.8	11.7	9.0	9.2
Nelson	2.3	2.2	2.3	2.6	2.4	2.4	2.7	2.9	4.6	5.4	4.3	3.8
New Plymouth	5.3	5.8	4.7	3.7	4.4	3.2	3.3	3.9	5.0	6.8	6.9	6.6
Ohakea	1.9	2.5	2.9	3.1	3.3	2.9	2.5	2.6	3.7	2.2	3.3	3.3
Palmerston North	3.8	3.9	2.8	2.1	1.9	2.8	3.8	4.5	4.5	5.1	5.2	5.6
Paraparaumu	0.4	0.4	0.4	0.0	1.1	1.3	1.2	2.1	1.4	2.5	3.0	2.6
Queenstown	1.9	2.2	1.2	2.4	2.3	3.4	4.8	5.5	5.4	4.3	3.3	2.3
Rotorua	4.4	3.6	2.6	3.1	3.5	2.2	2.3	2.3	4.4	6.3	6.6	6.0
Taupo	5.6	5.9	5.7	4.5	2.7	2.3	2.3	2.7	1.2	1.7	1.7	0.6
Tauranga	2.5	2.6	2.2	1.2	1.4	1.9	2.2	2.5	2.3	1.9	2.2	2.6
Timaru	5.0	10.0	10.0	8.8	6.3	2.5	2.5	3.8	3.8	5.0	6.3	6.3
Wanganui	3.4	3.6	2.9	3.9	2.6	1.9	2.5	3.4	3.1	6.3	6.9	5.6
Wellington	1.8	1.5	1.3	2.2	2.6	3.0	3.7	3.3	3.2	3.0	2.7	2.5
Westport	10.0	4.8	4.8	4.8	14.5	14.5	14.5	14.5	4.8	4.8	0.0	0.0
Whakatane	5.0	5.8	5.0	4.2	3.3	3.3	2.5	2.5	3.3	2.5	3.3	3.3
Whangarei	6.8	7.5	7.5	8.3	8.3	6.8	5.3	4.5	2.3	3.8	6.8	7.5
Whenuapai	12.0	10.0	11.2	10.9	14.2	14.9	14.2	12.1	7.1	6.6	5.2	5.0
Woodbourne	4.8	4.2	4.6	4.6	3.8	4.3	4.4	5.3	7.2	10.4	9.5	8.6
Overall	3.7	3.6	3.4	3.5	3.5	3.5	3.6	3.6	3.7	4.0	3.8	3.7

Data with a pink background is based on CAA estimates of aircraft movements for the aerodrome because the CAA has either no data or incomplete data for that aerodrome.

Analysis

Each aerodrome is assigned a risk category based on the most recent 12 month average bird strike rate per 10,000 aircraft movements. These categories are:

Low	where the rate is less than 5 strikes per 10,000 movements
Medium	where the rate is not less than 5 strikes per 10,000 movements but less than 10 strikes per 10,000 movements
High	where the rate is not less than 10 strikes per 10,000 movements.

Each aerodrome is also assigned a trend category based on a straight line approximation to the 3 year history of bird strike rates. These categories are:

Trending down	where the 3 year decrease exceeds 20% of the average
Constant	where the 3 year change is between + and – 20% of the average
Trending up	where the 3 year increase exceeds 20% of the average

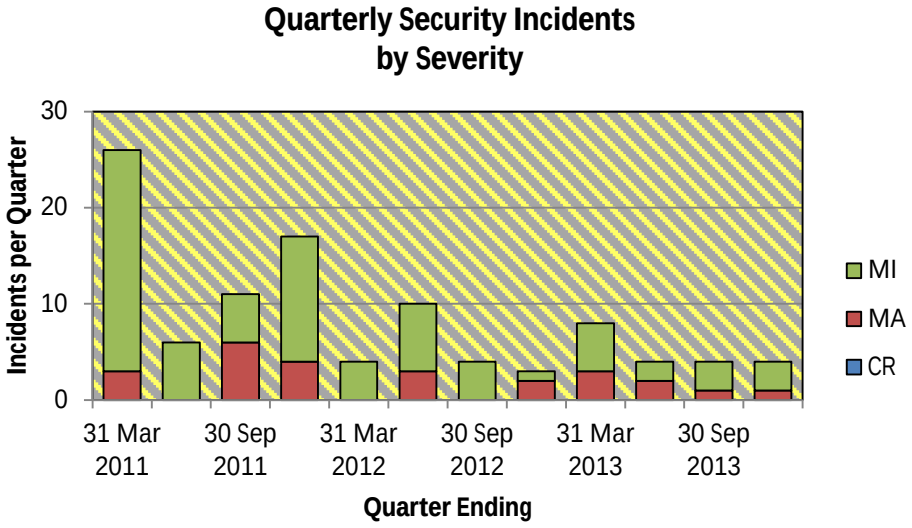
The CAA then determines what if any actions are required based on the combination of the above categories

Details as at 31 December 2013 for individual aerodromes are shown in the following table.

Aerodrome	Risk Category	Trend
Auckland	Low	Constant
Chatham Islands	High	Upward
Christchurch	Low	Constant
Dunedin	Medium	Constant
Gisborne	Medium	Upward
Hamilton	Low	Downward
Hokitika	Low	Downward
Invercargill	Low	Downward
Kerikeri	Medium	Constant
Manapouri	Low	Constant
Napier	Medium	Upward
Nelson	Low	Upward
New Plymouth	Medium	Upward
Ohakea	Low	Upward
Palmerston North	Medium	Upward
Paraparaumu	Low	Upward
Queenstown	Low	Upward
Rotorua	Medium	Upward
Taupo	Low	Downward
Tauranga	Low	Constant
Timaru	Medium	Downward
Wanganui	Medium	Upward
Wellington	Low	Upward
Westport	Low	Downward
Whakatane	Low	Downward
Whangarei	Medium	Downward
Whenuapai	Medium	Downward
Woodbourne	Medium	Upward

Security Incidents

The following chart shows the reported security incidents by quarter over the three year period ending 31 December 2013



Note: none of the incidents reported as occurring during this period have been assessed as Critical.

Yearly Comparison

The following table shows a breakdown by location (nearest staffed aerodrome) of the security incidents reported as occurring during the year ending 31 December 2013, the previous year and the average for the three prior years.

Location (Aerodrome)	Year Ending Dec 2013	Year Ending Dec 2012	Average 3 Prior Yrs
Auckland	3	6	33.3
Christchurch	1	0	8.3
Wellington	3	7	6.7
Milford Sound	0	0	0.0
Gisborne	3	0	0.7
Nelson	1	0	1.7
Hamilton	1	0	2.0
Rotorua	0	0	0.0
Queenstown	0	0	2.3
Dunedin	0	0	1.0
Palmerston North	0	0	0.0
Other	3	3	3.3
Not Reported	5	5	18.3
Total	20	21	77.7

The following table shows a breakdown by Aircraft Statistics Category of the security incidents reported as occurring during the year ending 31 December 2013, the previous year and the average for the three prior years.

Aircraft Type	Year Ending Dec 2013	Year Ending Dec 2012	Average 3 Prior Yrs
Large Aeroplanes	8	8	9.67
Medium Aeroplanes	1	4	1.00
Small Aeroplanes	1	1	0.00
Helicopters	0	0	0.00
Sport Aircraft	0	0	0.00
Agricultural Aeroplanes	0	0	0.00
Parachutes	0	0	0.00
Hang Gliders	0	0	0.00
Other	10	8	67.00
Total	20	21	77.67

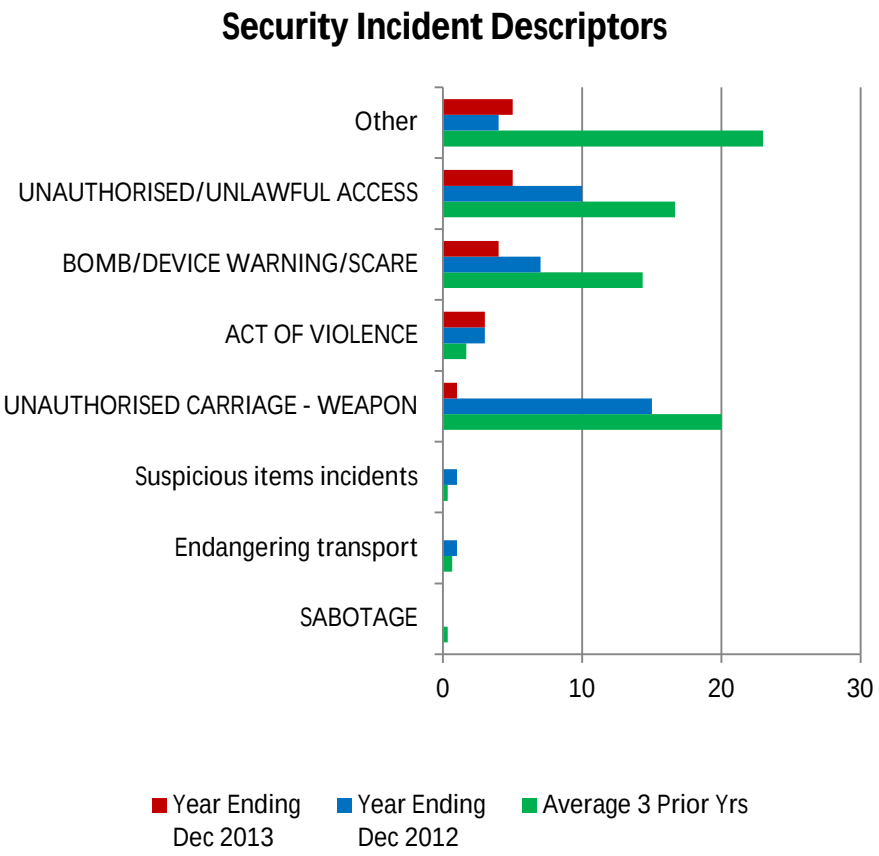
The large drop in the number of recorded security incidents is at least partly due to a correction in the way we interpret the definition of a security incident. No attempt has been made at this time to re-assess historic data.

Descriptors and Causal Factors
The most common descriptors (5 each) recorded for Security Incidents during the year ending 31 December 2013 were 'UNAUTHORISED/UNLAWFUL ACCESS' and 'Other'

No causal factors have been recorded for security incidents that occurred during the year ending 31 December 2013.

Descriptors

The following chart shows the numbers of each occurrence descriptor that has been recorded for security incidents reported as occurring during the year ending 31 December 2013, the previous year and the average for the three prior years.



Aerodrome Incidents

Runway Incursions

Runway incursion rates are calculated by dividing the total number of reported Aerodrome Incidents that have any of the five runway incursion descriptors by the total number of reported movements for the same aerodrome over the same period. The result is tabulated and graphed as runway incursions per 100,000 movements.

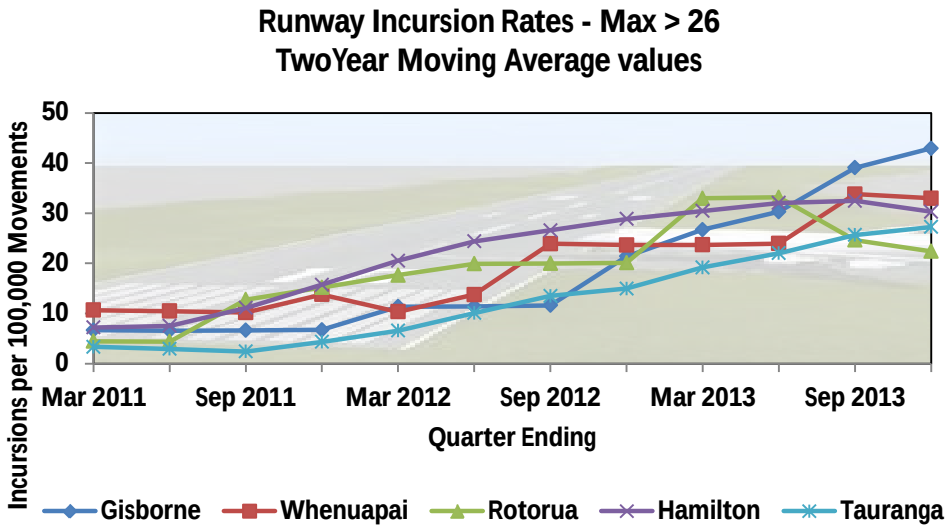
Usable data is available only from the 4th quarter of 2008 so the current report is limited to displaying 2 year moving average values. When enough data has been collected this table will be modified to show three year moving average values. When movement data becomes available from additional certificated aerodromes they will also be included.

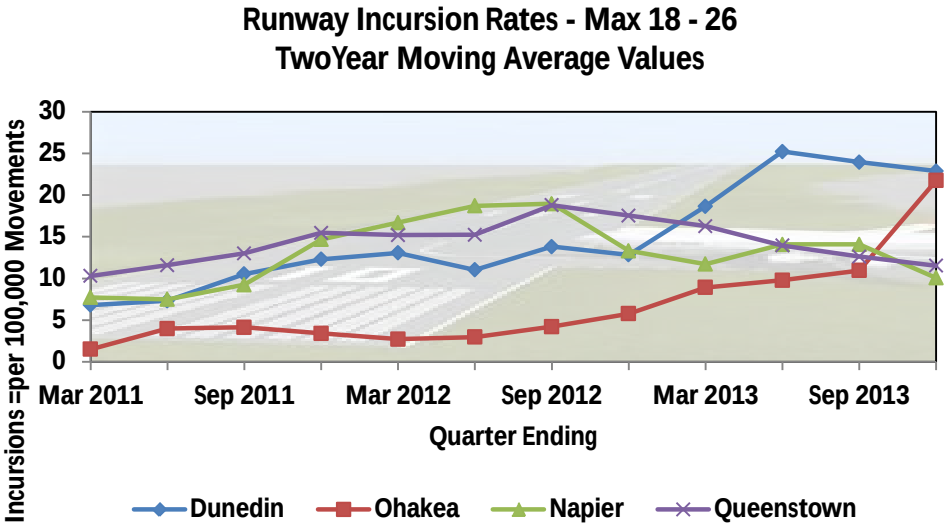
Clearly the number of runway incursions is low with many certificated aerodromes having no such incidents reported at all. With such low numbers caution needs to be exercised in drawing statistical conclusions..

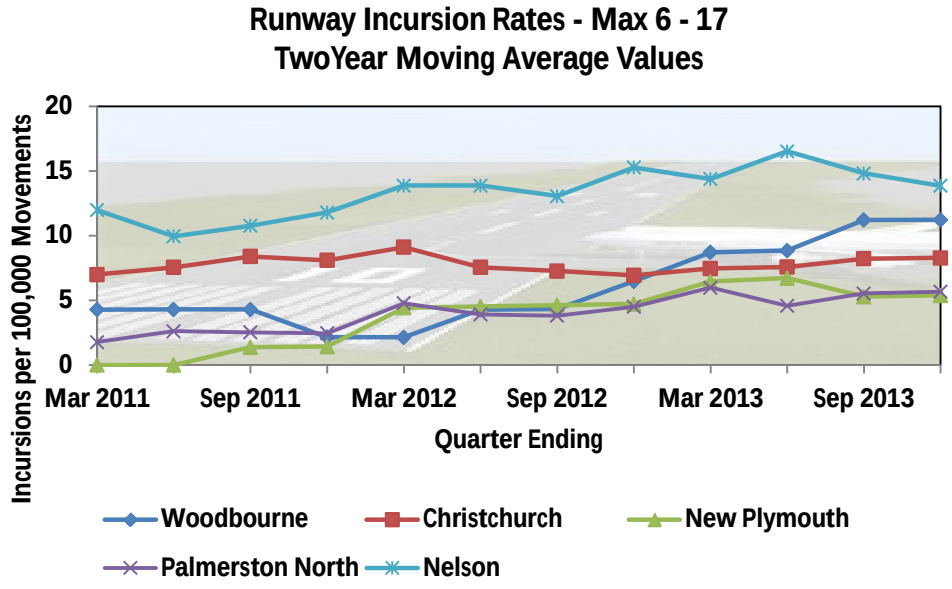
The following table shows 2 year moving average values of reported quarterly runway incursion rates for all certificated aerodromes for which adequate movement data is available.

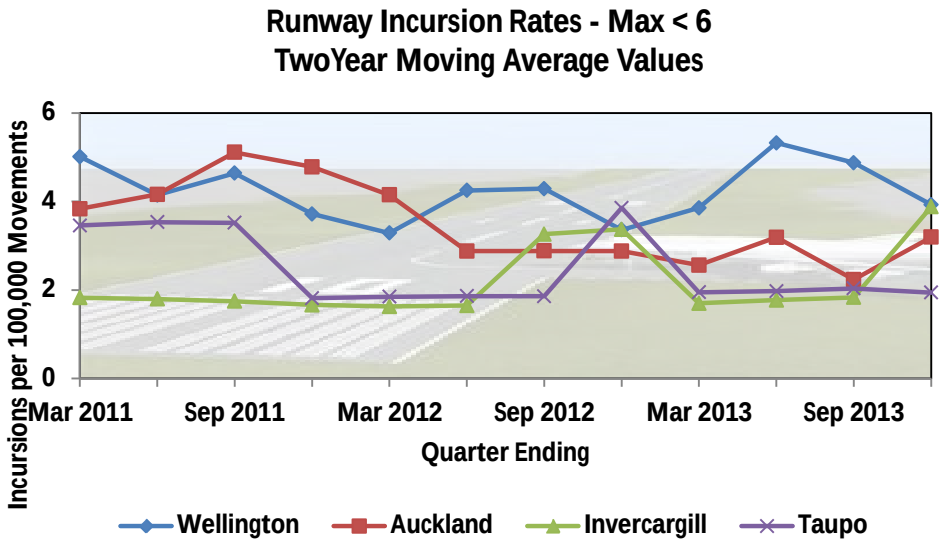
Aerodrome	11/1	11/2	11/3	11/4	12/1	12/2	12/3	12/4	13/1	13/2	13/3	13/4
Gisborne	6.7	6.6	6.6	6.7	11.4	11.4	11.6	21.4	26.7	30.3	39.1	42.9
Whenuapai	10.7	10.5	10.2	13.8	10.3	13.8	23.9	23.7	23.7	23.9	33.8	33.0
Rotorua	4.5	4.4	12.8	15.2	17.7	19.9	20.0	20.1	33.0	33.2	24.6	22.4
Hamilton	7.2	7.5	11.1	15.7	20.5	24.4	26.6	28.9	30.5	32.0	32.5	30.3
Tauranga	3.3	2.9	2.4	4.3	6.6	10.1	13.5	15.0	19.2	22.0	25.7	27.3
Dunedin	6.8	7.3	10.5	12.3	13.1	11.0	13.8	12.8	18.7	25.2	24.0	22.9
Ohakea	1.5	4.0	4.1	3.4	2.7	3.0	4.2	5.8	8.9	9.8	11.0	21.8
Napier	7.7	7.5	9.2	14.7	16.7	18.7	18.9	13.3	11.7	14.1	14.1	10.1
Queenstown	10.3	11.6	13.0	15.5	15.2	15.2	18.8	17.5	16.3	14.0	12.6	11.5
Nelson	12.0	10.0	10.8	11.8	13.9	13.9	13.1	15.3	14.4	16.5	14.8	13.9
Woodbourne	4.3	4.3	4.3	2.2	2.1	4.3	4.3	6.5	8.7	8.8	11.2	11.2
Christchurch	7.0	7.6	8.4	8.1	9.1	7.6	7.3	6.9	7.5	7.6	8.2	8.3
New Plymouth	0.0	0.0	1.4	1.4	4.4	4.5	4.6	4.7	6.5	6.7	5.3	5.4
Palmerston North	1.8	2.6	2.5	2.5	4.8	3.9	3.8	4.5	6.0	4.6	5.5	5.7
Wellington	5.0	4.1	4.6	3.7	3.3	4.3	4.3	3.4	3.9	5.3	4.9	3.9
Auckland	3.8	4.2	5.1	4.8	4.1	2.9	2.9	2.9	2.6	3.2	2.2	3.2
Invercargill	1.8	1.8	1.7	1.7	1.6	1.6	3.3	3.4	1.7	1.8	1.8	3.9
Taupo	3.5	3.5	3.5	1.8	1.8	1.9	1.9	3.9	1.9	2.0	2.0	1.9
Overall	7.3	6.6	8.4	9.2	11.3	13.8	14.3	14.7	15.3	14.8	15.3	15.6

By way of comparison, National Transportation Safety Board data puts the runway incursion rate in the United States at about 6 runway incursions per 100,000 tower operations during the 4 calendar years 2005 – 2008 with an improving outlook for 2009.


Runway Incursion Rates - Max > 26
TwoYear Moving Average values
Incursions per 100,000 Movements
50
40
30
20
10
0
Mar 2011
Sep 2011
Mar 2012
Sep 2012
Mar 2013
Sep 2013
Quarter Ending
Gisborne
Whenuapai
Rotorua
Hamilton
Tauranga


Runway Incursion Rates - Max 18 - 26
TwoYear Moving Average Values
Incursions =per 100,000 Movements
30
25
20
15
10
5
0
Mar 2011
Sep 2011
Mar 2012
Sep 2012
Mar 2013
Sep 2013
Quarter Ending
Dunedin
Ohakea
Napier
Queenstown


Runway Incursion Rates - Max 6 - 17
TwoYear Moving Average Values
Incursions per 100,000 Movements
20
15
10
5
0
Mar 2011
Sep 2011
Mar 2012
Sep 2012
Mar 2013
Sep 2013
Quarter Ending
Woodbourne
Christchurch
New Plymouth
Palmerston North
Nelson


Runway Incursion Rates - Max < 6
TwoYear Moving Average Values
Incursions per 100,000 Movements
6
4
2
0
Mar 2011
Sep 2011
Mar 2012
Sep 2012
Mar 2013
Sep 2013
Quarter Ending
Wellington
Auckland
Invercargill
Taupo

Occurrences — General

The following table shows the number of occurrences (excluding Non-Reportable Occurrences) that were registered on the CAA database during each of the 12 months of the reporting period.

Month	ACC	ADI	ARC	ASP	BRD	DEF	DGD	HGA	INC	NIO	PAA	PIO	SEC
Jan - 2013	12	18	64	128	87	147	8	2	76	5	0	2	1
Feb - 2013	9	33	79	153	109	172	15	4	75	1	1	1	3
Mar - 2013	9	12	76	130	108	130	3	1	60	2	1	2	4
Apr - 2013	9	25	39	124	160	143	13	4	61	4	0	0	1
May - 2013	8	17	49	101	193	192	8	0	67	2	1	1	3
Jun - 2013	5	14	66	87	99	133	2	6	55	5	1	8	1
Jul - 2013	7	18	79	106	90	148	7	1	80	7	0	1	0
Aug - 2013	5	20	85	138	80	137	5	0	69	4	0	2	2
Sep - 2013	2	15	61	90	71	174	4	1	67	2	0	1	2
Oct - 2013	10	13	58	147	108	187	4	0	90	6	0	1	2
Nov - 2013	12	23	88	142	80	140	8	3	65	3	0	1	1
Dec - 2013	8	17	72	86	63	111	7	0	42	4	0	0	0
Total	**96**	**225**	**816**	**1432**	**1248**	**1814**	**84**	**22**	**807**	**45**	**4**	**20**	**20**

ACC	Accident	**DGD**	Dangerous Goods Incident
ADI	Aerodrome Incident	**HGA**	Hang Glider Accident
ARC	Aviation Related Concern	**INC**	Aircraft Incident
ASP	Airspace Incident	**NIO**	Facility Malfunction Incident
BRD	Bird Incident	**PAA**	Parachute Accident
CSI	Cargo Security Incident	**PIO**	Promulgated Information Incident
DEF	Defect Incident	**SEC**	Security Incident

Causal Factor Analysis

Introduction

The following section presents an analysis of occurrence causes recorded during the year ending 31 December 2013 as determined by safety investigations.

The causal factor analysis is grouped into three parts, each dealing with a unique sector of the aviation industry:

- Aircraft Flight Operations (Aircraft Operator Organisations and Flight Crew);
- Aircraft Maintenance Operations (Aircraft Maintenance/Design Organisations and Maintenance Engineers);
- Air Traffic Services and Personnel (Air Traffic Service Organisations and Air Traffic Service personnel).

The first two sections are further sub-grouped by Aircraft Category, namely:

- Large Aeroplanes;
- Medium Aeroplanes;
- Other Aeroplanes, Helicopters and Sport; and
- "Unknown".

A discussion of the Reason Model – Latent Failure Model used by the CAA for causal factor identification is provided in the appendix.

Please note that the following abbreviations apply:

ACC	Accident	**DGD**	Dangerous Goods Incident
ADI	Aerodrome Incident	**HGA**	Hang Glider Accident
ARC	Aviation Related Concern	**INC**	Aircraft Incident
ASP	Airspace Incident	**NIO**	Facility Malfunction Incident
BRD	Bird Incident	**PAA**	Parachute Accident
CSI	Cargo Security Incident	**PIO**	Promulgated Information Incident
DEF	Defect Incident	**SEC**	Security Incident

Aircraft Flight Operations

The following section summarises causal factors identified from investigation of occurrences that occurred during the year ended 31 December 2013 and which have been attributed to aircraft flight operations (the aircraft operator, organisation or flight crew). The number of times particular causal factors have been identified is reported by occurrence type.

Large Aeroplanes

Category	Cause	ACC	ADI	ASP	DEF	INC	PIO
Active Failure	ACTIONS INCONSISTENT WITH PROCEDURES					1	
	INACCURATE SYSTEM "DIAGNOSIS"				1		
	POOR PROCEDURE "ACTION"			10		1	
	PRIMARILY "STRUCTURAL/MECHANICAL"				10		
	STATE CHANGE NOT DETECTED "INFORMATION"			1	1	1	
Organisation	INADEQUATE COMMUNICATIONS					1	
	INADEQUATE CONTROL AND MONITORING			9			
	INADEQUATE PROCEDURES	1			3	1	1
	INADEQUATE TRAINING			6			
Task/Environment Error	HOSTILE ENVIRONMENT	1					
	INADEQUATE CHECKING			1		1	
	INEXPERIENCE (NOT LACK OF TRAINING)					1	
	OTHER ENVIRONMENTAL FACTOR (EG WEATHER)			2			
	POOR INSTRUCTIONS/PROCEDURES					1	
	POOR SIGNAL:NOISE			1			
	TASK OVERLOAD		1	1			
	TIME SHORTAGE				2		

Medium Aeroplanes

Category	Cause	ASP	DEF	INC
Active Failure	ACTIONS INCONSISTENT WITH PROCEDURES	3		
	PRIMARILY "STRUCTURAL/MECHANICAL"		2	
Organisation	INADEQUATE PROCEDURES		1	
	OTHER ORGANISATION FACTOR		1	
Task/Environment Error	HOSTILE ENVIRONMENT	1		
	INADEQUATE CHECKING	2		1
	POOR INSTRUCTIONS/PROCEDURES	1		
	TASK UNFAMILIARITY			1

Unknown Aircraft Category

Category	Cause	ASP	INC
Active Failure	ACTIONS INCONSISTENT WITH PROCEDURES	2	1
Organisation	INADEQUATE CONTROL AND MONITORING	1	
Task/Environment Error	INADEQUATE TRAINING	1	
	INEXPERIENCE (NOT LACK OF TRAINING)	1	

Other Aeroplanes, Helicopters and Sport Aircraft

Category	Cause	ACC	ADI	ARC	ASP	DEF	INC
Active Failure	ACTIONS INCONSISTENT WITH PROCEDURES	3	1		5		
	INAPPROPRIATE "GOAL"	2			1		
	INAPPROPRIATE "PROCEDURES"		1		2		
	INAPPROPRIATE "STRATEGY"	1	2		4	1	3
	POOR PROCEDURE "ACTION"	2			6		2
	PRIMARILY "STRUCTURAL/MECHANICAL"	1			1	26	
	STATE CHANGE NOT DETECTED "INFORMATION"	5			1		
Organisation	INADEQUATE COMMUNICATIONS	1					
	INADEQUATE PROCEDURES						2
	INAPPROPRIATE GOALS OR POLICIES						1
	OTHER ORGANISATION FACTOR					1	
	UNSUITABLE EQUIPMENT						1
	UNSUITABLE MATERIALS	1					
Task/Environment Error	HOSTILE ENVIRONMENT	2			2		
	INADEQUATE CHECKING	4			4	1	5
	INEXPERIENCE (NOT LACK OF TRAINING)	3			1		2
	INFORMATION OVERLOAD		1		1		
	INTERPRETATION DIFFICULTIES				2		
	LACK OF KNOWLEDGE						1
	NEGATIVE TASK TRANSFER (HABITS)				1	1	
	OTHER ENVIRONMENTAL FACTOR (EG WEATHER)	1				1	1
	OTHER ERROR ENFORCING CONDITION	1					
	PHYSIOLOGICAL OTHER				1		
	POOR HUMAN-SYSTEM INTERFACE						1
	POOR INSTRUCTIONS/PROCEDURES	1					1
	POOR SYSTEM FEEDBACK	1			2		
	RISK MISPERCEPTION	5			1	3	
	TASK OVERLOAD				1		
	TASK UNFAMILIARITY	2			4		
	TASK/EDUCATION MISMATCH	1					
	TIME SHORTAGE	3					
Task/Environment Violation	COMPLACENCY (IE IT CAN'T HAPPEN)				1		
	HAZARD MISPERCEPTION			1			
	LACK OF SAFETY CULTURE			1			

Aircraft Maintenance Operations

The following section summarises causal factors identified from investigation of occurrences that occurred during the year ended 31 December 2013 and have been attributed to aircraft maintenance operations (the aircraft operator, aircraft maintenance organisation or maintenance engineer). The number of times particular causal factors have been identified is reported by occurrence type.

Large Aeroplanes

Category	Cause	DEF	INC
Active Failure	ACTIONS INCONSISTENT WITH PROCEDURES	1	
	INAPPROPRIATE "PROCEDURES"	1	
	POOR PROCEDURE "ACTION"	1	
	PRIMARILY "STRUCTURAL/MECHANICAL"	2	
	STATE CHANGE NOT DETECTED "INFORMATION"	1	
Organisation	DESIGN DEFICIENCIES	1	1
	INADEQUATE CONTROL AND MONITORING	1	
	INADEQUATE DEFENCES	1	
	INADEQUATE RESOURCE MANAGEMENT	1	
	INADEQUATE SPECIFICATIONS/REQUIREMENTS	1	
Task/Environment Error	FATIGUE - OTHER	1	
	INADEQUATE CHECKING	2	
	NEGATIVE TASK TRANSFER (HABITS)	1	
	TASK UNFAMILIARITY	1	
Task/Environment Violation	POOR SUPERVISION & CHECKING	1	

Medium Aeroplanes

Category	Cause	DEF
Active Failure	ACTIONS INCONSISTENT WITH PROCEDURES	1
	POOR PROCEDURE "ACTION"	1
	PRIMARILY "STRUCTURAL/MECHANICAL"	4
Organisation	INADEQUATE PROCEDURES	2
Task/Environment Error	INADEQUATE CHECKING	3
	LACK OF KNOWLEDGE	1
Task/Environment Violation	HAZARD MISPERCEPTION	1
	PERCEIVED LICENSE TO BEND RULES	2

Other Aeroplanes, Helicopters and Sport Aircraft

Category	Cause	ACC	DEF	INC
Active Failure	INAPPROPRIATE "STRATEGY"		1	
	PRIMARILY "STRUCTURAL/MECHANICAL"		8	
Organisation	DESIGN DEFICIENCIES		4	
	INADEQUATE SPECIFICATIONS/REQUIREMENTS			1
Task/Environment Error	INADEQUATE CHECKING		2	1
	OTHER ERROR ENFORCING CONDITION	1		
	POOR INSTRUCTIONS/PROCEDURES		1	

Unknown Aircraft Category

Category	Cause	DEF
Active Failure	PRIMARILY "STRUCTURAL/MECHANICAL"	1

Air Traffic Services and Personnel

The following tables summarise causal factors identified from investigation of occurrences that occurred during the year ended 31 December 2013 and which have been attributed to air traffic services or personnel. The number of times particular causal factors have been identified is reported by occurrence type.

Air Traffic Service Providers

Category	Cause	ASP	INC	PIO
Organisation	INADEQUATE CONTROL AND MONITORING		1	
	OTHER ORGANISATION FACTOR	5		3
Task/Environment Error	INADEQUATE CHECKING	4		
	INTERPRETATION DIFFICULTIES	1		
	OTHER ERROR ENFORCING CONDITION	8		
	POOR ATTENTION SPAN	1		
	POOR INSTRUCTIONS/PROCEDURES	2		
	POOR SIGNAL:NOISE	2		
	RISK MISPERCEPTION	2		
	TASK OVERLOAD	1		
	TASK UNFAMILIARITY	1		
	TIME SHORTAGE	1		
	VISUAL ILLUSION	1		

Air Traffic Service Personnel

Category	Cause	ASP
Active Failure	ACTIONS INCONSISTENT WITH PROCEDURES	1
	INAPPROPRIATE "PROCEDURES"	1
	POOR PROCEDURE "ACTION"	1
	STATE CHANGE NOT DETECTED "INFORMATION"	1
Task/Environment Error	INADEQUATE CHECKING	1
	POOR INSTRUCTIONS/PROCEDURES	1
Task/Environment Violation	PERCEIVED LICENSE TO BEND RULES	1

Client Risk Assessment

Introduction

The CAA's client risk assessment system came into operation in February 2007.

The system measures a series of factors, rated using a scale of 1 to 5 where 1 is an exemplary rating. It is a qualitative rating and relates solely to the interaction the CAA staff member is having with the client at that time, or to changes in the organisation recorded in the CAA database.

Risk profiles can be generated at any time, including at the end of every audit.

The combined ratings form a risk assessment used to help decide the depth and frequency of inspection and monitoring for each client.

Results are in the form of a percentage of the maximum possible score (if all factors had been rated 5), and are divided into bands of low, moderate, high and very high:

Low: <=16%

Moderate: 16-26%

High: 26-36%

Very High: >36%

Clients can have several risk profiles current at one time, one for each activity. Each risk profile is independent of the others, and applies only to the relevant activity.

The following table refers to risk profiles current on the dates shown and shows the numbers of certificate holders with risk scores in each band.

Comparison of Client Numbers in Risk Score Bands

(as at 31 December 2013 and over the Preceding Four Years)

	As at 31 December 2013				Average at end of each of 4 prior 12 month periods			
Activity	Very High	High	Moderate	Low	Very High	High	Moderate	Low
Australia AOC with ANZA Privileges Part 108 Security Programme	0	0	0	2	0.0	0.0	0.0	0.5
Part 108 Security Programme	0	0	0	1	0.0	0.0	0.0	2.5
Part 109 Regulated Air Cargo Agent	1	0	8	48	0.5	1.5	7.3	52.8
Part 115 Adventure Aviation Operator Certificate	1	3	7	23	0.5	0.8	4.5	2.0
Part 121 Air Operator Large Aeroplanes	0	0	0	5	0.0	0.0	0.0	3.3
Part 125 Air Operator Medium Aeroplanes	0	0	0	6	0.8	0.3	0.3	5.0
Part 129 Foreign Air Transport Operator	0	0	1	21	0.5	0.0	1.5	22.3
Part 135 Air Operator Helicopters and Small Aeroplanes	1	1	22	83	1.5	4.5	34.8	81.3
Part 137 Agricultural Aircraft Operator	1	3	12	57	0.3	2.8	21.5	52.0
Part 139 Aerodrome Operator	0	0	0	15	0.0	0.0	0.3	23.0
Part 140 Aviation Security Service Organisation	0	0	0	0	0.0	0.0	0.0	0.8
Part 141 Aviation Training Organisation	0	0	1	29	0.3	0.5	2.3	26.3
Part 145 Maintenance Organisation	0	1	0	25	1.0	0.0	1.3	25.3
Part 146 Aircraft Design Organisation	0	0	0	9	0.0	0.0	1.3	6.8
Part 148 Aircraft Manufacturing Organisation	0	0	1	9	0.0	0.3	0.5	9.8
Part 149 Aviation Recreation Organisation	0	1	2	4	0.3	0.0	0.8	4.8
Part 171 Telecom Service Organisation	0	0	0	1	0.0	0.0	0.0	1.0
Part 172 Air Traffic Service Organisation	0	0	1	0	0.0	0.3	0.0	0.3
Part 173 Instrument Flight Procedure	0	0	0	2	0.0	0.0	0.0	1.8
Part 174 Meteorological Service Organisation	0	0	0	1	0.0	0.0	0.0	1.0
Part 175 Aeronautical Info Service Organisation	0	0	0	0	0.0	0.0	0.0	0.5
Part 19F Supply Organisation	2	0	2	29	0.8	0.0	3.3	37.8
Part 61 Pilot Licence (Aeroplane) Holder	1	0	0	0	0.0	0.0	0.0	0.5
Part 92 Dangerous Goods Packaging Approval Holder	0	0	0	1	0.0	0.0	0.0	1.5

Appendix — Definitions

General

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

(1) a person is fatally or seriously injured as a result of–

(i) being in the aircraft; or

(ii) direct contact with any part of the aircraft, including any part that has become detached from the aircraft; or

(iii) direct exposure to jet blast–

except when the injuries are self-inflicted or inflicted by other persons, or when the injuries are to stowaways hiding outside the areas normally available to passengers and crew; or

(2) the aircraft sustains damage or structural failure that–

(i) adversely affects the structural strength, performance or flight characteristics of the aircraft; and

(ii) would normally require major repair or replacement of the affected component–

except engine failure or damage that is limited to the engine, its cowlings, or accessories, or damage limited to propellers, wing tips, antennas, tyres, brakes, fairings, small dents, or puncture holes in the aircraft skin; or

(3) the aircraft is missing or is completely inaccessible.

Aerodrome incident [ADI] — means an incident involving an aircraft operation and–

(1) an obstruction either on the aerodrome operational area or protruding into the aerodrome obstacle limitation surfaces; or

(2) a defective visual aid; or

(3) a defective surface of a manoeuvring area; or

(4) any other defective aerodrome facility.

Aircraft incident [INC] — means any incident, not otherwise classified, associated with the operation of an aircraft.

Airspace incident [ASP] — means an incident involving deviation from, or shortcomings of, the procedures or rules for–

(1) avoiding a collision between aircraft; or

(2) avoiding a collision between aircraft and other obstacles when an aircraft is being provided with an Air Traffic Service.

Bird incident [BRD] — means an incident where–

(1) there is a collision between an aircraft and one or more birds; or

(2) when one or more birds pass sufficiently close to an aircraft in flight to cause alarm to the pilot.

Cargo security incident [CSI] — means an incident involving cargo or mail that is carried, or has been accepted by a regulated air cargo agent or an air operator for carriage, by air on an aircraft conducting an international regular air transport operation passenger service, and–

(1) there is evidence of tampering or suspected tampering with the cargo or mail which could be an act or an attempted act of unlawful interference; or

(2) a weapon, explosive, or other dangerous device, article or substance, that may be used to commit an act of unlawful interference is detected in the cargo or mail.

Dangerous goods incident [DGD] — means an incident associated with and related to the carriage of dangerous goods by air after acceptance by the operator, that–

(1) results in injury to a person, property damage, fire, breakage, spillage, leakage of fluid or radiation, or other evidence that the integrity of the packaging has not been maintained; or

(2) involves dangerous goods incorrectly declared, packaged, labelled, marked, or documented.

Defect incident [DEF] — means an incident that involves failure or malfunction of an aircraft or aircraft component, whether found in flight or on the ground.

Facility malfunction incident [NIO] — means an incident that involves an aeronautical facility.

Fatal Injury — means any injury which results in death within 30 days of the accident.

Incident — means any occurrence, other than an accident, that is associated with the operation of an aircraft and affects or could affect the safety of operation. Note: Incident has many sub-categories.

Occurrence — means an accident or incident.

Promulgated information incident [PIO] — means an incident that involves significantly incorrect, inadequate, or misleading information or aeronautical data promulgated in an aeronautical information publication, map, chart, or otherwise provided for the operation of an aircraft.

Security incident [SEC] — means an incident that involves unlawful interference.

Serious Injury — means any injury that is sustained by a person in an accident and that–

(1) requires hospitalisation for more than 48 hours, commencing within 7 days from the date the injury was received; or

(2) results in a fracture of any bone, except simple fractures of fingers, toes, or nose; or

(3) involves lacerations which cause severe haemorrhage, nerve, muscle, or tendon damage; or

(4) involves injury to an internal organ; or

(5) involves second or third degree burns, or any burns affecting more than 5% of the body surface; or

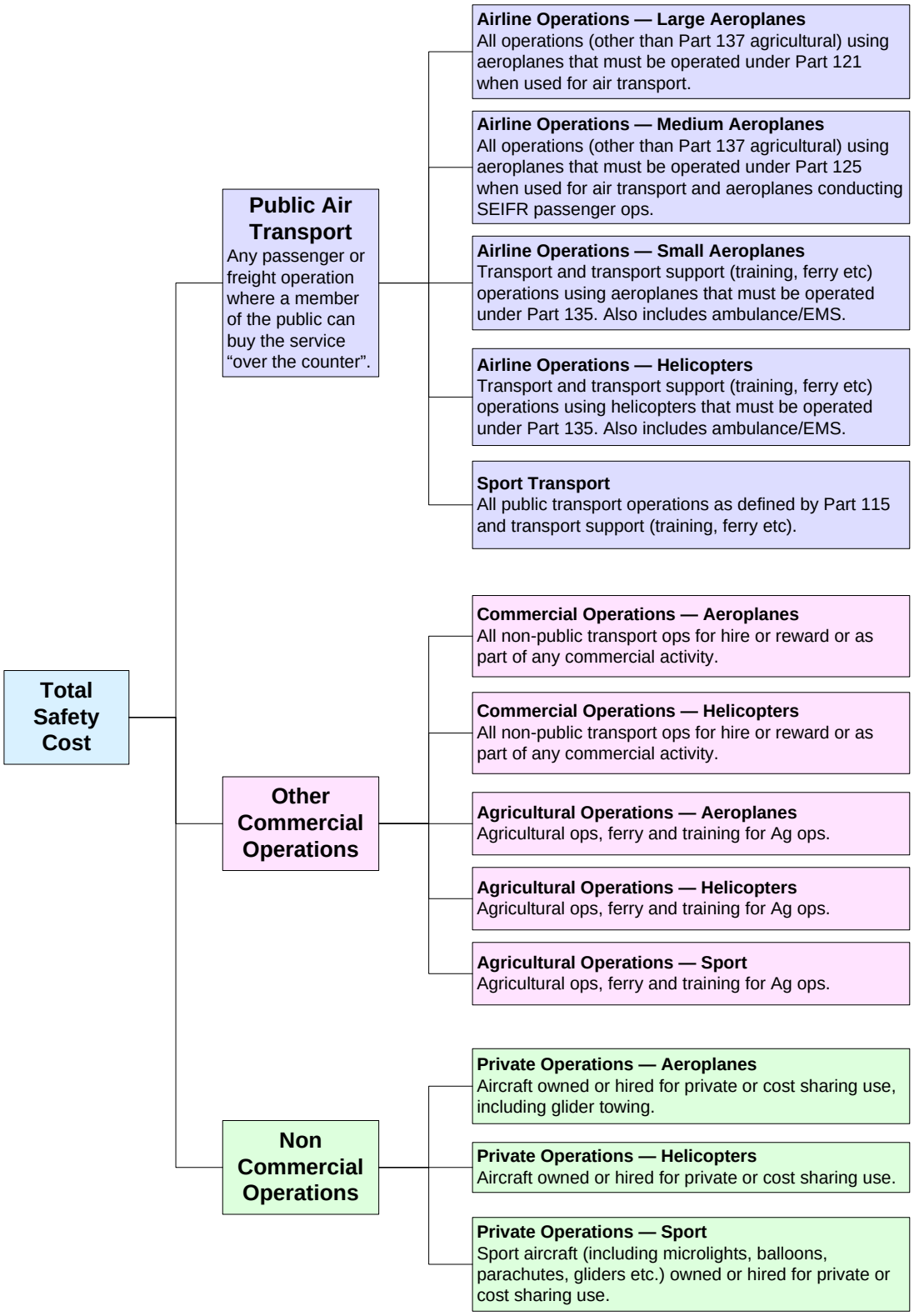
(6) involves verified exposure to infectious substances or injurious radiation.

Severity

The following definitions apply to the severity accorded to occurrences and to findings as the result of investigation of occurrences.

Severity Factor		Definition
CR	Critical	An occurrence or deficiency that caused, or on its own had the potential to cause, loss of life or limb;
MA	Major	An occurrence or deficiency involving a major system that caused, or had the potential to cause, significant problems to the function or effectiveness of that system;
MI	Minor	An isolated occurrence or deficiency not indicative of a significant system problem.

Safety Target Groups



Target group name	General description	Includes	Excludes
Airline Operation - Large Aeroplanes	All operations using large passenger and freight aeroplanes that are operated under part 121	Ferry, test, training, passenger and freight, domestic and international, Part 91 operations, and commercial operations other than Part 137 agricultural operations. Includes all aeroplanes that have a passenger seating configuration of 30 seats or more, or a payload capacity of more than 3410kg.	Part 137 agricultural operations
Airline Operation - Medium aeroplanes	All operations using medium passenger and freight aeroplanes that are operated under part 125.	Ferry, test, training, passenger and freight, domestic and international, Part 91 operations, and commercial operations other than Part 137 agricultural operations. Aeroplanes that have a seating configuration of 10 to 30 seats, excluding any required crew member seats, or a payload capacity of 3410 kg or less and a MCTOW of greater than 5700 kg, and any aeroplanes conducting SEIFR passenger operations.	Part 137 agricultural operations
Airline Operation - Small aeroplanes	All operations by 119 certificate holders using other aeroplanes.	Ferry, test, passenger and freight, domestic and international, training in support of Part 135 operations, Ambulance/EMS	Part 137 agricultural operations, Part 91 operations, and commercial operations. SEIFR under Part 125
Airline Operation - Helicopters	All operations by 119 certificate holders using helicopters	Ferry, test, passenger and freight, domestic and international, training in support of Part 135 operations, Ambulance/EMS	Part 137 agricultural operations, Part 91 operations, and commercial operations. SEIFR under Part 125
Commercial Operations - Aeroplane	Other commercial operations Aeroplane (all non-public transport ops for hire or reward or as part of any commercial activity)	Positioning, ferrying flights, training (dual and solo), "Commercial non-certified", Business and Executive	Public transport ops, Agricultural ops & training for Agricultural ops, non-commercial ops
Commercial Operations - Helicopter	Other commercial operations Helicopter (all non-public transport ops for hire or reward or as part of any commercial activity)	Positioning, ferrying flights, training (dual and solo), "Commercial non-certified", Business and Executive	Agricultural ops & training for Agricultural ops, public transport, non-commercial ops.
Agricultural Operations - Aeroplane	Agricultural operations using aeroplanes	Agricultural ops, ferry & training for Ag ops.	Everything else.
Agricultural Operations - Helicopters	Agricultural operations using helicopters	Agricultural ops, ferry & training for Ag ops.	Everything else
Agricultural Operations - Sport Aircraft	Agricultural operations using sport aircraft	Agricultural ops, ferry & training for Ag ops.	Everything else
Private Aeroplane	Private operations in aeroplanes	Cost sharing, aircraft hired from schools and clubs for private or cost sharing use, glider towing	Airline, commercial, agricultural operations, sport aircraft, balloons, training (dual and solo)
Private Helicopter	Private operations in helicopters	Cost sharing, aircraft hired from schools and clubs for private or cost sharing use	Airline, commercial, agricultural operations, sport aircraft, balloons, training, ferry/positioning flights by commercial operators
Sport Transport	All public transport ops by sport aircraft	Ferry, test, passenger and freight, domestic and international, training for such ops. And balloons	Agricultural operations.
Sport Private	Private operations using sport aircraft	Cost sharing, aircraft hired from schools and clubs for private or cost sharing use, training, gliders, power gliders, hang gliders, parachutes and all forms of inflatable wing, balloons	Airline, commercial, agricultural operations, and training for these activities

Aircraft Categories

Aircraft Statistics Category	Definition	Aircraft Class
Large Aeroplanes	Aeroplanes that must be operated under Part 121 when used for air transport	Aeroplane
Medium Aeroplanes	Aeroplanes that must be operated under Part 125 when used for air transport, except for those required to operate under Part 125 solely due to operating SEIFR	Aeroplane
Small Aeroplanes	Other Aeroplanes with Standard Category Certificates of Airworthiness	Aeroplane
Agricultural Aeroplanes	Aeroplanes with Restricted Category Certificates of Airworthiness limited to agricultural operations	Aeroplane
Helicopters	Helicopters with Standard or Restricted Category Certificates of Airworthiness	Helicopter
Sport Aircraft	All aircraft not included in the groups above	Aeroplane, Amateur Built Aeroplane, Amateur Built Glider, Amateur Built Helicopter, Balloon, Glider, Gyroplane, Helicopter, Microlight Class 1, Microlight Class 2, Power Glider

Significant Events

The following text is taken from the procedure SI - 0.0 Occurrence Management, 0.08 - Occurrence completion:

To facilitate in deciding whether or not your investigation file should be "tagged" as a "Significant Event" here are some occurrences that substantially meet the criteria.

- Occurrences that are investigated by TAIC unless it is known that the TAIC are using the event for their own training purposes and would not otherwise be investigating.
- Critical air transport occurrences resulting in Near Collision (provided one of the aircraft involved is airborne, nearly airborne, or has just landed). In cases where an aircraft is landing or taking off the event would not be significant unless the aircraft's speed was in excess of 10 kts.
- Critical air transport occurrences resulting in Loss of Control
- Critical air transport occurrences where a Distress or Urgency call was (or should have been) made
- Air transport occurrences where the last in a series of "redundant" systems failed in flight or during take off or landing
- SEIFR air transport occurrences involving loss of engine power to the extent that an unscheduled landing is required
- Fatal accidents
- Occurrences that are relevant to a current (group) of safety concerns. For example in 1999/2000 aircraft electrical wiring was a significant international concern therefore occurrences in the New Zealand fleet of electrical wiring problems may warrant them being tagged as significant.
- Occurrences that are relevant to the current CAA (Business) Safety Plan. For the 1999/2000-year collision with terrain, obstacles, and water; controlled flight into terrain and loss of control in flight were relevant for aircraft with a MCTOW of 5,670 kg and above.
- Engine failure in 2-plus engined air transport aircraft at critical phases of flight or failures of a nature that may have a fleet impact or significantly affect safe operations or are subject to media scrutiny.
- Significant structural or engine failure of a private GA aircraft/helicopter that may have implications for the fleet type, particularly where that type is used for air transport operations.

Serious Events

The following text is taken from the procedure SI - 2.0 Safety Investigation - Appendices, 2.02 Appendix B - Aviation Occurrence Notification Checklist:

"Serious incident" means an incident involving circumstances indicating that an accident nearly occurred. The difference between an accident and serious incident lies only in the result (ICAO Annex 13 definition). The serious incidents listed below are extracted from ICAO Annex 13 attachment D. The list is not exhaustive and only serves as guidance to the definition of serious incident.

(a) Near collisions requiring an avoidance manoeuvre to avoid a collision or an unsafe situation or when an avoidance action would have been appropriate.

(b) Controlled flight into terrain only marginally avoided.

(c) Aborted take-off on a closed or engaged runway.

(d) Take-off from a closed or engaged runway with marginal separation from obstacle(s).

(e) Landings or attempted landings on a closed or engaged runway.

(f) Gross failures to achieve predicated performance during take-off or initial climb.

(g) Fires and smoke in the passenger compartment, in cargo compartments or engine fires, even though such fires were extinguished by the use of extinguishing agents.

(h) Events requiring the emergency use of oxygen by the flight crew.

(i) Aircraft structural failures or engine disintegration's not classified as an accident.

(j) Multiple malfunctions of one or more aircraft systems seriously affecting the operation of the aircraft.

(k) Flight crew incapacitation in flight.

(l) Fuel quantity requiring the declaration of an emergency by the pilot.

(m) Take-off or landing incidents. Incidents such as undershooting, overrunning or running off the side of runways.

(n) System failures, weather phenomena, operations outside the approved flight envelope or other occurrences, which could have caused difficulties controlling the aircraft.

(o) Failures of more than one system in a redundancy system mandatory for flight guidance and navigation.

Reason Model – Latent Failure Model

CAA identification of occurrence causal factors is based on the Reason Model (latent failure model). Occurrence investigations attempt to assign attributable cause by identifying the generic type of organisation or person involved and the contributing active failures, local factors, and/or organisation factors. The analysis contained in the Causal Factor Analysis section of this report summarises the results from investigation by reporting the different

types of causal factors identified versus occurrence type. It should be noted that occurrence types (e.g. Accident, Defect etc.) are not mutually exclusive (e.g. an accident and a defect may be associated) and hence any causal factor recorded during the investigation will be recorded for all associated occurrence types.

The following two diagrams are designed to show the basic principles of the latent failure model:

Diagram 1

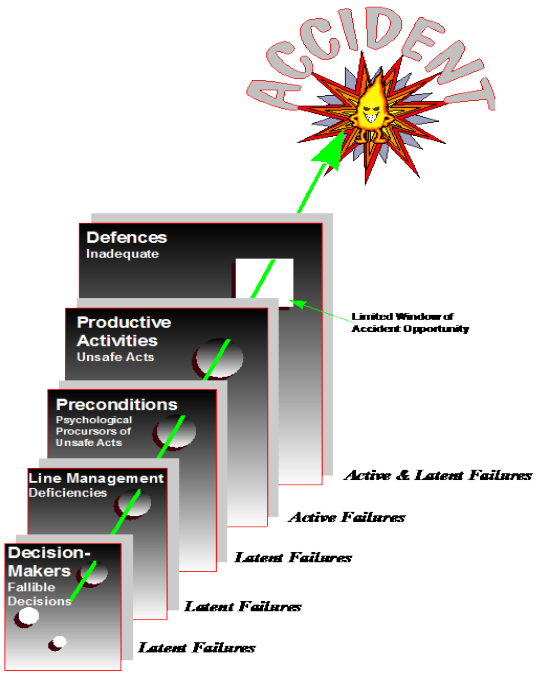


Diagram 1 shows the layers of defences that have been created within the aviation system to prevent accidents and incidents happening. It also shows how these defences have holes in them. When these holes line up there is a window of opportunity for an accident or incident. All that is needed to complete the breach in the defence is an active failure at the operational level. When this happens an accident occurs. When the defences in the system work properly and are only partially breached the end result may be an incident. Incidents are free lessons that should be investigated to show where the holes (latent failures) in the system are. Holes in the system are there all the time and a good pro-active audit program should also help in detecting them.

Diagram 2

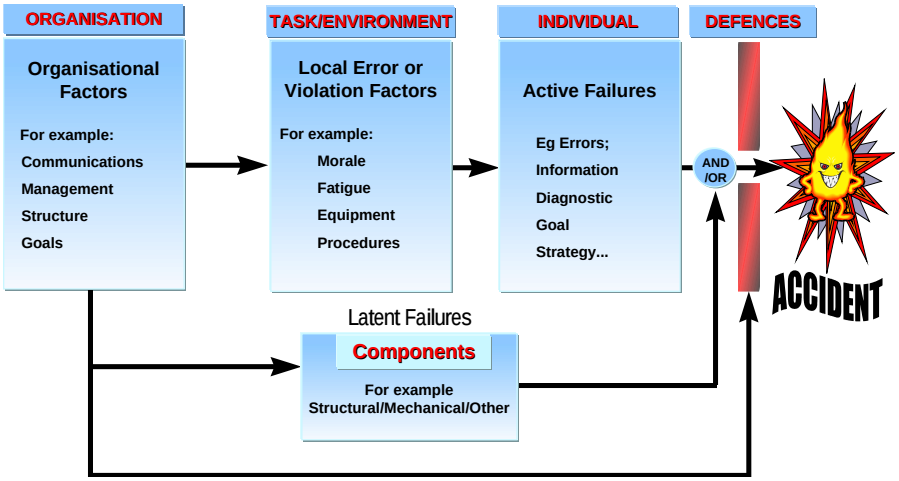


Diagram 2 shows how the latent failures are grouped into 3 areas:

1. The active failures.
2. Task/environment or local factors.
3. Organisational factors.

In basic terms the latent failure model states that an accident is predicated by deficiencies in the management and physical systems responsible for and supporting the particular operation. Management system deficiencies in the responsible organisation(s) can lead to error or violation inducing conditions in the local working environment. The existence of these conditions increases the likelihood of actual errors or violations by personnel which can place an over-reliance on, or expose deficiencies in, final defences.