

# Aviation Industry Safety Update

Intelligence, Safety and Risk Analysis Unit

1 January to 31 December 2012



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. While previous reports have covered a six-monthly period this report differ from previous versions as it covers the one year period ending 31 December 2012. It is intended to continuing releasing safety reports at six-monthly intervals but each covering the previous 12 months, with reference to the previous three years to provide context. The reason for doing this is that the relatively low number of safety occurrences in New Zealand, meant the six-month time frame was becoming too small for meaningful analysis.

This report uses calendar years; the first quarter is 1 January to 31 March. Data in tables may not sum exactly to the total shown due to rounding.

### **Key Indicators**

- The numbers of air transport flights, has increased by 8.7% while total hours flown across all sectors has increased by 17.5% relative to the previous year. Seat hours offered has decreased slightly (-2%)
- The number of aircraft movements at principal aerodromes has increased by 1% in this period but the trend over three years is downwards reflecting a downward trend in number of air transport flights.
- There were 86 aircraft accidents in 2012. This is down 17.3% on the previous year and down 25% on the average for the three previous years.
- The accident, fatalities and social cost statistics continue to be dominated by sport transport, private aircraft and agricultural operations, in that order.

### **Comments on Data Presentation**

This edition of the report includes a revised Executive Summary that presents key metrics relating to the safety performance of the New Zealand aviation sector in graphical form. Each Bar chart displays the current state and makeup of the sector. Trend information is provided by figures to the left of each chart which refers this year's figure to the previous year, and the average of the three previous years. This was done because in some cases the three previous year's average provides better long term trend information than the previous year's result which can be subject to short term economic or environmental fluctuations.

Also included in this edition is an improved presentation of the analysis of accident causal factors, see page 48. Active failures continue to be a leading cause of accident and these are broken down further on page 49. Airspace events have received a similar analysis by causal factor on pages 58-59. The CAA is considering how to improve the use of accident causal factor analysis so comment on this method of presentation would be welcome.

### **Jack Stanton**

Manager Intelligence, Safety and Risk Analysis

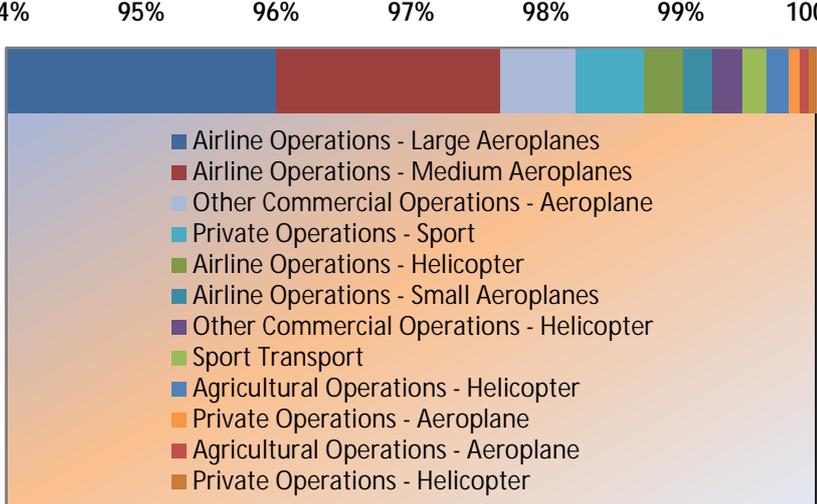
## Executive Summary - Status as at 31 December 2012

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

<b>Part 1 - Industry Size</b> (See page 18 for more information)	
<i>Measure</i>	<i>Current Contributors</i>
<p><b>Registered Aircraft</b> as at 31 Dec 2012 4,581</p> <p>1 Year prior 4,499</p> <p>31 Dec average for 3 prior years 4,403.7</p>	<p>0% 20% 40% 60% 80% 100%</p> <p>■ Sport Aircraft ■ Small Aeroplanes ■ Helicopters ■ Large Aeroplanes ■ Agricultural Aeroplanes ■ Medium Aeroplanes</p>
<p><b>Licences on Issue</b> as at 31 Dec 2012 13,473</p> <p>1 Year prior 13,361</p> <p>31 Dec average for 3 prior years 12,968.3</p>	<p>0% 20% 40% 60% 80% 100%</p> <p>■ CPL ■ PPL ■ LAME ■ ATPL ■ ATCL ■ RPL</p>
<p><b>Certificates Current</b> as at 31 Dec 2012 1009</p> <p>1 Year prior 985</p> <p>31 Dec average for 3 prior years 941.7</p>	<p>0% 20% 40% 60% 80% 100%</p> <p>■ Part 119 Air Operator ■ Part 135 Helicopters and Small Aeroplanes ■ Part 137 Agricultural Aircraft Operator ■ Part 145 Aircraft Maintenance Organisation ■ Part 109 Regulated Air Cargo Agent ■ Part 19 Supply Organisation Certificate of Approval ■ Part 141 Aviation Training Organisation ■ Part 92 Dangerous Goods Packaging Approval ■ Part 129 Foreign Air Operator ■ Part 115 Adventure Aviation Operator ■ Synthetic Training Device (General Aviation) ■ Other Certificates</p>

<b>Part 2 - Industry Activity</b> (See page 20 for more information)	
<i>Measure</i>	<i>Current Contributors</i>
<p><b><i>Aircraft Movements at Aerodromes</i></b></p> <p>Year ending 31 Dec 2012 1,020,857</p> <p>Previous year 1,038,147</p> <p>Average for 3 prior years 1,151,103.0</p>	<p style="text-align: center;"><b>Aircraft Movements from Aerodromes</b> Year ending Dec 2012, Percentages by Aerodrome</p>
<p><b><i>Air Transport Flights</i></b></p> <p>Year ending 31 Dec 2012 399,196</p> <p>Previous year 367,268</p> <p>Average for 3 prior years 388,112.7</p>	<p style="text-align: center;"><b>Air Transport Flights</b> Year ending Dec 2012, Percentages by Aircraft Type</p>
<p><b><i>Hours Flown (all operations)</i></b></p> <p>Year ending 31 Dec 2012 1,140,644</p> <p>Previous year 970,539</p> <p>Average for 3 prior years 952,126.3</p>	<p style="text-align: center;"><b>Hours Flown</b> Year ending Dec 2012, Percentages by Aircraft Type</p>

**Part 2 - Industry Activity**  
(See page 20 for more information)

<i>Measure</i>	<i>Current Contributors</i>
<p><b>Seat Hours (Millions)</b></p> <p>Year ending 31 Dec 2012 25.8</p> <p>Previous year 26.37</p> <p>Average for 3 prior years 24.73</p>	 <p style="text-align: center;"><b>Seat Hours Occupied for year ending Dec 2012 Percentages by Safety Outcome Target Group</b></p> <p>(Note the false zero on the percentage scale, The Airline Operations – Large Aeroplanes group contributes 96.13% to the seat-hour total)</p>

### Part 3 - Safety Outcomes

(See pages 32 to [92](#) for more information)

<i>Measure</i>	<i>Current Contributors</i>
<p><b>Social Cost</b> (2012 dollars)</p> <p>Year ending 31 Dec 2012 <b>\$M 89.81</b></p> <p>Previous year \$M 59.17</p> <p>Average for 3 prior years \$M 68.33</p>	<p><b>Social Cost for year ending Dec 2012</b> Percentages by Safety Outcome Target Group</p>
<p><b>Accidents</b></p> <p>Year ending 31 Dec 2012 86</p> <p>Previous year 104</p> <p>Average for 3 prior years 114.0</p>	<p><b>Accidents for year ending Dec 2012</b> Percentages by Safety Outcome Target Group</p>
<p><b>Fatalities</b></p> <p>Year ending 31 Dec 2012 <b>21</b></p> <p>Previous year 11</p> <p>Average for 3 prior years 14.7</p>	<p><b>Fatalities for year ending Dec 2012</b> Percentages by Safety Outcome Target Group</p>

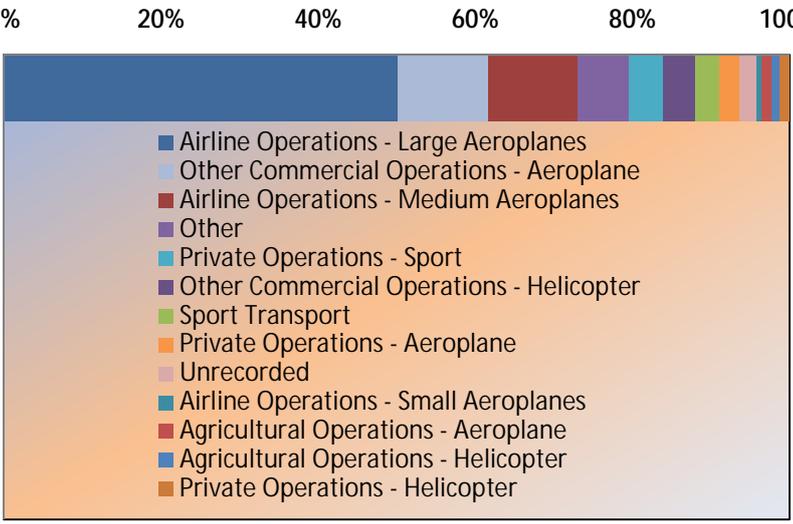
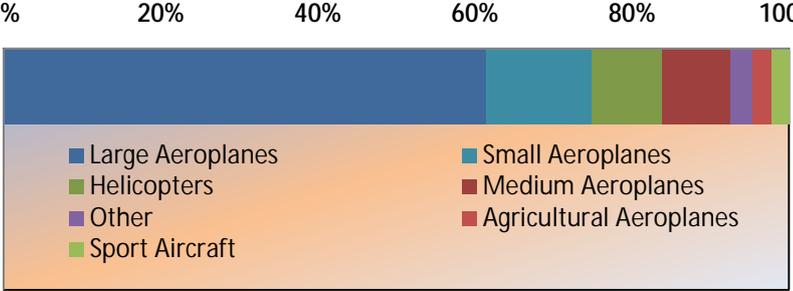
**Part 3 - Safety Outcomes**

(See pages 32 to [92](#) for more information)

<i>Measure</i>	<i>Current Contributors</i>
<p><b><i>Serious Injuries</i></b></p> <p>Year ending 31 Dec 2012 16</p> <p>Previous year 20</p> <p>Average for 3 prior years 16.0</p>	<p style="text-align: center;"><b>Serious Injuries for year ending Dec 2012</b> Percentages by Safety Outcome Target Group</p>
<p><b><i>Fatal Accidents</i></b></p> <p>Year ending 31 Dec 2012 9</p> <p>Previous year 9</p> <p>Average for 3 prior years 8.7</p>	<p style="text-align: center;"><b>Fatal Accidents for year ending Dec 2012</b> Percentages by Safety Outcome Target Group</p>
<p><b><i>Airspace Incidents Reported</i></b></p> <p>Year ending 31 Dec 2012 1271 (8 Critical)</p> <p>Previous year 1012 (18 Critical)</p> <p>Average for 3 prior years 935.7 (13.7 Critical)</p>	<p style="text-align: center;"><b>Airspace Incidents for year ending Dec 2012</b> Percentages by Nearest Reporting Point</p>

### Part 3 - Safety Outcomes

(See pages 32 to [92](#) for more information)

<i>Measure</i>	<i>Current Contributors</i>																												
<p><b>Operational Incidents Reported</b></p> <p>Year ending 31 Dec 2012 719 (7 Critical)</p> <p>Previous year 730 (5 Critical)</p> <p>Average for 3 prior years 819.0 (3.3 Critical)</p>	 <p><b>Operational Incidents for year ending Dec 2012 Percentages by Safety Outcome Target Group</b></p> <table border="1"> <caption>Operational Incidents - Percentages by Safety Outcome Target Group</caption> <thead> <tr> <th>Category</th> <th>Percentage</th> </tr> </thead> <tbody> <tr><td>Airline Operations - Large Aeroplanes</td><td>~15%</td></tr> <tr><td>Other Commercial Operations - Aeroplane</td><td>~10%</td></tr> <tr><td>Airline Operations - Medium Aeroplanes</td><td>~10%</td></tr> <tr><td>Other</td><td>~5%</td></tr> <tr><td>Private Operations - Sport</td><td>~5%</td></tr> <tr><td>Other Commercial Operations - Helicopter</td><td>~5%</td></tr> <tr><td>Sport Transport</td><td>~5%</td></tr> <tr><td>Private Operations - Aeroplane</td><td>~5%</td></tr> <tr><td>Unrecorded</td><td>~5%</td></tr> <tr><td>Airline Operations - Small Aeroplanes</td><td>~5%</td></tr> <tr><td>Agricultural Operations - Aeroplane</td><td>~5%</td></tr> <tr><td>Agricultural Operations - Helicopter</td><td>~5%</td></tr> <tr><td>Private Operations - Helicopter</td><td>~5%</td></tr> </tbody> </table>	Category	Percentage	Airline Operations - Large Aeroplanes	~15%	Other Commercial Operations - Aeroplane	~10%	Airline Operations - Medium Aeroplanes	~10%	Other	~5%	Private Operations - Sport	~5%	Other Commercial Operations - Helicopter	~5%	Sport Transport	~5%	Private Operations - Aeroplane	~5%	Unrecorded	~5%	Airline Operations - Small Aeroplanes	~5%	Agricultural Operations - Aeroplane	~5%	Agricultural Operations - Helicopter	~5%	Private Operations - Helicopter	~5%
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<p><b>Defect Incidents Reported</b></p> <p>Year ending 31 Dec 2012 1459 (6 Critical)</p> <p>Previous year 1451 (2 Critical)</p> <p>Average for 3 prior years 1253.7 (0.7 Critical)</p>	 <p><b>Defect Incidents for year ending Dec 2012 Percentages by Aircraft Type</b></p> <table border="1"> <caption>Defect Incidents - Percentages by Aircraft Type</caption> <thead> <tr> <th>Aircraft Type</th> <th>Percentage</th> </tr> </thead> <tbody> <tr><td>Large Aeroplanes</td><td>~45%</td></tr> <tr><td>Small Aeroplanes</td><td>~15%</td></tr> <tr><td>Helicopters</td><td>~10%</td></tr> <tr><td>Medium Aeroplanes</td><td>~10%</td></tr> <tr><td>Other</td><td>~5%</td></tr> <tr><td>Sport Aircraft</td><td>~5%</td></tr> <tr><td>Agricultural Aeroplanes</td><td>~5%</td></tr> </tbody> </table>	Aircraft Type	Percentage	Large Aeroplanes	~45%	Small Aeroplanes	~15%	Helicopters	~10%	Medium Aeroplanes	~10%	Other	~5%	Sport Aircraft	~5%	Agricultural Aeroplanes	~5%												
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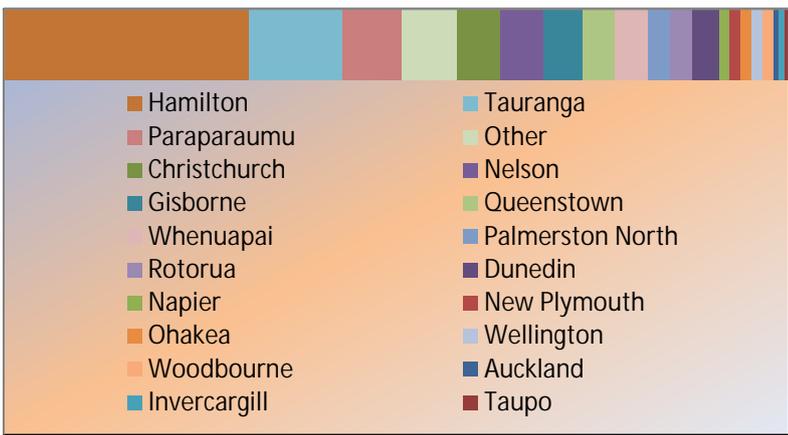
**Part 3 - Safety Outcomes**

(See pages 32 to [92](#) for more information)

<i>Measure</i>	<i>Current Contributors</i>
<p><b>Aerodrome Incidents Reported</b> Year ending 31 Dec 2012 203 (2 Critical)</p> <p>Previous year 147 (2 Critical)</p> <p>Average for 3 prior years 111.2 (0.0 Critical)</p>	<div data-bbox="507 472 1377 1010"> <p><b>Aerodrome Incidents for year ending Dec 2012 Percentages by Safety Outcome Target Group</b></p> <ul style="list-style-type: none"> <li>Other Commercial Operations - Aeroplane</li> <li>Other</li> <li>Private Operations - Aeroplane</li> <li>Airline Operations - Medium Aeroplanes</li> <li>Airline Operations - Large Aeroplanes</li> <li>Unrecorded</li> <li>Private Operations - Sport</li> <li>Airline Operations - Small Aeroplanes</li> <li>Private Operations - Helicopter</li> <li>Other Commercial Operations - Helicopter</li> <li>Agricultural Operations - Aeroplane</li> <li>Airline Operations - Helicopter</li> <li>Agricultural Operations - Helicopter</li> </ul> </div> <div data-bbox="507 1171 1342 1518"> <p><b>Aerodrome Incidents for year ending Dec 2012 Percentages by Nearest Reporting Point</b></p> <ul style="list-style-type: none"> <li>Hamilton</li> <li>Paraparaumu</li> <li>Gisborne</li> <li>Whenuapai</li> <li>Palmerston North</li> <li>Invercargill</li> <li>Woodbourne</li> <li>Tauranga</li> <li>Christchurch</li> <li>Nelson</li> <li>Auckland</li> <li>Rotorua</li> <li>Napier</li> <li>Taupo</li> <li>Other</li> <li>Wellington</li> <li>Queenstown</li> <li>Dunedin</li> <li>New Plymouth</li> <li>Ohakea</li> </ul> </div>

### Part 3 - Safety Outcomes

(See pages 32 to [92](#) for more information)

<i>Measure</i>	<i>Current Contributors</i>
<p><b>Runway Incursions Reported</b></p> <p>Year ending 31 Dec 2012 145 (2 Critical)</p> <p>Previous year 90 (1 Critical)</p> <p>Average for 3 prior years 56.7 (0.0 Critical)</p>	<div style="text-align: center;"> <p>0%      20%      40%      60%      80%      100%</p>  <p><b>Runway Incursions for year ending Dec 2012 Percentages by Safety Outcome Target Group</b></p> </div> <div style="text-align: center;"> <p>0%      20%      40%      60%      80%      100%</p>  <p><b>Runway Incursions for year ending Dec 2012 Percentages by Nearest Reporting Point</b></p> </div>

**Part 3 - Safety Outcomes**

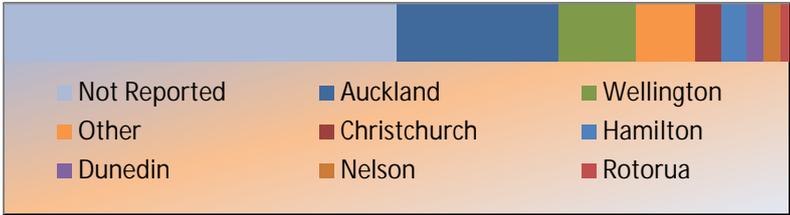
(See pages 32 to [92](#) for more information)

<i>Measure</i>	<i>Current Contributors</i>																																																																		
<p><b><i>Bird Hazard Incidents Reported</i></b></p> <p>Year ending 31 Dec 2012 1299 (484 Strikes)</p> <p>Previous year 1313 (475 Strikes)</p> <p>Average for 3 prior years 1333.7 (502.0 Strikes)</p> <p>(No Bird Hazard incident reported during the period covered by this report was Critical)</p>	<div data-bbox="507 472 1342 972"> <p><b>Bird Hazard Incidents for year ending Dec 2012 Percentages by Safety Outcome Target Group</b></p> <table border="1"> <caption>Approximate Data for Bird Hazard Incidents by Safety Outcome Target Group</caption> <thead> <tr> <th>Category</th> <th>Percentage</th> </tr> </thead> <tbody> <tr><td>Airline Operations - Large Aeroplanes</td><td>65%</td></tr> <tr><td>Airline Operations - Medium Aeroplanes</td><td>10%</td></tr> <tr><td>Other</td><td>10%</td></tr> <tr><td>Other Commercial Operations - Aeroplane</td><td>5%</td></tr> <tr><td>Unrecorded</td><td>5%</td></tr> <tr><td>Airline Operations - Small Aeroplanes</td><td>1%</td></tr> <tr><td>Private Operations - Aeroplane</td><td>1%</td></tr> <tr><td>Agricultural Operations - Aeroplane</td><td>1%</td></tr> <tr><td>Agricultural Operations - Helicopter</td><td>1%</td></tr> <tr><td>Other Commercial Operations - Helicopter</td><td>1%</td></tr> <tr><td>Private Operations - Sport</td><td>1%</td></tr> </tbody> </table> </div> <div data-bbox="507 1122 1342 1469"> <p><b>Bird Hazard Incidents for year ending Dec 2012 Percentages by Nearest Reporting Point</b></p> <table border="1"> <caption>Approximate Data for Bird Hazard Incidents by Nearest Reporting Point</caption> <thead> <tr> <th>Reporting Point</th> <th>Percentage</th> </tr> </thead> <tbody> <tr><td>Christchurch</td><td>15%</td></tr> <tr><td>Auckland</td><td>15%</td></tr> <tr><td>Wellington</td><td>10%</td></tr> <tr><td>Palmerston North</td><td>10%</td></tr> <tr><td>Other</td><td>10%</td></tr> <tr><td>Napier</td><td>5%</td></tr> <tr><td>Invercargill</td><td>5%</td></tr> <tr><td>Ohakea</td><td>5%</td></tr> <tr><td>Tauranga</td><td>5%</td></tr> <tr><td>Queenstown</td><td>5%</td></tr> <tr><td>Dunedin</td><td>5%</td></tr> <tr><td>Whenuapai</td><td>5%</td></tr> <tr><td>Woodbourne</td><td>5%</td></tr> <tr><td>Gisborne</td><td>5%</td></tr> <tr><td>Hamilton</td><td>5%</td></tr> <tr><td>Rotorua</td><td>5%</td></tr> <tr><td>Nelson</td><td>5%</td></tr> <tr><td>New Plymouth</td><td>5%</td></tr> <tr><td>Paraparaumu</td><td>5%</td></tr> <tr><td>Taupo</td><td>5%</td></tr> </tbody> </table> </div>	Category	Percentage	Airline Operations - Large Aeroplanes	65%	Airline Operations - Medium Aeroplanes	10%	Other	10%	Other Commercial Operations - Aeroplane	5%	Unrecorded	5%	Airline Operations - Small Aeroplanes	1%	Private Operations - Aeroplane	1%	Agricultural Operations - Aeroplane	1%	Agricultural Operations - Helicopter	1%	Other Commercial Operations - Helicopter	1%	Private Operations - Sport	1%	Reporting Point	Percentage	Christchurch	15%	Auckland	15%	Wellington	10%	Palmerston North	10%	Other	10%	Napier	5%	Invercargill	5%	Ohakea	5%	Tauranga	5%	Queenstown	5%	Dunedin	5%	Whenuapai	5%	Woodbourne	5%	Gisborne	5%	Hamilton	5%	Rotorua	5%	Nelson	5%	New Plymouth	5%	Paraparaumu	5%	Taupo	5%
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<b>Part 3 - Safety Outcomes</b>	
(See pages 32 to <a href="#">92</a> for more information)	
<i>Measure</i>	<i>Current Contributors</i>
<p><b>Security Incidents Reported</b></p> <p>Year ending 31 Dec 2012</p> <p style="text-align: right;">7 (0 Critical)</p> <p>Previous year</p> <p style="text-align: right;">28 (0 Critical)</p> <p>Average for 3 prior years</p> <p style="text-align: right;">31.0 (0.3 Critical)</p>	<div style="text-align: center;"> <p>0%      20%      40%      60%      80%      100%</p> <p>■ Not Aircraft Related      ■ Large Aeroplanes ■ Medium Aeroplanes      ■ Small Aeroplanes</p> <p><b>Security Incidents for year ending Dec 2012</b> Percentages by Aircraft Type</p> </div> <div style="text-align: center;"> <p>0%      20%      40%      60%      80%      100%</p> <p>■ Not Reported      ■ Auckland      ■ Wellington      ■ Other</p> <p><b>Security Incidents for year ending Dec 2012</b> Percentages by NRP</p> </div>
<p><b>Aviation Related Concerns Reported</b></p> <p>Year ending 31 Dec 2012</p> <p style="text-align: right;">784 (1 Critical)</p> <p>Previous year</p> <p style="text-align: right;">900 (0 Critical)</p> <p>Average for 3 prior years</p> <p style="text-align: right;">440.7 (0.7 Critical)</p>	<ul style="list-style-type: none"> <li>· The coding of ARCs is such that no useful analysis is currently possible</li> <li>· Approximately 39% of ARCs received are actually Section 13A notifications that are treated as ARCs because there is no other procedure defined for processing them.</li> </ul>

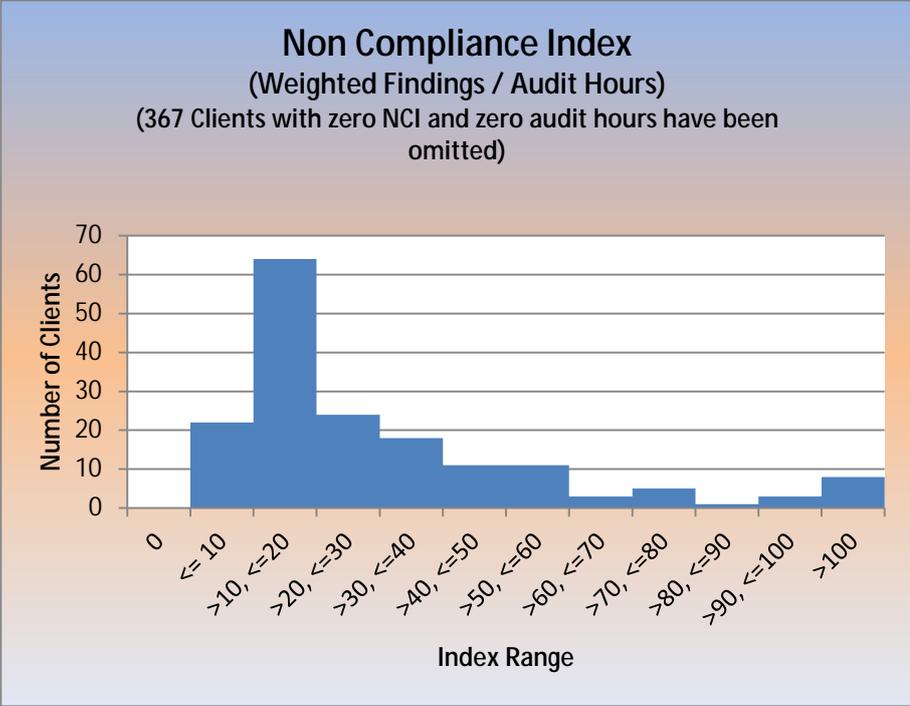
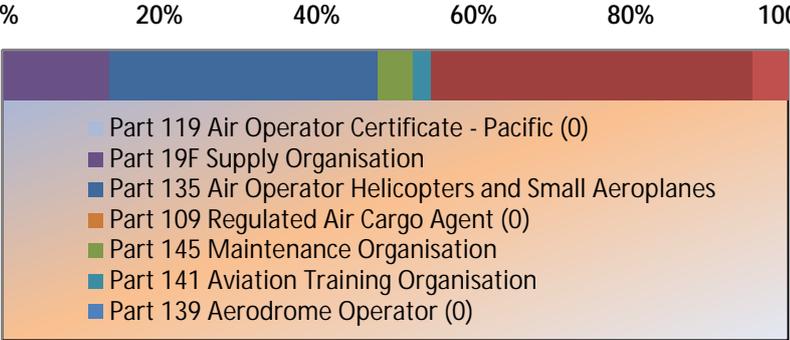
### Part 3 - Safety Outcomes

(See pages 32 to [92](#) for more information)

<i>Measure</i>	<i>Current Contributors</i>
<p><b>All Other Incidents Reported</b> (Dangerous Goods, Facility Malfunction, Cargo Security, Promulgated Information)</p> <p>Year ending 31 Dec 2012 92 (0 Critical)</p> <p>Previous year 90 (0 Critical)</p> <p>Average for 3 prior years 132.0 (0.3 Critical).</p>	<div data-bbox="507 432 1345 461"> <p>0%      20%      40%      60%      80%      100%</p> </div>  <p style="text-align: center;"><b>All Other Incidents for year ending Dec 2012 Percentages by Aircraft Type</b></p> <div data-bbox="507 757 1345 786"> <p>0%      20%      40%      60%      80%      100%</p> </div>  <p style="text-align: center;"><b>All Other Incidents for year ending Dec 2012 Percentages by NRP</b></p> <div data-bbox="507 1149 1345 1178"> <p>0%      20%      40%      60%      80%      100%</p> </div>  <p style="text-align: center;"><b>All Other Incidents Jan - Jun 2012 Percentages by Safety Outcome Target Group</b></p>

**Part 3 - Safety Outcomes**

(See pages 32 to [92](#) for more information)

<i>Measure</i>	<i>Current Contributors</i>																										
<p><b>Median Non-Compliance Index</b></p> <p>Year ending 31 Dec 2012 20.0</p> <p>Previous year 28.6</p> <p>Average for 3 prior years 30.8</p>	<p style="text-align: center;"><b>Non Compliance Index</b> (Weighted Findings / Audit Hours) (367 Clients with zero NCI and zero audit hours have been omitted)</p>  <table border="1"> <caption>Non Compliance Index Distribution</caption> <thead> <tr> <th>Index Range</th> <th>Number of Clients</th> </tr> </thead> <tbody> <tr><td>0</td><td>0</td></tr> <tr><td>&lt;=10</td><td>22</td></tr> <tr><td>&gt;10, &lt;=20</td><td>65</td></tr> <tr><td>&gt;20, &lt;=30</td><td>25</td></tr> <tr><td>&gt;30, &lt;=40</td><td>18</td></tr> <tr><td>&gt;40, &lt;=50</td><td>12</td></tr> <tr><td>&gt;50, &lt;=60</td><td>10</td></tr> <tr><td>&gt;60, &lt;=70</td><td>5</td></tr> <tr><td>&gt;70, &lt;=80</td><td>5</td></tr> <tr><td>&gt;80, &lt;=90</td><td>2</td></tr> <tr><td>&gt;90, &lt;=100</td><td>3</td></tr> <tr><td>&gt;100</td><td>8</td></tr> </tbody> </table>	Index Range	Number of Clients	0	0	<=10	22	>10, <=20	65	>20, <=30	25	>30, <=40	18	>40, <=50	12	>50, <=60	10	>60, <=70	5	>70, <=80	5	>80, <=90	2	>90, <=100	3	>100	8
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<p><b>Number of Clients with Risk Score of 'Very High'</b></p> <p>Year ending 31 Dec 2012 29</p> <p>Previous year 16</p> <p>Average for 3 prior years 15.3</p>	 <table border="1"> <caption>Clients with Very High Risk Scores by Certificate Type</caption> <thead> <tr> <th>Certificate Type</th> <th>Count</th> </tr> </thead> <tbody> <tr><td>Part 119 Air Operator Certificate - Pacific</td><td>0</td></tr> <tr><td>Part 19F Supply Organisation</td><td>1</td></tr> <tr><td>Part 135 Air Operator Helicopters and Small Aeroplanes</td><td>18</td></tr> <tr><td>Part 109 Regulated Air Cargo Agent</td><td>0</td></tr> <tr><td>Part 145 Maintenance Organisation</td><td>1</td></tr> <tr><td>Part 141 Aviation Training Organisation</td><td>1</td></tr> <tr><td>Part 139 Aerodrome Operator</td><td>0</td></tr> </tbody> </table> <p style="text-align: center;"><b>Clients with Very High Risk Scores</b> Year Ending 31 December 2012 Percentages by Certificate Held</p>	Certificate Type	Count	Part 119 Air Operator Certificate - Pacific	0	Part 19F Supply Organisation	1	Part 135 Air Operator Helicopters and Small Aeroplanes	18	Part 109 Regulated Air Cargo Agent	0	Part 145 Maintenance Organisation	1	Part 141 Aviation Training Organisation	1	Part 139 Aerodrome Operator	0										
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<b>Part 3 - Safety Outcomes</b>	
(See pages 32 to <a href="#">92</a> for more information)	
<i>Measure</i>	<i>Current Contributors</i>
<p><b><i>Number of Clients with Risk Score of 'High'</i></b></p> <p>Year ending 31 Dec 2012</p> <p style="text-align: right;">18</p> <p>Previous year</p> <p style="text-align: right;">12</p> <p>Average for 3 prior years</p> <p style="text-align: right;">33.7</p>	<p style="text-align: center;"><b>Clients with High Risk Scores Year Ending 31 December 2012 Percentages by Certificate Held</b></p>

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 2012, 31 Dec 2011 and the average of the numbers at the end of each of the three prior years.

Aircraft Category	31 Dec 2012	31 Dec 2011	Average 3 Prior Yrs
Large Aeroplanes	125	127	119.3
Medium Aeroplanes	86	84	83.0
Small Aeroplanes	1,523	1,517	1,507.3
Helicopters	787	767	756.0
Sport Aircraft	1,953	1,895	1,827.0
Agricultural Aeroplanes	107	109	111.0
<b>Total</b>	<b>4,581</b>	<b>4,499</b>	<b>4,403.7</b>

### 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 2012, 31 Dec 2011 and the average of the numbers at the end of each of the three prior years.

Licences	31 Dec 2012	31 Dec 2011	Average 3 Prior Yrs
RPL	240	205	115.7
ATCL	363	362	355.7
ATPL	2,112	2,086	2,053.3
LAME	2,611	2,549	2,420.7
PPL	3,361	3,513	3,739.0
CPL	4,786	4,646	4,284.0
<b>Total</b>	<b>13,473</b>	<b>13,361</b>	<b>12,968.3</b>

**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 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 2012, 31 Dec 2011 and the average of the numbers at the end of each of the three prior years.

Rule Part	31 Dec 2012	31 Dec 2011	Average 3 Prior Yrs *
Part 109 Regulated Air Cargo Agent	65	63	62.5
Part 115 Adventure Aviation Operator	33	1	0.0
Part 119 Air Operator	179	185	181.7
Part 129 Foreign Air Operator	32	30	37.3
Part 137 Agricultural Aircraft Operator	104	105	108.0
Part 139 Aerodromes	27	26	25.3
Part 140 Aviation Security Service	1	1	1.0
Part 141 Aviation Training Organisation	59	57	53.3
Part 145 Aircraft Maintenance Organisation	67	63	57.3
Part 146 Aircraft Design Organisation	14	14	12.0
Part 148 Aircraft Manufacturing Organisation	20	23	21.7
Part 149 Aviation Recreation Organisation	7	8	8.7
Part 171 Aeronautical Telecommunication Service Organisation	2	2	2.0
Part 172 Air Traffic Service	2	2	2.0
Part 173 Instrument Flight Procedure Service Organisation	3	3	2.0
Part 174 Meteorological Service Organisation	2	2	2.0
Part 175 Aeronautical Information Service Organisation	1	1	1.7
Part 19 Supply Organisation Certificate of Approval	56	60	60.0
Part 92 Dangerous Goods Packaging Approval	58	57	52.7
Australian AOC Operating with ANZA Privileges	2	1	1.3
<b>Total</b>	<b>734</b>	<b>704</b>	<b>671.7</b>

\* 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 2012	31 Dec 2011	Average 3 Prior Yrs
Part 108 Security Programme	18	18	19.0
Part 121 Large Aeroplanes	9	9	9.7
Part 125 Medium Aeroplanes	15	15	15.3
Part 135 Helicopters and Small Aeroplanes	168	175	170.3

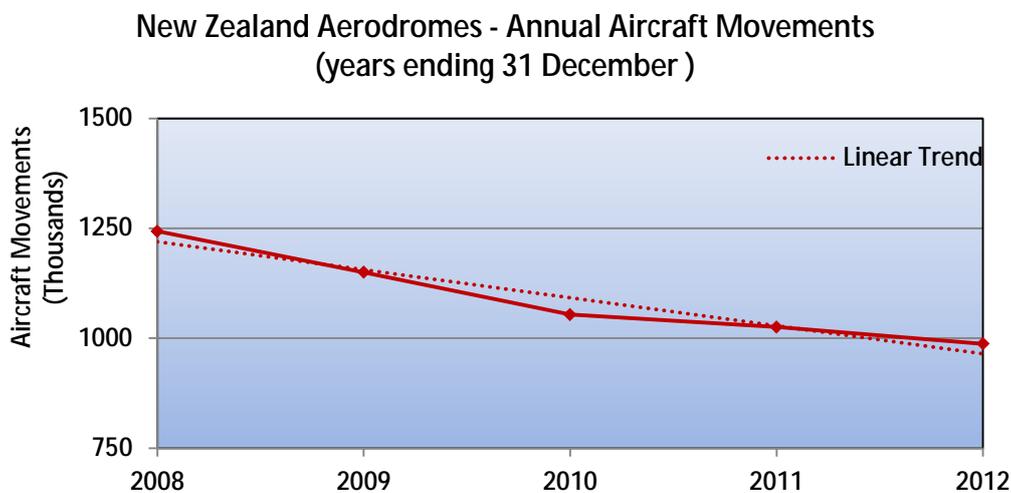
Part 129 Air Operator	31 Dec 2012	31 Dec 2011	Average 3 Prior Yrs
Part 108 Security Programme	23	21	28.0

## 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 2012. 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 5.6% from the year ended 31 December 2008 until the year ended 31 December 2012 during which 987155 movements were recorded.

### Yearly Comparison

The following table shows the number of Aerodrome movements in the period 1 January to 31 December 2012, the previous year and the average of the movement numbers during the prior 3 years.

Activity	Year Ending Dec 2012	Year Ending Dec 2011	Average 3 Prior Yrs
Aircraft Movements	1020857	1038147	1153622.3

## Aircraft Movements at Aerodromes

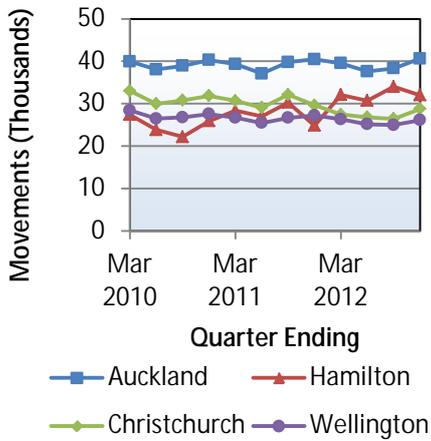
The aerodromes are shown in descending order of the number of aircraft movements for the year ending 31 December 2012. The figures all relate to years ending 31 December 2012.

Aerodrome	2008	2009	2010	2011	2012
Auckland	164,417	156,325	157,201	156,655	156,062
Taupo	34,696	30,680	28,774	26,376	25,536
Christchurch	148,320	136,249	125,611	121,469	109,444
Dunedin	55,321	53,602	44,003	29,229	25,328
Gisborne	24,341	23,955	22,174	22,459	19,594
Hamilton	151,109	148,380	99,308	110,419	128,744
Milford Sound	15,876	14,227	14,042	13,043	12,902
New Plymouth	45,773	43,518	37,097	32,791	30,773
Napier	27,948	24,114	27,172	27,332	25,242
Nelson	47,931	48,273	51,570	50,094	48,073
Invercargill	25,332	25,805	29,279	30,840	28,491
Ohakea	73,513	72,997	61,896	55,726	30,959
Palmerston North	82,776	58,761	56,439	65,708	67,395
Paraparaumu	0	6,305	0	12,832	33,702
Queenstown	50,445	45,966	42,347	41,769	43,776
Rotorua	29,657	20,734	23,380	22,682	22,092
Tauranga	105,992	97,144	86,935	74,400	72,652
Woodbourne	25,405	24,058	22,829	23,660	22,689
Wellington	122,206	111,969	109,193	105,988	102,488
Whenuapai	12,372	13,220	14,347	14,675	14,915

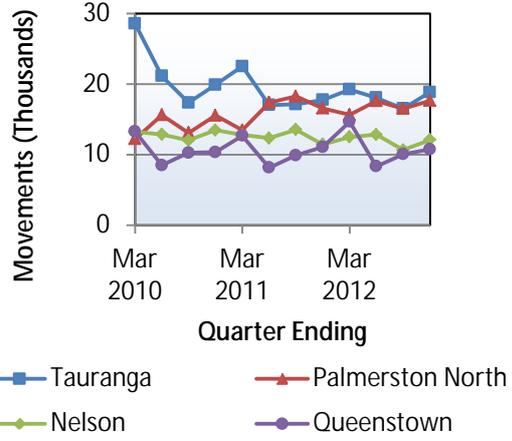
The 2009 figure for Paraparaumu is an estimate provided by that airport for that year. Data for Paraparaumu from 2011 onwards has been supplied by Airways Corporation. The value for 2011 relates only to the portion of the year when the Information Service was active.

This data is graphed on the next page.

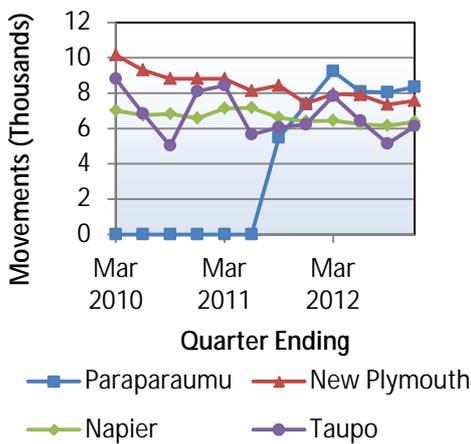
Quarterly Aircraft Movements at Aerodromes



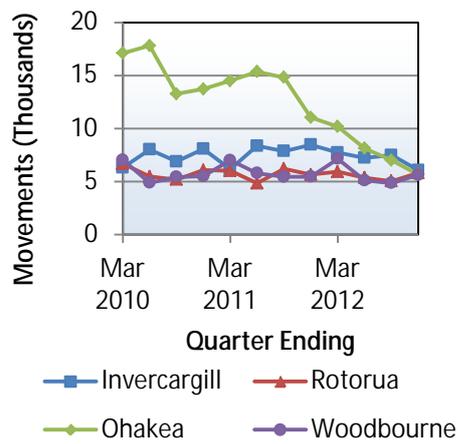
Quarterly Aircraft Movements at Aerodromes



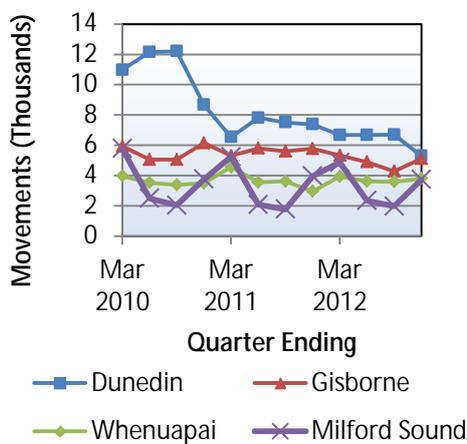
Quarterly Aircraft Movements at Aerodromes



Quarterly Aircraft Movements at Aerodromes



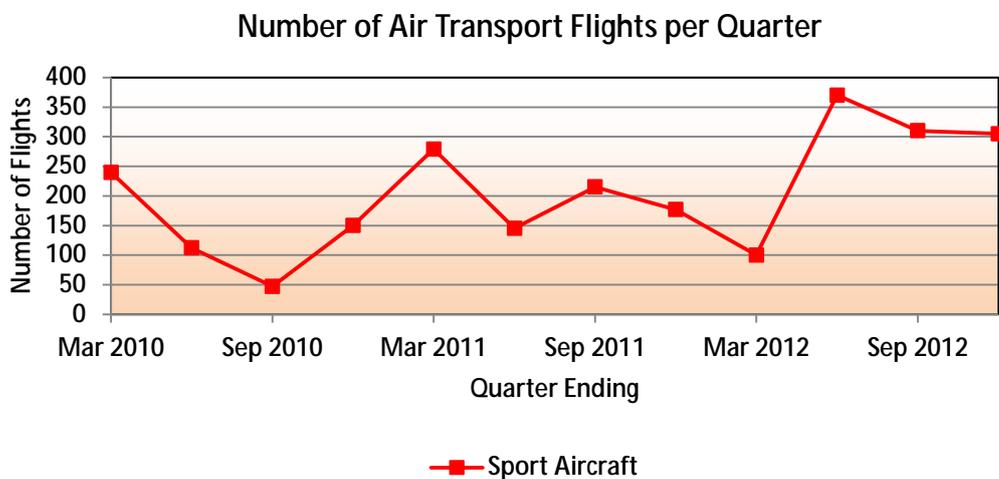
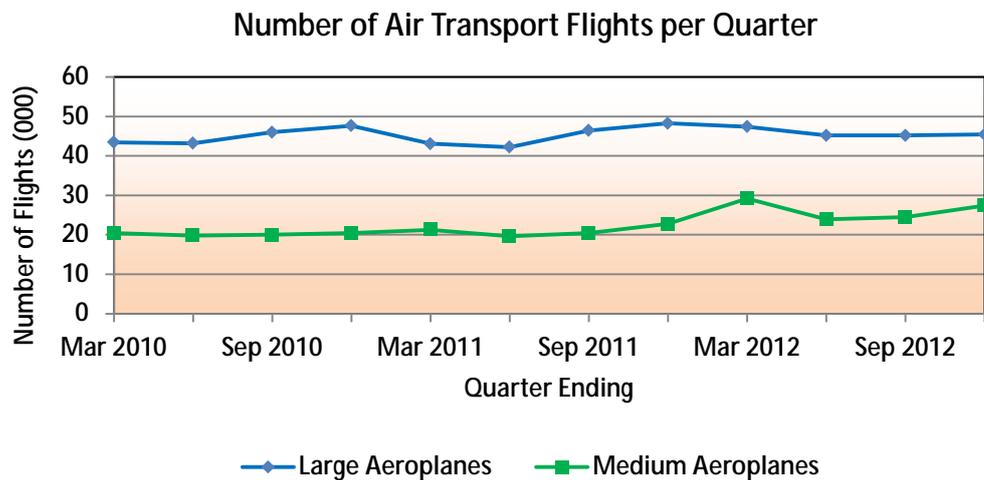
Quarterly Aircraft Movements at Aerodromes



## Air Transport Flights

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.

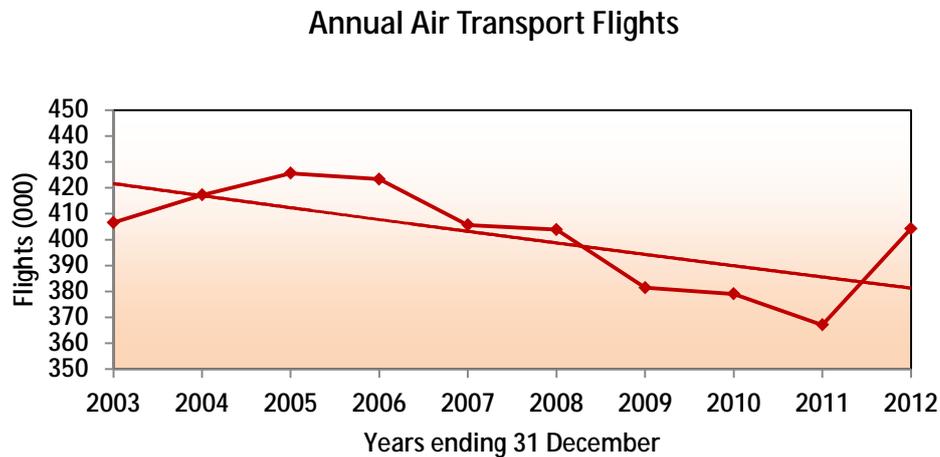
The following graphs show the estimated number of air transport flights per quarter during the three year period ending 31 December 2012. The estimates are based on the reported numbers of flights with an allowance for aircraft for which reports were not received.



**Note:** For comparison to previous reports, 2012q1 has been re-estimated as 100 because only 4 of 323 returns have been received for that period. Likewise 2011q1 has been re-estimated as 279. 25 returns were received from a possible of 74 operators and they reported a total of 179 flights, so 500 for the sector was not credible. In reality there were only approximately 39 balloons actually legally authorised to carry out sport air transport flights at the time so a better estimate is  $179 * 39 / 25 = 279.24$ .

### Long-Term Change in Air Transport Flights

The following graph shows the estimated number of air transport flights (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 2012



The change in the estimated number of annual air transport flights across this period is equivalent to an annual decrease of 0.1%. The trend line indicates an equivalent annual decrease of 1.2%.

### Yearly Comparison

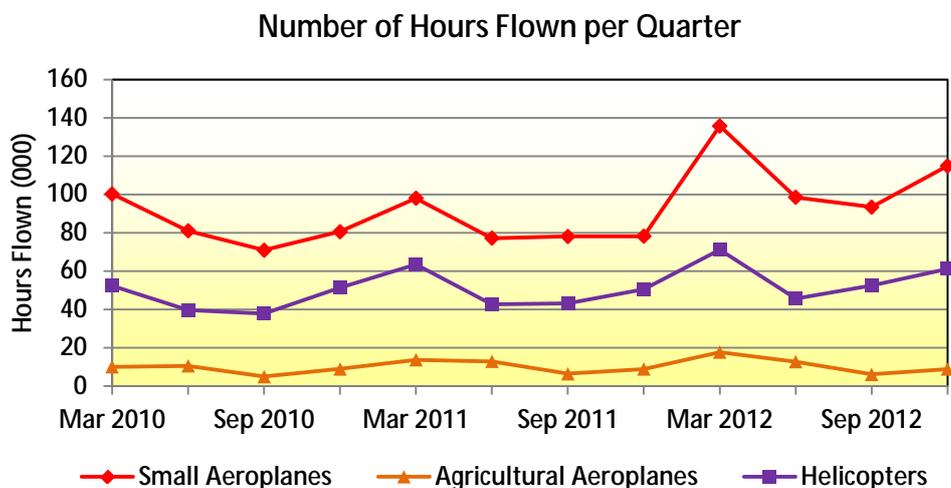
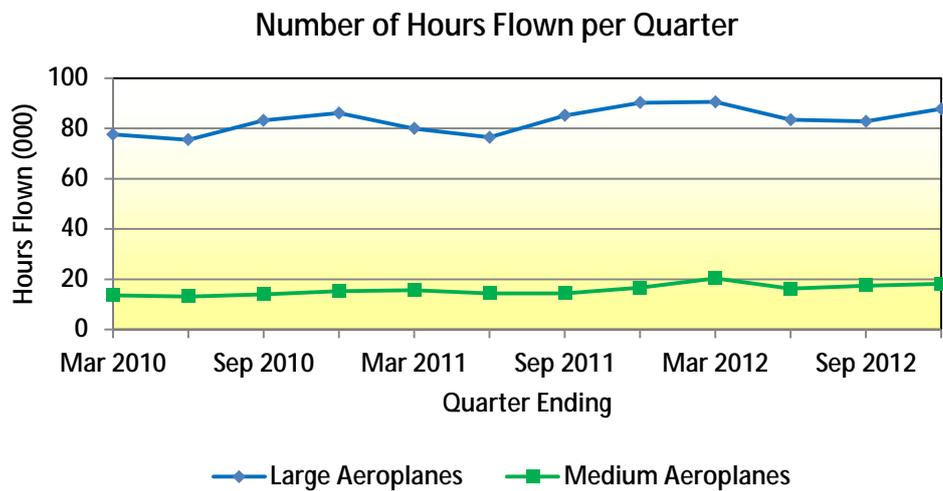
#### *Number of Air Transport Flights*

Aircraft Category	Year Ending Dec 2012	Year Ending Dec 2011	Average 3 Prior Yrs
Large Aeroplanes	185694	180009	184049.9
Medium Aeroplanes	105042	84134	86487.7
Small Aeroplanes	64780	48019	56844.9
Helicopters	47600	54068	60184.6
Sport Aircraft	1085	1038	545.6
<b>Total</b>	<b>404202</b>	<b>367268</b>	<b>388112.7</b>

## 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.

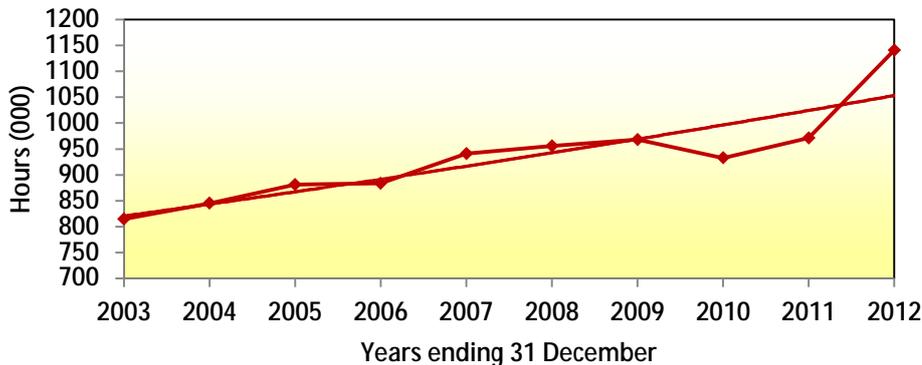
The following graphs show the estimated number of hours flown per quarter during the three year period ending 31 December 2012. The estimates are based on the reported hours with an allowance for aircraft for which reports were not received.



## 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 2012.

### Annual Hours Flown



The change in the estimated number of annual hours flown across this period is equivalent to an annual increase of 3.8%. The trend line represents an equivalent annual increase of 2.7%

### Yearly Comparison

#### Hours Flown

Aircraft Category	Year Ending Dec 2012	Year Ending Dec 2011	Average 3 Prior Yrs
Large Aeroplanes	344439.0	331662.5	319920.7
Medium Aeroplanes	72214.8	61015.2	59493.0
Small Aeroplanes	442616.8	331514.7	346898.7
Helicopters	230414.8	199821.7	183418.3
Sport Aircraft	5548.4	5069.7	4786.7
Agricultural Aeroplanes	45430.1	41956.2	37609.0
<b>Total</b>	<b>1140664.0</b>	<b>971039.9</b>	<b>952126.3</b>

### 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 2012 period at the time of compilation, which is at least 4 ½ months after most of the returns were due.

Aircraft Category	Percentage of Expected Returns Received
Large Aeroplanes	48.4%
Medium Aeroplanes	26.4%
Small Aeroplanes	12.1%
Helicopters	18.8%
Sport Aircraft – Aeroplanes	5.1%
Sport Aircraft – Free Balloons	2.7%
Sport Aircraft - Hang Gliders	40.7%
Sport Aircraft - Helicopters	0.0%
Sport Aircraft - Parachutes	31.6%
Sport Aircraft - Paragliders	31.6%
Agricultural Aeroplanes	28.2%

Helicopters, small and medium aircraft are struggling to achieve a return rate of 25%. Ways to increase compliance with the reporting requirements of CAR 12.151 are under consideration

## 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 six month period ending 31 December 2012. 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.

Safety Outcome Target Group	Year Ending Dec 2012	Year Ending Dec 2011	Average 3 Prior Yrs
Airline Operations - Large Aeroplanes	24.77 (96.00%)	25.47 (96.60%)	24.06 (96.15%)
Airline Operations - Medium Aeroplanes	0.43 (1.66%)	0.38 (1.45%)	0.38 (1.52%)
Airline Operations - Small Aeroplanes	0.06 (0.22%)	0.04 (0.16%)	0.06 (0.22%)
Airline Operations - Helicopter	0.07 (0.29%)	0.06 (0.23%)	0.07 (0.27%)
Sport Transport	0.04 (0.17%)	0.02 (0.09%)	0.05 (0.19%)
Other Commercial Operations - Aeroplane	0.15 (0.56%)	0.12 (0.46%)	0.13 (0.54%)
Other Commercial Operations - Helicopter	0.06 (0.23%)	0.05 (0.17%)	0.05 (0.21%)
Agricultural Operations - Aeroplane	0.02 (0.06%)	0.02 (0.07%)	0.02 (0.09%)
Agricultural Operations - Helicopter	0.04 (0.17%)	0.03 (0.13%)	0.05 (0.19%)
Private Operations - Aeroplane	0.02 (0.08%)	0.02 (0.08%)	0.02 (0.09%)
Private Operations - Helicopter	0.01 (0.05%)	0.02 (0.08%)	0.02 (0.07%)
Private Operations - Sport	0.13 (0.50%)	0.13 (0.48%)	0.11 (0.46%)
<b>Total</b>	<b>25.80 (100.00%)</b>	<b>26.37 (100.00%)</b>	<b>25.03 (100.00%)</b>

\* 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.

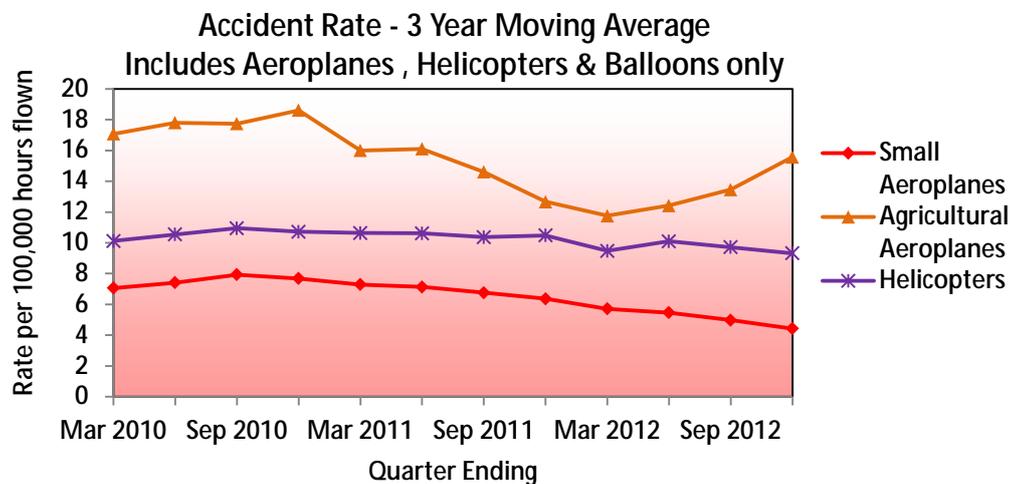
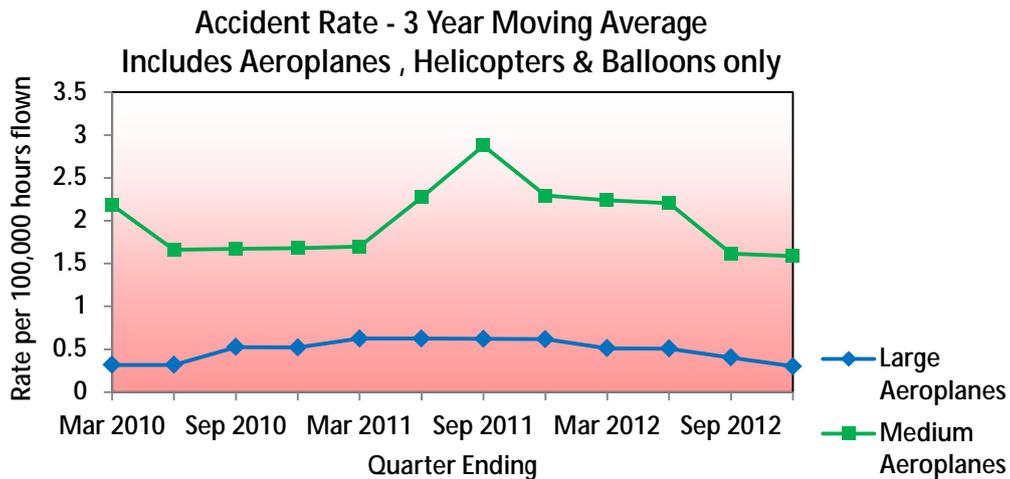
This table shows that approximately 96.0% of seat hours are offered by the Airline Operations – Large Aeroplanes group, around 1.7% by the Airline Operations – Medium Aeroplanes group, with the remaining 2.3% of seat hours offered being split between the other safety target groups.

## Occurrence Analysis

### Aircraft Accidents

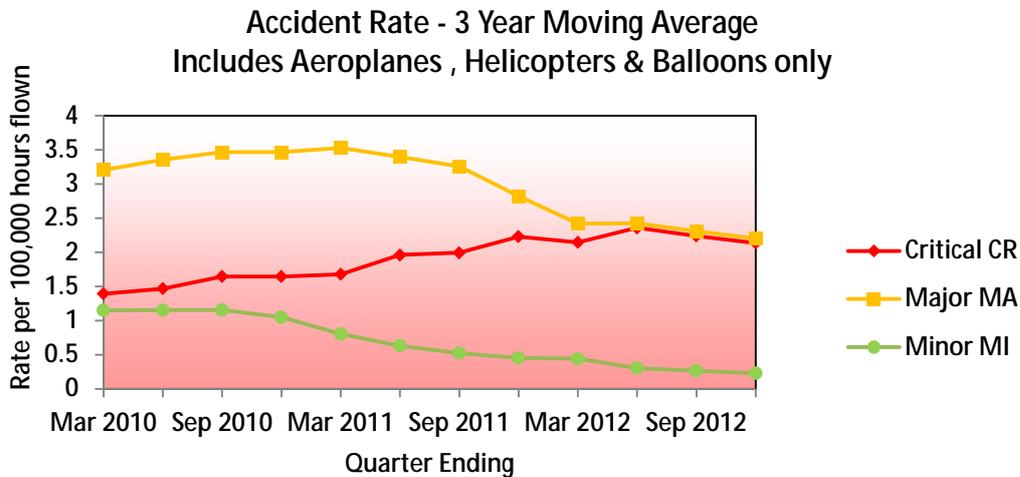
The following graphs show the aircraft accident rates (accidents per estimated 100,000 hours flown) three year moving average for the three-year period ending 31 December 2012 (excluding the aircraft statistics categories Sport Aircraft, Hang Gliders and Parachutes). Trends for each group are shown immediately following the group

#### 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 Down
Helicopters	Constant
Sport Aircraft	Constant

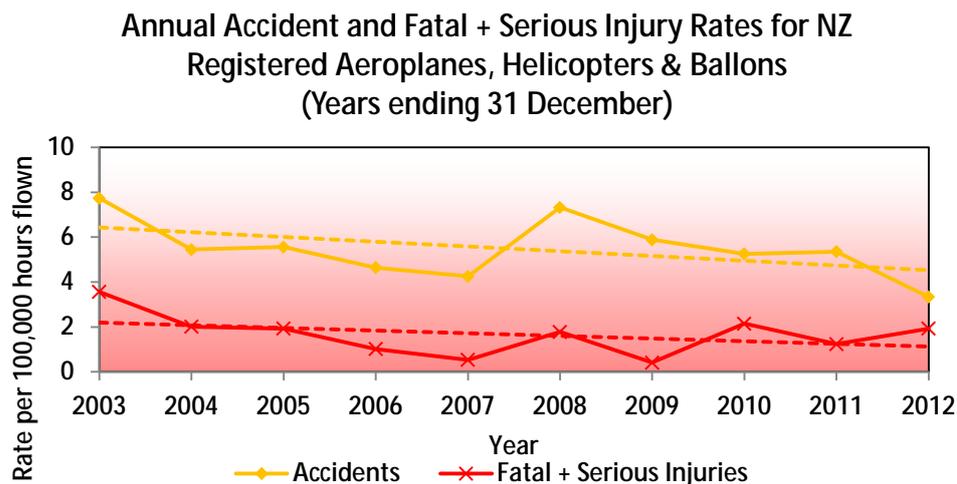
### Breakdown by Severity



Severity	Straight Line Trend of 3 Year Moving Average
Critical	Trending Up
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 2012. Hang gliders and parachutes are excluded because no reliable hours 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

Aircraft Category	Year Ending Dec 2012	Year Ending Dec 2011	Average 3 Prior Yrs
Large Aeroplanes	0	0	0.0
Medium Aeroplanes	0	0	0.3
Small Aeroplanes	2	9	7.0
Helicopters	9	18	6.0
Sport Aircraft	15	16	12.0
Agricultural Aeroplanes	3	2	2.0
Hang Gliders	5	5	3.7
Parachutes	5	2	1.3
Unknown	0	0	0.0
<b>Total</b>	<b>39</b>	<b>52</b>	<b>32.3</b>

Aircraft Category	Year Ending Dec 2012	Year Ending Dec 2011	Average 3 Prior Yrs
Large Aeroplanes	0	1	0.3
Medium Aeroplanes	0	2	0.3
Small Aeroplanes	7	8	14.0
Helicopters	6	5	13.0
Sport Aircraft	13	16	18.7
Agricultural Aeroplanes	5	3	3.0
Hang Gliders	2	3	5.3
Parachutes	6	4	2.3
Unknown	0	0	0.0
<b>Total</b>	<b>39</b>	<b>42</b>	<b>57.0</b>

Aircraft Category	Year Ending Dec 2012	Year Ending Dec 2011	Average 3 Prior Yrs
Large Aeroplanes	0	0	1.3
Medium Aeroplanes	0	0	0.3
Small Aeroplanes	2	0	5.7
Helicopters	0	0	0.7
Sport Aircraft	2	1	5.7
Agricultural Aeroplanes	0	2	2.0
Hang Gliders	2	2	7.3
Parachutes	1	2	1.3
Unknown	0	0	0.0
<b>Total</b>	<b>7</b>	<b>7</b>	<b>24.3</b>

Aircraft Category	Year Ending Dec 2012	Year Ending Dec 2011	Average 3 Prior Yrs
Large Aeroplanes	0	1	1.7
Medium Aeroplanes	0	2	1.0
Small Aeroplanes	11	17	26.7
Helicopters	15	23	19.7
Sport Aircraft	30	33	36.3
Agricultural Aeroplanes	8	7	7.0
Hang Gliders	9	10	16.3
Parachutes	12	8	5.0
Unknown	0	0	0.0
<b>Total</b>	<b>85</b>	<b>101</b>	<b>113.7</b>

## **Significant Accidents**

This section describes significant Accidents reported as occurring since the end of the period covered by the previous report. The section is grouped by safety outcome target group. Groups with no significant events have been omitted. For each incident the location is stated before the description.

### ***Agricultural Operations - Aeroplane***

- Waikite Valley: A pilot was conducting a solo flight after receiving dual instruction from an E Category instructor. The aircraft was observed to pitch up, bank to the right, and enter a spin, impacting the ground in a small gully. 1 Fatality. Aircraft destroyed. 12/5532

### ***Airline Operations - Helicopter***

- Pioneer Hutt: A helicopter suffered a dynamic rollover while landing at Pioneer Hutt. The four climbers and pilot on board were not injured, and were able to walk approximately 500m to Pioneer Hutt. 12/5015

### ***Private Operations - Helicopter***

- Queenstown: A helicopter was in transit between Wanaka and Queenstown aerodromes when a farmer observed the helicopter descend at a high rate and strike the hillside on a neighbouring property in the Cardrona Valley. First responders to the scene found the pilot deceased. 1 Fatality. Aircraft destroyed. 12/4957

## 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.

## 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 2012, the previous year and the annual average for the three prior years. All aircraft types are included

Safety Outcome Target Group	Year Ending Dec 2012	Year Ending Dec 2011	Average 3 Prior Yrs
Airline Operations - Large Aeroplanes	0	1.0	2.0
Airline Operations - Medium Aeroplanes	0	2.0	0.7
Airline Operations - Small Aeroplanes	0	2.0	2.7
Airline Operations - Helicopter	3	2.0	2.7
Sport Transport	7	9.0	9.0
Other Commercial Operations - Aeroplane	3	8.0	13.0
Other Commercial Operations - Helicopter	3	10.0	4.7
Agricultural Operations - Aeroplane	8	6.0	7.0
Agricultural Operations - Helicopter	7	6.0	5.0
Private Operations - Aeroplane	7	7.0	10.7
Private Operations - Helicopter	2	5.0	7.3
Private Operations - Sport	45	44.0	48.7
Other	1	2.0	0.7
<b>Total</b>	<b>86</b>	<b>104.0</b>	<b>114.0</b>

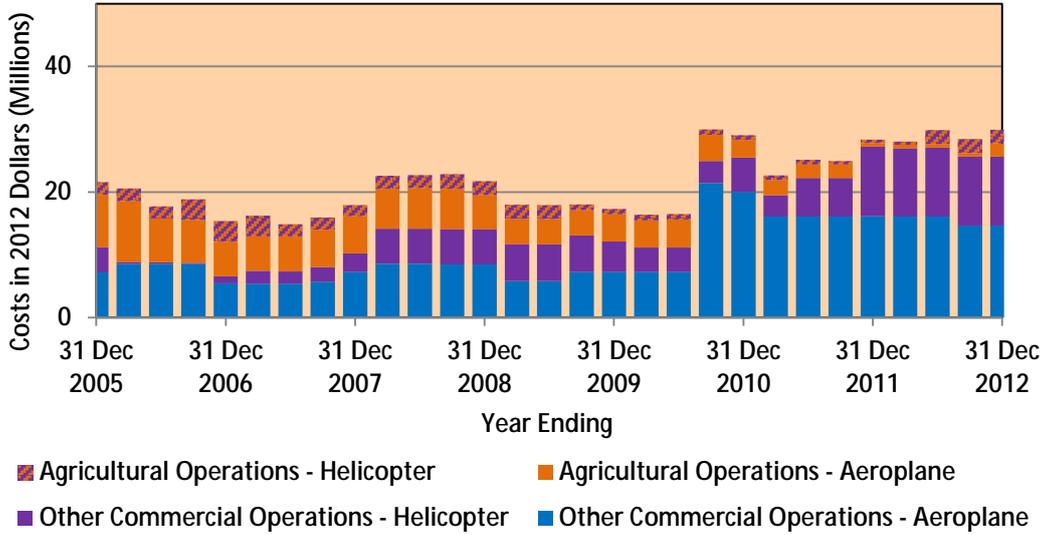
## Social Cost

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 (2012) for each safety target group for the year ending 31 December 2012 and the average six month cost for the last three years

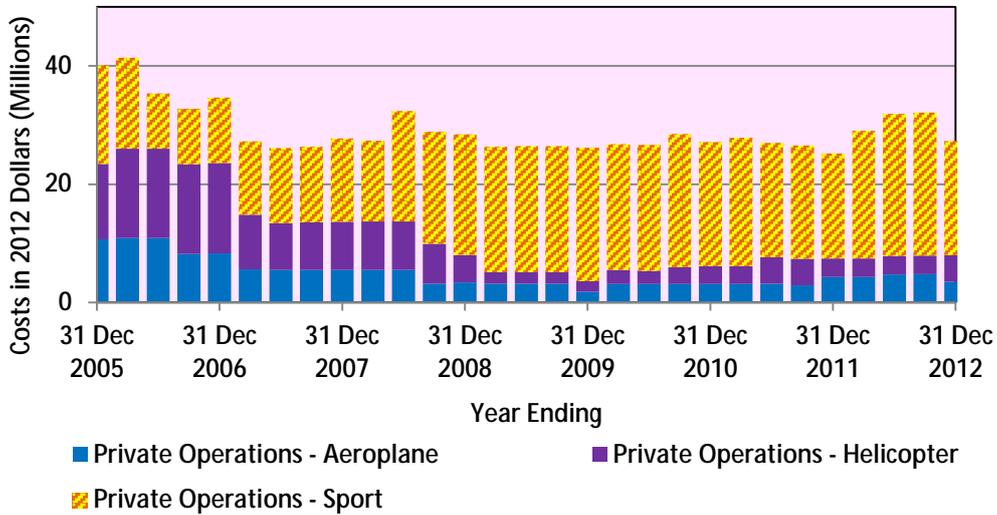
Safety Outcome Target Group	Year Ending Dec 2012	Year Ending Dec 2011	Average 3 Prior Yrs
Airline Operations - Large Aeroplanes	0.05	0.03	0.17
Airline Operations - Medium Aeroplanes	0.00	0.00	0.02
Airline Operations - Small Aeroplanes	0.00	0.17	0.26
Airline Operations - Helicopter	0.00	0.74	1.22
Sport Transport	42.24	1.69	7.91
Other Commercial Operations - Aeroplane	0.00	0.17	19.97
Other Commercial Operations - Helicopter	0.40	24.70	5.52
Agricultural Operations - Aeroplane	5.44	0.00	2.79
Agricultural Operations - Helicopter	5.04	1.58	0.77
Private Operations - Aeroplane	1.54	4.92	3.10
Private Operations - Helicopter	4.10	4.81	3.01
Private Operations - Sport	31.00	20.35	21.06
Other	0.00	0.00	2.53
<b>Total</b>	<b>89.81</b>	<b>59.2</b>	<b>68.33</b>



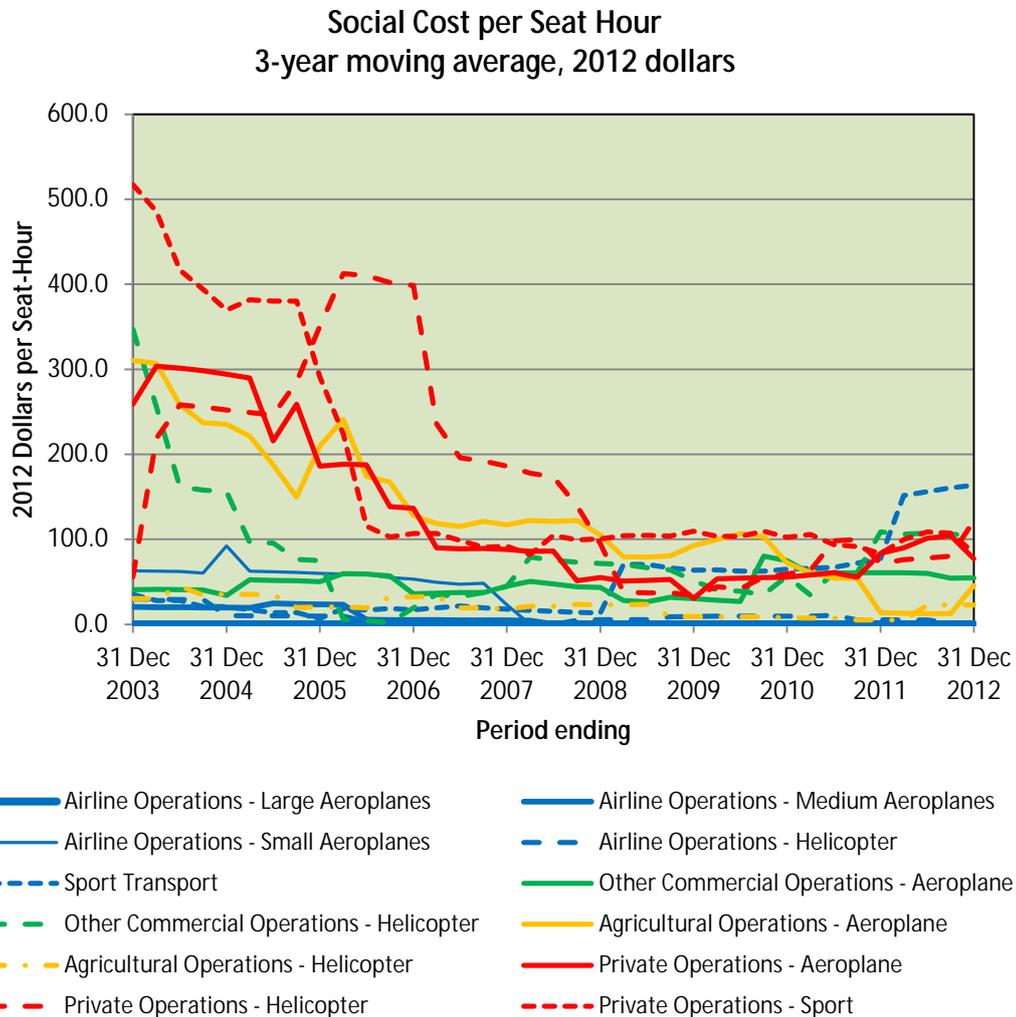
### 3 Year Moving Average Annual Social Cost Other Commercial Operations



### 3 Year Moving Average Annual Social Cost Private Operations

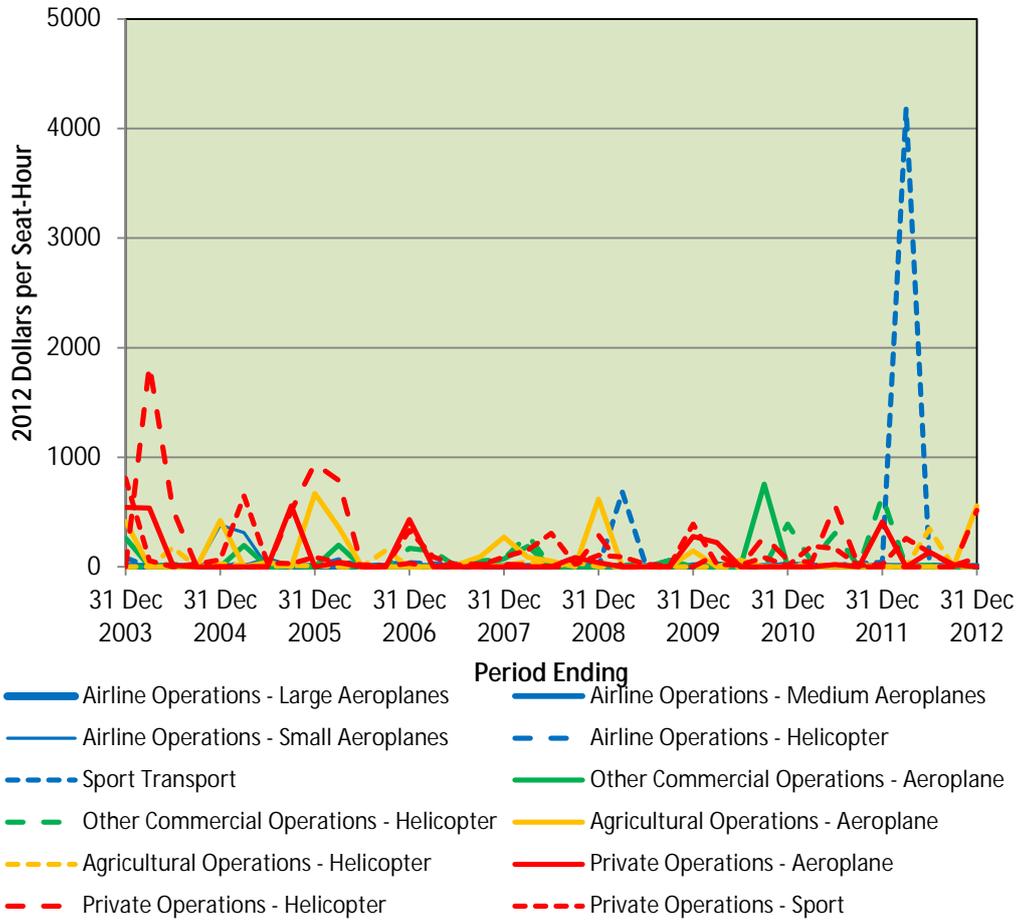


The following graph illustrates an apparent steady decline in the Social Cost **per Seat-Hour** (three year moving average) over the period since the 4<sup>th</sup> quarter of 2003. Since the 4<sup>th</sup> quarter of 2008 the decline has become relatively indiscernible and it may be that social cost levels have reached or are approaching a practical minimum for the current intervention practices.



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 has been included to shows that major unexpected downturns can occur with no prior warning from this kind of analysis..

### Social Cost per Seat Hour Quarterly - no smoothing, 2012 dollars



## Safety Outcome Targets

Each target group had 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 2012 dollars per seat-hour (including the cost of aircraft destroyed) for the three year period ending 31 December 2012. Target groups highlighted in yellow are groups where major safety improvements need to be achieved. Red text has been used to draw attention to groups with significant recent safety failure.

Safety Target Group	Current Estimate	Target
Airline Operations - Large Aeroplanes	0.00	0.00
Airline Operations - Medium Aeroplanes	0.00	0.02
Airline Operations - Small Aeroplanes	0.51	2.34
Airline Operations - Helicopter	1.82	6.50
Sport Transport	163.66	13.00
Other Commercial Operations - Aeroplane	54.61	6.50
Other Commercial Operations - Helicopter	105.30	6.50
Agricultural Operations - Aeroplane	45.87	14.00
Agricultural Operations - Helicopter	22.82	8.56
Private Operations - Aeroplane	77.29	10.00
Private Operations - Helicopter	121.78	10.00
Private Operations - Sport	84.11	20.00

Current Estimate:

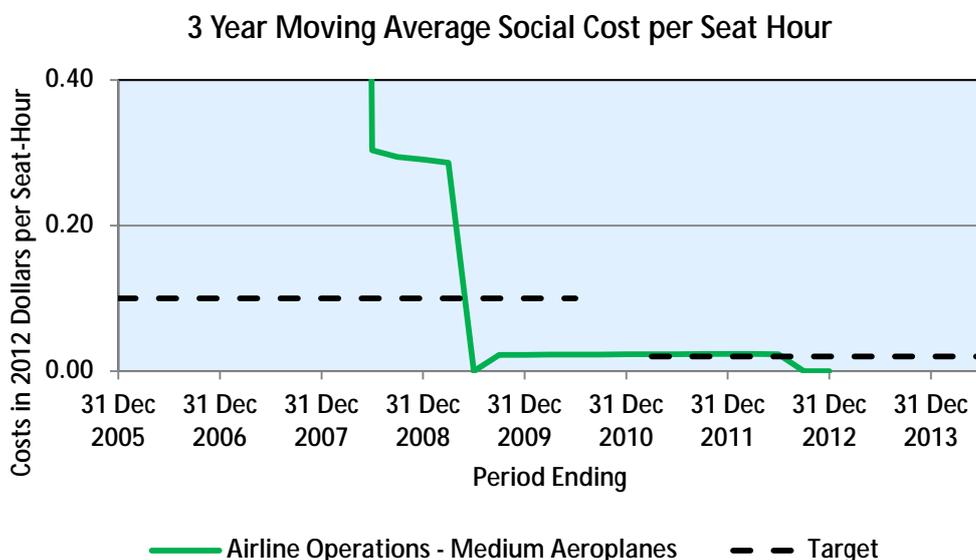
This is the estimated social cost of injuries and aircraft destroyed per seat hour for the three year period. Note: Aviation Safety reports prior to July to December 2008 used a 10 year averaging period for large and medium aeroplanes and a one year period for all others.

## Safety Target Graphs

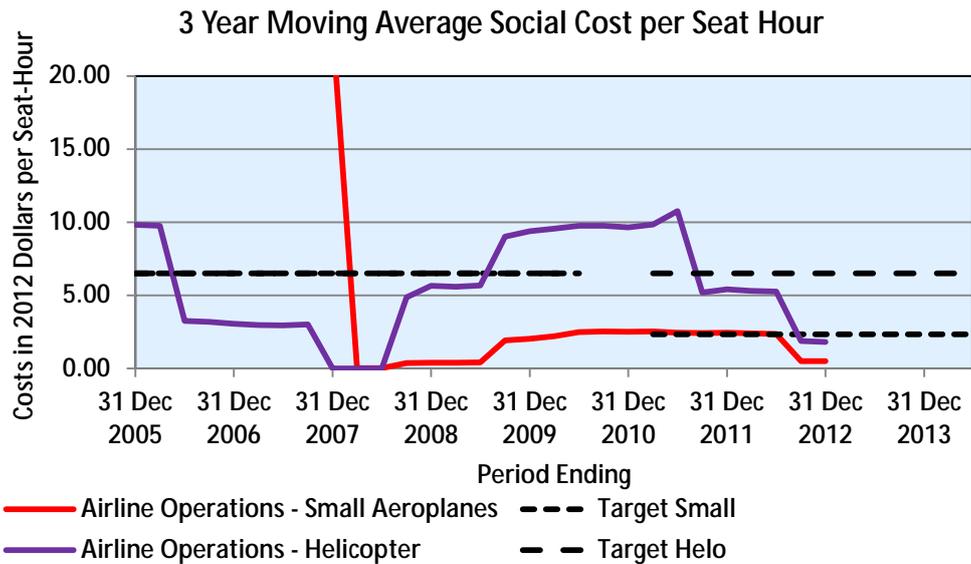
Graphs displaying the Safety Outcome Targets and the quarterly progress of Safety Outcomes derived using 3 year averages are shown on the following pages. These graphs span the period from 1 October 2005 when Social Cost targets were introduced to 30 June 2014 when the current targets are due for review.



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 is significantly below the target. There is no significant recent trend either up or down. No fatal, no serious and 5 minor injuries were reported in this group during the 3 year period ending 31 December 2012.

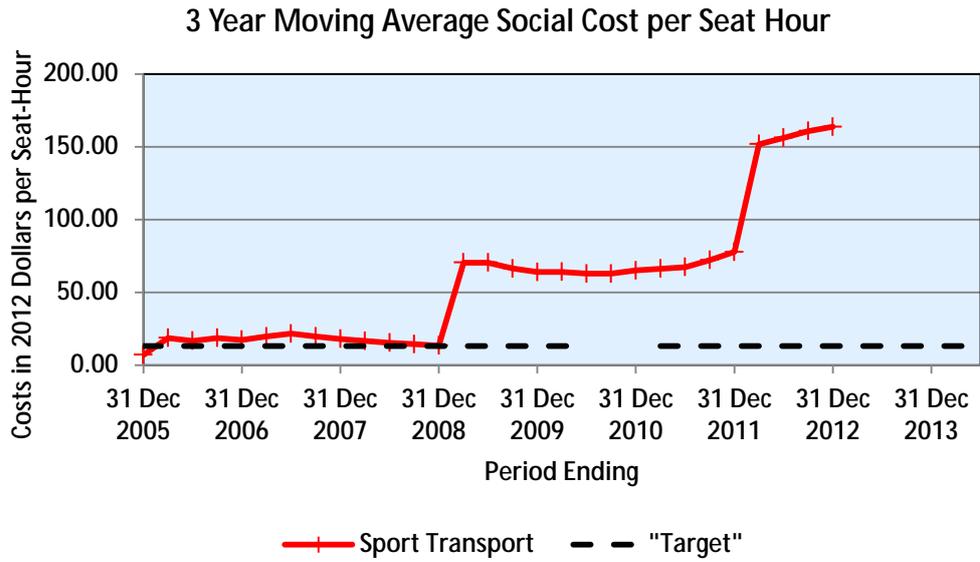


The outcome for Airline Operations – Medium Aeroplanes dropped below the initial target during the second quarter of 2009 and is trending down. The outcome is now below the new target of \$0.02 per seat hour. No fatal, no serious and no minor injuries were reported in this group during the 3 year period ending 31 December 2012.



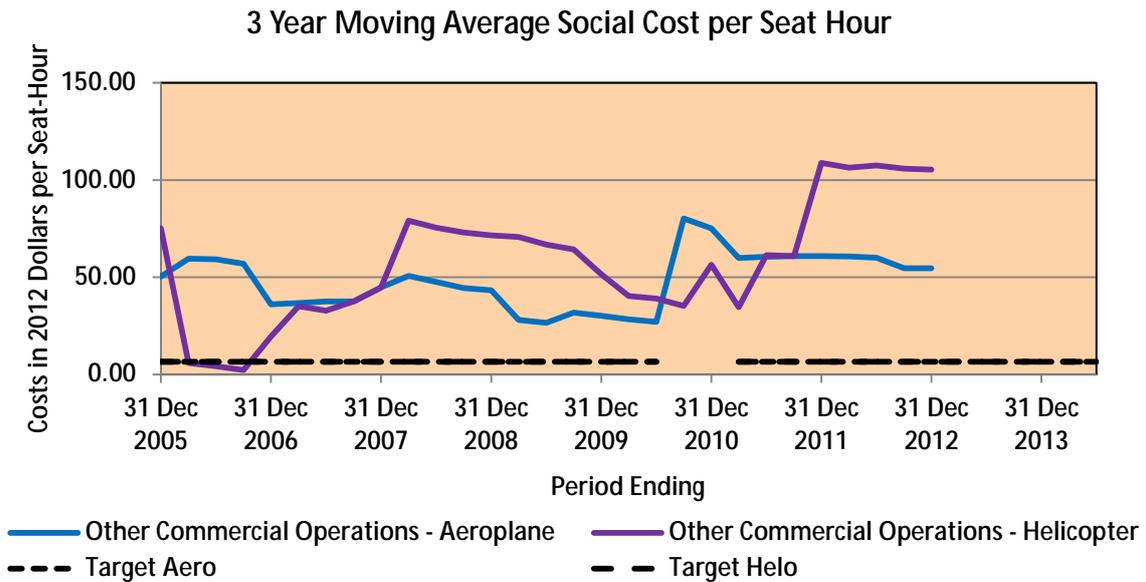
The outcome for Airline Operations – Small Aeroplanes shows a significant long term downward trend from the high starting point of \$45.64 per seat-hour of exposure in the three years to September 2007. The safety outcome for this group has been below the initial target level since the January to March 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 has remained. No fatal, no serious and no minor injuries were reported in this group during the 3 year period ending 31 December 2012.

The outcome for Airline Operations – Helicopter exceeded the target level until the second quarter of 2006 and it has done so again since the 3<sup>rd</sup> 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 has been achieved again since the 3<sup>rd</sup> quarter of 2011. No fatal, 1 serious and 2 minor injuries were reported in this group during the 3 year period ending 31 December 2012.



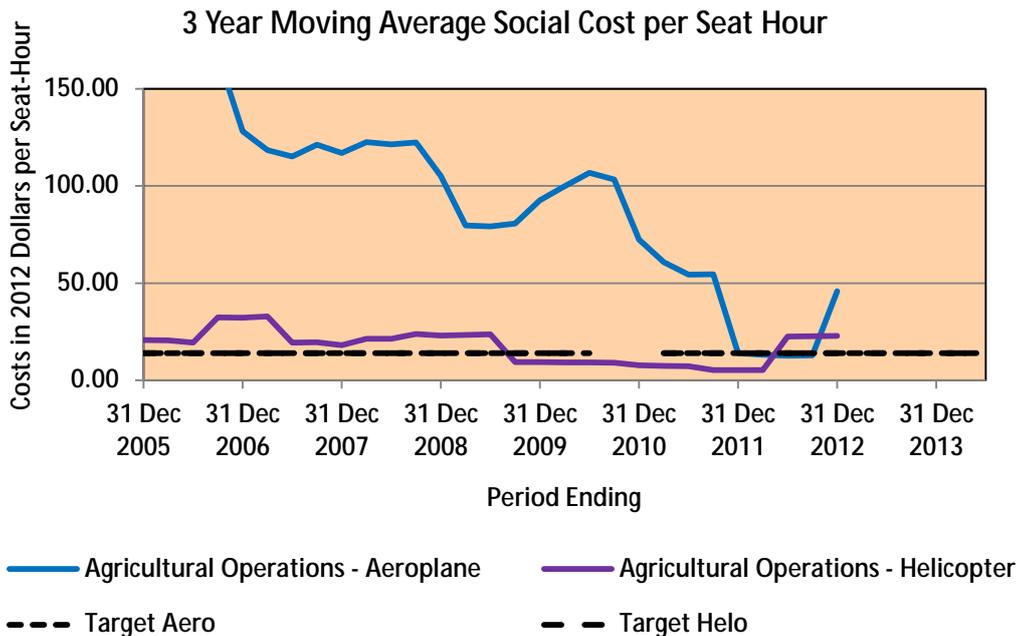
Two hang glider, two microlight and one glider fatalities during the first quarter of 2009 and 11 balloon fatalities in 2012 have contributed to a significant increase in the upward trend displayed by this group. The outcome exceeds the target of \$13.00 by a large margin. 11 fatal, 10 serious and 14 minor injuries were reported in this group during the 3 year period ending 31 December 2012.

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



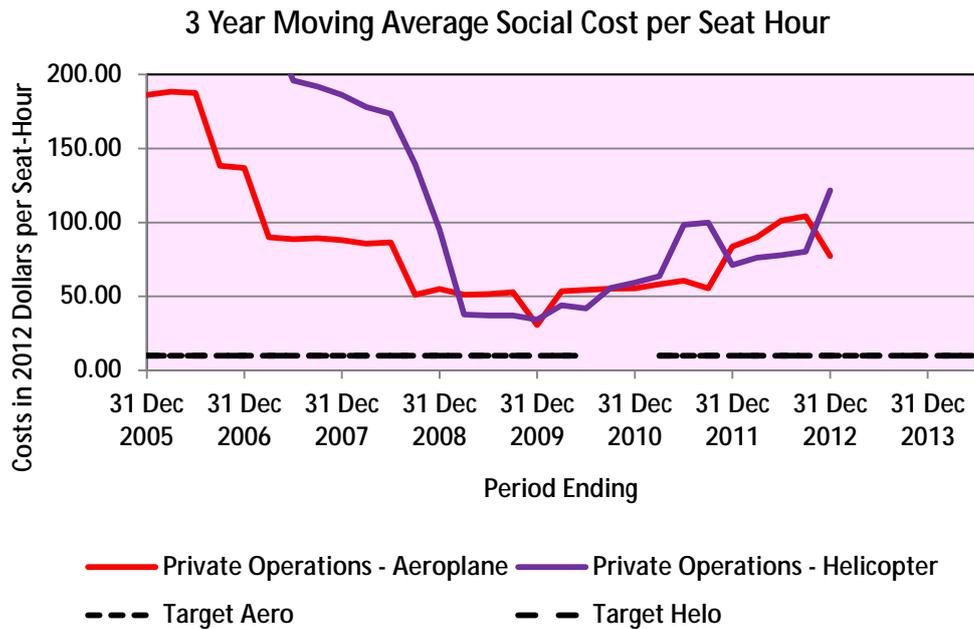
The outcome for Other Commercial Operations – Aeroplane remains well above the target of \$6.50 per seat hour. 11 fatal, 2 serious and no minor injuries were reported in this group during the 3 year period ending 31 December 2012.

The outcome for Other Commercial Operations – Helicopter turned sharply upwards during the first quarter of 2008 and again in the 3<sup>rd</sup> quarter of 2011. It remains well above the target level of \$6.50 per seat hour. 7 fatal, 2 serious and 3 minor injuries were reported in this group during the 3 year period ending 31 December 2012.



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 4<sup>th</sup> quarter of 2011. A fatality in the 4<sup>th</sup> quarter of 2012 has again taken the outcome above the target. 1 fatal, 2 serious and 1 minor injuries were reported in this group during the 3 year period ending 31 December 2012.

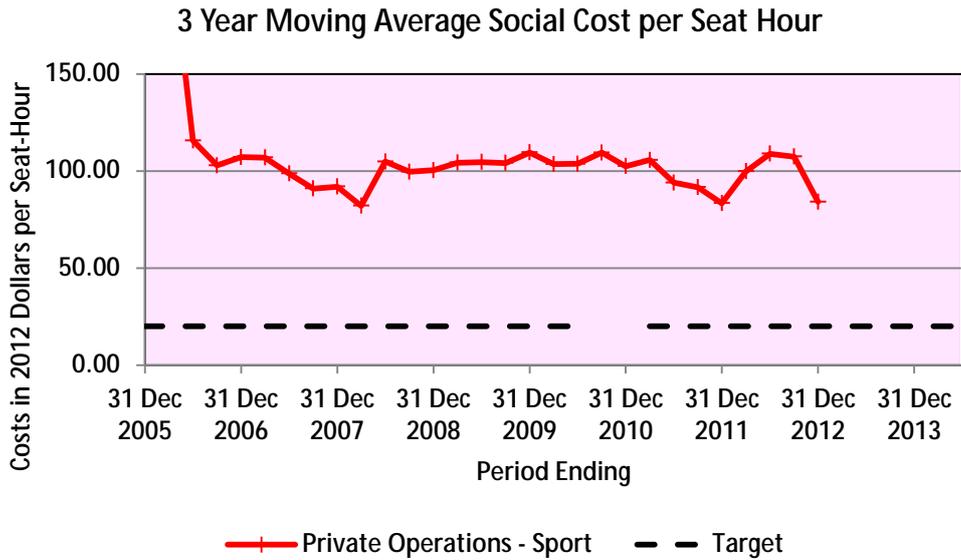
The outcome for Agricultural Operations – Helicopter was below the target level of \$8.56 per seat hour from the 3<sup>rd</sup> quarter of 2009 until the 2<sup>nd</sup> quarter of 2011 but a fatality during that quarter resulted in the target again being exceeded from the 2<sup>nd</sup> quarter of 2012. 1 fatal, no serious and 1 minor injuries were reported in this group during the 3 year period ending 31 December 2012.



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. 3 fatal, 2 fatal, 5 serious and 1 minor injuries were reported in this group during the 3 year period ending 31 December 2012.

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, 3 serious and 2 minor injuries were reported in this group during the 3 year period ending 31 December 2012.

Note: Previous safety reports incorrectly charted the absolute quarterly social cost in millions of dollars for this group instead of the normalised measure (social cost per seat-hour in dollars). This led to incorrect descriptions being published.

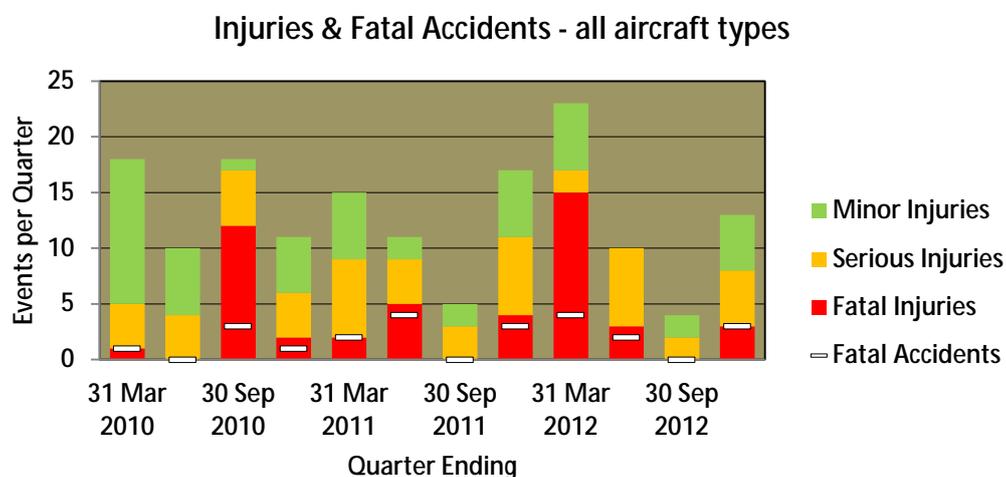


The outcome for Private Operations – Sport is well above the target level of \$20.00 per seat hour and shows no significant trend. 12 fatal, 29 serious and 25 minor injuries were reported in this group during the 3 year period ending 31 December 2012.

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 2012. 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	0	5	0
Airline Operations - Medium Aeroplanes	0	0	0	0
Airline Operations - Small Aeroplanes	0	0	0	0
Airline Operations - Helicopter	0	1	2	0
Sport Transport	11	10	14	1
Other Commercial Operations - Aeroplane	11	2	0	2
Other Commercial Operations - Helicopter	7	2	3	4
Agricultural Operations - Aeroplane	1	2	1	1
Agricultural Operations - Helicopter	1	0	1	1
Private Operations - Aeroplane	2	5	1	2
Private Operations - Helicopter	2	3	2	2
Private Operations - Sport	12	29	25	10
Other	0	0	0	0

### Yearly Comparison

The following table displays the number of fatalities for each safety target group for the year ending 31 December 2012, the previous year and the average of the three prior years

Safety Outcome Target Group	Year Ending Dec 2012	Year Ending Dec 2011	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	0	0	0.00
Sport Transport	11	0	1.67
Other Commercial Operations - Aeroplane	0	0	5.00
Other Commercial Operations - Helicopter	0	5	1.33
Agricultural Operations - Aeroplane	1	0	0.33
Agricultural Operations - Helicopter	1	0	0.00
Private Operations - Aeroplane	0	1	0.67
Private Operations - Helicopter	1	1	0.33
Private Operations - Sport	7	4	4.67
Other	0	0	3.00
<b>Total</b>	<b>21</b>	<b>11</b>	<b>17.00</b>

## Flight Phase

The following table shows the flight phase recorded for accidents for the year ending 31 December 2012, the previous year and the average of the three prior years. The figures include all aircraft types.

Flight Phase	Year Ending Dec 2012	Year Ending Dec 2011	Average 3 Prior Yrs
Aerobatics	1	0	0.0
Agricultural Manoeuvres	0	0	0.0
Approach	5	8	4.3
Circuit	0	1	1.0
Climb	2	9	6.7
Cruise Descent	0	0	0.0
Holding	0	0	0.3
Hover	2	4	3.3
Hover Taxi	1	0	0.0
Landing	34	32	41.3
Parked	5	2	4.0
Takeoff	9	20	22.7
Taxiing	3	5	4.3
Unknown	2	1	1.7
<b>Total</b>	<b>64</b>	<b>82</b>	<b>89.7</b>

The most common phase of flight during which accidents occurred in the year ending 31 December 2012 was the Landing phase (53%)

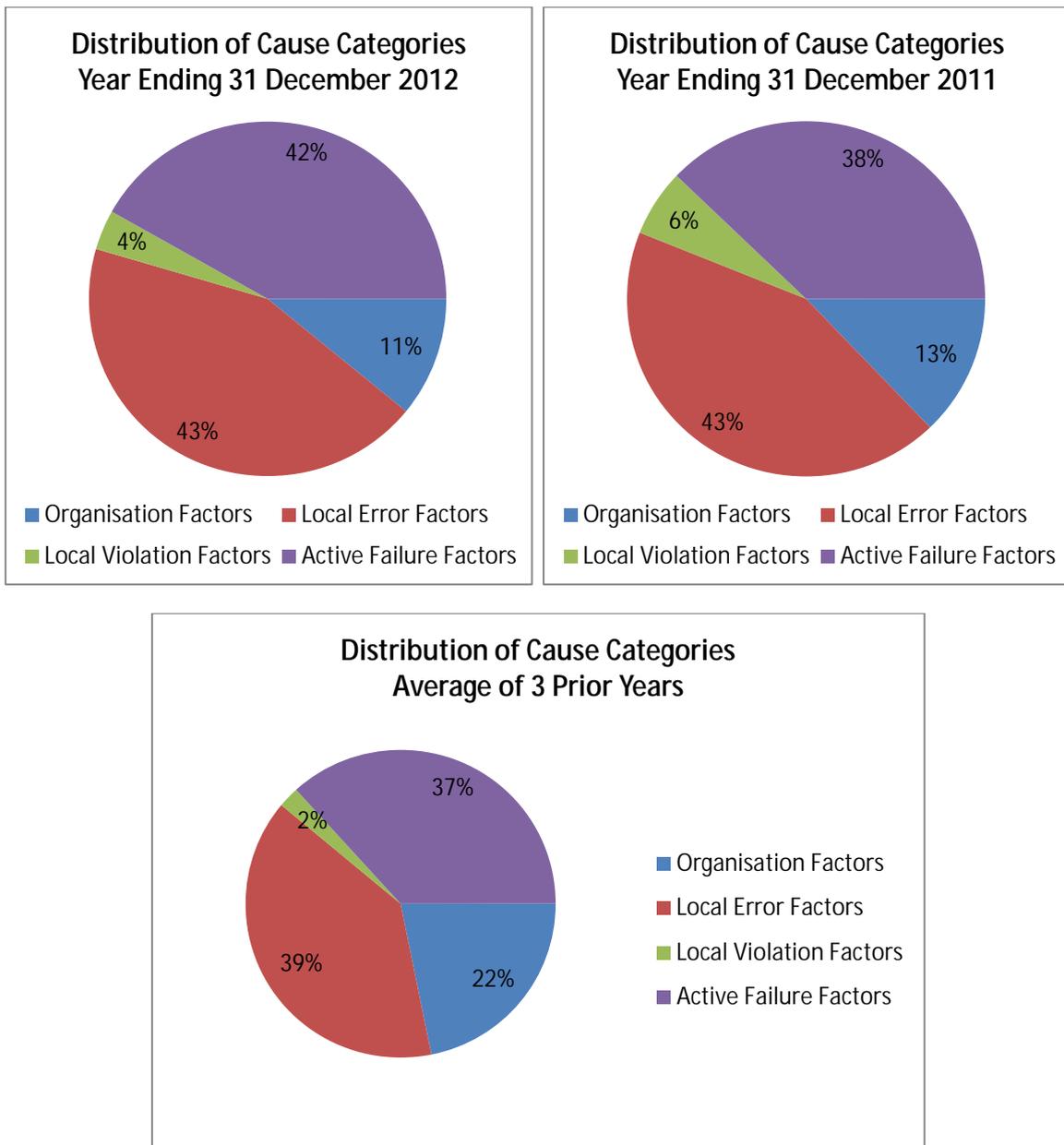
The most common descriptor associated with Landing phase accidents during the year ending 31 December 2012 was 'Hard Landing' (47%)

The most common cause (at 10.5%) recorded for Landing phase accidents during the year ending 31 December 2012 was 'Active Failure Factors - POOR PROCEDURE "ACTION"'

### Accident Causal Factors

Causal factors have been assigned to 28 (33%) of the 86 accidents that were reported as occurring during the six months ending 31 December 2012. This compares with 72% for the same period in the previous year and an average of 51% 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

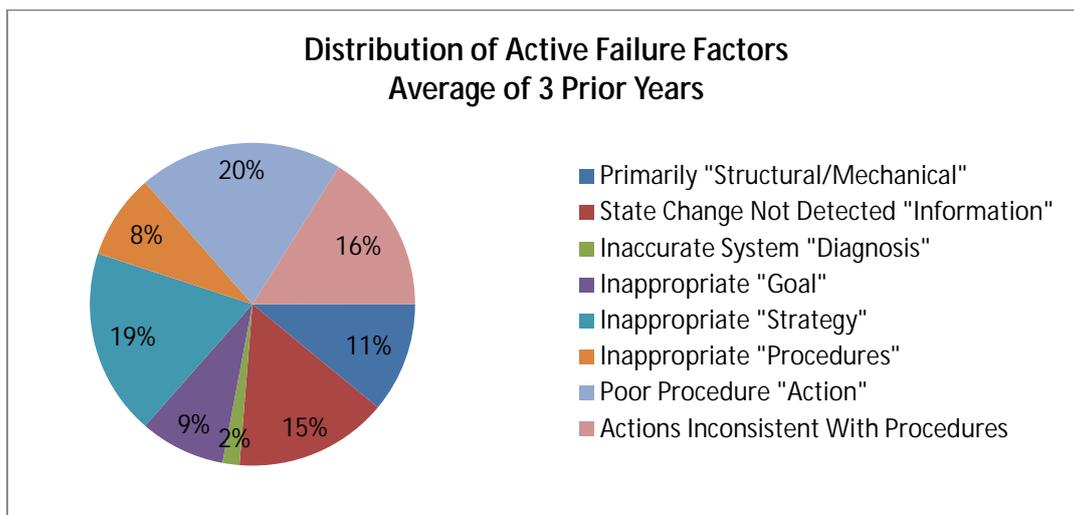
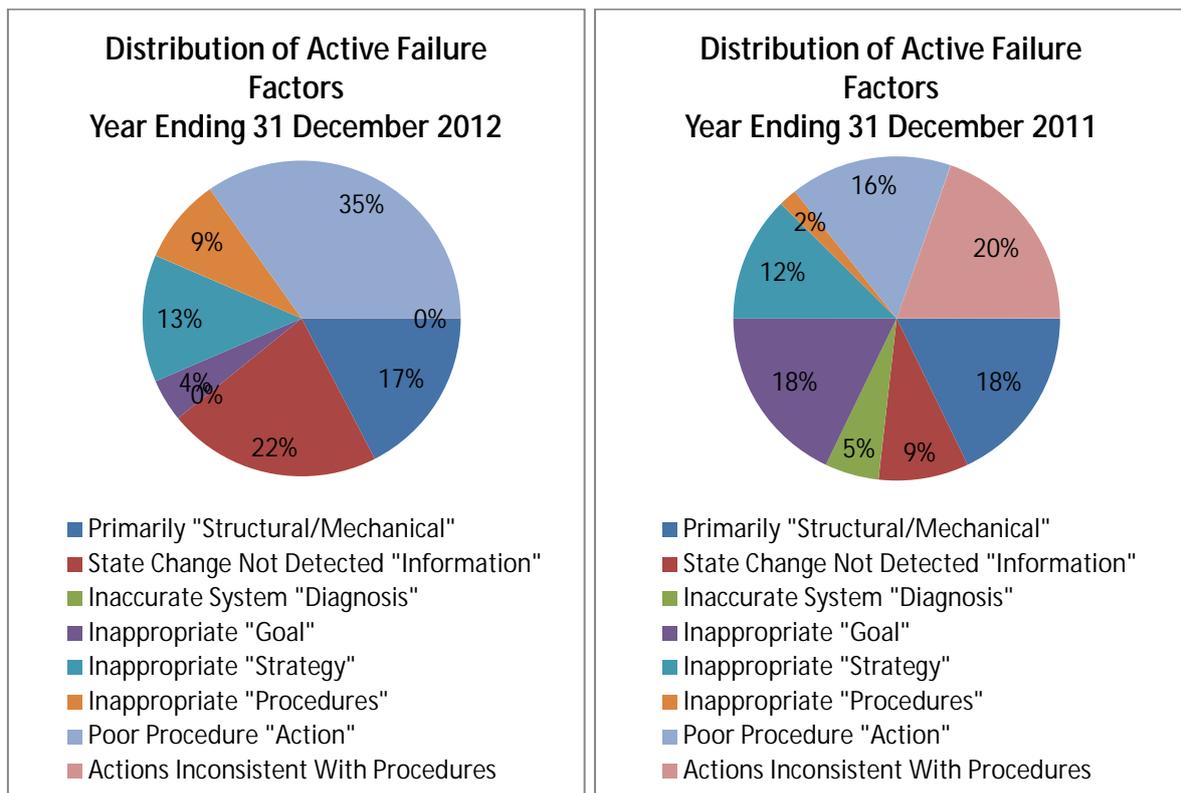
The following charts show the distribution of cause categories (groupings of causal factors) recorded for accidents that occurred during the year period ending 31 December 2012, the same period for the previous year and the average for the last three years.



**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.

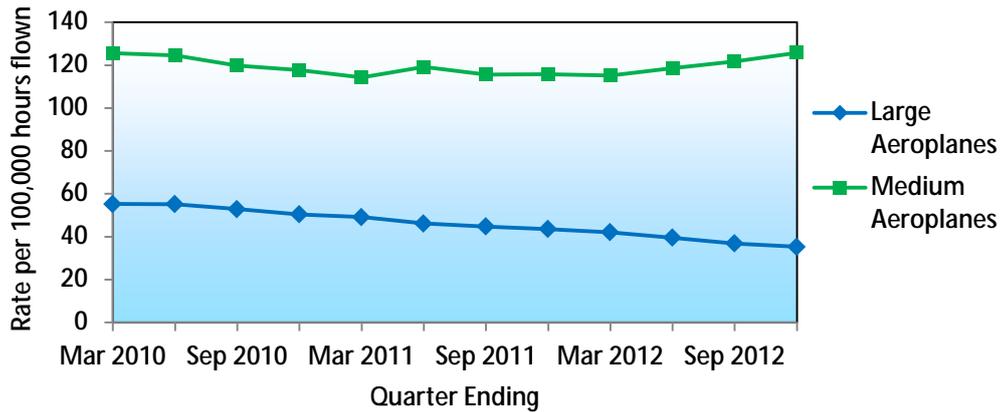


## Airspace Incidents

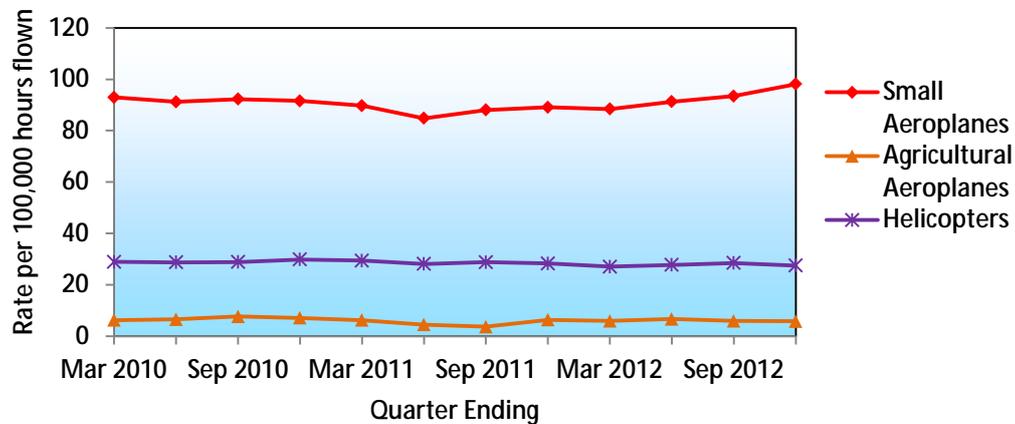
The following graphs show the airspace incident reporting rates (incidents per 100,000 hours flown) three year moving average for the three-year period ending 31 December 2012 (excluding the Sport Aircraft category). The graphs do not differentiate between incidents that are pilot or ATS attributable.

### Breakdown by Aircraft Category

Airspace Incident Rate - 3 Year Moving Average



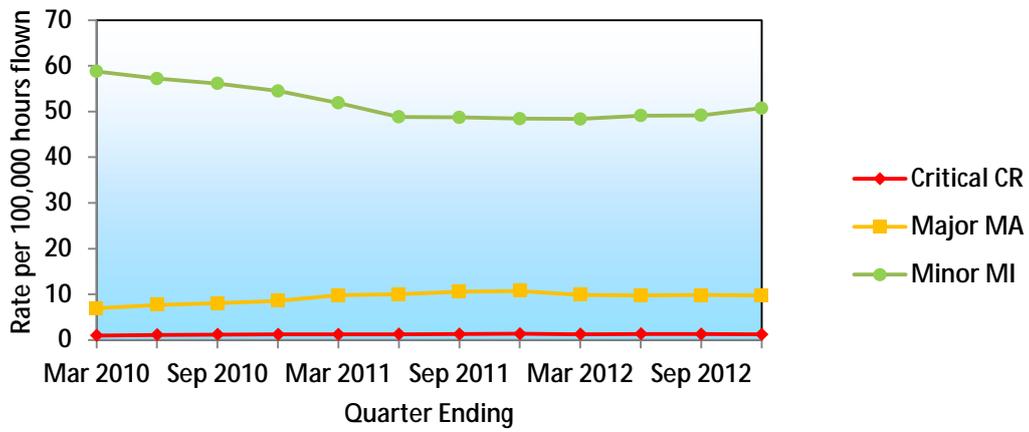
Airspace Incident Rate - 3 Year Moving Average



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

**Breakdown by Severity**

**Airspace Incident Rate - 3 Year Moving Average**



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

## Yearly Comparisons

### By Aircraft Category

Aircraft Category	Year Ending Dec 2012	Year Ending Dec 2011	Average 3 Prior Yrs
Large Aeroplanes	0	0	1.0
Medium Aeroplanes	0	0	0.3
Small Aeroplanes	6	9	7.3
Helicopters	1	3	2.7
Sport Aircraft	1	1	1.3
Agricultural Aeroplanes	0	1	0.0
Not Recorded	0	4	1.0
<b>Total</b>	<b>8</b>	<b>18</b>	<b>13.7</b>

Aircraft Category	Year Ending Dec 2012	Year Ending Dec 2011	Average 3 Prior Yrs
Large Aeroplanes	16	11	14.3
Medium Aeroplanes	11	11	9.3
Small Aeroplanes	61	77	48.0
Helicopters	10	8	8.3
Sport Aircraft	7	17	5.3
Agricultural Aeroplanes	0	1	0.0
Not Recorded	55	45	30.7
<b>Total</b>	<b>160</b>	<b>170</b>	<b>116.0</b>

Aircraft Category	Year Ending Dec 2012	Year Ending Dec 2011	Average 3 Prior Yrs
Large Aeroplanes	98	107	146.0
Medium Aeroplanes	99	63	60.3
Small Aeroplanes	404	256	262.3
Helicopters	53	39	43.7
Sport Aircraft	59	40	31.7
Agricultural Aeroplanes	1	2	2.7
Not Recorded	389	317	259.3
<b>Total</b>	<b>1103</b>	<b>824</b>	<b>806.0</b>

Aircraft Category	Year Ending Dec 2012	Year Ending Dec 2011	Average 3 Prior Yrs
Large Aeroplanes	114	118	161.3
Medium Aeroplanes	110	74	70.0
Small Aeroplanes	471	342	317.7
Helicopters	64	50	54.7
Sport Aircraft	67	58	38.3
Agricultural Aeroplanes	1	4	2.7
Not Recorded	444	366	291.0
<b>Total</b>	<b>1271</b>	<b>1012</b>	<b>935.7</b>

***By Nearest Airways Monitored Aerodrome***

All Airspace Incidents	Year Ending Dec 2012	Year Ending Dec 2011	Average 3 Prior Yrs
Auckland	104	117	103.3
Taupo	32	24	20.3
Christchurch	78	74	88.3
Dunedin	26	14	15.3
Gisborne	15	9	9.7
Hamilton	254	102	101.3
Milford Sound	2	1	0.3
New Plymouth	19	18	19.7
Napier	20	16	18.0
Nelson	32	40	36.3
Invercargill	5	7	7.0
Ohakea	38	31	29.3
Palmerston North	40	34	52.7
Paraparaumu	52	22	5.7
Queenstown	48	53	28.7
Rotorua	40	28	29.3
Tauranga	74	58	36.3
Woodbourne	14	16	29.3
Whakatane	2	3	1.7
Wellington	64	70	70.3
Whenuapai	13	10	6.7
Other	140	134	131.0
Not Reported	159	131	95.0
<b>Total</b>	<b>1271</b>	<b>1012</b>	<b>935.7</b>

## **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 1266 of the 1271 reported airspace incidents in the period Year Ending 31 December 2012

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

### ***Six-Monthly Comparison***

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

Descriptor	Year Ending Dec 2012	Year Ending Dec 2011	Average 3 Prior Yrs
ATS clearance/instruction deficiency	76	59	54.0
ATS coordination deficiency	88	72	71.7
ATS flight information deficiency	14	14	9.7
ATS flight planning system deficiency	18	20	15.7
<b>Total</b>	<b>196</b>	<b>165</b>	<b>151</b>

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

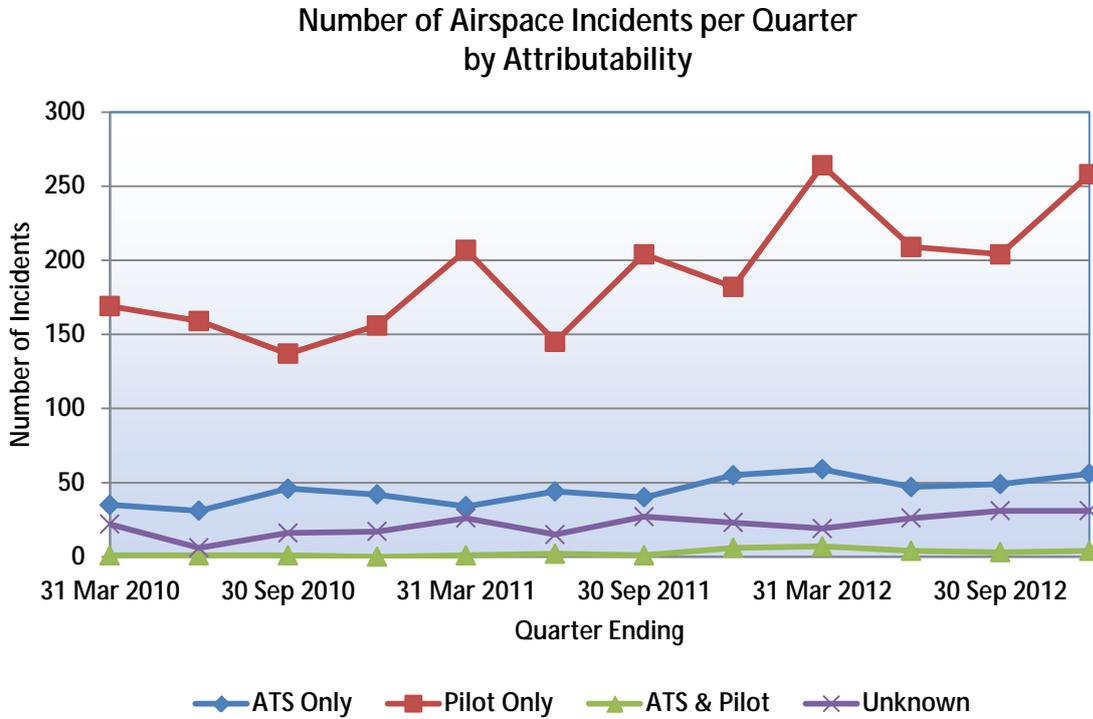
Descriptor	Year Ending Dec 2012	Year Ending Dec 2011	Average 3 Prior Yrs
Breach of other clearance	234	191	140.7
Flight assist	2	4	9.7
Pilot flight planning deficiency	23	15	22.0
Pilot position reporting deficiency	68	72	40.7
Pilot readback deficiency	4	3	4.7
Unauth airspace incursion	268	298	274.7
Unauth altitude penetration	119	81	82.7
<b>Total</b>	<b>718</b>	<b>664</b>	<b>403</b>

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 2012	Year Ending Dec 2011	Average 3 Prior Yrs
Controller/pilot datalink communications	1	0	1.0
Loss of separation	45	52	43.0
Near collision	11	35	33.7
Other	28	40	45.0
Reduced vertical separation minima	2	2	3.3
Short term conflict alert	7	3	1.3
Traffic collision avoidance system	72	104	116.3
<b>Total</b>	<b>166</b>	<b>236</b>	<b>166</b>

**Trend**

The following graph shows the quarterly numbers of airspace incident reports and their attributability for the three year period ending 31 December 2012.



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.

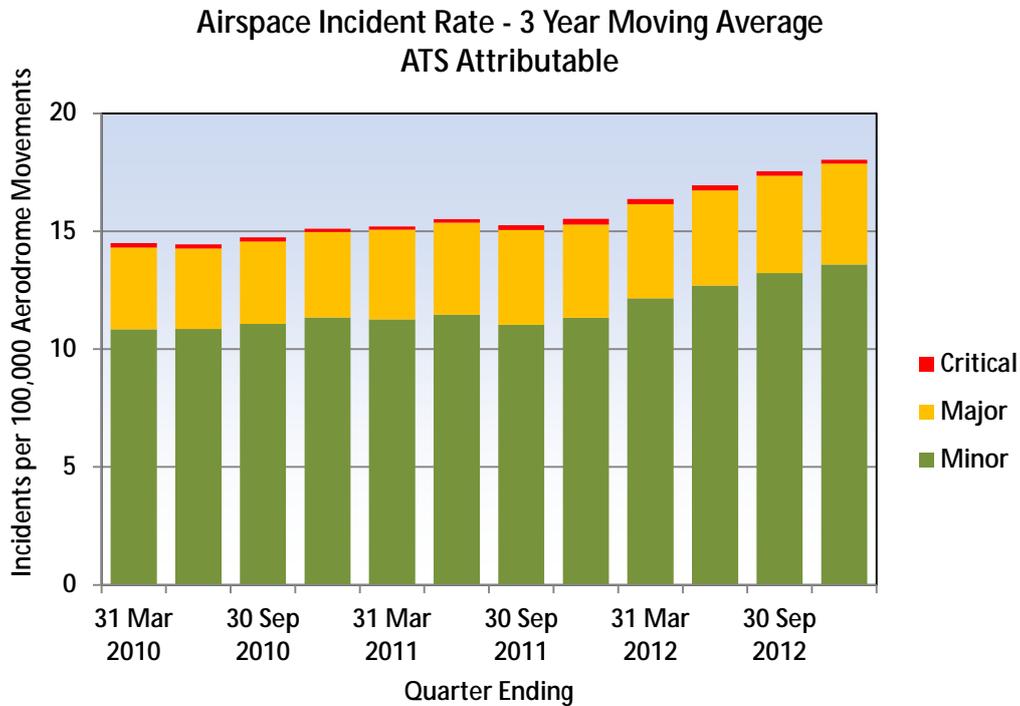
The following table shows the attributability of airspace incidents.

Attributability	Year Ending Dec 2012	Year Ending Dec 2011	Average 3 Prior Yrs
ATS Only	211	173	169.7
Pilot Only	935	738	660.3
ATS & Pilot	18	10	5.7
Unknown	107	91	100.0
<b>Total</b>	<b>1271</b>	<b>1012</b>	<b>936</b>

## 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 2012.

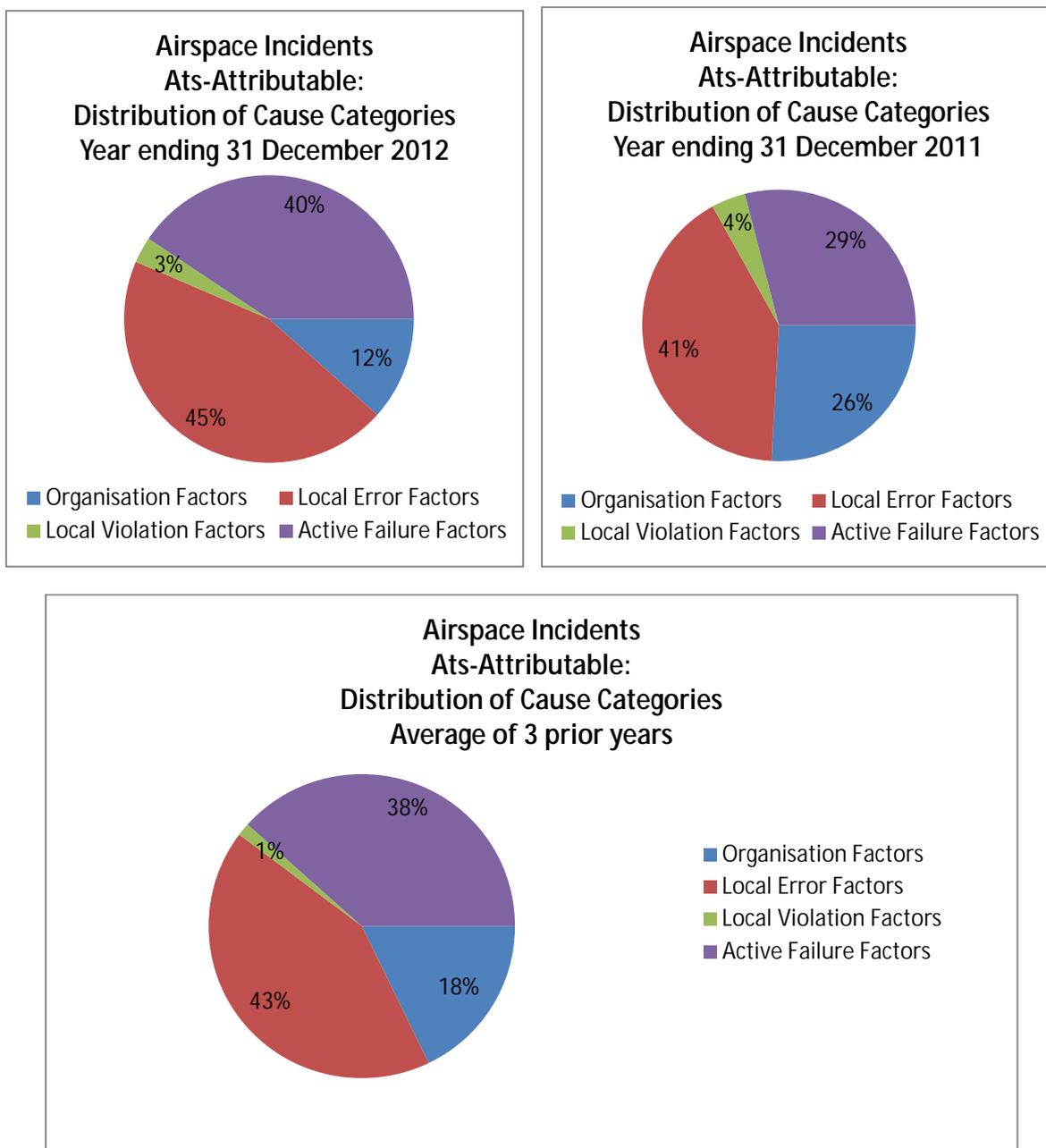


The ATS attributable airspace incident rate over the three year period is trending upward but is small.

**Causal Factors**

Causal factors have been assigned to 88 (7%) of the 1271 airspace incidents that were reported as occurring during the year ending 31 December 2012. This compares with 12% for the previous year and an average of 11% 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.

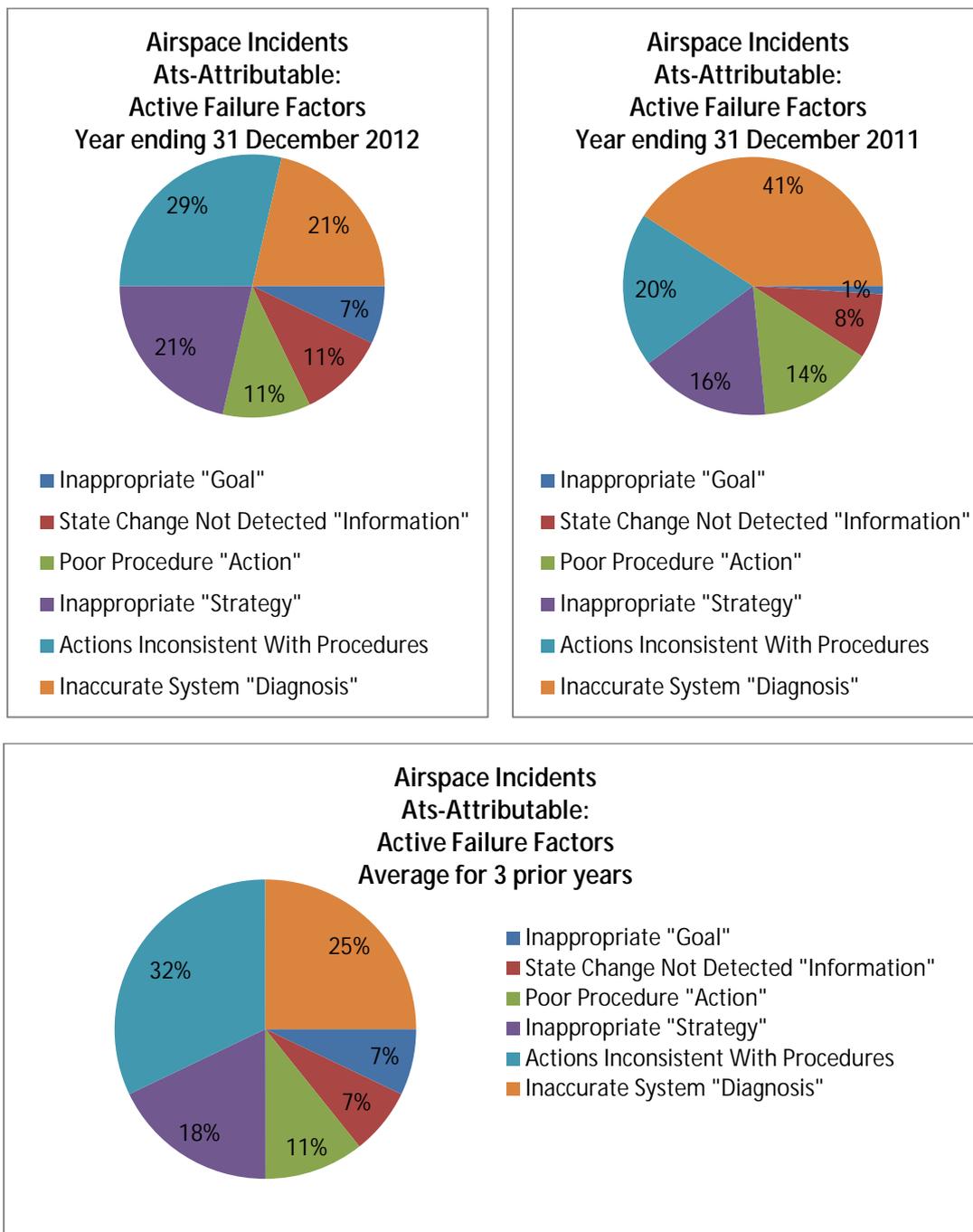
The following charts show the distribution of cause categories (groupings of causal factors) recorded for ATS attributable airspace incidents that occurred during the year ending 31 December 2012, the same period for the previous year and the average for the last three years.



### 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.

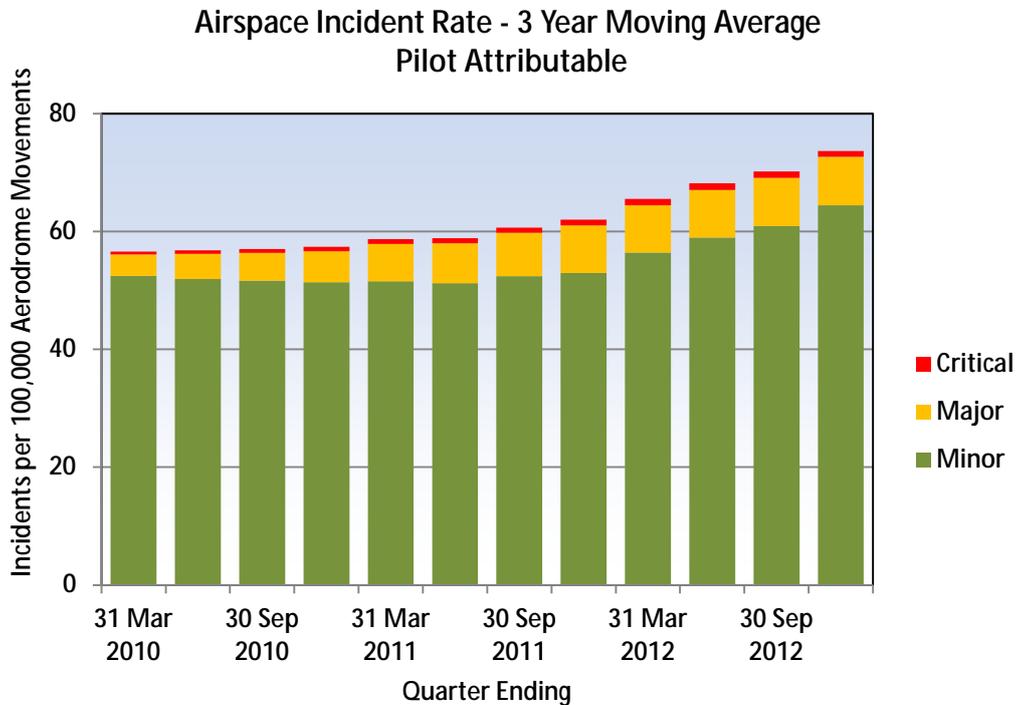
The following charts show the distribution of Active Failure causes during the same periods as above.



## 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 2012.

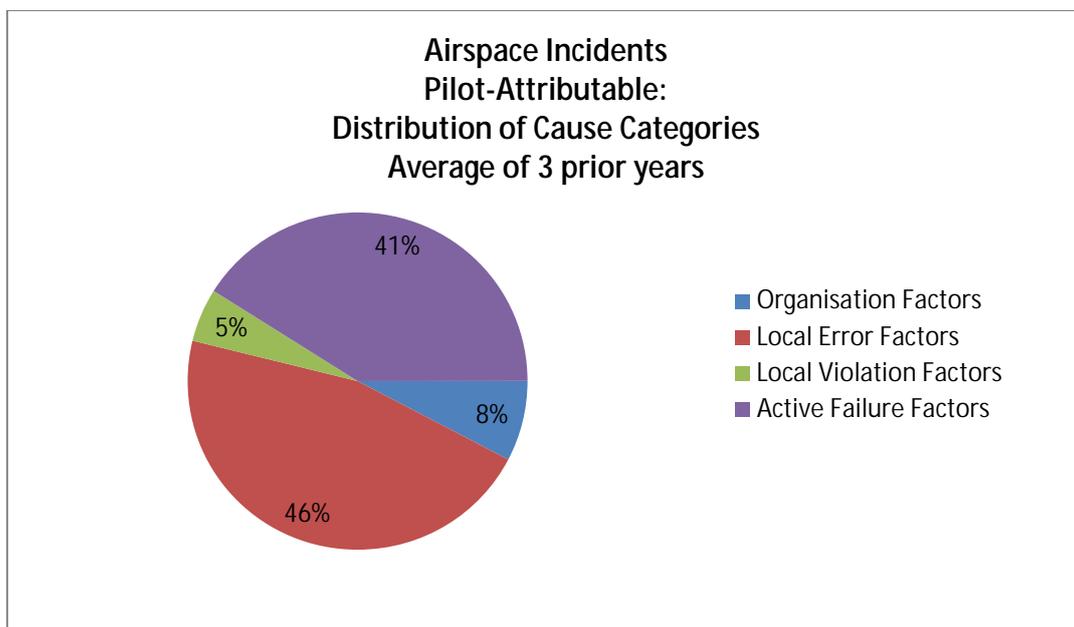
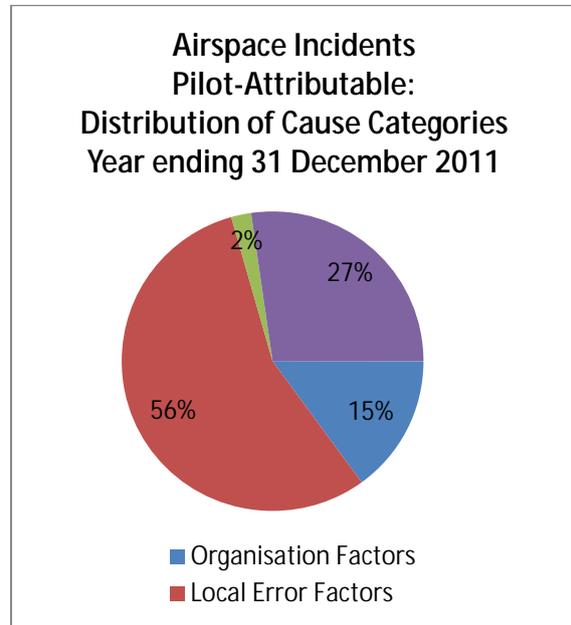
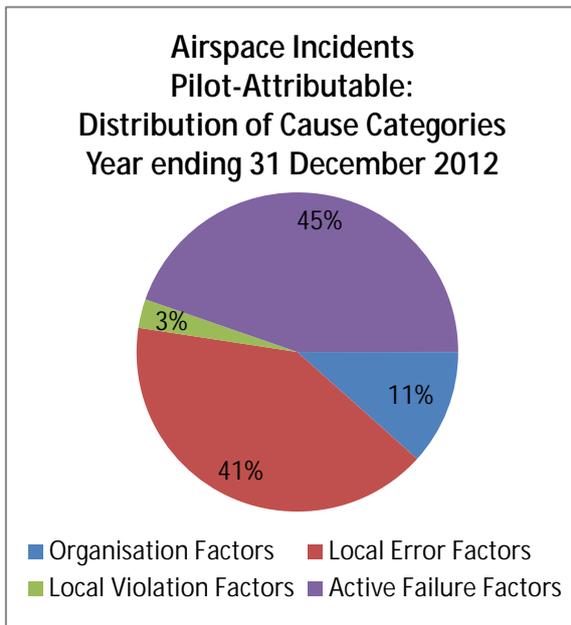


The Pilot attributable airspace incident rate over the three year period is trending upward.

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**

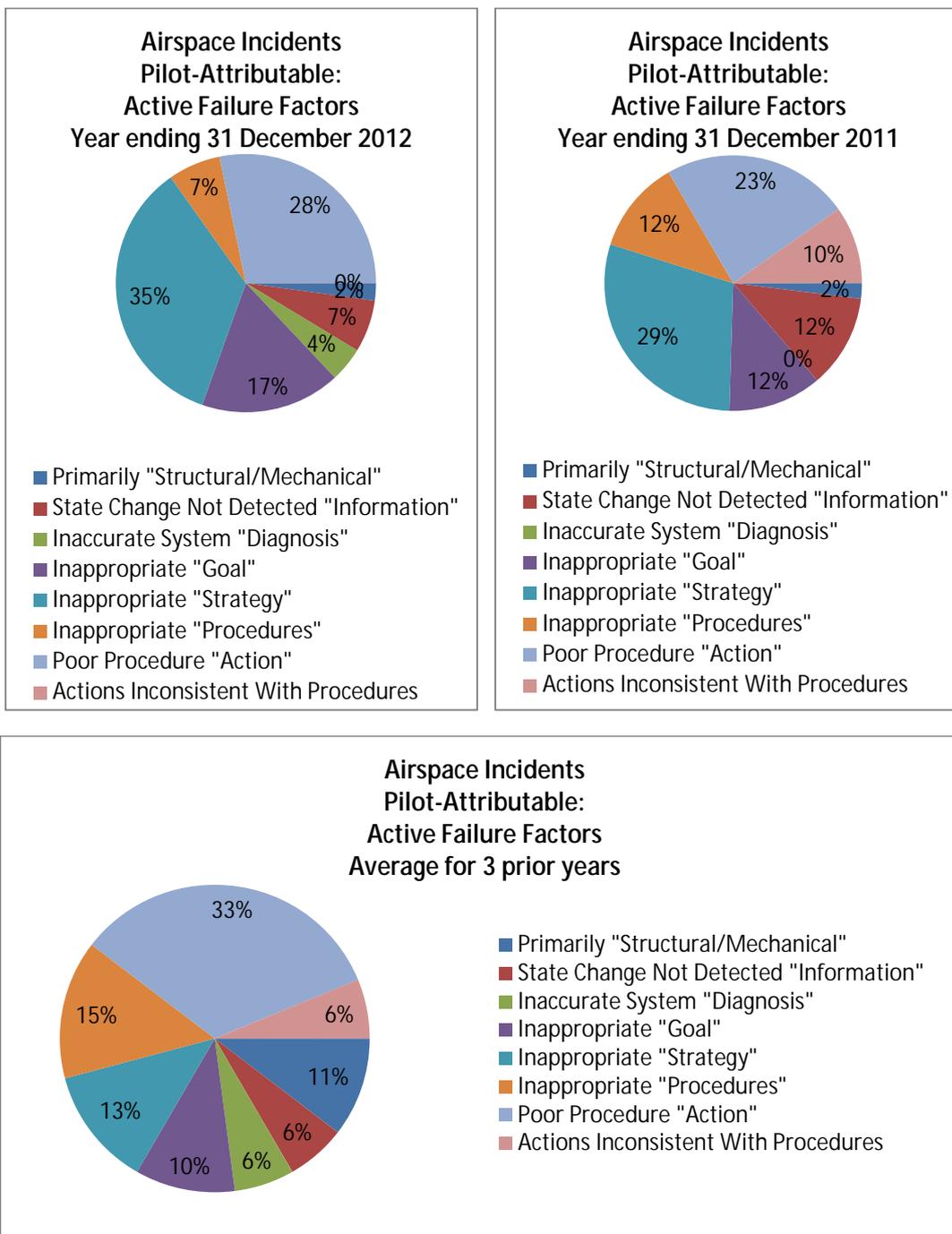
The following charts show the distribution of cause categories (groupings of causal factors) recorded for Pilot attributable airspace incidents that occurred during the year ending 31 December 2012, the same period for the previous year and the average for the last three years.



**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.

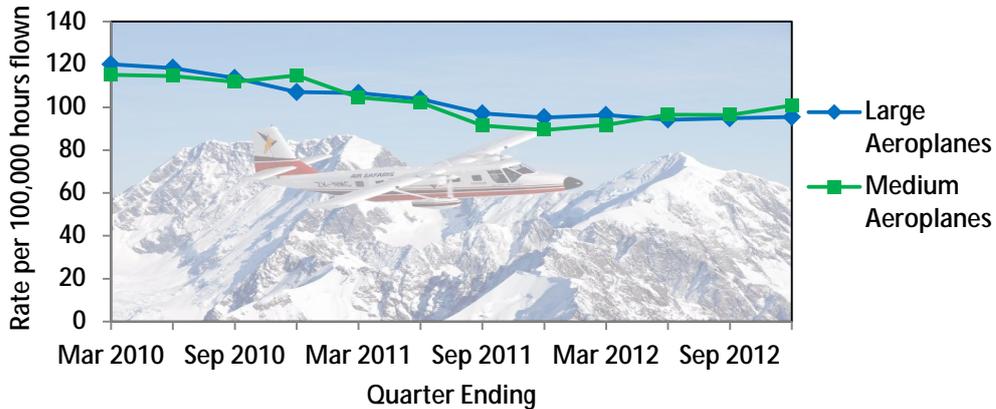


## Operational (Aircraft) Incidents

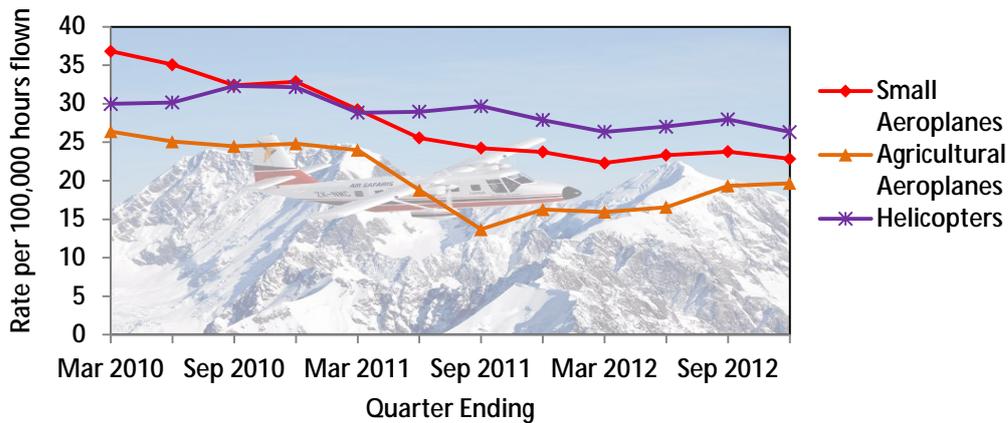
The following graphs show the reported operational incident rates (incidents per 100,000 hours flown) three year moving average for the three-year period ending 31 December 2012.

### Breakdown by Aircraft Category

Aircraft Incident Rate - 3 Year Moving Average



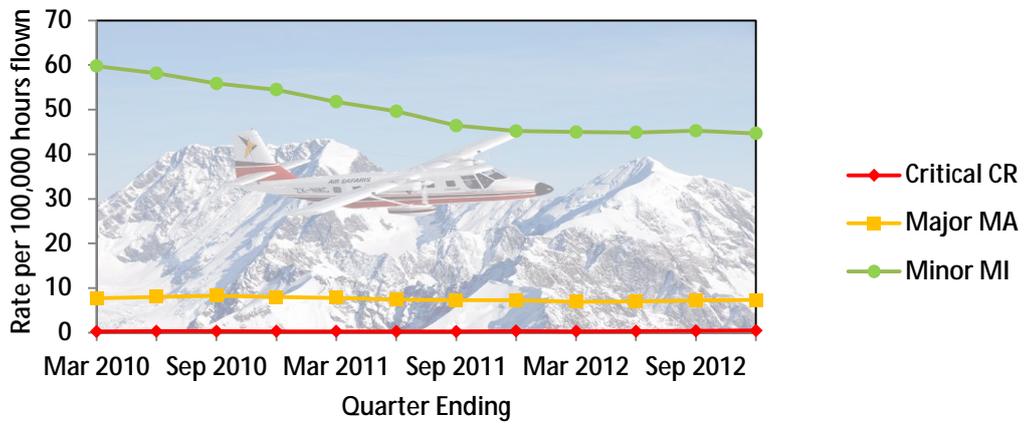
Aircraft Incident Rate - 3 Year Moving Average



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 Down
Helicopters	Constant

**Breakdown by Severity**

**Aircraft Incident Rate - 3 Year Moving Average**



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

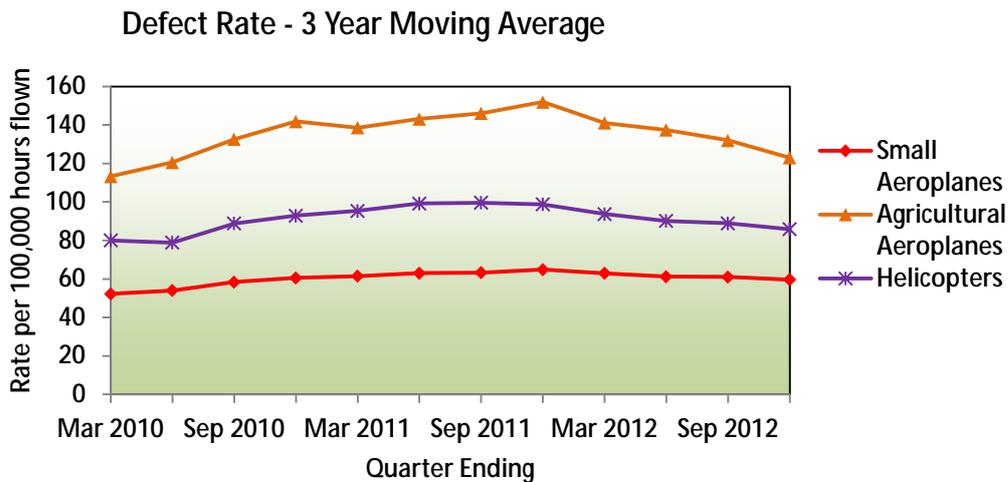
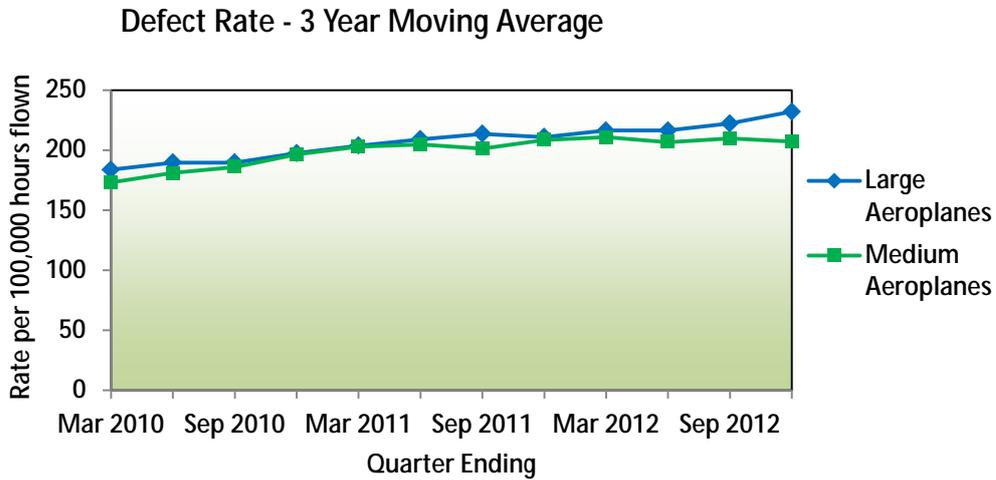
## Yearly Comparisons

		Year Ending Dec 2012	Year Ending Dec 2011	Average 3 Prior Yrs
Critical Operational Incidents	Aircraft Category			
	Large Aeroplanes	0	1	1.0
	Medium Aeroplanes	0	1	0.3
	Small Aeroplanes	0	2	0.3
	Helicopters	4	1	1.0
	Sport Aircraft	0	0	0.0
	Agricultural Aeroplanes	3	0	0.0
	Not Recorded	0	0	0.0
<b>Total</b>	<b>7</b>	<b>5</b>	<b>2.7</b>	
Major Operational Incidents	Aircraft Category			
	Large Aeroplanes	20	24	34.7
	Medium Aeroplanes	8	6	7.3
	Small Aeroplanes	28	23	15.3
	Helicopters	25	10	15.0
	Sport Aircraft	9	5	7.0
	Agricultural Aeroplanes	1	5	2.3
	Not Recorded	16	10	0.0
<b>Total</b>	<b>107</b>	<b>83</b>	<b>81.7</b>	
Minor Operational Incidents	Aircraft Category			
	Large Aeroplanes	317	314	307.0
	Medium Aeroplanes	76	40	60.7
	Small Aeroplanes	78	53	98.3
	Helicopters	22	42	43.0
	Sport Aircraft	28	8	17.7
	Agricultural Aeroplanes	4	6	7.0
	Not Recorded	80	179	0.0
<b>Total</b>	<b>605</b>	<b>642</b>	<b>533.7</b>	
All Operational Incidents	Aircraft Category			
	Large Aeroplanes	337	339	342.7
	Medium Aeroplanes	84	47	68.3
	Small Aeroplanes	106	78	114.0
	Helicopters	51	53	59.0
	Sport Aircraft	37	13	24.7
	Agricultural Aeroplanes	8	11	9.3
	Not Recorded	96	189	0.0
<b>Total</b>	<b>719</b>	<b>730</b>	<b>618.0</b>	

## Defect Incidents

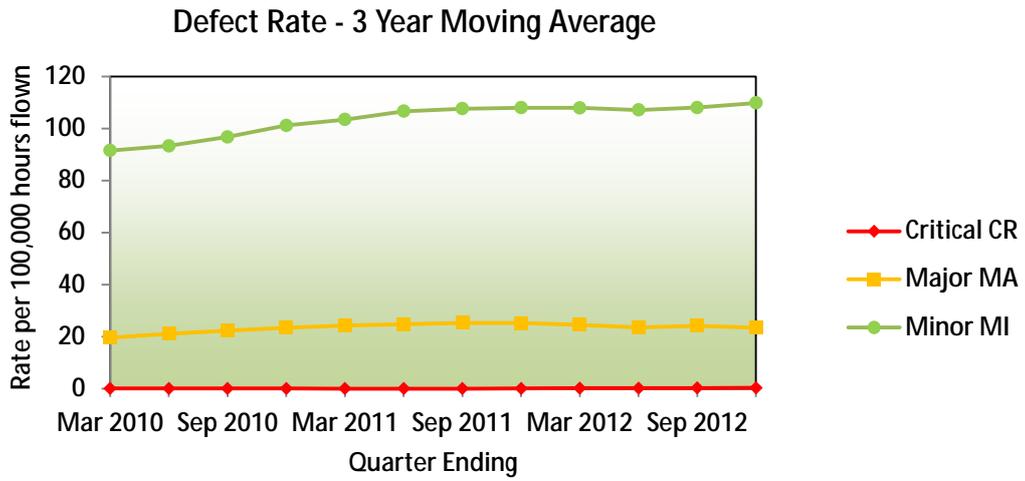
The following graphs show the aircraft defect incident reporting rates (incidents reported per 100,000 hours flown) three year moving average for the three-year period ending 31 December 2012.

### Breakdown by Aircraft Category



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

**Breakdown by Severity**



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

### Yearly Comparisons

Aircraft Category		Year Ending Dec 2012	Year Ending Dec 2011	Average 3 Prior Yrs
Critical Defect Incidents	Large Aeroplanes	1	0	0.0
	Medium Aeroplanes	0	1	0.3
	Small Aeroplanes	1	0	0.0
	Helicopters	0	1	0.0
	Sport Aircraft	1	0	0.0
	Agricultural Aeroplanes	3	0	0.3
	Not Recorded	0	0	0.0
	<b>Total</b>	<b>6</b>	<b>2</b>	<b>0.7</b>
Aircraft Category		Year Ending Dec 2012	Year Ending Dec 2011	Average 3 Prior Yrs
Major Defect Incidents	Large Aeroplanes	93	74	110.3
	Medium Aeroplanes	36	33	14.7
	Small Aeroplanes	56	61	48.3
	Helicopters	42	35	33.0
	Sport Aircraft	17	13	7.0
	Agricultural Aeroplanes	15	17	15.0
	Not Recorded	13	6	0.0
	<b>Total</b>	<b>272</b>	<b>239</b>	<b>228.3</b>
Aircraft Category		Year Ending Dec 2012	Year Ending Dec 2011	Average 3 Prior Yrs
Minor Defect Incidents	Large Aeroplanes	803	722	521.7
	Medium Aeroplanes	90	126	102.0
	Small Aeroplanes	139	136	161.7
	Helicopters	89	138	137.3
	Sport Aircraft	15	17	14.7
	Agricultural Aeroplanes	17	42	38.0
	Not Recorded	28	29	0.0
	<b>Total</b>	<b>1181</b>	<b>1210</b>	<b>975.3</b>
Aircraft Category		Year Ending Dec 2012	Year Ending Dec 2011	Average 3 Prior Yrs
All Defect Incidents	Large Aeroplanes	897	796	632.0
	Medium Aeroplanes	126	160	117.0
	Small Aeroplanes	196	197	210.0
	Helicopters	131	174	170.3
	Sport Aircraft	33	30	21.7
	Agricultural Aeroplanes	35	59	53.3
	Not Recorded	41	35	0.0
	<b>Total</b>	<b>1459</b>	<b>1451</b>	<b>1204.3</b>

## **ATA Chapters**

Defect Incidents reported as occurring during the year ending 31 December 2012 were associated with the following ATA component code chapters.

### ***Large Aeroplanes***

Chapter 21 (AIR CONDITIONING - GENERAL) was the most common with 98 defects, up from 72 in the previous period.

The next most common chapter was Chapter 49 (AUXILIARY POWER - GENERAL) with 83 defects, down from 117 in the previous period.

### ***Medium Aeroplanes***

Chapter 27 (AEROPLANE FLIGHT CONTROL - GENERAL) was the most common with 24 defects, up from 7 in the previous period.

The next most common chapter was Chapter 32 (LANDING GEAR (LG) - GENERAL) with 19 defects, up from 17 in the previous period.

### ***Small Aeroplanes***

Chapter 32 (LANDING GEAR (LG) - GENERAL) was the most common with 34 defects, up from 26 in the previous period.

The next most common chapter was Chapter 25 (AIRCRAFT FURNISHING - GENERAL) with 23 defects, up from 22 in the previous period.

### ***Agricultural Aeroplanes***

Chapter 32 (LANDING GEAR (LG) - GENERAL) was the most common with 8 defects, up from 7 in the previous period.

The next most common chapter was Chapter 25 (AIRCRAFT FURNISHING - GENERAL) with 6 defects, down from 7 in the previous period.

### ***Helicopters***

Chapter 63 (MAIN ROTOR DRIVE - GENERAL) was the most common with 20 defects, up from 10 in the previous period.

The next most common chapter was Chapter 25 (AIRCRAFT FURNISHING - GENERAL) with 14 defects, down from 29 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

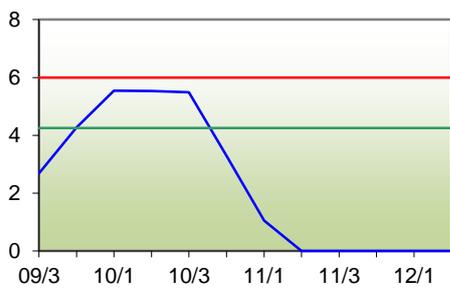
The timing of defect reports is often considerably later than what is mandated by Rule Part 12 and likewise a small number of operators of large and medium aeroplanes are persistently late with their hours and flights data returns. As a result the following defect rate graphs do not yet extend past the 2<sup>nd</sup> quarter of 2012 for want of sufficient data from a few operators.

**Analysis**

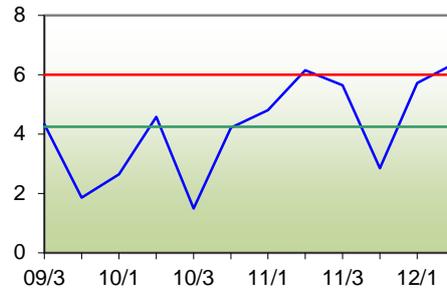
The top line on each graph shows the High defect rate. The next line shows the Alert defect rate. The Manager Airline Maintenance is notified of all high and alert rates on a quarterly basis.

**Large Aeroplanes**

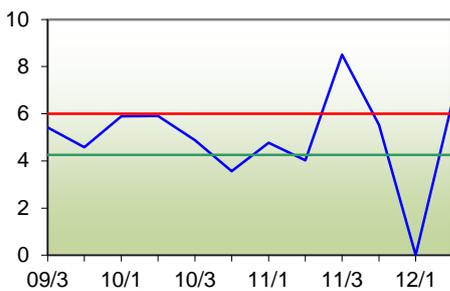
**B737-200 Defects per 1000 Hours**



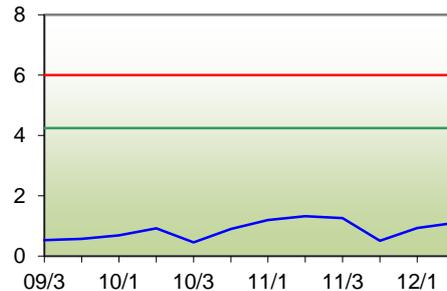
**B737-300 Defects per 1000 Hours**



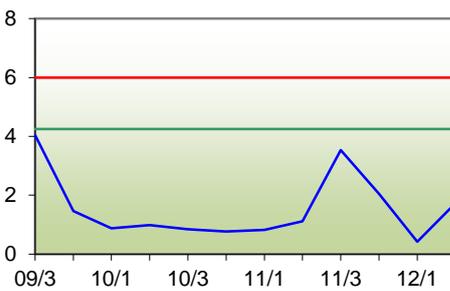
**B737-400 Defects per 1000 Hours**



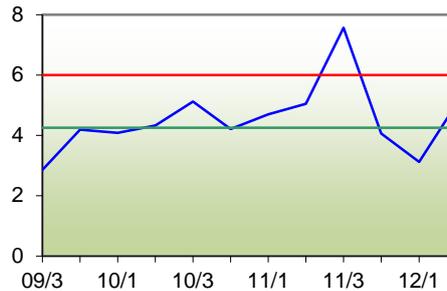
**B737-800 Defects per 1000 Hours**



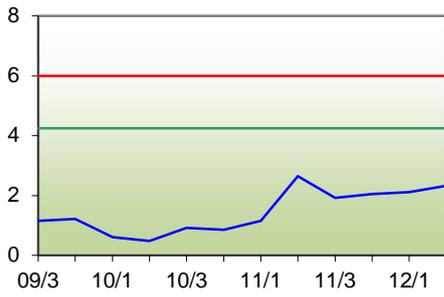
**B747-400 Defects per 1000 Hours**



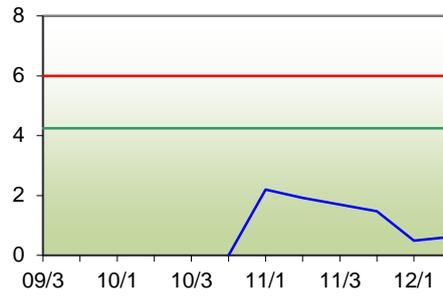
**B767 Defects per 1000 Hours**



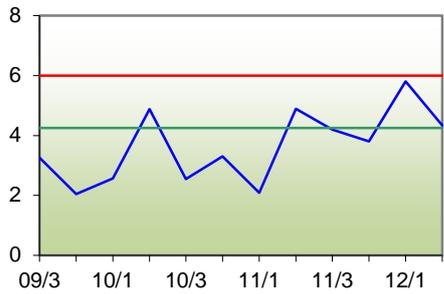
**B777-200 Defects per 1000 hours**



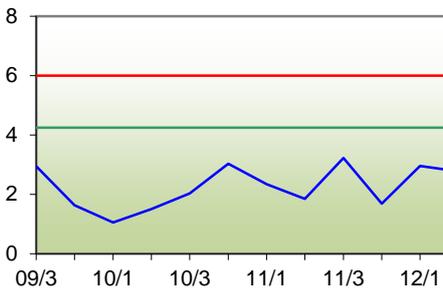
**B777-300 Defects per 1000 hours**



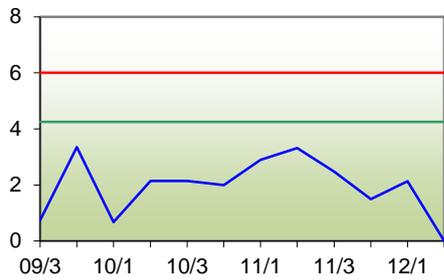
**A320 Defects per 1000 Hours**



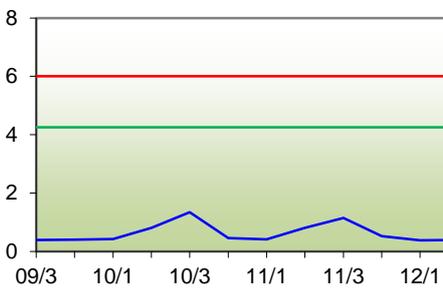
**ATR 72 Defects per 1000 Hours**



**Convair 580 Defects per 1000 hours**

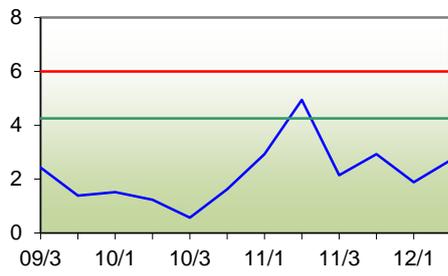


**DHC-8 Defects per 1000 Hours**

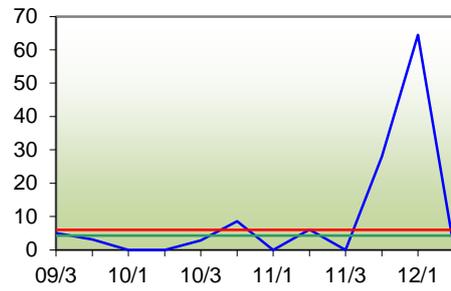


### Medium Aeroplanes

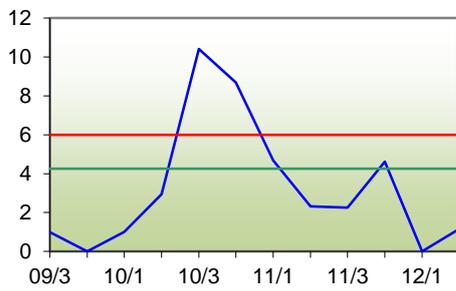
1900D Defects per 1000 Hours



J31, J32 Defects per 1000 Hours



SA227 Defects per 1000 Hours



## 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 March 2013.

Aerodrome	Quarter											
	10/2	10/3	10/4	11/1	11/2	11/3	11/4	12/1	12/2	12/3	12/4	13/1
Auckland	3.1	3.1	3.1	3.1	2.7	2.8	3.3	3.4	3.2	3.0	2.4	2.7
Chatham Islands	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Christchurch	2.2	2.8	2.8	3.2	3.1	3.2	3.3	3.2	3.9	4.1	3.7	3.7
Dunedin	4.3	5.5	4.1	4.8	5.1	4.9	6.2	5.4	5.3	4.4	5.1	4.1
Gisborne	2.6	2.7	4.1	4.2	5.8	5.3	5.3	6.7	7.0	7.4	7.1	6.9
Hamilton	1.9	2.6	2.6	1.9	1.9	1.5	1.4	1.3	1.2	1.2	1.4	1.4
Hokitika	3.7	3.8	7.5	3.7	3.7	3.6	0.0	3.6	3.6	3.6	3.6	0.0
Invercargill	7.2	8.2	7.2	5.8	6.4	7.2	6.8	5.9	3.8	1.9	2.5	3.8
Kerikeri	8.8	6.3	6.3	11.3	8.8	10.0	12.5	8.8	7.5	8.8	10.0	10.0
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	12.1	11.3	10.3	11.0	7.2	6.2	9.1	7.5	9.7	12.3	9.1	11.8
Nelson	1.8	2.4	2.7	2.3	2.2	2.3	2.6	2.4	2.4	3.0	3.1	5.0
New Plymouth	4.4	5.2	5.7	5.3	5.8	4.7	3.7	4.4	3.5	3.6	4.2	5.3
Ohakea	2.5	2.6	2.7	1.9	2.5	2.9	3.1	3.3	2.9	2.5	2.6	3.7
Palmerston North	4.3	4.6	4.3	3.8	3.9	2.8	2.1	1.9	2.8	3.8	4.5	4.5
Paraparaumu	1.2	1.2	0.4	0.4	0.4	0.4	0.0	1.1	1.3	1.2	2.1	1.4
Queenstown	1.6	1.6	1.2	1.7	1.9	1.2	2.4	2.3	3.6	5.0	5.7	5.7
Rotorua	6.4	7.1	6.4	4.4	3.6	2.6	3.1	4.0	2.6	2.7	2.7	4.4
Taupo	2.4	2.1	2.8	5.6	5.9	5.7	4.5	2.7	2.3	2.3	2.7	1.2
Tauranga	0.9	1.4	2.0	2.6	2.6	2.2	1.2	1.4	1.9	2.2	2.5	2.3
Timaru	3.8	1.3	2.5	5.0	10.0	10.0	8.8	6.3	2.5	2.5	3.8	3.8
Wanganui	1.2	1.7	1.7	3.4	3.6	2.9	3.9	2.6	2.0	2.4	3.4	3.0
Wellington	1.5	1.7	1.6	1.7	1.4	1.2	2.1	2.5	3.0	3.7	3.3	3.2
Westport	24.6	19.6	19.5	10.0	4.8	4.8	4.8	14.5	14.5	14.5	14.5	4.8
Whakatane	10.8	10.0	8.3	5.0	5.8	5.0	4.2	3.3	3.3	2.5	2.5	4.2
Whangarei	6.0	5.3	5.3	6.8	7.5	7.5	8.3	8.3	6.8	5.3	4.5	2.3
Whenuapai	12.5	12.6	13.2	12.0	10.0	11.2	10.9	14.2	14.9	14.2	12.1	7.1
Woodbourne	5.2	5.7	5.7	4.8	4.2	4.6	4.6	3.8	4.3	4.4	5.3	7.2

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

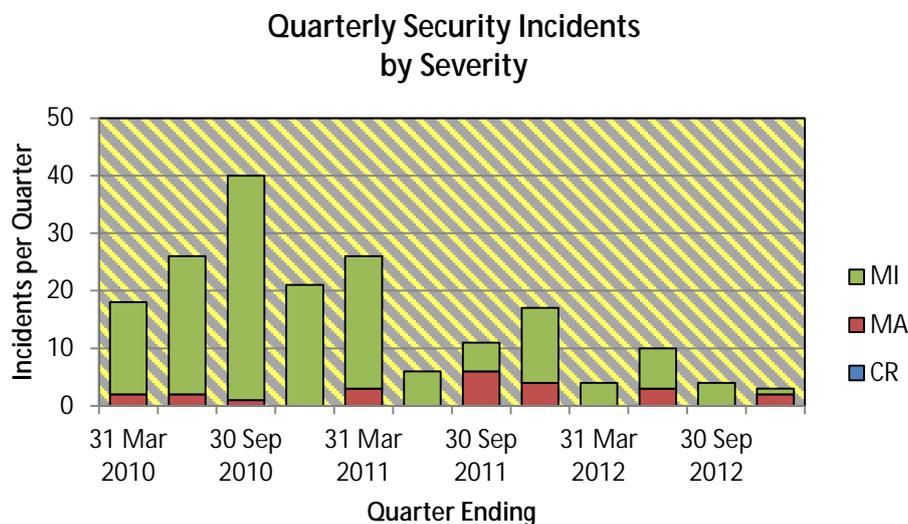
The CAA then determines what if any actions are required based on the combination of the above categories

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

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

## Security Incidents

The following chart shows the reported security incidents by quarter over the three year period ending 31 December 2012



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

### Six Monthly 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 2012, the previous year and the average for the three prior years.

Location (Aerodrome)	Year Ending Dec 2012	Year Ending Dec 2011	Average 3 Prior Yrs
Auckland	6	28	26.7
Christchurch	0	9	7.3
Wellington	7	4	6.3
Milford Sound	0	0	0.3
Gisborne	0	0	0.7
Nelson	0	2	1.0
Hamilton	0	3	1.0
Rotorua	0	0	0.7
Queenstown	0	1	2.0
Dunedin	0	0	1.0
Palmerston North	0	0	0.0
Other	3	1	4.7
Not Reported	5	12	30.0
<b>Total</b>	<b>21</b>	<b>60</b>	<b>81.7</b>

The following table shows a breakdown by Aircraft Statistics Category of the security incidents reported as occurring during the year ending 31 December 2012, the previous year and the average for the three prior years.

Aircraft Type	Year Ending Dec 2012	Year Ending Dec 2011	Average 3 Prior Yrs
Large Aeroplanes	8	10	13.00
Medium Aeroplanes	4	0	3.33
Small Aeroplanes	1	0	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	8	50	65.33
<b>Total</b>	<b>21</b>	<b>60</b>	<b>81.67</b>

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.

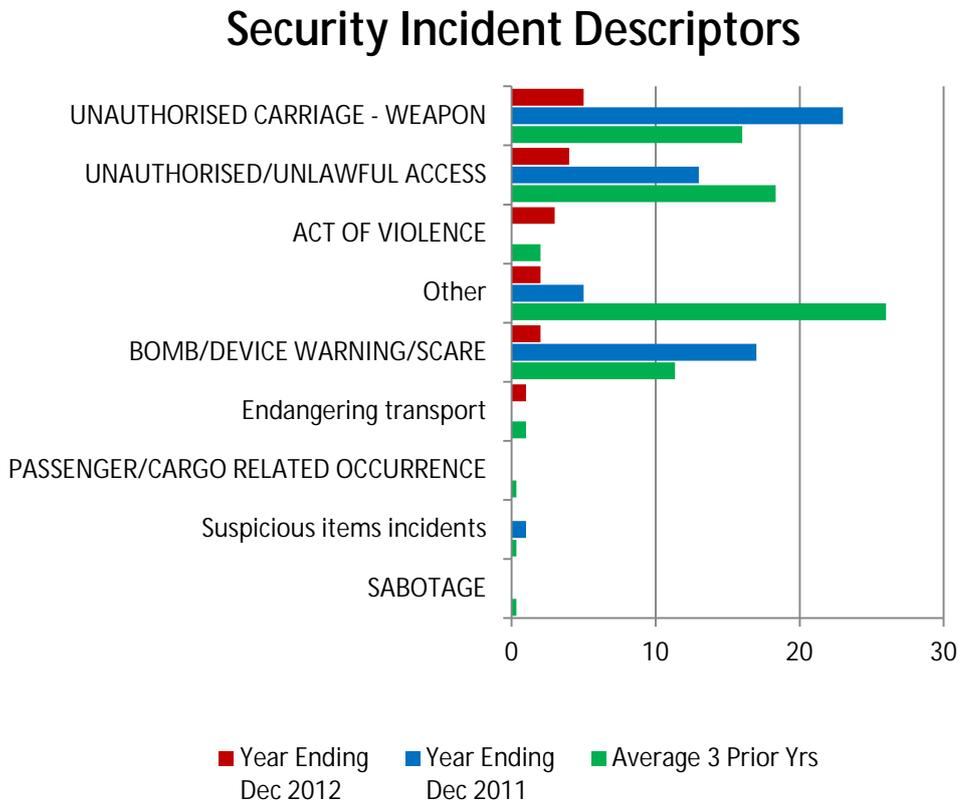
### Descriptors and Causal Factors

The most common descriptor (5) recorded for Security Incidents during the Year Ending 31 December 2012 was 'UNAUTHORISED CARRIAGE - WEAPON'

No causal factors have been recorded for security incidents that occurred during the Year Ending 31 December 2012, the previous year and the average for the three prior years.

#### 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 2012 and the two previous six-month periods.



## 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 4<sup>th</sup> quarter of 2008 so the current report is limited to displaying 12 month 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.

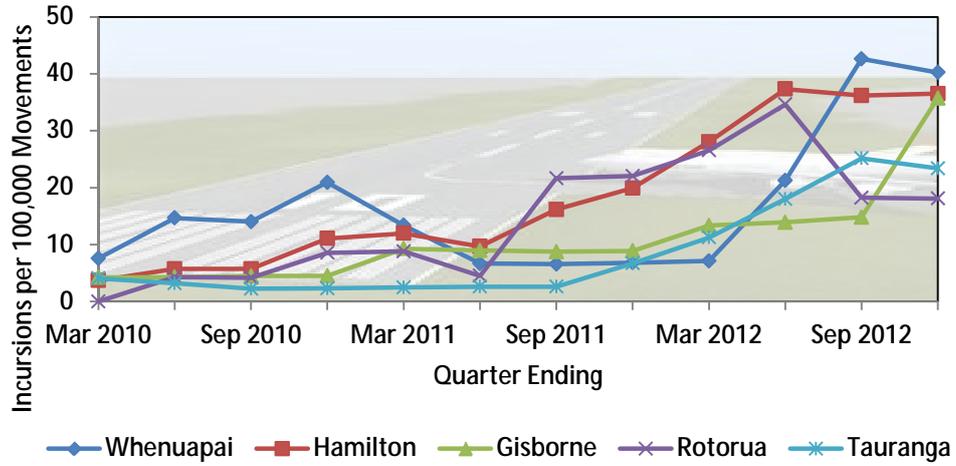
Clearly the number of runway incursions is low with many certificated aerodromes having no such incidents reported at all. With such low numbers caution needs to be exercised in drawing statistical conclusions..

The following table shows 12 month moving average values of reported quarterly runway incursion rates for all certificated aerodromes for which adequate movement data is available.

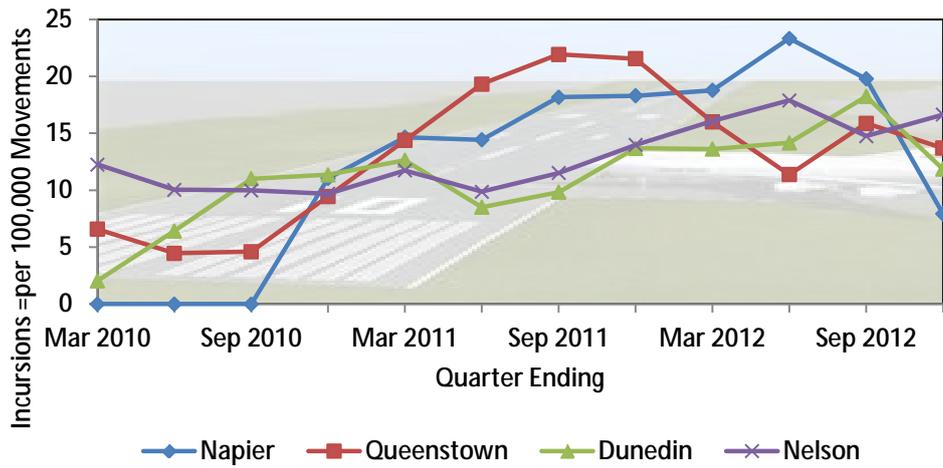
Aerodrome	10/1	10/2	10/3	10/4	11/1	11/2	11/3	11/4	12/1	12/2	12/3	12/4
Whenuapai	7.6	14.7	14.0	20.9	13.4	6.7	6.6	6.8	7.1	21.3	42.6	40.2
Hamilton	3.7	5.7	5.7	11.1	12.0	9.7	16.1	19.9	28.0	37.3	36.2	36.5
Gisborne	4.2	4.3	4.5	4.5	9.3	9.0	8.8	8.9	13.3	13.9	14.8	35.7
Rotorua	0.0	4.3	4.2	8.6	8.8	4.5	21.6	22.0	26.6	34.6	18.2	18.1
Tauranga	4.1	3.2	2.3	2.3	2.5	2.6	2.6	6.7	11.2	18.0	25.2	23.4
Napier	0.0	0.0	0.0	11.0	14.7	14.4	18.2	18.3	18.8	23.3	19.8	7.9
Queenstown	6.6	4.5	4.6	9.4	14.4	19.3	21.9	21.5	16.0	11.4	15.9	13.7
Dunedin	2.1	6.4	11.0	11.4	12.6	8.5	9.8	13.7	13.6	14.2	18.2	11.8
Nelson	12.3	10.0	10.0	9.7	11.7	9.9	11.5	14.0	16.1	17.9	14.8	16.6
Christchurch	4.5	7.8	8.7	9.6	9.7	7.4	8.1	6.6	8.5	7.8	6.3	7.3
New Plymouth	0.0	0.0	0.0	0.0	0.0	0.0	2.9	3.0	9.4	9.5	6.5	6.5
Woodbourne	8.4	8.7	4.4	0.0	0.0	0.0	4.2	4.2	4.2	8.6	4.4	8.8
Wellington	8.0	5.4	4.6	2.7	1.9	2.8	4.7	4.7	4.7	5.7	3.9	2.0
Palmerston North	1.8	1.8	1.9	1.8	1.7	3.4	3.1	3.0	7.4	4.4	4.5	5.9
Ohakea	2.7	2.9	3.2	1.6	0.0	5.3	5.1	5.4	5.8	0.0	2.8	6.5
Auckland	3.8	5.7	5.7	4.5	3.8	2.6	4.5	5.1	4.5	3.2	1.3	0.6
Taupo	3.4	3.4	3.5	0.0	3.5	3.7	3.5	3.8	0.0	0.0	0.0	3.9
Invercargill	0.0	0.0	0.0	0.0	3.4	3.4	3.3	3.2	0.0	0.0	3.2	3.5
Overall	5.5	6.0	6.3	6.9	7.3	6.6	8.4	9.2	11.3	13.8	14.3	14.6

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.

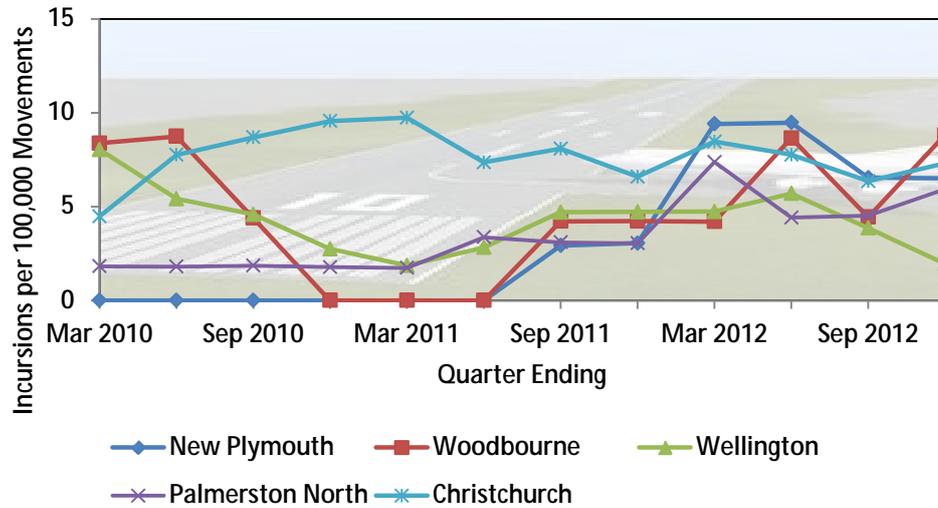
Runway Incursion Rates - Max > 25  
One Year Moving Average values



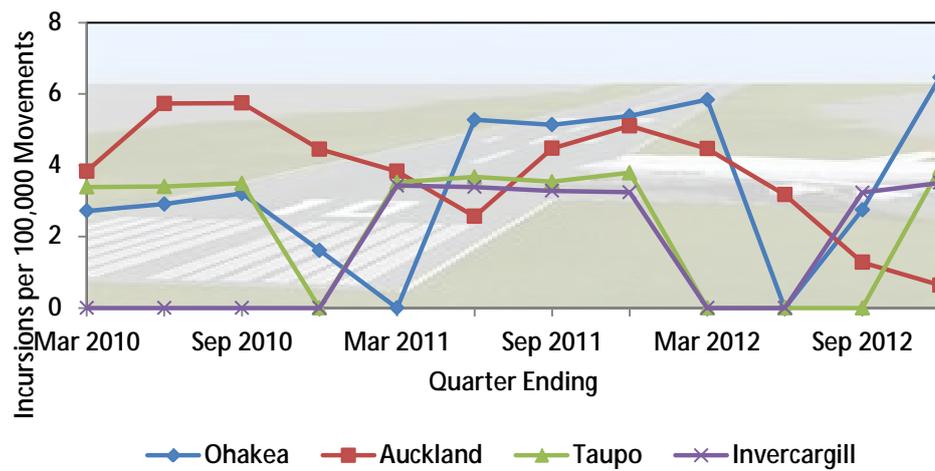
Runway Incursion Rates - Max 10 - 25  
One Year Moving Average Values



Runway Incursion Rates - Max 7 - 10  
One Year Moving Average Values



Runway Incursion Rates - Max < 7  
One Year Moving Average Values



## 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 - 2012	6	19	111	130	103	128	3	0	61	6	1	1	2
Feb - 2012	6	15	71	92	112	128	7	2	56	1	0	4	6
Mar - 2012	2	27	65	134	115	120	6	2	65	3	2	1	1
Apr - 2012	13	20	68	114	135	96	0	0	42	0	1	0	2
May - 2012	3	12	68	89	103	122	3	0	62	3	2	0	2
Jun - 2012	3	16	55	86	92	65	3	1	54	3	1	1	3
Jul - 2012	6	12	62	119	65	158	3	1	55	3	0	2	3
Aug - 2012	6	13	87	78	134	157	2	0	57	5	2	1	2
Sep - 2012	0	12	63	80	128	123	0	0	65	4	0	0	1
Oct - 2012	4	21	63	112	126	112	3	0	94	3	0	4	0
Nov - 2012	7	21	64	148	111	139	6	1	75	1	2	2	3
Dec - 2012	8	12	26	87	63	101	4	1	31	2	1	4	0
<b>Total</b>	<b>64</b>	<b>200</b>	<b>803</b>	<b>1269</b>	<b>1287</b>	<b>1449</b>	<b>40</b>	<b>8</b>	<b>717</b>	<b>34</b>	<b>12</b>	<b>20</b>	<b>25</b>

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

# Causal Factor Analysis

## Introduction

The following section presents an analysis of occurrence causes recorded during the year ending 31 December 2012 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:

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

## Aircraft Flight Operations

The following section summarises causal factors identified from investigation of occurrences that occurred during the year ended 31 December 2012 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	ASP	DEF	INC	PIO
Active Failure	ACTIONS INCONSISTENT WITH PROCEDURES INAPPROPRIATE "PROCEDURES"	1		1	
	POOR PROCEDURE "ACTION"	2			
	PRIMARILY "STRUCTURAL/MECHANICAL"		24	2	
	STATE CHANGE NOT DETECTED "INFORMATION"	1			
Organisation	DESIGN DEFICIENCIES				3
	INADEQUATE COMMUNICATIONS		1		
	INADEQUATE CONTROL AND MONITORING		1		
	INADEQUATE DEFENCES		1		
	INADEQUATE PROCEDURES			3	1
	INADEQUATE SPECIFICATIONS/REQUIREMENTS		1		
Task/Environment Error	FATIGUE - OTHER			1	
	INADEQUATE CHECKING		1	2	
	LACK OF KNOWLEDGE		1	1	
	POOR INSTRUCTIONS/PROCEDURES		1		
	POOR SYSTEM FEEDBACK			1	
	PSYCHOLOGICAL OTHER			1	
	TASK OVERLOAD			1	

### Medium Aeroplanes

Category	Cause	ADI	ASP	DEF	INC	PIO
Active Failure	ACTIONS INCONSISTENT WITH PROCEDURES PRIMARILY "STRUCTURAL/MECHANICAL"	1			1	1
				8		
Organisation	INADEQUATE DEFENCES				1	
	INADEQUATE PROCEDURES			1		
	OTHER ORGANISATION FACTOR			1		
	POOR COORDINATION		1			
Task/Environment Error	INADEQUATE CHECKING		1	1	1	
	INEXPERIENCE (NOT LACK OF TRAINING)		1			
	RISK MISPERCEPTION		1			

### Unknown Aircraft Category

Category	Cause	ACC	ARC	ASP	DEF
Active Failure	ACTIONS INCONSISTENT WITH PROCEDURES				1
	POOR PROCEDURE "ACTION"	1		4	
	PRIMARILY "STRUCTURAL/MECHANICAL"				1
	STATE CHANGE NOT DETECTED "INFORMATION"				1
Organisation	INADEQUATE PROCEDURES		1		
	INADEQUATE TRAINING				1
	OTHER ORGANISATION FACTOR				5
Task/Environment Error	INADEQUATE CHECKING	1		4	
	LACK OF KNOWLEDGE		1		
	OTHER ERROR ENFORCING CONDITION				3
	RISK MISPERCEPTION		1		

**Other Aeroplanes, Helicopters and Sport Aircraft**

Category	Cause	ACC	ADI	ARC	ASP	DEF	INC
Active Failure	ACTIONS INCONSISTENT WITH PROCEDURES		3		8	1	4
	INACCURATE SYSTEM "DIAGNOSIS"		1			1	3
	INAPPROPRIATE "GOAL"	1			2		1
	INAPPROPRIATE "PROCEDURES"	1	2	1	2		
	INAPPROPRIATE "STRATEGY"	3	1		2		2
	POOR PROCEDURE "ACTION"	7	2		9	2	4
	PRIMARILY "STRUCTURAL/MECHANICAL"	3			1	45	1
	STATE CHANGE NOT DETECTED "INFORMATION"	5	1		6		1
Organisation	INADEQUATE COMMUNICATIONS					1	
	INADEQUATE CONTROL AND MONITORING						2
	INADEQUATE DEFENCES	1					
	INADEQUATE PLANNING						1
	INAPPROPRIATE GOALS OR POLICIES				1		1
	OTHER ORGANISATION FACTOR						1
Task/Environment Error	POOR DECISIONS			1		1	
	FATIGUE - OTHER				1		
	HOSTILE ENVIRONMENT	2				1	1
	INADEQUATE CHECKING	2	1		8	1	6
	INEXPERIENCE (NOT LACK OF TRAINING)	4			4		4
	INFORMATION OVERLOAD		2		3		
	LACK OF KNOWLEDGE	3		1	2		
	NEGATIVE TASK TRANSFER (HABITS)		1				
	OTHER ENVIRONMENTAL FACTOR (EG WEATHER)	1			2		3
	OTHER ERROR ENFORCING CONDITION	1			1		2
	PHYSIOLOGICAL OTHER	2			1		
	POOR HUMAN-SYSTEM INTERFACE						1
	POOR INSTRUCTIONS/PROCEDURES	1					
	RISK MISPERCEPTION	6			2	1	5
TASK OVERLOAD				1			
TASK UNFAMILIARITY		1		2		2	
Task/Environment Violation	VISUAL ILLUSION	1					1
	HAZARD MISPERCEPTION	1			1		
	LACK OF MANAGEMENT CARE/CONCERN			1			
	LACK OF SAFETY CULTURE			1			
	PERCEIVED LICENSE TO BEND RULES	1			1		1

## Aircraft Maintenance Operations

The following section summarises causal factors identified from investigation of occurrences that occurred during the year ended 31 December 2012 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
Active Failure	POOR PROCEDURE "ACTION"	1
	PRIMARILY "STRUCTURAL/MECHANICAL"	2
	STATE CHANGE NOT DETECTED "INFORMATION"	1
Organisation	DESIGN DEFICIENCIES	8
	INADEQUATE COMMUNICATIONS	1
	INADEQUATE CONTROL AND MONITORING	2
	INADEQUATE RESOURCE MANAGEMENT	1
	INADEQUATE SPECIFICATIONS/REQUIREMENTS	2
	OTHER ORGANISATION FACTOR	1
Task/Environment Error	FATIGUE - OTHER	2
	INADEQUATE CHECKING	3
	POOR INSTRUCTIONS/PROCEDURES	3
	RISK MISPERCEPTION	1
	TASK UNFAMILIARITY	2

### Medium Aeroplanes

Category	Cause	DEF	INC	PIO
Active Failure	ACTIONS INCONSISTENT WITH PROCEDURES	3		
	POOR PROCEDURE "ACTION"	4	1	
	PRIMARILY "STRUCTURAL/MECHANICAL"	1		
	STATE CHANGE NOT DETECTED "INFORMATION"	1		1
Organisation	DESIGN DEFICIENCIES	3		
	INADEQUATE CONTROL AND MONITORING	3		
	INADEQUATE PROCEDURES	4	1	
	INAPPROPRIATE GOALS OR POLICIES	1		
Task/Environment Error	INADEQUATE CHECKING	3		
	NEGATIVE TASK TRANSFER (HABITS)	1		
	POOR HUMAN-SYSTEM INTERFACE	1		
	POOR INSTRUCTIONS/PROCEDURES	3		
	TASK OVERLOAD	2		
	TIME SHORTAGE	1		
Task/Environment Violation	HAZARD MISPERCEPTION	1		
	PERCEIVED LICENSE TO BEND RULES	2		

**Other Aeroplanes, Helicopters and Sport Aircraft**

Category	Cause	ACC	ASP	DEF	INC
<b>Active Failure</b>	ACTIONS INCONSISTENT WITH PROCEDURES			4	
	POOR PROCEDURE "ACTION"				1
	PRIMARILY "STRUCTURAL/MECHANICAL"			7	
	STATE CHANGE NOT DETECTED "INFORMATION"			2	
<b>Organisation</b>	DESIGN DEFICIENCIES	1		7	1
	INADEQUATE COMMUNICATIONS	2			
	INADEQUATE CONTROL AND MONITORING			2	
	INADEQUATE DEFENCES			1	1
	INADEQUATE SPECIFICATIONS/REQUIREMENTS			3	1
	INAPPROPRIATE GOALS OR POLICIES			1	
	POOR WORK ENVIRONMENT			2	
<b>Task/Environment Error</b>	HOSTILE ENVIRONMENT			1	
	INADEQUATE CHECKING			11	1
	LACK OF KNOWLEDGE			1	
	NEGATIVE TASK TRANSFER (HABITS)			1	
	OTHER ERROR ENFORCING CONDITION		1		1
	POOR INSTRUCTIONS/PROCEDURES			2	
	RISK MISPERCEPTION				1

**Unknown Aircraft Category**

Category	Cause	ARC	DEF
<b>Organisation</b>	INADEQUATE CONTROL AND MONITORING	1	
<b>Task/Environment Error</b>	NEGATIVE TASK TRANSFER (HABITS)	1	
	POOR INSTRUCTIONS/PROCEDURES		1
Task/Environment Violation	PERCEIVED LICENSE TO BEND RULES	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 2012 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
<b>Organisation</b>	DESIGN DEFICIENCIES	3	
	INADEQUATE COMMUNICATIONS	1	
	INADEQUATE CONTROL AND MONITORING		1
	INADEQUATE SPECIFICATIONS/REQUIREMENTS	1	
	INADEQUATE TRAINING	1	
	INAPPROPRIATE GOALS OR POLICIES	2	
<b>Task/Environment Error</b>	INADEQUATE CHECKING	1	1
	LACK OF KNOWLEDGE	1	
	OTHER ERROR ENFORCING CONDITION	4	
	POOR INSTRUCTIONS/PROCEDURES	1	
	TASK OVERLOAD	1	

### *Air Traffic Service Personnel*

Category	Cause	ADI	ASP	INC
<b>Active Failure</b>	ACTIONS INCONSISTENT WITH PROCEDURES	2	9	
	INACCURATE SYSTEM "DIAGNOSIS"	1	6	
	INAPPROPRIATE "GOAL"	1	2	
	INAPPROPRIATE "PROCEDURES"		1	
	INAPPROPRIATE "STRATEGY"		6	
	POOR PROCEDURE "ACTION"	1	4	
	STATE CHANGE NOT DETECTED "INFORMATION"	1	3	
<b>Task/Environment Error</b>	INADEQUATE CHECKING		6	1
	INEXPERIENCE (NOT LACK OF TRAINING)		2	
	INFORMATION OVERLOAD	1		
	LACK OF KNOWLEDGE		3	
	OTHER ERROR ENFORCING CONDITION		1	
	RISK MISPERCEPTION		5	
	TASK OVERLOAD		1	
TASK UNFAMILIARITY		1		
<b>Task/Environment Violation</b>	PERCEIVED LICENSE TO BEND RULES		2	

## 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 2012 and over the Preceding Four Years)

Activity	As at 31 December 2012				Average at end of each of 4 prior 12 month periods			
	Very High	High	Mode rate	Low	Very High	High	Mode rate	Low
Australia AOC with ANZA Privileges Part 108 Security Programme	0	0	0	1	0.0	0.0	0.0	0.5
Part 108 Security Programme	0	0	2	11	0.0	0.0	1.3	6.8
Part 109 Regulated Air Cargo Agent	1	0	5	59	0.0	0.8	4.3	25.5
Part 121 Air Operator Large Aeroplanes	0	0	0	8	0.3	0.0	0.5	4.8
Part 125 Air Operator Medium Aeroplanes	0	1	3	11	0.3	0.0	1.5	6.0
Part 129 Foreign Air Transport Operator	1	0	0	27	0.3	0.0	1.8	12.8
Part 135 Air Operator Helicopters and Small Aeroplanes	0	5	37	113	0.8	3.0	27.0	54.3
Part 137 Agricultural Aircraft Operator	0	3	21	75	0.3	2.3	15.0	36.5
Part 139 Aerodrome Operator	0	0	0	24	0.0	0.0	0.0	11.8
Part 140 Aviation Security Service Organisation	0	0	0	1	0.0	0.0	0.0	0.5
Part 141 Aviation Training Organisation	1	0	2	48	0.0	0.5	2.3	22.5
Part 145 Maintenance Organisation	2	0	2	51	0.5	0.0	2.8	27.3
Part 146 Aircraft Design Organisation	0	0	0	14	0.3	0.0	1.0	6.3
Part 148 Aircraft Manufacturing Organisation	0	0	0	21	0.5	0.3	0.8	10.8
Part 149 Aviation Recreation Organisation	0	0	0	6	0.3	0.0	0.3	1.8
Part 171 Telecom Service Organisation	0	0	0	2	0.0	0.0	0.3	1.0
Part 172 Air Traffic Service Organisation	0	0	1	0	0.0	0.0	0.3	0.3
Part 173 Instrument Flight Procedure	0	0	0	3	0.0	0.0	0.3	1.3
Part 174 Meteorological Service Organisation	0	0	0	2	0.0	0.0	0.3	0.8
Part 175 Aeronautical Info Service Organisation	0	0	0	1	0.0	0.0	0.3	0.3
Part 19F Supply Organisation	2	0	0	46	0.8	0.0	2.5	25.3
Part 92 Dangerous Goods Packaging Approval Holder	0	0	0	2	0.0	0.0	0.0	0.8

## 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—

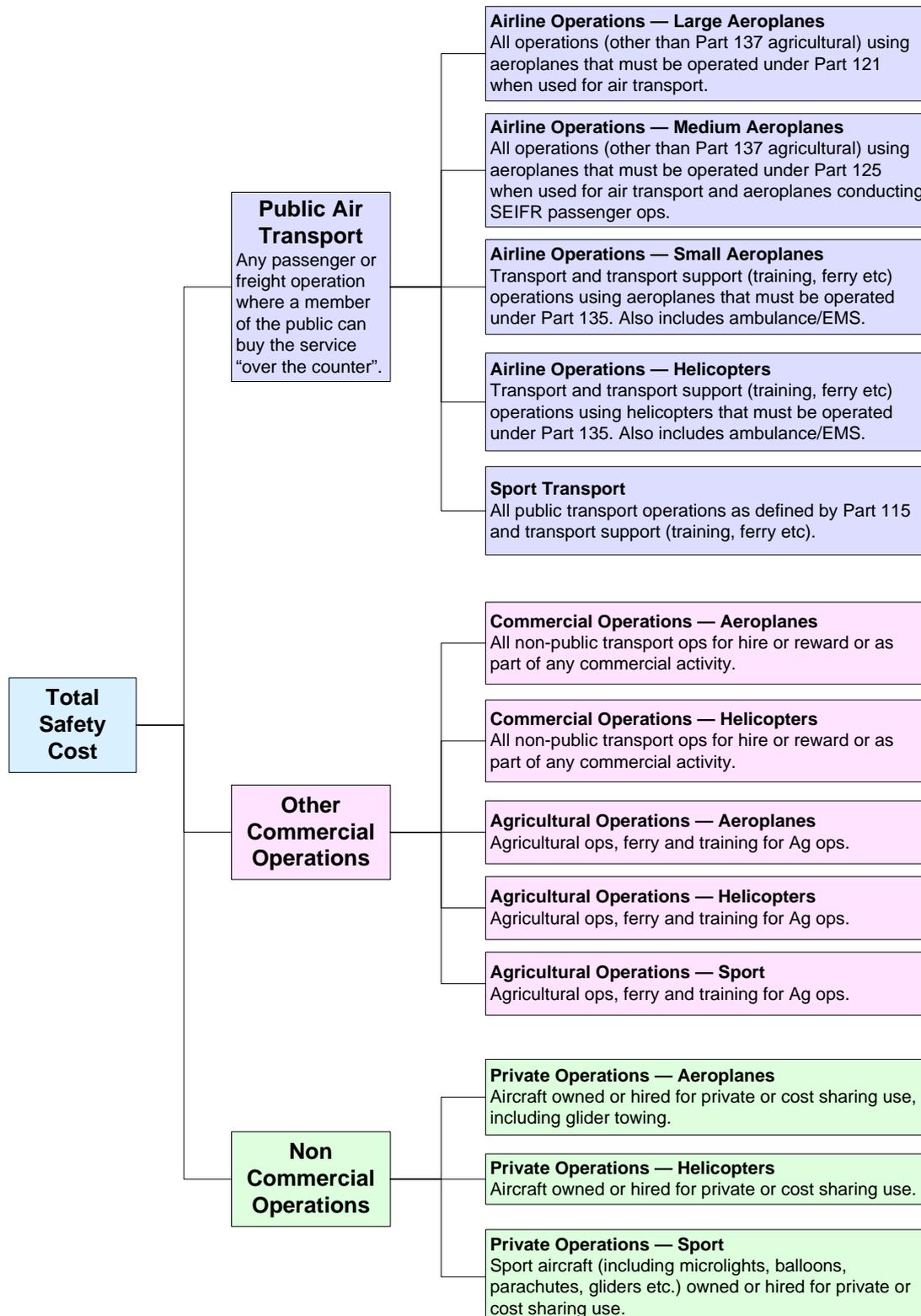
- (1) requires hospitalisation for more than 48 hours, commencing within 7 days from the date the injury was received; or
- (2) results in a fracture of any bone, except simple fractures of fingers, toes, or nose; or
- (3) involves lacerations which cause severe haemorrhage, nerve, muscle, or tendon 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.

<b>Severity Factor</b>		<b>Definition</b>
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.

Target group name	General description	Includes	Excludes
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.

- 2 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.
- 2 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.
- 2 Critical air transport occurrences resulting in Loss of Control
- 2 Critical air transport occurrences where a Distress or Urgency call was (or should have been) made
- 2 Air transport occurrences where the last in a series of “redundant” systems failed in flight or during take off or landing
- 2 SEIFR air transport occurrences involving loss of engine power to the extent that an unscheduled landing is required
- 2 Fatal accidents
- 2 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.
- 2 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.
- 2 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.
- 2 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**

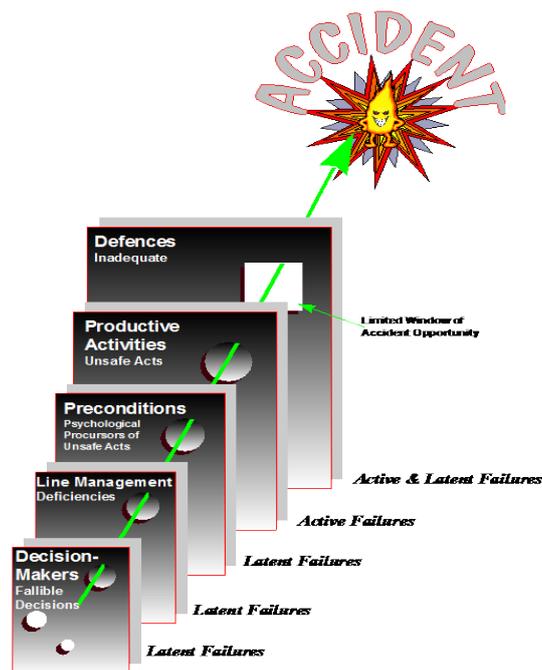


Diagram 1 shows the layers of defences that have been created within the aviation system to prevent accidents and incidents happening. It also shows how these defences have holes in them. When these holes line up there is a window of opportunity for an accident or incident. All that is needed to complete 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

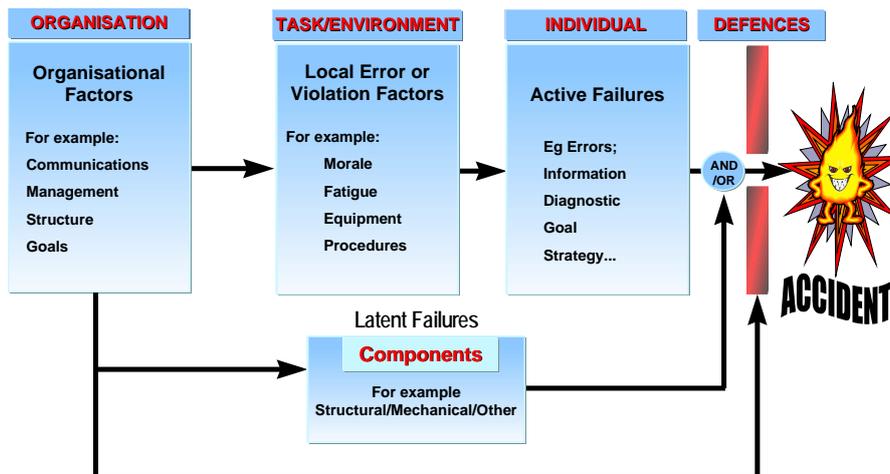


Diagram 2 shows how the latent failures are grouped into 3 areas:

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.