| ÚDARÁS EITLÍOCHTA NA HÉIREANN<br>IRISH AVIATION AUTHORITY | Reference No: 04/10<br>Page: 1 of 25<br>Issue Date: 12/02/2010 | SAFETY REGULATION DIVISION<br><br>**GENERAL**<br>**ADVISORY MEMORANDUM** |
|---|---|---|
| **Title: Annual Aviation Safety Performance Review 2009** | | |

## 1. INTRODUCTION

The purpose of this document is to provide a performance review of aviation safety in 2009.

## 2. REFERENCES

- ICAO Annual Report of the Council 2008
- EASA Annual Safety Review 2008

## 3. DETAIL

The attached document provides a safety performance review of aviation safety in Ireland in 2009.


# Irish Aviation Authority

## Safety Regulation Division

# Annual Safety Performance Review 2009

# Table of Contents

# Introduction

Welcome to the 2009 IAA Annual Safety Performance Review.

The purpose of the Annual Safety Review is to inform all aviation stakeholders how the aviation system in Ireland is performing, highlighting emerging safety trends and to generally raise awareness of safety in the aviation sector.

The annual safety review forms an integral part of the IAA's state safety programme, established in line with the International Civil Aviation Organisation (ICAO) standards introduced to ensure each ICAO state implements an integrated set of regulations and activities aimed at improving safety.

The review is structured into individual sections. The first section summarises world safety trends as reported by ICAO and the current status of the ICAO Accident Incident Data Reporting (ADREP) system. The section is concluded with a listing of the major causes of fatal accidents identified from the analysis of the accident data submitted to ICAO.

Section 2 summarises European safety trends as reported by the European Aviation Safety Agency (EASA). The main areas described are commercial air transport for helicopters and airplanes. Information pertaining to the number of accidents in general aviation and light aircraft is also included.

The third section summarises safety trends in Ireland and provides detailed information on the number of accidents and serious incidents which occurred in the Irish State or involved Irish registered aircraft.

Section 4 details all safety recommendations addressed to the IAA by air accident investigation bodies in all states in 2009. In 2009 there were just three recommendations to the IAA, all from the Air Accident Investigation Unit (AAIU) of the Department of Transport.

# About IAA Safety Regulation Division

The IAA Annual Safety Review is produced by the Safety Regulation Division of the IAA. The Safety Regulation Division carries out safety regulatory functions on behalf of the IAA. The Division is divided into four departments. These are:

## The Aeronautical Services Department (ASD)

ASD is responsible for the licensing and certification of aerodromes, airspace classification, instrument flight procedures and aeronautical charts. It is also responsible for regulating air traffic control service providers.

ASD licenses the three State airports, eleven public licensed aerodromes and 15 private licensed aerodromes. It classifies airspace in accordance with international rules, establishes Temporary Restricted Areas and sets standards for instrument flight procedures. It validates instrument flight procedures produced by ATS providers, validates aeronautical charts in accordance with ICAO Annex 4 and validates positional data in accordance with ICAO annexes and national standards.

ASD also licenses air traffic controllers, aerodrome flight information services officers (AFISOs) and radio officers. It regulates the air navigation services activities in 451,000 sq km of airspace and also regulates ATC Radar and Communications Systems.

## The Airworthiness Department (AWSD)

AWSD is responsible for regulating aircraft certification and maintenance standards, and ramp inspections of foreign aircraft.

The **Airworthiness Department** is responsible for the registration and certification of:

- 510 large commercial transport aircraft
- 456 small aircraft
- 128 helicopters
- 70 approved facilities for training, maintenance, manufacturing and storage

## The Flight Operations Department (FOD)

FOD oversees the operating standards of 19 airlines and oversees the training standards of flight and cabin crew. FOD is responsible for certifying and regulating all Irish air operators

FOD is also responsible for surveillance and oversight of industry flight training and operating standards.

## The Regulatory Performance and Personnel Licensing Department (RPPL)

RPPL is responsible for flight crew licensing and aircraft maintenance licences and also provides permits or approvals for sport aviation, aerial work aircraft, airshows, balloons and parachuting activities.

At present it licenses:

- over 4,000 commercial & airline pilots,
- 2,132 student and private pilots
- 1,382 aircraft maintenance engineers .

Flight crew licences are issued to persons who are suitably qualified by satisfactory completion of a course of flight training and who have been examined and flight tested by approved organisations and persons

RPPL is also responsible for aviation safety analysis and the development of the state safety programme, including the production of the annual safety review.

# Section 1: World Trends in Safety

## ICAO Safety Statistics for 2008

*A specialized agency of the United Nations, ICAO was created in 1944 to promote the safe and orderly development of international civil aviation throughout the world. It sets standards and regulations necessary for aviation safety, security, efficiency and regularity, as well as for aviation environmental protection. The Organization serves as the forum for cooperation in all fields of civil aviation among its 190 Contracting States.. ICAO issue their standards and recommended practices (SARPS) in the form of annexes. Presently there are 18 annexes containing over 10,000 SARPs on all aspects of aviation from airport design, aircraft design, to maintenance and flight crew licensing. For more information on ICAO please see www.icao.int.*

This section contains a synopsis of ICAO's Annual Report for 2008. The full report may be obtained from the ICAO website at http://www.icao.int/icaonet/dcs/9916/9916_en.pdf. The report contains safety statistics for its 190 member states. Only statistics for scheduled air services involving passenger fatalities with a maximum take-off mass of 2250kg are available.

During 2008 there were twelve fatal accidents involving passenger fatalities on scheduled air services worldwide (in aircraft with a maximum certificated take-off mass of more than 2,250kg. The total number of passenger fatalities was 439. In 2007, there were 587 passenger fatalities from eleven accidents. This information is illustrated graphically in Figure 1.1. Note these figures do not include accidents caused by acts of unlawful interference.

**Figure 1.1: Number of fatal aircraft accidents reported to ICAO between 1992 and 2008**


The figure above shows an overall downward trend in fatal accidents since the early 1990's. If we consider the growth in aviation traffic over this period the improvement in

safety is even more evident. From 1990-2008, there has been a significant decline in the fatal accident rate, from around 19 fatal accidents per 10 million departures in 1990 to approximately four in 2008. There were 29 fatal accidents in 1990 compared to 12 in 2008.

Figure 1.2 indicates the number of fatal accidents per 100,000 scheduled aircraft departures. In 2008 there were 0.05 fatal accidents per 100,000 aircraft departures, up from 0.04 in 2007. Nevertheless there has been an overall steady decline in this figure since 1992.

**Figure 1.2: Fatal accidents per 100,000 aircraft landings reported to ICAO between 1992 and 2008**


For non-scheduled operations in 2008, there were 12 accidents involving passenger fatalities for aircraft with a maximum take-off mass of more than 2,250 kgs in 2008, compared with 14 in 2007. These accidents accounted for 80 passenger fatalities compared with 86 in 2007. Comprehensive traffic figures for these operations are not available for the purpose of estimating accident rates.

## Reporting of Accidents and Incidents to ICAO

The ICAO Accident Data Reporting system (ADREP) database is based on the accident and incident data supplied to the ICAO organization by its member states since 1970. It was considered essential that a world accident data system be established and that ICAO be the custodian of the system.

According to ICAO 45% of air traffic accidents are not officially reported to them. As Table 1.1 indicates this is significantly higher than in previous years and poses a major problem for ICAO in determining key safety trends and emerging safety issues.

ICAO view the deployment of State Safety Programme's (SSP) and Safety Management Systems (SMS) as key factors which will foster improved reporting to ICAO and sharing of safety information.

**Table 1.1:** Percentage of accidents/incidents not officially notified to ICAO

| | 2005 | 2006 | 2007 | 2008 |
|---|---|---|---|---|
| Unofficial | 25% | 34% | 27% | 45% |
| Reported | 75% | 66% | 73% | 55% |

Ireland reports all applicable accidents and incidents to ICAO.

## Key Risk Area's

ICAO has released the top ten causes of worldwide accidents. These were identified from accidents which occurred between 1999 and 2008 and are listed in Table 1.2.

The most frequent cause identified is Controlled Flight Into Terrain (CFIT) followed by Loss of Control during flight.

Dividing the causes of accidents into those which occurred between 1999 and 2003 and those which occurred between 2004 and 2008 indicates a change in the main reason for fatal accidents. Pre-2004 CFIT is the most frequently cited cause of a fatal accident followed by loss of control in-flight. After 2003 a fire or smoke post impact is the most frequently cited cause followed by CFIT.

The reduction in CFIT events can be attributed primarily to more widespread equipment of aircraft with terrain awareness and warning systems (TAWS), greater awareness of approach and landing risks, implementation of constant descent angle approaches and minimum safe altitude warning systems.

**Table 1.2:** Leading causes of fatal accidents as identified by the ICAO

| Rank | Total number of accidents | Fatal accidents | |
|---|---|---|---|
| | 1999-2008 | 1999-2003 | 2004-2008 |
| 1 | CFIT | CFIT | fire/smoke post impact |
| 2 | loss of control - inflight | loss of control - inflight | CFIT |
| 3 | fire/smoke post impact | fire/smoke post impact | runway excursion |
| 4 | powerplant failure/malfunction | system/component failure/malfunction | loss of control - inflight |
| 5 | system/component failure/malfunction | powerplant failure/malfunction | system/component failure/malfunction |
| 6 | unknown/undetermined | abnormal runway contact | powerplant failure/malfunction |
| 7 | runway excursion | runway excursion | abnormal runway contact |
| 8 | abnormal runway contact | | |
| 9 | aerodrome infrastructure | | |
| 10 | windsheer/thunderstorm | | |

# Section 2: European Trends in Safety

## EASA Safety Statistics for 2008

*Established by EU regulation the European Aviation Safety Agency (EASA) promotes common standards of safety and environmental protection in a single European civil aviation market. Based in Cologne, the agency already employs some 500 professionals from across Europe.*
*The agency's responsibilities include:*

- *expert advice to the EU for drafting new legislation;*
- *implementing and monitoring safety rules, including standardization in the EU;*
- *type-certification of aircraft and components, as well as the approval of organisations involved in the design, manufacture and maintenance of aeronautical products;*
- *authorization of third-country (non EU) operators;*
- *safety analysis and research.*

This section contains a synopsis of EASA's Annual Safety Review for 2008. The full report may be obtained from the EASA website at www.easa.eu.int/ws_prod/g/g_sir_review.php

EASA have provided the number of accidents, fatal accidents and fatalities by commercial aeroplane and helicopter operations, general aviation, aerial work and light aircraft. This synopsis of EASA's report focuses more on the number of accidents and number of accidents which resulted in a fatality rather than the number of fatalities as the result of an accident as a measure of safety in the industry.

### Commercial Aeroplane Transport

Table 2.1 indicates that the number of accidents involving EASA registered aeroplanes fell from 37 in 2007 to 35 in 2008. The number of accidents which resulted in a fatality held steady at 3. The safety record for European registered aircraft conducting scheduled passenger operations is substantially better than that for the rest of the world. During the past decade the rate of fatal accidents decreased from an average of four to three accidents per 10 million flights.

The number of fatalities onboard was much higher during 2008 then for 2007 or the average for the decade 1997-2008. The sharp rise is due to a McDonnell Douglas MD-82 which crashed in Madrid killing 154 people.

One of the fatal accidents involved an Irish registered aircraft operated by TACA International Airlines, El Salvador. The Airbus A320 aircraft overran the runway while landing in Tegucigalpa-Toncontin Airport, Honduras killing five people.

**Table 2.1:** Total number of accidents and fatal accidents for EASA MS registered aeroplanes

| Period | Total no. of accidents | Fatal accidents | Fatalities on board | Ground fatalities |
|---|---|---|---|---|
| 1997-2006 (annual average) | 32 | 6 | 105 | 1 |
| 2007 | 37 | 3 | 25 | 1 |
| 2008 | 35 | 3 | 160 | 2 |

## Commercial Helicopter Transport

Table 2.2 indicates that the number of accidents involving EASA registered helicopters rose from 7 in 2007 to 8 in 2008. This is the same number as the average for the years 1997 to 2008. The number of fatalities has decreased.

**Table 2.2:** Number of accidents & fatal accidents - EASA MS registered helicopters

| Period | Number of accidents | Fatal accidents | Fatalities on board | Ground fatalities |
|---|---|---|---|---|
| 1997-2006 (average) | 8 | 3 | 12 | 0 |
| 2007 | 7 | 1 | 7 | 0 |
| 2008 | 8 | 2 | 4 | 0 |

## General Aviation

ICAO defines 'general aviation' as all civil aviation operations other than scheduled or non-scheduled air transport operations for remuneration, hire or aerial work. 'Aerial work' is defined as an aircraft operation in which an aircraft is used for specialised services such as agriculture, construction, photography, surveying, observation and patrol, search and rescue, or aerial advertisement.

Using this definition Table 2.3 indicates the number of accidents, fatal accidents and fatalities on board for helicopter or an aeroplane utilised for general aviation purposes. The number of accidents in aerial work operations is similar for aeroplanes and helicopters for the decade 1997 to 2006. In general aviation the small number of accidents involving helicopters in comparison to aeroplanes is a reflection on the relatively small number of helicopters used in this type of operation across Europe.

**Table 2.3:** Number of accidents & fatal accidents - EASA MS registered aircraft

| Operation Type | Period | Total no. of accidents | Fatal accidents | Fatalities on board | Ground fatalities |
|---|---|---|---|---|---|
| Aeroplane Aerial work | 1997-2006 (average) | 6 | 2 | 4 | 0 |
| | 2007 | 4 | 2 | 3 | 0 |
| | 2008 | 7 | 2 | 3 | 1 |
| Aeroplane General Aviation | 1997-2006 (average) | 16 | 5 | 13 | <1 |
| | 2007 | 14 | 4 | 5 | 0 |
| | 2008 | 17 | 7 | 17 | 1 |
| Helicopter Aerial work | 1997-2006 (average) | 6 | 2 | 4 | <1 |
| | 2007 | 8 | 1 | 0 | 1 |
| | 2008 | 5 | 1 | 2 | 0 |
| Helicopter General Aviation | 1997-2006 (average) | 4 | 1 | 2 | 0 |
| | 2007 | 4 | 3 | 10 | 0 |
| | 2008 | 3 | 1 | 3 | 0 |

## Light Aircraft

EASA defines light aircraft as those below 2,250kgs. Table 2.4 contains the number of accidents, fatal accidents and number of fatalities as a result of accidents, grouped by type of light aircraft.

EASA warns it is a very incomplete dataset, partially as not all countries have submitted figures, partially because accidents in this area frequently go unreported and also because countries are using different definitions of light aircraft.

**Table 2.4:** Total number of accidents and fatal accidents for EASA MS registered aircraft

| Operation Type | Period | Total no. of accidents | Fatal accidents | Fatalities on board | Ground fatalities |
|---|---|---|---|---|---|
| Aeroplanes | 1997-2006 | 546 | 72 | 124 | 1 |
| | 2007 | 533 | 61 | 120 | 0 |
| | 2008 | 517 | 53 | 98 | 2 |
| Balloon | 1997-2006 | 21 | 0 | 0 | 0 |
| | 2007 | 14 | 0 | 0 | 0 |
| | 2008 | 25 | 1 | 1 | 0 |
| Glider | 1997-2006 | 175 | 17 | 17 | 0 |
| | 2007 | 187 | 20 | 21 | 1 |
| | 2008 | 178 | 16 | 16 | 0 |
| Gyroplane | 1997-2006 | 5 | 1 | 1 | 0 |
| | 2007 | 6 | 3 | 4 | 0 |
| | 2008 | 12 | 3 | 3 | 0 |
| Helicopter | 1997-2006 | 89 | 7 | 17 | 0 |
| | 2007 | 86 | 11 | 23 | 4 |
| | 2008 | 64 | 7 | 12 | 0 |
| Microlight | 1997-2006 | 177 | 34 | 44 | 0 |
| | 2007 | 213 | 26 | 35 | 0 |
| | 2008 | 261 | 45 | 70 | 0 |
| Motorglider | 1997-2006 | 52 | 9 | 15 | 0 |
| | 2007 | 46 | 9 | 19 | 0 |
| | 2008 | 41 | 10 | 11 | 0 |
| Other | 1997-2006 | 56 | 11 | 13 | 2 |
| | 2007 | 72 | 12 | 16 | 0 |
| | 2008 | 46 | 5 | 5 | 0 |
| Unknown | 1997-2006 | 0 | 0 | 0 | 0 |
| | 2007 | 0 | 0 | 0 | 0 |
| | 2008 | 1 | 0 | 0 | 0 |
| Total | 1997-2006 | 1121 | 151 | 231 | 3 |
| | 2007 | 1157 | 142 | 238 | 5 |
| | 2008 | 1145 | 140 | 216 | 2 |

Although reliable exposure rates for member states are not available, EASA cites the number of accidents and related fatalities as a cause for concern. They also stress the need for more data to make meaningful comparisons.

## Reporting of Accidents and Incidents

At present the EU is establishing a European central repository (ECR) for accident and incident data. Each member state will report all accident and incident data to this central repository. At present EASA does not have a complete dataset for light aircraft. This is partially because three countries failed to submit figures, partially because accidents in this area frequently go unreported and also because of inconsistent definitions of light aircraft between countries. Ireland has reported all applicable data to the ECR.

## Key Risk Areas – Commercial Air Transport

In their Annual Safety Report EASA has described the main causes of fatal and non-fatal accidents for commercial aeroplanes, helicopter operations, general aviation, aerial work and light aircraft.

Table 2.5 shows the accident categories for fatal and non-fatal accidents involving EASA MS registered aircraft engaged in commercial air transport between 1999 and 2008.

**Table 2.5:** Top three categories for fatal and non-fatal accidents involving EASA MS registered aircraft between 1999 and 2008 engaged in commercial air transport

| Aeroplanes | | Helicopters | |
|---|---|---|---|
| Non-Fatal Accidents | Fatal Accidents | Non-Fatal Accidents | Fatal Accidents |
| abnormal runway contact | loss of control | other * | unknown |
| system/component failure/malfunction (non-powerplant) | system/component failure/malfunction (engine/powerplant) | loss of control | CFIT |
| runway excursion | CFIT | system/component failure/malfunction (engine/powerplant) | loss of control and other * |

* Mainly assigned to accidents during take-off and landing phases where collisions with objects on the ground occurred

For aeroplanes the primary cause of non-fatal accidents is abnormal runway contact and for fatal accidents it is loss of control. Runway excursions frequently appear in the three most common causes as it is often a consequential event of other accident categories such as unstabilised approach and abnormal runway contact. As a result a large number of accidents are assigned to this category.

A helicopter has different aerodynamic and handling characteristics from aeroplanes. They often operate close to terrain and take-off or land in areas other than airports, such as helipads, private landing sites and unprepared landing sites. All this is reflected in the accident characteristics. For helicopters the primary cause of non-fatal accidents was cited as 'other'. This is a category assigned to accidents where collisions with objects on the ground occurred during the take-off and landing phases. For fatal accidents the primary category was listed as 'unknown' as not enough data is available in each accident to determine the correct accident category. The European Helicopter Safety Analysis Team, of which Ireland is a member, is working in conjunction with EASA to address this issue.

## Key Risk Areas - General Aviation

Table 2.6 indicates the lead causes of non-fatal and fatal accidents in general aviation and aerial work. In general, the experience for general aviation is similar to that of commercial air transport operations in that abnormal runway contact and loss of control are the leading categories for fatal accidents.

**Table 2.6:** Top three categories for fatal and non-fatal accidents involving EASA MS registered aircraft between 1999 and 2008 engaged in general aviation and aerial work

| General Aviation | | Aerial Work | |
|---|---|---|---|
| Non-Fatal Accidents | Fatal Accidents | Non-Fatal Accidents | Fatal Accidents |
| abnormal runway contact | loss of control | runway excursion | loss of control in flight |
| system/component failure/malfunction (non-powerplant) | CFIT | loss of control in flight | CFIT |
| loss of control | unknown | CFIT | Low altitude operations |

The primary cause of accidents in aerial work is cited as runway excursion and the leading category type resulting in a fatality is loss of control in flight. The causes listed in Table 2.6 reflect that aerial work frequently involves operations close to the ground, which makes recovery from an unforeseen event more difficult.

## Key Risk Areas - Light Aircraft

EASA defines light aircraft as those below 2,250kg's. As Table 2.7 indicates the leading causes of accidents and fatal accidents are abnormal runway contact and loss of control in flight respectively. The high number of accidents classified as 'other' is an indication of the weakness in the taxonomy, that is, the inability to identify a specific primary cause. The high number of 'unknown' may reflect the difficulty of analysing accidents in aircraft not usually equipped with recording equipment. This analysis was based only on data received for the years 2006 and 2007, as the analysis of the occurrences in 2008 is still incomplete in most of the countries.

**Table 2.7:** Top three categories for fatal and non-fatal accidents involving light aircraft between 1999 and 2008

| Non-Fatal Accidents | Fatal Accidents |
|---|---|
| Abnormal runway contact | loss of control |
| loss of control | Low altitude operations |
| other | unknown |

# Section 3: Safety Trends in Ireland

This section contains a synopsis of accident and serious incident data for Ireland from January 2006 to November 2009. The data used is collated by the IAA and the Air Accident Investigation unit (AAIU) of the Department of Transport. The definition of an accident and serious incident is defined by ICAO in Annex 13.

## Commercial Aeroplane Transport

Ireland's domestic fleet, relative to the European and world fleet is quite small. For example, in 2009, Ireland's large transport aircraft operators will have accumulated approximately 650,000 revenue flights, compared to a total for Europe in 2007 of 9.5 million (source: Eurocontrol). Nonetheless Ireland's safety performance for scheduled commercial transport operation is in line with the overall European trends. There have been no fatalities involving Ireland's large transport aircraft operators since the 1960s.

During 2009 there was one accident and seven serious incidents, none of which resulted in fatalities and all occurring outside Irish airspace. This is a decrease from five accidents and three serious incidents during 2008. Of the 28 incidents and accidents recorded over four years in Table 3.1 ten occurred in Italy and five in the United Kingdom.

**Table 3.1:** Total no. of accidents, fatal accidents and serious incidents to Irish registered aircraft over 2,250 kg's

| Year | Accidents | Fatal Accidents | Serious Incidents |
|---|---|---|---|
| 2006 | 1 | 0 | 7 |
| 2007 | 0 | 0 | 4 |
| 2008 | 5 | 1 | 3 |
| 2009 | 1 | 0 | 7 |
| Total | 7 | 1 | 21 |

## Commercial Helicopter Transport

Table 3.2 indicates the number of accidents, fatal accidents and serious incidents involving helicopters over 2,250 kg's from 2006 until November 2009. Over the last four years there have been three accidents, one in 2006 and two in 2008. Two of the helicopters were registered abroad and none of the accidents resulted in a fatality. Two serious incidents were reported, both to helicopters registered abroad.

**Table 3.2:** Total no. of accidents, fatal accidents and serious incidents to helicopters over 2,250 kg's

| Year | Total No. Accidents | Accidents | | Fatal Accidents | | Serious Incidents | |
|---|---|---|---|---|---|---|---|
| | | Irish | Foreign | Irish | Foreign | Irish | Foreign |
| 2006 | 1 | 0 | 1 | 0 | 0 | 0 | 0 |
| 2007 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 2008 | 2 | 1 | 1 | 0 | 0 | 0 | 0 |
| 2009 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 3 | 1 | 2 | 0 | 0 | 0 | 2 |

## General Aviation - Airplanes

The number of fatal accidents, accidents and serious incidents to airplanes over 2,250 kg's involved in general aviation from 2006 until November 2009 is shown in Table 3.3. Since the beginning of 2006 there have been seven accidents involving three Irish and four foreign registered airplanes; of these one accident to a foreign registered aircraft during 2007 resulted in fatalities. The number of serious incidents has increased from two in 2006 to five in 2009 for both Irish and foreign registered aircraft.

**Table 3.3:** Total no. of accidents, fatal accidents and serious incidents to Airplanes over 2,250 kg's

| Year | Total No. Accidents | Accidents | | Fatal Accidents | | Serious Incidents | |
|---|---|---|---|---|---|---|---|
| | | Irish | Foreign | Irish | Foreign | Irish | Foreign |
| 2006 | 1 | 0 | 1 | 0 | 0 | 2 | 2 |
| 2007 | 3 | 0 | 3 | 0 | 1 | 2 | 2 |
| 2008 | 2 | 2 | 0 | 0 | 0 | 4 | 4 |
| 2009 | 1* | 1 | 0 | 0* | 0 | 5 | 5 |
| Total | 7* | 3 | 4 | 0* | 1 | 13 | 13 |

* During Oct. 2009 an accident involving an Irish military airplane which resulted in the loss of two lives occurred. It is not included in the data as the IAA has safety oversight of civil aviation only.

## Light Aircraft

EASA defines light aircraft as those below 2,250kgs. Table 3.4 contains the number of accidents, fatal accidents and serious incidents according to the different types of light aircraft and whether the aircraft was registered in Ireland or abroad.

A total of 24 accidents to light airplanes have occurred over the last four years. Nine of these occurred during 2008, two of which resulted in fatalities. No serious incidents were reported. A further nine accidents occurred during 2009, none of which resulted in a fatality. Two serious incidents were reported.

The number of accidents involving light helicopters from January to November 2009 was three, bringing the total number since 2006 to eleven. One of these accidents resulted in fatalities, the second time an accident involving a helicopter has done so since 2006. One serious incident was reported during 2009. The fleet of light helicopters in Ireland has decreased in the last year and now stands at approximately 110 helicopters. In 2006 there were 140 light helicopters registered in Ireland.

Nine accidents involving microlights, three to aircraft registered in Ireland and six to aircraft registered abroad, have occurred since 2006. Two of these accidents occurred during 2009. No serious incidents have been reported during the years 2006 to 2009. The microflight fleet registered in Ireland now stands at approximately 150 aircraft.

The number of accidents involving gliders were three during the last four years and none of these accidents occurred during 2009. No serious incidents were reported. The number of registered gliders in Ireland is 29.

**Table 3. 4:** Total number of accidents, fatal accidents and serious incidents to light aircraft

| Year | Total Registered | Total No. Accidents | Accidents | | Fatal Accidents | | Serious Incidents | |
|---|---|---|---|---|---|---|---|---|
| | | | Irish | Foreign | Irish | Foreign | Irish | Foreign |
| Airplanes | | | | | | | | |
| 2006 | 339 | 3 | 1 | 2 | 1 | 0 | 0 | 0 |
| 2007 | 423 | 3 | 1 | 2 | 1 | 0 | 1 | 1 |
| 2008 | 447 | 9 | 7 | 2 | 1 | 1 | 0 | 0 |
| 2009 | 392 | 9 | 5 | 4 | 0 | 0 | 1 | 1 |
| Total | | 24 | 14 | 10 | 3 | 1 | 2 | 2 |
| Helicopter | | | | | | | | |
| 2006 | 140 | 2 | 0 | 2 | 0 | 0 | 0 | 1 |
| 2007 | 161 | 6 | 1 | 5 | 1 | 0 | 0 | 0 |
| 2008 | 160 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2009 | 107 | 3 | 3 | 0 | 1 | 0 | 1 | 0 |
| Total | | 11 | 4 | 7 | 2 | 0 | 1 | 1 |
| Microlights | | | | | | | | |
| 2006 | 108 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |
| 2007 | 118 | 4 | 1 | 3 | 0 | 0 | 0 | 0 |
| 2008 | 122 | 2 | 0 | 2 | 0 | 0 | 0 | 0 |
| 2009 | 147 | 2 | 1 | 1 | 0 | 0 | 0 | 0 |
| Total | | 9 | 3 | 6 | 0 | 0 | 0 | 0 |
| Glider | | | | | | | | |
| 2006 | - | 2 | 2 | 0 | 1 | 0 | 0 | 0 |
| 2007 | - | 1 | 0 | 1 | 0 | 0 | 0 | 0 |
| 2008 | - | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2009 | 29 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | | 3 | 2 | 1 | 1 | 0 | 0 | 0 |
| Other | | | | | | | | |
| 2006 | - | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2007 | - | 1 | 1 | 0 | 0 | 0 | 0 | 0 |
| 2008 | - | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2009 | - | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| Total | | 2 | 1 | 0 | 0 | 0 | 0 | 1 |

## Aerodromes and Air Navigation Services

Ireland's safety performance in the area of Aerodromes and air traffic management faces the same challenges as all aerodromes and airspace worldwide. There were a small number of runway incursions and excursions reported and this remains a priority challenge for all aerodromes worldwide.

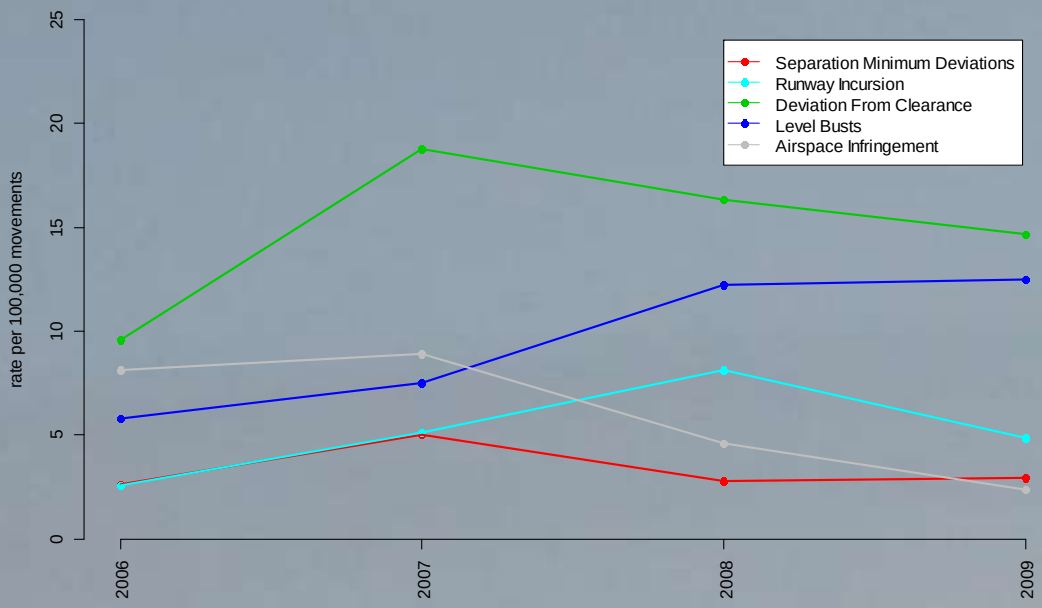
There are 29 licensed aerodromes in Ireland, with 9 aerodromes operating international flights. The accident and serious incident statistics presented are linked to aircraft categories, however, the aerodrome where an event occurs can often be a contributory factor to the accident or serious incident.

Air traffic services in Irish airspace and at the main international airports are provided by the IAA operations division. This division is functionally separate from the Safety Regulation Division.

The five key safety risks in European airspace and at aerodromes are separation minimum deviations, runway incursions, deviation from ATC clearance, level busts and airspace infringement. Progress in these key risk areas continues, with a large amount of research and development at a pan-European level.

Figure 3.1 shows the trends (number of reported occurrences per 100,000 terminal and enroute movements) for each of these key risk areas over the last four years at the three main international airports, namely Dublin, Cork and Shannon.

**Figure 3.1: Number of reported occurrences of each risk type per 100,000 movements from 2006 to 2009**




Note 1: rate for runway incursion is per million terminal movements

## Reporting of Accidents and Incidents

Incidents and accidents which occur within Irish airspace or to aircraft on the Irish register must be reported to the IAA or the AAIU as applicable. The occurrence may be submitted by an individual or a regulated organisation to the IAA. Details of how to report and related forms can be obtained from the IAA website www.iaa.ie.

Within commercial aviation the level of reporting of accidents and incidents is in line with expectations and comparable with other EU states. However within the general aviation community the IAA believe the level of incident reporting can be improved.

The IAA will continue to work with aviation clubs and associations to promote the reporting of accidents and incidents. The IAA has also improved its guidance material explaining occurrence reporting and has sought comment from all stakeholders on how occurrence reporting in Ireland can be improved.

## Key Risk Areas

The key risks areas identified at a European level also apply to Ireland. This is not surprising as we now share common regulatory requirements and indeed Irish airlines operate the vast majority of their flights within European airspace and to European airports.

Accidents always introduce new challenges for the European aviation industry.

On 31 May 2009, Air France A330-203 aircraft F-GXCP on flight AF447 took off from Rio de Janeiro Galeão airport bound for Paris Charles de Gaulle. The aircraft suffered a fatal accident with the loss of 228 lives. The second interim investigation report published by the Bureau d'Enquêtes et d'Analyses (BEA) in December 2009[1] states that, at this stage, in the absence of any data from the flight recorders, the main parts of the airplane and any witness testimony on the flight, the precise circumstances of the accident, and therefore its causes, have still not been determined.

The lack of information, particularly from flight data recorders, has severely hampered the ability of the BEA to determine the root causes of the accident and has lead to a number of initial safety recommendations. For example the BEA recommend that ICAO and EASA study the possibility of making it mandatory for airplanes performing public transport flights to regularly transmit basic flight parameters (for example position, altitude, speed, heading). EASA, on behalf of all European states, shall now analyse the feasibility of this new challenge and may subsequently introduce new aircraft certification or operation requirements to ensure, at the least, another aircraft cannot be lost without flight data being recorded.

For general aviation, it is somewhat more difficult to benchmark Ireland's performance against other EU member states, however, there are two issues of particular concern;

a) A high proportion of all GA accidents in Ireland involve foreign registered aircraft. Although these are foreign registered aircraft, the accidents and serious incidents primarily involve people resident in Ireland. It will be a challenge for SRD to identify the reasons for such a large proportion of foreign registered accidents and to develop an action plan that will reduce accidents and incidents in general aviation.

b) There is a lack of occurrence reporting in the GA community and, anecdotally, the GA community are unwilling to report occurrences to the IAA. Without this vital information it is impossible to pro-actively identify GA hazards and to take action prior to them becoming a serious incident or accident.

[1] See BEA website at http://www.bea.aero/docspa/2009/f-cp090601e2.en/pdf/f-cp090601e2.en.pdf

# Section 4: Safety Recommendations

Each year the IAA may receive safety recommendations from accident investigation authorities of any State where an Irish registered aircraft, approved organisation or Irish airspace has been a factor in an accident, serious incident or incident. In Ireland, the Air Accident Investigation Unit (AAIU) are the responsible body for the investigation of accidents, serious incidents and incidents and regularly issue reports and make safety recommendations based on their investigation findings.

In 2009, the IAA received a total of four safety recommendations from the AAIU. The IAA did not receive any safety recommendations from any other State in 2009.

*SR 9 of 2009*:

Serious Incident: McDonnell Douglas MD-83, G-FLTM, Santry Cross near Dublin Airport, 16 August 2007: Report No 2009-010

AAIU Recommendation
The IAA examine the manning levels of the Tower at night, and during periods of routine maintenance.

IAA Action:
The IAA accepts the AAIU recommendation. This safety recommendation was primarily directed at the operations division of the IAA. A number of changes have been implemented to the area control centre (ACC) resourcing requirements and contingency arrangements.

The IAA safety regulation division shall continue to perform regulatory oversight and ensure the effective implementation of the safety management system in IAA operations division.

*SR 10 of 2009*

Serious Incident: McDonnell Douglas MD-83, G-FLTM, Santry Cross near Dublin Airport, 16 August 2007: Report No 2009-010

AAIU Recommendation
The IAA, when considering the type and positioning of warning lights specified for an obstacle in the vicinity of an aerodrome, should take account of the potential for confusion by pilots of such lights with visual navigation aids at the aerodrome.

IAA Action
The IAA accepts the AAIU recommendation and in 2009 instigated a thorough review of its published Public Aerodrome Licensing Manual ALM 002.

A revised ALM 002 has now been completed and is published on the IAA website at http://www.iaa.ie/index.jsp?p=146&n=220. The manual contains detailed information on the appropriate lighting of all obstacles and is in accordance with the latest ICAO standards and recommended practices.

*SR 13 of 2009*

Accident: Agusta Westland A109E, EI-SBM, Lagore, Dunshaughlin, Co. Meath, 20 March 2008: Report No. 2009-018

AAIU Recommendation
The Irish Aviation Authority issue a Notice to maintenance organisations with regard to the control of tools and materials used during maintenance, in accordance with the requirements of JAR 145.

IAA Action
The regulatory requirements for the control of tools and materials used during aircraft maintenance are detailed in EU regulation 2042/2003, Part 145 and its related guidance material. The IAA no longer has regulatory competency to issue Notices in this area. The competency to issue regulatory requirements now lies with EASA.

The IAAs remit is to perform regulatory oversight of all Part 145 organisations located in Ireland. To this end the IAA have ensured the requirements for the control of tools and materials are effectively implemented by all Part 145 organisations through the oversight audit programme implemented by the IAA.

No further action is proposed by the IAA at this time.

*SR 16 of 2009*

Accident: Piper - PA 28-181 (ARCHER II), D-EAOB, Athboy Airfield (EIMH), Meath,11 March 2009: Report No 2009-026

AAIU Recommendation
The IAA should consider issuing guidance material to pilots making reference, where appropriate, to safety and performance related information that is currently available from a variety of reputable sources such as the UK CAA and FAA websites. Such information in this instance could include: UK CAA Safety Sense Leaflet No. 7 - Aircraft Performance, UK CAA AIC 127/2006 - Take-off, Climb and Landing Performance of Light Aeroplanes, FAA Airplane Flying Handbook and FAA Pilots Handbook of Aeronautical Knowledge.

IAA Action
The IAA accepts the AAIU recommendation and acknowledges a lack of guidance material, particularly for general aviation in Ireland. The IAA State Safety Programme recognises safety promotion as a key issue and the IAA shall implement a number of improvements in 2010 including a dedicated safety guidance material section on the IAA website and additional advisory memoranda like GAM 02/09 entitled 'General Aviation Winter Flying' available on the IAA website at http://www.iaa.ie/index.jsp?p=470&n=474.

# Section 5: Future direction of Safety Performance

Aviation safety performance is currently going through a further development phase.

In the early years of commercial aviation safety improvements were identified from investigations of serious accidents. The lessons learned were subsequently implemented in the certification requirements and standard practices implemented by the industry. This incremental adoption of new safety requirements has lead to improved safety with the rate of fatal accidents falling from 20 fatal hull losses per 10 million flights in the late 1980s down to a worldwide rate of approximately five in 2007 (3.9 per ten million flights in Europe).

The traditional opportunity for identifying further safety improvements, the investigation of serious accidents, is thankfully being reduced. The current challenge for the aviation industry is to identify where the greatest risks now lie and mitigate these risks before any fatal accident occurs.

This has been recognised globally and has led to the introduction of new requirements of various ICAO annexes. These new requirements are specifically aimed at the aviation authorities to implement a risked based assessment system over and above the existing systems of regulation and safety oversight that have brought us the improvements in aviation safety to date.

ICAO Annexes 1, 6, 8, 11, 13 and 14 now include the requirement for States to establish a State Safety Programme (SSP), in order to achieve an acceptable level of safety in civil aviation. An SSP is a management system for the management of safety by the State.

An SSP is defined as an integrated set of regulations and activities aimed at improving safety. It includes specific safety activities that must be performed by the State, and regulations and directives promulgated by the State to support fulfilment of its responsibilities concerning safe and efficient delivery of aviation activities in the State.

The recommended structure and elements of an SSP are outlined in ICAO Document No. 9859 titled 'Safety Management Manual' and it is readily available for all to see on ICAO website www.icao.int/anb/safetymanagement/Documents.html .

The core objective of SSP is to get ahead of safety risks through the development of safety management capabilities within the state's authorities and its service providers, rather than waiting for accidents, incidents or events of non-compliance. The key element of a successful system is measurement –you cannot manage what cannot be measured. Measurement, in turn, requires data. It follows that safety data collection, analysis and exchange is at the heart of the interactive nature of the SSP.

There are four key components in the IAA's SPP:

1) *Safety Policy and Objectives*

*The function of the safety policy and objectives component is to outline the regulatory structure, including who is responsible for each element and the responsibilities of each approved organisation and individual licensed person.*

*2) Safety Risk Management*

*A description of how the IAA will identify hazards and assess the safety risks of the consequences of hazards in Ireland's aviation operations. This includes the establishment of controls (rules and/or regulations) which govern how the IAA will manage safety, the rules and/or regulations which govern how the service provider's SMS operates, as well as agreement on the safety performance of the service provider's SMS.*

*3) Safety Assurance*

*Safety Assurance is how the IAA will ensure that safety management within the Irish aviation system (particularly in the operation of SMS in commercial organisations) follows the established regulatory controls (requirements, specific operating regulations and implementation policies). In effect, the IAAs safety assurance processes are used to obtain confidence in service providers' safety management capability.*

*4) Safety Promotion*

*The aim of safety promotion is to improve the overall knowledge and understanding of the requirements, risks, guidance and other data related to the various elements of the aviation system through increased effective communication.*

These four components constitute the basic building blocks of Ireland's State Safety Programme. Each component is subdivided into elements, which detail the specific sub-processes, specific activities or specific tools that the IAA safety regulation division utilises in order to conduct the management of safety in a manner that combines prescriptive and performance based approaches and supports the implementation of SMS by service providers.

Most elements of the SSP are already implemented in Europe and Ireland. For example all airlines in Europe must have a safety management system for the collection and analysis of all safety risks, Ireland has an independent air accident investigation unit (AAIU) and has implemented the necessary regulation in the state to implement the standards and recommended practices of ICAO.

Over the next three years the EU (EASA) and the IAA shall implement further aspects of the recommended SSP. This document is one such improvement, to publish an annual safety review for Ireland, and will be expanded in future years to include additional safety information.

# Section 6: Conclusion

This safety review gives a limited but informative oversight into the performance of the Irish aviation safety system. Commercial air transport aircraft are performing similar to other EU member states and ahead of the global performance and this review does not identify any adverse safety trends. This view is supported by EASA audits, IAA audits and the Safety Assessment of Foreign Aircraft (SAFA) data collated on Irish operators.

For the GA sector it is difficult to state how well we are performing compared to other EU member states as the necessary data is not readily available across Europe. EU initiatives are underway to improve this situation and it is anticipated that future editions of this review will be able to capture our performance against that of other EU countries.

2009 has been a very difficult year for commercial aviation worldwide. IATA[2] estimates a total net loss worldwide of €11billion for 2009. European airlines are estimated to have lost $3.5 billion and numerous airlines have ceased trading during this current downturn. The forecast for 2010 is for further losses.

It is always a concern among aviation users that aviation safety may suffer during economically difficult times, however, our recent experience does not support this. In 2001 – 2003 airlines worldwide suffered extensive losses, however, the safety statistics showed a continuing safety improvement. Past experience does not guarantee future performance and the IAA will remain committed to ensure the excellent safety culture embedded in the Irish aviation industry continues to grow and adopt best practice in aviation safety.

[2] IATA Fact Sheet: Industry Statistics December 2009 available on www.iata.org

# Glossary of Terms

| | |
|---|---|
| A | |
| AAIU | Air Accident Investigation Unit |
| ADREP | Accident Data Reporting system |
| AFISO | aerodrome flight information services officer |
| ASD | Aeronautical Services Department |
| ATC | Air Traffic Control |
| AWSD | Airworthiness Department |
| B | |
| BEA | Bureau d'Enquêtes et d'Analyses |
| C | |
| CFIT | controlled flight into terrain |
| E | |
| EASA | European Aviation Safety Agency |
| ECR | European Central Repository |
| F | |
| FOD | Flight Operations Department |
| G | |
| GA | General Aviation |
| I | |
| IAA | Irish Aviation Authority |
| IATA | International Air Transport Association |
| ICAO | International Civil Aviation Organisation |
| L | |
| LOC | Loss of control |
| R | |
| RPPL | Regulatory Performance and Personnel Licensing |
| S | |
| SAFA | Safety Assessment of Foreign Aircraft |
| SMS | Safety Management system |
| SSP | State safety programme |
| T | |
| TAWS | Terrain Awareness and Warning System |

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