

# Flight Safety Bulletin



## Flight Safety Information & Statistics Division of CAO

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### ANNUAL INFORMATION ON FLIGHT SAFETY IN POLISH CIVIL AVIATION FOR THE 2007

#### INTRODUCTION

This Annual Flight Safety Information is compiled by CAO to inform the public of the general safety level in the field of civil aviation as required by Article 135b para. 5 of the Polish Aviation Act of 03 July 2002.

The number of accidents and incidents in this bulletin is based on data derived from data bases maintained by the Polish CAO.

Polish CAO continues to maintain and improve aviation safety and treats it as priority issue.

The total number of onboard fatal accidents within the last decade to fixed wing aircraft in public transportation (scheduled) is still equal to zero. So as presented Annual Flight Safety Information shows, **flying is the safest form of transportation and it has been the case for the last several years.**

The last fatal accident in the Polish scheduled commercial aviation took place in 1987, exactly twenty one years ago.

**The above means that the fatal accident rate involving passenger fatalities in scheduled commercial aviation operations per 100 000 hours flown is still equal to zero.**

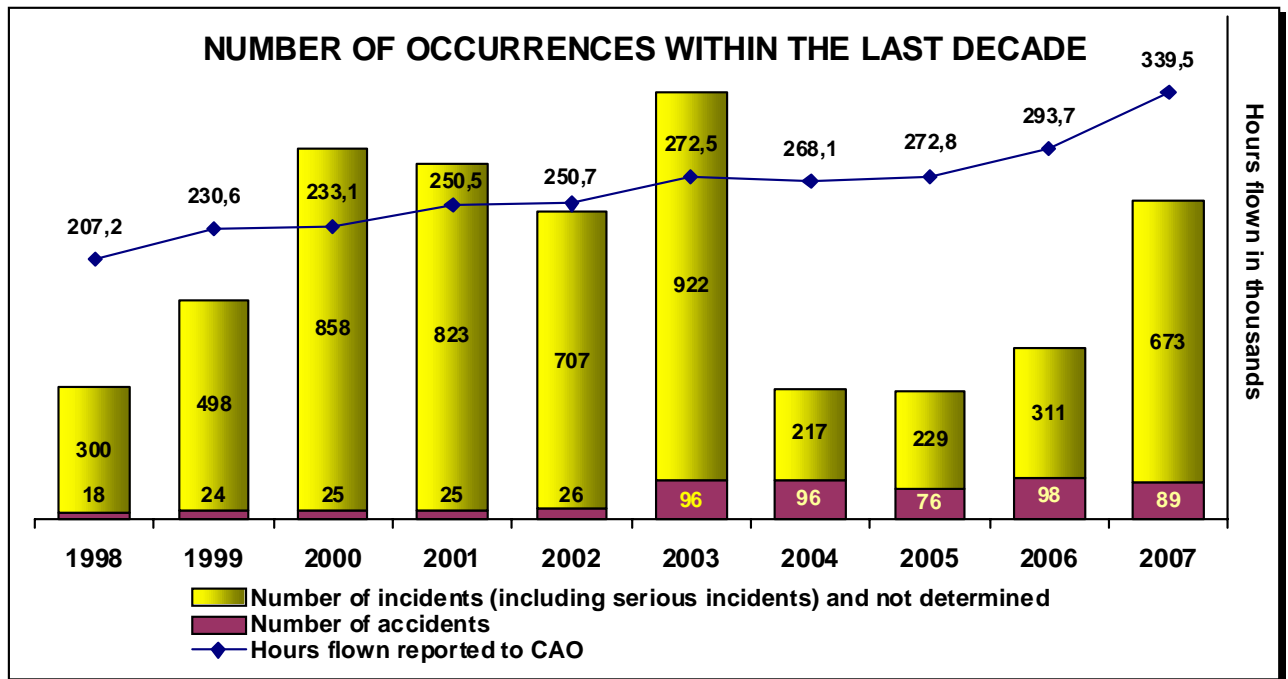
However, there is no room for complacency and the CAO continues to strive for further improvements of flight safety especially in General Aviation business.

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## HISTORICAL DATA

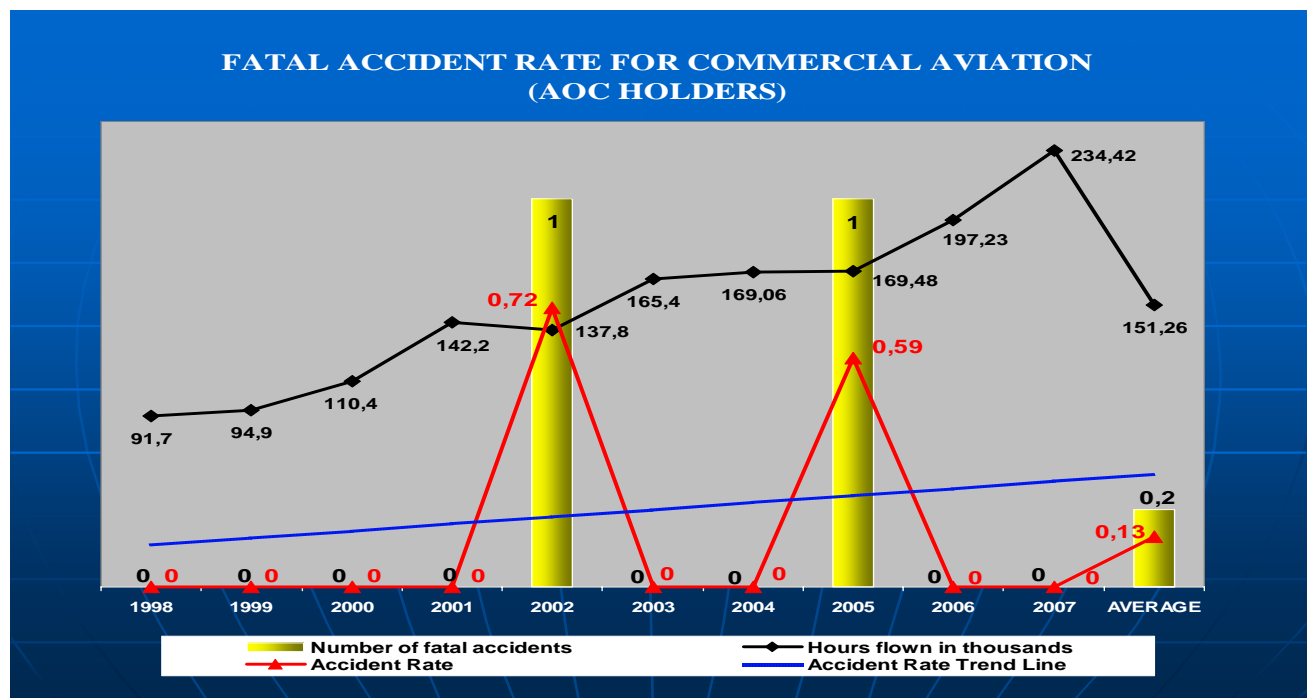
The data in Figure 1 show the difference between the number of occurrences before 2004 and later. Since that year CAO started to register not only the total number of events (incidents) but also their full description. The sharp increase in the number of accidents between 2002 and 2003 is **inexplicable** (a new Aviation Act was passed). Moreover since 2004 we observe the stable increase in the number of incidents and at the same time a slight decrease in the number of accidents.

Figure 1



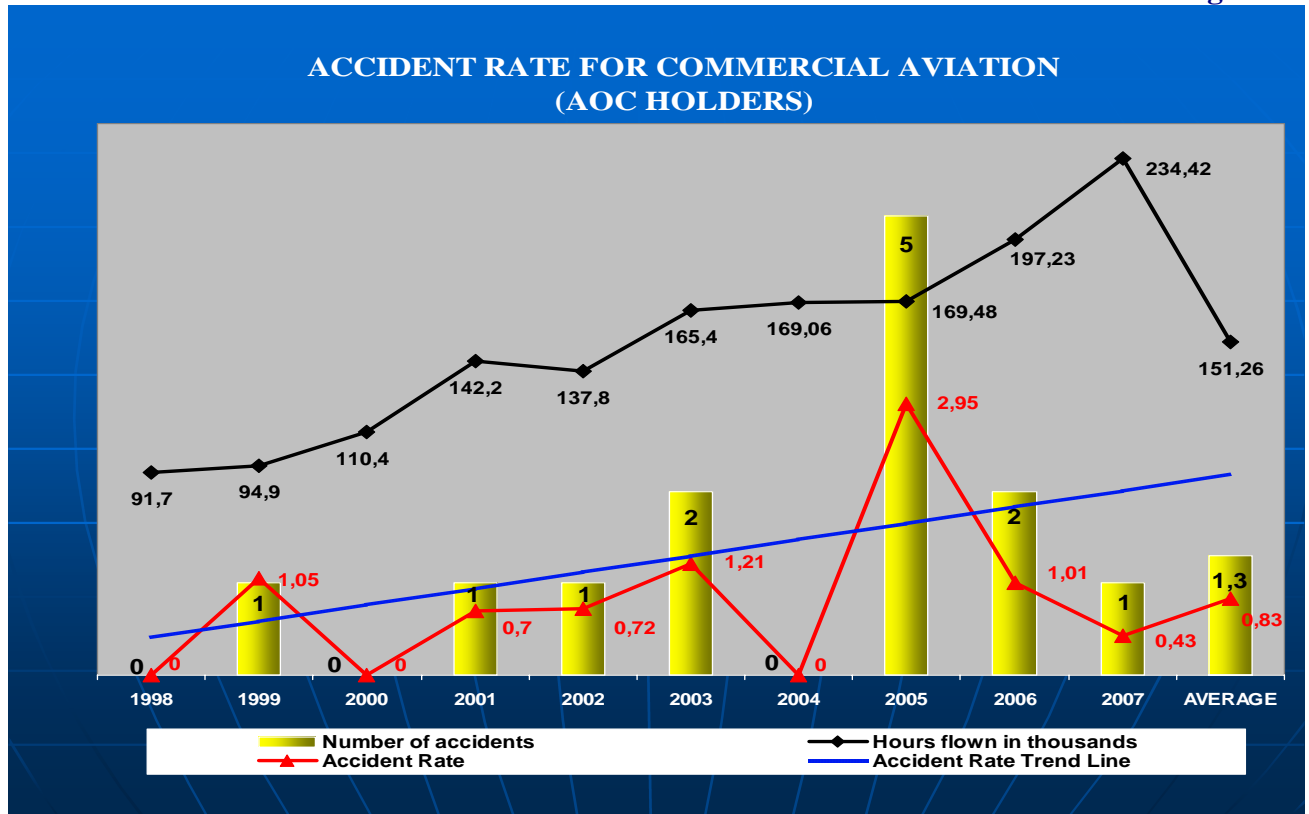
While the total number of accidents has slightly decreased since 2003, the safety of civil aviation in terms of the number of **fatal** accidents (for AOC holders) has remained at the low level for the last ten years (Figure 2). The average **Fatal Accident Rate** for the last decade equals **0,13**.

Figure 2



2007 saw only one accident (synopsis 1 on P6) that happened to helicopter (AOC holder) and the accident rate in this type of aviation for the last ten years depicts the below figure. So the average Accident Rate for the last decade equals **0,83**.

**Figure 3**



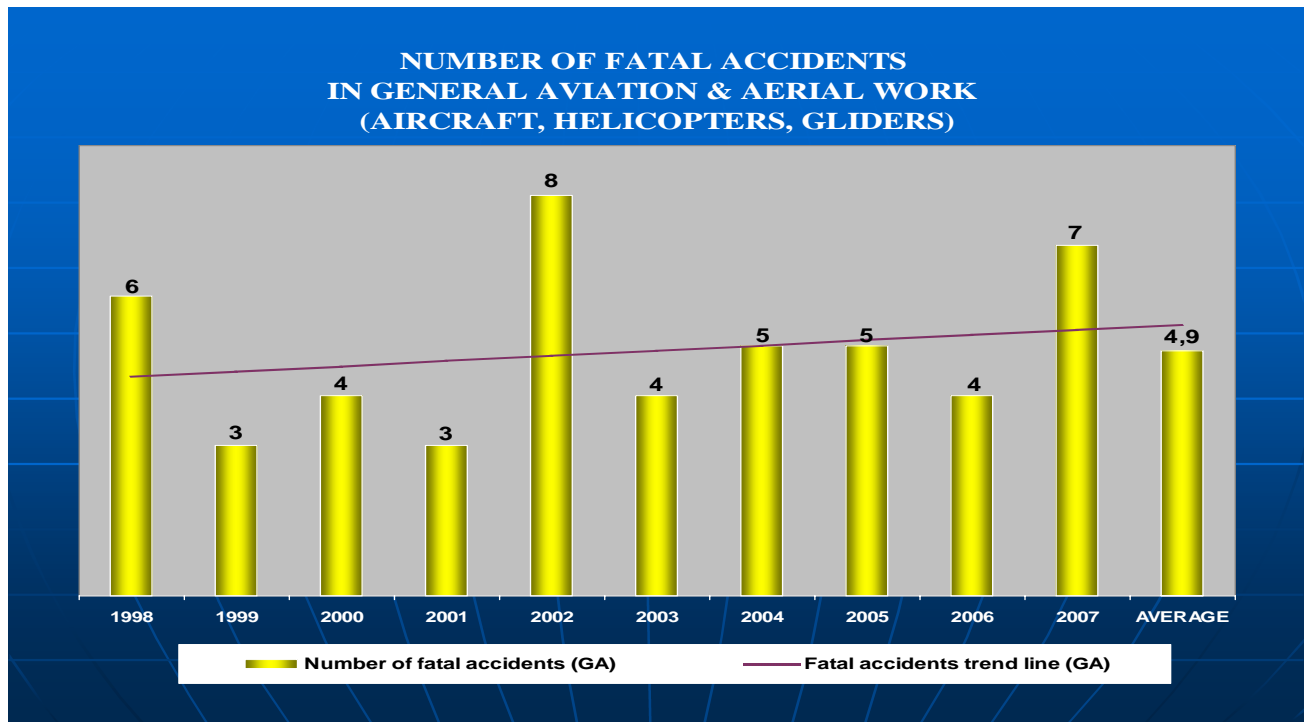
The below chart shows the numbers of accidents that happened to registered (obligatory) aircraft, helicopters and gliders (GA). There were **78** casualties in the aforementioned accidents.

**NUMBER OF FATAL ACCIDENTS  
IN GENERAL AVIATION AND AERIAL WORK  
(REGISTERED AIRCRAFT, HELICOPTERS, GLIDERS)**

**Table 1**

|                           | 1998        | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | AVERAGE |
|---------------------------|-------------|------|------|------|------|------|------|------|------|------|---------|
| NUMBER OF FATAL ACCIDENTS | AIRCRAFT    |      |      |      |      |      |      |      |      |      |         |
|                           | 4           | 2    | 4    | 2    | 5    | 2    | 3    | 4    | 3    | 4    | 3,3     |
|                           | HELICOPTERS |      |      |      |      |      |      |      |      |      |         |
|                           | 1           | 0    | 0    | 1    | 0    | 1    | 1    | 0    | 0    | 0    | 0,4     |
|                           | GLIDERS     |      |      |      |      |      |      |      |      |      |         |
|                           | 1           | 0    | 0    | 0    | 3    | 1    | 1    | 1    | 1    | 3    | 1,2     |
|                           | TOTAL       |      |      |      |      |      |      |      |      |      |         |
| 6                         | 3           | 4    | 3    | 8    | 4    | 5    | 5    | 4    | 7    | 4,9  |         |

Figure 4



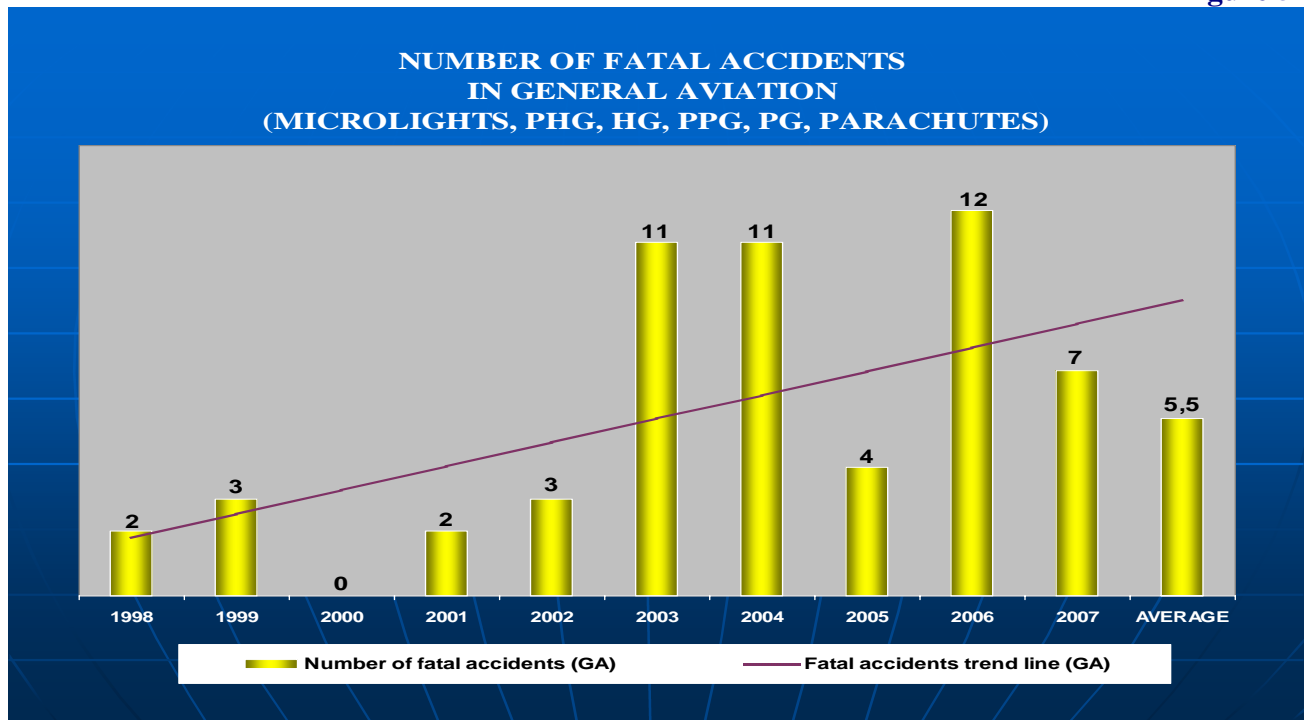
**NUMBER OF FATAL ACCIDENTS IN GENERAL AVIATION (Microlights, PPG, PG, PHG, HG, Parachutes)**

Table 2

|                                  | 1998              | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | AVERAGE |
|----------------------------------|-------------------|------|------|------|------|------|------|------|------|------|---------|
| <b>NUMBER OF FATAL ACCIDENTS</b> | <b>Microlight</b> |      |      |      |      |      |      |      |      |      |         |
|                                  | 0                 | 0    | 0    | 0    | 0    | 4    | 3    | 1    | 5    | 0    | 1,3     |
|                                  | <b>PPG</b>        |      |      |      |      |      |      |      |      |      |         |
|                                  | 0                 | 0    | 0    | 0    | 0    | 2    | 0    | 0    | 0    | 0    | 0,2     |
|                                  | <b>PG</b>         |      |      |      |      |      |      |      |      |      |         |
|                                  | 0                 | 0    | 0    | 0    | 0    | 0    | 3    | 1    | 2    | 1    | 0,7     |
|                                  | <b>PHG</b>        |      |      |      |      |      |      |      |      |      |         |
|                                  | 0                 | 0    | 0    | 0    | 0    | 4    | 4    | 1    | 2    | 4    | 1,5     |
|                                  | <b>HG</b>         |      |      |      |      |      |      |      |      |      |         |
|                                  | 0                 | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 1    | 0    | 0,1     |
|                                  | <b>PARACHUTES</b> |      |      |      |      |      |      |      |      |      |         |
|                                  | 2                 | 3    | 0    | 2    | 3    | 1    | 1    | 1    | 2    | 2    | 1,7     |
| <b>TOTAL</b>                     |                   |      |      |      |      |      |      |      |      |      |         |
| 2                                | 3                 | 0    | 2    | 3    | 11   | 11   | 4    | 12   | 7    | 5,5  |         |

The last chart shows that there were no occurrences reported up to 2003 concerning the above except for parachutes (lack of figures). However, the total number of fatalities was 66.

Figure 5



Establishing the fatal accident rate for General Aviation (mainly in recreational aviation activities) using the hours flown is very difficult as it is not possible to separate out the hours flown on non-public transport activities. Additionally, and this is even a more important factor, the complete data concerning hours flown were unavailable. In other words, the final outcome would be burdened with too high fault. **That is why only fatal figures are published in this operation type.**

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## GENERAL FLIGHT SAFETY INDICATORS FOR 2007

During the 2007, **762** aviation occurrences were registered in the Polish airspace, including **89** accidents, **15** serious incidents-of which five of aircraft with MTOW of greater than 5700 kg (commercial aviation – synopses 1 to 5 on P6 & P7), **483** incidents and **175** so called „Not Determined” - other occurrences, reporting of which is mandatory in accordance with Directive 2003/42/EC of the European Parliament and of the Council of 13 June 2003 on occurrence reporting in civil aviation.

Of **14** fatal accidents in which **22** persons died, **7** accidents (see Table 1 on P3) with **9** fatalities occurred on planes below 5700kg MTOW (synopses 3 to 6 on P7 & P8), **2** persons died on a glider with a motor (synopsis 1 on P7) and **2** on gliders (synopsis 2 on P7 & 7 on P8).

Additionally in the rest **7** fatal accidents **6** people died on powered hang-gliders (PHG), **2** on parachutes and **one** on a paraglider (PG) – see Table 2 on P4.

Moreover in total **34** accidents, **40** persons sustained serious injuries and additionally **17** who sustained slight injuries.

## SYNOPSIS OF SOME OCCURRENCES

### COMMERCIAL AVIATION

#### Rough description of an accident – a helicopter.

**1.** A helicopter Mi-2 on 6 December during a ferry flight to Suwałki collided with terrain nearby the airfield. Parts of it were found in a 100 meter radius. Pilot managed to leave it and he was taken to hospital. Just before landing the pilot declared some navigating problems and used landing lights incorrectly. The weather conditions were very bad at that time (fog and drizzle).

The accident is under investigation.

#### Descriptions of serious incidents – aircraft.

**1.** On 31 January the crew of the aircraft (Learjet 60) was carrying out an IFR, commercial flight from EPWA. Then after lining up RWY 29 they commenced a take-off run for UUWW without any ATC clearance. The beginning of their manoeuvre was not being observed by TWR. At the same time another crew of the aircraft (Embraer 170) was at landing roll stage about 300 meters from the runways crossing.

The investigation established that the incident was caused by operational errors. The take-off operation of the aircraft was done without any ATC clearance.

**2.** On 01 March, during take-off, the crew of the aircraft (Piaggio 180) reported the lack of possibility to maintain straight direction (drifting to the left-side). PIC decided to reject take-off procedure but despite that the aircraft run into grass field and stopped about 45 meters from the RWY without any possibility to maneuver – failure of a nose gear. Flight operations were suspended for about 45 minutes.

Serious incident under investigation.

**3.** On 20 March the crew of the aircraft (ATR 72-200) was carrying out an IFR, scheduled commercial domestic flight from EPWA to EPGD. Soon after the take-off, the crew noted some abnormal movements of the aircraft also observed by the flight attendants (vibrations and noises). After the uneventful landing procedure at EPGD, the maintenance team during the inspection discovered the lack of a metal cover between a hull and a wing. The aircraft made a return flight after fixing the missing part and overall inspection.

Serious incident is under investigation.

4. On 10 October the crew of the aircraft (Boeing 737-400) during taxiing to RWY for take-off did not execute an ATC clearance to stop before RWY 11 and they crossed RWY. As a consequence another crew of the approaching aircraft (Embraer 145) was instructed to make a go-around procedure.

Serious incident under investigation.

5. On 15 November the crew of the aircraft (Embraer 170) during approach received an ATIS report “Wind 030/10; breaking conditions good (...)”. A while before landing ATC TWR confirmed: “Clearance for landing; breaking conditions good”. Then after touch-down it was found that breaking action was inefficient. The crew disconnected “AUTOBRAKE” mode and started manual braking with full reverse power. The aircraft stopped about 50 meters before the end of runway. After that action reverses jammed in open position. Several minutes later the right engine’s reverse was closed and the aircraft left the runway. Left engine’s reverse was not closed before switching off the engines. Technical services found later some faults of the engine caused by this event. The crew declared that if they had known the real breaking conditions (snow on the runway), they would not have made a landing procedure in these weather conditions.

The investigation of the event proved that changeable weather conditions were a real cause of the serious incident.

## GENERAL AVIATION

### (fatal accidents that happened to obligatory registered aircraft)

#### **Description of a fatal accident - a glider with a motor.**

1. On 19 May 2007 the crew (a student and an instructor) of a glider with a motor (PZL - SZD-45A OGAR) was carrying out a training circuit flight. During the take-off run in a West direction, after about 600 meters, the glider left the ground with its aerodynamic brakes extended by self-acting and at the same time it lost its direction about 10 degrees to the left. Then the glider increased the angle of attack and as a consequence entered into a spin. The crew did not recover and the glider crashed into a forested area. The crew was killed and the glider was destroyed.

On investigation it was found that the accident was caused by operational errors.

Pre-flight preparation of the instructor was incorrect and the motor glider was not appropriately loaded causing shifting the centre of gravity forwards. In result, it left the ground too late.

#### **Description of a fatal accident - a glider.**

2. On 14 July the pilot of a glider (SZD-30 Pirat) during the take-off with a towing plane whilst at about 80 meters AGL entered into a zone of thermal current. This caused a strong vibration up and down of a glider and a loss of the towing plane from the pilot’s eyesight. Then the pilot released the glider and put the glider into a 180 degree left turn in order to land with the tail wind at departure airfield. This caused the loss of speed in that turn. Additionally, extended aerodynamic brakes to improve landing approach were the cause of entering into a spin. The glider crashed into the ground about 900 m from departure point. The pilot died in the hospital.

The investigation established that the accident was caused by operational errors.

#### **Rough description of a fatal accident – a plane.**

3. On 22 July the pilot of a plane (Piper 32) with 4 passengers on board, during a recreational flight, just before landing changed the task and decided to continue his flight over Solina Lake. Soon after that the accident occurred. The plane crashed into a forested area and caught fire. The pilot and passengers died.

The accident is under investigation.

**Rough description of a fatal accident – a plane.**

4. On 3 August the pilot of a plane (M-18 Dromader) during a fire fighting flight hit trees with its wing. The plane crashed into the ground and exploded. The pilot was killed. The accident is under investigation.

**Rough description of a fatal accident – two planes.**

5. On 1 September the crews of two sports planes (Zlin 526F & Zlin 526 AFS) during "Airshow ... 2007", while performing air show crashed into each other. The planes were completely destroyed and the pilots died. The accident is under investigation.

**Rough description of a fatal accident – a plane.**

6. On 15 September the pilot of a plane (Cessna 150) while completing a task during approach from training flight declared a problem with the engine, and then he reported a shut down of the engine. So the pilot decided to land on the Vistula river. Reportedly after landing he abandoned the cabin and tried to swim to the coast of the river - unsuccessfully. Pilot was found dead after 7 days of searching. The accident is under investigation.

**Rough description of a fatal accident – a glider.**

7. On 18 October the crew (student and instructor) of a glider (PZL-SZD 35 Bekas) on after the take-off from a mountain airfield made the right turn and were executing a parallel flight to the hill at about 15 meters of altitude. During that flight it hit the top of trees with its left wing which resulted in a crash. The instructor died and the student got serious injuries. The accident is under investigation.

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The following three figures will show the comparison of the last five years in relation to the above indicators. The constant increase in the number of reported occurrences does not necessarily mean that the number of casualties or material losses represent the same trend. The data which are presented in the tables below (see figure 6 and 7) prove that the more occurrences are reported and the circumstances of reasons investigated, the less loss we bear.

*Five years only because this period of time is well documented.*

Figure 6

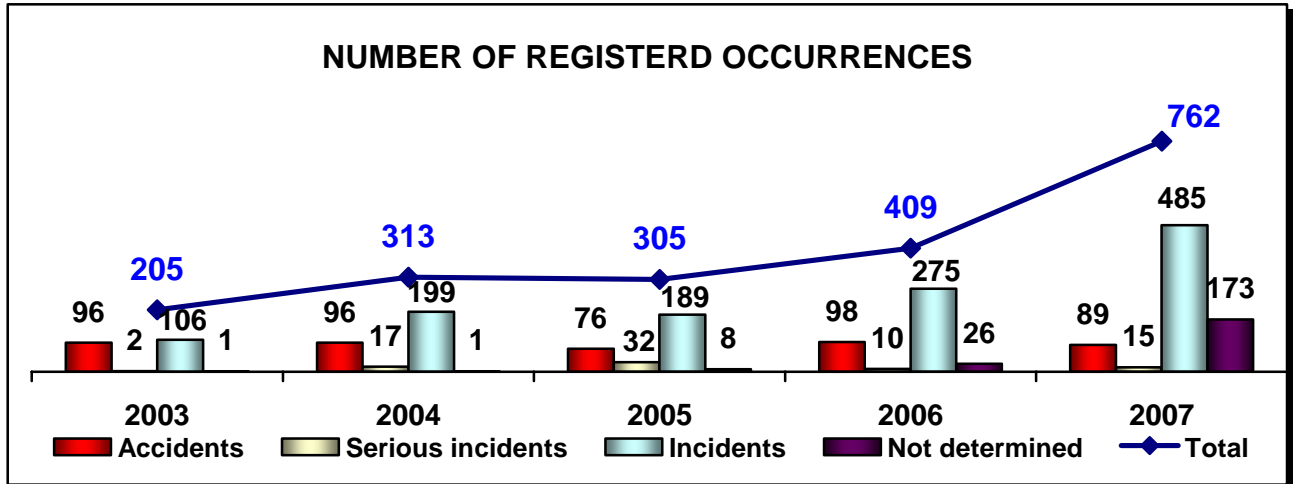


Figure 7

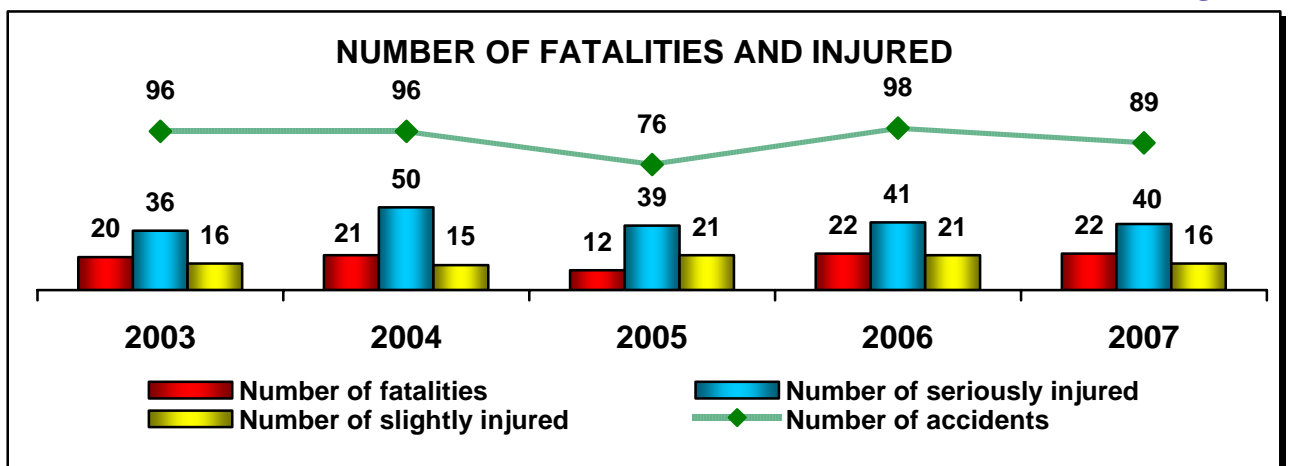
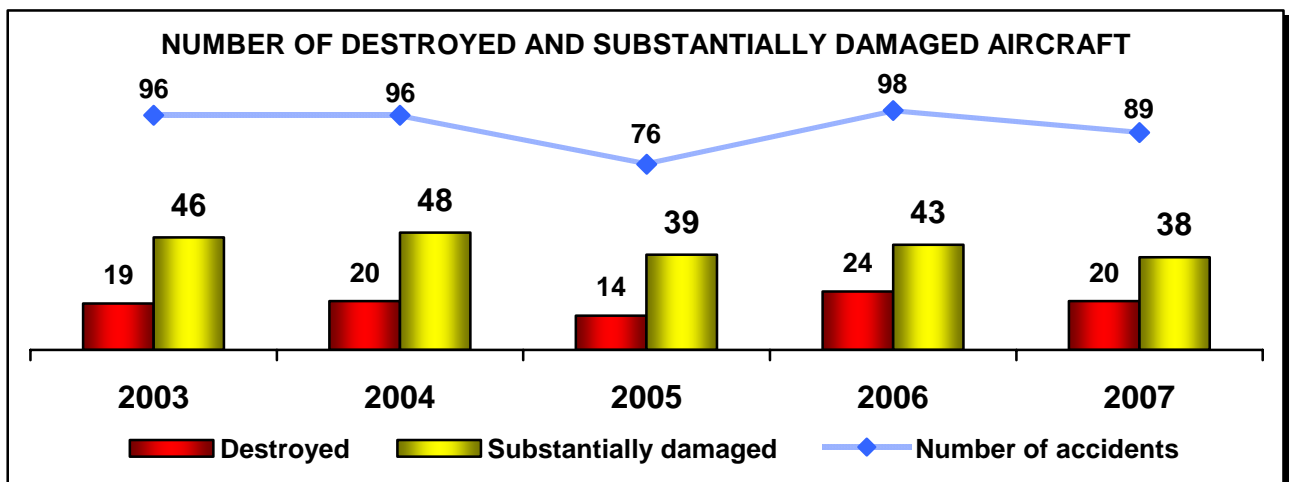
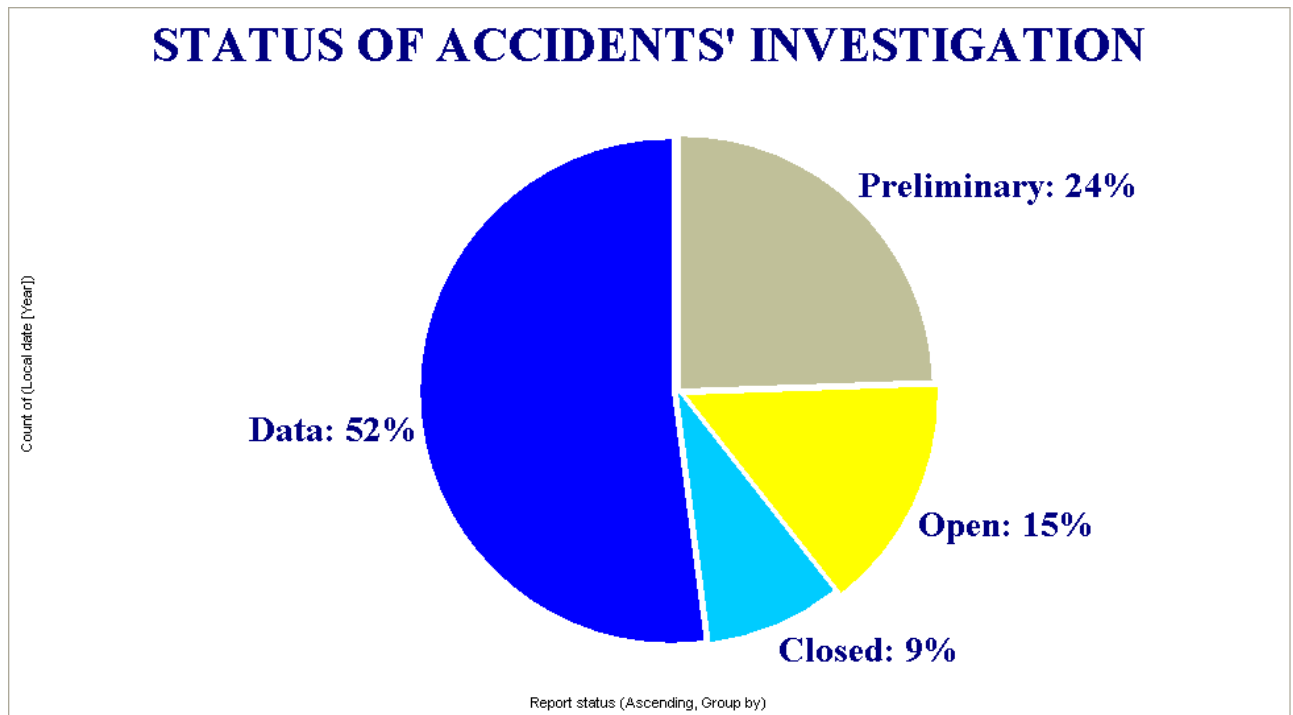


Figure 8



## ACCIDENT'S PREVENTION

Figure 9



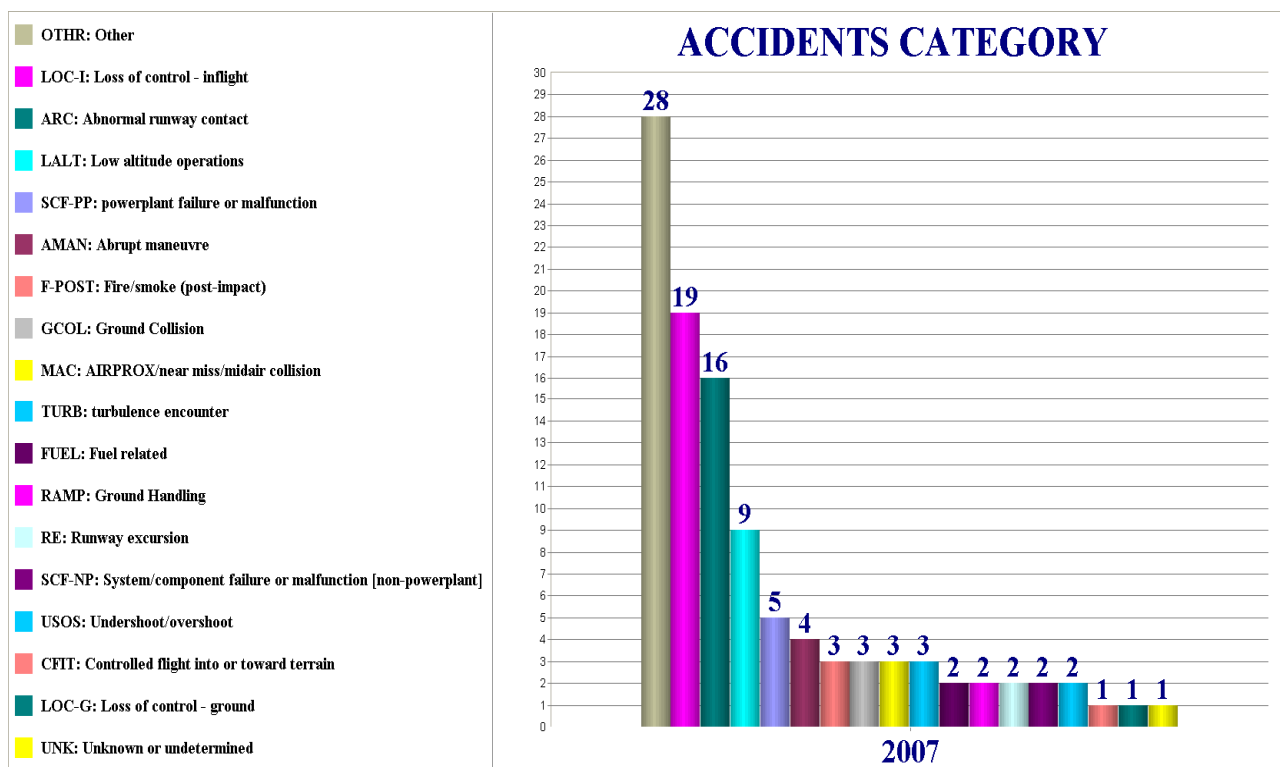
#### Legend:

- Data:** A report containing the factual information obtained in the investigation as well as the factors derived from the analysis and the safety recommendations, if any. This is the report required to be completed under Annex 13, Standard 7,5.
- Closed:** No further information is expected to be received for the occurrence and no further action in respect to the occurrence is being contemplated.
- Preliminary:** The sufficient information for prompt dissemination of data obtained in the early stages of the investigation. More data is expected in due course, once an investigation has been completed in accordance with Annex 13.
- Open:** Some information was received. It is expected that more information will be received in due course that may enhance the information and upgrade the status.

The last graph shows how much investigation work has been performed by the Polish State Commission on Aircraft Accident Investigation (SCAAI). We hope that lessons learned from the recommendations will improve flight safety or give at least indications to users or carriers on how to avoid many of these accidents especially in general aviation including recreational aviation.

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Figure 10



„Other” category placed in legend position on this illustration means occurrences that happened to parachutes, paragliders and hang-gliders. In the last year, the number of accidents in this type of aviation constitutes about 43% of all accidents, including 7 fatal accidents in which 9 people died.

Total number of categories one can find higher than total number of accidents due to the fact that in some events more than one category was applied.

Figure 11

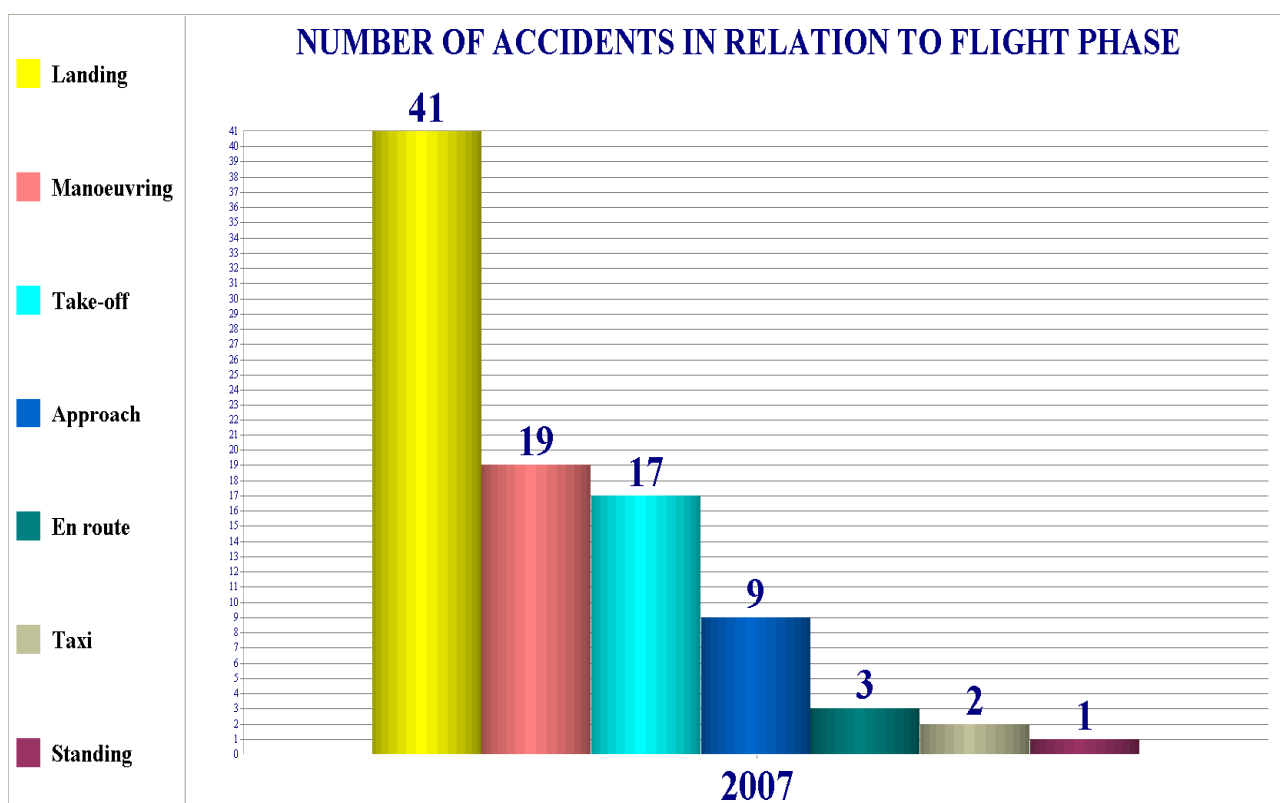
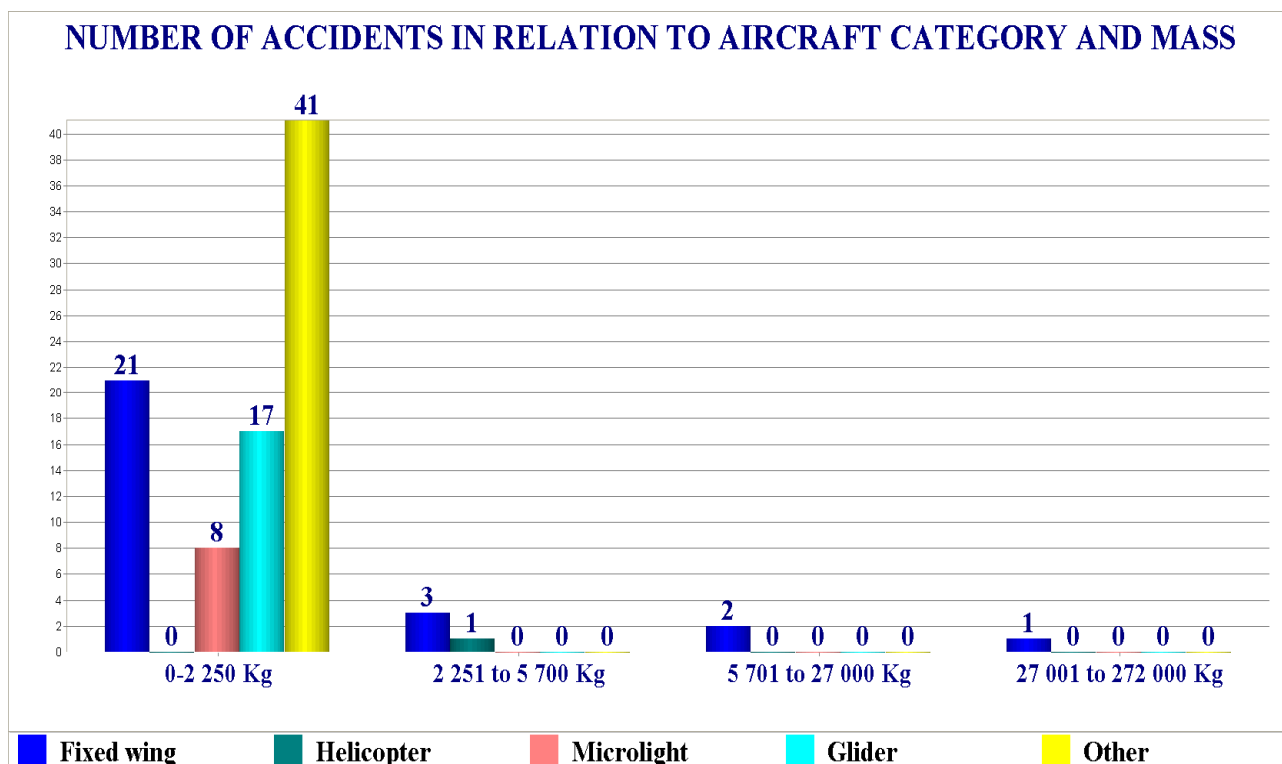


Figure 12



Figure 13

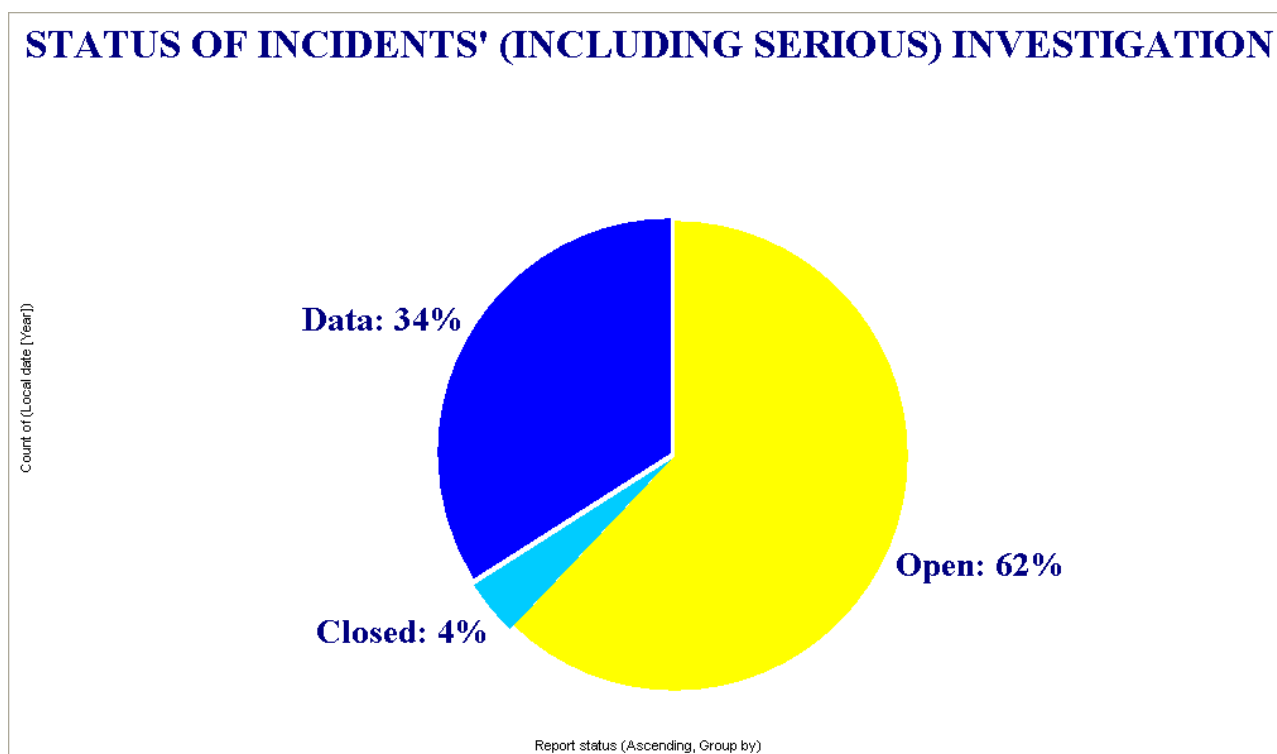


„Other” category placed in legend position on this illustration means occurrences that happened to parachutes, paragliders and hang-gliders.

Additionally the position „0 - 2250 kg” includes also events that occurred to: parachutes, hang-gliders (HG) and powered hang-gliders (PHG), paragliders (PG) and powered paragliders (PPG).

## INCIDENT'S (INCLUDING SERIOUS) PREVENTION

Figure 14



### Legend:

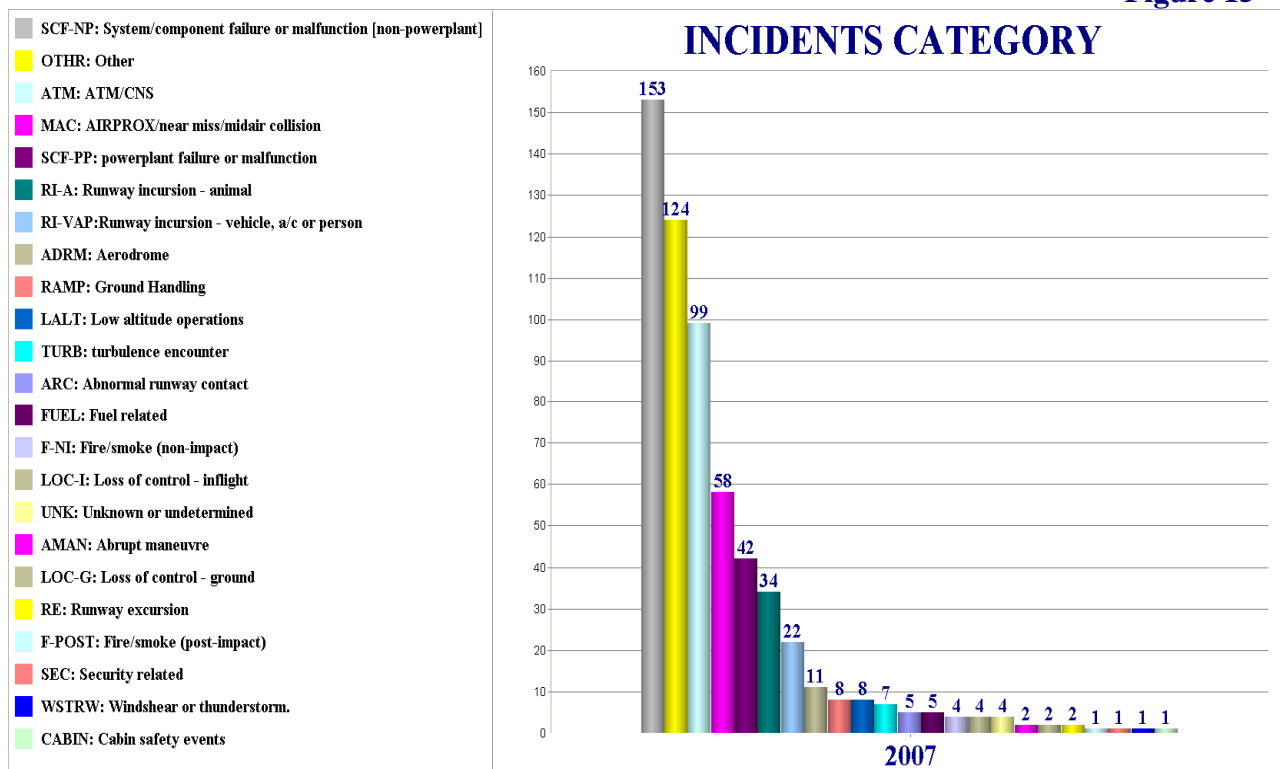
- Data:** A report containing the factual information obtained in the investigation as well as the factors derived from the analysis and the safety recommendations, if any. This is the report required to be completed under Annex 13, Standard 7.5.
- Closed:** No further information is expected to be received for the occurrence and no further action in respect to the occurrence is being contemplated.
- Open:** Some information was received. It is expected that more information will be received in due course that may enhance the information and upgrade the status.

The above graph shows the current situation in the area of incidents investigation. According to the Polish law the Polish SCAAI is responsible mainly for supervision over investigation of all occurred incidents. This means that so called all “airspace users” especially commercial airliners are responsible for investigation of all incidents whether they are investigated by the State Commission or not. It is now clear how much we all have to do in the field of flight safety. Reporting of any occurrence is only the first step on “The road to Just Culture”. That idea says also that we ought to share all information about the occurrences and draw lessons from them to improve flight safety and to be safe airborne. It is worth remembering that:

*„To have an accident is unfortunate  
To have an accident and learn  
nothing from it is unforgivable”*

*Flight Safety Digest*

Figure 15

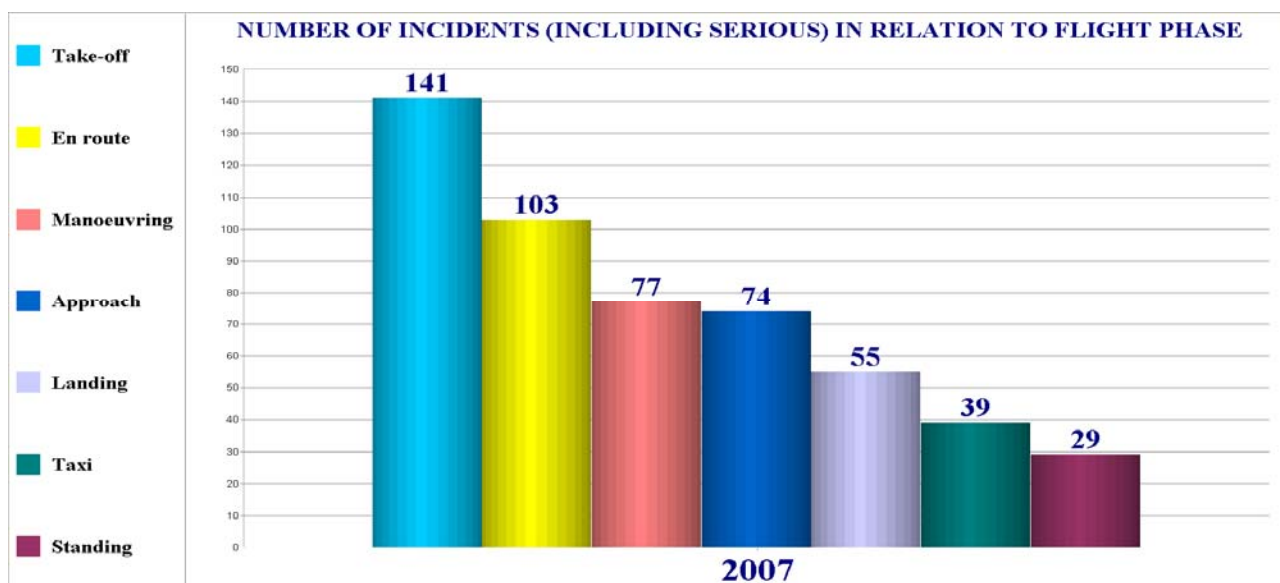


„Other” category placed in legend position on this illustration means occurrences that happened to parachutes, paragliders and hang-gliders as well as strikes with birds and other occurrences that could not relate to any of the above categories.

ATM: „ATM/CNS”, this category in turn, can be involved in other events such as: airprox/near miss/midair collision - including activation of ACAS/TCAS devices, some Runway Incursions and first of all, there are so called „ATM specific” (in other words failures of ground radio nav aids).

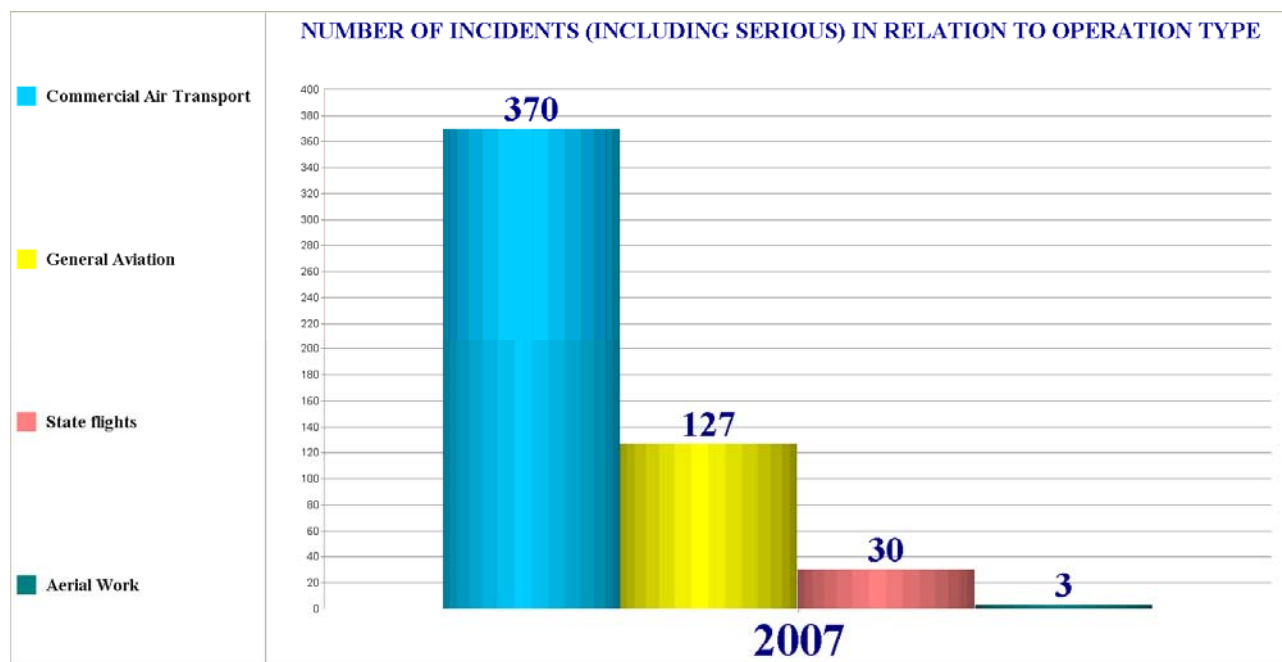
Total number of categories one can find higher that total number of incidents due to the fact that in some events more than one category was applied.

Figure 16



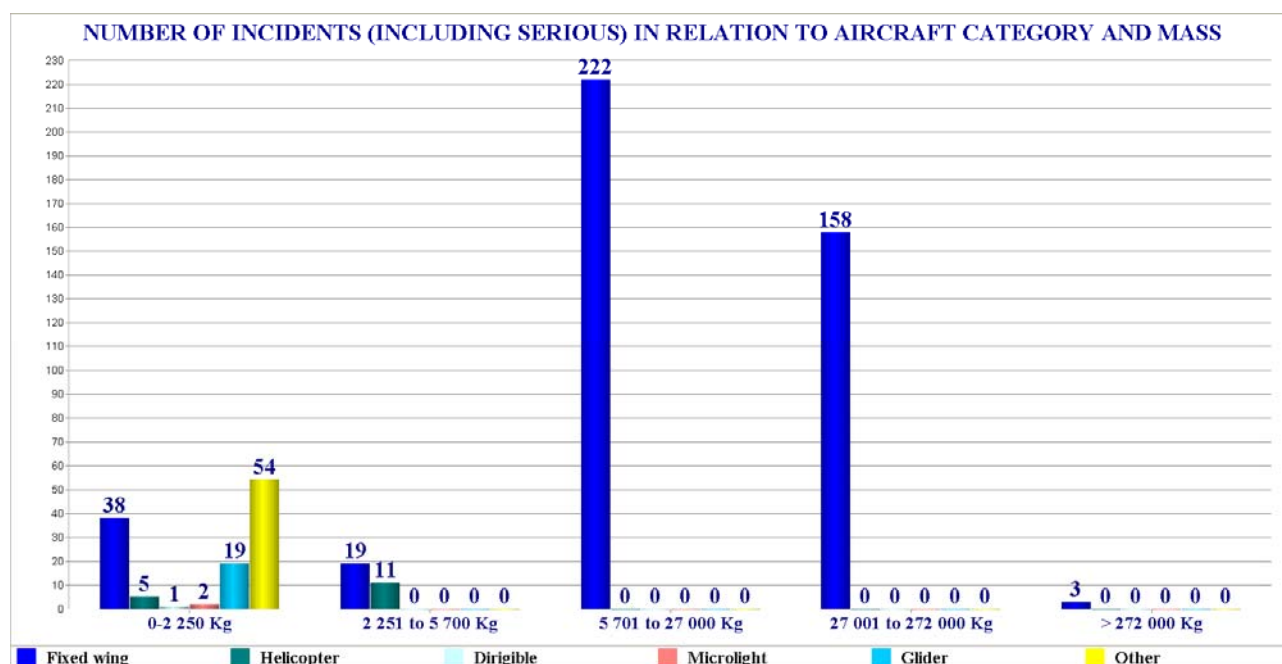
Total number of occurrences on this illustration is diminished by the number of events in which no aircraft was involved (“ATM specific”).

**Figure 17**



Total number of occurrences on this illustration is diminished by the number of events in which no aircraft was involved (“ATM specific”).

**Figure 18**



„Other” placed in legend on this illustration means occurrences that happened to: parachutes, hang-gliders (HG), powered hang-gliders (PHG), paragliders (PG) and powered paragliders (PPG) as well as strikes with birds and other occurrences that could not relate to any of the above categories.

*Total number of occurrences is diminished by the number of so called „ATM specific” in which no aircraft was involved.*

## GENERAL KEY RISK AREAS

### Technical incidents:

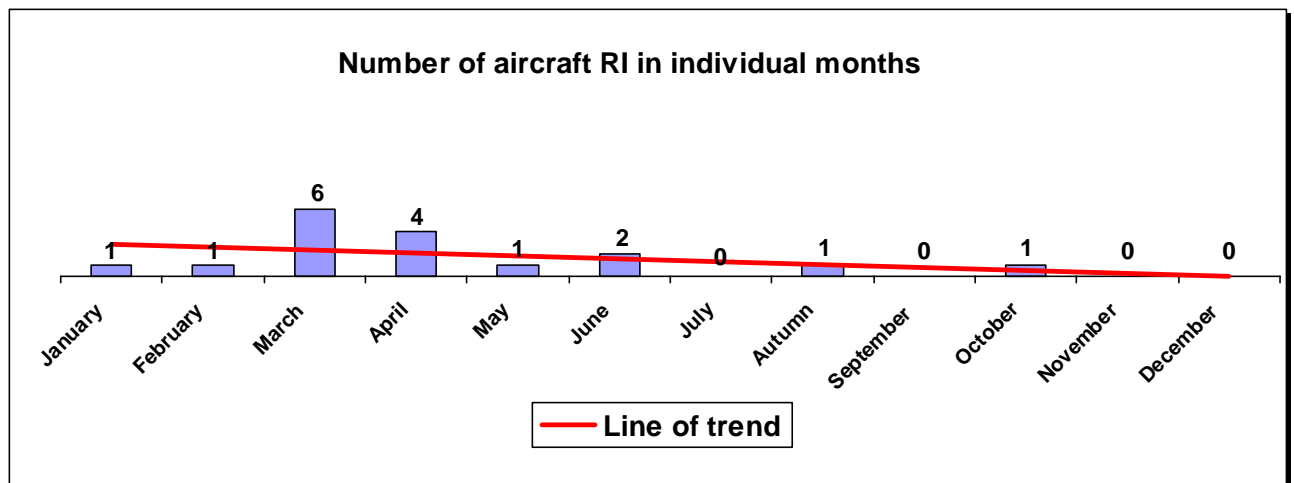
During the last five years the biggest group of occurrences constitutes technical incidents, including failures detected by maintenance services still on the ground. It is a proof that shows not only professionalism of those services but also their vigilance. And a big number of technical occurrences especially in group of incidents remains at the same level for years and keeps up with the world trends. It should be emphasized that the number of so called technical incidents is not proportional to the number of aviation accidents, which means that **the higher amount of reported occurrences of low severity, the lower number of accidents.**

### Runway Incursions:

In 2007 there were **66** occurrences reported, so called „*Runway Incursions (RI)* More details will follow.

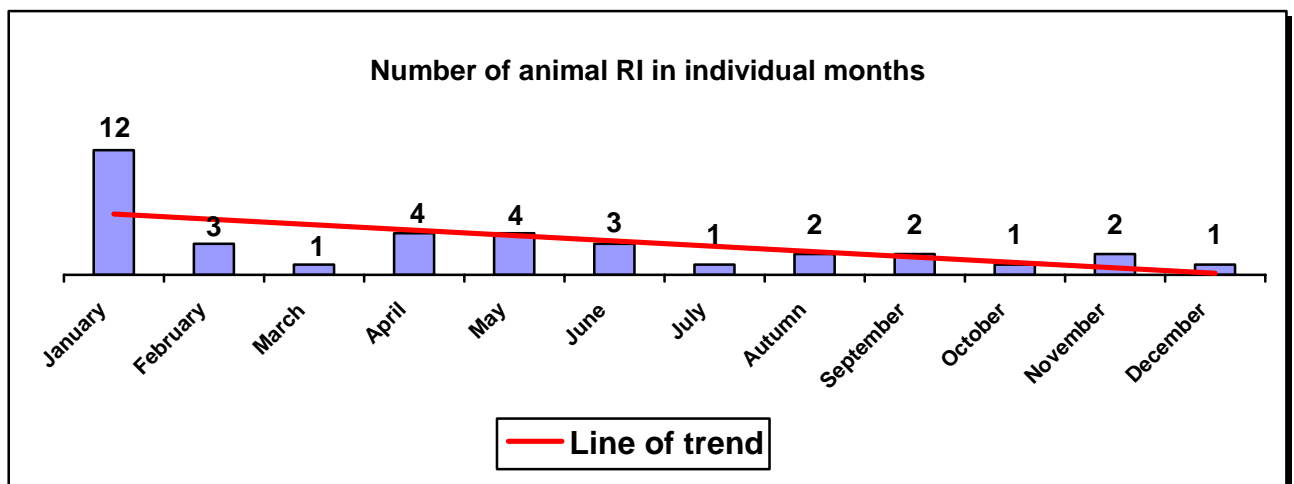
The separate uneasy group of RI constitutes aircraft runway incursions. In 2007 there were **17** events reported.

Figure 19



Notwithstanding the biggest group of RI still embraces animals.

Figure 20



### ACAS/TCAS occurrences:

In 2007, there were 28 incidents registered of activating ACAS/TCAS (*Traffic Collision Avoidance System*) on the aircraft board. During of the year 2006 there were 61 such events reported. So the number of incidents declined significantly.

The main causes of these occurrences are known. In most cases, they occurred because of too high speed of vertical climbing or descending to required levels, by the aircraft crew. From the preliminary analysis of these incidents, it can be assumed that most causes are attributable to the human factor .

Some preventive actions were undertaken and the following recommendations were introduced:

1. To introduce as a valid procedure the instructions which order to maintain the speed limit of climbing / descending maximum to 1000 ft/min in the range of altitudes up to 1000ft before obtaining the commanded altitude of flight.
2. To introduce as a valid procedure the instruction in check lists to inform about approaching the commanded level of flight.
3. To introduce the instruction in Air Information - Poland (AIP) about limitation in FIR Warsaw, the speed of climbing and descending maximum to 1000 ft/min in the range of altitudes up to 1000 ft before reaching the commanded flight altitude.
4. To remind the crews of aircraft about their responsibility to:
  - follow the instructions of ACAS/TCAS system,
  - immediately inform about actions taken following the indications of ACAS/TCAS system to ATC services,
  - correctly fill in the appropriate forms of reports (ATIR's and ASR's).
5. To talk over/consider with aircraft crews the occurrences with aircraft which are equipped with ACAS/TCAS device.

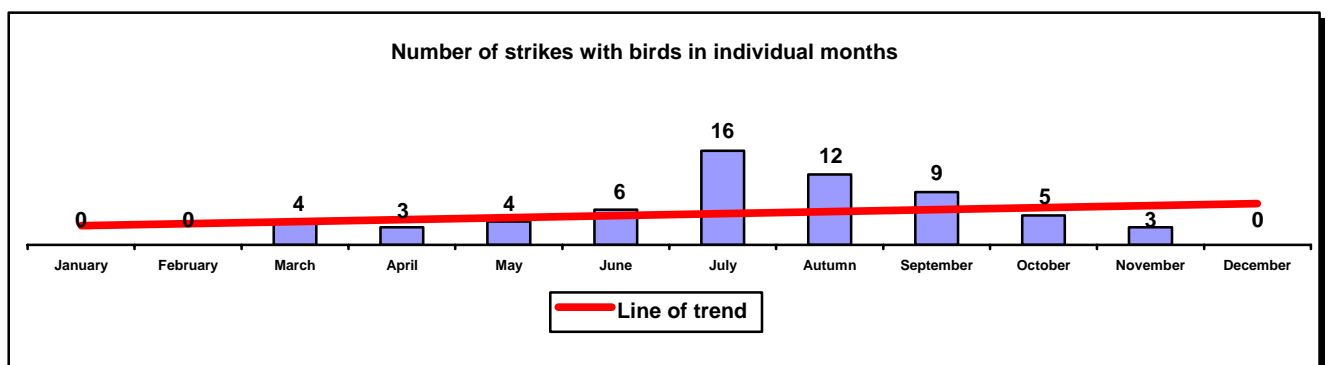
### ATM specific:

From the beginning of the last year we observed the rapid growth in number of occurrences so called "ATM specific", which stands for the breakdowns (failures) of the ground radio nav aids (radiolocation, communication). They were submitted to the appropriate authorities according to the Directive 2003/42/EC of the European Parliament and of the Council as well as the ESARR 2 of EUROCONTROL.

### Birdstrike:

In 2007 there were **62** incidents reported in which strikes with birds took place in different phases of flights, including **48** during take-off and landing procedures. Many airspace users realized how dangerous such a „meeting” can be. It is a topic that should be addressed by airport managers with due accuracy as soon as possible.

**Figure 21**



### Stalls:

The unintended introduction of aircraft into stall and, in repercussion, spin particularly in GA.

Phases of flight in which stalls most often occurred:

- **take-off** – particularly during take-off while on a second range of speed;
- **climbings** – at high angle of attack, influence of wind or turbulence;
- **turns** – in most cases stalling during executing the fourth turn, during approach to land or during an engine breakdown while below 100 meters and during searching a better place to land in a field;
- **approaches** – especially in glide paths with the engine off while forgetting to ensure the safe gliding speed.

**Mistakes and infringements of flight conditions which were the direct reasons that ended in unintentional stall and spin:**

- **violent maneuvering of aircraft at small altitude;**
- **overloading of aircraft;**
- **breakdown of engine** while in the air due to some reasons (lack of fuel, lack of oil or others);
- **lack of sufficient theoretical or practical training;**
- **lack of proper meteorological knowledge;**
- **lack of knowledge and abilities** about procedure of particular situation in flight;
- **errors in decision making** - specially in particular situations;
- **errors related with aircraft exploitation** with very modern devices and highly automated systems;
- **errors related with use** of many different types of aircraft;
- **erroneous analysis of situation** while in the air;
- **errors made by student-pilots and instructors** during training flights;

The below table depicts total number of stalls and spins in GA in the last 8 years. Altogether **29** people were killed.

**Table 3**

|                 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | <b>AVERAGE</b> |
|-----------------|------|------|------|------|------|------|------|------|----------------|
| <b>Aircraft</b> | 3    | 1    | 3    | 2    | 3    | 2    | 3    | 3    | <b>2,5</b>     |
| <b>Glider</b>   | 2    | 1    | 4    | 3    | 1    | 4    | 6    | 1    | <b>2,75</b>    |
| <b>Total</b>    | 5    | 2    | 7    | 5    | 4    | 6    | 9    | 4    | <b>5,25</b>    |

## Summing up

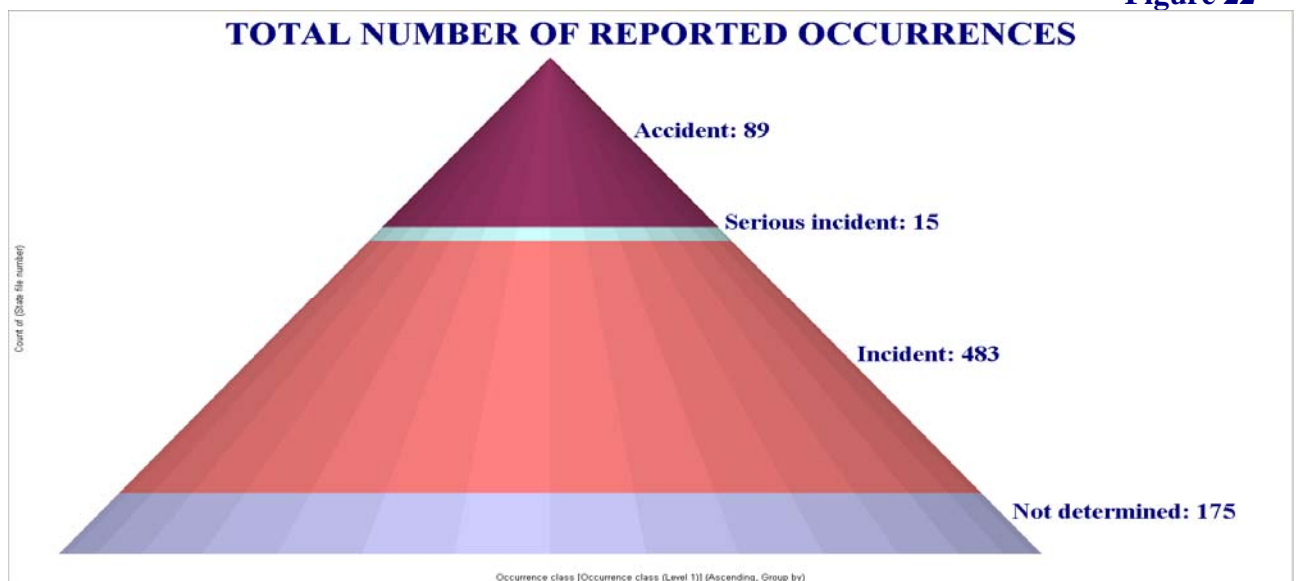
With a view to improve flight safety the Polish CAO took several actions. The main are:

- safety awareness campaign was launched to general aviation to encourage all airspace users to investigate occurrences or at least to find their reasons and share information,
- airport authorities were obliged to solve the problem of runway incursions and bird strikes,
- encouraging all airspace users especially airliners to report and effectively investigate incidents to enhance flight safety,
- annual flight safety conference was held to inform the public of the general safety level in the field of civil aviation,
- safety bulletins were written to show the repeatable causes and warn airspace users,
- the voluntary reporting system implementation is under consideration.

The 2007 figures showed that the positive phenomenon is stable, almost double rise in the number of aviation events reported, that is, the rise in the ability to detect them and willingness to share information with other users.

There is only one rational practice: the **more** reported, and correctly investigated number of occurrences, the **higher** level of flight safety. According to ICAO researches, on each aviation accident, falls from a few to several dozen of so called precursors, in other words aviation incidents. How these figures reflect in Poland shows the illustration below.

**Figure 22**



The above facts are the evidence that the activity of the Polish Civil Aviation Office follows the right direction. Moreover, the “Just Culture” idea has been initiated and propagated for the last five years and continues to bring positive effects in accordance with the best practices and world trends in this field.

*All the data presented is strictly for information purposes only. It is obtained from CAO data bases and it reflects knowledge at the time the report was generated.*

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