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## Abstract

Over the past decade (2001-2010), the domestic and international transportation services showed contradictory trends to the civil aviation industries over the period from 2001 to 2010. There was a significant increase on international air transport for both passenger and cargo. The number of passenger increased 55 percent, the cargo increased 75 percent, and the numbers of flights increased 61 percent over the period. Meanwhile, the numbers of domestic air transport declined significantly since the number of passengers decreased almost 60 percent, the numbers of flights also decreased 59 percent, however the numbers of cargo services remained constant ever since 2001.

National Airborne Service Corps were also having a substantial increase in the total number of missions and the cumulative flown hours for the past nine years. The total number of flight hours was still less than 1,000 hours in 2002; however, when it came to 2005, the number has increased rapidly to about 9,400 hours. The trend then remained steady for the last four years. In year 2009, due to the 88 typhoon disaster, the missions of disaster relief were increased in the period. The yearly total flight hours almost reached 10 thousand hours. In year 2010, the yearly total flight hours were reduced about 1800 hours.

According to the occurrence rates for the airplanes in civil aviation transportation category over the last 10 years (2001-2010), the average rate of hull loss occurrences on commercial jet was 0.55 per million flight hours, or 1.75 per million departures. In addition to that, the hull loss occurrence rate on turboprop airplane was 1.31 per million flight hours or 1.25 per million departures. Based on the 10-year moving average of hull loss occurrence rates on civil aviation transportation category, from 1993 to 2010, suggested that by 2006, the 10-year average of hull loss occurrence rates on commercial jet had declined, though with a minor rise in 2007, from 2008 to 2009 it returned to declination trend, the occurrence rate was constant in year 2010; whereas the number on turboprop airplanes had declined steadily over the years.

When focusing at the accident rates for each phase of flight, which was defined by International Civil Aviation Organization (ICAO), there were total 34 aviation occurrences happening at different flight phases over the last decade. Among all these accidents, 12 of them took place at landing phase, as the most prevalent, followed by cruise phase, which accounted for 8 occurrences.

In accordance with the occurrence category used by ICAO, among all 34 civil transportation category airplane occurrences over the past ten years, the runway excursions overall were the most frequent and a total of 7 occurrences were reported. The second most frequent occurrences were abnormal runway contact, accounting for 6. When further analyzed those transport category

occurrences with ASC occurrence scales, the most frequent Class I occurrence were the SCE-NP (system/component failure or malfunction/non-power plant) and ICE. Although the highest numbers of occurrences came from the category of RE (runway excursions), 6 out of 7 cases were Class V, which was a smaller scale of occurrences.

The National Transportation Safety Board (NTSB) established the probable cause and contributing factor of an occurrence using three broad categories: personnel, environment, and aircraft related. By using the similar approach, for the civil transportation category airplane occurrence occurred over the past ten years in Taiwan, personnel was cited as a cause/factor in 71.9% (46.9% related to pilots, 25.0% related to maintenance/ATC personnel), of those occurrences as the largest percentage, environment was cited in 28.1%, and the aircraft related in 21.9%.

From 2001 to 2010, the rate of general aviation occurrence was 7.35 per 100,000 flight hours, fatal occurrence rate was 3.67 per 100,000 flight hours and hull loss occurrence rate was 5.51 per 100,000 flight hours. The general aviation was safer between 2002 and 2007 as neither fatal accident nor Hull Loss of aircrafts occurred, however there were 2 hull loss occurrences in year 2008 and 2009. There was no occurrence in year 2010.

There were 8 occurrences involving public aircraft during the period of 2001 to 2010. Of these occurrences, 2 were fatal occurrences and 5 were hull loss occurrences which included the cost of repair exceeding the cost of the aircraft. There was no occurrence in year 2010.

According to the formal records of ultra-light vehicles occurrence, there were 9 occurrences from 2004 to 2010, including 4 fatal occurrences which resulted in 7 fatalities. Of all 9 occurrences were hull losses.

After finishing 57 occurrences investigation, the Aviation Safety Council had made 515 aviation safety recommendations during the period from April, 1999 to February, 2011. At the time of this publication, the numbers of action plans proposed by government were 247 which account for 96.5%, while the numbers of plans/proposals still under supervision were 8 which account for 3.1%. The percentage of those plans/proposals still under reviewing or waiting for reply was 0.4%.

## **Introduction**

Civil aviation has become an integral part of the economy; and at the same time, and the demands for air transport has been closely linked with economic development as well. This paper begins with the topic of social economy, which includes the critical changes in socioeconomic indicator systems in Taiwan over the last decade. Then following by the review of operation status of civil aircrafts, public aircrafts and ultra-light vehicles, it will allow readers to observe the civil aviation operations change in view of the Taiwan social economy.

The second part of the report includes the statistics/analysis of aviation occurrences and safety recommendations. In order to give readers the general understanding of aviation occurrences statistics, the article will first introduce the basics and definition of statistical data, categorization of occurrence aircrafts, ASC's investigation procedure and classification of occurrences. Then the report will focus on the statistics of aviation occurrences, including the overview of occurrences happened over the last decade, and different types of aircraft occurrences: the civil aviation transport category occurrences, general aviation occurrences, helicopter occurrences, public aircraft occurrences, and ultra-light vehicle occurrences. Data related to the civil aviation transport category will be further analyzed in accordance with the taxonomy used by International Civil Aviation Organization. The end of this section will include safety recommendations made by the Aviation Safety Council and the status of its follow-up.

Several terminologies are used throughout this report that relate specifically to the civil aviation or International Civil Aviation Organization, for definitions of those terms, please refer to the attachment - Definitions of Terms.



## **Civil Aviation and the Social Economy**

### **The Economic Profile in 2010<sup>1</sup>**

In 2010, the economic growth rate was 10.88% which was higher than the growth rate of previous year (-1.93%). The gross national product grew to \$14 trillion and 20.5 billion NT dollars and the gross domestic product grew to \$13 trillion and \$603.4 billion NT dollars, representing an 8.76% and 9.03% increases, respectively, over the previous year. The national dividend also grew to \$519 thousands and 67 NT dollars, with an increase of 10.02% when compared to the previous year. The rate of labor force participation was 58.07% which was higher than year 2009 in 57.9%. Accordingly, the overall economy was increasing. The population of Taiwan increased 0.19%, reaching the total number of 23.16 million people; and the number of families in Taiwan increased to 7.93 million families in 2010, an increase of 1.69% over the previous year.

### **Economic Changes and Tendencies from 2001 to 2010**

The common indicators of socioeconomic of Taiwan from 2001 to 2010 were shown on the attached Appendix 1.

The socioeconomic indicators, gross national product (GNP), gross domestic product (GDP), and national dividend of the last decade were shown in Figure 1 and Figure 2. In addition to year 2001<sup>2</sup>, the year 2008 and 2009 also showed negative growth. Improvement showed in year 2010. The trend variations of economic growth rates (Figure 3) were similar to the overall economic indexes. The economic growth rate fluctuated 3.6%-6.2% from year 2002 to year 2007. In year 2009, it reached its lowest level (-1.93%). The growth rate of year 2010 (10.88%) was the highest over the past decade. As for the labor force participation rate<sup>3</sup> (Figure 4), it reached the lowest 57.23% in year 2001; the rate was then increased again year over year to 58.28% in year 2008, in year 2009, the rate slightly dropped to 57.9%, in year 2010, it slightly increased to 58.07%.

---

<sup>1</sup> Data was referred to the Directorate General of Budget, Accounting and Statistics, Executive Yuan, R.O.C.

<sup>2</sup> In 2001, there was the first whole year of negative economic growth since 1947.

<sup>3</sup> Labor Force Participation Rate is the rate between the labor force and the overall size of their cohort, national population of the people with ages over 15. Labor force is the number of persons with ages over 15 and who are employed or are unemployed but looking for a job.

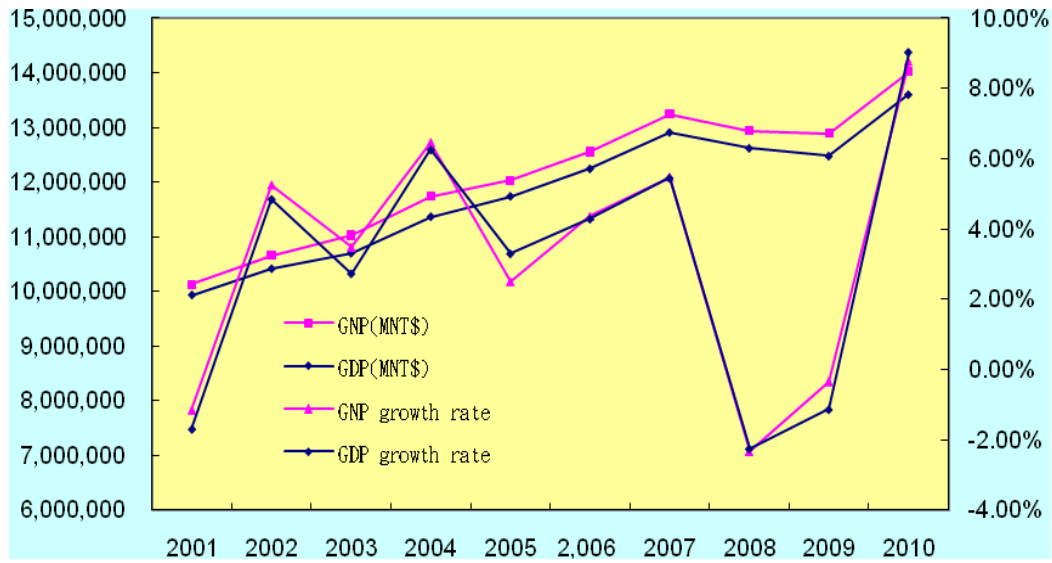


Figure1 : GNP and GDP in Taiwan, 2001-2010

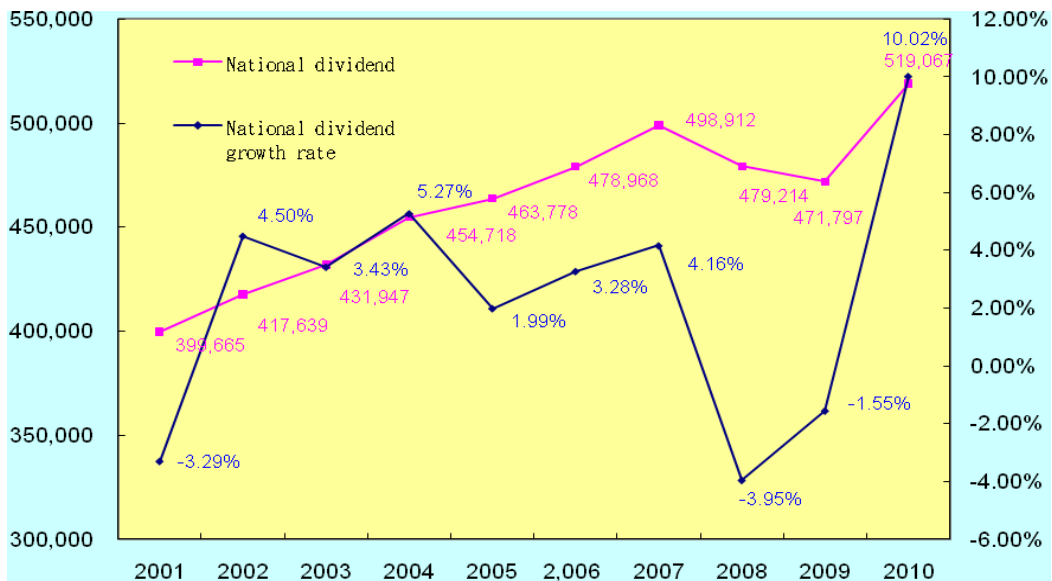


Figure2 : The Average Annual National Dividend and its Growth Rate, 2001-2010

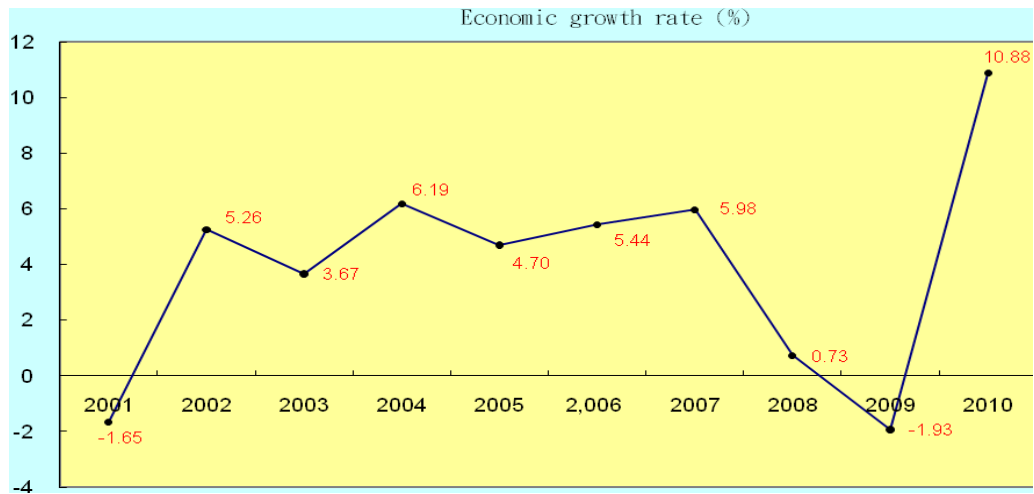


Figure3 : The Economic Growth Rate of Taiwan, 2001-2010

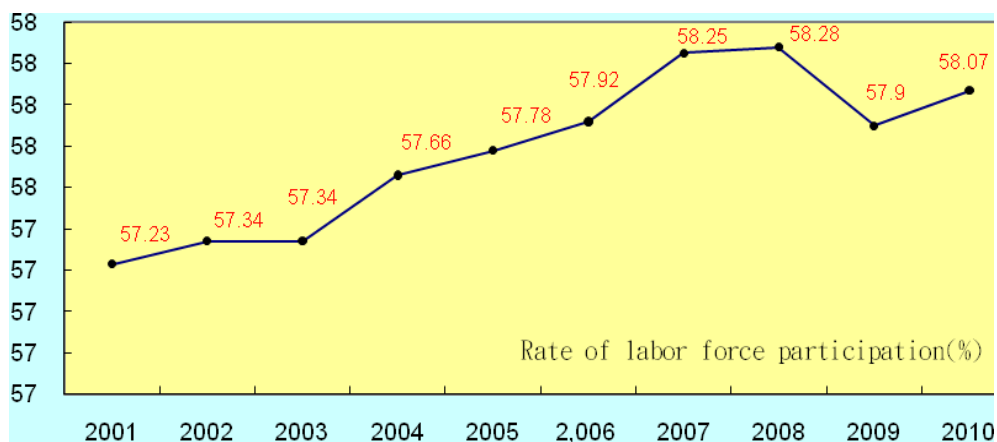


Figure4 : The Change of Labor Force Participation Rate, 2001-2010

Over the past decade, the Taiwanese population (Figure 5) and number of families (Figure 6) were both growing at a steady rate. The growth rate of families was three to nine times more than that of population. Although the growth rate in population remained positive, it had dropped from 0.58% in 2001 to 0.19 percent in 2010, which indicated the growth rate in population decreasing to a steady rate of recent years. For the family growth rate, it varied between 1.4% and 1.95%.

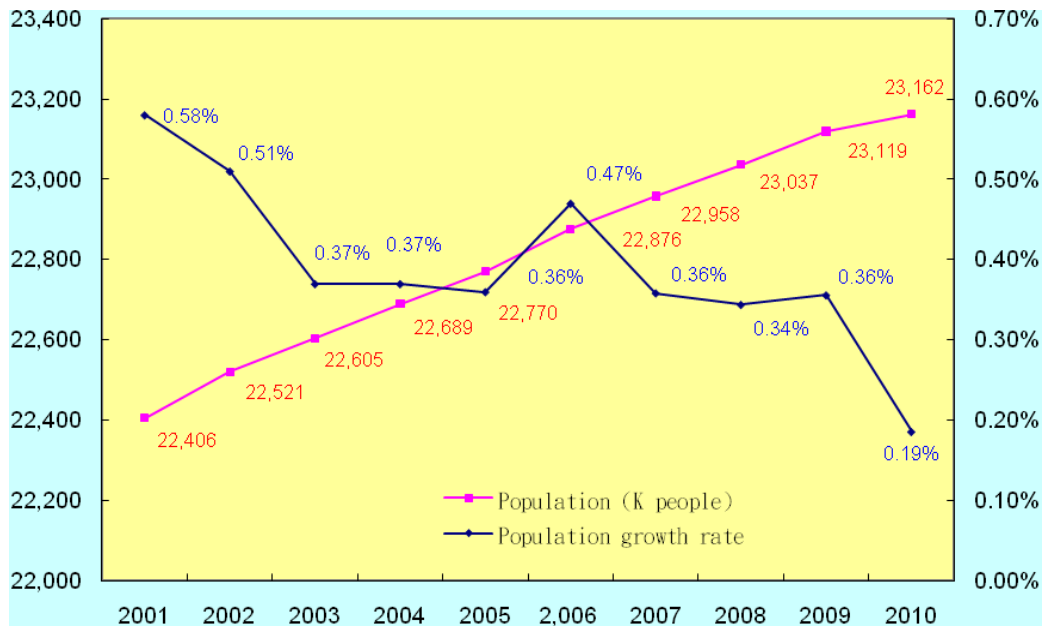


Figure5 : The Population and Population Growth Rate, 2001-2010

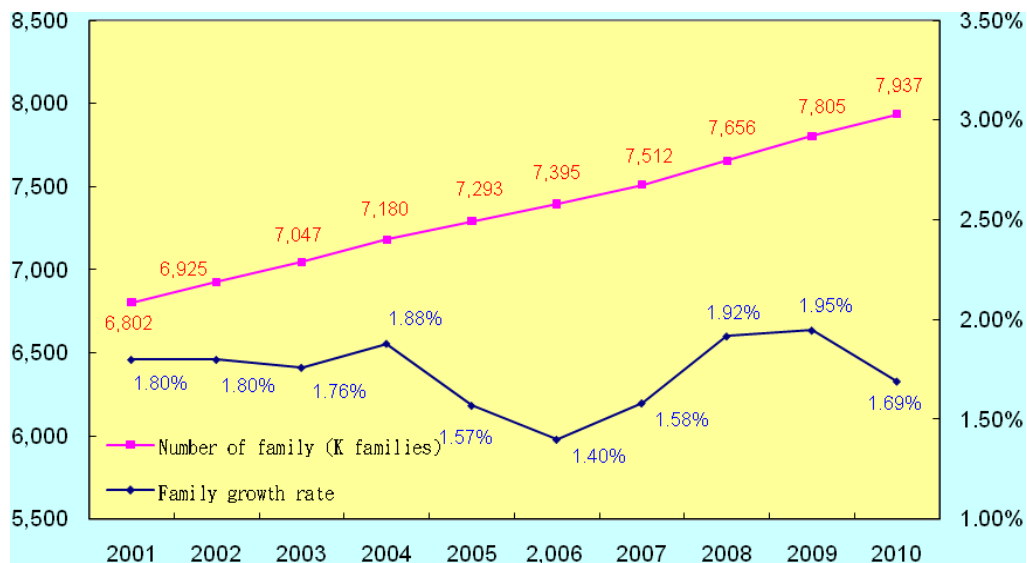


Figure6 : Total Numbers of Families and the Families Growth Rate, 2001-2010

## The Operation of Civil Aircraft and Public Aircraft in Taiwan<sup>4</sup>

### The Overview of Civil Aviation Operation, 2001-2010

There were 13 air carriers<sup>5</sup> in Taiwan in 2010, and 8 of them served in civil aviation transportation category. Five<sup>6</sup> out of 8 transportation category carriers operated on both international and domestic routes. Two<sup>7</sup> operated in domestic routes only. The number of air carriers in the general aviation industry was 7<sup>8</sup>. In Aug. 19, 2010, the CAA issued flight operational certificate to the Win Air Business Jet for charter operation. Total number of aircraft operated in transport category and general aviation was 182.

In 2010 the transportation category air carrier in Taiwan carried a total of 25,430,000 passengers, a 13.8 percent higher than that in 2009. Among those, 81.0 percent were international passengers, 15.9 percent increase over the previous year, 19.0 percent were domestic passengers with a 5.7 percent increase when compared to the year before. The total weights the air cargo carried in 2010 increased to 1,920,000 tons, a 34.5 percent higher when compared to 2009. Among them, the international air cargo accounted for 96.4 percent of the total weight in 2010, increased by 35.8 percent from 2009. The domestic air cargo accounted for 3.6 percent of the total weight, dropped by 0.2 percent from 2009 to 2010. There were a total of 203,001 flights in the whole year, including 43.6 percent domestic flights, a 0.7 percent increase compared to the year before. International flights accounted for 56.4 percent of the total number of flights, 12.4 percent increase over the previous year. It was demonstrated from previous data that in 2010, the passenger carried showed large growth and it was the highest over the past decade. The domestic flights increase but the air cargo had a little drop in year 2010. In 2010, the general aviation had a total of 4,508 flight hours, which was decreased by 1.8 percent from 2009 to 2010. The index of overall operations of local air carriers over the past ten years was showed in Appendix 2.

### Transportation Category

As shown in Figure 7, the number of air carriers operating in civil air transportation category was 8 in 2008. In terms of the number of registered aircraft, there was an increasing trend in recent years as shown in Figure 8. The number of registered aircrafts was 182 in year 2010 which was less than

<sup>4</sup> The listed statistical data mainly came from "CAA Annual Report".

<sup>5</sup> The number is 8 which included the Far Eastern Airline.

<sup>6</sup> China Airlines, EVA Airways, TransAsia Airways, Uni Airways and Mandarin Airlines

<sup>7</sup> Daily Air and Sunrise Airlines

<sup>8</sup> Daily Air Corporation, Aerospace Industrial Development Corporation (AIDC), Emerald Pacific Airlines (EPA), ROC Aviation Company, Sunrise Airlines, Great Wing Airline and Win Air Business Jet.

those of 2009 by 9. The reason was the incorporation of Far Eastern Airline and its reduced fleet size.

For the numbers of passengers (Figure 9), the international air carriers and domestic air carriers showed two totally different trends. On international routes, apart from the negative growth in 2003, numbers of passengers were 13,323,000 in 2001 and increased gradually over the years, and reached 20,600,000 in 2010. It showed a 54.6 percent increased over the past 10 year. Differently from the international routes, domestic routes had positive growth only in 2004. Other than that, numbers fell from 12,056,000 in 2001 to 4,825,000 in 2010, a decrease of 60.0 percent over the decade.

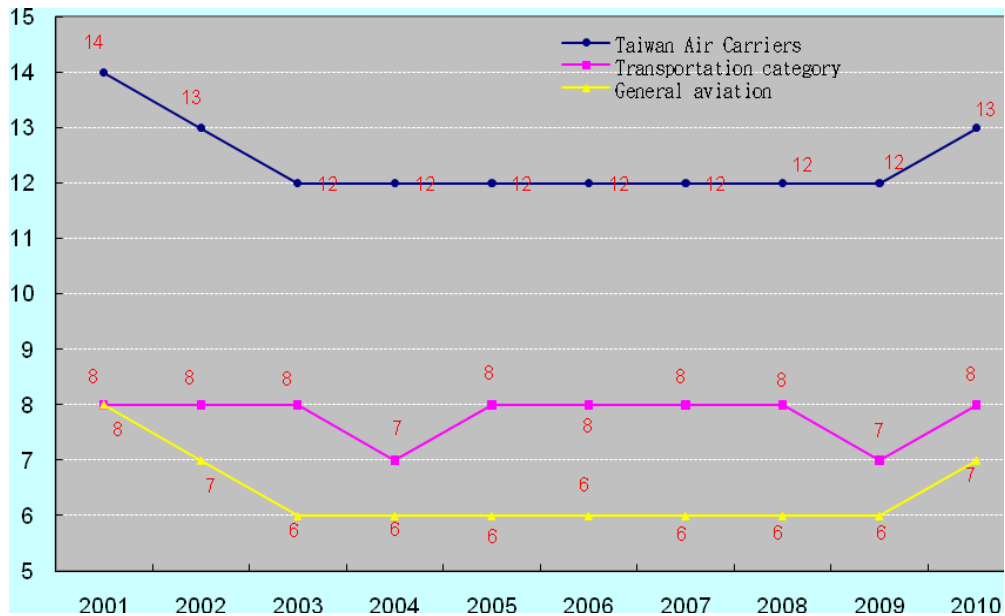


Figure7 : Taiwan air carriers, transportation and general aviation category, 2001-2010

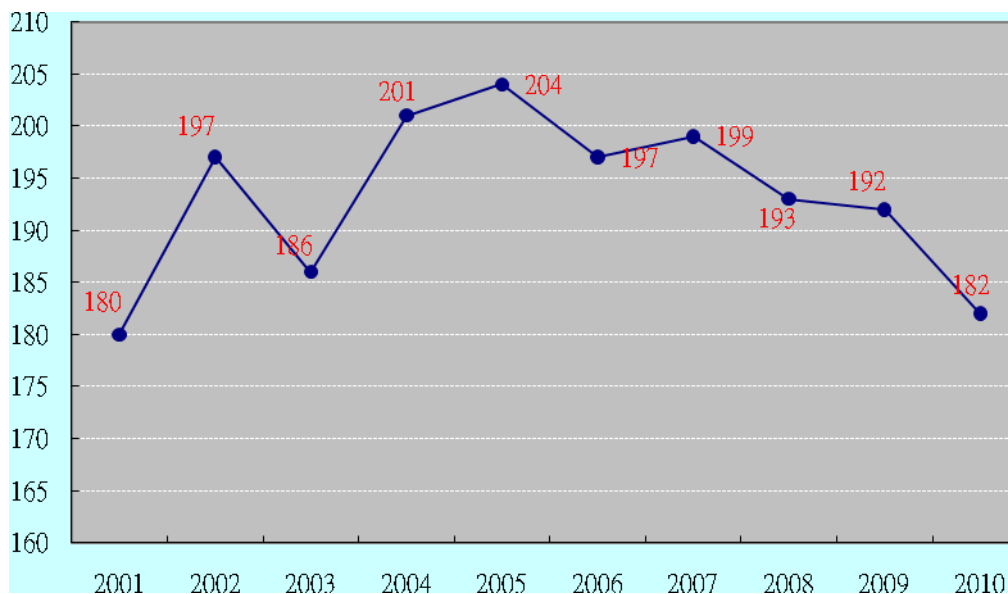


Figure8 : Taiwan registered civil aircraft, 2001-2010

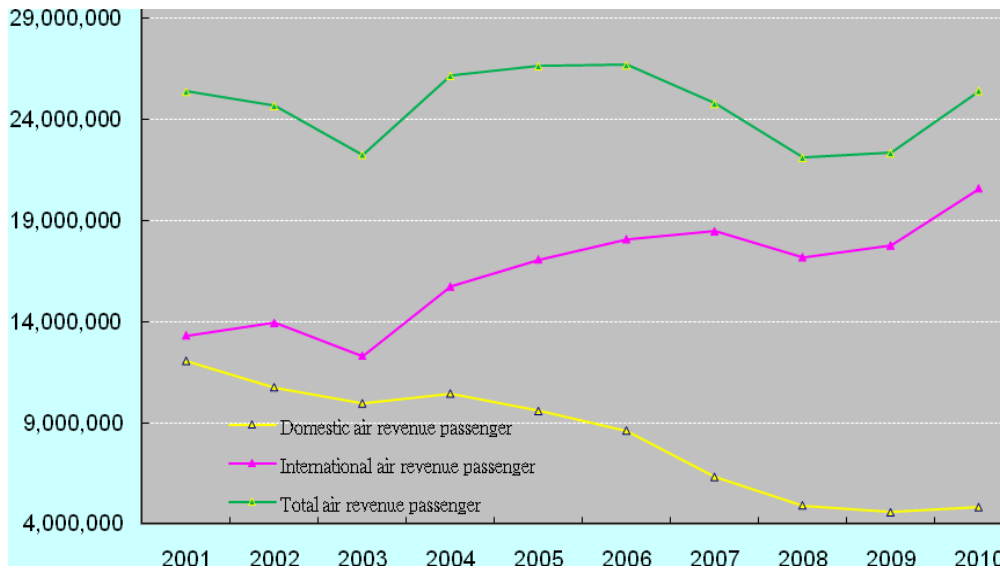


Figure9 : Taiwan air carriers revenue passengers of transportation category, 2001-2010

In terms of the air cargo as shown in Figure 10, the international air cargo was more than domestic one. In the past ten years, the international air cargo took up almost 96 percent of the total annual. The numbers of international air freight increased gradually from 1.07 million tons in 2001. In 2006, the number reached a total of 173 million tons, but than a decreasing trend in the following three years. The air cargo reached a maximum in 2010. Accordingly, the number of air cargo had almost 74.9% growth over the decade. As for the domestic air cargo, the numbers increased from 53 thousand tons in 2001 to 57 thousand tons in 2002, but remained steady with only small variation from thereafter till 2010. Total domestic air cargo was about 50 thousand tons in 2010.

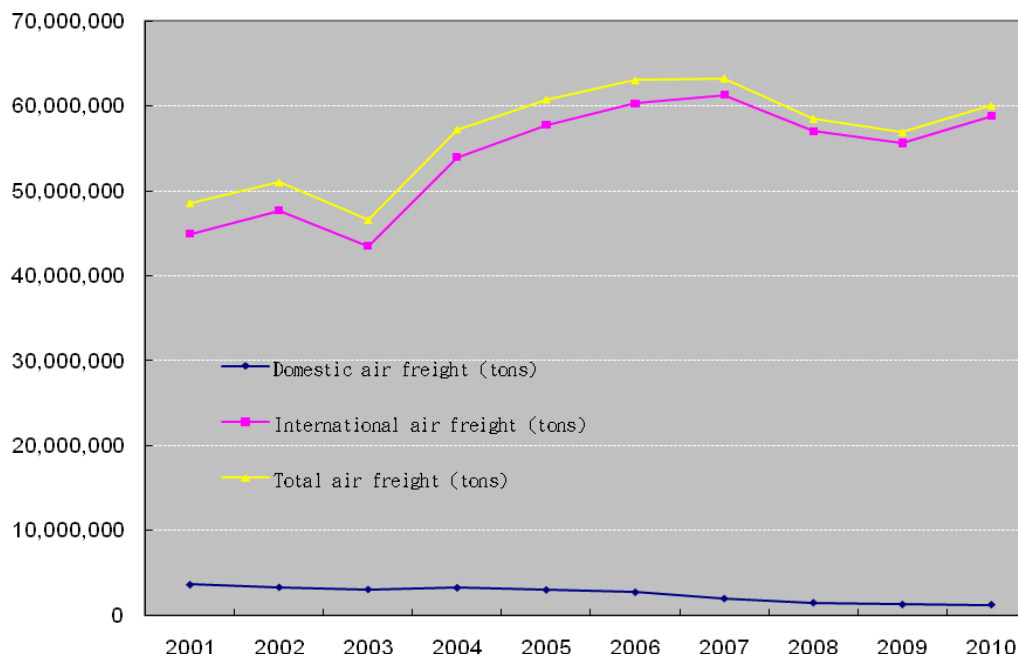


Figure10 : Taiwan air freight of transportation category air carrier, 2001-2010

In terms of the number of flights, the numbers of domestic flights were 2.7 times more than the numbers of the international flights in 2001 (figure 11). While through the expansion of international airlines and the downsizing of domestic flight over the last decade, the numbers of international flights in 2010 were 1.4 times more than the numbers of domestic flights. The domestic flights dropped to 83,000 flights in 2010 from 203,000 flights in 2001, a reduction of nearly 59 percent. Differently from the domestic routes, international airlines increased from 75,000 flights in 2001 to 120,000 flights in 2010, a 61 percent growth.

Overall speaking, the domestic and international transportation services showed contradictory trends to the civil aviation industries over the period from 2001 to 2010. There was a significant increase on international air transport for both passenger and cargo. The number of passenger increased 55 percent, the cargo increased 75 percent, and the numbers of flights increased 61 percent over the period. Meanwhile, the numbers of domestic air transport declined significantly since the number of passengers decreased almost 60 percent, the numbers of flights also decreased 59 percent, however the numbers of cargo services remained constant ever since 2001.



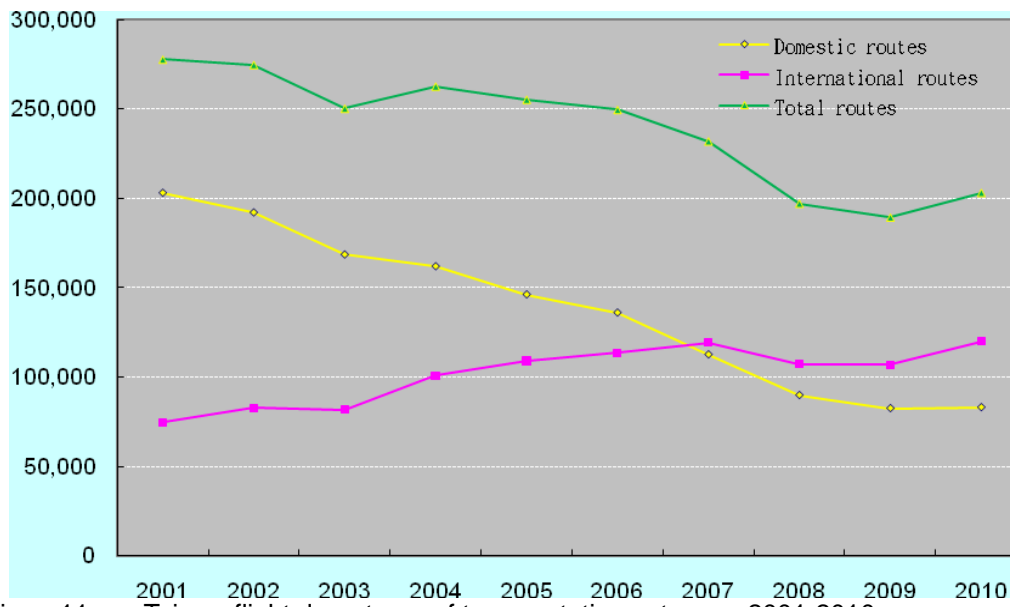


Figure11 : Taiwan flight departures of transportation category, 2001-2010

General Aviation

As shown in Figure 7, air carriers running the general aviation were varied from 6 to 8 in the country over the past ten years. The total flight hours were raised from 5,015 hours in 2001 and achieve its peak at 9,773 hours in 2002; then gradually decreased to 5738 hours in 2003. In recent years, a small increase was observed again giving the total flight hours to 4,508 hours in 2010.

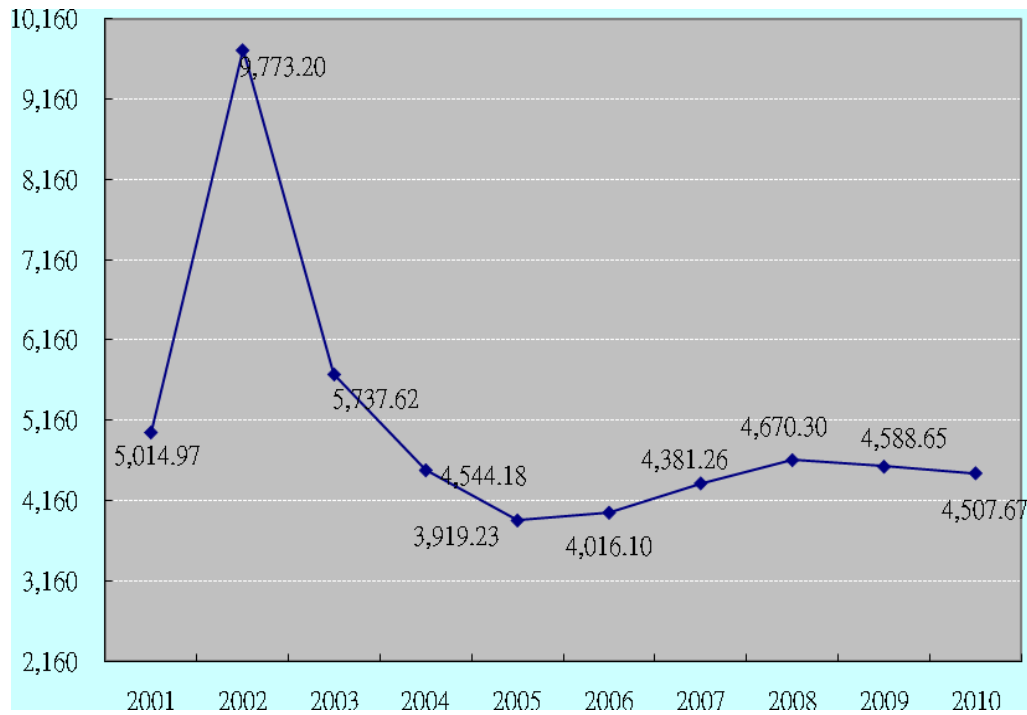


Figure12 : Taiwan air carriers flight hours of general aviation, 2001-2010

## Public Aircraft

Due to different requirement of assignments, public aircraft in the old days were under different units: the Aviation Team of Civil Aeronautics Administration of Ministry of Transportation and Communications, the Airborne Squadron of National Police Agency, the Preparatory Office of the Airborne Fire Fighting Squadron of National Fire Agency and the Air Patrol Squadron of the Coast Guard Administration, Executive Yuan.

After the promulgation of Aviation Occurrence Investigation Act on June, 2004, investigations of public aviation aircrafts were then officially the responsibility of Aviation Safety Council, Executive Yuan. On June, 2005, the Organization Act of Airborne Services Corps of MOI was passed, and National Airborne Service Corps (NASC) of the Ministry of the Interior was finally officially established. After the merging, there were 35 helicopters and 2 fixed-wing aircrafts under the NASC command. Till the end of year 2010, there were 29 helicopters and 2 fixed-wing aircrafts currently running by the NASC. In addition, the Civil Aeronautics Administration still owned 1 light aircraft in order to assist the airport navigation facilities flight test.

According to the data of NASC, as shown in Figure 13, the total numbers of flights were plotted against the total flight hours in recent years as showing in the curve graphs. From the graph, the total flight hours of 2002 was less than 1000 hours, but rapidly increased, to a total of 9,400 flight hours in 2005 and remained stable in continuous 3 years. In 2009, the total flight hours almost reached 10 thousand hours. In 2010, the total flight hours declined to 7944 hours.

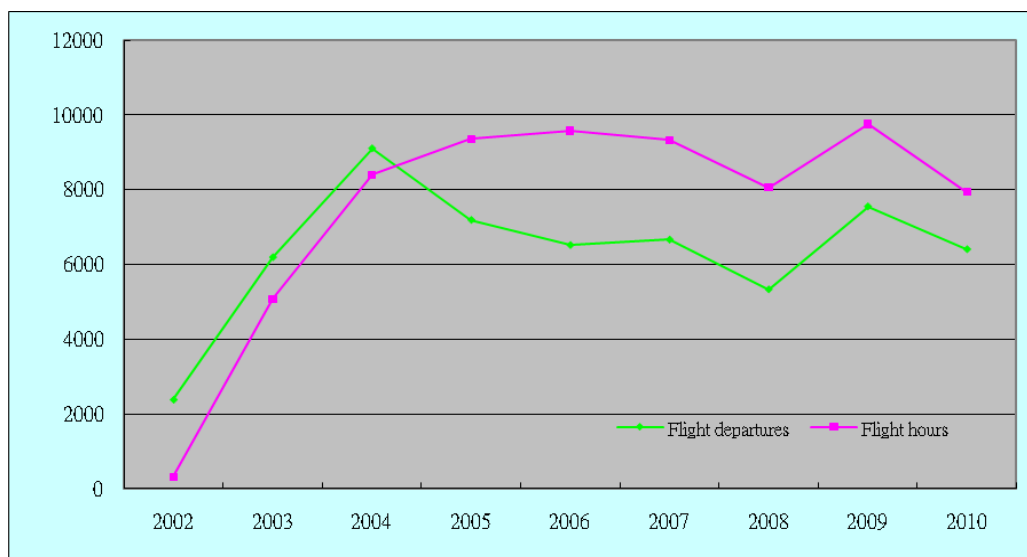


Figure13 : Total flight numbers and total flight hours of National Airborne Service Corps, 2002-2010

### **Activities of Ultra-Light Vehicle**

The Ministry of Transportation and Communications added related provisions to civil aviation acts in 2003, concluded “Ultra-light Vehicle Regulation” in the following year, ultra-light vehicle then formally under CAA’s supervision. Furthermore, according to the CAA data, there are 18 available airspaces nowadays, and 6 of them were legal airspaces, among them, only 4 airfields could formally carried out ultra-light vehicle activities. Twelve ultra-light vehicle activity associations were approved by the Ministry of the Interior based on Citizen’s Organization Law. There was no formal statistics of ultra-light vehicle number in Taiwan.

## **Statistics and Analysis of Aviation Occurrence data, 2001-2010**

### **Introduction to Aviation Occurrence Data**

#### **Data Source**

The contents presented in this chapter are a statistical compilation of the Taiwan air carriers' operation and aviation occurrences. Major data sources include the statistics of operation/flight safety from CAA, the Aviation Safety Council aviation occurrences investigation reports, and the data from the National Airborne Service Corps. The government official documents and press accounts provide additional information of the few aviation occurrence statistics on the early days.

#### **Definition and Categories**

In the review of aircraft accident data released by the US National Transport Safety Board, civil aircraft fall into several categories, including Part 121, Part 135, Commuters, On Demand Operations, and General Aviation, following the Federal Aviation Regulations (FARs). Briefly stated, Part121 applies to major airlines and cargo carriers that fly large transport category aircraft while Part 135 applies to commercial air carriers commonly referred to as commuter airlines and air taxis.

The statistics released by the International Civil Aviation Organization (ICAO) covers a wide range of aircraft, including those of various Maximum Take-Off Weight, number of engine installed, types of engine thrust, scheduled and non-scheduled, and General Aviation. The focus, however, is on the fatal accidents of scheduled and non-scheduled flights of transport category aircraft, as well as that of aircraft of Maximum Take-Off Weight in excess of 27,000 kg.

The Boeing Company (USA) has presented a statistical summary of commercial jet airplane accidents worldwide. The statistics is confined to worldwide commercial jet airplanes that were heavier than 60,000 pounds (or 27,000 kg) maximum gross weight, excluding those manufactured in the Commonwealth of Independent States (CIS) or the Union of Soviet Socialist Republics (USSR). In Britain, airplanes above 5,700 kg (12,500 lb.) are the major focus of the statistics of the fatal accident rate per 1,000,000 flight hours.

The definition of jets for statistics of the Civil Aeronautics Administration was referred to a Maximum Take-Off Weight of more than 15,000 kg, which was the same as the International Air Transport Association (IATA). Since then, it has been applied in annual reports and statistics of civil aircraft flight hours and departures released by the Civil Aeronautics Administration, Taiwan.

Judging from the above information, global aviation accident data mainly focus on the large aircrafts (Maximum Take-Off Weight in excess of 15,000 kg

or 27,000 kg). For local aviation accident data statistics, all size of aircrafts are accounted and categorized. Taking advantage of sharing the same pool of flight operation data from CAA, the statistics of this report adapts the definition of aircraft category used by CAA. The aviation occurrence data presented in this report are confined to all Taiwan domestic aircraft (except military airplanes and unmanned aerial vehicles), including:

- Aircraft of transportation category  
Commercial Jet airplanes (models listed in Table 1)  
Turboprop airplanes (models listed in Table 2)
- General Aviation (models listed in Table 3)
- Public aircraft (models listed in Table 4)
- Ultra-light vehicles

A glossary of aviation and technical terms used in this document can be found in appendix 1. The major references are from the Civil Aviation Act of the Republic of China, Aviation Occurrences Investigation Act (AOIA), Regulations Governing the Investigation of Aviation Occurrence of Civil and Public Aircraft, the Aviation Occurrence Investigation Standard Operation Procedure, and ICAO publications etc.

Table 1 : Types of Taiwan commercial jet airplanes

BOEING	BOEING	AIRBUS	FOKKER	EMBRAER
737	MD-80	A300-600	F-100	190
747	MD-90	A310		
757	MD-11	A320		
767		A330		
777		A340		

Table 2 : Types of Taiwan commercial turboprop airplanes

ATR	FOKKER	DORNIER	DE HAVILLAND	SAAB
ATR72	F-50	Do-228	DHC-8	340

Table 3 : Types of Taiwan general aviation aircrafts

BELL	AEROSPATIALE	KAWASAKI	HILLER	其他
Bell 206	AS-365	BK117	UH-12E	BN-2B
Bell 412				ASTRA SPX
Bell 430				KA32A11BC
				Hawker 400XP
				GV-SP

Table 4 : Types of Taiwan public aircrafts

BELL	AEROSPATIALE	BOEING	SIKORSKY	BEECH
UH-1H(205)	AS-365	B234	S76B	BE200
				BE350

### **ASC Definition and Classification of Occurrences**

Aviation occurrence in the Aviation Occurrences Investigation Act (AOIA) is defined as an occurrence associated with the operation of an aircraft which

takes place between the time any person boards the aircraft with the intention of flight until such time as all such persons have disembarked, in which: (1) A person sustains death or serious injuries; (2) The aircraft sustains substantial damage or missing; or (3) Death or serious injuries of a person or substantial damage of the aircraft nearly occurred.

In terms of the investigation scale, ASC classified the occurrence into one of the following six classes:

Class I. An occurrence of an airplane not by the general aviation nature, resulted in fatality or injury and the airplane was substantially damaged.

Class II. An occurrence of an airplane not by the general aviation nature, resulted in fatality or injury but aircraft not substantially damaged.

Class III. An occurrence of an airplane not by the general aviation nature, not resulted in fatality or injury but resulted in substantial damage to the aircraft.

Class IV. Any occurrence of a helicopter, or an airplane by general aviation or public aircraft resulted in fatality or injury or in substantial damage to the aircraft.

Class V. Serious incidents of all types of aircraft except ultra-light vehicle.

Class VI. An occurrence of an ultra-light vehicle.

The class decides the structure of the ASC on-scene investigation team, the format of a report and the verification procedure of the report.

To establish comparable data sets to those of aviation statistics collected worldwide, Classes I to III are categorized in the same group, where the occurrences lead to fatality, injury and/or substantial damage of the aircraft. Such aviation occurrences are defined as “accident” by ICAO and aviation accident in CAA regulations. These aviation occurrences are sub-divided into fatal occurrence and hull loss occurrence in the aviation occurrence statistics.

## Overview of Taiwan aviation occurrences

From 2001 through 2010, the total number of aviation occurrences in Taiwan was 60, including those Taiwan air carriers' aircraft occurred outside the country. In general, transportation category aircraft occurrences accounted for the most (35). The remaining 25 occurrences were general aviation, public aircrafts, ultra-light vehicles or foreign-registered aircrafts. Of those 60 occurrences, 242 fatalities were resulted, majorly due to the occurrences involving two transportation category aircrafts. Of the Taiwan carriers' transportation category occurrences, 2 were fatal, resulting in 226 fatalities. The details were shown in Table 5.

Table 5 : Aviation Occurrence Statistics in Taiwan, 2001-2010

	Number of Occurrence			Fatalities	
	Total	Fatal	Hull Losses	Total Fatalities	Aboard
<b>Civil Aviation Transport Category</b>					
<i>Commercial Jet airplane</i>	28	1	3	224	224
<i>Turboprop airplane</i>	7	1	1	2	2
<b>Sum</b>	<b>35</b>	<b>2</b>	<b>4</b>	<b>226</b>	<b>226</b>
<b>General Aviation Aircraft</b>	4	2	2	4	4
<b>Public Aircraft</b>	7	2	4	5	5
<b>Ultra-light vehicle</b>	9	4	9	7	7
<b>Occurrences related to Sabotage, hijacking or terrorism</b>	0	0	0	0	0
<b>Foreign-Registered Aircraft Occurrence in Taiwan/ Occurrences Investigated by ASC</b>	5	0	0	0	0
<b>Total</b>	<b>60</b>	<b>10</b>	<b>19</b>	<b>242</b>	<b>242</b>

Note : When an occurrence involved two aircraft, for example: midair collision, airprox, or ground collision; although it was one occurrence investigation, would be counted twice when compiled the statistic data.

## Fatal/ hull loss aviation occurrences in Taiwan, 2010

As shown in the Table 6, totally 5 aviation occurrences occurred in 2010 totally, including 4 local civil aviation transportation category aircrafts and 1 ultra light aircraft. There was no fatality or serious injury of civil aviation transportation category aircrafts. The occurrence of Ultra-light resulted in hull loss but no fatality. The details were shown in Table 6.



Table 6 : Aviation fatal/ hull loss occurrence Statistics in Taiwan, 2010.

	Number of Occurrence			Fatalities	
	All	Fatal	Hull Loss	Total Fatalities	Aboard
<b>Civil Aviation Transportation Category</b>					
<i>Commercial Jet airplane</i>	4	0	0	0	0
<i>Turboprop airplane</i>	0	0	0	0	0
<b>Sum</b>	4	0	0	0	0
<b>General Aviation Aircraft</b>	0	0	0	0	0
<b>Government Aircraft</b>	0	0	0	0	0
<b>Ultra-light Aircraft</b>	1	0	1	0	0
<b>Occurrences of Foreign-Registered Aircrafts Occurred in Taiwan</b>	0	0	0	0	0
<b>Total Sum</b>	0	0	0	0	0

For transportation category aircraft, none of the occurrence resulted in crew/passenger fatal or injured or aircraft hull loss, as shown in the Table7.

Table 7 : Fatalities or injuries caused by transportation category aircrafts in Taiwan, 2010

Injuries Level	Flight Crew	Cabin Crew	Passengers	Other	Total
Fatal	0	0	0	0	0
Serious	0	0	0	0	0
Minor	0	0	0	0	0
Total	0	0	0	0	0

## Occurrences involving civil transportation aircrafts

The cumulative numbers of passengers over the past 10 years were 247 million passengers. Of the passengers on board, 206 passengers were reported fatal. The majority of fatalities were caused by the catastrophic occurrence, CI611 occurrence in 2002

### By the number of passenger fatalities rate

Cumulative data of fatal occurrences, fatalities and injuries of passenger involving transportation category aircraft in Taiwan have been listed and summed over the last decade, as shown in Table 8. The fatality rate involving transportation category aircraft occurrences was 0.84<sup>9</sup> fatalities per million passengers over the past decade. It's about 0.01 more than that of 2009. This was resulted from on board passengers of 2010 was less than those of 2009 by 930 thousand passengers. The fatality rate was about 1 fatality per 1.2 million passengers. The fatality rate could also be shown as 0.0364 fatalities per 100 million passenger-km, or in flight mileage as 1 fatality per 27 million km.

Table 8 : Aviation safety performance of transportation category aircraft in Taiwan

Year	Fatalities	Serious Injured	Total Aboard (Millions)	100 million Passenger-km	Death/Million Passenger Aboard	Death/100 million passenger-km
2001	0	0	25.38	486.04	0	0
2002	206	0	24.67	510.58	8.35	0.4035
2003	0	0	22.26	466.11	0	0
2004	0	0	26.17	572.68	0	0
2005	0	0	26.65	607.94	0	0
2006	0	4	26.69	630.43	0	0
2007	0	0	24.79	632.87	0	0
2008	0	6	22.1	585.06	0	0
2009	0	0	22.3	569.2	0	0
2010	0	0	25.4	600.5	0	0
Total	206	10	246.41	5661.41	0.84	0.0364

Note: Fatalities not including flight crew and cabin crew.

### Fatal occurrence rate with 5-year moving average

The average occurrence rates of local turboprop airplanes of civil transportation category airplane were decreased since the year 2002. The occurrence rates were all zero from year 2007 to 2010. The occurrence rates of turbojet airplanes were also decreased since the year 2002. From the year

<sup>9</sup> The global fatalities rate from aviation accidents for 2010 was 0.32 (per million passengers) announced by IATA.

2007 to 2010, the 5 years moving average occurrence rates were all zero (0.0) which were the same as those of turboprop airplanes. Figure 14 is a 5-year moving average of fatal occurrence rate by million departures of Taiwan transportation category airplanes. From the figure, it showed clearly the fatal occurrence rates per million departures of local transportation category airplanes over the past decade.

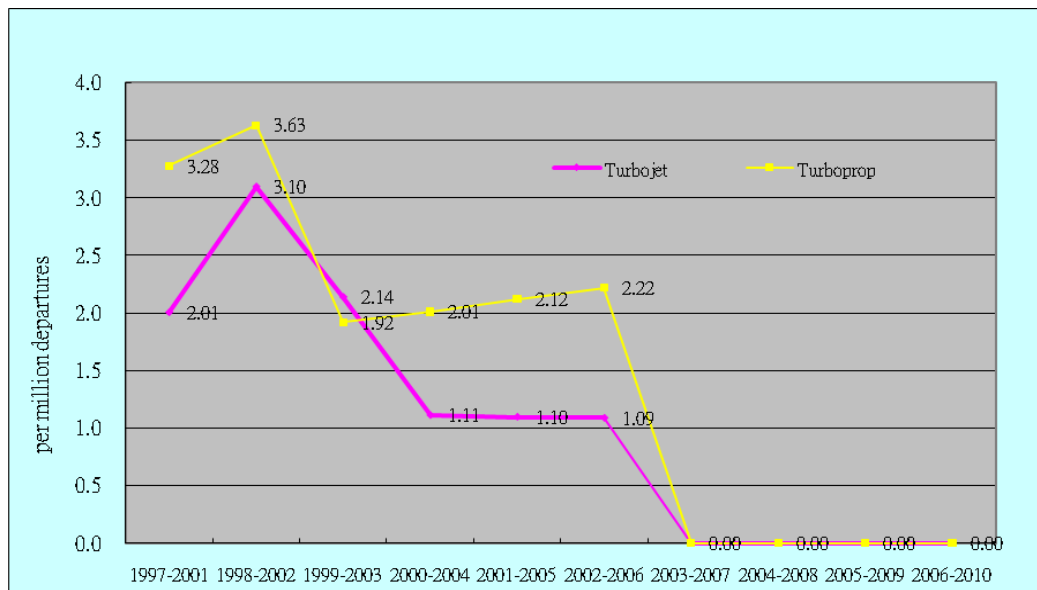


Figure14 : 5-year moving average of fatal occurrence rate by million departures, Taiwan transportation category airplane, 2001-2010

### Hull loss occurrence rate with 5-year moving average

From 2007 through 2010, 5-year moving averages of hull loss occurrence rate in Taiwan were all zero. The commercial jet airplanes had a higher hull loss occurrence rate than fatal occurrence rates. This difference suggested that there were some occurrences where commercial jet airplanes hull loss occurrence resulted in hull loss, but without fatalities. The 5-year moving average hull loss rate of turboprop airplanes was 1.25 in year 2010, which was higher than that of 2009 (1.17). This was resulted from the cumulative numbers of occurrence were the same while the number of departures of the year 2010 were less. The 5-year moving average hull loss rate of Taiwan transportation category airplanes from 2001 to 2010 was shown in Figure 15.



Figure15 : 5-year moving averages of hull loss occurrence rates by million departures, Taiwan transportation category airplane, 2001-2010

**Hull loss occurrence rate with 10-year moving average**

The 10-year moving averages rates of transportation category airplanes were illustrated in Figure 16. In recent 10 year, the hull loss occurrence rate of commercial jet airplane was 0.55 per million flight hours or 1.75 per million departures. In figure 17, the hull loss occurrence rate of turboprop airplane was 1.31 per million flight hours or 1.25 per million departures. From 2002 to 2010, the hull loss occurrence rate of commercial jet airplane was going down with little rising in year 2007. The 10-year moving average hull loss occurrence rates for turboprop airplanes showed a decreasing trend except that the rates were kept constant in 2009 and 2010 over the past decade.

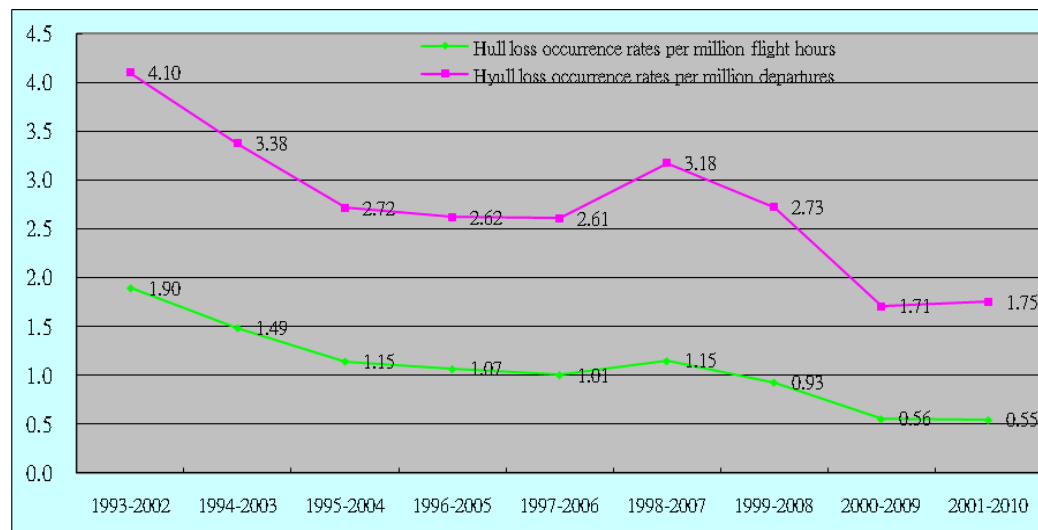


Figure16 : 10-year moving averages of hull loss occurrence rates of Taiwan commercial jet airplanes

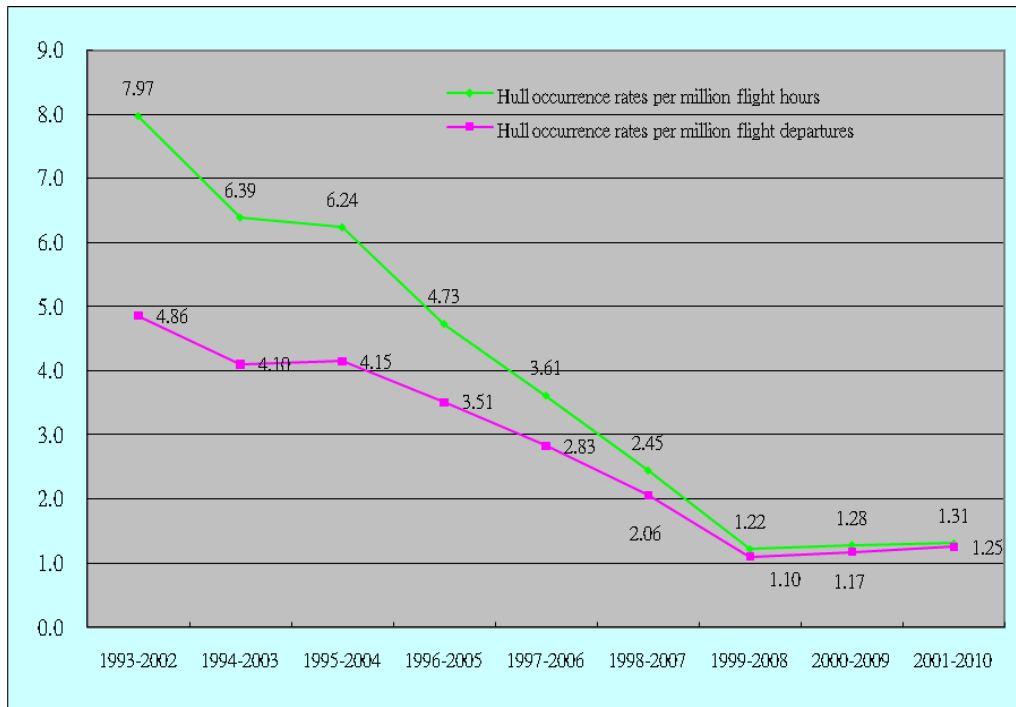


Figure17 : 10-year moving averages of hull loss occurrence rates of Taiwan turboprop airplanes

**Aviation accident rate ( by ICAO definition )**

Referring to the “accident” definition of ICAO, the number of aviation accidents involving transportation category airplane in Taiwan was 17 over the past 10 years. The average accident rate was 2.72 per million flight hours, or 6.77 per million departures. The yearly number and rate distribution of accidents was shown in Figure 18.

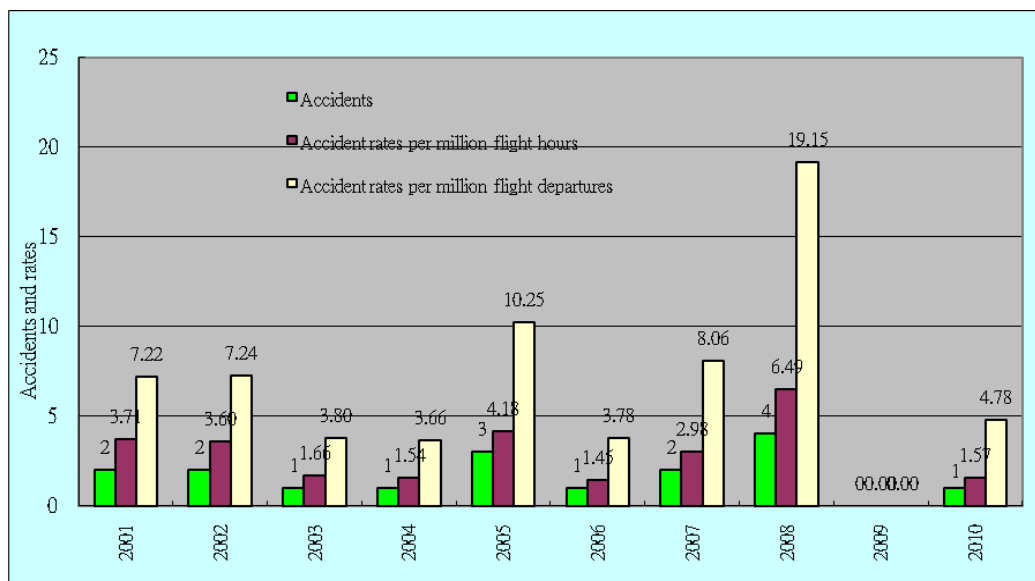


Figure18 : Numbers and rates of transportation category airplane accidents (ICAO definition), 2001-2010

Of the total 17 accidents, 14 of them were related to commercial turbojet airplanes. Of these 14 commercial turbojet accidents, 3 resulted in hull loss or fatalities, a total of 224 fatalities. There were 3 accidents involving turboprop airplanes. Of these 3 accidents, 1 accident resulted in 2 fatalities. Together, there were 3 transportation category airplanes accidents resulting in hull loss or fatalities. The details were shown in Table 9.

Table 9 : Number of transportation category airplanes accidents (by ICAO definition), 2001-2010

	Total number of accidents	Numbers of hull loss or fatal accidents	Fatalities
Commercial jet airplanes	14	3	224
Turboprop airplanes	3	1	2
Total	17	4	226

From the severity level of injury and aircraft damage, a total of 17 accidents were distributed to different levels of severity as shown in Figure 19. Most of the occurrences during that period were 「serious injuries w/o aircraft substantial damage」 and 「substantial damage only accidents」, each had 6 and 7 cases respectively. Numbers for 「fatal/serious injury w/o aircraft substantial damage accidents」 were 2, and 「hull loss w/o injuries accidents」 were 2 as well.

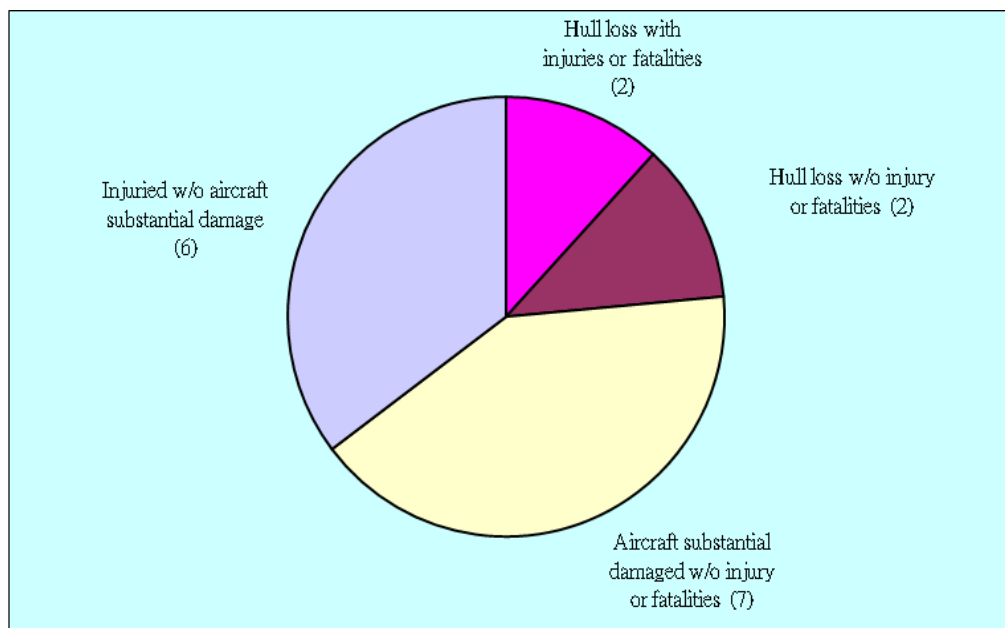


Figure19 : Transportation category accidents by severity classification, 2001-2010

### Aviation occurrence rate ( by ASC classification )

The accident defined by ICAO has a wide range which would not differentiate the nature of accidents from statistics perspective. Accidents as defined by ICAO might be classified into same category with significant different level of severity. Differently the ASC classified occurrences into six

classes as mentioned previously, where Class-I, II, III, and V were related to occurrences involving transportation category airplanes. Occurrences rates of transportation category commercial jet at each class were shown in Table 10. The most obvious differences between 2010 and 2009 were that the number of 2010 Class III and Class V occurrences increased from zeros to 1 and 3 cases of 2009. Therefore, the 10-year moving average occurrence rates increased to become 1.75 and 5.25 respectively, Take Class-I as an example, it included those occurrences of highest level of damage and injury, and in 2010 the 10-year average accident rate for Class-I was 0.18 per million flight hours.

Table 10 : Commercial jet airplane occurrence rate by ASC classification, 2001- 2010

year	number of occurrences				flight Hours	occurrence rate per million flight hours			
	class-I	class-I	class-II	class-V	hrs	class-I	class-II	class-III	class-V
2001	0	0	1	1	475,313	0.00	0.00	2.10	2.10
2002	1	0	0	2	488,564	2.05	0.00	0.00	4.09
2003	0	0	1	1	515,190	0.00	0.00	1.94	1.94
2004	0	0	1	1	557,856	0.00	0.00	1.79	1.79
2005	0	2	0	1	595,662	0.00	3.36	0.00	1.68
2006	0	1	0	1	616,984	0.00	1.62	0.00	1.62
2007	0	0	2	1	604,110	0.00	0.00	3.31	1.66
2008	0	3	1	2	548,910	0.00	5.47	1.82	3.64
2009	0	0	0	0	518,426	0.00	0.00	0.00	0.00
2010	0	0	1	3	571,651	0.00	0.00	1.75	5.25
Total	1	6	7	13	5,492,666	0.18	1.09	1.27	2.37

According to the Table 11, the occurrence rates of transportation category turboprop airplane at each class, the occurrences in Class-I had an average of 1.31 per million flight hours in 2010. There were no big differences to compare with the Class I occurrence rate of 1.28 per million flight hours of 2009. This rate was obviously higher than the Class-I occurrence rate of commercial turbojet, 0.18 per million flight hours. If using the million departure as the basis, turboprop in Class-I accidents had 1.25 per million departures and commercial turbojet had 0.58 per million departures. The details were shown in Appendix 6 and Appendix 7.

Table 11 : Turboprop airplane occurrence rate by ASC classification, 2001- 2010

year	number of occurrences				flight Hours	accident rate per million flight hours			
	class-I	class-II	class-III	class-V		class-I	class-II	class-III	class-V
2001	0	0	1	1	63,857	0.00	0.00	15.66	15.66
2002	1	0	0	1	67,401	14.84	0.00	0.00	14.84
2003	0	0	0	1	86,700	0.00	0.00	0.00	11.53
2004	0	0	0	0	90,541	0.00	0.00	0.00	0.00
2005	0	0	1	0	122,058	0.00	0.00	8.19	0.00
2006	0	0	0	0	74,006	0.00	0.00	0.00	0.00
2007	0	0	0	0	65,943	0.00	0.00	0.00	0.00
2008	0	0	0	0	67,524	0.00	0.00	0.00	0.00
2009	0	0	0	1	61,822	0.00	0.00	0.00	16.18
2010	0	0	0	0	66,234	0.00	0.00	0.00	0.00
Total	1	0	2	4	766,086	1.31	0.00	2.62	5.24

When looked at the occurrences of overall transportation category in Taiwan, a 5-year moving average of occurrence rate was shown in Figure 20, where the occurrence rate was based on per million flight hours. Prior to 1998, documented statistics were limited, only aviation accident would be recorded, serious incidents were not officially recorded. Until the promulgation of “Regulations for Aircraft Accident and Serious Incident Investigation” on July 2000, the authority for ASC to conduct investigation on serious incidents was finally proclaimed in writing. Therefore, when looked at the 5-year moving average from the perspective of classification, the average occurrence rate in Class-V was more reliable since 2004.

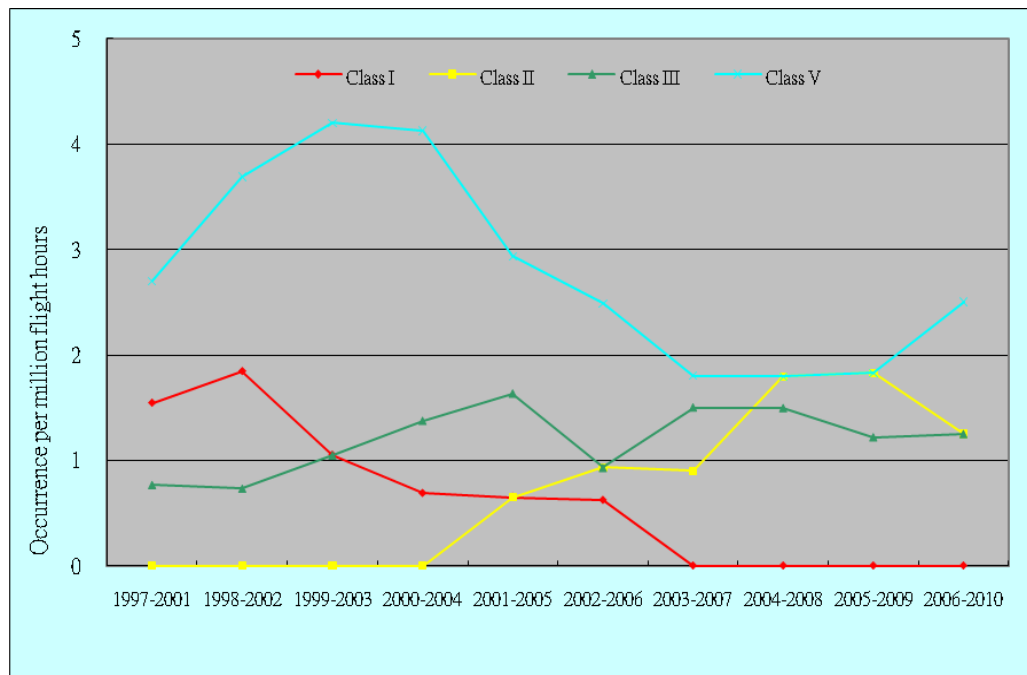


Figure20 : 5-year moving average occurrence rate of transportation category airplane per



million flight hours by ASC's classification

The trend in the occurrence rate of Class-I was shown as the red line in Figure 20. The moving average for Class-I occurrences was decreased year over year since 2002, and achieved the zero-accident record per million flight hours flown in 2007. The occurrence rate of 2010 was zero too. The numbers of Class-II occurrences had always been low until an increasing trend since 2005. In 2005, there were 2 occurrences of clear air turbulence resulting in injuries and in 2006 there was a mid-air collision, which causing the upward trend. The upward trend continued to 2008 because of 2 occurrences related to turbulence and 1 occurrence related to ground operation. The rate decreased to 1.25 per million flight hours in 2010 because of the subtraction of 2 clear air turbulence occurrences occurred in 2005. Class-III occurrences trend increased gradually over the years, and did not seem to go down significantly in the recent five years. For occurrences in Class-V, the occurrence rate was at highest in 2003, resulted in 4.2 per million flight hours, the rate gradually decreased and then kept constant from 2007 to 2009. Because of 3 occurrences in 2010, the rate increased to 2.5 per million flight hours.

As shown in Figure 21, when looking at the occurrence rate based on per million departures, each class of occurrences then still had similar trend as those observed from the rates per million flight hours.

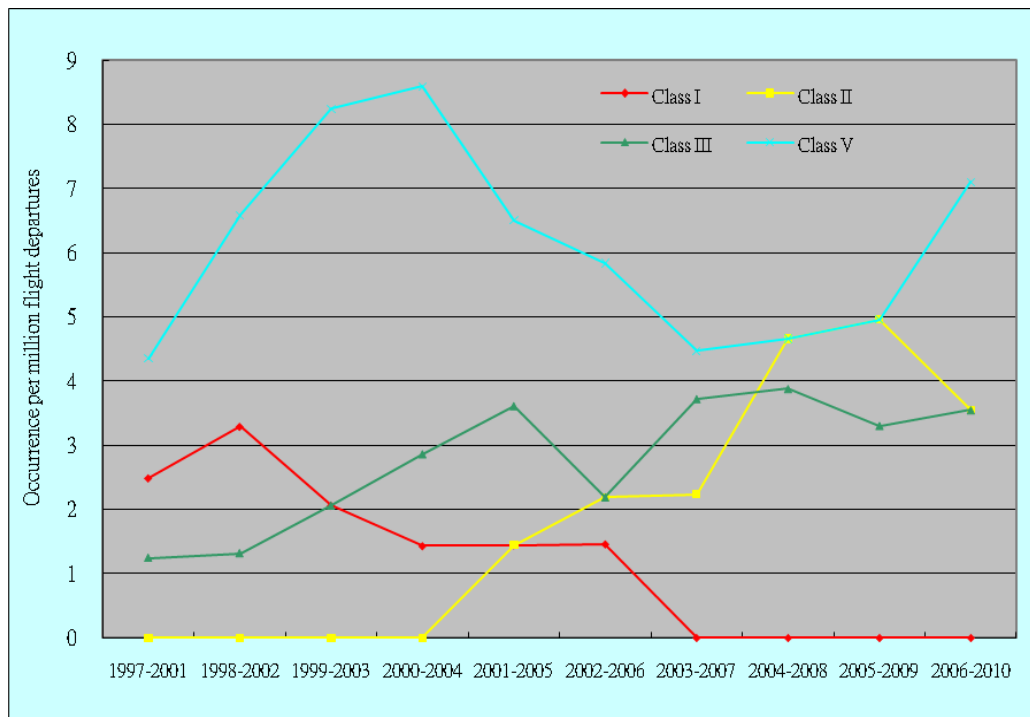


Figure21 : 5-year moving average occurrence rate of transportation category airplane per million departures by ASC's classification

As indicated from the above statistic changes in aviation transport category occurrence for each class, numbers of Class-I accidents, which required

large-scale investigations, decreased over the years; whereas, the number of Class-III incidents, which required smaller-scale investigation, increased gradually. Such phenomenon can be interpreted as: despite the numbers of aviation occurrences, the severity level of those occurrences was less in recent years. The number of Class-II accidents was increased; however they were excluded from the “Statistical Summary of Commercial Jet Airplane Accidents Worldwide Operations” by Boeing when calculating the fatality rates and hull-loss rates. Class-V occurrences had the smallest scale of investigation. This kind of occurrences did not result in fatality/injuries nor cause any substantial damages to the aircraft. From the viewpoint of public interest, Class-V occurrences would have less direct impact on passengers’ safety. Nonetheless, by investigating such kind of occurrences could effectively improve the safety of aviation because of the available evidence. The rate also showed a downward trend for Class-V occurrences since 2000. The average occurrence rate of Class V serious incident was increased in 2010 because of 2 occurrences resulted from runway excursion. Runway excursion was also the dominant causes of global aviation accident in 2010.

In accordance with the definitions of the occurrences classified by the ASC, there were total 34 cases of transportation category occurrences over the last ten years. The percentages of occurrences for each class were shown in Figure 22, where Class-V, indicating the smallest scale of investigation, was cited in 50 percent, and the Class-I occurrences, involving the largest scale investigations, accounted for 6 percent.

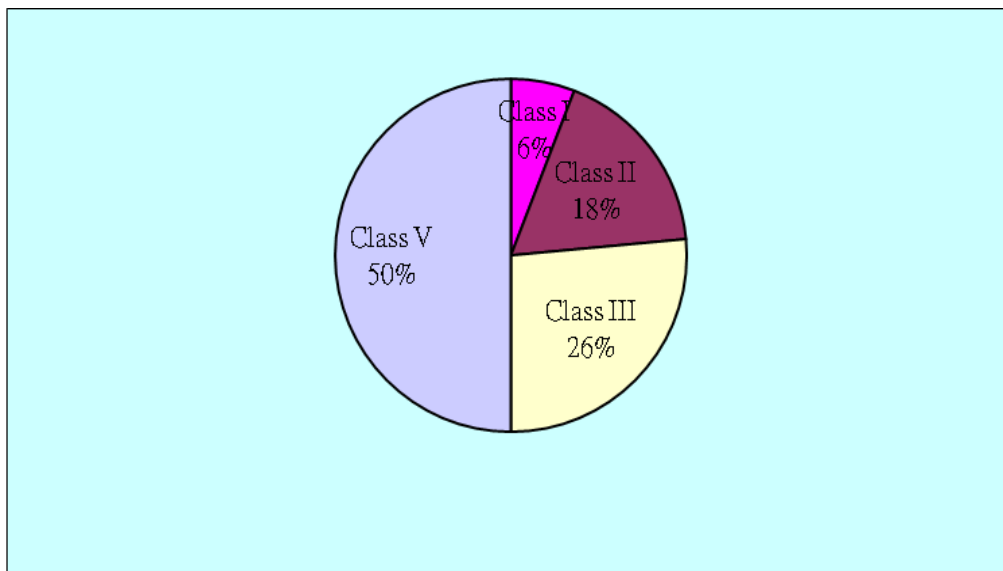


Figure22 : Occurrences distribution of transportation category airplane 2001-2010 by ASC Classification

**Statistic Analysis of Transport Category Occurrences**

**Phase of Flight :**

When focusing at the occurrence numbers for each phase of flight, which was defined by International Civil Aviation Organization (ICAO), there were total 34 transportation category occurrences happening at different phases over the last decade as shown on Figure 23. Among all these occurrences, 12 of them were the most prevalent cited occurrences taken place at landing phase, as which included 4 Class III, and 8 Class V occurrences. Cruising phase was the second most prevalent phases accounting for 8 occurrences which included 2 Class I, 5 Class II and 1 Class V occurrences.

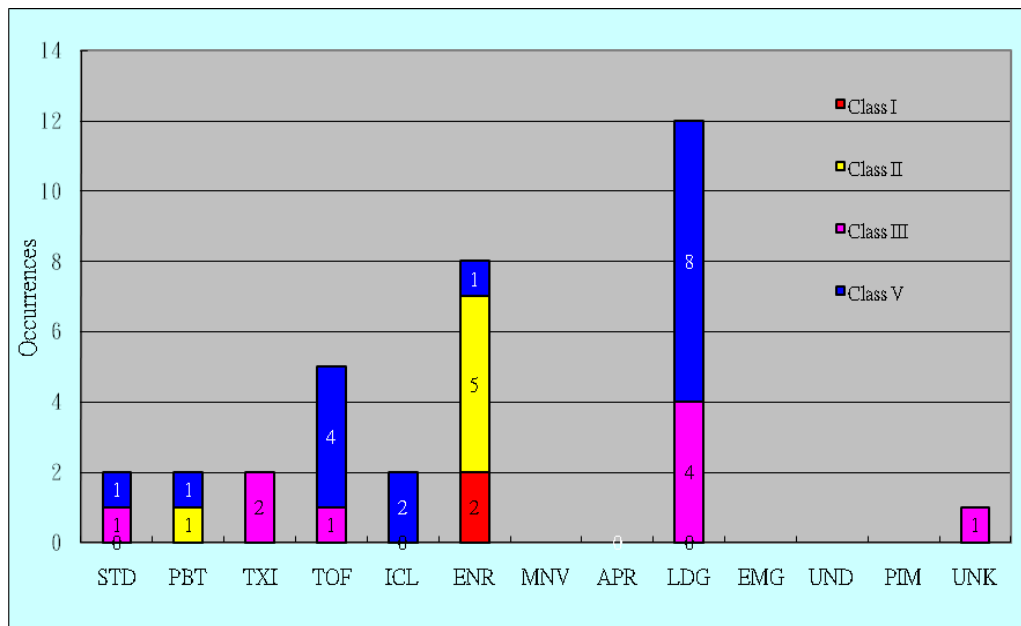


Figure23 : Occurrences distribution of transportation category airplane 2001-2010 by flight phase

**Occurrence category by ICAO definition :**

There were total 34 transportation category airplane occurrences happening over the last ten years as shown in Figure 24. The runway excursions overall were the most frequent and a total of 7 occurrences were reported. The second most frequent occurrences were abnormal runway contact, accounting for 6. When further analyzed those transportation category occurrences with ASC occurrence classifications, the most frequent Class I occurrence were the SCF-NP (system/component failure or malfunction/ non-powerplant) and ICE (icing). Although the highest numbers of occurrences came from the category of runway excursions, 6 out of 7 cases were Class V, a smaller scale of occurrences.

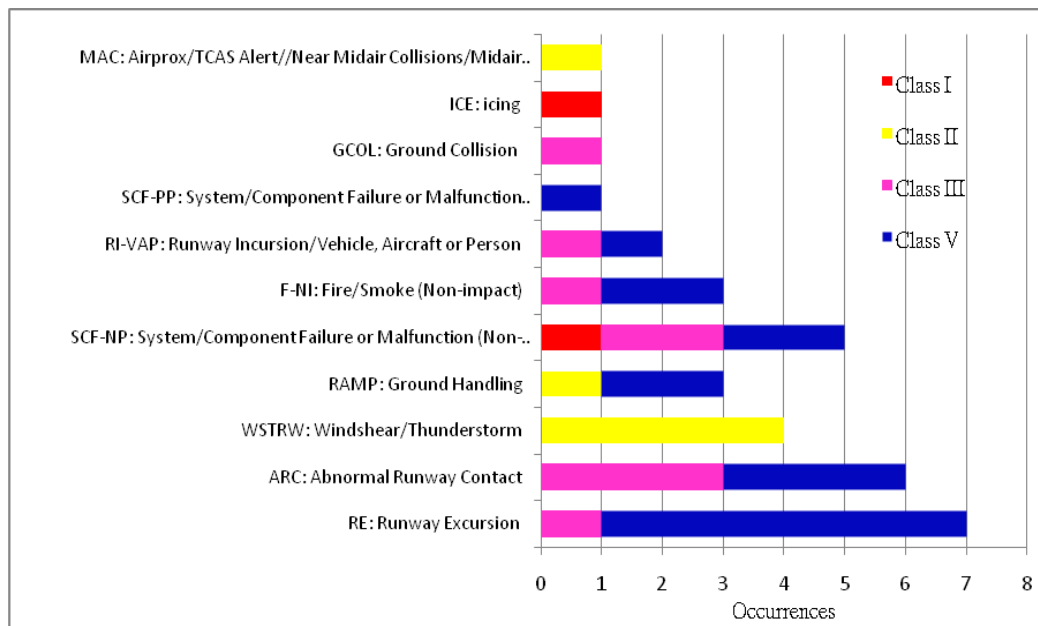


Figure 24 : Occurrences distribution of transportation category airplane 2001-2010 by ICAO occurrence category

#### Causes/Factors of Occurrences :

The National Transportation Safety Board (NTSB) often established more than one cause or factor to an aviation accident using three broad categories: personnel, environment, and aircraft related. Personnel related classification included pilot and other personnel such as: maintenance personnel, air traffic controller, and management personnel. Environmental related categories included those causes related to weather, airport facilities, air traffic facilities, time of the accident (day or at night), and terrain conditions. Then in the category of aircraft related cause or factors, failures of aircraft system and equipment, engines, and structure or performance of the aircraft were all belonging to this category. Broad causes and/or factors for airplane of transport category occurrences over the last ten years were shown in Figure 25. In total, there were 34 occurrences, and 32 investigations of them were closed.

Within each occurrence, there was at least one cause that explained why the occurrence had happened, and some might have two or even more causes and factors. As shown in Figure 25, personnel were cited as causes/factors in 71.9 percents (46.9 percent were pilot related, 25.0 percent were other personnel such as maintenance personnel and air traffic controller related), followed by 28.1 percents of environment-related causes/factors and by 21.9 percent of aircraft-related causes/factors as indicated in the figure

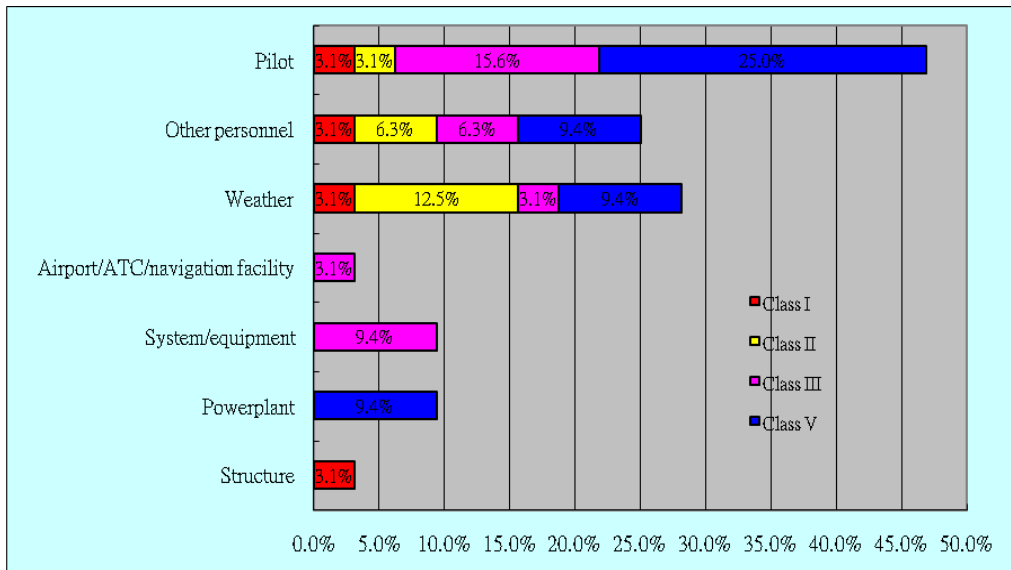


Figure25 : Broad causes/factors for airplane of transport category, 2001-2010.

## Occurrences Involving General Aviation and Helicopter

In the general aviation (GA) industry, the majority of operation is carried out by helicopters with the exception of few turboprop airplanes. The ASC classified the occurrence of general aviation aircrafts as Class IV occurrence. Few corporations provide both transportation service and GA service. The following statistics were all related to general aviation service aircraft and helicopters. As indicated in Table 12, 4 occurrences occurred over the past ten years, 2 of them were fatal occurrences, resulting in 2 hull losses and 4 fatalities. The other 2 occurrences have no fatality or hull loss. This then led to an average of 7.35 occurrences per 100 thousands hours, 5.51 hull loss occurrences and 3.67 fatal occurrences per 100 thousands hours over the past decade. The fatal occurrences occurred in 2001 and 2009. No occurrence occurred in 2010.

Table 12 : Occurrence rate of general aviation / helicopter of transport category, 2001-2010

Year	Number of occurrences			Aboard Fatalities	Total Flight Hours	Accident Per 10 Thousands Hours		
	All	Fatal	Hull Losses			Accident Rate	Fatalities Rate	Aircraft Hull Loss Rate
2001	1	1	1	2	5,162	19.37	19.37	19.37
2002	1	0	0	0	10,087	9.91	0.00	0.00
2003	0	0	0	0	5,998	0.00	0.00	0.00
2004	0	0	0	0	4,851	0.00	0.00	0.00
2005	0	0	0	0	4,319	0.00	0.00	0.00
2006	0	0	0	0	4,404	0.00	0.00	0.00
2007	0	0	0	0	4,961	0.00	0.00	0.00
2008	1	0	1	0	5,032	19.87	0.00	19.87
2009	1	1	1	2	4,859	20.58	20.58	20.58
2010	0	0	0	0	4,753	0.00	0.00	0.00
Total	5	2	3	4	54,426	7.35	3.67	5.51

### Occurrences Involving Public Aircraft

From 2001 to 2010, there were a total of 8 public aircraft occurrences, which resulted in 2 fatal occurrences and 5 hull loss occurrences. The statistics chart was shown as Figure 26.

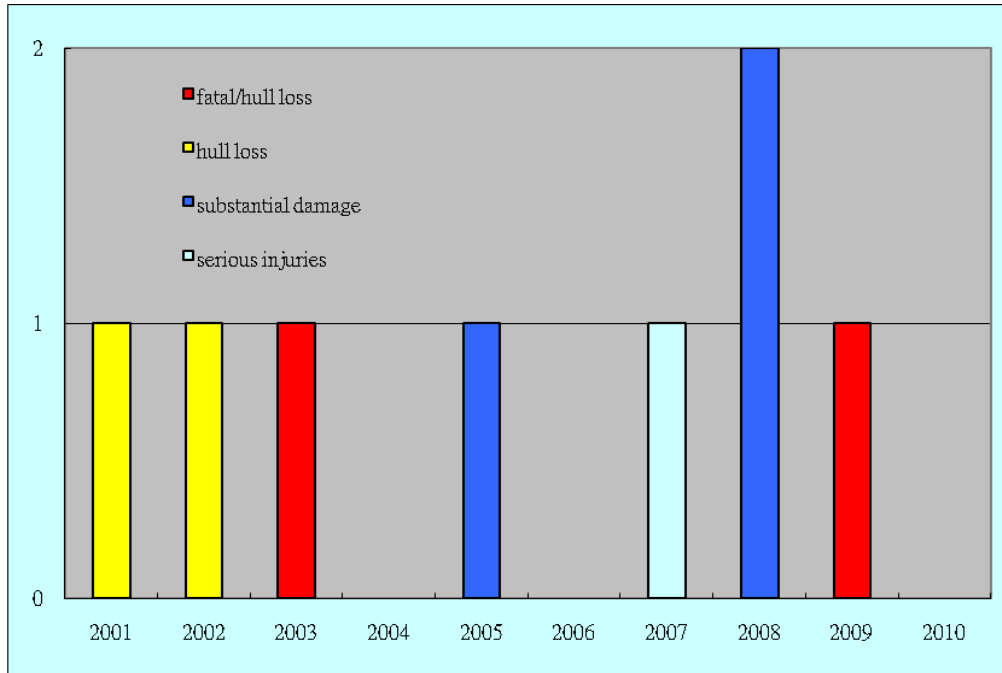


Figure26 : Occurrences statistics of public aircrafts, 2001-2010

## Ultra-light Vehicle Occurrences

The ultra-light vehicles were not under supervision of Civil Aviation Act of the Republic of China until 2004. Later in the same year of 2004, in June, the investigation of any occurrences of ultra-light vehicle has formally been part of the investigation scope of Aviation Safety Council. There were only limited documented accident data on ultra-light vehicle and the official record on ultra-light vehicle accidents only showed the data from 2004 to 2010. As indicated in Table 13, a total of 9 occurrences occurred during these four years, and 4 of them were fatal accidents resulting in 7 fatalities. All 9 occurrences were resulted in hull loss.

Table 13 : Ultra-light vehicle occurrences, 2004- 2010

Year	Number of occurrences	Fatal occurrences	Hull losses occurrences	Fatalities
2004	1	1	1	1
2005	2	1	2	2
2006	1	0	0	1
2007	3	1	2	3
2008	0	0	0	0
2009	1	1	1	2
2010	1	0	1	0
Total	9	4	9	7



## Status of Tracking Safety Recommendations and associated action plans

### Safety Recommendations Statistics

The purpose of the safety investigation for aviation occurrences is to prevent similar occurrences from happening again. When probable causes and contribution factors of occurrences were found through systematic investigation, the council would provide appropriate recommendations to each associated units. The recommendations recipients would draft corrective actions and execution plan to solve potential safety problems.

From April 1999 to February 2011, there were 57 aviation occurrences investigation completed. In total, the council has made 515 aviation safety recommendations. Within these recommendations, a maximum of 50.1% were presented to associated organizations of Taiwan government agencies, approximately 32.2% were presented to aviation industries, and approximately 17.7% were presented to foreign associated organizations (as shown in Figure 27).

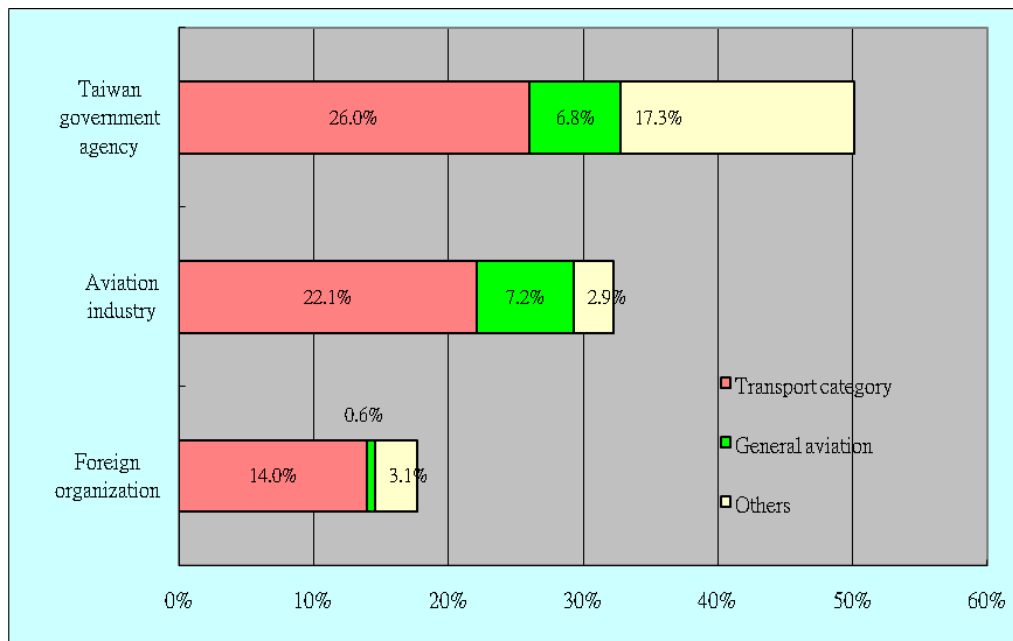


Figure27 : Statistics of Aviation Safety Recommendations, 1999.4-2011.2

## Tracking of Action Plans/ Proposals for Aviation Safety Recommendations

In order to positively solve the investigation discovered aviation safety issues, if the safety recommendation recipient was part of Taiwan government, the recipient should then establish corresponding action plans and/or proposals. These action plans/ proposals will be supervised by Research, Development and Evaluation Commission (RDEC), Executive Yuan, and tracked by ASC. Usually ASC performs the evaluation of each action plan for RDEC.

After evaluating each action plan/ proposal, ASC will then categorize these plans into three statuses- “accepted”, “under supervision”, and “under evaluation”. ASC then submits the evaluation status to RDEC. When the specific action plan was carried out, the plan will be labeled as “accepted” and ASC will also recommend the RDEC to close the item. If the action plans required longer time, usually over years, to complete, the item will be supervised by RDEC continuously and then label as “under supervision”. Such items have regular follow-ups in every six months until the cases closed. For the rest of the plans/ proposals, during the process of examination or organizing by other associated units, these plans will be labeled as “under evaluation”.

### The Statistics of Action Plans Status

From April 1999 to December 2010, there were total 256 action plans being presented by related Taiwan government agencies according to the aviation safety recommendations. Currently, 8 of them is in the status of “under supervision”, and 1 of them is in the status of “under evaluation”. Of all the plans, 247 plans were identified as “accepted”. The statistics was shown in Figure 28, where the percentage of accepted plans was as high as 96.5%, with only 3.1% in the state of “under supervision”.

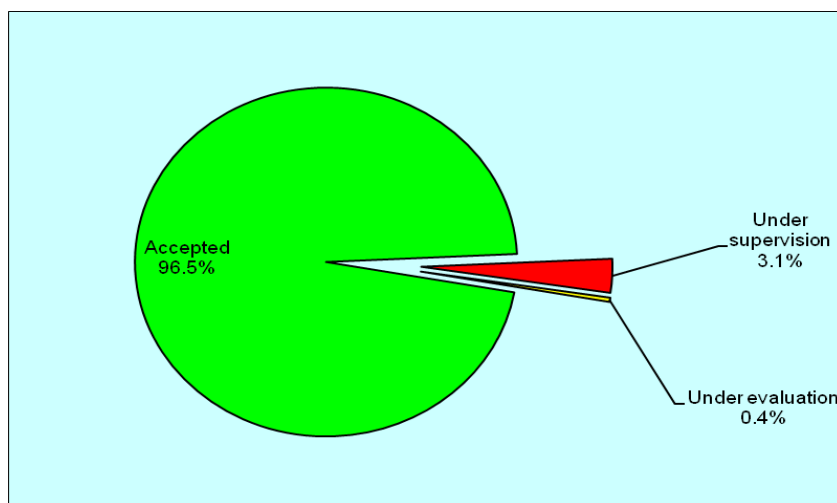


Figure28 : Statistics of action plans status

## Definitions of Terms

### Definitions of Civil Aviation Legal Terms

**Aircraft** : means any machine that can derive support in the atmosphere from the reactions of the air other than the reactions of the air against the earth's surface.

**Aeroplane** : means a power-driven heavier-than-air aircraft, deriving its lift in flight chiefly from aerodynamic reactions on surfaces which remain fixed under given conditions of flight.

**Helicopter** : means a heavier-than-air aircraft supported in flight chiefly by the reactions of the air on one or more power-driven rotors on substantially vertical axes.

**Civil Air Transport Enterprise** : An enterprise engaged in the carriage of passengers, baggages, cargo and mail with civil aircraft to earn profits. (Here in this document the aircraft operated by Civil Air Transport Enterprise is used to called "transport category aircraft" or "transportation category aircraft")

**General Aviation Enterprise** : Industries that use aircrafts to earn profits by offering sightseeing in the sky, prospecting, photographing and measuring, fire protection rescues first aid, towing, spraying, and all other authorized purposes except carrying and transporting passengers, merchandises, and mails/parcel. (Here in this document the aircraft operated by General Aviation Enterprise is used to called "General Aviation aircraft" or "GA Aircraft")

**Ultra-light vehicle** : "Ultra-light vehicle" means a powered aircraft which is used for manned operation in the air, has a maximum takeoff weight of five hundred and ten kilograms or less, and has a takeoff speed of less than sixty-five kilometers per hour at maximum takeoff weight or a power-off stall speed which does not exceed sixty-four kilometers per hour.

**Accident** : An aircraft accident means an occurrence associated with the operation of an aircraft which takes place between the time any person boards the aircraft with the intention of flight until such time as all such persons have disembarked, in which such person is fatally or seriously injured or in which the aircraft is substantially damaged or missing.

**Serious Incident** : A serious incident means an occurrence associated with the operation of an aircraft which takes place between the time any person boards the aircraft with the intention of flight until such time as all such persons have disembarked, which may cause aviation accidents.

**Incident** : Any events associated with the operation of an aircraft which takes place between the time any person boards the aircraft with the intention of flight until such

time as all such persons have disembarked, and are not belong to aircraft accident or serious incident mentioned above.

**Definition of Terms in Aviation Occurrence Investigation Act and ASC internal Standard Operation Procedures :**

Aviation occurrence: An occurrence associated with the operation of an aircraft which takes place between the time any person boards the aircraft with the intention of flight until such time as all such persons have disembarked, in which:

- (1) A person sustains death or serious injuries;
- (2) The aircraft sustains substantial damage or missing; or
- (3) Death or serious injuries of a person or substantial damage of the aircraft nearly occurred.

Investigation Report : A report prepared by the Investigator-in-Charge (IIC) compiling submissions from all technical sub-groups in accordance with the format administered by the International Civil Aviation Organization (ICAO), containing factual information, analysis, conclusions, and aviation safety recommendations reviewed and approved under this Act.

Aviation Occurrence Investigation : A process consisting of aviation occurrence identification, gathering, compiling, and analysis of factual data, probable causes identification, submission of safety recommendations, and investigation report preparation

Civil aircraft : An aircraft that is used for the purposes of civil air transportation services or general aviation services has completed the process of registration and airworthiness inspection in the civil aeronautics administration authorities.

Public Aircraft : An aircraft owned or used by a government agency to carry out official duties, excluding the military aircraft administered by the Ministry of Defense.

**Terms in Aviation Occurrence Investigation Standard Operation Procedures for Civil Aircraft and Public Aircraft :**

Death or serious injuries : A person is killed or injured as a result of any of the following :

- (I) Person being in the aircraft;
- (II) Person directly contacts with any part of the aircraft, including the parts that have been detached from it, or
- (III) person directly exposed to jet blast,

With exception when the injuries are from natural causes, self-inflicted or inflicted by other persons, or when the injuries are to stowaways hiding outside the areas normally available to the passengers and crew.

Injury : Any of which in the following :

- (I) requires hospitalization for more than 48 hours, commencing within 7 days from the date the injury was received;

- (II) results in a fracture of any bone (except simple fractures of fingers, toes, or nose);
- (III) causes severe hemorrhage, nerve, muscle, or tendon damage;
- (IV) involves any internal organ;
- (V) involves second- or third-degree burns, or any burns affecting more than 5% of the body surface;
- (VI) proved to be exposed to radiation, or contaminated with radioactive material.

**Substantial Damaged** : Damage or Failure which adversely affects the structural strength, performance, or flight characteristics of the aircraft, and which would normally require major repair or replacement of the affected component. Engine failure or damage limited to an engine if only one engine fails or is damaged, bent fairings or cowling, dented skin, small puncture holes in the skin or fabric, ground damage to rotor or propeller blades, and damage to landing gear, wheels, tires, flaps, engine accessories, brakes, or wingtips are not considered “substantial damage” for the purpose of this part.

**Missing** : When the official search, so designated by the ASC, is terminated and the wreckage has not been located, or has been located but found to be inaccessible or impossible to retrieve the evidence essential to the investigation.

**Accredited Representative, AR** : A person who is designated by the foreign country to which the aircraft involved in an occurrence is registered, the country that owns the aircraft, the country where the designer and/or manufacturer of the aircraft is located, the country whose nationalities are casualties of the occurrence, or the country that in any case is involved in the occurrence to participate in the investigation led by ROC.

### **Definitions of Terms for Aviation Occurrence Investigation Standard Operation Procedures used by the Aviation Safety Council :**

**Preliminary Report** : The report written within 30 days of the occurrence, based on the data and limited information obtained during the early stages.

**Factual Data Report** : The report is the basis for follow-up analysis and composition of investigation reports. Factual data report is the factual information consented by the entire investigation team. The investigating director composed the report according to the information from each groups, and also integrating proposals by specialized conveners and the members of other investigation teams.

**Preliminary Draft Report** : It is the initial draft composed by the investigating director and it is the earlier stage of the final draft report. The content includes factual information, an analysis, and non-categorized conclusions. The purpose of this report is to organize the ideas and suggestions from the associated units for the final draft report.

**Final Draft Report** : After the investigation, the investigating director combines and organizes all the information proposed by each specialized teams. The content of this report includes several key subjects, such as factual information, an analysis, finalized conclusions, and a list of aviation safety recommendations.

Final Report : After the final draft report is approved by the council, it will become an official final report.

Interim Flight Safety Bulletin : For anything found during the process of investigation that affects the aviation safeties, which should be reported to the associated organizations and industries as soon as possible.

Finding : The conclusion acquired from the factual information and analysis of the investigation of aviation accidents.

Safety Recommendation : Recommendations which are based on findings of the investigation, may address deficiencies that do not pertain directly to what is ultimately determined to be the cause of the accident.

Findings related to Probable Causes : The findings related to probable causes identify elements that have been shown to have operated in the accident, or almost certainly operated in the accident. These findings are associated with unsafe acts, unsafe conditions, or safety deficiencies associated with safety significant events that played a major role in the circumstances leading to the accident.

Findings related to Risk : The findings identify elements of risk that have the potential to degrade aviation safety. Some of the findings in this class identify unsafe acts, unsafe conditions, and safety deficiencies, including organizational and systemic risks that made this accident more likely; however, they cannot be clearly shown to have operated in the accident alone. Further, some of the findings in this class identify risks that are unrelated to this accident, but nonetheless were safety deficiencies that may warrant future safety actions

Other Findings : Other findings identify elements that have the potential to enhance aviation safety, resolve an issue of controversy, or clarify an issue of unresolved ambiguity. Some of these findings are of general interests that are often included in the ICAO format accident reports for informational, safety awareness, education, and improvement purposes.

### **Definitions of Terms Used by the International Civil Aviation Organizations :**

Accident: An occurrence associated with the operation of an aircraft which takes place between the time any person boards the aircraft with the intention of flight until such time as all such persons have disembarked, in which:

- a) a person is fatally or seriously injured as a result of
  - being in the aircraft, or- direct contact with any part of the aircraft, including parts which have become detached from the aircraft, or
  - direct exposure to jet blast,**except** when the injuries are from natural causes, self inflicted or inflicted by other persons, or when the injuries are to stowaways hiding outside the areas normally available to the passengers and crew: or
- b) the aircraft sustains damage or structural failure which:
  - adversely affects the structural strength, performance or flight characteristics of the aircraft, and

- would normally require major repair or replacement of the affected component,

**except** for engine failure or damage. when the damage is limited to the engine, its cowlings or accessories: or for damage limited to propellers, wing tips, antennas, tires, brakes, fairings, small dents or puncture holes in the aircraft skin: or

c) the aircraft is missing or is completely inaccessible.

Note 1.-- For **statistical** uniformity only, an injury resulting in death within thirty days of the date of the accident is classified as a fatal injury by ICAO.

Note 2.-- An aircraft is considered to be missing when the official search has been terminated and the wreckage has not been located.

Causes: Actions, omissions, events, conditions, or a combination thereof, which led to the accident or incident.

### **Aviation Accidents Database of the International Civil Aviation Organization Has Categorized Each Aviation Process Into the Following :**

- STANDING (STD): Prior to pushback or taxi, or after arrival, at the gate, ramp, or parking area, while the aircraft is stationary.
- PUSHBACK/TOWING (PBT): Aircraft is moving in the gate, ramp, or parking area, assisted by a tow vehicle [tug].
- TAXI (TXI) : The aircraft is moving on the aerodrome surface under its own power prior to takeoff or after landing.
- TAKEOFF (TOF) : From the application of takeoff power, through rotation and to an altitude of 35 feet above runway elevation.
- INITIAL CLIMB (ICL) : From the end of the Takeoff sub-phase to the first prescribed power reduction, or until reaching 1000 feet above runway elevation or the VFR pattern, whichever comes first
- EN ROUTE (ENR) : From completion of Initial Climb through cruise altitude and completion of controlled descent to the Initial Approach Fix (IAF).
- Instrument Flight Rules (IFR): A set of rules governing the conduct of flight under instrument.
- Visual Flight Rules (VFR): From completion of Initial Climb through cruise and controlled descent to the VFR pattern altitude or 1000 feet above runway elevation, whichever comes first.
- MANEUVERING (MNV) : Low altitude/aerobatic flight operations
- APPROACH (APR) Instrument Flight Rules (IFR): From the Initial Approach Fix (IAF) to the beginning of the landing flare. Visual Flight Rules (VFR): From the point of VFR pattern entry, or 1000 feet above the runway elevation, to the beginning of the landing flare.
- LANDING (LDG) : From the beginning of the landing flare until aircraft exits the landing runway, comes to a stop on the runway, or when power is applied for takeoff in the case of a touch-and-go landing
- EMERGENCY DESCENT (EMG) : A controlled descent during any airborne phase in response to a perceived emergency situation.
- UNCONTROLLED DESCENT (UND) : A descent during any airborne phase in which the aircraft does not sustain controlled flight.
- POST-IMPACT (PIM) : Any of that portion of the Flight which occurs after impact with a person, object, obstacle or terrain.

- UNKNOWN (UNK) : Phase of flight is not discernable from the information available.

**Aviation Accidents Database of the International Civil Aviation Organization Has Categorized Each Accident Into the Following:**

- Abnormal Runway Contact (ARC)
- Abrupt Maneuver (AMAN)
- Aerodrome (ADRM)
- ATM/CANS
- Cabin Safety Events (CABIN)
- Controlled Flight Into or Toward Terrain (CFIT)
- Evacuation (EVAC)
- Fire/Smoke (Non-Impact) (F-NI)
- Fuel Related (FUEL)
- Ground Handling (RAMP)
- Ground Collision (GCOL)
- Icing (ICE)
- Loss of Control-Ground (LOC-G)
- Loss of Control-In-flight (LOC-I)
- Low Altitude Operations (LALT)
- Airprox/TCAS Alert/Loss of Separation/Near Midair Collisions/Midair Collisions (MAC)
- Other (OTHR)
- Runway Excursion (RE)
- Runway Incursion/ Animal (RI-A)
- Runway Incursion/ Vehicle, Aircraft or Person (RI-VAP)
- Security Related (SEC)
- System/Component Failure or Malfunction (Non-Powerplant) (SCF-NP)
- System/Component Failure or Malfunction (Powerplant) (SCF-PP)
- Turbulence Encounter (TURB)
- Undershoot/Overshoot (USOS)
- Unknown/Undetermined (UNK)
- Windshear/Thunderstorm (WSTRW)

**Definition of Other Terms :**

Economic Growth Rate : The percent rate of increase in *real* gross domestic product. This value, also known as the amount of the goods and services produced by an economy, is obtained by calculating the increase of gross domestic product based on a fixed weight of the base period. Economic growth rate is an important indicator for determining the overall change in economic trend. In order to net out the effect of inflation on the price of the goods and services produced, the “*real*” term here is calculated by specifying a single base-period, setting of prices and then valuing the output in all period in those prices, currently using the price from year 2001.

Gross National Product, GNP : The value of all goods and services produced in a country by the nationals, plus income earned by its citizens abroad. At countries that are open to foreign investment, there are many investments or branches in the country or a region owned by foreigners. Although their production results belong to the national domestic product, its distribution is not attributable to the income earned



by nationals.

Gross Domestic Product, GDP : The total value of all final goods and services produced in the country (or a particular region); regardless of the nationalities of owners, all productions are attributed to part of gross domestic product.

Labor Force Participation Rate : Participation rate is the rate between the labor force and the overall size of their cohort, national population of the people with ages over 15. Labor force is the number of persons with ages over 15 and who are employed or are unemployed but looking for a job.

Fatal Occurrence : Accidents where one or more passengers die during the flight from causes of the following: a) a deliberate act by another passenger on the flight; b) a directly hit by any parts of the aircraft, including the sub-part of the aircraft body; c) a directly exposure to turbulent which was caused by the aircraft. These events exclude deaths due to natural factors, self behavior, others invasion, or hidings of stowaways at non-passengers/crews area on the aircraft in order to travel without paying or without being detected.

Hull Loss Occurrence : An aircraft damaged to the extent that is not economically feasible to repair it. This would include aircraft that are Hull Loss or aircraft that are missing, including the wreckage of unknown position or wreckage that are seriously damaged and unreachable.

## Appendix

### Appendix1: Key Social-Economic Indicator in Taiwan, 2001-2010

Year	Unit	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Economic Growth Rate	%	-1.65	5.26	3.67	6.19	4.70	5.44	5.98	0.73	-1.91	10.88
Gross National Product	Million Dollars	10,122,411	10,654,141	11,025,130	11,737,391	12,031,145	12,555,170	13,243,277	13,013,147	12,930,401	14,020,591
Gross National Product Growth Rate	%	-1.15%	5.25%	3.48%	6.46%	2.50%	4.36%	5.48%	-1.74%	-0.64%	8.76%
Gross Domestic Product	Million Dollars	9,930,387	10,411,639	10,696,257	11,365,292	11,740,279	12,243,471	12,910,511	12,698,501	12,512,678	13,603,477
Gross Domestic Product Growth Rate	%	-1.69%	4.85%	2.73%	6.25%	3.30%	4.29%	5.45%	-1.64%	-1.46%	9.03%
Average National Income	Dollar	399,665	419,317	430,748	454,640	462,853	478,968	501,848	482,982	477,188	519,067
Average National Income Growth Rate	%	-3.29%	4.92%	2.73%	5.55%	1.81%	3.48%	4.78%	-3.76%	-1.20%	10.02%
Participation Rate of Labor Force	%	57.23	57.34	57.34	57.66	57.78	57.92	58.25	58.28	57.9	58.07
Population	Thousand People	22,406	22,521	22,605	22,689	22,770	22,876	22,958	23,037	23,119	23,162
Population Growth Rate	%	0.58%	0.51%	0.37%	0.37%	0.36%	0.47%	0.36%	0.34%	0.36%	0.19%
Number of Households	Thousand Household	6,802	6,925	7,047	7,180	7,293	7,395	7,512	7,656	7,805	7,937
Number of Households Growth Rate	%	1.80%	1.80%	1.76%	1.88%	1.57%	1.40%	1.58%	1.92%	1.95%	1.69%

**Appendix2: The Operations of Airline Companies in Taiwan, 2001-2010**

Year		2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	
The Nationality of Airlines	Number of Companies	14	13	12	12	12	12	12	12	12	13	
	Operations of Civil Aviation Transporting Industry	8	8	8	7	8	8	8	8	7	8	
	General Aviation Industry Operators	8	7	6	6	6	6	6	6	6	7	
	Number of Registered Aircrafts	180	197	186	201	204	197	199	193	192	182	
Aircraft of Civil Air Transport Enterprise	Domestic Passenger Flight	Passengers aboard	12055845	10748282	9949410	10435597	9571448	8606339	6320000	4908889	4564516	4824917
		Passenger- Kilometers	3649813	3335551	3083657	3281672	3020943	2748635	1973000	1473750	1268615	1238689
	International Passenger Flight	Passengers aboard	13323033	13926689	12308978	15738207	17081082	18085793	18470000	17192364	17775123	20603129
		Passenger- Kilometers	44953835	47722077	43527445	53986238	57772630	60294197	61314000	57032361	55649773	58812536
	Total Number of Passenger Flight	Passengers aboard	25378878	24674971	22258388	26173804	26652530	26692132	24790000	22101253	22339639	25428046
		Passenger- Kilometers	48603649	51057628	46611102	57267909	60793574	63042833	63287000	58506111	56918388	60051226
	Domestic Cargo Flight	Tonnage	53368	57104	53159	55267	54555	53621	52383	49911	51076	50981
		Passenger- Kilometers	7249	8690	8077	7422	7023	6975	6450	6314	5626	5298
	International Cargo Flight	Tonnage	1068247	1287590	1427700	1698853	1730241	1731481	1679542	1536589	1376553	1868875
		Passenger- Kilometers	7319456	8733977	9489420	11274247	11391722	11489345	11139070	9488982	8598983	11868040
	Total Sum of Cargo Flights	Tonnage	1121615	1344694	1480859	1754120	1784796	1785102	1731925	1586500	1427629	1919856
		Passenger- Kilometers	7326705	8742667	9497497	11281670	11398744	11496320	11145520	9495296	8604609	11873339
	Flight Routes	Domestic Routes	202923	191978	168440	161863	146114	135943	112528	89813	82447	83019
		International Routes	74672	82719	81779	100745	109094	113546	119369	107210	106761	119982
		Total	277595	274697	250219	262608	255208	249489	231897	197023	189208	203001
	Helicopter for Civil Air Transport Enterprise	Flight Hours	146.72	313.55	260.82	306.58	399.57	387.88	580.22	361.22	270.35	244.93
Number of Flights		15	448	548	738	1140	1012	461	460	630	484	
Passengers Aboard		133	3563	2641	4153	6137	5007	4606	2088	2709	2517	
Helicopter for General Aviation	Flight Hours	5014.97	9773.20	5737.62	4544.18	3919.23	4016.10	4381.26	4670.30	4588.65	4507.67	

**Appendix3: The Operation Statistics of Public Aircraft, 2002-2010**

Year	Government units	Types of Operation	Total flights	Total Flight Hours	Aircraft Type · Number of Aircraft					
2002	General Aviation Squadron, the Aerial Police Brigade of National Police Agency, the Aerial Fire Brigade Provisional Office of National Fire Agency	Search and Rescue, Disaster Relief, Emergency Medical Services, Reconnaissance and Patrol, and Transportation(T raining)	2396	322 : 05	AS-365 10	S-76B 2	BE-200 1	B-234 3	BE-350 1	UH-1H 8
2003			6194	5079 : 15	AS-365 10	S-76B 2	BE-200 1	B-234 3	BE-350 1	UH-1H 20
2004	National Airborne Service Corps (NASC) of the Ministry of the Interior	Search and Rescue, Disaster Relief, Emergency Medical Services, Reconnaissance and Patrol, and Transportation(T raining)	9094	8399 : 02	AS-365 10	S-76B 2	BE-200 1	B-234 3	BE-350 1	UH-1H 20
2005			7187	9358 : 09	AS-365 10	S-76B 2	BE-200 1	B-234 3	BE-350 1	UH-1H 20
2006			6518	9577 : 54	AS-365 10	S-76B 2	BE-200 1	B-234 3	BE-350 1	UH-1H 20
2007			6663	9324:06	AS-365 10	S-76B 2	BE-200 1	B-234 3	BE-350 1	UH-1H 20
2008			5338	8061:02	AS-365 10	S-76B 2	BE-200 1	B-234 3	BE-350 1	UH-1H 20
2009			7547	9756:15	AS-365 10	S-76B 2	BE-200 1	B-234 2	BE-350 1	UH-1H 15
2010			6408	7944:27	AS-365 10	S-76B 2	BE-200 1	B-234 2	BE-350 1	UH-1H 15

Note :

- I. The National Airborne Service Corps ( NASC ) preparatory office is established on Mar 10, 2004 by merging 4 government agencies including the Air Patrol Corps of the Coast Guard Administration, the Aviation Corps of Civil Aeronautics Administration of Ministry of Transportation and Communications, the Aviation Police Corps of National Police Agency and the Aviation Fire Corps of National Fire Agency. The National Airborne Service Corps officially established on Nov 9, 2005 by the order of Executive Yuan.
- II. This statistical table does not include the number of flights and flying hours on helicopter rental by the Air Patrol Corps of Coast Guard Administration, Executive Yuan.
- III. Number of aircraft in 2010 only counted serviceable aircraft.

**Appendix4: Aviation Occurrences and Rates (by Flight Hours) of Civil Aviation Transport Category Airplane, 2001-2010**

Year	Fatal Aviation Occurrences of Jet Transport Aircraft						Fatal Aviation Occurrences of Turboprop Aircraft						Fatal Occurrences for All Aircrafts in National Civil Air Transport Enterprise								
	Fatal Occurrence	Hull Loss Occurrences	Fatal/Hull Loss Occurrences	Flight Hours	Fatal Rate Per Million Flight Hours	Hull Loss Rate Per Million Flight Hours	Fatal/Hull Loss Rate Per Million Flight Hours	Fatal Occurrences	Hull Loss Occurrences	Fatal/Hull Loss Occurrences	Flight Hours	Fatal Rate Per Million Flight Hours	Hull Loss Rate Per Million Flight Hours	Fatal/Hull Loss Rate Per Million Flight Hours	Total Fatal Occurrences	Total Hull Loss Occurrences	Fatal/Hull Loss Occurrences	Flight Hours	Fatal Rate Per Million Flight Hours	Hull Loss Rate Per Million Flight Hours	Fatal/Hull Loss Rate Per Million Flight Hours
2001	0	0	0	475,313	0.00	0.00	0.00	0	0	0	63,857	0.00	0.00	0.00	0	0	0	539,170	0.00	0.00	0.00
2002	1	1	1	488,564	2.05	2.05	2.05	1	1	1	67,401	14.84	14.84	14.84	2	2	2	555,965	3.60	3.60	3.60
2003	0	1	0	515,190	0.00	1.94	0.00	0	0	0	86,700	0.00	0.00	0.00	0	1	0	601,890	0.00	1.66	0.00
2004	0	0	0	580,524	0.00	0.00	0.00	0	0	0	89,575	0.00	0.00	0.00	0	0	0	670,099	0.00	0.00	0.00
2005	0	0	0	590,792	0.00	0.00	0.00	0	0	0	120,821	0.00	0.00	0.00	0	0	0	711,613	0.00	0.00	0.00
2006	0	0	0	597,757	0.00	0.00	0.00	0	0	0	107,510	0.00	0.00	0.00	0	0	0	705,267	0.00	0.00	0.00
2007	0	1	0	525,157	0.00	1.90	0.00	0	0	0	96,504	0.00	0.00	0.00	0	1	0	621,661	0.00	1.61	0.00
2008	0	0	0	414,579	0.00	0.00	0.00	0	0	0	106,752	0.00	0.00	0.00	0	0	0	521,331	0.00	0.00	0.00
2009	0	0	0	369,210	0.00	0.00	0.00	0	0	0	98,755	0.00	0.00	0.00	0	0	0	467,965	0.00	0.00	0.00
2010	0	0	0	571,651	0.00	0.00	0.00	0	0	0	66,234	0.00	0.00	0.00	0	0	0	637,885	0.00	0.00	0.00
total	1	3	1	5,492,666	0.18	0.55	0.18	1	1	1	766,086	1.31	1.31	1.31	2	4	2	6,258,752	0.32	0.64	0.32

**Appendix5: Aviation Occurrences/ Rates (by Departures) of Civil Aviation Transport Category Airplane, 2001-2010**

Year	Fatal Aviation Occurrences of Commercial Jet							Fatal Aviation Occurrences of Turboprop Aircraft							Fatal Occurrences for All Aircrafts in National Civil Air Transport Enterprise						
	Fatal Occurrences	Hull Loss Occurrences	Fatal/Hull Loss Occurrences	Number of Departures	Fatal Rate Per Million Departures	Hull Loss Rate Per Million Departures	Fatal/Hull Loss Rate Per Million Departures	Fatal Occurrences	Hull Loss Occurrences	Fatal/Hull Loss Occurrences	Number of Departures	Hull Loss Rate Per Million Departures	Fatal/Hull Loss Rate Per Million Departures	Total Fatal Occurrences	Total Hull Loss Occurrences	Fatal/Hull Loss Occurrences	Fatal/Hull Loss Occurrences	Number of Departures	Fatal Rate Per Million Departures	Hull Loss Rate Per Million Departure	Fatal/ Hull Loss Rate Per Million Departures
2001	0	0	0	180,019	0.00	0.00	0.00	0	0	0	97,151	0.00	0.00	0.00	0	0	0	277,170	0.00	0.00	0.00
2002	1	1	1	176,466	5.67	5.67	5.67	1	1	1	99,701	10.03	10.03	10.03	2	2	2	276,167	7.24	7.24	7.24
2003	0	1	0	168,335	0.00	5.94	0.00	0	0	0	94,976	0.00	0.00	0.00	0	1	0	263,311	0.00	3.80	0.00
2004	0	0	0	180,092	0.00	0.00	0.00	0	0	0	93,221	0.00	0.00	0.00	0	0	0	273,313	0.00	0.00	0.00
2005	0	0	0	203,874	0.00	0.00	0.00	0	0	0	85,144	0.00	0.00	0.00	0	0	0	289,018	0.00	0.00	0.00
2006	0	0	0	188,679	0.00	0.00	0.00	0	0	0	98,818	0.00	0.00	0.00	0	0	0	287,497	0.00	0.00	0.00
2007	0	1	0	152,503	0.00	6.56	0.00	0	0	0	94,283	0.00	0.00	0.00	0	1	0	246,786	0.00	4.05	0.00
2008	0	0	0	109,321	0.00	0.00	0.00	0	0	0	87,641	0.00	0.00	0.00	0	0	0	196,962	0.00	0.00	0.00
2009	0	0	0	91,891	0.00	0.00	0.00	0	0	0	113,157	0.00	0.00	0.00	0	0	0	205,048	0.00	0.00	0.00
2010	0	0	0	150,402	0.00	0.00	0.00	0	0	0	58,979	0.00	0.00	0.00	0	0	0	209,381	0.00	0.00	0.00
total	1	3	1	1,710,575	0.58	1.75	0.58	1	1	1	798,718	1.25	1.25	1.25	2	4	2	2,509,293	0.80	1.59	0.80

**Appendix6: Aviation Occurrences/Rates of Transport Category  
Commercial Jet Aircraft, 2001-2010**

Year	Aviation Occurrences				Number of Departures	Rate of Aviation Occurrences Per Million Departures			
	Class I	Class II	Class III	Class V		Class I	Class II	Class III	Class V
2001	0	0	1	1	180,019	0.00	0.00	5.55	5.55
2002	1	0	0	2	176,466	5.67	0.00	0.00	11.33
2003	0	0	1	1	168,335	0.00	0.00	5.94	5.94
2004	0	0	1	1	180,092	0.00	0.00	5.55	5.55
2005	0	2	0	1	203,874	0.00	9.81	0.00	4.90
2006	0	1	0	1	188,679	0.00	5.30	0.00	5.30
2007	0	0	2	1	152,503	0.00	0.00	13.11	6.56
2008	0	3	1	2	109,321	0.00	27.44	9.15	18.29
2009	0	0	0	0	91,891	0.00	0.00	0.00	0.00
2010	0	0	1	3	150,402	0.00	0.00	6.65	19.95
total	1	6	7	13	1,710,575	0.58	3.51	4.09	7.60

**Appendix7: Aviation Occurrences/Rates of Transport Category  
Tuboprop Aircraft, 2001-2010**

Year	Aviation Occurrences				Number of Departures	Rate of Aviation Occurrences Per Million Departures			
	Class I	Class II	Class III	Class V		Class I	Class II	Class III	Class V
2001	0	0	1	1	97,151	0.00	0.00	10.29	10.29
2002	1	0	0	1	99,701	10.03	0.00	0.00	10.03
2003	0	0	0	1	94,976	0.00	0.00	0.00	10.53
2004	0	0	0	0	93,221	0.00	0.00	0.00	0.00
2005	0	0	1	0	85,144	0.00	0.00	11.74	0.00
2006	0	0	0	0	98,818	0.00	0.00	0.00	0.00
2007	0	0	0	0	94,283	0.00	0.00	0.00	0.00
2008	0	0	0	0	87,641	0.00	0.00	0.00	0.00
2009	0	0	0	1	113,157	0.00	0.00	0.00	8.84
2010	0	0	0	0	58,979	0.00	0.00	0.00	0.00
total	1	0	2	4	798,718	1.25	0.00	2.50	5.01

**Appendix8: Aviation Occurrences Involving Illegal Actions in Airlines  
(Suicide, Damaging on Purpose, Terrorists), 2001-2010**

Category	Date	Place	Airline Companies	Total Fatalities	
				Total Number	Total Number
Civil Air Transport Enterprise	N/A	N/A	N/A	0	0
General Aviation Enterprise	N/A	N/A	N/A	0	0

**Appendix9: Statistics of Aviation Safety Recommendations, 1999-2011.2**

Accepted by Type of Aircrafts	Associated to the Percentage	Aviation Industry	International Organization	Total	Percentage
Civil Air Transport Enterprise	134	114	72	320	62.14%
General aviation Enterprise	35	37	3	75	14.56%
Other	89	15	16	120	23.30%
Total	258	166	91	515	100%
Percentage	50.10%	32.23%	17.67%	100%	

Note : Others including public aircrafts and ultra-light vehicle etc.