Statistical Summary of Commercial Jet Airplane Accidents
Worldwide Operations
1959 - 2006
Note to Our Readers

This year’s summary incorporates a number of significant changes from past versions. Those changes are described below.

• The definitions used in this summary have been clarified. Differences from International Civil Aviation Organization (ICAO) and National Transportation Safety Board (NTSB) definitions have been noted.

• The focus of this year’s publication is on Fatal Accidents, whereas in prior years it was on Hull Loss and/or Fatal Accidents. There has been an increasing aviation-industry emphasis on fatalities as demonstrated by the Commercial Aviation Safety Team (CAST) selection of Fatal Accident Rate as their metric. Generating statistics based upon hull loss has been de-emphasized in this publication, although it has not been completely eliminated. Hull loss is not necessarily a good indicator of accident severity. The age of the fleet and the economics of repairs are resulting in less severe accidents becoming hull loss accidents. For example, last year’s summary showed 22 hull losses in 2005, of which 8 involved a loss of life.

• The term Major Accident is introduced into this publication for the first time. This is a term defined and used by both the NTSB and Flight Safety Foundation (FSF). The definition can be found on page 6.

• Assignment of airplane types into “generations” has been discontinued along with the chart that used the “generations” (Accident Rates by Years Following Introduction). The message of the chart had become misleading because many other factors were significant contributors to the curves generated. The unlabeled “generation” lines have also been eliminated from the Accident Rates by Airplane Type chart on page 20.

• The Accidents by Primary Cause chart has been eliminated. Many investigating authorities do not assign a primary cause. Assigning a “primary cause” can oversimplify the complexities of the aviation system and can therefore be misleading.

• The Excluded Events section which contained Hostile Action Events and Non-Hostile Events has also been discontinued. This information had always been excluded from the accident data and charts, but had been included as information only. However, as this information is not regularly reported to Boeing, the charts were eliminated to avoid potential publication of inaccurate or incomplete information.

• Boeing conducted an audit of fatal accidents and hull loss accidents in our database. It included cross-checking against a number of national and international sources. The reader may observe changes in accident listings or accident rates on some charts.
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Introduction

The accident statistics presented in this summary are confined to worldwide commercial jet airplanes that are heavier than 60,000 pounds maximum gross weight. Within that set of airplanes, there are two groups excluded:

1) Airplanes manufactured in the Commonwealth of Independent States (CIS) or the Union of Soviet Socialists Republic (USSR) are excluded because of the lack of operational data, and;

2) Commercial airplanes operated in military service. (However, if a military-owned commercial jet transport is used for civilian commercial service, those data will be included in this summary.)

The following airplane types are included in the statistics:

- 717 DC-8 A300 BAe 146 F-28 Concorde L-1011 BAC 1-11 Comet 4
- 707, 720 DC-9 A300-600 Avro RJ-70/-85/-100 F-70 Trident
- 727 DC-10/MD-10 A310 CRJ-700/-900 F-100 Caravelle
- 737 MD-11 A320/321/319/318 EMB-170/-175/-190 Mercure
- 747 MD-80/-90 A330 CV-880/-990 VC-10
- 757 A340
- 767
- 777

Flight operations data for Boeing airplanes are developed internally from airline operator reports. Flight operations data for non-Boeing airplanes are developed from two external sources, AirCraft Analytical System (ACAS), published by Flight, and Client Aviation System Enquiry (CASE) published by Ascend.

Accident data are obtained, when available, from government accident reports. Otherwise, information is from operators, manufacturers, various government and private information services, and press accounts.

Definitions related to development of statistics in this summary are primarily based on corresponding International Civil Aviation Organization (ICAO), National Transportation Safety Board (NTSB), and Flight Safety Foundation (FSF) terms as explained in the next section.
Definitions

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

- Death or serious injury results from:
  - being in the airplane, or
  - direct contact with the airplane or anything attached thereto, or
  - direct exposure to jet blast; or

*(Excluding:*
  - fatal and nonfatal injuries from natural causes; and
  - fatal and nonfatal self-inflicted injuries or injuries inflicted by other persons; and
  - fatal and nonfatal injuries of stowaways hiding outside the areas normally available to the passengers and crew; and
  - nonfatal injuries resulting from atmospheric turbulence, maneuvering, loose objects, boarding, disembarking, evacuation, maintenance and servicing; and
  - nonfatal injuries to persons not aboard the airplane)

- The airplane sustains substantial damage; or
- The airplane is missing or is completely inaccessible.

The following occurrences are **not** considered airplane accidents – those that are the result of experimental test flights or the result of a hostile action, including sabotage, hijacking, terrorism, and military action.

*Note: This is generally consistent with the ICAO and the NTSB definition of an accident (see the referenced ICAO and NTSB Definitions section). The differences are:*

1) The ICAO and NTSB references to “aircraft” were changed to “airplane” and references to propellers and rotors were eliminated; and

2) This publication excludes events that result in nonfatal injuries from atmospheric turbulence, maneuvering, etc., nonfatal injuries to persons not aboard the airplane, and any events that result from an experimental test flight or from hostile action, such as sabotage, hijacking, terrorism, and military action.

*Note: Within this publication the term “accident” is used interchangeably with “airplane accident.”*
Definitions (continued)

**Destroyed**: The estimated or likely cost of repairs would have exceeded 50% of the new value of the airplane had it still been in production at the time of the accident.

*Note: This definition is consistent with the FSF definition. The NTSB defines destroyed as damage due to impact, fire, or in-flight failures to an extent not economically repairable.*

**Fatal Injury**: Any injury that results in death within 30 days of the accident.

*Note: This is consistent with both the ICAO and the NTSB definition.*

**Major Accident**: An accident in which any of three conditions is met:

- The airplane was destroyed; or
- There were multiple fatalities; or
- There was one fatality and the airplane was substantially damaged.

*Note: This definition is consistent with the NTSB definition. It is also generally consistent with Flight Safety Foundation (FSF), except that FSF confines multiple fatalities to occupants. ICAO does not formally define the term major accident.*

**Serious Injury**: An injury which is sustained by a person in an accident and which:

- requires hospitalization for more than 48 hours, commencing within seven days from the date the injury was received; or
- results in a fracture of any bone (except simple fractures of fingers, toes or nose); or
- involves lacerations which cause severe hemorrhage, nerve, muscle or tendon damage; or
- involves injury to any internal organ; or
- involves second or third degree burns, or any burns affecting more than 5 percent of the body surface; or
- involves verified exposure to infectious substances or injurious radiation.

*Note: This is consistent with the ICAO definition. It is also consistent with the NTSB except for the last bullet which is not included in the NTSB definition.*
Definitions (continued)

**Substantial Damage**: Damage or failure which adversely affects the structural strength, performance, or flight characteristics of the airplane, and which would normally require major repair or replacement of the affected component.
Substantial damage is not considered to be:

- Engine failure or damage limited to an engine if only one engine fails or is damaged
- Bent fairings or cowlings
- Dents in the skin
- Small puncture holes in the skin
- Damage to wheels
- Damage to tires
- Damage to flaps
- Damage to engine accessories
- Damage to brakes
- Damage to wingtips

*Note 1.* – This is generally consistent with the NTSB definition of substantial damage except: 1) It deletes reference to “puncture holes in the fabric” and “ground damage to rotor or propeller blades”; and 2) It deletes “damage to landing gear” from the list of items not considered to be substantial damage.

*Note 2.* – ICAO does not define the term substantial damage. Still, the above definition is generally consistent with the ICAO definition of structural damage contained within part b) of the ICAO accident definition.
Boeing Terms

The terms on this page were created by Boeing for this publication and do not have corresponding equivalents in ICAO, the NTSB, etc.

**Accident Rates:** In general, this expression is a measure of accidents per million departures. Departures (or flight cycles) are used as the basis for calculating rates, since there is a stronger statistical correlation between accidents and departures than there is between accidents and flight hours, or between accidents and the number of airplanes in service, or between accidents and passenger miles or freight miles. Airplane departures data are continually updated and revised as new information and estimating processes become available. These form the baseline for the measure of accident rates and, as a consequence, rates may appear to vary between editions of this publication.

**Airplane Collisions:** Events involving two or more airplanes are counted as separate events, one for each airplane. For example, destruction of two airplanes in a collision is considered to be two separate accidents.

**Fatal Accident:** An accident that results in fatal injury.

**Hull Loss:** Airplane totally destroyed or damaged beyond economic repair. Hull loss also includes but is not limited to events in which:

- The airplane is missing; or
- The search for the wreckage has been terminated without it being located; or
- The airplane is completely inaccessible.

*Note: Neither ICAO nor the NTSB has a definition for hull loss.*
Exclusions

Certain airplanes and events are excluded from consideration as accidents in this summary. This is a complete list of exclusions.

Excluded Airplanes

Airplanes manufactured in the Commonwealth of Independent States (CIS) or the Union of Soviet Socialists Republic (USSR) are excluded because of the lack of operational data. Commercial airplanes operated in military service are also excluded. (However, if a military-owned commercial jet transport is used for civilian commercial service, those data are included in this summary.)

Excluded Events

- Fatal and nonfatal injuries from natural causes
- Fatal and nonfatal self-inflicted injuries or injuries inflicted by other persons
- Fatal and nonfatal injuries of stowaways hiding outside the areas normally available to the passengers and crew
- Nonfatal injuries resulting from atmospheric turbulence, maneuvering, loose objects, boarding, disembarking, evacuation, and maintenance and servicing
- Nonfatal injuries to persons not aboard the airplane
- Experimental test flights (However, maintenance test flights, ferry, positioning, training, and demonstration flights are not excluded events.)
- Sabotage, hijacking, terrorism, and military action
Referenced ICAO and NTSB Definitions

International Civil Aviation Organization (ICAO) and the National Transportation Safety Board (NTSB) definitions are included below for reference.

**Accident**

ICAO defines an *accident* as follows:

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.

The NTSB defines an *aircraft accident* as follows:

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 and all such persons have disembarked, and in which any person suffers death or serious injury, or in which the aircraft receives substantial damage.
Serious Injury

ICAO defines serious injury as follows:

An injury which is sustained by a person in an accident and which:

a) requires hospitalization for more than 48 hours, commencing within seven days from the date the injury was received; or
b) results in a fracture of any bone (except simple fractures of fingers, toes or nose); or
c) involves lacerations which cause severe hemorrhage, nerve, muscle or tendon damage; or
d) involves injury to any internal organ; or
e) involves second or third degree burns, or any burns affecting more than 5 percent of the body surface; or
f) involves verified exposure to infectious substances or injurious radiation.

The NTSB defines serious injury as follows:

Serious injury means any injury which:

1) requires hospitalization for more than 48 hours, commencing within 7 days from the date the injury was received;
2) results in a fracture of any bone (except simple fractures of fingers, toes, or nose);
3) causes severe hemorrhages, nerve, muscle, or tendon damage;
4) involves any internal organ; or
5) involves second- or third-degree burns, or any burns affecting more than 5 percent of the body surface.

Substantial Damage

The NTSB defines substantial damage as follows:

Damage or failure that adversely affects the structural strength, performance, or flight characteristics of the aircraft, and that 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 cowering, 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."

ICAO does not define the term substantial damage.
# Airplane Accidents


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<thead>
<tr>
<th>Date</th>
<th>Airline</th>
<th>Model (AP Age Yrs)</th>
<th>Type of Operation</th>
<th>Accident Location</th>
<th>Phase of Flight</th>
<th>Event Description</th>
<th>Damage Category</th>
<th>Hull Loss</th>
<th>Injury Category</th>
<th>Onboard Fatalities / Onboard Occupants (External Fatalities)</th>
<th>Major Accident</th>
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<tbody>
<tr>
<td>16-Jan-06</td>
<td>Continental Airlines</td>
<td>737-500 (11)</td>
<td>Sched Pax</td>
<td>El Paso, TX, USA</td>
<td>Parked</td>
<td>While the airplane was being prepared for departure, a mechanic was fatally injured during engine troubleshooting.</td>
<td>Fatal (1)</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7-Feb-06</td>
<td>UPS</td>
<td>DC-8 (39)</td>
<td>Sched Cargo</td>
<td>Philadelphia, PA, USA</td>
<td>Initial Approach</td>
<td>A fire started in flight. After an emergency landing, 3 crew members evacuated with minor injuries, but the airplane was completely engulfed by the fire.</td>
<td>Destroyed</td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>4-Mar-06</td>
<td>Air Macau</td>
<td>A321 (7)</td>
<td>Sched Pax</td>
<td>Macau, China</td>
<td>Tow</td>
<td>The airplane was being pushed back when the tow bar broke, the airplane stopped suddenly, and 1 passenger was seriously injured.</td>
<td>Serious</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4-Mar-06</td>
<td>Lion Air</td>
<td>MD-82 (20)</td>
<td>Sched Pax</td>
<td>Surabaya, Indonesia</td>
<td>Landing</td>
<td>On landing rollout, upon application of reverse thrust, the airplane departed the right side of the runway, substantially damaging the NLG and E&amp;E bay. There were no injuries.</td>
<td>Substantial</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18-Mar-06</td>
<td>Air Algerie</td>
<td>737-600 (4)</td>
<td>Charter Pax</td>
<td>Seville, Spain</td>
<td>Landing</td>
<td>The airplane was substantially damaged when it touched down hard during landing. Its RH MLG subsequently fractured and collapsed. There were minor injuries during evacuation.</td>
<td>Substantial</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19-Apr-06</td>
<td>United Airlines</td>
<td>777-200 (6)</td>
<td>Sched Pax</td>
<td>Shanghai, China</td>
<td>Descent</td>
<td>At the top of descent, the airplane experienced a TCAS RA advisory in the vicinity of a climbing A340. One passenger was seriously injured during the avoidance maneuver.</td>
<td>Serious</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3-May-06</td>
<td>Armavia</td>
<td>A320 (11)</td>
<td>Sched Pax</td>
<td>(near) Sochi, Russia</td>
<td>Final Approach</td>
<td>The airplane crashed into the sea in bad weather while making a second attempt to land.</td>
<td>Destroyed</td>
<td>X</td>
<td>Fatal 113/113</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>30-May-06</td>
<td>Shuttle America</td>
<td>EMB 170 (1)</td>
<td>Sched Pax</td>
<td>Dulles, VA, USA</td>
<td>Landing</td>
<td>Airplane landed with the NLG retracted, sustaining substantial damage. A serious injury occurred during the evacuation.</td>
<td>Substantial</td>
<td>X</td>
<td>Serious</td>
<td></td>
<td></td>
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<td>4-Jun-06</td>
<td>Arrow Cargo</td>
<td>DC-10 (33)</td>
<td>Sched Cargo</td>
<td>Managua, Nicaragua</td>
<td>Landing</td>
<td>The airplane overran the runway, collapsing the NLG, causing substantial damage to the forward fuselage. There were no injuries.</td>
<td>Substantial</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7-Jun-06</td>
<td>TradeWinds Airlines</td>
<td>747-200SF (24)</td>
<td>Charter Cargo</td>
<td>Medellin, Colombia</td>
<td>Takeoff</td>
<td>Near V1, the crew heard a loud explosion, rejected the takeoff, and overran the runway, substantially damaging the airplane. There were no injuries.</td>
<td>Substantial</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9-Jun-06</td>
<td>Asiana Airlines</td>
<td>A321 (6)</td>
<td>Sched Pax</td>
<td>(near) Seoul, Korea</td>
<td>Cruise</td>
<td>The airplane encountered a severe thunderstorm, sustaining substantial lightning and hail damage. There were no injuries.</td>
<td>Substantial</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15-Jun-06</td>
<td>TNT Airways</td>
<td>737-300SF (19)</td>
<td>Charter Cargo</td>
<td>East Midlands, UK</td>
<td>Landing</td>
<td>Following a hard touchdown that broke off the RH MLG, the airplane bounced. The flight crew applied full power and proceeded to another airport, landing on the remaining gear. There were no injuries.</td>
<td>Substantial</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16-Jun-06</td>
<td>VARIG</td>
<td>MD-11-P (13)</td>
<td>Sched Pax</td>
<td>Brasilia, Brazil</td>
<td>Landing</td>
<td>The airplane was substantially damaged on landing when its center MLG fractured and broke away. There were no injuries.</td>
<td>Substantial</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23-Jun-06</td>
<td>AMC Airlines</td>
<td>MD-83 (10)</td>
<td>Charter Pax</td>
<td>Juba, Sudan</td>
<td>Landing</td>
<td>After a reportedly normal approach and landing, the airplane sustained substantial damage when it overran the runway. There were no injuries.</td>
<td>Substantial</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note: Data includes all accidents that occurred in 2006 involving commercial jet aircraft worldwide.*

Boeing

2006 STATISTICAL SUMMARY, JULY 2007
## Airplane Accidents
### All Accidents – Worldwide Commercial Jet Fleet – 2006

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<th>Date</th>
<th>Airline</th>
<th>Model (A/P Age Yrs)</th>
<th>Type of Operation</th>
<th>Accident Location</th>
<th>Phase of Flight</th>
<th>Event Description</th>
<th>Damage Category</th>
<th>Hull Loss</th>
<th>Injury Category</th>
<th>Onboard Fatalities / Onboard Occupants (External Fatalities)</th>
<th>Major Accident</th>
</tr>
</thead>
<tbody>
<tr>
<td>9-Jul-06</td>
<td>S7 Airlines</td>
<td>A310 (19)</td>
<td>Sched Pax</td>
<td>Irkutsk, Russia</td>
<td>Landing</td>
<td>The airplane overran the runway, collided with several buildings and caught fire.</td>
<td>Destroyed</td>
<td>X</td>
<td>Fatal 126/203</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>28-Jul-06</td>
<td>FedEx</td>
<td>MD-10-10F (31)</td>
<td>Sched Cargo</td>
<td>Memphis, TN, USA</td>
<td>Landing</td>
<td>During landing rollout, the LH MLG collapsed, sending sparks into the nearby grass which ignited both the grass and the airplane's left wing. There were no injuries.</td>
<td>Substantial Damage</td>
<td>X</td>
<td></td>
<td>Substantial Damage</td>
<td></td>
</tr>
<tr>
<td>27-Aug-06</td>
<td>China Eastern Airlines</td>
<td>A320 (1)</td>
<td>Sched Pax</td>
<td>Beijing, China</td>
<td>Tow</td>
<td>On pushback, the airplane was substantially damaged when it collided with a taxiing 777. There were no injuries.</td>
<td>Substantial Damage</td>
<td>X</td>
<td></td>
<td>Substantial Damage</td>
<td></td>
</tr>
<tr>
<td>7-Sep-06</td>
<td>DHL Aviation</td>
<td>727-200F (25)</td>
<td>Charter Cargo</td>
<td>Lagos, Nigeria</td>
<td>Landing</td>
<td>In heavy rain, the airplane overran the runway on landing and struck a navigation facility, collapsing the NLG. There were no injuries.</td>
<td>Substantial Damage</td>
<td>X</td>
<td></td>
<td>Substantial Damage</td>
<td></td>
</tr>
<tr>
<td>9-Sep-06</td>
<td>KLM - Royal Dutch Airlines</td>
<td>MD-11-P (12)</td>
<td>Sched Pax</td>
<td>Amsterdum, Netherlands</td>
<td>Landing</td>
<td>The airplane landed on a runway that had been resurfaced three days earlier. Loose FOD caused substantial airplane damage. There were no injuries.</td>
<td>Substantial Damage</td>
<td>X</td>
<td></td>
<td>Substantial Damage</td>
<td></td>
</tr>
<tr>
<td>14-Sep-06</td>
<td>FedEx</td>
<td>MD-11-F (7)</td>
<td>Charter Cargo</td>
<td>Subic Bay, Philippines</td>
<td>Landing</td>
<td>The airplane suffered a tail strike on landing. There were no injuries.</td>
<td>Substantial Damage</td>
<td>X</td>
<td></td>
<td>Substantial Damage</td>
<td></td>
</tr>
<tr>
<td>29-Sep-06</td>
<td>GOL Linhas Aereas</td>
<td>737-800 (18 days)</td>
<td>Sched Pax</td>
<td>(near) Peixote Azavedo, Brazil</td>
<td>Cruise</td>
<td>The airplane collided with another airplane at FL360, went out of control, and crashed.</td>
<td>Destroyed</td>
<td>X</td>
<td>Fatal 154/154</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>3-Oct-06</td>
<td>Mandala Airlines</td>
<td>737-200 (23)</td>
<td>Sched Pax</td>
<td>Tanakan, Indonesia</td>
<td>Landing</td>
<td>On landing in a heavy haze, the airplane overran the end of the runway, sustaining significant damage. There were no injuries.</td>
<td>Destroyed</td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>10-Oct-06</td>
<td>Atlantic Airways (Faroe Islands)</td>
<td>BAe 146 (19)</td>
<td>Sched Pax</td>
<td>Stord, Norway</td>
<td>Landing</td>
<td>The airplane overran the runway, continued down a steep slope, and caught fire.</td>
<td>Destroyed</td>
<td>X</td>
<td>Fatal 4/16</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>29-Oct-06</td>
<td>ADC Airlines</td>
<td>737-200 (23)</td>
<td>Sched Pax</td>
<td>Abuja, Nigeria</td>
<td>Initial Climb</td>
<td>The airplane crashed shortly after takeoff.</td>
<td>Destroyed</td>
<td>X</td>
<td>Fatal 96/105 (1)</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>10-Nov-06</td>
<td>AirTran Airways</td>
<td>717-200 (6)</td>
<td>Sched Pax</td>
<td>Memphis, TN, USA</td>
<td>Taxi</td>
<td>After a normal landing and turnout, the airplane departed the side of the paved taxiway, struck a drainage ditch, and collapsed the NLG, substantially damaging airplane structure. There were no injuries.</td>
<td>Substantial Damage</td>
<td>X</td>
<td></td>
<td>Substantial Damage</td>
<td></td>
</tr>
<tr>
<td>17-Nov-06</td>
<td>Cielos Airlines</td>
<td>DC-10 (23)</td>
<td>Sched Cargo</td>
<td>Barranquilla, Colombia</td>
<td>Landing</td>
<td>On landing in rain, to avoid an overrun, the flight crew steered the airplane off the side of the runway onto soft ground, where the NLG collapsed into the forward fuselage. There were only minor injuries.</td>
<td>Substantial Damage</td>
<td>X</td>
<td></td>
<td>Substantial Damage</td>
<td></td>
</tr>
<tr>
<td>18-Nov-06</td>
<td>Aerosucre Colombia</td>
<td>727-100F (39)</td>
<td>Charter Cargo</td>
<td>(near) Leticia, Colombia</td>
<td>Final Approach</td>
<td>In fog, the airplane hit a communication tower on final approach, lost control, and crashed.</td>
<td>Destroyed</td>
<td>X</td>
<td>Fatal 5/5</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>24-Dec-06</td>
<td>Lion Air</td>
<td>737-400 (16)</td>
<td>Sched Pax</td>
<td>Djung Pandang, Indonesia</td>
<td>Landing</td>
<td>During landing, the crew reported a loud noise and the airplane swerved off the runway, sustaining substantial damage. There were no injuries.</td>
<td>Substantial Damage</td>
<td>X</td>
<td></td>
<td>Substantial Damage</td>
<td></td>
</tr>
</tbody>
</table>

28 Total Accidents

17 498 Onboard Fatalities
2 Ext. Fatalities
8
## Departures, Flight Hours, and Jet Airplanes in Service*

**Worldwide Operations 1987 Through 2006**

<table>
<thead>
<tr>
<th>Year</th>
<th>Departures (millions)</th>
<th>Flight hours (millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>87</td>
<td>20.0</td>
<td>40.0</td>
</tr>
<tr>
<td>88</td>
<td>20.0</td>
<td>40.0</td>
</tr>
<tr>
<td>89</td>
<td>20.0</td>
<td>40.0</td>
</tr>
<tr>
<td>90</td>
<td>20.0</td>
<td>40.0</td>
</tr>
<tr>
<td>91</td>
<td>20.0</td>
<td>40.0</td>
</tr>
<tr>
<td>92</td>
<td>20.0</td>
<td>40.0</td>
</tr>
<tr>
<td>93</td>
<td>20.0</td>
<td>40.0</td>
</tr>
<tr>
<td>94</td>
<td>20.0</td>
<td>40.0</td>
</tr>
<tr>
<td>95</td>
<td>20.0</td>
<td>40.0</td>
</tr>
<tr>
<td>96</td>
<td>20.0</td>
<td>40.0</td>
</tr>
<tr>
<td>97</td>
<td>20.0</td>
<td>40.0</td>
</tr>
<tr>
<td>98</td>
<td>20.0</td>
<td>40.0</td>
</tr>
<tr>
<td>99</td>
<td>20.0</td>
<td>40.0</td>
</tr>
<tr>
<td>00</td>
<td>20.0</td>
<td>40.0</td>
</tr>
<tr>
<td>01</td>
<td>20.0</td>
<td>40.0</td>
</tr>
<tr>
<td>02</td>
<td>20.0</td>
<td>40.0</td>
</tr>
<tr>
<td>03</td>
<td>20.0</td>
<td>40.0</td>
</tr>
<tr>
<td>04</td>
<td>20.0</td>
<td>40.0</td>
</tr>
<tr>
<td>05</td>
<td>20.0</td>
<td>40.0</td>
</tr>
<tr>
<td>06</td>
<td>20.0</td>
<td>40.0</td>
</tr>
</tbody>
</table>

- 487.5 million cumulative departures since 1959 (396.1 million on Boeing airplanes)
- 874.4 million cumulative flight hours since 1959 (684.9 million on Boeing airplanes)
- 7 manufacturers – 35 significant types (14 Boeing) in service as of 12/31/2006

*Certified jet airplanes greater than 60,000 pounds maximum gross weight, including those in temporary nonflying status and those in use by non-airline operators. Excluded are military airplanes and CIS/USSR-manufactured airplanes.*

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**BOEING**

2006 STATISTICAL SUMMARY, JULY 2007
## Accident Summary by Type of Operation
### Worldwide Commercial Jet Fleet

<table>
<thead>
<tr>
<th>Type of operation</th>
<th>All Accidents</th>
<th>Fatal Accidents</th>
<th>Onboard Fatalities (External Fatalities)*</th>
<th>Hull Loss Accidents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Passenger</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>– Scheduled</td>
<td>1,198</td>
<td>285</td>
<td>445</td>
<td>75</td>
</tr>
<tr>
<td></td>
<td>1,109</td>
<td>274</td>
<td>405</td>
<td>73</td>
</tr>
<tr>
<td></td>
<td>89</td>
<td>11</td>
<td>40</td>
<td>2</td>
</tr>
<tr>
<td>– Charter</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cargo</td>
<td>215</td>
<td>79</td>
<td>67</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maintenance test, ferry, positioning, training, and demonstration</td>
<td>109</td>
<td>9</td>
<td>40</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Totals</td>
<td>1,522</td>
<td>373</td>
<td>552</td>
<td>89</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>U.S. and Canadian Operators</td>
<td>495</td>
<td>82</td>
<td>168</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rest of the World</td>
<td>1,027</td>
<td>291</td>
<td>384</td>
<td>73</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Totals</td>
<td>1,522</td>
<td>373</td>
<td>552</td>
<td>89</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*External fatalities include on-ground fatalities as well as fatalities on other aircraft involved.*
Accident Summary by Injury and Damage
All Accidents – Worldwide Commercial Jet Fleet

1959 Through 2006

- 552 Fatal Accidents (36% of Total)
  - 451 Fatal acc. with hull loss
  - 23 Fatal accidents with substantial damage
  - 78 Fatal accidents without substantial damage

- 970 Non-Fatal Accidents (64% of Total)
  - 384 Hull loss w/o fatalities
  - 544 Substantial damage w/o fatalities
  - 42 Accidents without substantial damage (but with serious injuries)

Total 1,522

1997 Through 2006

- 89 Fatal Accidents (24% of Total)
  - 72 Fatal acc. w/ hull loss
  - 2 Fatal accidents with substantial damage
  - 15 Fatal accidents without substantial damage

- 284 Non-Fatal Accidents (76% of Total)
  - 134 Hull loss w/o fatalities
  - 141 Substantial damage w/o fatalities
  - 9 Accidents without substantial damage (but with serious injuries)

Total 373
Accident Rates and Onboard Fatalities by Year

Annual accident rate (accidents per million departures)

Onboard fatalities

Year 1959 60 62 64 66 68 70 72 74 76 78 80 82 84 86 88 90 92 94 96 98 00 02 04 06

Annual onboard fatalities

All accident rate
Fatal accident rate
Hull loss accident rate

Onboard fatalities
U.S. and Canadian Operators Accident Rates by Year

Annual fatal accident rate (accidents per million departures)

1987 Through 2006

Year

59 60 62 64 66 68 70 72 74 76 78 80 82 84 86 88 90 92 94 96 98 00 02 04 06

Rest of the world
U.S. & Canadian operators

0 0.5 1.0 1.5 2.0 2.5

0.0 0.5 1.0 1.5 2.0 2.5

Year

1987 88 90 92 94 96 98 00 02 04 06
10-Year Accident Rates by Type of Operation

*Charter passenger, charter cargo, scheduled cargo, maintenance test, ferry, positioning, training, and demonstration flights
Accident Rates by Airplane Type

Hull Loss Accidents

* The Comet, CV880/990, Caravelle, Concorde, Mercure, Trident and VC-10 are no longer in commercial service.

** These types have accumulated fewer than 1 million departures.
Fatal Accidents and Onboard Fatalities by Phase of Flight

Percentage of accidents/fatalities

- **Fatal Accidents**
  - Taxi, load/unload parked, tow: 13%
  - Takeoff: 11%
  - Initial climb: 8%
  - Climb (flaps up): 11%
  - Cruise: 10%
  - Descent: 5%
  - Initial approach: 10%
  - Final approach: 10%
  - Landing: 22%

- **Onboard Fatalities**
  - 0%
  - Takeoff: 12%
  - Initial climb: 17%
  - Climb (flaps up): 12%
  - Cruise: 19%
  - Descent: 6%
  - Initial approach: 14%
  - Final approach: 15%
  - Landing: 5%

**Exposure**
(Percentage of flight time estimated for a 1.5 hour flight)

- <1%
- 1%
- 1%
- 1%
- 1%
- 14%
- 57%
- 11%
- 12%
- 3%
- 1%

*Percentages do not sum to 100% due to numerical rounding.

**Distribution of fatal accidents and onboard fatalities**

- Fatal accidents
- Onboard fatalities

Fatal accidents:
- Taxi, load/unload parked, tow: 11
- Takeoff: 10
- Initial climb: 7
- Climb (flaps up): 10
- Cruise: 9
- Descent: 4
- Initial approach: 9
- Final approach: 9
- Landing: 20

Onboard fatalities:
- Taxi, load/unload parked, tow: 4
- Takeoff: 10
- Initial climb: 7
- Climb (flaps up): 10
- Cruise: 9
- Descent: 4
- Initial approach: 9
- Final approach: 9
- Landing: 275
Fatalities by CAST/ICAO Taxonomy Accident Category

Fatalities

External fatalities [Total 249]
Onboard fatalities [Total 5,149]

Number of fatal accidents (89 total)

Note: Principal categories as assigned by CAST.
CAST/ICAO Taxonomy Accident Categories

The International Civil Aviation Organization (ICAO) and the Commercial Aviation Safety Team (CAST), which include government officials and aviation industry leaders, have jointly chartered the CAST/ICAO Common Taxonomy Team (CICTT). CICTT includes experts from ICAO, several air carriers, aircraft manufacturers, engine manufacturers, pilot associations, regulatory authorities, transportation safety boards, with members from Canada, the European Union, France, Italy, the Netherlands, the United Kingdom, and the United States. CICTT is co-chaired by a representative from ICAO and CAST.

The team is charged with developing common taxonomies and definitions for aviation accident and incident reporting systems. Common taxonomies and definitions establish a standard industry language, thereby improving the quality of information and communications. With this common language, the aviation community's capacity to focus on common safety issues is greatly enhanced.

The CICTT taxonomy is designed to permit the assignment of multiple categories as necessary to describe the accident or incident. Since 2001, the SISG (Safety Indicator Steering Group) has met annually to assign CICTT occurrence categories to the prior year's accidents.

In a separate activity, the CAST assigned each accident to a single principal category. Those accident assignments and a brief description of the categories are reported in the preceding chart.

The CAST use of principal categories has been instrumental in focusing industry and government efforts and resources on accident prevention. Pareto charts using principal categories are used by CAST to identify changes to historic risk and to help to determine if the safety enhancements put in place are effective.

For a complete description of the categories go to: http://www.intlaviationstandards.org/