Safety Report

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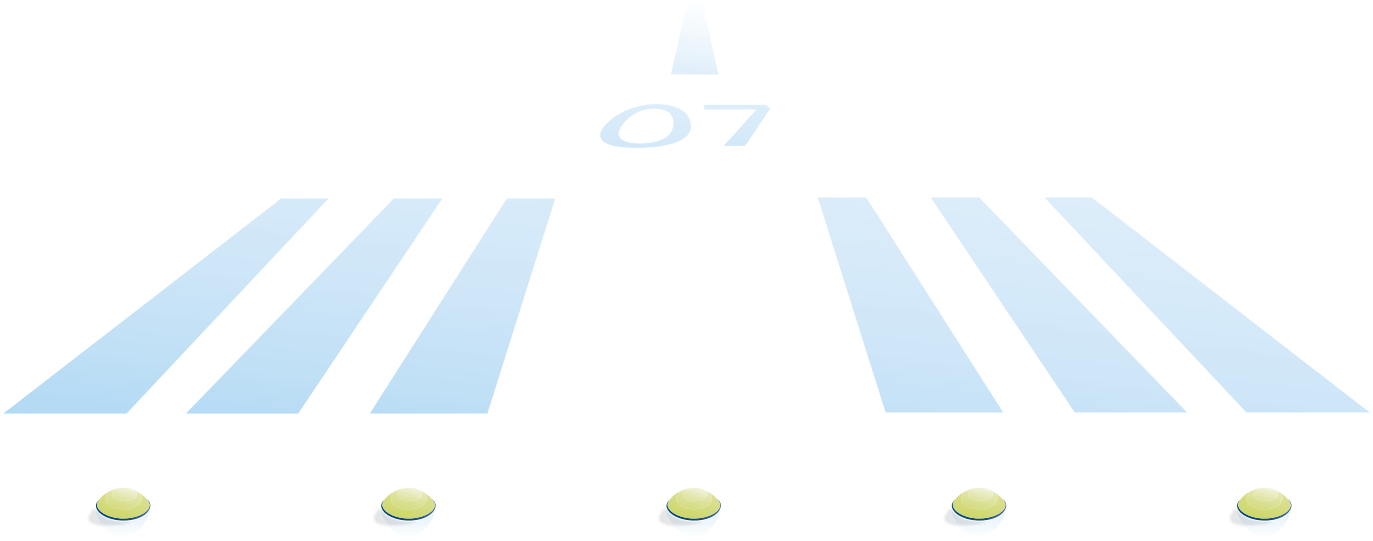
Issued April 2008



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Issued April 2008

International Air Transport Association
Montreal – Geneva

2007 Edition

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Table of Contents

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> IATA is taking action to maintain the industry's impressive Safety record.

Foreword

Dear Colleagues,

Air transport is the safest way to travel. In 2007, the number of fatalities and the fatality rate continued to decline. From a regional perspective, the accident rates in North America and Europe dropped. However, accidents in Brazil, Indonesia and Africa pushed the global accident rate up to 0.75 Western-built Jet Hull Losses per million sectors flown in 2007.

Overall, IATA member airlines surpassed the industry in terms of safety with an accident rate of 0.68 Western-built Jet Hull losses per million flights.

IATA is taking action to reduce the accident rate, both in the regions most affected by the increase, as well as on a global scale to maintain the industry's impressive safety record. Already, existing programmes such as IATA Operational Safety Audit (IOSA), have provided the industry with valuable tools. In 2008, we are looking forward to new initiatives that will add value to our members' operations and help the industry as a whole. The IATA Safety Audit for Ground Operations (ISAGO) and our Training and Qualification Initiative (ITQI) are two prime examples of the exciting things to come. Through these and IATA's other safety solutions, such as the Partnership for Safety Programme (PfS) and the Safety Trend Evaluation, Analysis and Data Exchange System (STEADES), we are committed to leading the industry in the global effort of continuously enhancing safety.

I invite you to take note of the valuable information in this 44th edition of the IATA Safety Report and disseminate it across your entire organisation. This edition marks significant changes and innovations to the Report. Along with a completely redesigned accident analysis classification, I am proud to announce that the Safety Report 2007 is the first publication in IATA's history to be published on fully recycled and recyclable paper: this is one more way that we are contributing to the global effort to make our industry even more environmentally friendly.

I wish to thank the IATA Operations Commitee (OPC), the Safety Group (SG) and its Accident Classification Task Force (ACTF) for all their efforts and shared expertise, which make this report possible.

The Safety Report is a key tool to communicate safety information across the industry and assist us in attaining our goal to improve safety worldwide.

Günther Matschnigg
Senior Vice President
Safety, Operations & Infrastructure

Safety Report 2007 - Executive Summary

The goal of the IATA Safety Report is to present prevention strategies in order to enhance safety of the air transport industry. These strategies are based on the analytical findings of accidents that occurred in the year 2007.

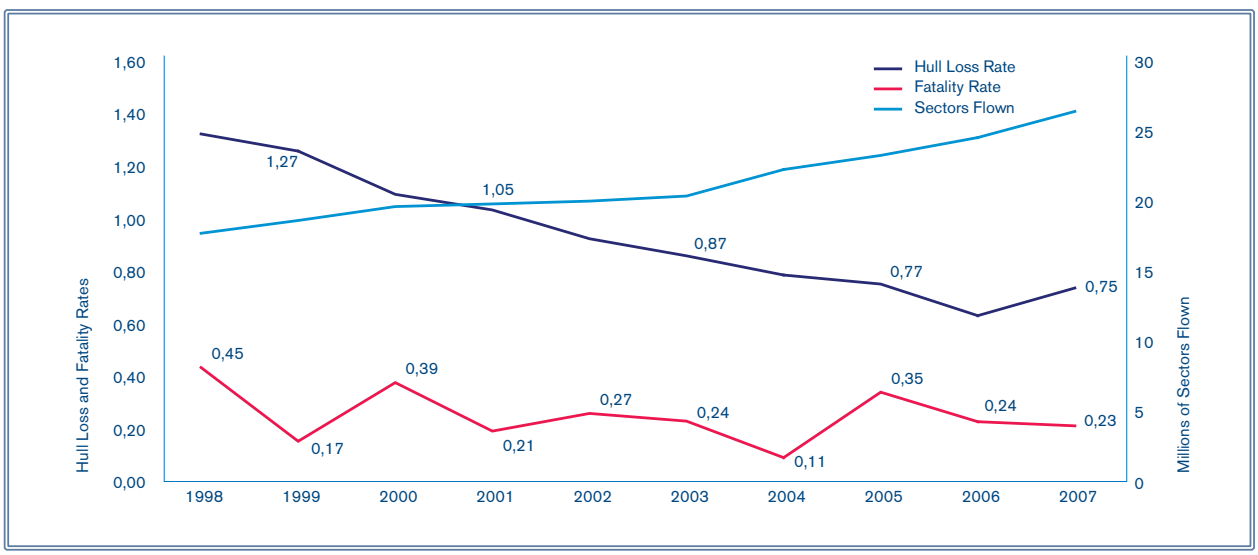
In total, 100 accidents occurred in 2007. Compared to the previous year, the breakdown is as follows:

	Jet	Turboprop	Western-built Jet Hull Loss Rate	Fatal Accidents	Fatalities
2007	57	43	0.75	20	692
2006	46	31	0.65	20	855

In 2007, the number of fatalities and the fatality rate continued to decline despite the increase in traffic. From a regional perspective, the accident rates in areas such as North America and Europe decreased. However, accidents in Brazil, Indonesia and Africa pushed the global accident rate up to 0.75 Western-built Jet Hull Losses per million sectors flown.

Overall, IATA member airlines surpassed the industry in terms of safety with an accident rate of 0.68 Western-built Jet Hull Losses per million flights.

Western-built Jet Traffic, Hull Loss & Passenger Fatality Rates 1998-2007



Based on the findings from accident analysis, IATA has developed the following prevention strategies to address the top safety issues:

Runway Excursions & Go-around Decision-making

- Almost half (48%) of the year's accidents took place during landing. The majority of these accidents involved a runway excursion.
- Many of these accidents could have been prevented by the initiation of a timely go-around.
- Crews require additional training to improve the go-around decision-making process throughout all phases of the approach as well as to improve execution of the go-around itself. In addition, airline cultures and SOPs should encourage execution of a go-around.
- Inadequate overrun areas (e.g. obstacles close to the runway) contribute to the magnitude of damage incurred / significant loss of life resulting from runway excursions. Aerodrome operators need to ensure adequate systems are in place to mitigate the risks associated with runway excursions.

Prevention Strategy: IATA is developing a toolkit that will address the issues linked to runway safety enhancement, including the prevention of runway excursions.

Ground Damage Reduction

- Almost 20% of all accidents in 2007 related to ground damage.
- Year after year, this has been an issue which affects predominantly IATA member airlines.
- Lack of standardisation can contribute to ground handling activities that result in damage to aircraft.

Prevention Strategy: IATA developed the IATA Safety Audit for Ground Operations (ISAGO) programme to drastically reduce aircraft damage and personal injuries in the ground environment.

Flight Crew Training & Proficiency

- Deficiencies in flight crew training were cited as contributing factors in over 20% of all accidents in 2007.
- Manual handling / Flight controls errors by flight crews were noted in almost 40% of all accidents.
- Flight crew training and proficiencies are key issues, which the industry needs to address, particularly in light of anticipated growth and pilot demand in the coming years.

Prevention Strategy: IATA, joining forces with ICAO and the Flight Safety Foundation (FSF), has launched its Training and Qualification Initiative (ITQI) to deliver a global solution that aims at enhancing quality of licensed personnel while increasing capacity.

Safety Management in Maintenance Operations

- Almost half of the accidents in 2007 were linked to a technical issue; maintenance events contributed to almost 20% of all occurrences last year.
- Many of the events relating to gear-up landing or gear collapse were linked to maintenance issues.
- Airlines need to maintain proper Safety assurance of maintenance activities, whether these are run in-house or as an outsourced function.

Prevention Strategy: IATA is revising its Safety Strategy in 2008 to encompass maintenance activities and SMS implementation for Maintenance Organisations.

Regional Safety Issues

- Despite improvements in some regions, such as North America, other regions or countries remain a concern in terms of their Safety performance.
- The Asia / Pacific region saw an increase in its accident rate, particularly in Indonesia. Africa and Brazil are also areas where action is needed to further improve accident rates.
- IATA is in a position to help airlines in different regions attain and maintain an acceptable level of safety and meet internationally recognised standards through its existing programmes such as IOSA and PfS.

Prevention Strategy: To continue helping its Members, IATA has developed PfS Plus, which will focus on helping airlines to close the findings from their initial audits, and later to prepare for their renewal audits by maintaining ongoing IOSA compliance. PfS Plus will target geographical areas of safety concern such as Indonesia and Brazil.

In 2008, IATA continues to work with its member airlines, as well as airports, air navigation service providers and regulators, to align its strategy and develop solutions to meet the needs of the industry and enhance operational Safety.

“IATA developed ISAGO to drastically reduce damage and injuries in the ground environment.”

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Section 1

1

IATA Annual Safety Report

Founded in 1945, The International Air Transport Association (IATA) represents, leads and serves the airline industry. IATA's membership includes some 240 airlines comprising approximately 94% of all international scheduled traffic. IATA's global reach extends to 126 nations through 78 offices in 72 countries.

IATA calls upon the vast and representative expertise of its Member Airlines, industry stakeholders and offices worldwide when determining the lessons learned from accidents.

The Safety Report is created immediately following the year under review. Alongside accident statistics and trends examined, the Report presents contributing factors to the year's accidents with the goal of developing prevention strategies to enhance safety.

PURPOSE OF THE SAFETY REPORT

The purpose of the Safety Report is to assist with maintaining safety vigilance by identifying the areas of greatest risk apparent from the experience of aircraft accidents. It aims to offer practical guidance to airlines in accident prevention against the backdrop of accidents that have occurred in 2007.

SAFETY REPORT FORMAT

In addition to presenting areas of concern and prevention strategies, the Safety Report also provides tools for safety management. There is a CD-ROM included in the report, which is divided into the following sections:

- **Safety Report**, containing the Report, and previous years' reports;
- **Supporting Documents**, containing additional material supporting discussions in the report;
- **Safety Toolkit**, containing useful and practical material for use at airlines;
- **CEO/COO Brief**, containing executive summary and PowerPoint presentation;
- **Graphic Material**, all charts, graphs & illustrations are available in electronic format in the CD for readers to use.

Image courtesy of Boeing

1

ACCIDENT CLASSIFICATION TASK FORCE

The IATA Safety Group (SG) created the Accident Classification Task Force (ACTF) in order to analyse accidents and identity contributing factors, determine trends and matters of concern in aviation safety worldwide from the accident database available and to develop prevention strategies related thereto, which are incorporated into the annual IATA Safety Report.

The ACTF is composed of airline safety experts from IATA Member Airlines and representatives from the aeronautical industry and regulatory boards. The group is instrumental in the analysis process, in order to produce a safety review based on subjective evaluations for the classification of accidents. The data analysed and presented in this report comes from a variety of sources, including Airclaims Ltd., government accident reports and other sources. Once assembled, the ACTF validates each accident report with their expertise to develop as accurate a picture as possible of the events.

IATA REGIONS

At the time of writing the 2007 Safety Report, regions are delineated using the definition set out by IATA. Further information can be found at Annex 1.

Representation at the ACTF is as follows:

Dr. Dieter Reisinger
AUSTRIAN AIRLINES (Chair)

Captain Georges Merkovic
AIR FRANCE

Captain Jean-Lucien Tarrillon
AIR FRANCE RÉGIONAL

Mr. Jean Daney
AIRBUS INDUSTRIE

Captain Angelo Ledda
ALITALIA LINEE AEREE ITALIANE

Captain David C. Carbaugh
BOEING COMPANY

Mr. Jim Donnelly
BOMBARDIER

Mr. Alan Thorne
BRITISH AIRWAYS

Captain Mattias Pak
CARGOLUX AIRLINES INTERNATIONAL

Mr. Luis Savio dos Santos
EMBRAER AVIATION INTERNATIONAL

Mr. Don Bateman
HONEYWELL

Mr. Serge Larue
IATA

Mr. Martin Maurino
IATA (ACTF Secretary)

Captain Karel Mündel
IFALPA

Mr. Bert Ruitenberg
IFATCA

Captain Keiji Kushino
JAPAN AIRLINES INTERNATIONAL

Mr. Richard Fosnot
JEPPESEN

Captain Joachim Fleger
LUFTHANSA GERMAN AIRLINES

Captain Peter Eggler
SWISS INTERNATIONAL AIR LINES

Captain Carlos dos Santos Nunes
TAP AIR PORTUGAL

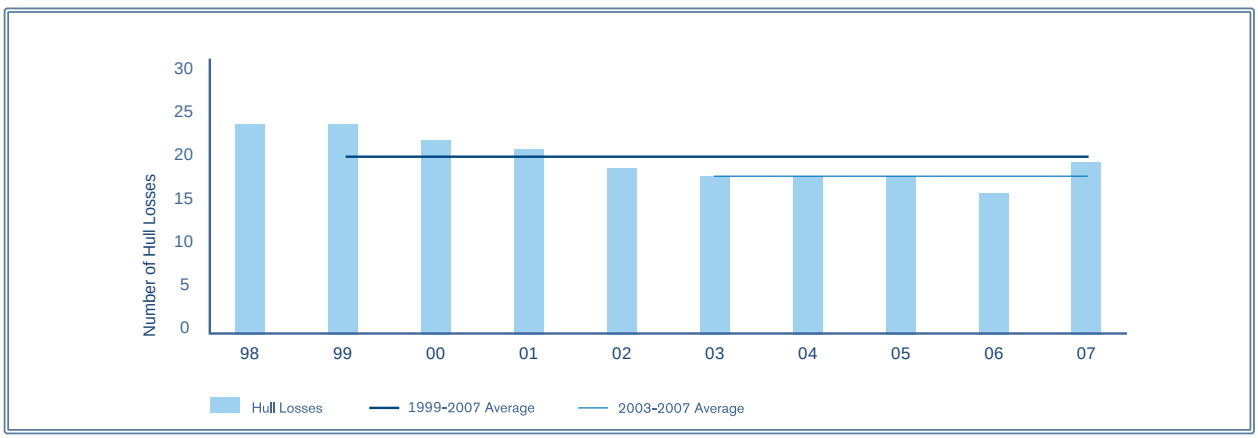
Section 2

2

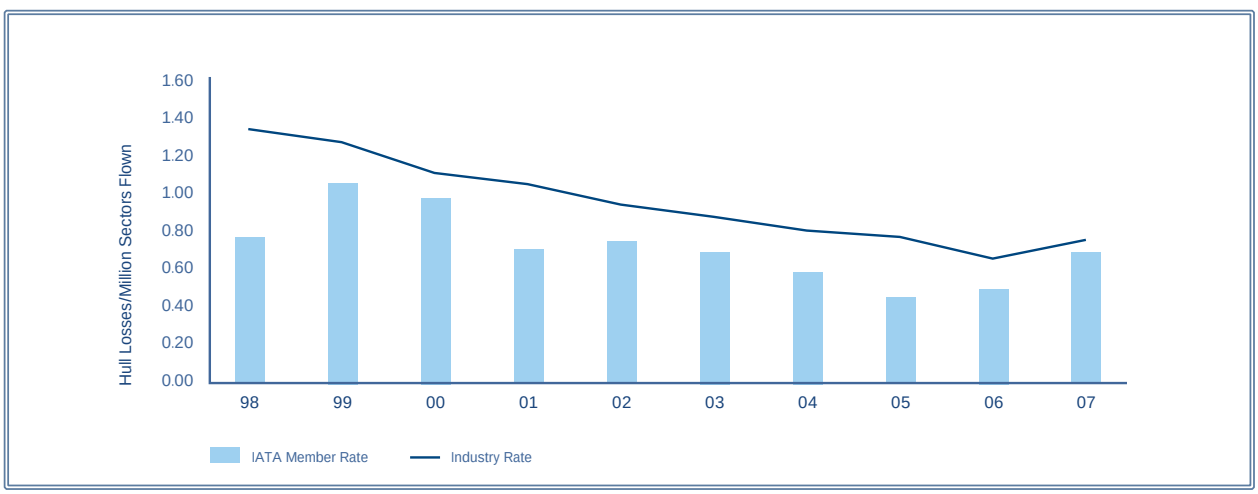
Decade in Review

ACCIDENT / FATALITY STATISTICS AND RATES

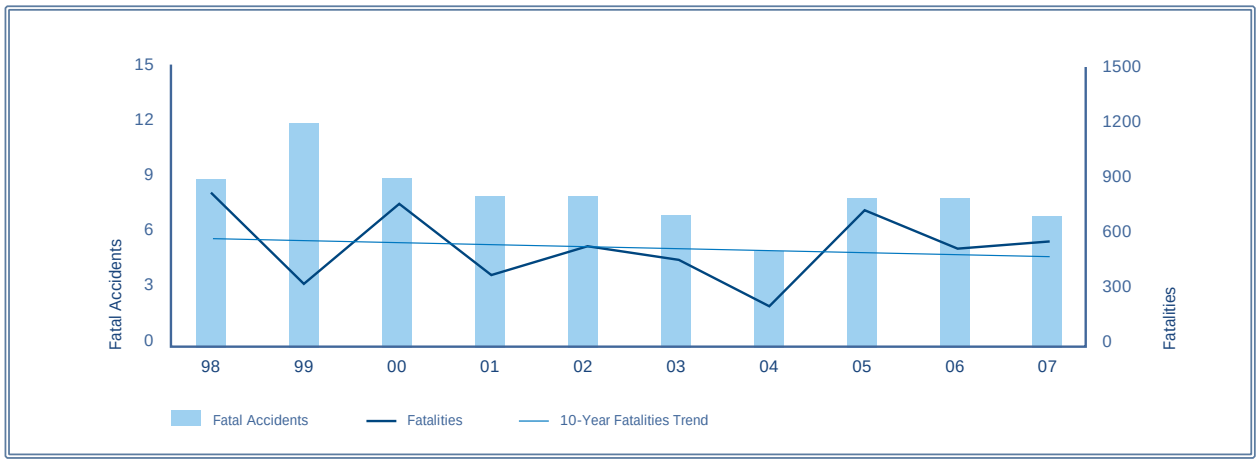
Western-built Jet Aircraft Hull Losses (1998-2007)



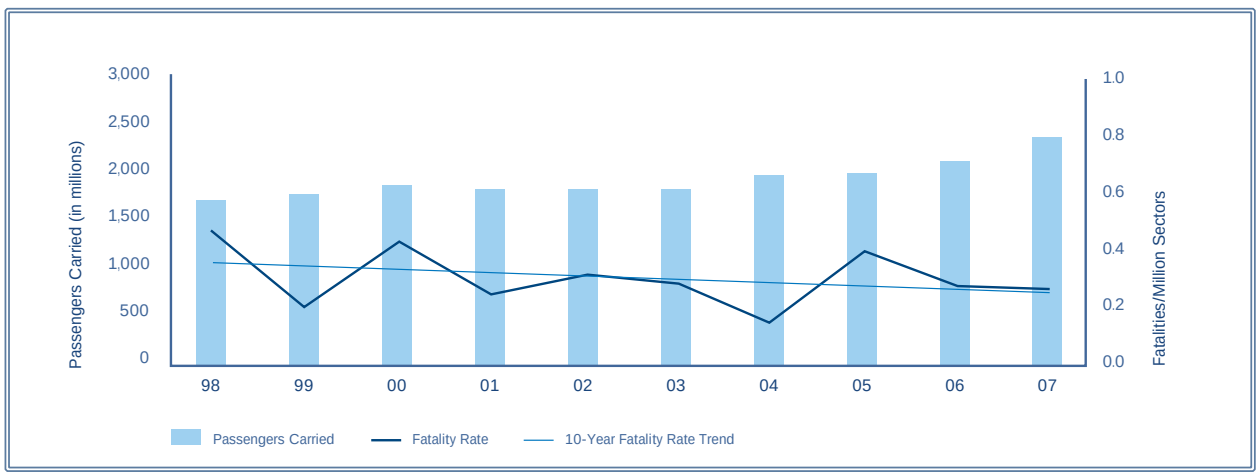
Western-built Jet Aircraft Hull Loss Rate: IATA Member Airlines vs. Industry (1998-2007)



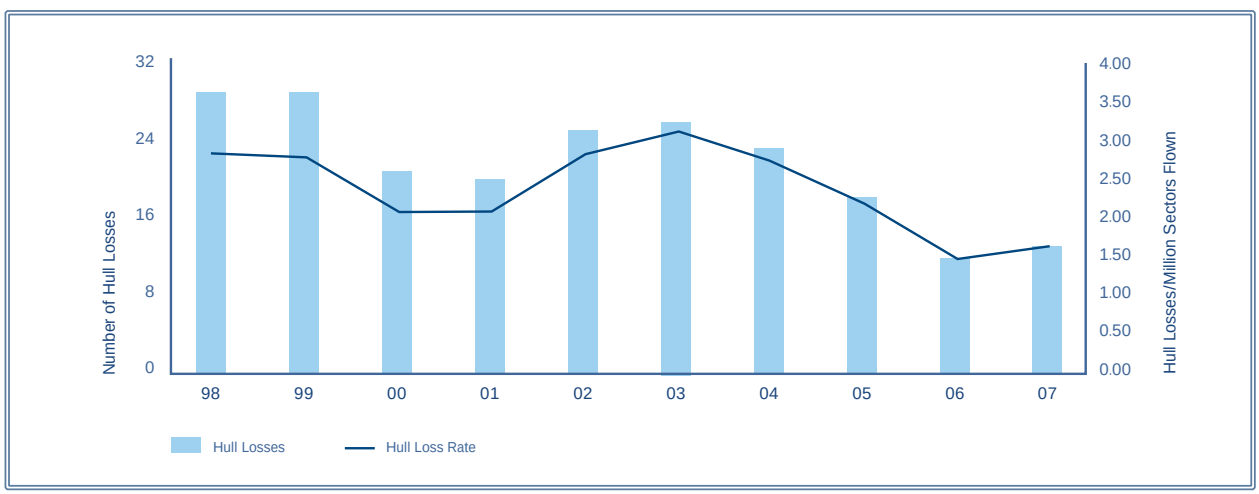
Western-built Jet Aircraft: Fatal Accidents & Fatalities (1998-2007)



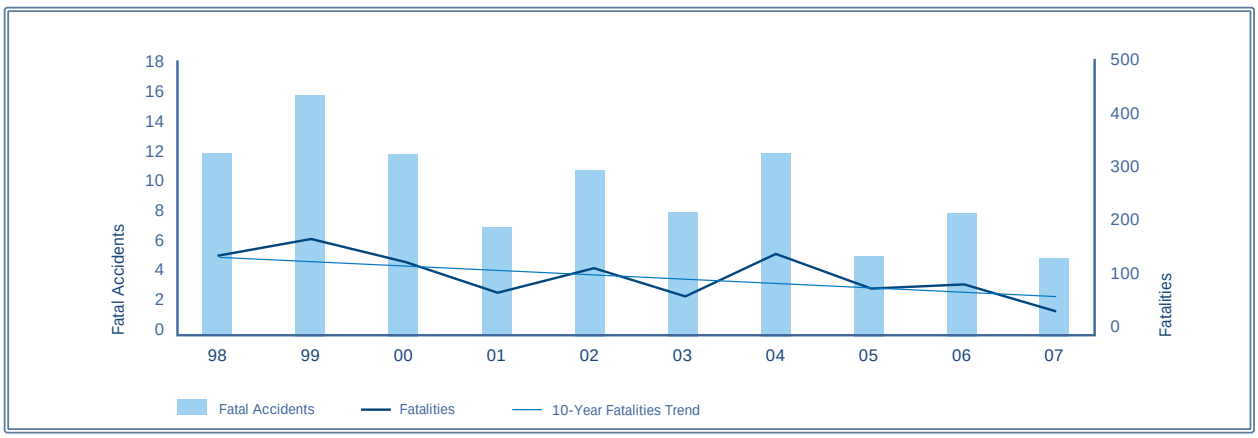
Western-built Jet Aircraft: Passengers Carried & Passenger Fatality Rate (1998-2007)



Western-built Turboprop Aircraft Hull Losses & Accident Rate (1998-2007)



Western-built Turboprop Aircraft: Fatal Accidents & Fatalities (1998-2007)

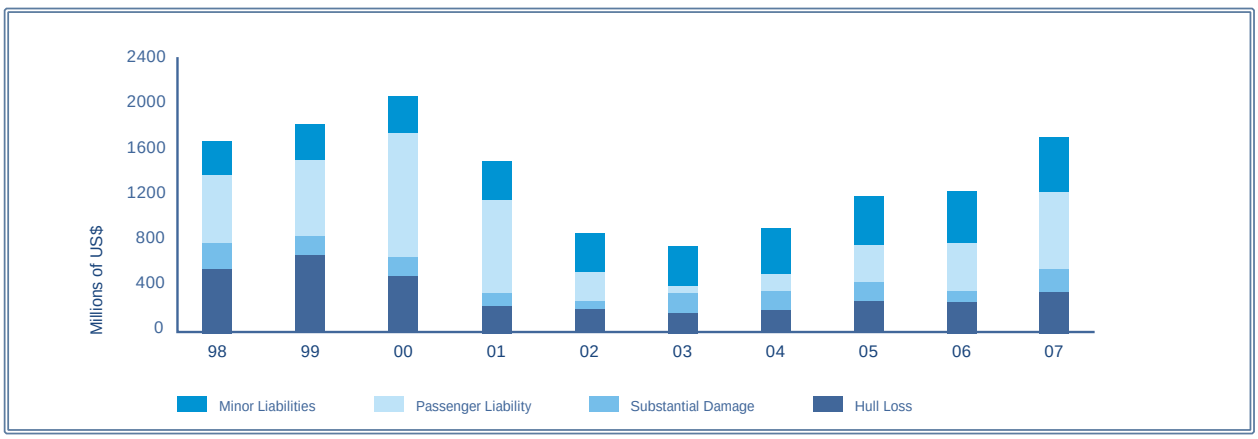


ACCIDENT COSTS

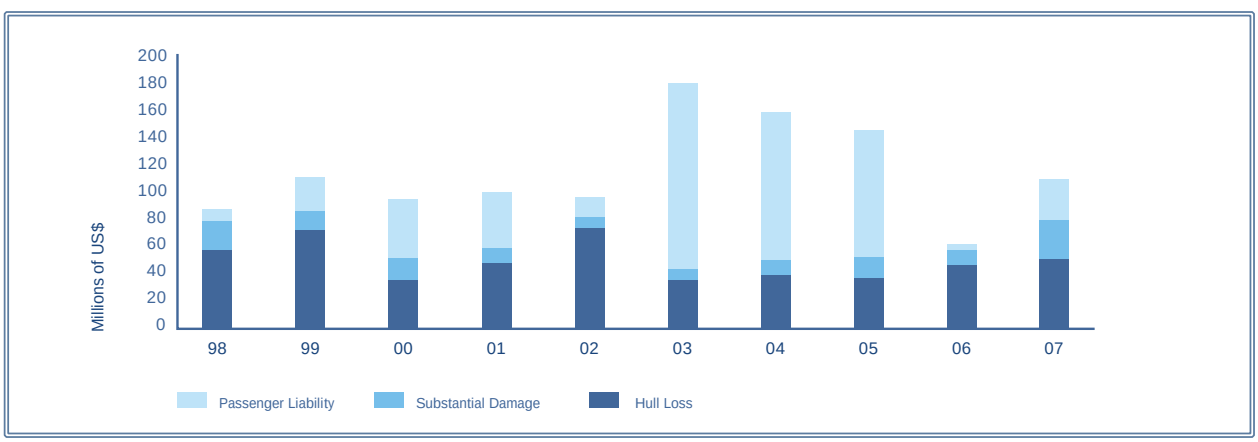
IATA has obtained the estimated costs for all losses involving Western-built aircraft over the last 10 years, as well as current year estimates for the Eastern-built fleet.

The figures presented in this section are operational accidents excluding security-related events and acts of violence. All amounts are expressed in US dollars.

Western-built Jet Aircraft: Accident Costs (1998-2007)



Western-built Turboprop Aircraft: Accident Costs (1998-2007)



“Already, existing programmes, such as IOSA, have provided the industry with valuable tools.”

Section 3

3

Year 2007 in Review

AIRCRAFT ACCIDENTS

There were a total of 100 accidents in 2007. Descriptions of all the year's accidents are presented in **Annex 2**.

Fleet Size, Hours and Sectors Flown

	Western-built Aircraft		Eastern-built Aircraft	
	Jet	Turboprop	Jet	Turboprop
World Fleet (end of year)	19723	5563	1617	1744
Hours Flown (millions)	51.14	6.69	1.18	0.63
Sectors (landings) (millions)	26.66	8.04	0.54	0.42

Operational Accidents

	Western-built Aircraft		Eastern-built Aircraft	
	Jet	Turboprop	Jet	Turboprop
Hull Loss (HL):	20	13	1	11
Substantial Damage (SD):	36	17	0	2
Total Accidents:	56	30	1	13
Fatal Accidents	7	5	1	7

3

Operational Hull Loss Rates

	Western-built Aircraft		Eastern-built Aircraft	
	Jet	Turboprop	Jet	Turboprop
Hull Losses per million sectors:	0.75	1.62	1.85	26.2
Hull Losses per million hours:	0.39	1.94	0.85	17.5

Passengers Carried

	Western-built Aircraft		Eastern-built Aircraft	
	Jet	Turboprop	Jet	Turboprop
Passengers Carried (millions):	2,393	124	34	7
Estimated Change in Passengers Carried Since the Previous Year	+12%	+1.6%	-11%	0%

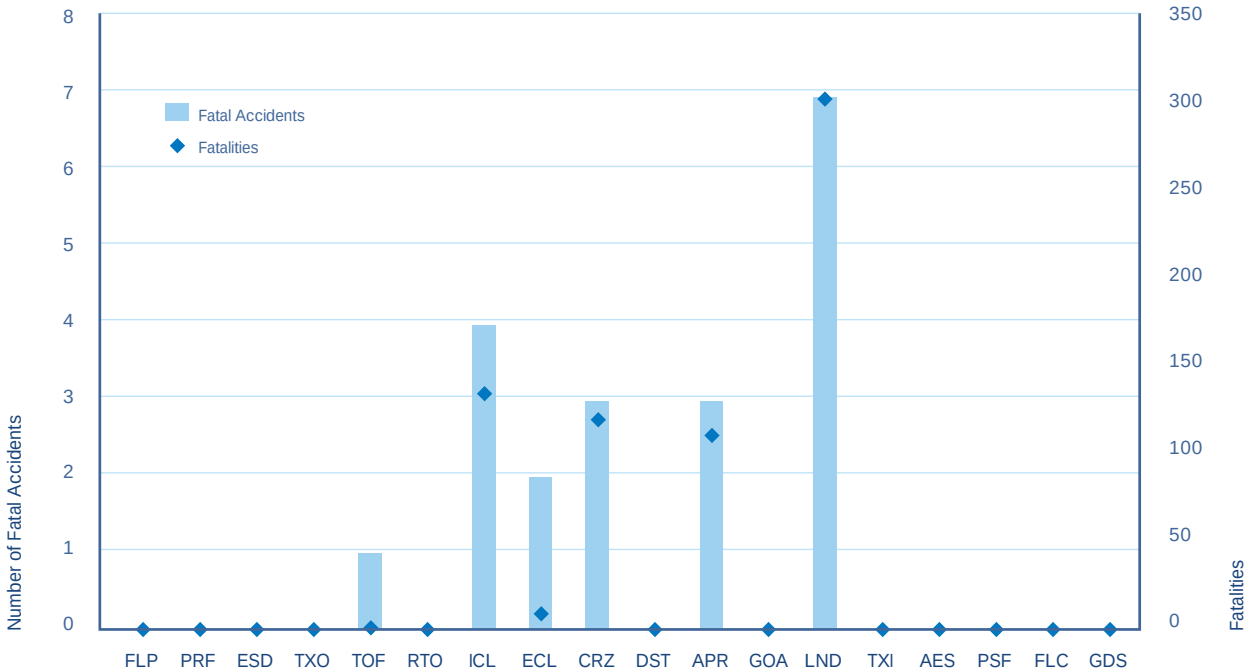
Western-built Jet Aircraft Fatal Accidents by Operator Region

	AFI	EUR	ASPAC	LATAM	MENA	NAM	NASIA	CIS
Accidents:	4	13	13	4	5	13	4	0
Fatal Accidents:	2	1	3	1	0	0	0	0
Fatalities (crew and passengers):	119	56	214	187	0	0	0	0

Fatalities by Aircraft Type

	Western-built Aircraft		Eastern-built Aircraft	
	Jet	Turboprop	Jet	Turboprop
Passenger Fatalities:	541	20	6	61
Crew Fatalities:	35	6	0	23
Total Fatalities:	576	26	6	84

Fatal Accidents and Fatalities by Phase of Flight



Phase of Flight Definitions

FLP	Flight Planning	**DST**	Descent
PRF	Pre-flight	**APR**	Approach
ESD	Engine Start/Depart	**GOA**	Go-around
TXO	Taxi-out	**LND**	Landing
TOF	Take-off	**TXI**	Taxi-in
RTO	Rejected Take-off	**AES**	Arrival/Engine Shutdown
ICL	Initial Climb	**PSF**	Post-flight
ECL	En Route Climb	**FLC**	Flight Close
CRZ	Cruise	**GDS**	Ground Servicing

AIRCRAFT ACCIDENTS BY REGION

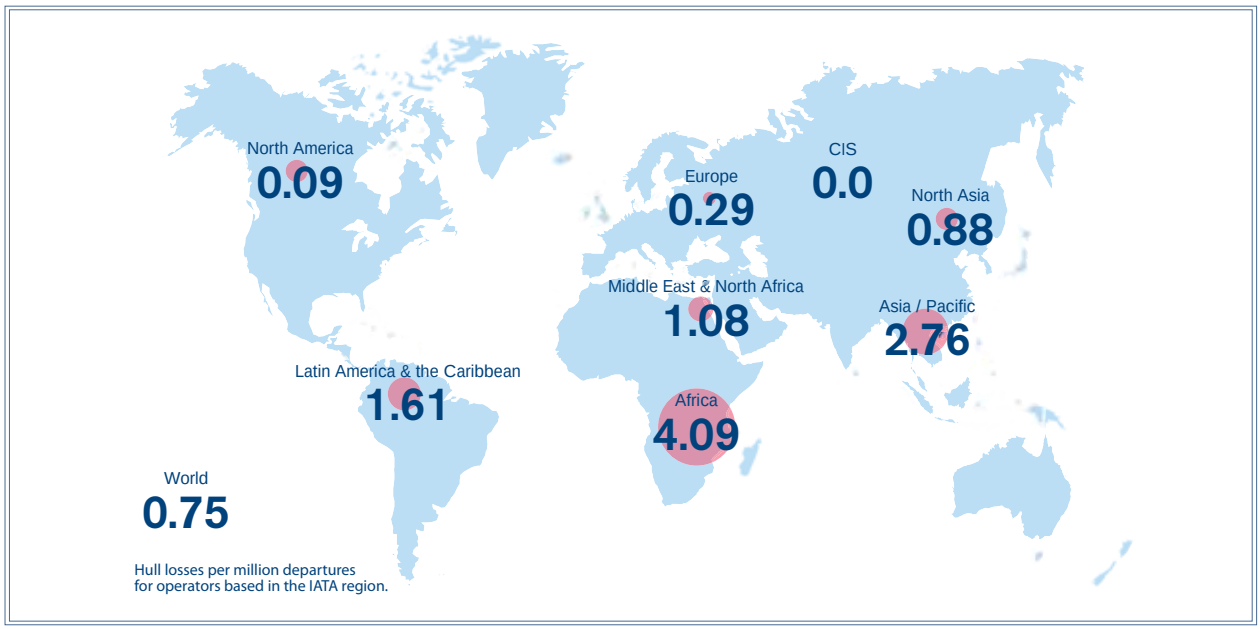
Western-built Aircraft Accidents By Operator Region

Sectors are calculated on a regional basis using the operator's country of AOC to determine what region they belong in. Accordingly, the rates presented below are by operator region.

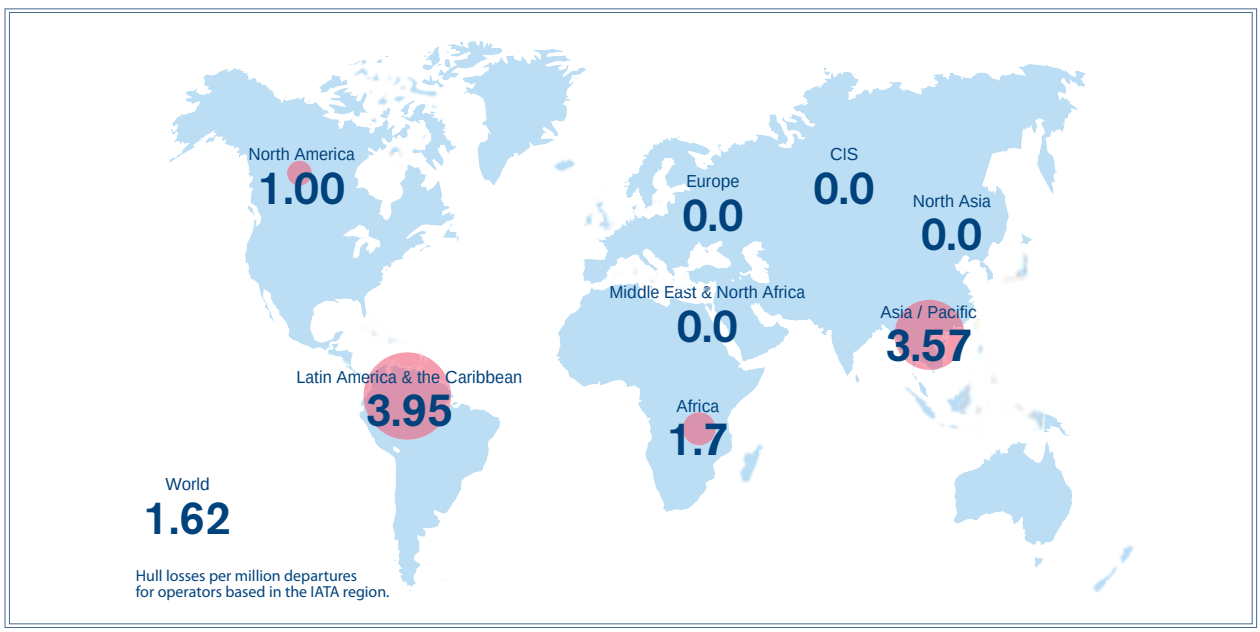
For a complete list of countries by region, consult Annex 1

3

Western-built Jet Aircraft Hull Loss Rate by Operator Region



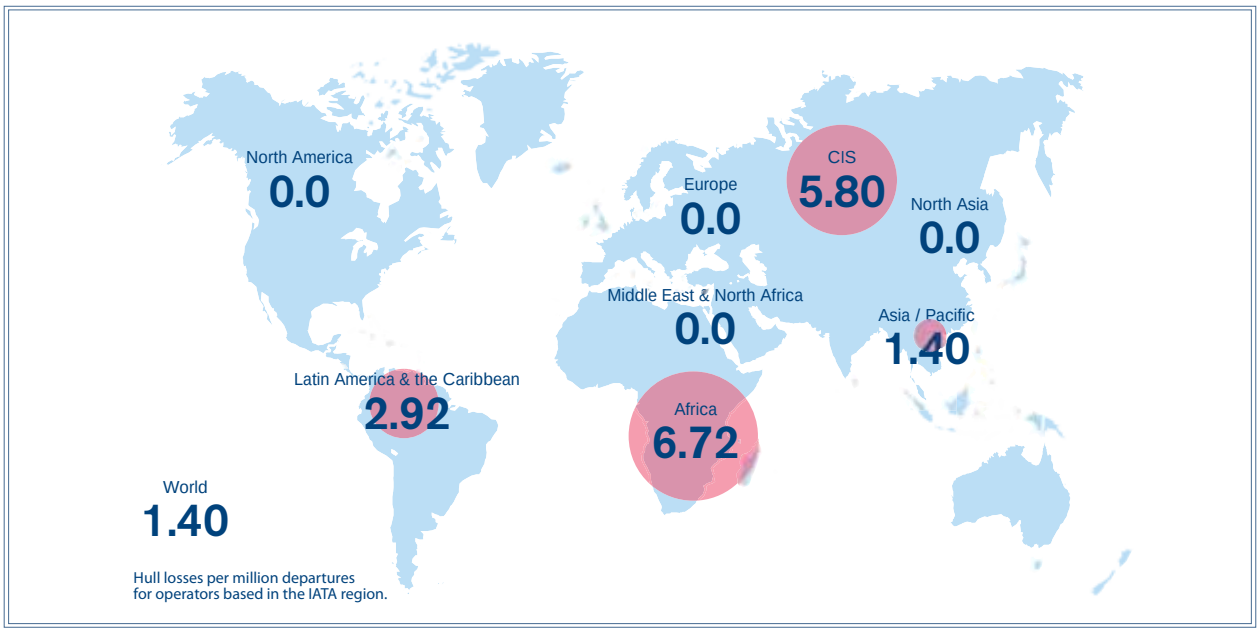
Western-built Turboprop Aircraft Hull Loss Rate by Operator Region



Eastern-built Aircraft Accidents By Operator Region

IATA has also obtained exposure data for the Eastern-built fleets. The regional accident loss rate breakdown by operator region is presented below.

Eastern-built Aircraft (All Types) Hull Loss Rate by Operator Region



“In 2007, IATA member airlines surpassed the industry in terms of safety.”

Section 4

4

In-Depth Accident Analysis 2007

INTRODUCTION TO TEM FRAMEWORK

The Human Factors Research Project at The University of Texas at Austin developed the Threat and Error Management (TEM) framework as a conceptual framework to interpret data obtained from both normal and abnormal operations. For many years, IATA has worked closely with The University of Texas at Austin Human Factors Research Team, the International Civil Aviation Organisation (ICAO) and its member airlines and manufacturers to apply TEM to its many safety activities.

Fig. 4.1 Threat and Error Management Framework

This section presents some definitions that will be helpful to understand the analysis contained in this report. The TEM framework is illustrated in Figure 4.1.

Latent Conditions: Conditions present in the system before the accident, made evident by triggering factors. These often relate to deficiencies relating to organisational processes and procedures.

Threat: An event or error that occurs outside the influence of the flight crew, but which requires crew attention and management if safety margins are to be maintained.

Mismanaged Threat: A threat that is linked to or induces crew error.

Flight Crew Error: An observed flight crew deviation from organisational expectations or crew intentions.

Mismanaged Error: An error that is linked to or induces additional error or an undesired aircraft state.

Undesired Aircraft State (UAS): A *flight-crew-induced* aircraft state that clearly reduces safety margins; a safety-compromising situation that results from ineffective threat / error management. An undesired aircraft state is recoverable.

Mismanaged UAS: A UAS that is linked to or induces additional error.

End State: An end state is a reportable event. An end state is unrecoverable.

Distinction between "Undesired Aircraft State" and "End State": An unstable approach is recoverable. This is a UAS. A runway excursion is *unrecoverable*. Therefore, this is an End State.

4

NEW TAXONOMY

In 2007, at the request of member airlines, manufacturers and other organisations involved in the Safety Report, IATA modified its existing accident classification taxonomy and developed a classification system based on the Threat and Error Management (TEM) framework.

The purpose of the new taxonomy:

- Acquire more meaningful data
- Extract further information / intelligence
- Formulate relevant mitigation strategies / safety recommendations

Unfortunately, some accidents do not contain sufficient information at the time of the analysis to adequately assess contributing factors. When an event cannot be properly classified due to lack of information, it is coded under the "insufficient information" category. It should also be noted that the contributing factors that have been classified do not always reflect all the factors that played a part in an accident but rather those known at the time of the analysis. Hence there is a need for Operators and States to improve their reporting cultures.

Important note: In the in-depth analysis charts presented in Sections 4-5-6, the percentages shown with regards to contributing factors (e.g. % of threats and errors noted) are not based on total number of events but on the total number of classified events.

However, accidents classified as "insufficient information" are part of the overall statistics (e.g. % of accidents that were fatal or resulted in Hull Losses).

Annex 1 contains definitions and detailed information in terms of the types of aircraft that are included in the Safety Report analysis.

ORGANISATIONAL & FLIGHT CREW-AIMED COUNTERMEASURES

Every year, the ACTF classifies accidents and, with the benefit of hindsight, determines actions or measures that could have been taken to prevent an accident. These proposed countermeasures can include overarching issues within an organisation or a particular country, or involve performance of front line personnel, such as pilots or ground personnel.

Countermeasures are aimed at two levels:

- The first set is aimed at the operator or the State responsible for oversight: these countermeasures are based on activities, processes or systemic issues internal to the airline operation or State's oversight activities.
- The other set of countermeasures are aimed at the flight crews, to help them manage threats or their own errors while on the line.

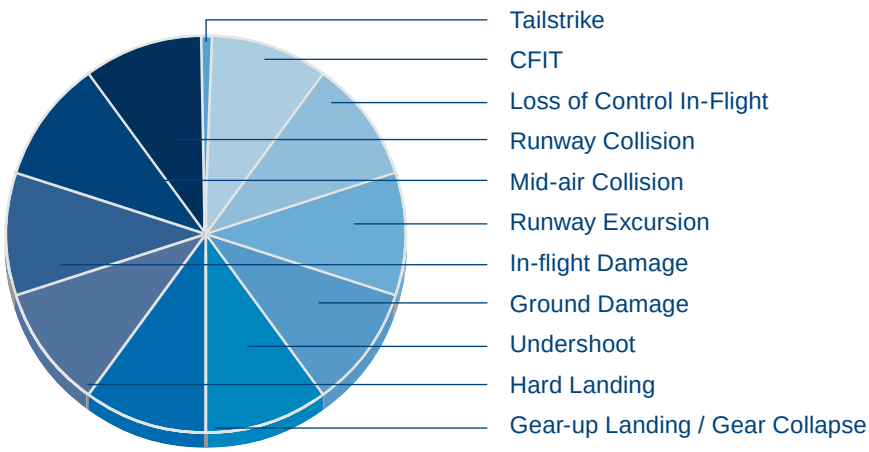
Countermeasures for other personnel, such as air traffic controllers, ground crew, cabin crew or maintenance staff, are important but they are not considered at this time.

Each event was coded with potential counter-measures that, with the benefit of hindsight, could have altered the outcome of events. A statistical compilation of the top countermeasures is presented in Section 7 of this report.

ANALYSIS BY ACCIDENT CATEGORIES & REGIONS

- This section presents an in-depth analysis of the 2007 occurrences by accident categories, as illustrated in the sample Figure 4.2.
- The term “accident categories” refers to a generic classification of accidents.
- Definitions of these categories can be found in Annex 1.

Figure 4.2 – Accident Categories (End States)



Referring to these accident categories helps an operator to:

- Structure its safety activities and set priorities.
- Avoid “forgetting” key risk areas, when a type of accident does not occur on a given year.
- Provide resources for well-identified prevention strategies.
- Address systematically and continuously these categories in the airline’s safety management system.

Section 5 shows an in-depth regional accident analysis (by region of the involved operator).

Note: In 2007, no accidents occurred as a result of a runway or mid-air collision. Therefore, no in-depth analysis could be conducted for each of these categories in the Safety Report.

4

Year 2007 Aircraft Accidents

100 Accidents

IATA Members	35%
Hull Losses	45%
Fatal	20%

81% Passenger

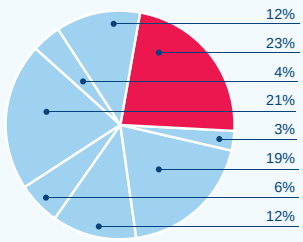
16% Cargo

3% Ferry

57% Jet

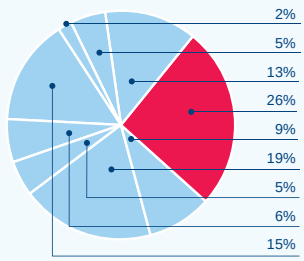
43% Turboprop

Accidents by Region of Operator



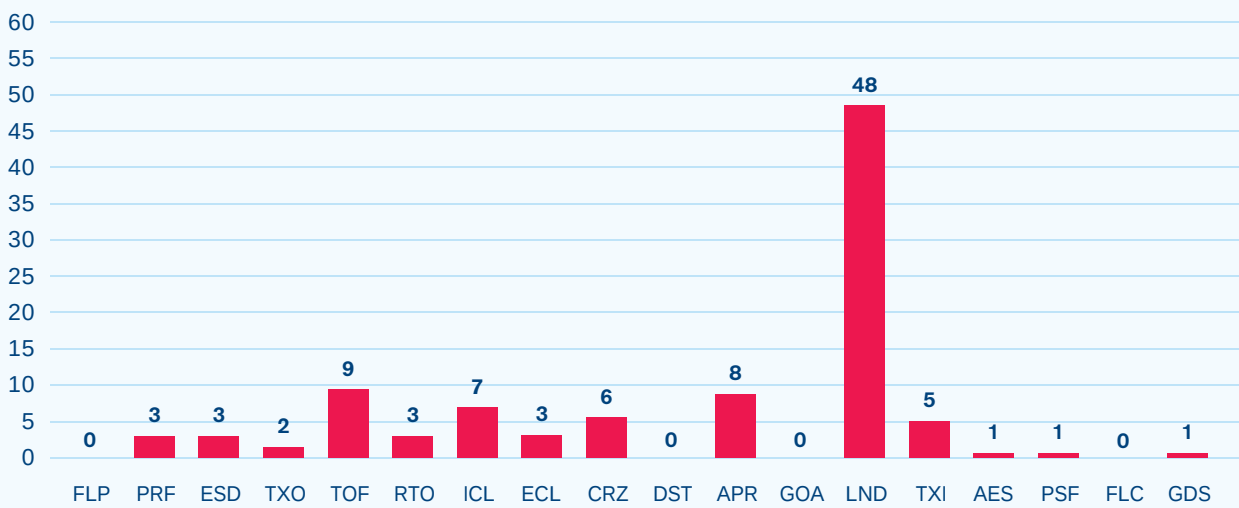
12%	Africa
23%	Asia / Pacific
4%	North Asia
21%	North America
3%	CIS
19%	Europe
6%	Middle East & North Africa
12%	Latin America & the Caribbean

Breakdown by Accident Category



2%	Tailstrike
5%	CFIT
13%	Loss of Control In-flight
26%	Runway Excursion
9%	In-flight Damage
19%	Ground Damage
5%	Undershoot
6%	Hard Landing
15%	Gear-up Landing / Gear Collapse
0%	Mid-air Collision
0%	Runway Collision

Accidents by Phase of Flight*



Year 2007 Aircraft Accidents *Continued*

Top Contributing Factors*

Latent Conditions (Deficiencies in...)

- **26%** Regulatory oversight
- **22%** Safety management
- **21%** Flight crew training
- **19%** Flight Operations: SOPs & checking
- **14%** Maintenance Operations: SOPs & checking

Threats

Environmental

- **36%** Meteorology
- **22%** Airport facilities
- **11%** Terrain / Obstacles
- **8%** Air Traffic Services
- **6%** Birds / Foreign objects

Airline

- **45%** Aircraft malfunction
  - Gear / Tire (**34%** of all malfunctions)
  - Contained engine failure (**16%** of all malfunctions)
  - Structural failure (**11%** of all malfunctions)
- **19%** Maintenance events
- **12%** Ground events
- **8%** Operational pressure
- **4%** MEL item

Flight Crew Errors (relating to...)

- **39%** Manual handling / Flight controls
- **22%** SOP adherence / cross-verification
- **14%** Other procedural errors
- **12%** Failure to go-around after destabilisation during approach
- **8%** Callouts

Undesired Aircraft States (UAS)

- **29%** Vertical, lateral or speed deviations
- **18%** Long, floated, bounced, firm or off-centerline landing
- **15%** Unstable approach
- **14%** Continued landing after unstable approach
- **11%** Operation outside aircraft limitations

Correlations of Interest

The majority of accidents **(63%)** involving procedural errors by flight crews also involved deficiencies with regards to the Operator's flight crew training.

In **39%** of accidents where an aircraft malfunction was cited as a contributing factor, a maintenance event (e.g. maintenance error) was also cited.

Overall, in **50%** of the accidents involving a maintenance event, deficiencies in the Operator's maintenance organisation were also noted as a contributing factor.

The majority **(61%)** of manual handling errors by flight crews occurred in adverse weather.

74% of accidents involving deficiencies in safety management at the Operator level also implicated poor regulatory oversight by the State of the Operator.

37% of accidents resulting in ground damage involved ground events (e.g. errors by the ground crew).

Note: 15% of accidents were not classified due to insufficient data

* See Annex 1 for definitions

Phase of Flight Definitions

FLP	Flight Planning	**DST**	Descent
PRF	Pre-flight	**APR**	Approach
ESD	Engine Start/Depart	**GOA**	Go-around
TXO	Taxi-out	**LND**	Landing
TOF	Take-off	**TXI**	Taxi-in
RTO	Rejected Take-off	**AES**	Arrival/Engine Shutdown
ICL	Initial Climb	**PSF**	Post-flight
ECL	En Route Climb	**FLC**	Flight Close
CRZ	Cruise	**GDS**	Ground Servicing

4

Controlled Flight into Terrain

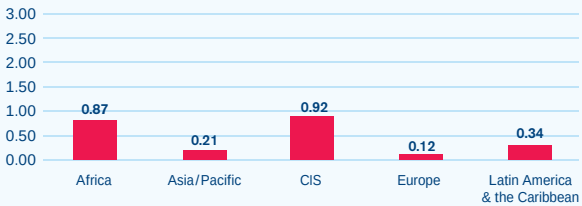
5 Accidents

IATA Members	1 case
Hull Losses	100%
Fatal	80%
Accident Rate*	0.14

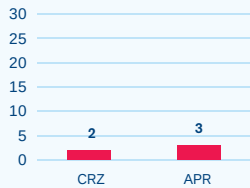
80% Passenger | 0% Cargo | 20% Ferry

20% Jet | 80% Turboprop

Accident Rates by Region of Operator*



Accidents by Phase of Flight**



Top Contributing Factors***

Latent Conditions (Deficiencies in...)

- **40%** Regulatory oversight
- **40%** Operations planning & scheduling
- **20%** Flight Operations: SOPs & checking

Threats

Environmental

- **80%** Terrain / Obstacles
- **60%** Meteorology
- **40%** Lack of Nav Aids

Airline

None noted

Flight Crew Errors (relating to...)

- **40%** Manual handling / Flight controls
- **40%** SOP adherence / cross-verification
- **20%** Automation

Undesired Aircraft States (UAS)

- **80%** Vertical, lateral or speed deviations

End State

Controlled Flight into Terrain

Correlations of Interest

50% of the CFIT accidents where vertical, lateral or speed deviations by flight crews were noted also involved a ground navigation aid malfunction, lack or unavailability.

One aircraft involved in a CFIT was equipped with E-GPWS. However the E-GPWS was in-operative at the time of the accident. This issue will be discussed in Section 7.

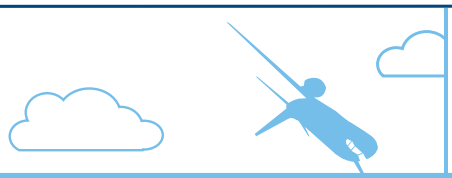
Accident Scenarios of Interest

Scenario:

While operating in an environment with unavailable, absent or malfunctioning ground navigation aids, the flight crew commits aircraft handling errors and the aircraft undergoes vertical, lateral or speed deviations. It impacts terrain and is destroyed.

This scenario is common to 40% of all accidents involving a controlled flight into terrain.

Note: All events were classified.
* Accidents per million sectors flown for all aircraft types
** See Annex 1 for "Phase of Flight" definitions
*** See Annex 1 for "Contributing Factors" definitions



Loss of Control In-flight

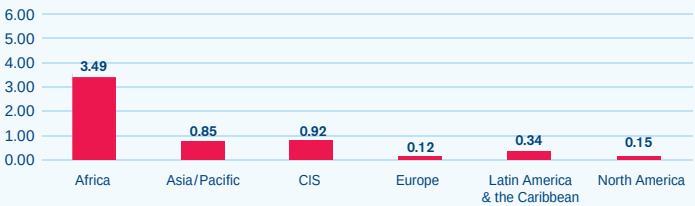
13 Accidents

IATA Members	1 case
Hull Losses	100%
Fatal	85%
Accident Rate*	0.36

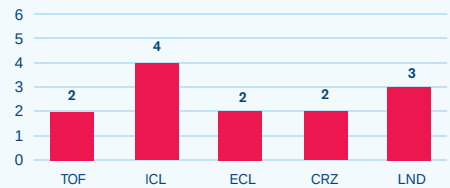
70% Passenger | **15%** Cargo | **15%** Ferry

31% Jet | **69%** Turboprop

Accident Rates by Region of Operator*



Accidents by Phase of Flight**



Top Contributing Factors***

Latent Conditions (Deficiencies in...)

- **50%** Flight crew training
- **40%** Regulatory oversight
- **20%** Safety management
- **20%** Maintenance Operations: SOPs & checking

Threats

Environmental

- **50%** Meteorology
- **20%** Birds / Foreign objects

Airline

- **50%** Aircraft malfunction
  - Avionics (**40%** of all malfunctions)
  - Engine failure (**40%** of all malfunctions)
  - Flight controls (**20%** of all malfunctions)
- **20%** Maintenance events

Flight Crew Errors (relating to...)

- **40%** Manual handling / Flight controls
- **30%** SOP adherence / cross-verification
- **20%** Pilot-to-Pilot communication
- **20%** Automation

Undesired Aircraft States (UAS)

- **50%** Operation outside aircraft limitations
- **30%** Vertical, lateral or speed deviations
- **20%** Incorrect configuration – aircraft systems
- **20%** Incorrect configuration – flight controls / automation

End State

Loss of Control In-flight

Correlations of Interest

All the accidents involving manual handling / flight control errors also involved deficiencies in flight crew training on the part of the Operator.

In the majority (**80%**) of accidents linked to operation outside aircraft limitations, flight crew errors relating to manual handling / flight controls were also noted.

40% of accidents involving aircraft malfunctions were linked to maintenance events, such as a maintenance error.

Accident Scenarios of Interest

Scenario 1:

The Operator in question has deficiencies with regards to flight crew training. While operating in adverse weather, the flight crew commits manual handling / flight control errors. They operate the aircraft outside its limitations and subsequently lose control. The aircraft is destroyed.

This scenario is common to 30% of all the loss of control in-flight accidents.

Scenario 2:

The Operator in question has deficiencies with regards to flight crew training. While operating in adverse weather, the flight crew commits errors relating to automation and does not adhere to SOPs. The aircraft undergoes vertical, lateral or speed deviations. There is an incorrect configuration with regards to flight controls / automation. The flight crew loses control and the aircraft is destroyed.

This scenario is common to 20% of all the loss of control in-flight accidents.

Scenario 3:

The Operator in question has deficiencies with regards to flight crew training. On the day of the accident, flight crew faces several environmental threats. Miscommunication occurs between the flight crew members. They operate the aircraft outside its limitations and lose control.

This scenario is common to 20% of all the loss of control in-flight accidents.

Note: 23% of accidents were not classified due to insufficient data
* Accidents per million sectors flown for all aircraft types
** See Annex 1 for "Phase of Flight" definitions
*** See Annex 1 for "Contributing Factors" definitions

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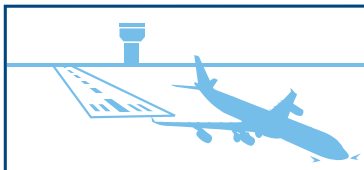


Runway Excursions

26 Accidents

IATA Members	50%
Hull Losses	35%
Fatal	8%
Accident Rate*	0.73

100% Passenger

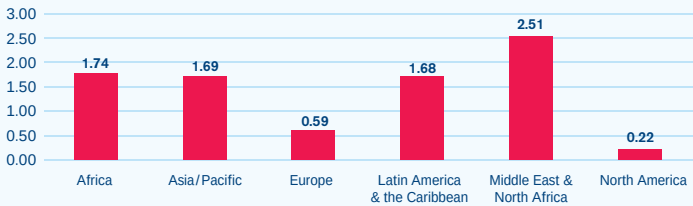
0% Cargo

0% Ferry

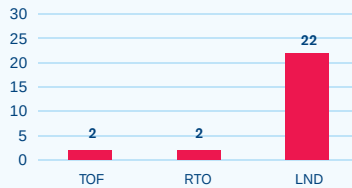
62% Jet

38% Turboprop

Accident Rates by Region of Operator*



Accidents by Phase of Flight**



Top Contributing Factors***

Latent Conditions (Deficiencies in...)

- **38%** Flight crew training
- **29%** Flight Operations: SOPs & checking
- **29%** Safety management

Threats

Environmental

- **62%** Meteorology
- **52%** Airport facilities

Airline

- **33%** Aircraft malfunction
  - Gear / Tire (**29%** of all malfunctions)
  - Uncontained engine failure (**29%** of all malfunctions)

Flight Crew Errors (relating to...)

- **67%** Manual handling / Flight controls
- **43%** SOP adherence / cross-verification
- **33%** Other procedural errors
- **19%** Failure to go-around after destabilisation during approach

Undesired Aircraft States (UAS)

- **48%** Vertical, lateral or speed deviations
- **43%** Long, floated, bounced, firm or off-centerline landing
- **33%** Incorrect configuration - brakes, thrust reversers or ground spoilers
- **29%** Unstable approach
- **29%** Continued landing after unstable approach

End State

Runway Excursion

Correlations of Interest

In almost a quarter (**24%**) of runway excursion accidents, the flight crew continued to land after an unstable approach.

In **31%** of all runway excursions, there was a correlation between adverse weather and long, floated, bounced, firm or off-centerline landing by the flight crew.

In **27%** of runway excursions, a correlation was noted between non-adherence to SOPs by flight crews, and vertical, lateral or speed deviations prior to the accident.

Accident Scenarios of Interest

Scenario 1:

While operating in adverse weather, the flight crew commits manual handling / flight control errors. After an unstable approach, the crew elects to continue to land. The aircraft lands long, floats, bounces, lands firmly, or off-centerline. It departs the runway and is substantially damaged or destroyed.

This scenario is common to 24% of all the runway excursion accidents.

Scenario 2:

The Operator in question has deficiencies with regards to flight crew training and Flight Operations (in terms of SOPs & checking). On the day of the accident, flight crew is operating in adverse weather conditions and into an airport with deficient facilities. The flight crew commits manual handling / flight control errors. They do not adhere to SOPs. The aircraft undergoes vertical, lateral or speed deviations and lands long, floats, bounces, lands firmly or off-centerline. It departs the runway and is substantially damaged or destroyed.

This scenario is common to 19% of all the runway excursion accidents.

Scenario 3:

The Operator in question has deficiencies with regards to flight crew training and Flight Operations (in terms of SOPs & checking). On the day of the accident, flight crew is operating in adverse weather conditions and into an airport with deficient facilities. The flight crew commits manual handling / flight control errors. They do not adhere to SOPs. The aircraft undergoes vertical, lateral or speed deviations. There is an incorrect configuration with regards to brakes, thrust reversers, or ground spoilers. The aircraft departs the runway and is substantially damaged or destroyed.

This scenario is common to 14% of all the runway excursion accidents.

Note: 19% of accidents were not classified due to insufficient data
* Accidents per million sectors flown for all aircraft types
** See Annex 1 for "Phase of Flight" definitions
*** See Annex 1 for "Contributing Factors" definitions

In-flight Damage

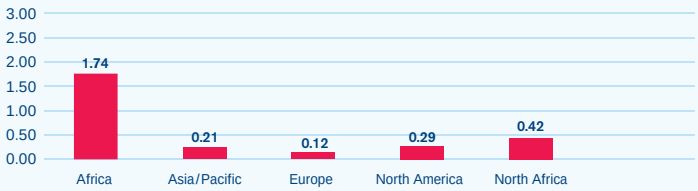
9 Accidents

IATA Members	44%
Hull Losses	22%
Fatal	11%
Accident Rate*	0.25

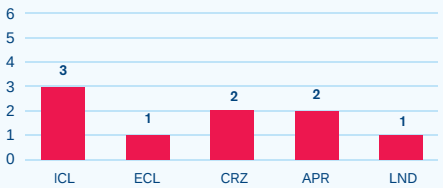
67% Passenger | 33% Cargo | 0% Ferry

67% Jet | 33% Turboprop

Accident Rates by Region of Operator*



Accidents by Phase of Flight**



Top Contributing Factors***

Latent Conditions (Deficiencies in...)

- 13% Flight Operations: SOPs & checking
- 13% Flight crew training
- 13% Maintenance Operations: SOPs & checking

Threats

Environmental

- 25% Meteorology

Airline

- 75% Aircraft malfunction
  - Structural failure (33% of all malfunctions)
  - Contained engine failure (33% of all malfunctions)
  - Uncontained engine failure (33% of all malfunctions)
- 25% Maintenance events

Flight Crew Errors (relating to...)

- 50% Procedural errors
- 13% Automation

Undesired Aircraft States (UAS)

- 50% Aircraft handling

End State

In-flight Damage

Correlations of Interest

No significant correlations noted

Accident Scenarios of Interest

No significant scenarios noted

Note: 11% of accidents were not classified due to insufficient data
* Accidents per million sectors flown for all aircraft types
** See Annex 1 for "Phase of Flight" definitions
*** See Annex 1 for "Contributing Factors" definitions

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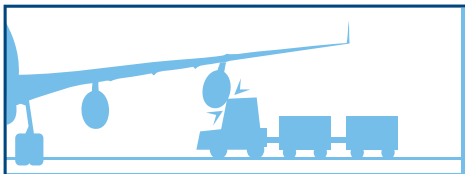


Ground Damage

19 Accidents

IATA Members	42%
Hull Losses	26%
Fatal	0%
Accident Rate*	0.53

68% Passenger

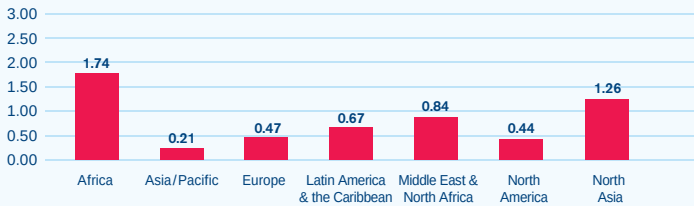
32% Cargo

0% Ferry

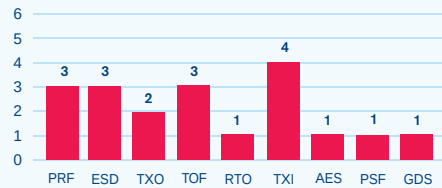
74% Jet

26% Turboprop

Accident Rates by Region of Operator*



Accidents by Phase of Flight**



Top Contributing Factors***

Latent Conditions (Deficiencies in...)

- **18%** Ground Operations: SOPs & checking
- **18%** Safety management
- **12%** Maintenance Operations: SOPs & checking

Threats

Environmental

- **24%** Meteorology
- **18%** Birds / Foreign objects
- **18%** Airport facilities

Airline

- **41%** Ground events
- **35%** Aircraft malfunction
  - Structural failure (**33%** of all malfunctions)
  - Brakes (**17%** of all malfunctions)
  - Fire / Smoke (**17%** of all malfunctions)
  - Hydraulic system failure (**17%** of all malfunctions)
  - Contained engine failure (**17%** of all malfunctions)
- **18%** Maintenance Events

Flight Crew Errors (relating to...)

- **18%** Manual handling / Flight controls
- **12%** Flight crew to external communication

Undesired Aircraft States (UAS)

- **6%** Ground navigation - ramp movements

End State

Ground Damage

Correlations of Interest

Deficiencies in Ground Operations on the part of the Operator or subcontracted Ground Handling company where identified in **29%** of accidents involving ground events (e.g. ground crew errors) as a contributing factor.

50% of the accidents involving an aircraft malfunction also cited maintenance events, such as a maintenance error, as a contributing factor.

There is a correlation between ground events that contributed to an accident and communication issues between the flight and ground crew implicated.

Accident Scenarios of Interest

Scenario 1:

The Operator in question has deficiencies with regards to Ground Operations (in terms of SOPs & checking). On the day of the accident, a ground event occurs, such as improper ground support. There is a miscommunication between the flight crew and the ground crew handling the aircraft. The aircraft is damaged by ground equipment.

This scenario is common to 12% of all the ground accidents.

Scenario 2:

The Operator in question has deficiencies with regards to Maintenance Operations (in terms of SOPs & checking). A maintenance event occurs, such as a maintenance error. A structural failure occurs and the aircraft sustains substantial damage. The flight crew does not commit any errors in this scenario, nor can they prevent the malfunction from occurring.

This scenario is common to 12% of all the ground accidents.

Note: 16% of accidents were not classified due to insufficient data
* Accidents per million sectors flown for all aircraft types
** See Annex 1 for "Phase of Flight" definitions
*** See Annex 1 for "Contributing Factors" definitions

Undershoot

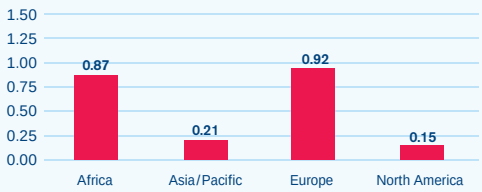
5 Accidents

IATA Members	20%
Hull Losses	80%
Fatal	40%
Accident Rate*	0.14

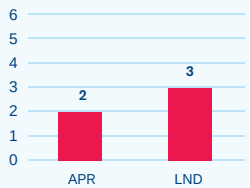
60% Passenger | 40% Cargo | 0% Ferry

60% Jet | 40% Turboprop

Accident Rates by Region of Operator*



Accidents by Phase of Flight**



Top Contributing Factors***

Latent Conditions (Deficiencies in...)

- **75%** Regulatory oversight
- **75%** Flight Operations: SOPs & checking
- **50%** Flight crew training
- **25%** Safety management

Threats

Environmental
- **50%** Meteorology
- **50%** Airport facilities
- **25%** Air Traffic Services

Airline
- **25%** Operational pressure
- **25%** Manuals / Charts

Flight Crew Errors (relating to...)

- **100%** Manual handling / Flight controls
- **50%** Failure to go-around after destabilisation during approach
- **25%** Pilot-to-pilot communication

Undesired Aircraft States (UAS)

- **75%** Vertical, lateral or speed deviations
- **50%** Unstable approach
- **25%** Continued landing after unstable approach
- **25%** Unnecessary weather penetration

End State

Undershoot

Correlations of Interest

In **50%** of the events where flight crew manual handling errors were cited, meteorology was also noted as a contributing factor.

In both accidents where deficient safety management (on the part of the Operator) was cited, poor regulatory oversight was also noted as a contributing factor.

75% of the events citing flight crew manual handling errors also noted deficiencies in Flight Operations (in terms of SOPs & checking) on the part of the Operator.

Accident Scenarios of Interest

Scenario 1:

The Operator in question has deficiencies with regards to Flight Operations (in terms of SOPs & checking) and the regulatory oversight by the State of the Operator is considered poor. The flight is operated into an airport with deficient facilities. The flight crew commits manual handling / flight control errors. After an unstable approach, they touchdown off the runway surface.

This scenario is common to 50% of all the undershoot accidents.

Scenario 2:

On the day of the accident, flight crew is operating in adverse weather conditions. They fail to go-around after destabilisation during approach. The aircraft undergoes vertical, lateral or speed deviations and touches down off the runway surface.

This scenario is common to 50% of all the undershoot accidents.

Note: 20% of accidents were not classified due to insufficient data
* Accidents per million sectors flown for all aircraft types
** See Annex 1 for "Phase of Flight" definitions
*** See Annex 1 for "Contributing Factors" definitions

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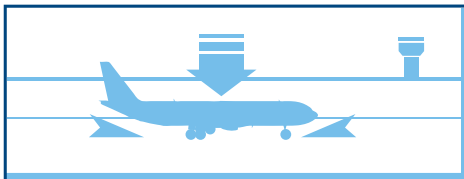


Hard Landing

6 Accidents

IATA Members	33%
Hull Losses	50%
Fatal	0%
Accident Rate*	0.17

100% Passenger

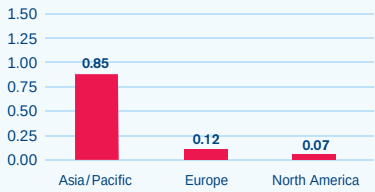
0% Cargo

0% Ferry

83% Jet

17% Turboprop

Accident Rates by Region of Operator*



Top Contributing Factors**

Latent Conditions (Deficiencies in...)

- **33%** Regulatory oversight
- **33%** Safety management
- **17%** Flight Operations: SOPs & checking
- **17%** Flight crew training
- **17%** Maintenance Operations: SOPs & checking
- **17%** Maintenance crew training

Threats

Environmental

- **33%** Meteorology

Airline

- **33%** Aircraft malfunction
  - Avionics (**50%** of all malfunctions)
  - Gear / Tire (**50%** of all malfunctions)
- **33%** Maintenance events

Flight Crew Errors (relating to...)

- **67%** Manual handling / Flight controls
- **33%** Callouts

Undesired Aircraft States (UAS)

- **83%** Long, floated, bounced, firm or off-centerline landing
- **67%** Unstable approach
- **67%** Continued landing after unstable approach
- **50%** Vertical, lateral or speed deviations

End State

Hard Landing

Correlations of Interest

In **50%** of the unstable approaches that preceding a hard landing, flight crews omitted callouts.

50% of the events involving flight crew errors with regards to manual handling / flight controls also implicated vertical, lateral or speed deviations prior to the hard landing.

Both accidents citing an aircraft malfunction also noted maintenance events, such as maintenance errors, as a contributing factor.

Accident Scenarios of Interest

Scenario 1:

The Operator in question has deficiencies with regards to safety management. The flight crew omits approach callouts. After an unstable approach, they elect to continue to land. The aircraft touches down hard and is damaged.

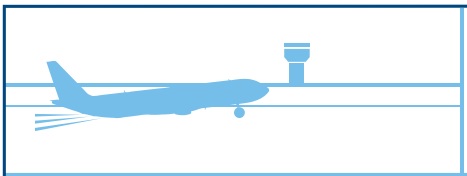
This scenario is common to 33% of all the hard landings.

Scenario 2:

While operating in adverse weather conditions, the flight crew commits manual handling / flight control errors. After an unstable approach, they elect to continue to land. The aircraft touches down hard and is damaged.

This scenario is common to 33% of all the hard landings.

Note: All events were classified.
* Accidents per million sectors flown for all aircraft types
** See Annex 1 for "Contributing Factors" definitions



Gear-up Landing / Gear Collapse

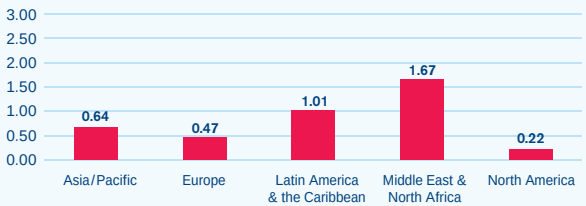
15 Accidents

IATA Members	20%
Hull Losses	27%
Fatal	0%
Accident Rate*	0.42

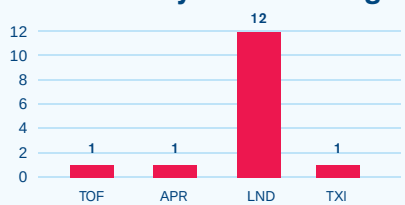
80% Passenger | **20%** Cargo | **0%** Ferry

40% Jet | **60%** Turboprop

Accident Rates by Region of Operator*



Accidents by Phase of Flight**



Top Contributing Factors***

Latent Conditions (Deficiencies in...)

33% Regulatory oversight

33% Maintenance Operations: SOPs & checking

Threats

Environmental

8% Airport facilities

Airline

100% Aircraft malfunction

- Gear / Tire (**83%** of all malfunctions)
- Flight controls (**17%** of all malfunctions)
- Hydraulic system failure (**17%** of all malfunctions)

42% Maintenance events

Flight Crew Errors (relating to...)

17% Checklist

Undesired Aircraft States (UAS)

25% Incorrect configuration – landing gear

End State

Gear-up Landing / Gear Collapse

Correlations of Interest

In **42%** of the accidents citing an aircraft malfunction, maintenance events (e.g. errors by maintenance personnel) were also noted.

33% of the accidents relating to an aircraft malfunction also involved deficiencies in Maintenance Operations (SOPs and checking) as a contributing factor. This covers either in-house or outsourced maintenance activities.

67% of the accidents relating to incorrect landing gear configuration also involved checklist-related errors by the flight crew.

Accident Scenarios of Interest

Scenario 1:

The Operator in question has deficiencies with regards to its Maintenance Operations (in terms of SOPs & checking). On the day of the accident, the flight crew is confronted with a malfunction affecting the landing gear. Despite their efforts, the gear cannot extend or does not lock. The flight crew carries out a landing with the gear retracted or with an unlocked gear which collapses on touchdown. The aircraft is damaged as a result.

This scenario is common to 25% of all the accidents involving a gear-up landing or a gear collapse during landing.

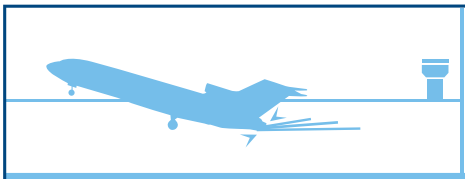
Scenario 2:

On the day of the accident, the flight crew is confronted with a malfunction affecting flight controls. The flight crew commits errors relating to the use of checklists: the checklist is performed from memory, it is omitted or items are missed. There is an incorrect configuration with regards to the landing gear. The landing is carried out with the gear retracted or with an unlocked gear which collapses on touchdown.

The aircraft is damaged as a result. This scenario is common to 17% of all the accidents involving a gear-up landing or a gear collapse during landing.

Note: 20% of accidents were not classified due to insufficient data
* Accidents per million sectors flown for all aircraft types
** See Annex 1 for "Phase of Flight" definitions
*** See Annex 1 for "Contributing Factors" definitions

4



Tailstrike

2 Accidents

IATA Members	100%
Hull Losses	0
Fatal	0
Accident Rate*	0.06

100% Passenger

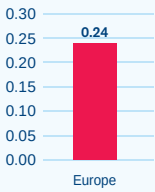
0% Cargo

0% Ferry

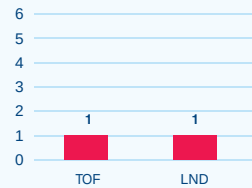
100% Jet

0% Turboprop

Accident Rates by Region of Operator*



Accidents by Phase of Flight**



Top Contributing Factors***

Latent Conditions (Deficiencies in...)

Dispatch: SOPs & checking + flight crew training **(1 case)**

Cabin Operations: SOPs & checking **(1 case)**

Threats

Environmental

Airport facilities **(1 case)**

Airline

Dispatch events **(1 case)**

Ground events **(1 case)**

Cabin events **(1 case)**

Flight Crew Errors (relating to...)

Manual handling / Flight controls **(1 case)**

Documentation **(1 case)**

Undesired Aircraft States (UAS)

Weight & balance **(1 case)**

Abrupt aircraft control **(1 case)**

Vertical, lateral or speed deviations **(1 case)**

End State

Tailstrike

Correlations of Interest

No significant correlations noted

Accident Scenarios of Interest

No significant scenarios noted

Note: all events were classified.
* Accidents per million sectors flown for all aircraft types
** See Annex 1 for "Phase of Flight" definitions
*** See Annex 1 for "Contributing Factors" definitions

Section 5

5

In-Depth Regional Accident Analysis

Following the same model as the in-depth analysis by accident category, presented in Section 4, this section presents an overview of occurrences, their contributing factors and common accident scenarios, broken down by region of the involved Operators.

The purpose of this section is to identify common hazards and determine issues that can be shared by Operators located in the same region, in order to develop adequate prevention strategies.

Regions are delineated using the definitions set out by IATA. Information as to the distribution of countries by region can be found at Annex 1.

5

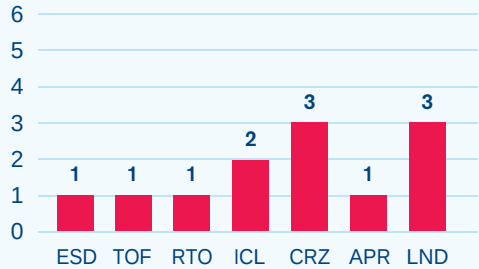
Africa

12 Accidents

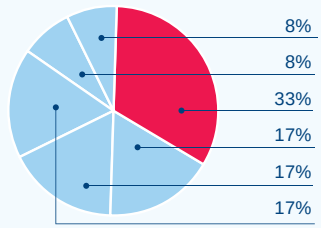
IATA Members	50%
Hull Losses	58%
Fatal	42%

92% Passenger | 0% Cargo | 8% Ferry | 33% Jet | 67% Turboprop

Accidents by Phase of Flight*



Breakdown by Accident Category



- CFIT
- Undershoot
- Loss of Control In-flight
- Runway Excursion
- In-flight Damage
- Ground Damage

Top Contributing Factors**

Latent Conditions (Deficiencies in...)

- **38%** Regulatory oversight
- **25%** Safety management
- **25%** Flight Operations: SOPs & checking
- **25%** Operations planning & scheduling

Threats

Environmental

- **25%** Nav Aids
- **25%** Terrain / Obstacles

Airline

- **25%** Aircraft malfunction
  - Contained engine failure (**50%** of all malfunctions)
  - Structural failure (**50%** of all malfunctions)

Flight Crew Errors (relating to...)

- **50%** Manual handling / Flight controls
- **25%** SOP adherence / cross-verification

Undesired Aircraft States (UAS)

- **38%** Vertical, lateral or speed deviations

Correlations of Interest

There is a correlation between deficient regulatory oversight by the State and deficiencies in safety management on the part of the Operator.

75% of flight crew manual handling / flight control errors led to vertical, lateral or speed deviations prior to the accident.

None of the loss of control in-flight accidents was linked to an aircraft malfunction.

Accident Scenarios of Interest

Scenario 1:

The Operator in question has deficiencies with regards to safety management and Flight Operations (in terms of SOPs & checking). It also has deficiencies in its Operations planning and scheduling. The State of the Operator exercises poor regulatory oversight over the airline's activities. On the day of the accident. The flight crew is operating in an environment with malfunctioning, absent or unavailable ground navigation aids. The flight crew commits manual handling / flight control errors. The aircraft is placed into an undesired state (e.g. operated outside limitations). The flight crew loses control in-flight or impacts terrain while under controlled flight.

This scenario is common to 25% of all the accidents involving African Operators.

Note: 33% of accidents were not classified due to insufficient data
* See Annex 1 for "Phase of Flight" definitions
** See Annex 1 for "Contributing Factors" definitions

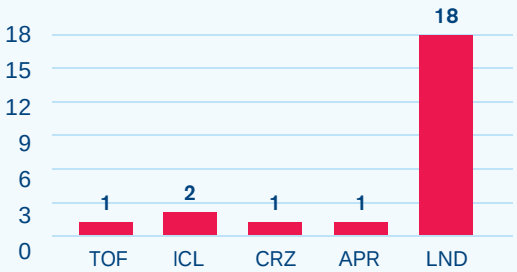
Asia / Pacific

23 Accidents

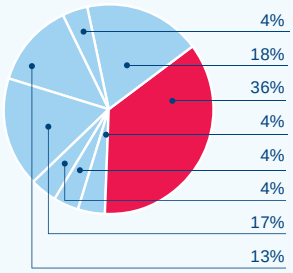
IATA Members	30%
Hull Losses	70%
Fatal	26%

83% Passenger | 17% Cargo | 0% Ferry | 57% Jet | 43% Turboprop

Accidents by Phase of Flight*



Breakdown by Accident Category



4%	CFIT
18%	Loss of Control In-flight
36%	Runway Excursion
4%	In-flight Damage
4%	Ground Damage
4%	Undershoot
17%	Hard Landing
13%	Gear-up Landing / Gear Collapse

Top Contributing Factors**

Latent Conditions (Deficiencies in...)

- 39% Regulatory oversight
- 33% Safety management
- 17% Flight Operations: SOPs & checking
- 28% Flight crew training
- 22% Maintenance Operations: SOPs & checking
- 11% Maintenance crew training

Threats

Environmental
- 56% Meteorology
- 17% Airport facilities
- 11% Nav Aids
- 11% Terrain / Obstacles

Airline
- 44% Aircraft malfunction
  - Gear / Tire (25% of all malfunctions)
  - Contained engine failure (25% of all malfunctions)
  - Flight controls (25% of all malfunctions)
  - Avionics (25% of all malfunctions)
- 22% Maintenance events

Flight Crew Errors (relating to...)

- 44% Manual handling / Flight controls (44%)
- 17% SOP adherence / cross-verification (17%)
- 17% Callouts (17%)
- 17% Failure to go-around after destabilisation during approach
- 22% Other procedural errors

Undesired Aircraft States (UAS)

- 44% Vertical, lateral or speed deviations
- 44% Long, floated, bounced, firm or off-centerline landing
- 39% Unstable approach
- 39% Continued landing after unstable approach
- 17% Operation outside aircraft limitations

Correlations of Interest

There is a correlation between deficient regulatory oversight by the State and deficiencies in safety management on the part of the Operator.

38% of aircraft malfunctions were linked to a maintenance event and deficiencies in Maintenance Operations on the part of the Operator.

50% of the runway excursions occurred in adverse weather conditions and were preceded by a long, floated, bounced, firm or off-centerline landing.

Accident Scenarios of Interest

Scenario 1:

While operating in adverse weather, the flight crew commits manual handling / flight control errors. The aircraft lands long, floats, bounces, lands firmly, or off-centerline. It is damaged during a runway excursion or a hard landing.

This scenario is common to 28% of all the accidents involving Asia / Pacific Operators.

Scenario 2:

The Operator in question has deficiencies with regards to safety management and Flight Operations (in terms of SOPs & checking). The State of the Operator exercises poor regulatory oversight over the airline's activities. On the day of the accident, the flight crew commits procedural errors. After an unstable approach, they elect to continue to land. The aircraft departs the runway or suffers damage from a hard landing.

This scenario is common to 17% of all the accidents involving Asia / Pacific Operators.

Scenario 3:

The Operator in question has deficiencies with regards to its Maintenance Operations (in terms of SOPs & checking). A maintenance event, such as an error by maintenance personnel, occurs prior to the accident. During the flight, the flight crew is confronted with a malfunction, affecting flight controls or avionics. The flight crew subsequently loses control of the aircraft in-flight or suffers a hard landing.

This scenario is common to 17% of all the accidents involving Asia / Pacific Operators.

Note: 22% of accidents were not classified due to insufficient data
* See Annex 1 for "Phase of Flight" definitions
** See Annex 1 for "Contributing Factors" definitions

5

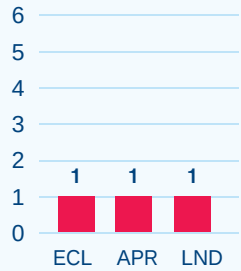
Commonwealth of Independent States (CIS)

3 Accidents

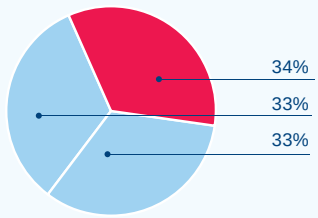
IATA Members	0%
Hull Losses	100%
Fatal	100%

67% Passenger | 33% Cargo | 0% Ferry | 33% Jet | 67% Turboprop

Accidents by Phase of Flight*



Breakdown by Accident Category



CFIT

Loss of Control In-flight

Undershoot

Top Contributing Factors**

Latent Conditions (Deficiencies in...)

- **67%** Regulatory oversight
- **67%** Flight crew training

Threats

Environmental

- **67%** Meteorology
- **67%** Airport facilities

Airline

- **67%** Manuals and charts

Flight Crew Errors (relating to...)

- **100%** Manual handling / Flight controls
- **67%** SOP adherence / cross-verification
- **67%** Failure to go-around after destabilisation during approach
- **67%** Pilot to pilot communication

Undesired Aircraft States (UAS)

- **67%** Vertical, lateral or speed deviations

Correlations of Interest

67% of accidents citing flight crew manual handling / flight control errors also noted deficient flight crew training and poor regulatory oversight as contributing factors.

Accident Scenarios of Interest

Scenario 1:

The Operator in question has deficiencies with regards to flight crew training. The State of the Operator exercises poor regulatory oversight over the airline's activities. On the day of the accident, flight crew has incorrect / unclear charts or operating manuals or is missing them all together. The flight crew commits manual handling / flight control errors. The aircraft is subsequently placed into an undesired state linked to handling errors (e.g. operated outside limitations). The flight crew loses control in-flight or undershoots while attempting to land.

This scenario is common to 67% of all the accidents involving CIS Operators.

Note: All events were classified
* See Annex 1 for "Phase of Flight" definitions
** See Annex 1 for "Contributing Factors" definitions

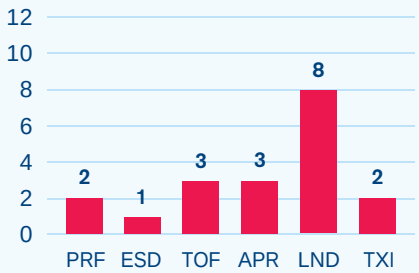
Europe

19 Accidents

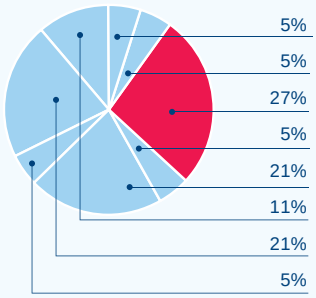
IATA Members	58%
Hull Losses	11%
Fatal	5%

95% Passenger | 5% Cargo | 0% Ferry | 68% Jet | 32% Turboprop

Accidents by Phase of Flight*



Breakdown by Accident Category



5%	CFIT
5%	Loss of Control In-flight
27%	Runway Excursion
5%	In-flight Damage
21%	Ground Damage
11%	Tailstrike
21%	Gear-up Landing / Gear Collapse
5%	Hard Landing

Top Contributing Factors**

Latent Conditions (Deficiencies in...)

- **21%** Flight crew training
- **21%** Design
- **16%** Safety management
- **11%** Flight Operations: SOPs & checking
- **11%** Maintenance Operations: SOPs & checking

Threats

Environmental

- **26%** Meteorology
- **16%** Airport facilities
- **11%** Air Traffic Services
- **11%** Nav Aids
- **11%** Terrain / Obstacles

Airline

- **37%** Aircraft malfunction
  - Gear / Tire (**72%** of all malfunctions)
  - Flight controls (**14%** of all malfunctions)
  - Brakes (**14%** of all malfunctions)
- **32%** Ground events
- **16%** Maintenance events

Flight Crew Errors (relating to...)

- **26%** Manual handling / Flight controls
- **21%** SOP adherence / cross-verification
- **11%** Automation
- **11%** Callouts
- **11%** Failure to go-around after destabilisation during approach

Undesired Aircraft States (UAS)

- **21%** Vertical, lateral or speed deviations
- **11%** Unstable approach
- **11%** Continued landing after unstable approach
- **11%** Long, floated, bounced, firm or off-centerline landing
- **11%** Incorrect aircraft configuration - brakes, thrust reversers or ground spoilers
- **11%** Abrupt aircraft control

Correlations of Interest

In **40%** of accidents involving flight crew manual handling / flight control errors, adverse weather was also a contributor.

75% of the accidents involving non-adherence to SOPs by flight crews also cited deficiencies in flight crew training as a contributing factor.

Airport facilities played a contributing role in **40%** of runway excursions involving European Operators.

Accident Scenarios of Interest

Scenario 1:

On the day of the accident, a ground event occurs, such as an error by ground handling personnel. The aircraft is damaged by ground equipment / vehicle. No flight crew errors are noted.

This scenario is common to 21% of all the accidents involving European Operators.

Scenario 2:

Prior to the accident, a maintenance event (e.g. error by maintenance personnel) occurs. On the day of the accident, the flight crew is confronted with a malfunction affecting the landing gear. Despite their efforts, the gear cannot extend or does not lock. The flight crew carries out a landing with the gear retracted or with an unlocked gear, which collapses on touchdown. The aircraft is damaged as a result.

This scenario is common to 16% of all the accidents involving European Operators.

Scenario 3:

The Operator in question has deficiencies with regards to flight crew training. On the day of the accident, the flight crew does not adhere to SOPs. The flight crew's errors lead to an incorrect configuration with regards to brakes, thrust reversers, or ground spoilers. The aircraft departs the runway on landing and is substantially damaged or destroyed.

This scenario is common to 11% of all the accidents involving European Operators.

Note: All events were classified
* See Annex 1 for "Phase of Flight" definitions
** See Annex 1 for "Contributing Factors" definitions

5

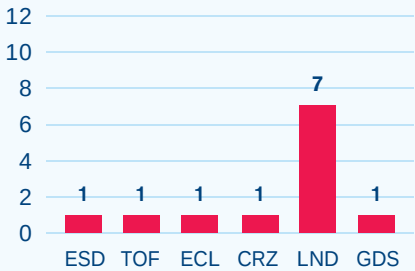
Latin America & the Caribbean

12 Accidents

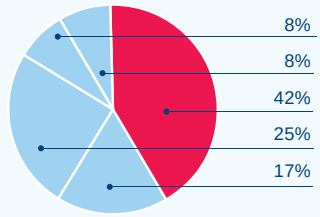
IATA Members	8%
Hull Losses	83%
Fatal	25%

67% Passenger | 25% Cargo | 8% Ferry | 33% Jet | 67% Turboprop

Accidents by Phase of Flight*



Breakdown by Accident Category



- CFIT
- Loss of Control In-flight
- Runway Excursion
- Gear-up Landing / Gear Collapse
- Ground Damage

Top Contributing Factors**

Latent Conditions (Deficiencies in...)

- **55%** Regulatory oversight
- **27%** Safety management
- **18%** Flight Operations: SOPs & checking
- **18%** Flight crew training
- **18%** Ground Operations: SOPs & checking
- **18%** Maintenance Operations: SOPs & checking

Threats

Environmental

- **45%** Meteorology
- **45%** Airport facilities
- **18%** Terrain / Obstacles

Airline

- **55%** Aircraft malfunction
  - Gear / Tire (**33%** of all malfunctions)
- **18%** Maintenance events

Flight Crew Errors (relating to...)

- **36%** Manual handling / Flight controls
- **18%** SOP adherence / cross-verification
- **18%** Other procedural errors

Undesired Aircraft States (UAS)

- **18%** Vertical, lateral or speed deviations
- **18%** Long, floated, bounced, firm or off-centerline landing
- **18%** Incorrect aircraft configuration - brakes, thrust reversers or ground spoilers

Correlations of Interest

In all the accidents where deficient safety management by the Operator was cited, poor regulatory oversight on the part of the State was also noted as a contributing factor.

75% of accidents where flight crew manual handling errors were cited as a contributing factor, also involved adverse weather and resulted in a runway excursion.

33% of accidents involving an aircraft malfunction also implicated maintenance events (e.g. error by maintenance personnel) and deficiencies in Maintenance Operations as contributing factors.

Accident Scenarios of Interest

Scenario 1:

While operating in adverse weather, and into airports with known deficiencies, the flight crew commits manual handling / flight control errors. The aircraft undergoes vertical, lateral or speed deviations. It departs the runway and is substantially damaged or destroyed.

This scenario is common to 18% of all the accidents involving Operators from Latin America & the Caribbean.

Scenario 2:

The Operator in question has deficiencies with regards to its Maintenance Operations (in terms of SOPs & checking). On the day of the accident, the flight crew is confronted with a malfunction affecting the landing gear. Despite their efforts, the gear cannot extend or does not lock. The flight crew carries out a landing with the gear retracted or with an unlocked gear which collapses on touchdown. The aircraft is damaged as a result.

This scenario is common to 18% of all the accidents involving Operators from Latin America & the Caribbean.

Scenario 3:

While operating in adverse weather, and into airports with known deficiencies, the flight crew commits manual handling / flight control errors. They also commit procedural errors. There is an incorrect configuration with regards to brakes, thrust reversers, or ground spoilers. The aircraft departs the runway and is substantially damaged or destroyed.

This scenario is common to 18% of all the accidents involving Operators from Latin America & the Caribbean.

Note: 8% of accidents were not classified due to insufficient data
* See Annex 1 for "Phase of Flight" definitions
** See Annex 1 for "Contributing Factors" definitions

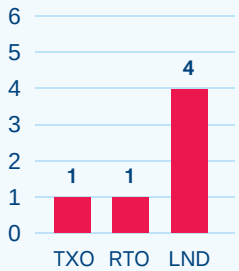
Middle East & North Africa

6 Accidents

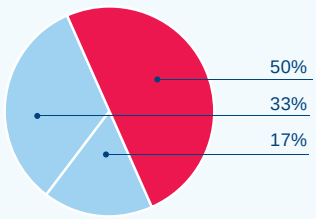
IATA Members	67%
Hull Losses	17%
Fatal	0

100% Passenger | 0% Cargo | 0% Ferry | 83% Jet | 17% Turboprop

Accidents by Phase of Flight*



Breakdown by Accident Category



Runway Excursion

Gear-up Landing / Gear Collapse

Ground Damage

Top Contributing Factors**

Latent Conditions (Deficiencies in...)

40% Flight Operations: SOPs & checking

40% Flight crew training

Threats

Environmental

20% Meteorology

20% Airport facilities

20% Terrain / Obstacles

Airline

60% Aircraft malfunction

- Contained engine failure (**33%** of all malfunctions)
- Gear / Tire (**33%** of all malfunctions)
- Electrical power generation failure (**33%** of all malfunctions)

20% Ground events

Flight Crew Errors (relating to...)

60% SOP adherence / cross-verification

40% Manual handling / Flight controls

20% Checklist

20% Flight crew to external communication

Undesired Aircraft States (UAS)

40% Vertical, lateral or speed deviations

40% Incorrect aircraft configurations

20% Ground navigation - ramp movements

Correlations of Interest

67% of accidents involving non-adherence to SOPs also implicated deficiencies in Flight Operations (SOPs and checking) at the Operator level.

67% of the runway excursions were preceded by flight crew manual handling errors and vertical, lateral or speed deviations.

Accident Scenarios of Interest

Scenario 1:

The Operator in question has deficiencies with regards to flight crew training. On the day of the accident, the flight crew commits manual handling / flight control errors and does not adhere to SOPs. The aircraft undergoes vertical, lateral or speed deviations. It departs the runway and is substantially damaged or destroyed.

This scenario is common to 40% of all the accidents involving Middle Eastern & North African Operators.

Note: 17% of accidents were not classified due to insufficient data

* See Annex 1 for "Phase of Flight" definitions

** See Annex 1 for "Contributing Factors" definitions

5

North America

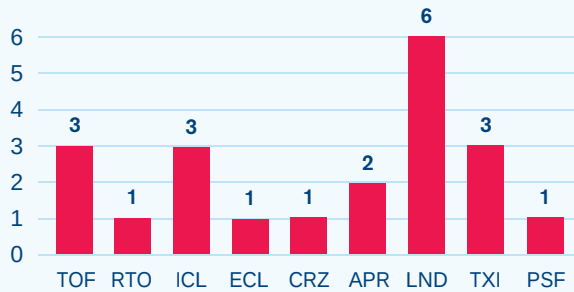
21 Accidents

IATA Members	**10%**
Hull Losses	**19%**
Fatal	**10%**

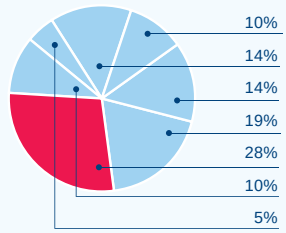
71% Passenger | **24%** Cargo | **5%** Ferry

62% Jet | **38%** Turboprop

Accidents by Phase of Flight*



Breakdown by Accident Category



- Loss of Control In-flight
- Gear-up Landing / Gear Collapse
- Runway Excursion
- In-flight Damage
- Ground Damage
- Undershoot
- Hard Landing

Top Contributing Factors**

Latent Conditions (Deficiencies in...)

- **22%** Safety management
- **22%** Flight Operations: SOPs & checking
- **11%** Flight crew training
- **11%** Operations planning & scheduling

Threats

Environmental

- **39%** Meteorology
- **17%** Air Traffic Services
- **17%** Airport facilities

Airline

- **44%** Aircraft malfunction
  - Gear / Tire (**38%** of all malfunctions)
  - Hydraulic system failure (**38%** of all malfunctions)
  - Uncontained engine failure (**11%** of all malfunctions)
- **22%** Operational pressure
- **17%** Maintenance events

Flight Crew Errors (relating to...)

- **39%** Manual handling / Flight controls
- **17%** SOP adherence / cross-verification
- **17%** Failure to go-around after destabilisation during approach

Undesired Aircraft States (UAS)

- **22%** Vertical, lateral or speed deviations
- **17%** Operation outside aircraft limitations
- **17%** Long, floated, bounced, firm or off-centerline landing

Correlations of Interest

72% of flight crew manual handling / flight control errors were committed in adverse weather conditions.

67% of runway excursion accidents were preceded by unnecessary weather penetration.

In **25%** of accidents involving aircraft malfunctions, maintenance events (e.g. an error by maintenance personnel) were also cited as contributing factors.

Accident Scenarios of Interest

Scenario 1:

While operating in adverse weather, the flight crew commits manual handling / flight control errors. They do not adhere to SOPs and do not perform a go-around despite being destabilised during approach. The aircraft undergoes vertical, lateral or speed deviations. It departs the runway on landing and is substantially damaged or destroyed.

This scenario is common to 11% of all the accidents involving North American Operators.

Note: 14% of accidents were not classified due to insufficient data
* See Annex 1 for "Phase of Flight" definitions
** See Annex 1 for "Contributing Factors" definitions

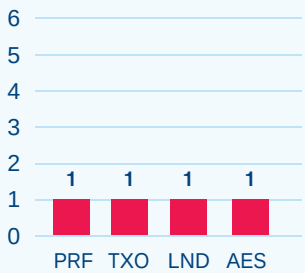
North Asia

4 Accidents

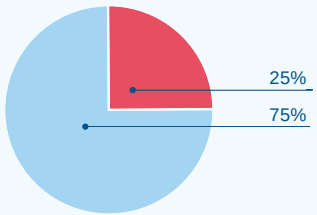
IATA Members	100%
Hull Losses	50%
Fatal	0

50% Passenger | 50% Cargo | 0% Ferry | 100% Jet | 0% Turboprop

Accidents by Phase of Flight*



Breakdown by Accident Category



Top Contributing Factors**

Latent Conditions (Deficiencies in...)

- 33% Design
- 33% Maintenance Operations: SOPs & checking

Threats

Environmental

- 33% Airport facilities

Airline

- 100% Aircraft malfunction
  - Structural failure (67% of all malfunctions)
  - Hydraulic system failure (33% of all malfunctions)
- 100% Maintenance events

Flight Crew Errors (relating to...)

None found

Undesired Aircraft States (UAS)

None found

Correlations of Interest

All the accidents involved an aircraft malfunction and all were linked to maintenance events, such as an error by maintenance personnel.

Accident Scenarios of Interest

Scenario 1:

A maintenance event (e.g. error by maintenance personnel) results in an aircraft malfunction. As a consequence of the malfunction, the aircraft is damaged on the ground or during the flight. No flight crew errors are noted.

This scenario is common to 100% of the accidents involving North Asian Operators.

Note: 25% of accidents were not classified due to insufficient data
* See Annex 1 for "Phase of Flight" definitions
** See Annex 1 for "Contributing Factors" definitions

“The majority of accidents occurred during landing.”

Section 6

6

Analysis of Cargo Aircraft Accidents

YEAR 2007 IN REVIEW FOR CARGO OPERATORS

Cargo versus Passenger Operations for Western-built Jet Aircraft

	Fleet Size End of 2007	HL	HL per 1000 Aircraft	SD	Total	Operational Accidents per 1000 Aircraft
Cargo	1960	2	1.02	5	7	3.57
Passenger	17763	18	1.01	31	49	2.76
Total	19723	20	1.01	36	56	2.84

HL = Hull Loss SD = Substantial Damage

Cargo versus Passenger Operations for Western-built Turboprop Aircraft

	Fleet Size End of 2007	HL	HL per 1000 Aircraft	SD	Total	Operational Accidents per 1000 Aircraft
Cargo	971	3	3.09	3	6	6.18
Passenger	4592	10	2.18	14	24	5.23
Total	5563	13	2.34	17	30	5.39

HL = Hull Loss SD = Substantial Damage

6

Cargo Aircraft Accidents

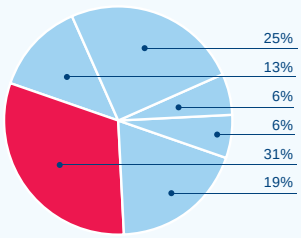
16 Accidents

44% Jet

56% Turboprop

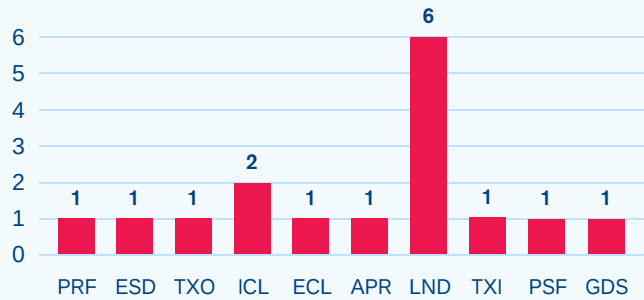
IATA Members	13%
Hull Losses	50%
Fatal	13%

Cargo Accidents by Region of Operator (raw numbers)



Asia / Pacific
North Asia
CIS
Europe
North America
Latin America & the Caribbean

Cargo Accidents by Phase of Flight*



Top Contributing Factors**

Latent Conditions (Deficiencies in...)

- **45%** Regulatory oversight
- **27%** Safety management
- **18%** Ground Operations: SOPs & checking

Threats

Environmental

- **18%** Meteorology
- **9%** Air Traffic Services
- **9%** Birds / Foreign objects

Airline

- **55%** Aircraft malfunction
  - Contained engine failure (**33%** of all malfunctions)
  - Uncontained engine failure (**17%** of all malfunctions)
  - Structural failure (**17%** of all malfunctions)
  - Fire / Smoke (**17%** of all malfunctions)
- **27%** Maintenance events
- **18%** Ground events

Flight Crew Errors (relating to...)

- **27%** Manual handing / Flight controls
- **9%** Pilot-to-pilot communication
- **9%** Callouts

Undesired Aircraft States (UAS)

- **9%** Vertical, lateral or speed deviations
- **9%** Unnecessary weather penetration
- **9%** Operation outside aircraft limitations

Correlations of Interest

All the accidents where deficient safety management on the part of the Operator was cited also involved deficiencies in regulatory oversight by the designated Authority.

33% of the accidents relating to an aircraft malfunction also involved a maintenance event, such as an error by maintenance crew.

Deficiencies in the Operator's ground operations and ground events (e.g. ground crew errors) were cited in **33%** of the accidents resulting in ground damage to freighter aircraft.

Accident Scenarios of Interest

Scenario 1:

There are deficiencies in oversight by the State of the Operator. On the day of the accident, the flight crew commits manual handling / flight control errors. These lead to an undesired aircraft handling state (e.g. operation outside aircraft limitations). The flight crew loses control of the aircraft while in-flight or undershoot.

This scenario is common to 18% of all the accidents involving cargo aircraft.

Scenario 2:

A maintenance event, such as an error by maintenance personnel, occurs prior to the accident. During the flight, the flight crew is confronted with a malfunction, such as an uncontained engine failure which results in substantial damage. No flight crew errors are noted in this accident chain.

This scenario is common to 18% of all the accidents involving cargo aircraft.

Scenario 3:

On the day of the accident, a ground event occurs, such as improper ground support. The aircraft is damaged by ground equipment. No flight crew errors are noted in this accident chain.

This scenario is common to 18% of all the accidents involving cargo aircraft.

Note: 31% of accidents were not classified due to insufficient data
* See Annex 1 for "Phase of Flight" definitions
** See Annex 1 for "Contributing Factors" definitions

Overview of the Year 2007 Cargo Aircraft Accidents

Although there are a number of threat scenarios which are specific to cargo flights (load and balance errors, restraint deficiencies, dangerous goods-related problems), none of the 16 accidents involving cargo aircraft during 2007 were associated with these types of issues.

As shown in the analysis of the year's cargo aircraft accidents, contributing factors were linked to the operational environment, organisational factors, technical failures or flight crew performance rather than the transport of cargo itself.

2008 CARGO OPERATIONS SAFETY OBJECTIVES

In order to improve safety among Cargo Operators, IATA is focusing its strategy on the following:

- Implementation of a Safety Management System (SMS) among Cargo Operators. This includes raising awareness and providing training on SMS to Operators.
- Implementation of the IATA Safety Audit for Ground Operations (ISAGO) as an industry standard.
- Enhancing Dangerous Goods Regulations (DGR): The upcoming 50th edition of the IATA DGR will for the first time recognise a paperless Shipper's Declaration for Dangerous Goods.

IATA DANGEROUS GOODS REGULATIONS

The IATA Dangerous Goods Regulations (DG) Board, ICAO DG Panel and the UN Sub-Committee of experts spent a considerable amount of time during 2007 developing changes to the regulatory requirements for the transport of lithium batteries by air.

As a result, there will be significant changes to the provisions applicable to the transport of lithium metal batteries as cargo on passenger and cargo aircraft. In addition, the ICAO document for emergency response guidance to cabin crew has been revised to specifically address fires involving electronic equipment and lithium batteries.

The United States' Department of Transport has aligned its regulations on the carriage of lithium batteries by passengers with the ICAO Technical Instructions (TI). The IATA DGR are in full compliance with the ICAO TI.

IATA provided resources to support the Special Cargos Support Hotline. In 2007, the team responded to almost 8,000 inquiries from shippers, freight forwarders, operators, industry groups, travel agents and passengers on the application of the Dangerous Goods Regulations, the Live Animals Regulations (LAR), Perishable Cargo Manual (PCR) and aircraft Unit Load Devices (ULD Technical Manual).

In 2008, IATA continues to support airlines to ensure the safe transporting Dangerous Goods and enhancing cargo operations safety.

For more information on IATA's activities relating to Cargo, please visit the IATA website at:

www.iata.org/whatwedo/cargo

Image courtesy of Airbus

“In 2007, the number of fatalities and the fatality rate continued to decline despite the increase in traffic.”

Section 7

7

Report Findings and IATA Prevention Strategies

TOP FINDINGS

- 100 accidents in 2007; 35% involved IATA Members
- 20% of all accidents were fatal
- 81% involved passenger aircraft, 16% involved cargo aircraft and 3% ferry flights
- 57% on Jet aircraft and 43% on Turboprops
- 45% of accidents resulted in a Hull Loss and 55% in Substantial Damage
- The majority (48%) of accidents occurred during landing

	Top 3 Contributing Factors
Latent conditions (Deficiencies in...)	1. Regulatory oversight 2. Safety management 3. Flight crew training
Threats	1. Aircraft malfunction 2. Meteorology 3. Airport facilities
Flight crew errors relating to…	1. Manual handling / Flight controls 2. SOP adherence / cross-verification 3. Other procedural errors
Undesired Aircraft States	1. Vertical, lateral or speed deviations 2. Long, floated, bounced, firm or off-centerline landing 3. Unstable approach
End States	1. Runway Excursion 2. Ground damage 3. Gear-up landing / Gear collapse

PROPOSED COUNTERMEASURES

Every year, the ACTF classifies accidents and, with the benefit of hindsight, determines actions or measures that could have been taken to prevent an accident. These proposed countermeasures can include issues within an organisation or a particular country, or involve performance of front line personnel, such as pilots or ground personnel.

Based on the statistical analysis, this section presents some countermeasures that can help airlines enhance safety, in line with the ACTF analysis of all accidents in 2007.

The following tables present the top five counter-measures which should be addressed along with a brief description for each.

The last column of each table presents the percentage (%) of accidents where countermeasures could have been effective, according to the analysis conducted by the ACTF.

Countermeasures are aimed at two levels:

The Operator or the State responsible for oversight. These countermeasures are based on activities, processes and systemic issues internal to the airline operation or State's oversight activities.

Another set of countermeasures are aimed at flight crew, to help them manage threats or their own errors during operations.

Countermeasures for other areas, such as ATC, ground crew, cabin crew or maintenance staff, are important but are not considered at this time.

7

Countermeasures for the Operator and the State

Subject	Description	% of Accidents where countermeasures could have been effective
Regulatory oversight by the State of the Operator	States must be responsible for establishing a safety programme, in order to achieve an acceptable level of safety, encompassing the following responsibilities: • Safety regulation • Safety oversight • Accident/incident investigation • Mandatory/voluntary reporting systems • Safety data analysis and exchange • Safety assurance • Safety promotion	**26%**
Safety management (Operator)	The Operator should implement a safety management system accepted by the State that, as a minimum: • Identifies safety hazards • Ensures that remedial action necessary to maintain an acceptable level of safety is implemented • Provides for continuous monitoring and regular assessment of the safety level achieved • Aims to make continuous improvements to the overall level of safety	**22%**
Flight crew training (Operator)	Adequate training must be in place including: language skills, a set minimum qualification of flight crews, continual assessment of training and training resources including training manuals or computer-based training (CBT) devices.	**21%**
Flight Operations: SOPs & checking (Operator)	Ensure the Operator addresses clearly: Standard Operating Procedures (SOPs), operational instructions and / or policies, company regulations, controls to assess compliance with regulations and SOPs.	**19%**
Maintenance Operations: SOPs & checking (Operator, even if outsourced)	Ensure the Operator addresses clearly: Standard Operating Procedures (SOPs), operational instructions and / or policies, company regulations, controls to assess compliance with regulations and SOPs for maintenance activities, whether these are conducted in-house or they are outsourced. • Includes verification of proper technical documentation, records of maintenance activities and the use of approved parts / modifications	**14%**

Countermeasures for the Flight Crews

Subject	Description	% of Accidents where countermeasures could have been effective
Monitor / Cross-check	Crew-members should actively monitor and cross-check systems and other crew member actions e.g. Aircraft position, navigation and communications settings, and ensure crew actions are verified.	**25%**
Workload management	Operational tasks should be prioritised and properly managed to handle primary flight duties e.g. Avoid task fixation, prevent work overload.	**21%**
Contingency management	Crew members should develop effective strategies to manage threats to safety e.g. Threats and their consequences are anticipated; use all available resources to manage threats.	**21%**
Overall crew performance	Overall, crew-members should perform well as Risk Managers - Includes flight, cabin, ground crew as well as interactions with ATC.	**20%**
Leadership	• **Captain** should show leadership and coordinated flight deck activities. e.g. Encourages crew participation, is decisive and in command. • **First Officer** (FO) is assertive when necessary e.g. FO takes action when required, such as during a go-around decision, as stated in the airline's SOPs.	**14%**

Image courtesy of Embraer

7

ACTF DISCUSSION & STRATEGIES

The following section presents the issues discussed at the January 2008 ACTF meeting, following the classification of the year's accidents. The ACTF felt that the following topics should be noted.

Adapt Briefing to the Situation Which You Expect

Background:

- Flight crews tend to brief at length on standard operating procedures, despite knowing that the actual approach or departure path is likely to differ from that which is published.

Objective: Briefing should not only include published procedures, but specifically address anticipated threats.

Discussion: Tailored Briefing

- Threats included in the briefing can relate to:
  - Special considerations due to adverse weather and airport conditions
  - Calculation of landing distance with current conditions, applying an ample safety margin
  - Runway changes
  - Rejected landings and go-around instructions
  - Visual approaches
  - Airport construction / hazards affecting standard taxi routes
  - Thunderstorm location and effect on go-around options

Unstable / Destabilised Approaches

Background:

- Definition of an unstable approach can depend upon the operation.
- Flying unstable approaches can become a habit, depending on the operational environment and restrictions.
- In 2007 we continued to see landing accidents preceded by an unstable approach.

Objective: Understand and prevent unstable approaches, by effective approach management.

Discussion: Enhanced Simulator Training

- Airlines should be aware of common deviations from SOPs and take corrective actions.
- Airlines can use a Flight Data Analysis (FDA) programme to understand why unstable approaches occur.
- FDA can help the airline determine correlations of interest between unstable approaches and specific airports (e.g. ATC restrictions), individual pilots, specific fleets, etc.
- Airlines should address not only unstable approaches but also destabilisation after being stabilised, especially at low altitude (below MDA/DH) and consequently go-arounds / rejected landings.

Note: The go-around decision-making process is discussed below.

Go-Around: Training & Awareness Raising Issues

Background:

- During the execution of certain go-arounds, it is necessary for flight crews to deviate from published procedures to accommodate ATC requirements.
- Level busts are a concern due to ATC requests requiring flight crews to level off at an altitude below that published in the go-around procedure.
- For certain aircraft types, go-arounds initiated with TOGA thrust result in a high rate of climb, creating potential for configuration exceedences.
- Due to the infrequent execution of the go-around procedure, flight crew proficiency may be a factor in mitigating the threats identified in these situations.
- Some of the accidents resulting in runway excursions showed that first officers attempted to conduct a go-around that was not supported by the Captain. The assertiveness of the first officer in these cases remains an area where improvement is needed. This needs to be addressed at an organisational level through SOPs and training.

Objective: Train flight crews to improve the go-around decision-making process and increase proficiency with respect to execution of non-standard go-around procedures.

Discussion: Enhanced Simulator Training

- Airlines should not limit training scenarios to the initiation of a go-around at approach minimum or missed approach point.
- Create unexpected go-around scenarios at intermediate altitudes with instructions that deviate from the published procedure. This addresses both the go-around decision-making and execution.
- Include training on go-around execution with all engines operating, including level-off at a low altitude.
- Introduce destabilised approach simulator training scenarios, which emphasise that deviations from the stabilised approach profile at low altitudes (below MDA / DH) should require execution of a go-around.
- Ensure training addresses assertiveness amongst first officers as well as Captains' attitude towards them.

Rejected Landing Training

Background:

- Level of flight crew proficiency when executing a rejected landing can vary amongst pilots.
- Note: A rejected landing is defined as a go-around below MDA / DH even after touchdown as long as reversers are not yet commanded.

Objective: Training for rejected landing.

Discussion: Practice Rejected Landings

- Train crews on scenarios that lead to a rejected landing decision (e.g. sharp decrease in visibility or windshift) and practice its execution in the simulator.
- Familiarise crews so that they feel comfortable executing a rejected landing.
- Airlines must promote the execution of a rejected landing as a standard operating procedure.
- Communication: if the flight crew decides to go-around at a late stage, it is important to communicate this to ATC. Airlines should integrate this as part of their training and SOPs.

Maintenance-related Factors in Accidents

Background:

- Almost half of the accidents in 2007 were linked to a technical issue; maintenance events played a contributing role in almost 20% of all occurrences.
- Many of the events relating to gear-up landing or gear collapse were linked to maintenance issues.
- How can airlines maintain proper oversight of maintenance activities, whether these are run in-house or as an outsourced function?

Objective: Ensure acceptable level of safety in maintenance activities.

Discussion: SMS and Maintenance Organisations

- As per ICAO regulation, Maintenance Organisations must implement a Safety Management System (SMS).
- Data collection systems need to be in place to ensure these organisations can capture hazards relating to maintenance activities and mitigate associated risks.
- Airlines need to work with their Maintenance Organisations (internal or external) to ensure information is fed into the SMS and corrective actions are taken.

7

Upset Recovery Training

Background:

- "Loss of control in-flight" accidents were generally fatal and resulted in hull losses.
- In half of the loss of control in-flight accidents, deficiencies in flight crew training were cited as contributing factors.

Objective: training for upset recovery was noted as a key method to prevent a loss of control in-flight.

Discussion: Upset recovery training and CRM

- The manufacturers have worked extensively to prevent upsetting aircraft in-flight.
- However, Operators need to train for spatial disorientation.
- The training needs to emphasise how crews should handle spatial disorientation.
- The role of the Pilot Monitoring (PM) and Crew Resource Management (CRM) as tools for preventing spatial disorientation.
- Operators should ensure upset recovery training is conducted and be in accordance with the guidelines published in the Airplane Upset Recovery Training Aid Rev 1.

For more information, visit:
www.faa.gov/other_visit/aviation_industry/airline_operators/training/

Also see Upset Recovery Training documentation on the Safety Report CD-ROM.

Ground Damage / Inappropriate Ground Handling Procedures

Background:

- Ground damage was the second type of accident reported, after runway excursions.
- Despite the high number of accidents reported, much of the ground damage that occurs in the industry remains unreported.
- The lack of standardisation can contribute to ground handling errors that result in damage to aircraft (e.g. during pushback).
- Single-man pushback operations have become more common within the industry. The group noted a correlation between this type of operation and cases resulting in damage to aircraft.
- De-icing remains an issue of concern as accidents relating to ice / frost build up on critical surfaces of flight are repeated.

Objective: reduce ground damage accidents and incidents

Discussion: ISAGO

- The IATA Safety Audit for Ground Operations (ISAGO) will tackle this issue, and will be discussed later in this section.
- De-icing decision: airline must ensure that there is a clear definition of responsibilities relating to de-icing / anti-icing and that training covers this issue in an adequate manner (this must insure auditing of 3rd party facilities providing this service).

Tailstrike Prevention

Background:

- Tailstrike damage can result in severe pressure bulkhead damage.
- Tailstrike damage can occur during both take-off and landing.
- Short-term risks include structural failure of the pressure bulkhead, if the flight is continued without appropriate inspection and repair.
- Long-term risk of structural failure will result if repairs do not properly correct damage sustained during a tailstrike event.

Objective: prevent tailstrikes by raising awareness through training and pilot self-assessments.

Discussion: Train for tailstrike prevention

- Tailstrikes are preventable.
- Training is the key to prevention.
- Standard recommendations when followed are successful.
- Strong and gusty winds create additional challenges and need specific solutions.
- Technology developed by the manufacturers provides an effective mitigation strategy.

Documentation on tailstrike preventive measures from the Boeing Company is available on the Safety Report 2007 CD-ROM. The document is entitled "Boeing Tailstrike Prevention".

THE USE OF TECHNOLOGY FOR ACCIDENT PREVENTION

Technology & CFIT Accident Prevention

In 2007, 5% of all accidents involved a Controlled Flight Into Terrain (CFIT). Overall, 80% of these events were fatal and all events resulted in a Hull Loss. The majority of CFIT accidents involved aircraft without adequate technology / equipment, such as Enhanced-Ground Proximity Warning System (E-GPWS).

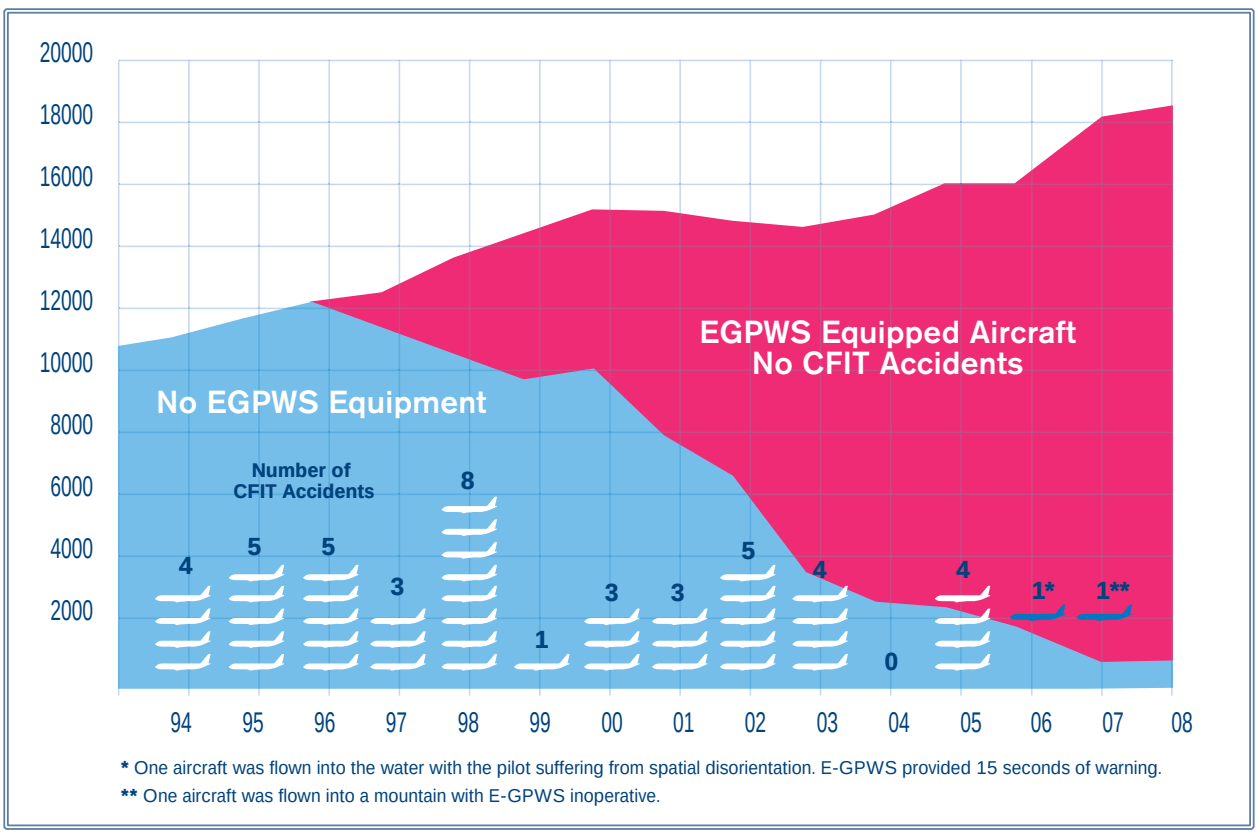
Ground Proximity Warning System (GPWS)

- Ground Proximity Warning Systems (GPWS) have been widely fitted on commercial transport aircraft for a considerable time and are successful in preventing many CFIT accidents.
- A major drawback of GPWS is that it is based on aircraft radio altimeters and gives very little warning of approaching terrain.
- Furthermore, it is inhibited in the landing configuration (i.e. gear down and flaps selected).

Enhanced-Ground Proximity Warning System (E-GPWS) / TAWS

- Since E-GPWS equipment was first installed in 1996, the world's Western-built large commercial jet fleet fitted with E-GPWS / TAWS has grown to 95% of the fleet with over 300,000,000 departures and no CFIT accident yet.
- Since 1996, approximately 30 large commercial jet aircraft have been involved in CFIT accidents, none fitted with E-GPWS, as shown in Figure 7.1.
- E-GPWS / TAWS has been designed to overcome these limitations providing flight crews with more warning of approaching terrain in time for them to take corrective action.
- The system consists of a global terrain database; a data feed from the aircraft air data computers, a Global Positioning System (GPS) input from the aircraft GPS, or an internal GPS in the E-GPWS computer itself.
- An inferior choice is to use data from the Flight Management System (FMS)

FIGURE 7.1 GPWS Versus E-GPWS Active World's Large Commercial Jet Fleet



* One aircraft was flown into the water with the pilot suffering from spatial disorientation. E-GPWS provided 15 seconds of warning.
** One aircraft was flown into a mountain with E-GPWS inoperative.

Image courtesy of Honeywell

7

Enhanced-Ground Proximity Warning System (E-GPWS) / TAWS (Cont'd)

- Unfortunately the FMS can be subject to Map Shift, or faulty ground navigation position updating and AIP coordinates that may not agree to WGS-84 coordinates used by E-GPWS / TAWS terrain, obstacle, and runway end position.
- E-GPWS / TAWS units combine the aircraft current position with the terrain database and present the information to the crew on the navigation display, giving a picture of terrain relative to the aircraft.
- GPS track, ground speed, with data from the aircraft air data computers, and roll attitude is used to predict the aircraft flight path in terms of horizontal and vertical profile.

E-GPWS / TAWS gives the flight crew visual and aural warnings of proximity to terrain. When a hazardous condition occurs, a nominal alert time of 60 seconds is given by an aural "terrain" message, followed with a nominal 30 seconds of warning to "pull up" en-route, but with shorter times as the runway is approached.

Figure 7.1 indicates the increase in the number of aircraft fitted with E-GPWS / TAWS and the related decrease in the number of CFIT accidents. E-GPWS has been hailed as one of the greatest CFIT prevention tools that the industry has seen, but it will only be reliable if the software and database is kept up to date. This is leading to a growing concern that there may be a CFIT accident to an aircraft capable of avoiding a CFIT accident because an E-GPWS with outdated information provides a misleading sense of comfort.

In 2007, one aircraft, involved in a CFIT accident, was equipped with E-GPWS. However, the E-GPWS was in-operative at the time of the accident. A lack of maintenance appears very probable. To get the most CFIT risk reduction from E-GPWS, the airline needs to provide GPS position directly to the E-GPWS unit, and use the latest software and database. All safety equipment needs to be maintained and kept in an operative state.

The advantages of using GPS direct to the E-GPWS are independence from the FMS, independence to altimetry errors, setting error or various setting standards used such QNE / QFE / QNH. Unwanted warnings are significantly reduced.

GPS

There are approximately 7,000 large aircraft using a GPS engine internal to E-GPWS. Unfortunately, there remain some 5,500 large commercial jet aircraft without GPS direct to E-GPWS. The operator needs to pin up by means of a rear jumper Geometric Altitude (Airbus only) obstacles, and peaks. Every E-GPWS has these safety functions built-in and they are available free from Honeywell. The use of GPS direct, with geometric altitude enabled, provides earlier warnings when needed near the runway, gives less risk of unwanted warnings, and provides compatibility with QFE operations and independence from barometric altimeter setting errors or altimeter errors.

Software

The software is also free, but needs to be updated by a PCMCIA card. If the E-GPWS was type certified by Airbus or Boeing, they may have to coordinate with them; otherwise if the airline can use an E-GPWS / TAWS that was installed themselves or by others using an Amended Supplemental Type Certificates.

Database

Many airlines have never updated their E-GPWS database since they first installed the E-GPWS equipment. It is important to keep the Terrain / Obstacle / Runway WGS-84 database current. It is provided free of charge from Honeywell and can be downloaded from their website:

http://www.honeywell.com/sites/aero/Egpws-Home.htm

With a simple arrangement or on a PCMCIA card from Honeywell, airlines can also sign up to receive email notifications when new databases are released. The PCMCIA card is inserted into the front of the E-GPWS computer (power on), installed on the aircraft and the front panel button pressed, and the database is loaded within 30 minutes.

Technology and Runway Misidentification Prevention

Runway incursions, wrong runway take-offs, wrong runway landings, take-off and landing on taxiways are a continuing risk leading to a possible runway accident. Although no accident involving a runway incursion occurred during 2007, this remains a safety concern, particularly in light of the many incidents reported worldwide.

- The risk can be reduced by tools for the Controller, such as radar
- Runway traffic lighting and other monitoring sensors can help
- The use of SOPs that can help increase awareness.
- Tools can also reduce the risk for the pilot such as:
  - A Moving Map displaying runway / taxiway / aircraft position with ATC Clearances and taxi guidance
  - Aural advisories

"RAAS" (Runway Awareness and Advisory System) is a software function that can be hosted on existing E-GPWS equipment. No new hardware, or aircraft wiring, or change to the cockpit is necessary.

- RAAS uses the E-GPWS world's runway database, aural advisories and GPS positions that exist in the present E-GPWS equipment
- A "virtual box" is placed around the complete runway in software
- The aircraft's position related to the runway box and runway itself can give awareness advisories
- RAAS will aurally advise the pilots that they are about to enter a runway (the virtual box approximates the ICAO holding line and expands with ground speed as the runway box is approached)
- The second advisory occurs when the aircraft is aligned on the runway (runway heading ± 20 degrees)
- These two advisories are the only advisories the pilots should ever hear
- Their purpose is to encourage runway awareness
- See Figure 7.2

There are other advisories given if there is something possibly wrong. Based on aircraft type these can be given:

- To tell the pilot that the runway length is possibly short for the aircraft type (E-GPWS knows what type of aircraft it is in) for either take-off, or an intersection take-off or landing
- For speeds in excess of 40 KTS and not on a runway such as taking off inadvertently on a taxiway
- For being left on a runway for take-off for over a minute
- For back taxiing when the end of the runway is less than 30 meters, or 100 feet.
- When distances remaining are getting short and the aircraft is still above 40 KTS

These advisories should rarely, if ever, be heard during the career of the pilots. The operator selects the actual advisories, distance remaining. Male or female voice, runway distances in Meters or Feet and in increments typically 300 meters (1,000 feet) and the last is typically 150 meters (500 feet) when greater than 40 KTS before running off the runway.

- Some operators use very few advisories, others many.
- Business aircraft most often use many or all, as their operations may take them to unfamiliar airfields.

Figure 7.2 Runway Awareness and Advisory System

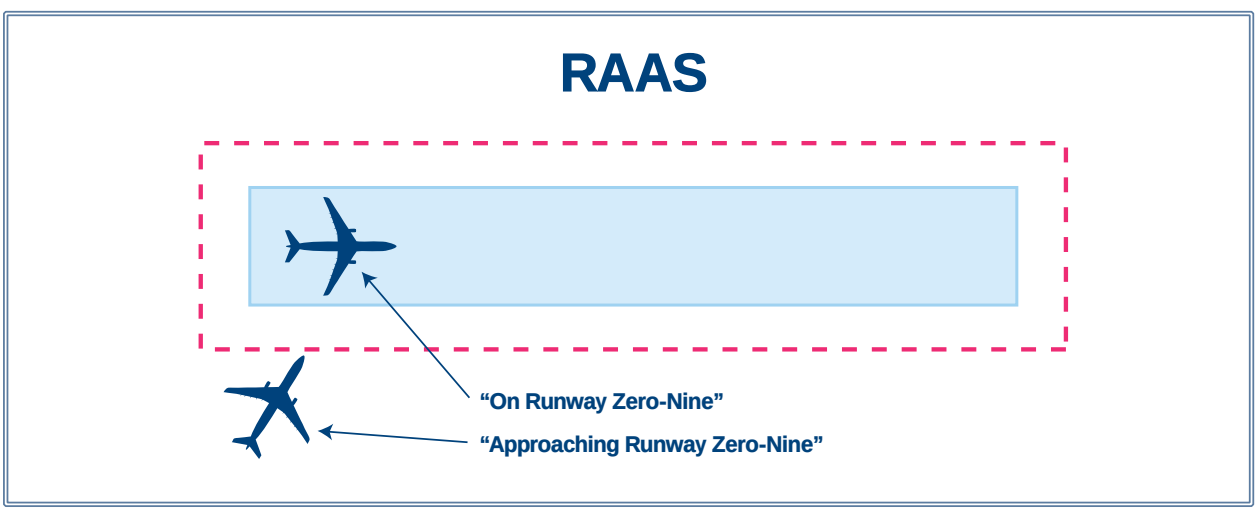


Image courtesy of Honeywell

7

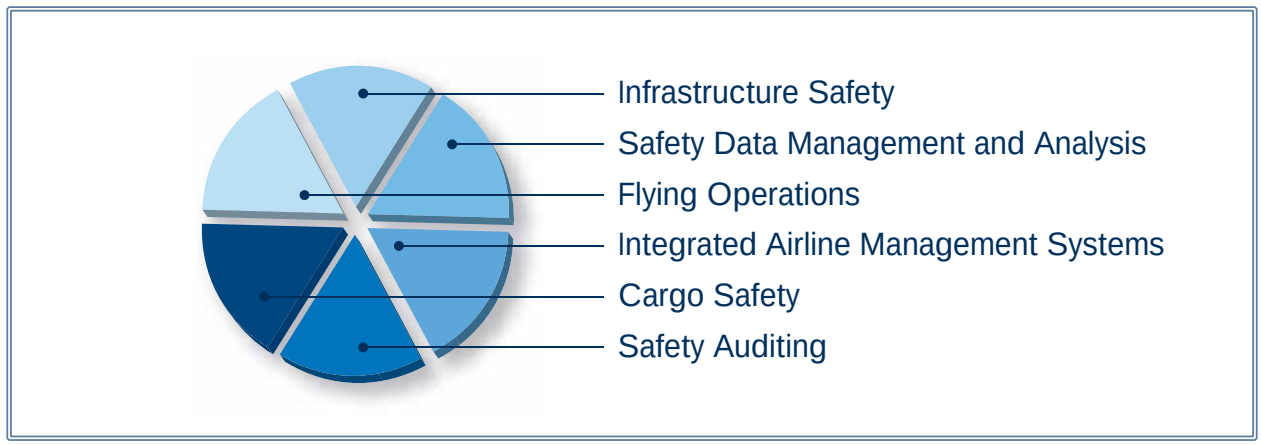
IATA SAFETY STRATEGY

The IATA Six-point Safety Programme reflects the strategic direction that IATA has taken to ensure the continuous improvement of the Industry's safety record. Established in close cooperation with our member airlines, the programme focuses not on one aspect, but on a whole system to improve operational safety.

The cornerstone of our approach to enhancing aviation safety is the IATA Operational Safety Audit (IOSA), which continued its growth as a global programme during the past year, becoming internationally recognised and implemented.

The programme addresses areas of global concern and targets specific regional challenges especially in Africa, Indonesia and Brazil.

The segments of the Programme are shown here:



IATA Operational Safety Audit (IOSA)

IOSA is the world's first airline safety audit programme based on internationally harmonised standards.

The programme is designed to help airlines share audit resources and reduce the overall number of audits performed, but most importantly it aims at improving safety levels throughout the entire airline industry.

IATA oversees the accreditation of audit and training organisations, ensures continuous development of the IOSA standards and recommended practices and manages the central database of IOSA audit reports.

IATA also implements effective quality assurance to provide overall programme standardisation and to ensure that the programme is meeting airline needs as effectively as possible. IOSA is a condition of IATA Membership.

IATA Safety Audit for Ground Operations (ISAGO)

Modeled on the successful IOSA framework, IATA has developed the industry's first global standard for the oversight and auditing of ground handling companies.

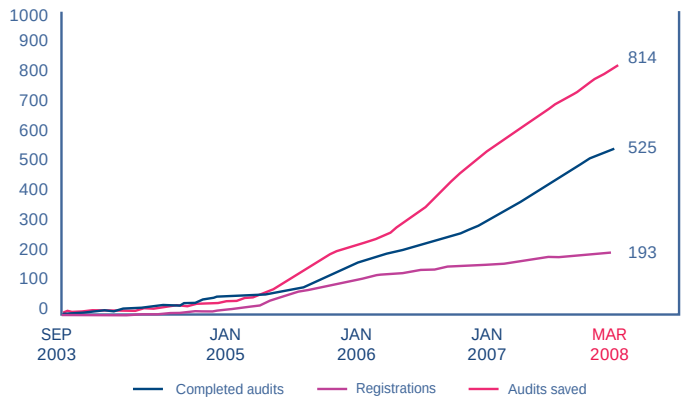
ISAGO is intended to bring the same improvement in safety and efficiency for ground handlers as IOSA achieves for airlines. The primary aim of the programme is to drastically reduce aircraft damage and personal injuries in the ground environment, while driving down the number of redundant audits.

ISAGO is built upon a 'backbone' of audit standards applicable to all ground handling companies worldwide, coupled with uniform sets of standards tailored to the specific activities of any ground handler.

ISAGO audits are conducted at both corporate and station levels of ground handling companies, mainly using existing airline audit resources managed by IATA through an Audit Pool.

More information on ISAGO is included in the Safety Report CD-ROM.

IOSA Programme Status as of 31 March 2008



Partnership for Safety Plus

Partnership for Safety (PfS) was implemented to assist members in developing nations prepare for their IOSA audit. During its implementation phase from 2005 to end-2007, PfS has benefited hundreds of airlines. Over 200 airlines received assistance in the form of awareness seminars, individual gap audits and specialised training courses. As a result of these efforts these airlines were able to meet the IATA deadline and conduct the IOSA audit by the end of 2007.

To continue helping its Members, IATA has developed PfS Plus, which will focus on helping airlines to close the findings from their initial audits, and later to prepare for their renewal audits by maintaining ongoing IOSA compliance. Additionally, PfS Plus will target two areas of safety concern – Indonesia and Brazil. In Indonesia the programme provisions will be offered to all Indonesian carriers to enable them to prepare for and to undergo the IOSA audit. In Brazil, the emphasis will be on infrastructure, procedures and training improvements to promote safety enhancements.

Flight Operations

Hazard identification and risk management are required to maintain an acceptable level of safety across operations. IATA works on sharing safety data in order to reduce serious incidents such as runway incursions, runway excursions, level busts and miscommunication. IATA also encourages airlines to collect data on threats perceived in their operations and successful threat management strategies. This includes voluntary crew reporting systems and Flight Data Analysis programmes. This area also covers aspects related to Cabin Operations Safety.

IATA Training and Qualification Initiative (ITQI)

Global traffic growth brings challenges with the availability of qualified personnel (pilots, engineers and ATC controllers).

There will be 18,000 additional aircraft in the global fleet by 2026. To manage the increased demand, the industry will need 342,000 more pilots (19,000 per year). This exceeds the current capacity to train 16,000 per year, which in turn creates a potential shortage of 54,000 pilots in 2026. To close this gap, it is clear that the industry needs to re-think pilot training and qualification and create global standards for training concepts and regulation. It must also make aviation more attractive to potential candidates.

IATA has addressed these issues with its Training and Qualification Initiative (ITQI). Multi-Crew Pilot License (MPL) is a key part of ITQI. It is a fully integrated, competency-based and quality-driven concept with an emphasis on the pilot's role in a multi-crew environment.

IATA is also joining forces with ICAO and the Flight Safety Foundation (FSF) to deliver a global solution that aims at enhancing quality while increasing capacity.

Infrastructure Safety

Runway safety remains a concern. Over 25% of all accidents last year involved a runway excursion. Although no accidents last year involved a runway incursion, airlines continue to report serious incidents of this nature.

IATA is preparing an electronic toolkit that will address the issues linked to runway safety enhancement, including measures that will mitigate the consequences of runway excursions and the establishment of a standard for braking-action measuring and reporting.

The main focus of the Infrastructure Safety segment will be runway incursions prevention and runway friction management.

Integrated Airline Management Systems

IATA leads the industry by highlighting the relationships that exist among the major management systems within an airline, most notably the Safety Management System (SMS) and the Quality Management System.

This approach helps airlines implement the policies, processes and procedures required to ensure a comprehensive and proactive approach to safety. It also incorporates elements of safety, security, quality, risk, environmental and supplier management systems, to create a culture that clearly delineates safety accountabilities throughout the organisation.

Through the Integrated Airline Management Toolkit and its classroom training under the IATA Training and Development Institute (ITDI), IATA provides a framework that helps airlines, air navigation service providers, maintenance organisations and aerodrome operators meet the ICAO requirement for implementation of Safety Management Systems by 1 January 2009.

7

Safety Data Management and Analysis

IATA operates a database (STEADES) that contains incident reports from participating airlines. Participants have the opportunity to benchmark their specific operation against all (or part) of the STEADES database. This offers them the possibility to answer the question: "How effectively are we managing operational risks?" by comparing to other, similar, operations.

In the near future the database will be expanded with more relevant data and with more interactive opportunities for members.

Participation in STEADES is free for IATA member airlines. IATA also provides a Flight Data Analysis (FDA) Service.

Cargo Operations Safety

The goal of the Cargo Safety team is to define prevention strategies to enhance safety of the air cargo industry, and to develop a stronger industry voice in cargo safety issues. This subject is covered under Section 6 of the Safety Report.

SUMMARY OF MAIN FINDINGS AND IATA PREVENTION STRATEGIES

In 2007, the number of fatalities and the fatality rate continued to decline.

From a regional perspective, the accident rates (measure in terms of Western-built Jet Hull Losses per million sectors flown) in North America and Europe dropped. However, accidents in Brazil, Indonesia and Africa pushed the global accident rate up to 0.75 in 2007.

Overall, IATA member airlines surpassed the industry in terms of safety with an accident rate of 0.68 Western-built Jet Hull Losses per million flights in 2007, well below the industry rate.

IATA's analysis of last year's accidents shows the types of accidents that occurred. Runway excursions, ground damage and gear-up landings were amongst the top accident categories.

Based on the findings from accident analysis, IATA has developed the following prevention strategies to address the top safety issues:

Runway Excursions & Go-around Decision-making

- Almost half (48%) of the year's accidents took place during landing. The majority of these accidents involved a runway excursion.
- Many of these accidents could have been prevented by initiation of a timely go-around.
- Crews require additional training to improve the go-around decision-making process throughout all phases of the approach as well as to improve execution of the go-around itself. In addition, airline cultures and SOPs should encourage execution of a go-around.
- Inadequate overrun areas (e.g. obstacles close to the runway) contribute in the magnitude of damage incurred / significant loss of life resulting from runway excursions.
- Aerodrome operators need to ensure adequate systems are in place to mitigate the risks associated with runway excursions.

Prevention Strategy: IATA is developing a toolkit that will address the issues linked to runway safety enhancement, including the prevention of runway excursions.

Ground Damage Reduction

- Almost 20% of all accidents in 2007 related to ground damage.
- Year after year, this has been an issue which affects predominantly IATA member airlines.
- The lack of standardisation can contribute to ground handling activities that result in damage to aircraft.

Prevention Strategy: IATA developed the ISAGO programme to drastically reduce aircraft damage and personal injuries in the ground environment.

Flight Crew Training & Proficiency

- Deficiencies in flight crew training were cited as contributing factors in over 20% of all accidents in 2007.
- Manual handling / Flight control errors by flight crews were noted in almost 40% of all accidents.
- Flight crew training and proficiencies are key issues, which the industry needs to address, particularly in light of the anticipated growth and pilot demand in the coming years.

Prevention Strategy: IATA, joining forces with ICAO and the Flight Safety Foundation (FSF), has launched its Training and Qualification Initiative (ITQI) to deliver a global solution that aims at enhancing quality of licensed personnel while increasing capacity.

Safety Management in Maintenance Operations

- Almost half of the accidents in 2007 were linked to a technical issue; maintenance events contributed to almost 20% of all occurrences last year.
- Many of the events relating to gear-up landing or gear collapse were linked to maintenance issues.
- Airlines need to maintain proper Safety assurance of maintenance activities, whether these are run in-house or as an outsourced function.

Prevention Strategy: IATA is revising its Safety Strategy in 2008 to encompass maintenance activities and SMS implementation for Maintenance Organisations.

Regional Safety Issues

- Despite improvements in some regions, such as North America, other regions or countries remain a concern in terms of their Safety performance.
- The Asia / Pacific region saw an increase in its accident rate, particularly in Indonesia. Africa and Brazil are also areas where action is needed to further improve the accident rates.
- IATA is in a position to help airlines in different regions attain and maintain an acceptable level of Safety and meet internationally recognised standards through existing programmes such as IOSA and Partnership for Safety (PfS).

Prevention Strategy: To continue helping its members, IATA has developed PfS Plus, which will focus on helping airlines to close the findings from their initial audits, and later to prepare for their renewal audits by maintaining ongoing IOSA compliance. PfS Plus will target geographical areas of safety concern such as Indonesia and Brazil.

In 2008, IATA continues to work with its member airlines, as well as airports, air navigation service providers and regulators, to align its strategy and develop solutions to meet the needs of the industry and enhance operational Safety.

Image courtesy of Bombardier

“IATA is in a position to help airlines in different regions attain an acceptable level of Safety.”

Annex 1

A1

Definitions

Aircraft-years: means, for purposes of the Safety Report, the average fleet in service during the year. The figure is calculated by counting the number of days each aircraft is in the airline fleet during the year and then dividing by 365. Periods during which the aircraft is out of service (for repair, storage, parked, etc.) are then excluded.

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 person is fatally injured as a result of:
  (a) being in the aircraft;
  (b) direct contact with any part of the aircraft, including parts which have become detached from the aircraft; or
  (c) 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;

- the aircraft sustains damage or structural failure which:
  (a) adversely affects the structural strength, performance or flight characteristics of the aircraft; and
  (b) 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, antennae, tires, brakes, fairings, small dents or puncture holes in the aircraft skin; or

the aircraft is still missing or is completely inaccessible.

Notes

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.

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

For purposes of this Safety Report, only operational accidents are classified.

The following types of operations are excluded:

- Private aviation
- Business aviation
- Illegal flights (e.g. cargo flights without an airway bill, fire arms or narcotics trafficking)
- Humanitarian relief
- Crop dusting / agricultural flights
- Security-related events (e.g. hijackings)
- Experimental / Test Flight

Accident classification: means the process by which actions, omissions, events, conditions, or a combination thereof, which led to the accident, or incident are identified and categorised.

Aerodrome manager: means an aerodrome manager as defined in applicable regulations; and includes the owner of aerodrome.

Air Traffic Service unit: means an involved Air Traffic Service (ATS) unit, as defined in applicable ATS, Search and Rescue, and overflight regulations.

Aircraft: means the involved aircraft, used inter-changeably with aeroplane(s).

Captain: means the involved pilot responsible for operation and safety of the aeroplane during flight time.

A1

Commander: means the involved pilot, in an augmented crew, responsible for operation and safety of the aeroplane during flight time.

Crewmember: means anyone on board a flight who has duties connected with the sector of the flight during which the accident happened. It excludes positioning or relief crew, security staff, etc. (See definition of "passenger" below).

Eastern-built Jet aircraft: The main types in current service and considered in this Safety Report are the An-72, Il-62, Il-76, Il-86, Tu-134, Tu-154, Yak-40 and Yak-42.

Eastern-built Turboprop aircraft: The main types in current service and considered in this Safety Report are An-12, An-24, An-26, An-28, An-32, L-410 and Y-12.

Fatal accident: A fatal accident is one where at least one passenger or crewmember is killed or later dies of their injuries as a result of an operational accident.

Events such as slips and falls, food poisoning, turbulence or accidents involving on board equipment, which may involve fatalities but where the aircraft sustains minor or no damage, are excluded.

Most fatal accidents also result in the aircraft becoming a hull loss but this is not necessarily always the case and there have been a number of substantial damage accidents where deaths have occurred.

Fatality: A fatality is a passenger or crewmember who is killed or later dies of their injuries resulting from an operational accident. Injured persons who die more than 30 days after the accident are generally excluded, however, one or two cases where death came later but could reasonably be shown to have been a direct result of injuries sustained in the original accident, are included (this does not conform to the ICAO Annex 13 definition but, in this context, is thought to be more meaningful).

Hazard: Condition, object or activity with the potential of causing injuries to personnel, damage to equipment or structures, loss of material, or reduction of ability to perform a prescribed function.

Hull loss: An accident in which the aircraft is destroyed or substantially damaged and is not subsequently repaired for whatever reason including a financial decision of the owner.

IATA accident classification system: IATA's accident classification system comprises five categories: human, technical, environmental, organisational, and insufficient data. Each category (excepting the last) is further subdivided into detailed contributing factors.

IATA Regions: At the time of writing the 2007 Safety Report, regions are deliniated using the definition set out by IATA, as per the table presented here.

Country	IATA Region
Afghanistan	ASPAC
Albania	EUR
Algeria	MENA
American Samoa	ASPAC
Andorra	EUR
Angola	AFI
Anguilla	LATAM
Antigua and Barbuda	LATAM
Argentina	LATAM
Armenia	CIS
Aruba	LATAM
Australia	ASPAC
Austria	EUR
Azerbaijani Republic	CIS
Bahamas	LATAM
Bahrain	MENA
Bangladesh	ASPAC
Barbados	LATAM
Belarus	CIS
Belgium	EUR
Belize	LATAM
Benin	AFI
Bermuda	NAT-NAM
Bhutan	ASPAC
Bolivia	LATAM
Bosnia and Herzegovina	EUR
Botswana	AFI
Brazil	LATAM
British Virgin Islands	LATAM
Brunei	ASPAC
Brunei Darussalam	ASPAC
Bulgaria	EUR
Burkina Faso	AFI
Burundi	AFI
Cambodia	ASPAC
Cameroon	AFI
Canada	NAT-NAM
Cape Verde	AFI
Cayman Islands	LATAM
Central African Republic	AFI
Chad	AFI

Country	IATA Region
Chile	LATAM
China	NASIA
Colombia	LATAM
Comoros	AFI
Congo, Republic of the	AFI
Cook Islands	ASPAC
Costa Rica	LATAM
Croatia	EUR
Cuba	LATAM
Cyprus	MENA
Czech Republic	EUR
Denmark	EUR
Djibouti	AFI
Dominica	LATAM
Dominican Republic	LATAM
Ecuador	LATAM
Egypt	MENA
El Salvador	LATAM
Equatorial Guinea	AFI
Eritrea	AFI
Estonia	EUR
Ethiopia	AFI
Falkland Islands	LATAM
Faroe Islands	EUR
Fiji	ASPAC
Finland	EUR
France	EUR
French Guiana	LATAM
French Polynesia	ASPAC
Gabon	AFI
Gambia	AFI
Georgia	CIS
Germany	EUR
Ghana	AFI
Gibraltar	EUR
Greece	EUR
Greenland	NAT-NAM
Grenada	LATAM
Guadeloupe	LATAM
Guam	ASPAC
Guatemala	LATAM
Guinea	AFI
Guinea Bissau	AFI

Country	IATA Region
Guinea, Republic of	AFI
Guinea-Bissau	AFI
Guyana	AFI
Haiti	LATAM
Honduras	LATAM
Hong Kong	NASIA
Hungary	EUR
Iceland	NAT-NAM
India	ASPAC
Indonesia	ASPAC
Iran	MENA
Iraq	MENA
Ireland	EUR
Israel	MENA
Italy	EUR
Ivory Coast	AFI
Jamaica	LATAM
Japan	ASPAC
Jordan	MENA
Kazakhstan	CIS
Kenya	AFI
Kiribati	ASPAC
Korea (Democratic Republic)	ASPAC
Korea (North)	NASIA
Kuwait	MENA
Kyrgyz Republic	ASPAC
Lao People's Democratic Republic	ASPAC
Laos	ASPAC
Latvia	EUR
Lebanon	MENA
Lesotho	AFI
Liberia	AFI
Libya	MENA
Liechtenstein	EUR
Lithuania	EUR
Luxembourg	EUR
Macau	NASIA
Macedonia	EUR
Madagascar	AFI
Malawi	AFI
Malaysia	ASPAC
Maldives	ASPAC

A1

Country	IATA Region
Mali	AFI
Malta	EUR
Marshall Islands	ASPAC
Martinique	LATAM
Mauritania	AFI
Mauritius	AFI
Mexico	LATAM
Micronesia	ASPAC
Moldova	CIS
Monaco	EUR
Mongolia	NASIA
Montenegro	EUR
Montserrat	LATAM
Morocco	MENA
Mozambique	AFI
Myanmar	ASPAC
Namibia	AFI
Nauru	ASPAC
Nepal	ASPAC
Netherlands	EUR
Netherlands Antilles	LATAM
New Caledonia	ASPAC
New Zealand	ASPAC
Nicaragua	LATAM
Niger	AFI
Nigeria	AFI
Northern Marianas Islands	ASPAC
Norway	EUR
Oman	MENA
Pacific Islands (Trust Territ)	ASPAC
Pakistan	ASPAC
Palau	ASPAC
Palestine	MENA
Panama	LATAM
Papua New Guinea	ASPAC
Paraguay	LATAM
Peru	LATAM
Philippines	ASPAC
Poland	EUR
Portugal	EUR
Puerto Rico	LATAM

Country	IATA Region
Qatar	MENA
Republic of Bophuthatswana	AFI
Reunion	AFI
Romania	EUR
Russian Federation	CIS
Rwandese Republic	AFI
Saint Christopher and Nevis	LATAM
Saint Kitts and Nevis	LATAM
Saint Lucia	LATAM
Saint Pierre and Miquelon	NAT-NAM
Saint Vincent and the Grenadines	LATAM
Samoa	ASPAC
San Marino	EUR
Sao Tome and Principe	AFI
Saudi Arabia	MENA
Senegal	AFI
Serbia	EUR
Seychelles	AFI
Sierra Leone	AFI
Singapore	ASPAC
Slovak Republic	EUR
Slovakia	EUR
Slovenia	EUR
Solomon Islands	ASPAC
Somalia	AFI
South Africa	AFI
Spain	EUR
Sri Lanka	ASPAC
Sudan	MENA
Suriname	LATAM
Swaziland	AFI
Sweden	EUR
Switzerland	EUR
Syrian Arab Republic	MENA
Taiwan	NASIA
Tajikistan	ASPAC
Tanzania	AFI

Country	IATA Region
Thailand	ASPAC
Togo, Republic	AFI
Tonga	ASPAC
Trinidad and Tobago	LATAM
Tunisia	MENA
Turkey	EUR
Turkmenistan	CIS
Turks and Caicos Islands	LATAM
Tuvalu	ASPAC
Uganda	AFI
Ukraine	CIS
United Arab Emirates	MENA
United Kingdom	EUR
United States	NAT-NAM
Uruguay	LATAM
US Virgin Islands	LATAM
Uzbekistan	CIS
Vanuatu	ASPAC
Vatican City State	EUR
Venezuela	LATAM
Viet Nam	ASPAC
Virgin Islands (British)	LATAM
Western Sahara	AFI
Western Samoa	ASPAC
Yemen	MENA
Yugoslavia	EUR
Zambia	AFI
Zimbabwe	AFI

Latent Conditions

Definition: Conditions present in the system before the accident, made evident by triggering factors.

A1

Latent Conditions (Deficiencies in…)	DESCRIPTION
Design	Design shortcomings, manufacturing defects.
Regulatory oversight	Deficient regulatory oversight or lack thereof.
Safety Management	Absence of safety office / officer, absence / deficient data collection / analysis mechanisms (incident reporting, FDA, etc.). Absent or deficient Quality Management System
Change Management	Deficiencies in oversight of change; in addressing operational needs created by, for example: expansion, or downsizing. Deficiencies in the evaluation integrate and / or monitor changes to establish organisational practices or procedures. Consequences of mergers or acquisitions.
Selection Systems	Deficient or absent selection standards
Ops Planning & Scheduling	Deficiencies in crew rostering and staffing practices, flight and duty time limitations, health and welfare issues.
Technology & Equipment	Available safety equipment not installed (E-GPWS, predictive wind-shear, TCAS / ACAS, etc.).
Flight Ops: SOPs & Checking	Deficient or absent: (1) Standard Operating Procedures (SOPs), (2) operational instructions and / or policies, (3) company regulations, (4) controls to assess compliance with regulations and SOPs.
Flight Ops: Training Systems	Omitted training, language skills deficiencies and qualifications of flight crews, operational needs leading to training reductions, deficiencies in assessment of training or training resources such as manuals or CBT devices.
Cabin Ops: SOPs & Checking	Deficient or absent: (1) Standard Operating Procedures (SOPs), (2) operational instructions and / or policies, (3) company regulations, (4) controls to assess compliance with regulations and SOPs.
Cabin Ops: Training Systems	Omitted training, language skills deficiencies and qualifications of cabin crews, operational needs leading to training reductions, deficiencies in assessment of training or training resources such as manuals or CBT devices.
Ground Ops: SOPs & Checking	Deficient or absent: (1) Standard Operating Procedures (SOPs), (2) operational instructions and / or policies, (3) company regulations, (4) controls to assess compliance with regulations and SOPs.
Ground Ops: Training Systems	Omitted training, language skills deficiencies and qualifications of ground crews, operational needs leading to training reductions, deficiencies in assessment of training or training resources such as manuals or CBT devices.

Latent Conditions: *Continued*

Definition: Conditions present in the system before the accident, made evident by triggering factors.

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Latent Conditions (Deficiencies in…)	DESCRIPTION
Maintenance Ops: SOPs & Checking	Deficient or absent: (1) Standard Operating Procedures (SOPs), (2) operational instructions and / or policies, (3) company regulations, (4) controls to assess compliance with regulations and SOPs. Includes deficiencies in technical documentation, unrecorded maintenance and the use of bogus parts / unapproved modifications
Maintenance Ops: Training Systems	Omitted training, language skills deficiencies and qualifications of maintenance crews, operational needs leading to training reductions, deficiencies in assessment of training or training resources such as manuals or CBT devices.
Dispatch: SOPs & Checking	Deficient or absent: (1) Standard Operating Procedures (SOPs), (2) operational instructions and / or policies, (3) company regulations, (4) controls to assess compliance with regulations and SOPs.
Dispatch: Training Systems	Omitted training, language skills deficiencies and qualifications of dispatchers, operational needs leading to training reductions, deficiencies in assessment of training or training resources such as manuals or CBT devices.
Other	Not clearly falling within the other latent conditions

Note: All areas such as Ground Operations, Maintenance or Training include outsourced functions.

Threats

Threat: An event or error that occurs outside the influence of the flight crew, but which requires crew attention and management if safety margins are to be maintained.

Mismanaged Threat: A threat that is linked to or induces crew error.

A1

Environmental Threats	DESCRIPTION
Meteorology	Thunderstorms, turbulence, poor visibility, wind shear, icing conditions, IMC
Air Traffic Services	Tough-to-meet clearances / restrictions, reroutes, language difficulties, controller errors, failure to provide separation (air or ground)
Birds / Foreign objects	Self-explanatory
Airport Facilities	Poor signage, faint markings, runway / taxiway closures, INOP navigational aids, poor braking action, contaminated runways / taxiways
NAV Aids	Ground navigation aid malfunction, lack or unavailability
Terrain / Obstacles	Self-explanatory
Traffic	Self-explanatory
Other	Not clearly falling within the other environmental threats

Airline Threats	DESCRIPTION
Aircraft Malfunction	Technical anomalies / failures Note – See expanded technical factors category
MEL item	MEL items with operational implications
Operational Pressure	Operational time pressure, missed approach, diversion, other non-normal ops
Cabin Events	Cabin events, cabin crew errors, distractions, interruptions
Ground Events	Aircraft loading events, fueling errors, agent interruptions, improper ground support, de-icing
Dispatch / Paperwork	Load sheet errors, crew scheduling events, late paperwork changes or errors
Maintenance Events	Aircraft repairs on ground, maintenance log problems, maintenance errors
Dangerous Goods	Carriage of articles or substances capable of posing a significant risk to health, safety or property when transported by air.
Manuals/Charts	Incorrect / unclear chart pages or operating manuals
Other	Not clearly falling within the other airline threats

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A/C Malfunction (Technical) Threats	DESCRIPTION
Extensive / Uncontained Engine Failure	Damage due to non-containment
Contained Engine Failure	Engine overheat, propeller failure
Gear / Tire	Failure affecting parking, taxi, take-off or landing
Flight Controls	Failure affecting aircraft controllability
Structural Failure	Failure due to flutter, overload, corrosion / fatigue; engine separation
Fire / Smoke (Cockpit / Cabin / Cargo)	Fire due to aircraft systems; other fire causes; post-crash fire
Avionics	All avionics except autopilot and FMS
Autopilot / FMS	Self-explanatory
Hydraulic System Failure	Self-explanatory
Electrical Power Generation Failure	Self-explanatory
Brakes	Failure affecting Parking, Taxi, Take-off or Landing
Other	Not clearly falling within the other aircraft malfunction threats

Errors

Flight Crew Error: An observed flight crew deviation from organisational expectations or crew intentions.

Mismanaged Error: An error that is linked to or induces additional error or an undesired aircraft state.

A1

Aircraft Handling Errors	DESCRIPTION
Manual Handling / Flight Controls	Hand flying vertical, lateral, or speed deviations. Approach deviations by choice (e.g., flying below the GS). Missed runway / taxiway, failure to hold short, taxi above speed limit. Incorrect flaps, speed brake, autobrake, thrust reverser or power settings.
Ground Navigation	Attempting to turn down wrong taxiway / runway. Missed taxiway / runway / gate.
Automation	Incorrect altitude, speed, heading, autothrottle settings, mode executed, or entries.
Systems / Radio / Instruments	Incorrect packs, altimeter, fuel switch settings, or radio frequency dialed.
Other	Not clearly falling within the other handling errors.
Procedural Errors	**DESCRIPTION**
SOP adherence / Cross-verification	Intentional or unintentional failure to cross-verify automation inputs
Checklist Split to normal and abnormal	Checklist performed from memory or omitted; wrong challenge and response. Checklist performed late or at wrong time; items missed.
Callouts	Omitted takeoff, descent, or approach callouts.
Briefings	Omitted departure, takeoff, approach, or handover briefing; items missed.
Documentation	Wrong weight and balance, fuel information, ATIS, or clearance recorded. Misinterpreted items on paperwork. Incorrect log book entries.
Failure to Go-around after destabilisation during approach	The flight crew does not execute a go-around after stabilisation requirements are not met.
Other Procedural	Administrative duties performed after top of descent or before leaving active runway. Pilot Flying makes own automation changes. Incorrect application of MEL, normal or abnormal procedures. Intentional non-compliance.
Communication Errors	**DESCRIPTION**
Crew to External Communication	Crew to ATC—missed calls, misinterpretation of instructions, or incorrect read-backs. Wrong clearance, taxiway, gate or runway communicated. Also includes communication issues with cabin crew, ground crew, maintenance personnel and dispatch crew.
Pilot-to-Pilot Communication	Within-crew miscommunication or misinterpretation. Sterile cockpit violations.

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Undesired Aircraft States

Undesired Aircraft State (UAS): A flight-crew-induced aircraft state that clearly reduces safety margins; a safety-compromising situation that results from ineffective threat / error management.

An undesired aircraft state is recoverable.
Mismanaged UAS: A UAS that is linked to or induces additional error.

Undesired Aircraft States	DESCRIPTION
Aircraft Handling	Abrupt Aircraft Control
	Vertical, Lateral or Speed Deviations
	Unnecessary Weather Penetration
	Unauthorised Airspace Penetration
	Operation Outside Aircraft Limitations
	Unstable Approach
	Continued Landing after Unstable Approach
	Long, Floated, Bounced, Firm or Off-Centerline Landing
	Rejected Take-off after V1
	Incorrect ramp handling
	Other
Ground Navigation	Runway / Taxiway Incursions
	Proceeding towards wrong taxiway / runway
	Wrong taxiway, ramp, gate or hold spot
	Other
Incorrect Aircraft Configurations	Brakes, Thrust Reversers, Ground Spoilers
	Systems (Fuel, Electrical, Hydraulics, Pneumatics, Air Conditioning, Pressurisation / Instrumentation)
	Landing Gear
	Flight Controls / Automation
	Engine
	Weight & Balance
	Other

Additional Classification	DESCRIPTION
Insufficient Data	Reserved for accidents that do not contain sufficient data to be classified.
Fatigue	Crewmember unable to perform duties due to physical or psychological impairment.

End States

Definition: An end state is a reportable event.
An end state is unrecoverable.

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End States	DESCRIPTION
Controlled Flight into Terrain	In-flight collision with terrain, water, or obstacle without indication of loss of control.
Loss of Control In-flight	Loss of aircraft control while in-flight.
Runway Incursion	Any occurrence at an aerodrome involving the incorrect presence of an aircraft, vehicle, person or wildlife on the protected area of a surface designated for the landing and take-off of aircraft.
Mid-air Collision	Collision between aircraft in flight.
Runway Excursion	A veer off or overrun off the runway surface.
In-flight Damage / Injuries	Damage or injuries occurring while airborne, including: • Weather-related events, technical failures, bird strikes, serious / fatal injuries to crew or passengers and fire / smoke / fumes.
Ground Damage / Injuries	Damage or injuries occurring during ground operations, including: • Occurrences during (or as a result of) ground handling operations. • Collision while taxiing to or from a runway in use. • Foreign object damage.
Loss of Control on Ground	Loss of aircraft control while the aircraft is on the ground.
Undershoot	A touchdown off the runway surface.
Hard Landing	Any hard landing resulting in substantial damage.
Gear-up Landing / Gear Collapse	Any gear-up landing resulting in substantial damage. Note: if the gear failure is the result of a runway excursion or hard landing, event is classified in those categories.
Tailstrike	Tail strike resulting in substantial damage.

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Countermeasure	DEFINITION	EXAMPLE PERFORMANCE
	Team Climate	
Communication Environment	Environment for open communication should be established and maintained.	• Good cross talk — flow of information is fluid, clear, and direct
Leadership	Captain should show leadership and coordinated flight deck activities. First Officer (FO) is assertive when necessary.	• In command, decisive, and encourages crew participation-FO takes action when required e.g. Go-around.
Overall Crew Performance	Overall, crew members should perform well as risk managers.	• Includes Flight, Cabin, Ground crew as well as their interactions with ATC
	Planning	
SOB Briefing	The required briefing should be interactive and operationally thorough.	• Concise and not rushed • Bottom lines are established
Plans Stated	Operational plans and decisions should be communicated and acknowledged.	• Shared understanding about plans • "Everybody on the same page"
Contingency Management	Crew members should develop effective strategies to manage threats to safety.	• Threats and their consequences are anticipated • Use all available resources to manage threats

Countermeasure	DEFINITION	EXAMPLE PERFORMANCE
	Execution	
Monitor / Cross-Check	Crew members should actively monitor and cross-check systems and other crew members.	• Aircraft position, settings, and crew actions are verified
Workload Management	Operational tasks should be prioritised and properly managed to handle primary flight duties.	• Avoid task fixation • Do not allow work overload
Automation Management	Automation should be properly managed to balance situational and / or workload requirements.	• Brief automation setup • Effective recovery techniques from anomalies
Taxiway / Runway Management	Crew members use caution and keep watch outside when navigating taxiways and runways.	• Clearances are verbalized and understood • Airport and taxiway charts are used when needed
	Review / Modify	
Evaluation of Plans	Existing plans should be reviewed and modified when necessary.	• Crew decisions and actions are openly analysed to make sure the existing plan is the best plan
Inquiry	Crew members should not be afraid to ask questions to investigate and / or clarify current plans of action.	"Nothing taken for granted" attitude • Crew members speak up without hesitation

A1

Incident: An occurrence, other than an accident, associated with the operation of an aircraft which affects or could affect the safety of operation.

In-flight Security Personnel: An individual who is trained, authorised and armed by the state and is carried on board an aircraft and whose intention is to prevent acts of unlawful interference.

Investigation: A process conducted for the purpose of accident prevention which includes the gathering and analysis of information, the drawing of conclusions, including the determination of causes and, when appropriate, the making of safety recommendations.

Investigator in charge: A person charged, on the basis of his or her qualifications, with the responsibility for the organisation, conduct and control of an investigation.

Involved: means directly concerned, or designated to be concerned, with an accident or incident.

Level of safety: means how far a level of safety is to be pursued in a given context, assessed with reference to an acceptable risk, based on the current values of society.

Major repair: means a repair which, if improperly done, might appreciably affect mass, balance, structural strength, performance, powerplant operation, flight characteristics, or other qualities affecting airworthiness.

Non-operational accident: This definition includes acts of deliberate violence such as sabotage, war, etc., and (an IATA constraint) accidents which occur during crew training, demonstration and test flights (sabotage, etc., is believed to be a matter of security rather than flight safety, and crew training, demonstration and test flying are considered to involve special risks inherent to these types of operations).

Also included in this category are:

- Non-airline operated aircraft (e.g. military or government operated, survey, aerial work or parachuting flights);
- Accidents where there has been no intention of flight.

Occurrence: means any unusual or abnormal event involving an aircraft, including but not limited to an incident.

Operator: A person, organisation or enterprise engaged in or offering to engage in aircraft operation.

Operational accident: An accident which is believed to represent the risks of normal commercial operation, generally accidents which occur during normal revenue operations or positioning flights.

Passenger: means anyone on board a flight who, as far as may be determined, is not a crewmember. Apart from normal revenue passengers this includes off-duty staff members, positioning and relief flight crew members, etc., who have no duties connected with the sector of the flight during which the accident happened. Security staff are included as passengers as their duties are not concerned with the operation of the flight.

Person: means any involved individual, including an aerodrome manager and / or a member of an air traffic services unit.

Phase of flight: The phase of flight definitions were, and continue to be, developed by the ATA Flight Operations Working Group. The following is an excerpt from the Flight Operations Information Data Interchange — Phase of Flight Specification, ATA iSpec2200 (ATA POF Spec). Further information on iSpec2200 may be obtained from:

www.airlines.org

Flight Planning (FLP) This phase begins when the flight crew initiates the use of flight planning information facilities and becomes dedicated to a flight based upon a route and an airplane; it ends when the crew arrives at the aircraft for the purpose of the planned flight or the crew initiates a “Flight Close” phase.

Pre-flight (PRF) This phase begins with the arrival of the flight crew at an aircraft for the purpose of flight; it ends when a dedication is made to depart the parking position and / or start the engine(s). It may also end by the crew initiating a “Post- flight” phase.

NOTE: The Pre-flight phase assumes the aircraft is sitting at the point at which the aircraft will be loaded or boarded, with the primary engine(s) not operating. If boarding occurs in this phase, it is done without any engines operating. Boarding with any engine operating is covered under Engine Start/Depart.

Engine Start / Depart (ESD) This phase begins when the flight crew take action to have the aircraft moved from the parked position and / or take switch action to energise the engine(s); it ends when the aircraft begins to move forward under its own power or the crew initiates an “Arrival/Engine Shutdown” phase.

NOTE: The Engine Start / Depart phase includes: the aircraft engine(s) start-up whether assisted or not and whether the aircraft is stationary with more than one engine shutdown prior to Taxi-out, i.e., boarding of persons or baggage with engines running. It includes all actions of power back for the purpose of positioning the aircraft for Taxi-out.

Taxi-out (TXO) This phase begins when the crew moves the aircraft forward under its own power; it ends when thrust is increased for the purpose of Take-off or the crew initiates a “Taxi-in” phase.

NOTE: This phase includes taxi from the point of moving under its own power, up to and including entering the runway and reaching the Take-off position.

Take-off (TOF) This phase begins when the crew increases the thrust for the purpose of lift-off; it ends when an Initial Climb is established or the crew initiates a “Rejected Take-off” phase.

Rejected Take-off (RTO) This phase begins when the crew reduces thrust for the purpose of stopping the aircraft prior to the end of the Take-off phase; it ends when the aircraft is taxied off the runway for a “Taxi-in” phase or when the aircraft is stopped and engines shutdown.

Initial Climb (ICL) This phase begins at 35 ft above the runway elevation; it ends after the speed and configuration are established at a defined maneuvering altitude or to continue the climb for the purpose of cruise. It may also end by the crew initiating an “Approach” phase.

NOTE: Maneuvering altitude is based upon such an altitude to safely maneuver the aircraft after an engine failure occurs, or pre-defined as an obstacle clearance altitude. Initial Climb includes such procedures applied to meet the requirements of noise abatement climb, or best angle/rate of climb.

En Route Climb (ECL) This phase begins when the crew establishes the aircraft at a defined speed and configuration enabling the aircraft to increase altitude for the purpose of cruising; it ends with the aircraft established at a predetermined constant initial cruise altitude at a defined speed or by the crew initiating a “Descent” phase.

Cruise (CRZ) The cruise phase begins when the crew establishes the aircraft at a defined speed and predetermined constant initial cruise altitude and proceeds in the direction of a destination; it ends with the beginning of Descent for the purpose of an approach or by the crew initiating an “En Route Climb” phase.

Descent (DST) This phase begins when the crew departs the cruise altitude for the purpose of an approach at a particular destination; it ends when the crew initiates changes in aircraft configuration and / or speeds to facilitate a landing on a particular runway. It may also end by the crew initiating an “En Route Climb” or “Cruise” phase.

Approach (APR) This phase begins when the crew initiates changes in aircraft configuration and / or speeds enabling the aircraft to maneuver for the purpose of landing on a particular runway; it ends when the aircraft is in the landing configuration and the crew is dedicated to land on a specific runway. It may also end by the crew initiating an “Initial Climb” or “Go-around” phase.

Go-around (GOA) This phase begins when the crew aborts the descent to the planned landing runway during the Approach phase, it ends after speed and configuration are established at a defined maneuvering altitude or to continue the climb for the purpose of cruise (same as end of “Initial Climb”).

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Landing (LND) This phase begins when the aircraft is in the landing configuration and the crew is dedicated to touch down on a specific runway; it ends when the speed permits the aircraft to be maneuvered by means of taxiing for the purpose of arriving at a parking area. It may also end by the crew initiating a "Go-around" phase.

Taxi-in (TXI) This phase begins when the crew begins to maneuver the aircraft under its own power to an arrival area for the purpose of parking; it ends when the aircraft ceases moving under its own power with a commitment to shut down the engine(s). It may also end by the crew initiating a "Taxi-out" phase.

Arrival / Engine Shutdown (AES) This phase begins when the crew ceases to move the aircraft under its own power and a commitment is made to shutdown the engine(s); it ends with a dedication to shutting down ancillary systems for the purpose of securing the aircraft. It may also end by the crew initiating an "Engine Start / Depart" phase.

NOTE: The Arrival / Engine Shutdown phase includes actions required during a time when the aircraft is stationary with one or more engines operating while ground servicing may be taking place, i.e., deplaning persons or baggage with engine(s) running, and or refueling with engine(s) running.

Post-flight (PSF) This phase begins when the crew commences the shutdown of ancillary systems of the aircraft for the purpose of leaving the flight deck; it ends when the cockpit and cabin crew leaves the aircraft. It may also end by the crew initiating a "Pre-flight" phase.

Flight Close (FLC) This phase begins when the crew initiates a message to the flight-following authorities that the aircraft is secure, and the crew is finished with the duties of the past flight; it ends when the crew has completed these duties or begins to plan for another flight by initiating a "Flight Planning" phase.

Ground Servicing (GDS) This phase begins when the aircraft is stopped and available to be safely approached by ground personnel for the purpose of securing the aircraft and performing the duties applicable to the arrival of the aircraft, aircraft maintenance, etc.; it ends with completion of the duties applicable to the departure of the aircraft or when the aircraft is no longer safe to approach for the purpose of ground servicing. (e.g. Prior to crew initiating the "Taxi-out" phase.)

NOTE: This phase was identified by the need for information that may not directly require the input of cockpit or cabin crew. It is acknowledged as an entity to allow placement of the tasks required of personnel assigned to service the aircraft.

Sky Marshal: see In-flight Security Personnel.

Products: refer, in terms of accident costs, to those liabilities which fall on parties other than the involved airline.

Risk: the assessment, expressed in terms of predicted **probability** and **severity**, of the consequence(s) of a hazard, taking as reference the worst foreseeable situation.

Safety: the state in which the risk of harm to persons or property damage is reduced to, and maintained at or below, an **acceptable level** through a **continuing process** of **hazard identification** and **risk management**.

Sector: the operation of an aircraft between takeoff at one location and landing at another (other than a diversion).

Serious Incident: an incident involving circumstances indicating that an accident nearly occurred (note the difference between an accident and a serious incident lies only in the result).

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

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

Substantial Damage: means damage or structural 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.

Notes

1. Engine failure (damage limited to an engine), bent fairing or cowling, dented skin, small punctured holes in the skin or fabric, ground damage to rotor or propeller blades, minor damage to landing gear, wheels, tires, flaps, engine accessories, brakes, or wing tips are not considered "substantial damage" for the purpose of this Safety Report.

2. The ICAO Annex 13 definition is unrelated to cost and includes many incidents in which the financial consequences are minimal.

Western-built Jet: Commercial Jet transport aeroplane with a maximum certificated takeoff mass of more than 15,000 kg, designed and manufactured in the Western world countries.

Western-built Turboprop: Commercial Turboprop transport aeroplane with a maximum certificated takeoff mass of more than 3900 kg, designed and manufactured in the Western world countries.

Annex 2 2007 Accidents Summary

DATE	MANUFACTURER	AIRCRAFT	OPERATOR	LOCATION	PHASE	SERVICE	ORIGIN	JET/TURBOPROP	SEVERITY	SUMMARY
1-Jan-07	Boeing	B737-400	Adam Air	8 km south of Pare Pare area / West Sulawesi, Indonesia	CRZ	DSP	Western-built	Jet	Hull Loss	Aircraft disappeared during cruise flight.
9-Jan-07	BAE Systems	Jetstream 31	Peace Air	Fort St John, CA, Canada	APR	DSP	Western-built	Turboprop	Hull Loss	Undershoot on landing.
9-Jan-07	Antonov	An-26	Aeriantur-M Airlines	Balad Air Base area / 50 nm North of Baghdad, Iraq	APR	INP	Eastern-built	Turboprop	Hull Loss	Undershoot on landing.
11-Jan-07	Indonesian Aerospace	Indonesian Aerospace 212	Aviastar Mandiri	Tanjung Bara, ID, Indonesia	LND	DNP	Western-built	Turboprop	Substantial Damage	Hard landing
13-Jan-07	Boeing	B737-200	Gading Sari Aviation Services	Kuching Airport (WBGG), Malaysia	LND	DSC	Western-built	Jet	Hull Loss	Undershoot on landing.
24-Jan-07	Beechcraft	Beech 1900	Alsair	Samedan Airport, St.Moritz, CH, Switzerland	LND	INP	Western-built	Turboprop	Substantial Damage	Runway excursion on landing.
24-Jan-07	Beechcraft	Beech 99	Freight Runners Express	General Mitchell International Airport Milwaukee, US, United States	TXI	DNC	Western-built	Turboprop	Substantial Damage	Collision with other aircraft during taxi
24-Jan-07	Bombardier (Canadair)	CRJ Regional Jet	Air Nostrum	Barcelona Airport (LEBN), Spain	APR	DSP	Western-built	Jet	Substantial Damage	Gear-up landing.
25-Jan-07	Bombardier (Canadair)	CRJ Regional Jet	Mesa Airlines	70 miles W SW of Denver, US, United States	ECL	DSP	Western-built	Jet	Substantial Damage	Uncontained engine failure during climb.
25-Jan-07	Fokker	F100	Régional	Uzein Airport, Pau (LFBP), France	TOF	DSP	Western-built	Jet	Hull Loss	Loss of control during take-off.
4-Feb-07	Boeing	DC-8	TAMPA Cargo	MIA, USA, United States	LND	ISC	Western-built	Jet	Hull Loss	Main gear collapse on landing.
18-Feb-07	Embraer	EMB-170	Shuttle America	(CLE), Cleveland, Ohio, United States	LND	DSP	Western-built	Jet	Substantial Damage	Overrun on landing.
21-Feb-07	Boeing	B737-300	Adam Air	Surabaya-Intl AP (WRSJ), Indonesia	LND	DSP	Western-built	Jet	Hull Loss	Hard landing.
7-Mar-07	Boeing	B737-400	Garuda Indonesia	Yogyakarta-Intl AP (WARJ), Indonesia	LND	DSP	Western-built	Jet	Hull Loss	Overrun following hard landing
12-Mar-07	Airbus	A310	Biman Bangladesh Airlines	Dubai, UAE, United Arab Emirates	TOF	ISP	Western-built	Jet	Hull Loss	Gear collpase on take-off roll
13-Mar-07	Airbus	A320	Air Canada	McCarran International Airport, Las Vegas, United States	RTO	DSP	Western-built	Jet	Substantial Damage	Landing gear damaged

DATE	MANUFACTURER	AIRCRAFT	OPERATOR	LOCATION	PHASE	SERVICE	ORIGIN	JET/TURBOPROP	SEVERITY	SUMMARY
16-Mar-07	Boeing	MD-82	Kish Air	Kish Island Airport, Iran	LND	ISP	Western-built	Jet	Substantial Damage	Wheels-up landing
17-Mar-07	Tupolev	Tu-134	UTair	Samara - near Kurumoch Int Airport, Russia	LND	DSP	Eastern-built	Jet	Hull Loss	Undershoot
22-Mar-07	Bombardier (Canadair)	DHC-6 Twin Otter	Loganair	Gladscow, GB, United Kingdom	TXI	DSP	Western-built	Turboprop	Substantial Damage	Undercarriage collapse during taxi-in.
23-Mar-07	Airbus	A300	Ariana Afghan Airlines	Instabul - Atatuerk Intl Airport (LTBA), Turkey	LND	ISP	Western-built	Jet	Hull Loss	Main gear failures while landing in poor weather.
25-Mar-07	Fairchild (Swearingen)	Metro II	Perimeter Airlines	Thompson Airport, Canada	TOF	DNP	Western-built	Turboprop	Substantial Damage	Collided with obstacles on take-off
29-Mar-07	Lockheed	L-188 Electra	Vigo Jet	Tocumen Int AP, Panama, Panama	ESD	INC	Western-built	Turboprop	Hull Loss	Collision with ground equipment
29-Mar-07	Boeing	MD-83	Allegiant Air	Orlando Sanford International Airport (SFB), United States	LND	DSP	Western-built	Jet	Substantial Damage	Nose gear-up landing
30-Mar-07	Embraer	EMB-110 Bandeirante	Airlink (PNG)	(near) Gasmata, PG, Papua New Guinea	LND	DNC	Western-built	Turboprop	Hull Loss	CFIT on approach
7-Apr-07	Bombardier (Canadair)	CRJ Regional Jet	Mesa Airlines	about 35 miles west of GRR, Michigan, United States	CRZ	DSP	Western-built	Jet	Substantial Damage	Structural failure during cruise.
9-Apr-07	Let	Let 410	Comores Aviation	Ouani Airport (FMCV), Comoros	RTO	DSP	Eastern-built	Turboprop	Substantial Damage	Runway excursion following rejected take-off
9-Apr-07	Airbus	A321	Alitalia	Capodichino International Airport, Italy	LND	DSP	Western-built	Jet	Substantial Damage	Runway excursion on landing
12-Apr-07	Bombardier (Canadair)	CRJ Regional Jet	Pinnacle Airlines	Traverse City Airport (KTVC), United States	LND	DSP	Western-built	Jet	Substantial Damage	Runway excursion on landing
13-Apr-07	Boeing	B747-400	El Al	Paris CDG, France	TXO	ISP	Western-built	Jet	Substantial Damage	Collision with tug during taxi
17-Apr-07	Airbus	A310-300	Pakistan International Airlines	Quaid E Azam intl AP, Pakistan	TOF	DSP	Western-built	Jet	Substantial Damage	Hard Landing
20-Apr-07	Bombardier (Canadair)	Dash 8	Bahamasair	Governors Harbour Airport, Bahamas	LND	DSP	Western-built	Turboprop	Hull Loss	Gear collapse on landing
30-Apr-07	Boeing	B737-500	Royal Air Maroc	Bamako, Mali, Mali	RTO	ISP	Western-built	Jet	Substantial Damage	Runway excurison following rejected take-off
5-May-07	Boeing	B737-800	Kenya Airways	(near) Douala, CM, Cameroon	ICL	ISP	Western-built	Jet	Hull Loss	Destroyed shortly after take-off
20-May-07	Bombardier (Canadair)	CRJ Regional Jet	Air Canada Jazz	Toronto Int'l AP (YYZ), Canada	LND	DSP	Western-built	Jet	Hull Loss	Damaged during hard landing
20-May-07	Boeing	B747-200F	Cathay Pacific	Frankfurt Intl AP, Germany	LND	ISC	Western-built	Jet	Substantial Damage	Thrust reverser separated from engine on landing

Annex 2 2007 Accidents Summary (Cont'd)

DATE	MANUFACTURER	AIRCRAFT	OPERATOR	LOCATION	PHASE	SERVICE	ORIGIN	JET/TURBOPROP	SEVERITY	SUMMARY
1-Jun-07	Bombardier (Canadair)	DHC-6 Twin Otter	Trigana Air	Gunung Mulia, ID, Indonesia	LND	D?P	Western-built	Turboprop	Substantial Damage	Runway excursion on landing
15-Jun-07	BAE Systems	ATP Bulk Freighter	First Flight Couriers	Meenambakkam, Chennai IN, India	LND	DSC	Western-built	Turboprop	Hull Loss	Gear collapse on landing
17-Jun-07	Bombardier (Canadair)	Shorts 360	Air Seychelles	Mahe, SC, Seychelles	APR	DSP	Western-built	Turboprop	Substantial Damage	Contained engine failure..
18-Jun-07	Beechcraft	Beech 1900	Eagle Airways	Blenheim-Woodbourne Airport (BHE), New Zealand	LND	DSP	Western-built	Turboprop	Substantial Damage	Gear-up landing
20-Jun-07	Beechcraft	Beech 1900	Great Lakes Airlines	Laramie Regional Airport (LAR), United States	TXI	DSP	Western-built	Turboprop	Substantial Damage	Collision with obstacles during taxi-in
21-Jun-07	Let	Let 410	Karibu Airways	Kamina area (FZSA), Congo, Republic of the	ICL	DNP	Eastern-built	Turboprop	Hull Loss	Crashed following take-off
23-Jun-07	Airbus	A330-240	Monarch Airlines	Sanford Int AP, Orlando Florida, United States	LND	INP	Western-built	Jet	Substantial Damage	Hard Landing
25-Jun-07	Antonov	An-24	PMT Airlines	Kamchay / Bokor Mountains, Cambodia	APR	DSP	Eastern-built	Turboprop	Hull Loss	CFIT
25-Jun-07	Boeing	B747-200SF	Cathay Pacific	Arlanda AP, Sweden	TXO	ISC	Western-built	Jet	Substantial Damage	Collision with tug on taxi-out.
26-Jun-07	Let	Let 410	Business Aviation of Congo	100km from Brazzaville, CG, Congo, Republic of the	CRZ	DNP	Eastern-built	Turboprop	Hull Loss	Crashed after fuel starvation
26-Jun-07	BAE Systems	Jetstream 41	Eastern Airways	Birmingham Int AP, Great Britain, United Kingdom	ESD	DSP	Western-built	Turboprop	Substantial Damage	Damaged during pushback
28-Jun-07	Boeing	B737-200	TAAG - Angola Airlines	M'Banza Congo Airport (SSY), Angola	LND	DSP	Western-built	Jet	Hull Loss	Undershoot followed by collision with structures
1-Jul-07	Boeing	B767-200ER	Air China	Beijing-Intl AP (ZBAA), China	PRF	ISP	Western-built	Jet	Hull Loss	Undercarriage collapse while parked
1-Jul-07	ATR	ATR-42	Jet Airways	Devi Ahilyabai Holkar Airport, India	LND	DSP	Western-built	Turboprop	Hull Loss	Hard landing
3-Jul-07	Boeing	B737-800	JetLite Airways	Cochin AP, India, India	LND	DSP	Western-built	Jet	Substantial Damage	Runway excursion on landing
8-Jul-07	Bombardier (Canadair)	DHC-6 Twin Otter	Liard Air	Muncho Lake-Mile 462 Water Aerodrome, Alaska, United States	ICL	D?P	Western-built	Turboprop	Hull Loss	Crashed on or shortly after take-off
8-Jul-07	ATR	ATR-72	Precision Air	Jomo Kenyatta Int AP, KE, Kenya	LND	ISP	Western-built	Turboprop	Substantial Damage	Runway excursion on landing

DATE	MANUFACTURER	AIRCRAFT	OPERATOR	LOCATION	PHASE	SERVICE	ORIGIN	JET/TURBOPROP	SEVERITY	SUMMARY
16-Jul-07	ATR	ATR-42	Pantanal Linhas Aereas	Sao Paulo-Congohas AP (SBSP), Brazil	LND	DSP	Western-built	Turboprop	Substantial Damage	Runway excursioin on landing.
17-Jul-07	Airbus	A320-200	TAM Linhas Aereas	São Paulo-Congonhas Airport, SP (CGH), Brazil	LND	DSP	Western-built	Jet	Hull Loss	Runway excurison on landing.
17-Jul-07	Embraer	EMB-190	Aero-Republica Colombia	Santa Marta (SMR), Colombia	LND	DSP	Western-built	Jet	Hull Loss	Runway excurison on landing.
23-Jul-07	Antonov	An-26	Djibouti Airlines	Shinele / East Somali Region, Somalia	CRZ	INP	Eastern-built	Turboprop	Hull Loss	Damaged during forced landing after technical problems.
29-Jul-07	Antonov	An-12	Atran	Moscow Domodedovo AP (UUDD), Russia	ECL	DNC	Eastern-built	Turboprop	Hull Loss	Crashed after engine failure.
29-Jul-07	Antonov	An-32	Alok Air Transport	Palouge, Sudan	LND	D?P	Eastern-built	Turboprop	Substantial Damage	Gear collapse on landing.
9-Aug-07	Bombardier (Canadair)	DHC-6 Twin Otter	Air Moorea	near Temae Airport, Moorea, French Polynesia	ICL	DSP	Western-built	Turboprop	Hull Loss	Crashed into sea after take-off
12-Aug-07	Bombardier (Canadair)	Dash 8	Jeju Air	kimhae (Pusan) International Airport (PUS), Korea (Democratic Republic)	LND	DSP	Western-built	Turboprop	Hull Loss	Runway excursion on landing
18-Aug-07	BAE Systems	Avro RJ-100	Swiss European Air Lines	London-City AP (EGLC) / England, Switzerland	LND	ISP	Western-built	Jet	Substantial Damage	Tailstrike on landing.
20-Aug-07	Boeing	B737-800	China Airlines	Naha Airport, Okinawa (OKI), Japan	AES	ISP	Western-built	Jet	Hull Loss	Destroyed by post-flight fire
20-Aug-07	Airbus	A310	Yemenia	Sana'a Int AP, Yermen, Yemen	LND	ISP	Western-built	Jet	Substantial Damage	Runway excusion on landing
21-Aug-07	Antonov	An-26	SELVA Colombia	Antonio Narino AP, Pasto, CO, Colombia	LND	DNP	Eastern-built	Turboprop	Hull Loss	Runway excursion on landing
22-Aug-07	Embraer	EMB-110 Bandeirante	Two Taxi Aero	near Curitiba Airport (SBCT), Brazil	ECL	Ferry	Western-built	Turboprop	Hull Loss	Crashed after take-off.
27-Aug-07	Antonov	An-32	SELVA Colombia	Mitu AP (SKMU), Colombia	GDS	DNC	Eastern-built	Turboprop	Hull Loss	Destroyed by fuel spill fire
29-Aug-07	Fokker	F28	Myanma Airways	Dawei AP, MM, Myanmar	LND	DSP	Western-built	Jet	Substantial Damage	Runway excursion on landing
31-Aug-07	Bombardier (Canadair)	DHC-6 Twin Otter	Air Serv International	30 km (18.8 mls) E of Punia Airport (PUN), Congo, Republic of the	CRZ	Ferry	Western-built	Turboprop	Hull Loss	Loss of control in-flight
1-Sep-07	Bombardier (Canadair)	Short Brothers SC-7	Arctic Circle Air Service	near Mistic Lake Lodge Airstrip, USA, United States	LND	DNC	Western-built	Turboprop	Substantial Damage	Gear collapse on landing

Annex 2 2007 Accidents Summary (Cont'd)

DATE	MANUFACTURER	AIRCRAFT	OPERATOR	LOCATION	PHASE	SERVICE	ORIGIN	JET/TURBOPROP	SEVERITY	SUMMARY
9-Sep-07	Bombardier (Canadair)	Dash 8	SAS	Aalborg-Intl AP (EKYT), Denmark	LND	DSP	Western-built	Turboprop	Substantial Damage	Runway excursion on landing
12-Sep-07	Bombardier (Canadair)	Dash 8	SAS	Vilnius-Intl AP (EYVI), Lithuania	LND	ISP	Western-built	Turboprop	Substantial Damage	Gear collapse on landing
14-Sep-07	Boeing	B737-200	Magnicharters	Guadalajara-Miguel Hidal Airport (GDL/ MMGL), Mexico	LND	DSP	Western-built	Jet	Substantial Damage	Damaged on landing.
16-Sep-07	Boeing	MD-82	1-2-Go Airlines	Phuket-Intl AP (VTSP), Thailand	LND	DSP	Western-built	Jet	Hull Loss	Runway excursion on landing
18-Sep-07	Airbus	A320	Air Asia	Subang International Airport, KL, Malaysia	LND	DSP	Western-built	Jet	Substantial Damage	Hard landing
20-Sep-07	Bombardier (Canadair)	Short Brothers SC-7	Arctic Circle Air Service	Amos Lake / Mystic Lake Lodge area / AK, United States	TOF	Ferry	Western-built	Turboprop	Hull Loss	Loss of control after take-off
24-Sep-07	Let	Let 410	Karibu Airways	Malemba Nkulu / Lubumbashi area, Congo, Republic of the	LND	DNP	Eastern-built	Turboprop	Hull Loss	Runway excursion on landing
28-Sep-07	Boeing	MD-82	American Airlines	St. Louis-Intl AP (KSTL) / MO, United States	ICL	DSP	Western-built	Jet	Substantial Damage	Engine fire during climb.
2-Oct-07	Boeing	B737-800	Austrian	Linz, Austria, Austria	TOF	DSP	Western-built	Jet	Substantial Damage	Rear fuselage struck runway on take-off.
8-Oct-07	Let	Let 410	Nacional de Aviac	Between Villavicencio and Uribe, CO, Colombia	CRZ	DNP	Eastern-built	Turboprop	Hull Loss	Aircraft went missing; wreckage never found.
11-Oct-07	Boeing	MD-83	AMC Airlines	Istanbul-Intl AP (LTBA), Turkey	LND	ISP	Western-built	Jet	Hull Loss	Runway excursion on landing.
11-Oct-07	Bombardier (Canadair)	CRJ-700	SkyWest Airlines	DEN, United States	TOF	DSP	Western-built	Jet	Substantial Damage	Bird strike on take-off
17-Oct-07	Antonov	An-12	Imtrec Aviation Cambodia	Phnom Penh-Intl AP (VDPP), Cambodia	ICL	INC	Eastern-built	Turboprop	Hull Loss	Aircraft lost height after take-off and crashed.
26-Oct-07	Airbus	A320	Philippine Airlines	Butuan AP (RPME), Philippines	LND	DSP	Western-built	Jet	Hull Loss	Runway excursion on landing
27-Oct-07	Bombardier (Canadair)	Dash 8	SAS	Copenhagen-Kastrup Intl AP (EKCH), Denmark	LND	ISP	Western-built	Turboprop	Substantial Damage	Main gear collapse during landing.
27-Oct-07	Boeing	B737-800	Air Europa	Katowice-Intl AP (EKPM), Poland	APR	INP	Western-built	Jet	Substantial Damage	Struck approach lights
28-Oct-07	Boeing	B717	AeBal - Aerolineas de Baleares	Palma de Mallorca Airport, Spain	PRF	DSP	Western-built	Jet	Substantial Damage	Struck by ground vehicle while at gate.

DATE	MANUFACTURER	AIRCRAFT	OPERATOR	LOCATION	PHASE	SERVICE	ORIGIN	JET/TURBOPROP	SEVERITY	SUMMARY
31-Oct-07	Fokker	F27	Air Panama	Balboa - Marcos A Gelabert Airport, Panama	TOF	DSP	Western-built	Turboprop	Hull Loss	Runway excusion after failure to become airborne.
1-Nov-07	Boeing	B737-200	Mandala Airlines	Malang-Intl AP (WARA), Indonesia	LND	DSP	Western-built	Jet	Hull Loss	Nose gear collapse on landing
7-Nov-07	Boeing	B737-200	Nationwide Airlines	CPT, South Africa, South Africa	TOF	DSP	Western-built	Jet	Substantial Damage	Engine detached on take-off roll.
9-Nov-07	Airbus	A340-600	Iberia	Quito-Intl AP (SEQU), Ecuador	LND	ISP	Western-built	Jet	Substantial Damage	Runway excursion on landing.
18-Nov-07	Boeing	B747-400F	Polar Air Cargo	Seoul, KR, Korea (Democratic Republic)	ICL	ISC	Western-built	Jet	Substantial Damage	Damage in-flight, aircraft returned to land.
30-Nov-07	Boeing	MD-83	Atlasjet Airlines	Cukuroren area west of Isparta-Intl Airport (LTFC), Turkey	APR	DSP	Western-built	Jet	Hull Loss	Aircraft impacted mountainous terrain on approach.
6-Dec-07	Boeing	B747-400SF	Air Atlanta Icelandic	Brussels, Belgium	PRF	ISC	Western-built	Jet	Substantial Damage	Collision with ground vehicle
12-Dec-07	Boeing	B767-300	Arkefly	Chania, GR, Greece	TXI	INP	Western-built	Jet	Substantial Damage	Collision with lamp post during taxi-in.
16-Dec-07	Bombardier (Canadair)	CRJ Regional Jet	Air Wisconsin	Theodore Francis Greene Airport, Providence, Rhode Island, United States	LND	DSP	Western-built	Jet	Substantial Damage	gear collapse on landing
16-Dec-07	Bombardier (Canadair)	CL-600-2B19	SkyWest Airlines	O'Hare International Airport (ORD), United States	TXI	DSP	Western-built	Jet	Substantial Damage	Collided with tug during taxi-in.
16-Dec-07	Boeing	B747-200F	Southern Air	Cairo-Intl AP (HECA), Egypt	PSF	ISC	Western-built	Jet	Substantial Damage	Ground collision
17-Dec-07	Beechcraft	Beech C99	Ameriflight	Vernal, Utah, United States	APR	DSC	Western-built	Turboprop	Substantial Damage	Undershoot
24-Dec-07	Boeing	B767-300	Air Seychelles	CDG, France, France	ESD	ISP	Western-built	Jet	Substantial Damage	Ground damage on pushback
30-Dec-07	Boeing	B737-300	TAROM	Otopeni Airport, Bucharest, Romania	TOF	INP	Western-built	Jet	Substantial Damage	Runway incursion with vehicle

LIST OF ACRONYMS

AACO Arab Air Carriers Organization
ACAS Airborne Collision Avoidance Systems
ACTF IATA Accident Classification Task Force
ACI Airports Council International
AENA Spanish Aviation Authority
AES Arrival/Engine Shutdown (ATA Phase of Flight)
AFI Africa (IATA Regions)
AGAS European Action Group for ATM Safety
AIP Aeronautical Information Publication
ALA Approach and Landing Accidents
ALAR Approach and Landing Accident Reduction
ANSP Aviation Navigation and Satellite Programs
APR Approach (ATA Phase of Flight)
ASPAC Asia/Pacific
ASC Airports Services Committee
ASG IATA Airside Safety Group
ASR Air Safety Reports
ATA Air Transport Association
ATC Air Traffic Control
ATOS Air Transportation Oversight System (FAA)
ATSP Air Traffic Service Provider
BASIS British Airways Safety Information System
CAP UK Civil Aviation Publication
CASA Civil Aviation Safety Authority
CAST Commercial Aviation Safety Team
CBT Computer Based Training
CFIT Controlled Flight Into Terrain
COSCAP Co-operative Development Of Operational Safety and Continuing Airworthiness Programmes
CRM Crew Resource Management
CRZ Cruise (ATA Phase of Flight)
CSTF IATA Cabin Safety Task Force
CVR Cockpit Voice Recorder
DFDR Digital Flight Data Recorder
DGAC Dominican Republic CAA
DGB IATA Dangerous Goods Board
DGR Dangerous Goods Regulations
DST Descent (ATA Phase of Flight)
EAGOSH The European Ground Safety Council
ECL En Route Climb (ATA Phase of Flight)
EGPWS Enhanced Ground Proximity Warning System
ERPTF IATA Emergency Response Planning Task Force
ESD Engine Start/Depart (ATA Phase of Flight)
ETOPS Extended-Range Twin-Engine Operations
FAA Federal Aviation Authority
FDA Flight Data Analysis

FDR Flight Data Recording
FLC Flight Close (ATA Phase of Flight)
FLP Flight Planning (ATA Phase of Flight)
FO First Officer
FOG IATA Flight Operations Group
FOQA Flight Operations Quality Assurance
FPA Flight Procedure Authorizations
FSF Flight Safety Foundation
GASAG Global Aviation Security Action Group
GDS Ground Servicing (ATA Phase of Flight)
GOA Go-around (ATA Phase of Flight)
GPWS Ground Proximity Warning System
HL Hull Loss
IACA International Air Carriers Association
ICAEA International Civil Aviation English Association
ICAO International Civil Aviation Organization
ICL Initial Climb (ATA Phase of Flight)
IFALPA International Federation of Air Line Pilots' Associations
IFATCA International Federation of Air Traffic Controllers' Associations
IFSP In Flight Security Personnel
IGHC IATA Ground Handling Council
INTERPOL International Criminal Police Organization
IOSA IATA Operational Safety Audit
IRTF Incident Review Task Force
ISASI International Society of Air Safety Investigators
ITATF Integrated Threat Analysis Task Force
ITDI IATA Training and Development Institute
ITF International Transport Workers Federation
LAHSO Land-and-Hold Short Operations
LATAM Latin America and the Caribbean (IATA Regions).
LND Landing (ATA Phase of Flight)
LOC Loss of Control
LOSA Line Operations Safety Audit
MANPADS Man Portable Air Defense Systems
MENA Middle East and North Africa (IATA Regions)
MSTF IATA Multidivisional Safety Task Force
NAM North America and North Atlantic (IATA Region)
NASIA North Asia
NASP National Aviation Security Programme
NBIA New Bangkok International Airport
NLR National Aerospace Laboratory NLR, The Netherlands
NOTAM Notices to Airmen
OPC IATA Operations Committee
OQS Operational Quality Standards
PA Public Announcement
PAAST Pan American Aviation Safety Team
PED Portable Electronic Device
PFS IATA Partnership for Safety Programme

LIST OF ACRONYMS (Cont'd)

PRF	Pre-Flight (ATA Phase of Flight)
PRIOR	Programme for International Operator Readiness
PSF	Post-flight (ATA Phase of Flight)
QAR	Quick Access Recorder
RA	Resolution Advisory
RDPS	Radar Data Processing System
RIPP	Runway Incursion Prevention Programme
RTC/RCG	Regional Technical Conference
RTL	Regional Team Leaders
RTO	Rejected Take-off (ATA Phase of Flight)
SG	IATA Safety Group
SAFA	Safety Assessment of Foreign Aircraft
SARAST	South Asia Regional Aviation Safety Teams
SBS	Safety Bulletin System
SCCM	Senior Cabin Crew Member
SD	Substantial Damage
SEARAST	Southeast Asia Regional Aviation Safety Teams
SISG	Safety Improvement Sub Group
SMS	Safety Management System
SOP	Standard Operating Procedures
SRC	Safety Regulation Commission
STEADES	Safety Trend Evaluation, Analysis and Data Exchange System
SWAP	Safety With Answers Provided
TAWS	Terrain Awareness Warning System
TCAS	Traffic Alert and Collision Avoidance System
TCAS RA	Traffic Alert and Collision Avoidance System Resolution Advisory
TEM	Threat and Error Management
TIPH	Taxy into Position and Hold
TOF	Taxi-off (ATA Phase of Flight)
TOPM	Technical Operations Policy Manual
TXI	Taxi-in (ATA Phase of Flight)
TXO	Taxi-out (ATA Phase of Flight)
UK CAA	UK Civil Aviation Authority
UKFSC	UK Flight Safety Committee
V/S	Vertical Speed
VNAV	Vertical Navigation
WMO — AMDAR	The World Meteorological Organisation — Aircraft Meteorological Data Reporting Associations

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