Annual Safety Report

The objectives of the Regional Aviation Safety Group's Annual Safety Report are to gather safety information, analyse the main aviation safety risks in the Asia Pacific region and identify possible actions for enhancing aviation safety in a coordinated manner.

Acknowledgement to contributors: RASG-APAC thanks the members of the RASG-APAC Annual Safety Reporting and Programme Working Group that contributed to the elaboration of this 2018 RASG-APAC Annual Safety Report: ICAO, IATA, CAST

Contents

The objectives of this RASG-APAC Annual Safety Report are to gather safety information from various stakeholders, analyse the main aviation safety risks in the Asia Pacific region and identify possible actions for enhancing aviation safety in a coordinated manner.

Foreword

The establishment of the Regional Aviation Safety Group – Asia Pacific (RASG-APAC) was endorsed at the 47th DGCA conference as a focal point to ensure harmonisation and coordination of efforts aimed at reducing aviation safety risks for the Asia Pacific region.

1—Regional Aviation Safety Group: Asia Pacific (RASG-APAC) background

The establishment of the Regional Aviation Safety Group – Asia Pacific (RASG-APAC) was endorsed at the 47th DGCA conference as a focal point to ensure harmonisation and coordination of efforts aimed at reducing aviation safety risks for the Asia Pacific region.

RASG-APAC supports implementation of the ICAO Global Aviation Safety Plan (GASP) and the Global Aviation Safety Roadmap (GASR).

RASG-APAC membership includes representatives from the 41 States/ Administrations associated with the ICAO Asia Pacific regional office.

RASG-APAC has established the Asia Pacific Regional Aviation Safety Team (APRAST) to implement its work program. The objectives of the APRAST include recommending interventions to the RASG-APAC which will reduce aviation risks.

To do so, APRAST will:

- review, for application within the Asia Pacific region, existing safety interventions which have already been developed through the efforts of well-established, multi-national safety initiatives
- review, for application within the Asia Pacific region, the best practices and metrics defined in the GASP/GASR
- review regional accidents, significant incident trends and other areas of local concern to determine unique issues that may warrant locally developed interventions. The focus and priority for APRAST will be to introduce, support, and develop actions that have the potential to effectively and economically reduce regional aviation risks.

Supporting the work of the APRAST, are three working groups:

a. Asia Pacific – Accident Investigation Working Group (APAC–AIG);
b. Safety Reporting Program Working Group (SRP WG); and
c. Safety Enhancement Initiative Working Group (SEI WG).

Asia Pacific: Accident Investigation Working Group (APAC–AIG)

The APAC-AIG will review the Global Aviation Safety Plan/Roadmap (GASP/R) Global Safety initiative 3/Focus Area 3, 'Impediments to Reporting of Errors and Incidents', and GSI 4/Focus Area 4, 'Ineffective Incident and Accident Investigation' and propose the necessary recommendations to address these two focus areas.

The APAC-AIG will:

- review, for application within the Asia Pacific region, existing policies and procedures relating to accident investigation and the reporting of errors and incidents that have already been developed
- review, for application within the Asia Pacific region, the best practices and metrics defined in Global Safety Initiative/ Focus Areas 3 and 4 of the GASP/GASR
- review regional accidents and significant incident trends and other areas of local concern to determine unique issues that may warrant locally developed policies and procedures to effectively capture information for study and for the development of recommendations. The focus and priority for APRAST-AIG WG will be to introduce, support and develop actions that have the potential to effectively and economically reduce the regional aviation accident risk.

Safety Reporting Program Working Group (SRP WG)

The SRP WG will gather safety information from various sources to determine the main aviation safety risks in the Asia Pacific region. Key information to be included in the Annual Safety Report are:

1. reactive information
2. proactive information.

The Information Analysis Team (IAT), formed within the SRP WG, will analyse the available safety information to identify risk areas. Recommendations for safety enhancement initiatives will be made by the SRP WG to the RASG-APAC, through the APRAST, based on the identified risk areas.

Safety Enhancement Initiative Working Group

The SEI WG is to assist APRAST in the development, implementation and review of SEIs to reduce aviation risks.

The SEIs could be established based on the analysis of regional data, based on ICAO initiatives or the initiatives of other relevant organisations, regions or based on the risks and issues identified through the USOAP CMA process. The identified SEIs should be prioritised to ensure that those that have the greatest potential for reducing safety risk are examined first.

To accomplish the objectives, the SEI WG will:

1. Assist APRAST in the identification and development of SEIs, for application within the Asia and Pacific regions, which are aligned with the regional priorities and targets. The focus of these SEIs is to effectively and economically mitigate regional safety risks identified by the SRP-WG.
2. Assist APRAST in the provision of generic implementation guidance related to the SEIs to guide members through the SEI implementation process.

3 Assist APRAST in the identification of assistance programs such as, but not limited to, workshops and seminars to improve the level of implementation of developed SEIs, with the support of the secretariat.

4 Develop and conduct a process to review existing SEIs and provide recommendations to improve the effectiveness and level of implementation.

The organisational structure of the RASG-APAC and its subsidiary bodies is shown in Figure 1.1. The International Civil Aviation Organization (ICAO) Asia Pacific regional office in Bangkok provides the secretariat support necessary for the RASG-APAC to function.

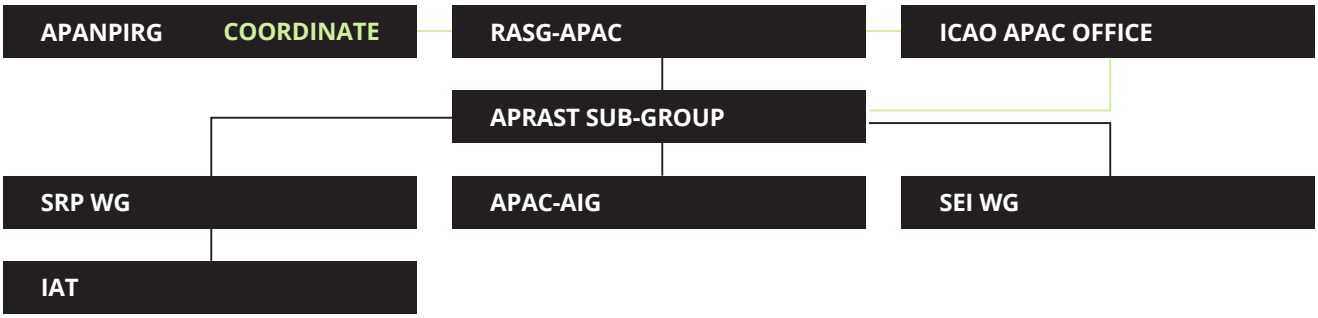
The 2018 Annual Safety Report, developed by the SRP WG and published by RASG-APAC, is the sixth edition of the exclusive safety report for the Asia Pacific region based on data provided by ICAO, CAST and IATA.

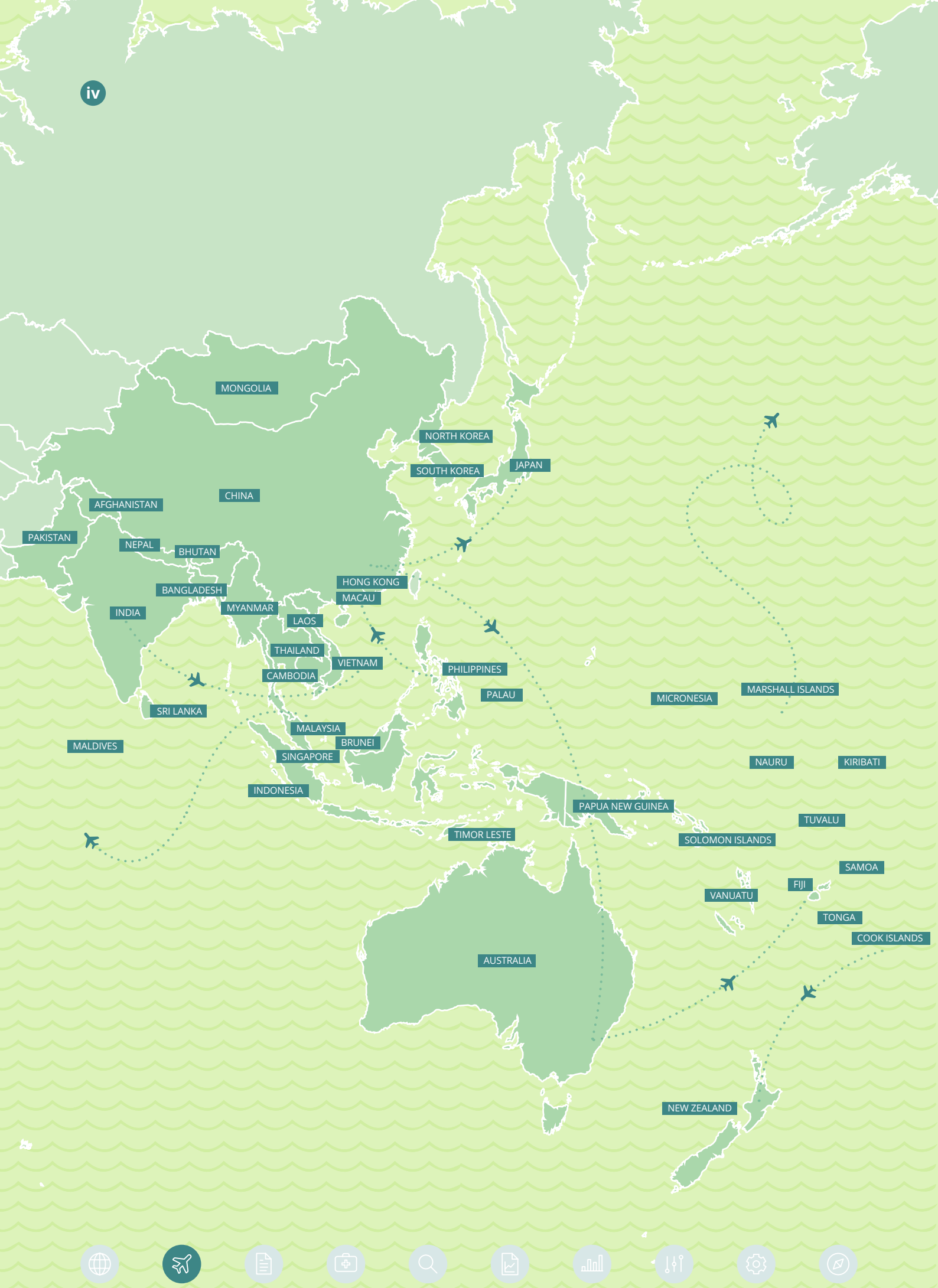
Analysis of this aviation safety data was completed with the in-kind contributions of aviation safety personnel from RASG-APAC member States/Administrations and industry partners. This report is envisioned to be an annual publication providing appropriately updated aviation safety information.

> Copies of this report can be downloaded from: **www.icao.bangkok.int**

> For clarification or additional information please email: **rasgapac@bangkok.icao.int**

FIGURE 1.1—RASG-APAC ORGANISATION




MONGOLIA
NORTH KOREA
SOUTH KOREA
JAPAN
CHINA
AFGHANISTAN
PAKISTAN
NEPAL
BHUTAN
BANGLADESH
INDIA
MYANMAR
HONG KONG
MACAU
LAOS
THAILAND
VIETNAM
CAMBODIA
PHILIPPINES
PALAU
MICRONESIA
MARSHALL ISLANDS
SRI LANKA
MALAYSIA
BRUNEI
SINGAPORE
MALDIVES
INDONESIA
NAURU
KIRIBATI
PAPUA NEW GUINEA
TUVALU
TIMOR LESTE
SOLOMON ISLANDS
SAMOA
FIJI
VANUATU
TONGA
COOK ISLANDS
AUSTRALIA
NEW ZEALAND

Introduction

The objectives of this RASG-APAC Annual Safety Report are to gather safety information from various stakeholders, analyse the main aviation safety risks in the Asia Pacific region and identify possible actions for enhancing aviation safety in a coordinated manner.

2—Introduction

The objectives of this RASG-APAC Annual Safety Report are to gather safety information from various stakeholders, analyse the main aviation safety risks in the Asia Pacific region and identify possible actions for enhancing aviation safety in a coordinated manner.

The safety information presented in this report is based on the compilation and analysis of data provided by ICAO, the International Air Transport Association (IATA) and the US Commercial Aviation Safety Team (CAST).

This sixth edition of the RASG-APAC Annual Safety Report focuses on reactive information relating to hull loss and fatal accidents (both on the ground and in flight) involving commercial aeroplanes operated by (or registered with) the member States/Administrations of the RASG-APAC i.e. States/Administrations associated with the ICAO Asia Pacific Regional Office.

It will also include proactive information for the Asia Pacific region based on USOAP Continuous Monitoring Approach (CMA).

In future, the Annual Safety Report will also include the compilation and analysis of predictive information so that effective mitigation measures can be developed and implemented to reduce/prevent accidents.

In this report the most frequent accident categories, in accordance with ICAO/IATA/CAST taxonomy, relating to fatality risks, as well as other significant emerging safety categories in the Asia Pacific region, are identified.

Figure 2.1—Countries associated with the ICAO Asia Pacific Regional Office (opposite page)

TABLE 2.1—MEMBER STATES ASSOCIATED WITH THE ICAO ASIA PACIFIC REGIONAL OFFICE

- Afghanistan
- Australia
- Bangladesh
- Bhutan
- Brunei Darussalam
- Cambodia
- China
- Hong Kong, China
- Macao, China
- Cook Islands
- Democratic People's Republic of Korea
- Fiji
- India
- Indonesia
- Japan
- Kiribati
- Lao People's Democratic Republic
- Malaysia
- Maldives
- Marshall Islands
- Micronesia
- Mongolia
- Myanmar
- Nauru
- Nepal
- New Zealand
- Pakistan
- Palau
- Papua New Guinea
- Philippines
- Republic of Korea
- Samoa
- Singapore
- Solomon Islands
- Sri Lanka
- Thailand
- Timor Leste
- Tuvalu
- Tonga
- Vanuatu
- Vietnam


EXTERNAL
POWER

Executive Summary

This edition of the RASG-APAC Annual Safety Report collates and presents the results of analysis carried out by members of the Information Analysis Team on aviation accidents in the Asia Pacific (APAC) region.

3—Executive summary

This edition of the RASG-APAC Annual Safety Report collates and presents the results of analysis carried out by members of the Information Analysis Team on aviation accidents in the Asia Pacific (APAC) region. The safety information was collected from ICAO, IATA and CAST.

Reactive information analysis

The number of accidents attributable to States/Administrations in the RASG-APAC region in 2017 was 19[1], up from 17 in 2016. In terms of fatalities, there was one fatal accident in 2017, down from two in 2016. The fatal accident resulted in two fatalities, down from 50 in 2016.

The higher number of accidents, partially offset by growing APAC's air traffic volume (from 10.05 to 10.9 million departures), led to the increase in RASG-APAC region's accident rate from 1.69 in 2016 to 1.74 accidents per million departures in 2017. This was slightly better than the global accident rate of 1.93 accidents per million departures in 2016. The RASG-APAC's five-year moving average accident rate of 2.24 per million departures remains lower than the global average rate of 2.64 per million departures.

The top two most frequent accident categories for RASG-APAC region in 2017 were:

1. runway safety which includes runway excursion, runway incursion, hard landings and tailstrikes on landing
2. ground collision.

The fatal accident recorded in 2017 was attributed to loss of control-inflight (LOC-I.)

Proactive information analysis

The RASG-APAC region had an overall USOAP Effective Implementation (EI) score of 61.96 per cent in 2018, up from 59.26 per cent in 2017. However, this result is lower than the global level of 66.05 per cent.

In terms of Critical Element (CE), the APAC region had lower EI scores for all categories compared to the global average. By CE, CE-4 on *Technical personnel qualifications and training* and CE-8 on *Resolution of safety concerns (CE-8)* had the lowest EI scores within RASG-APAC, at 47.82 and 50.59 per cent respectively. By area, Accident and Incident Investigation (AIG) and Aerodrome and Ground Aids (AGA) had the lowest EI scores of 47.79 per cent and 56.26 per cent respectively.

1 Two accidents involving an Eva Air Boeing 777 (registration no. B-16718) and Daily Air Viking Air DHC-6 (registration no. B-55571) are not included in the total accident count.

Safety Information

4—Safety information

Safety information is an important input for any safety management process. With adequate and accurate safety information, hazards can be identified through robust processing and critical analysis of this safety information. Identified hazards and their associated risk can then be prioritised and appropriate mitigation actions taken.

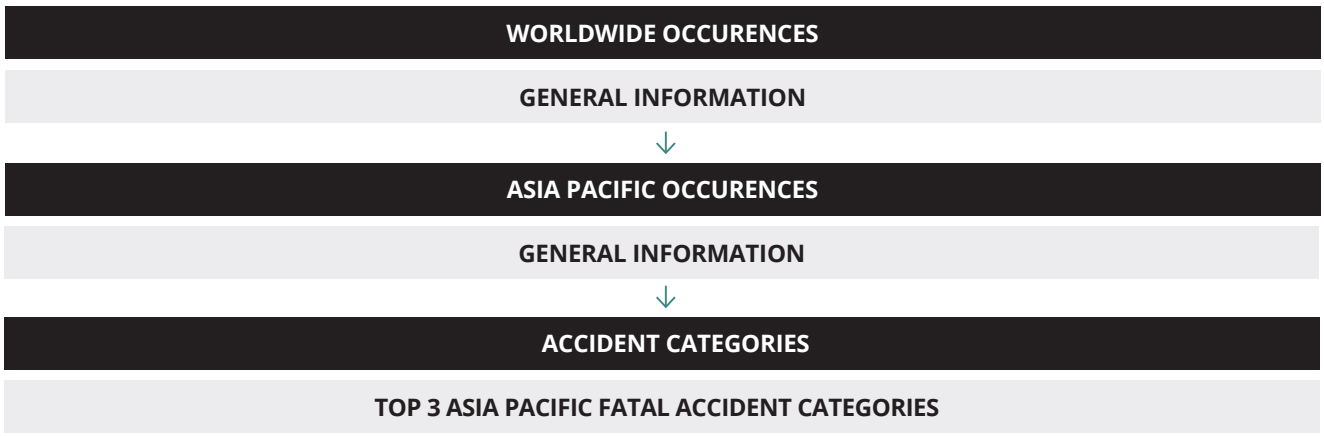
RASG-APAC can be viewed as a regional safety management process or a regional safety program (RSP) in the same way that a State Safety Program (SSP) is a national safety management process and a Safety Management System is a service provider's safety management program. Using safety information provided by ICAO, IATA and CAST helps the region to identify the areas of greater safety concerns and therefore be able to collectively focus on addressing these areas.

5—Approach for analysis

Our approach for the analysis is to process the accident information, provided by ICAO, IATA and CAST, involving commercial aircraft of MTOW greater than 5700 kg operated by (or registered with) the members States/ Administrations of RASG-APAC. All reported information is for aircraft involved in scheduled commercial activities which are either validated or under validation. The analysis initially focuses on accident rates from a global perspective, then on the APAC region and finally on the sub-regions of North Asia, South Asia, South-East Asia and the Pacific. The next step is to identify accident categories that are prevalent in the APAC region. The process is illustrated in Figure 5.1.

The grouping of States/Administrations into the four APAC sub-regions will firstly be based on their membership of the respective Cooperative Development of Operational Safety and Continuing Airworthiness Program (COSCAP) or, if there is no affiliated membership with any sub-regional body, on geographical association. The results of the analysis for each of the sub-regions can therefore be used by the various COSCAP or sub-regional groupings to identify work programs. Moreover, each of the COSCAPs will be able to aid in implementation and training in areas that are more relevant to their sub-regions.

FIGURE 5.1—APPROACH FOR ANALYSIS



Approach for Analysis

The grouping of the States/Administrations in the four RASG-APAC sub-regions is as follows:

North Asia (NA) region

States/Administrations that are members of COSCAP-NA:

- China
- Hong Kong, China
- Macao, China
- Democratic People's Republic of Korea
- Japan
- Mongolia
- Republic of Korea

Pacific region

States/Administrations that are members of the Pacific Aviation Safety Office (PASO):

- Australia
- Cook Islands
- Fiji
- Kiribati
- Marshall Islands
- Micronesia (Federated States of)
- Nauru
- New Zealand
- Palau
- Papua New Guinea
- Samoa
- Solomon Islands
- Tuvalu
- Tonga
- Vanuatu

South-East Asia (SEA) region

States/Administrations that are members of COSCAP-SEA:

- Brunei Darussalam
- Cambodia
- Indonesia
- Lao People's Democratic Republic
- Malaysia
- Myanmar
- Philippines
- Singapore
- Thailand
- Timor Leste
- Vietnam

South Asia (SA) region

States/Administrations that are members of COSCAP-SA:

- Afghanistan
- Bangladesh
- Bhutan
- India
- Maldives
- Nepal
- Pakistan
- Sri Lanka

6 Reporting culture and accidents in the Asia Pacific region

This report will not focus on any analysis of the reporting culture of the RASG-APAC region, but this may be included in future editions.

Reactive Safety Information

A reactive analysis method responds to events (such as incidents and accidents) that have already happened, and about which information has been collected.

7—Reactive safety information

As defined in the third edition of the ICAO Document 9859, a reactive hazard identification methodology responds to events (such as incidents and accidents) that have already happened, and about which information has been collected. In the context of this report, all the reactive safety information analysed relates to accidents involving aircraft operated by (or registered with) the member States/Administration within the RASG-APAC region.

The reactive safety information analysed in this report has been obtained from ICAO, IATA and CAST, and the organisation of this information will take these sources into account.

Please note:

1. ICAO's reactive safety information is derived from the iSTARS, which are essentially repositories of accident information supplied by member States' investigative bodies. The definition of 'accident' is based on ICAO Annex 13. For accidents recorded in 2016, only those incidents that are flagged as official information are used.

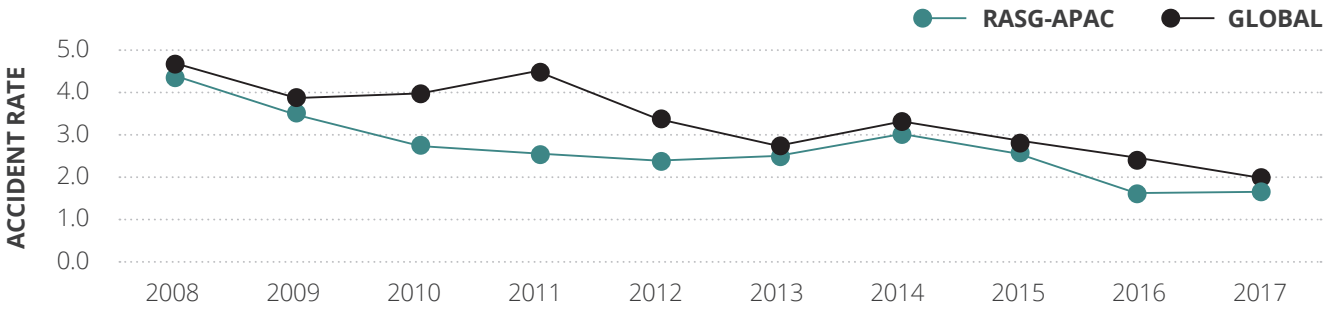
2. IATA's reactive safety information relates to accidents that result in hull loss, fatalities and substantial damage to aircraft.

7.1—Worldwide/regional accident Information: ICAO iSTARS

Global accident rates, APAC accident rates and the accident rates for the four RASG-APAC sub-regions were compiled and illustrated based on information extracted from the ICAO iSTARS database. All the information presented was extracted directly from iSTARS without manipulation and is dependent on accurate information being supplied by member States.

Accident Rate

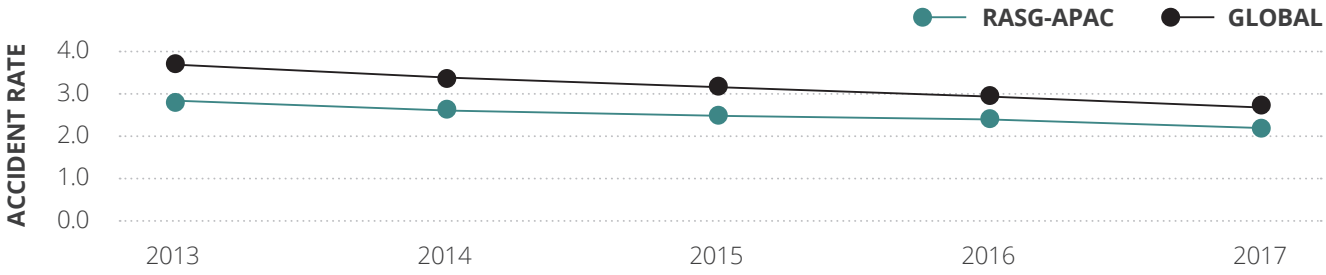
CHART 7.1.1—GLOBAL ACCIDENT RATE VERSUS APAC ACCIDENT RATE (2008–2017)



The accident rate for the RASG-APAC region was 1.74 per million departures in 2017, up from 1.69 per million departures in 2016. The higher accident rate was due to the increase in the number of accidents attributable to APAC member States/Administrations from 17 in 2016 to 19 in 2017, which was partially offset by the increase in APAC's air traffic volume from 10.05 million departures in 2016 to 10.9 million departures in 2017. It can be observed that the RASG-APAC's accident rate has generally been trending down over the past ten years except from 2012 to 2014 and has remained lower than the global accident rate for the same period.

Accident Rate

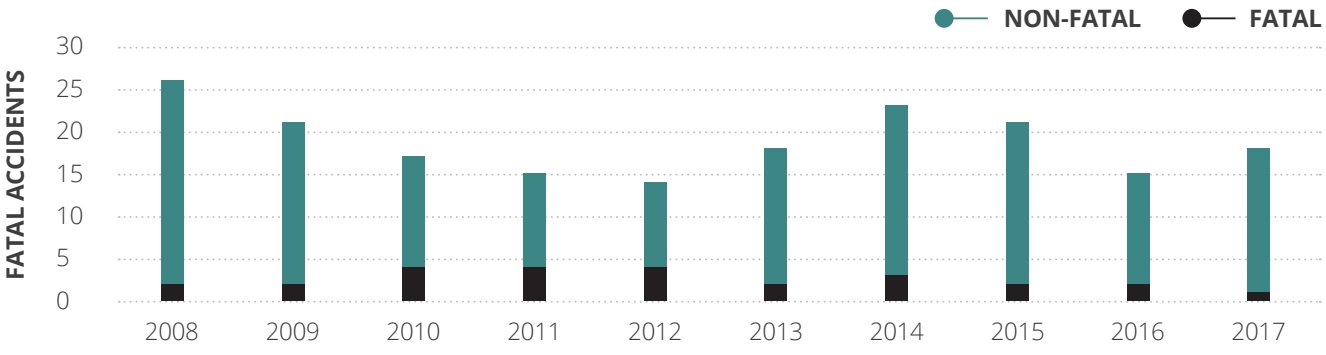
CHART 7.1.2—FIVE-YEAR SLIDING AVERAGE ACCIDENT RATE (2013-2017)



The RASG-APAC five-year sliding average accident rate decreased from 2.37 per million departures in 2016 to 2.24 per million departures in 2017.

Over the last five years, the global and RASG-APAC's sliding average accident rate has been trending down.

CHART 7.1.3—NUMBER OF ACCIDENTS: RASG-APAC (2008-2017)



There was one fatal accident attributable to RASG-APAC member States/Administrations in 2017, a decrease from two in 2016. The number of fatalities decreased from 50 in 2016 to 2 in 2017. The number of accidents attributable to RASG-APAC member States/Administrations in 2017 increased to 19 from 17 in 2016.

Accident Rate

CHART 7.1.4 ACCIDENT RATES WITHIN APAC (BY SUB REGIONS) 2008-2017

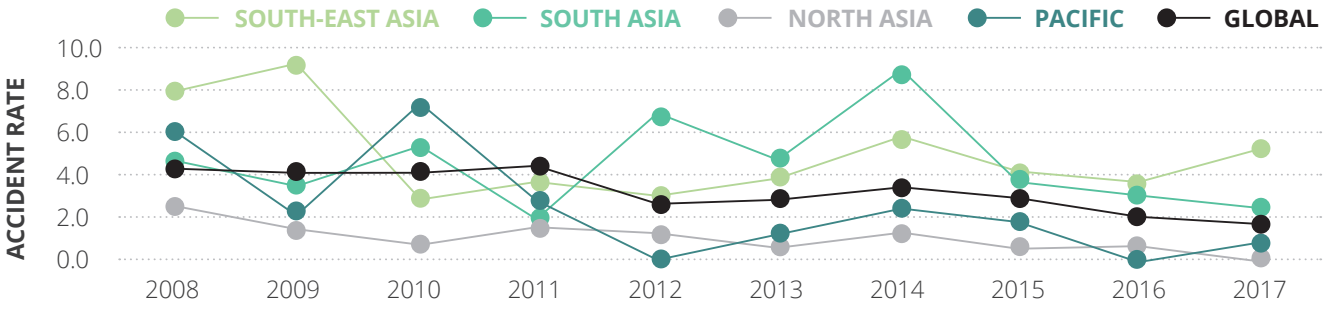


Chart 7.1.4 provides an illustration of the accident rates within APAC by sub-region. In line with the global trend, all the sub-regional accident rates have generally trended down since 2014. The SA sub-region has seen a decrease in its accident rates by more than three times from 8.66 per million departures in 2014 to 2.22 per million departures in 2017. From the chart, the accident rates for the South-East Asia (SEA) and South Asia (SA) sub-regions have consistently been above global average rates while North Asia (NA) and the Pacific sub-region have remained below the global average rate.

Accident Rate

CHART 7.1.5—NUMBER OF ACCIDENTS WITHIN APAC (BY SUB-REGIONS), 2008-2017

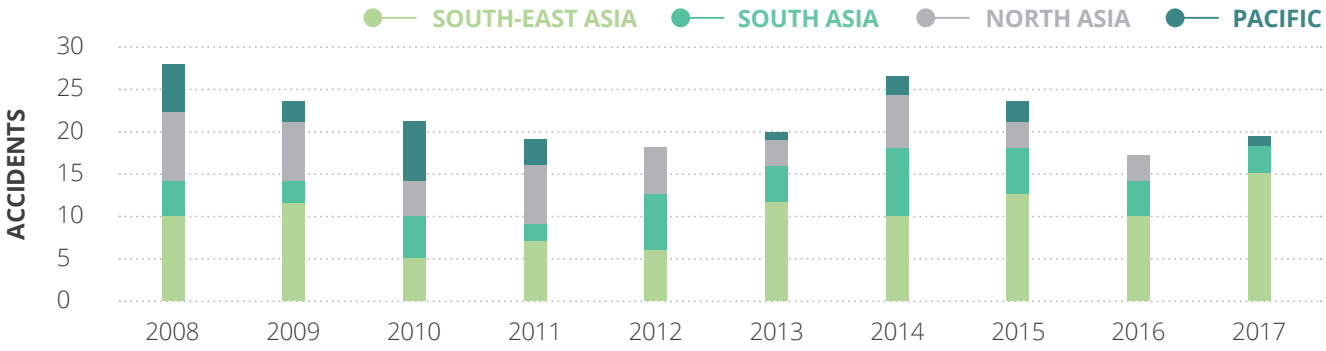
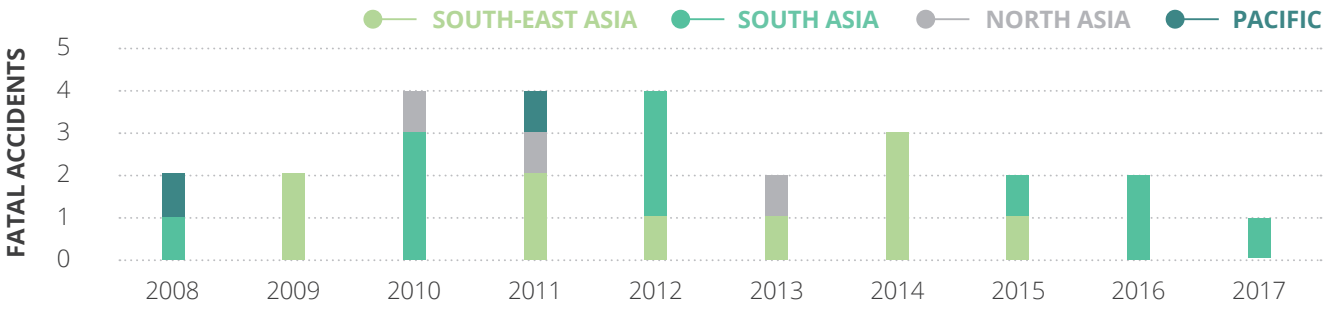


CHART 7.1.6—NUMBER OF FATAL ACCIDENTS WITHIN APAC (BY SUB-REGIONS), 2008-2017



The distribution of the accidents shown in Chart 7.1.5 indicates that the SEA sub-region had the highest number of accidents (100) over the last ten years. In terms of fatal accidents, Chart 7.1.6 shows that the SA sub-region recorded the highest number (11) over the same period.

In 2017, the SEA sub-region accounted for around 79 per cent of the total number of accidents in the APAC region. This was followed by the SA (15 per cent) and Pacific (5 per cent) sub-regions. The one fatal accident in 2017, which resulted in two fatalities, was attributed to the SA sub-region.

Accident Rate

7.2 Worldwide/regional accident information: IATA

This segment contains statistics on accidents classified by the Accident Classification Task Force (ACTF). It utilises the same definitions contained in the IATA Annual Safety Report. All regional rates are based on the operator's state of registry and are always based on per million sectors (flights).

The term 'all accident rate' refers to all accidents (hull loss and substantial damage) for the type of analysis being performed. For example, 'all accident rate' in the general context means all accidents, of all aircraft types that meet the ACTF criteria (commercial operation, jet or turboprop and MTOW > 5700 kg) of all accident categories. Another example is 'all accident rate' in the context of jet/hard landings.

This means all jet accidents (hull loss and substantial damage) that had a hard landing.

Only accidents of the following categories form part of the database:

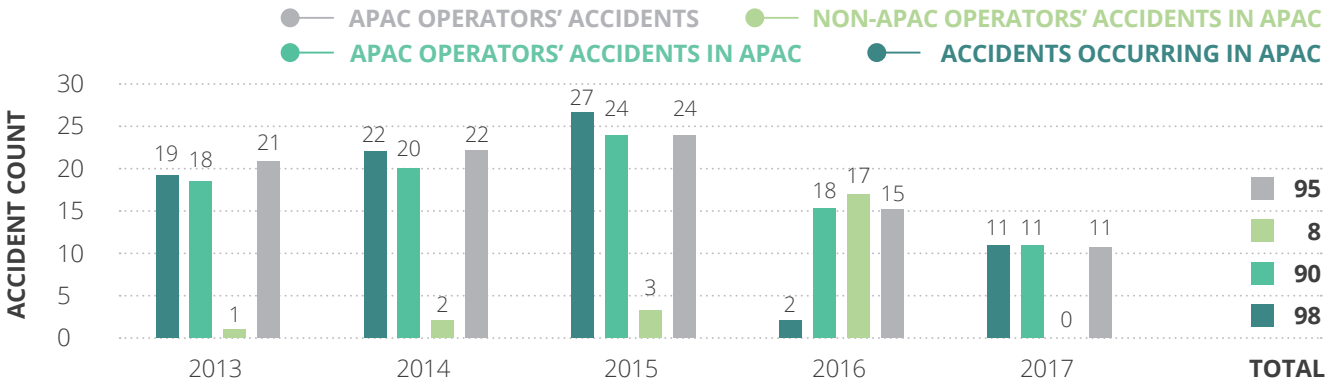
- controlled flight into terrain (CFIT)
- gear-up landing/gear collapse ground damage
- hard landing
- in-flight damage
- loss of control-inflight
- mid-air collision
- off airport landing/ditching
- other end state
- runway/ taxiway excursion
- runway collision
- tailstrike
- undershoot.

Note: IATA defines 'sector' as the operation of an aircraft between take-off at one location and landing at another location (other than a diversion)

Note: IATA's North Asia (NASIA) and Asia Pacific (ASPAC) regions are equivalent to ICAO's APAC region.

Accident Rate

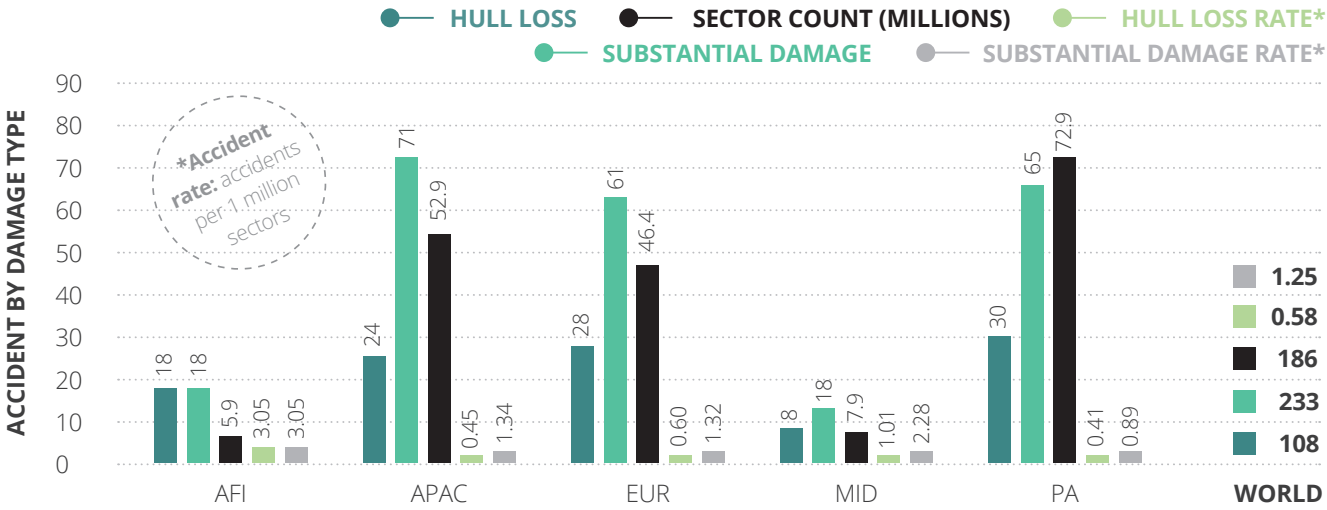
CHART 7.2.1—ACCIDENT COUNT FROM 2013–2017 (OCCURRENCE VS OPERATOR REGION)



The number of accidents attributable to APAC operators decreased from 15 in 2016 to 11 in 2017. The number of accidents that occurred in the APAC region (which include non-APAC operators) also dipped from 17 in 2016 to 11 in 2017. This was the lowest recorded over the past five years.

Accident Rate

CHART 7.2.2—ACCIDENT TYPE FROM 2013–2017

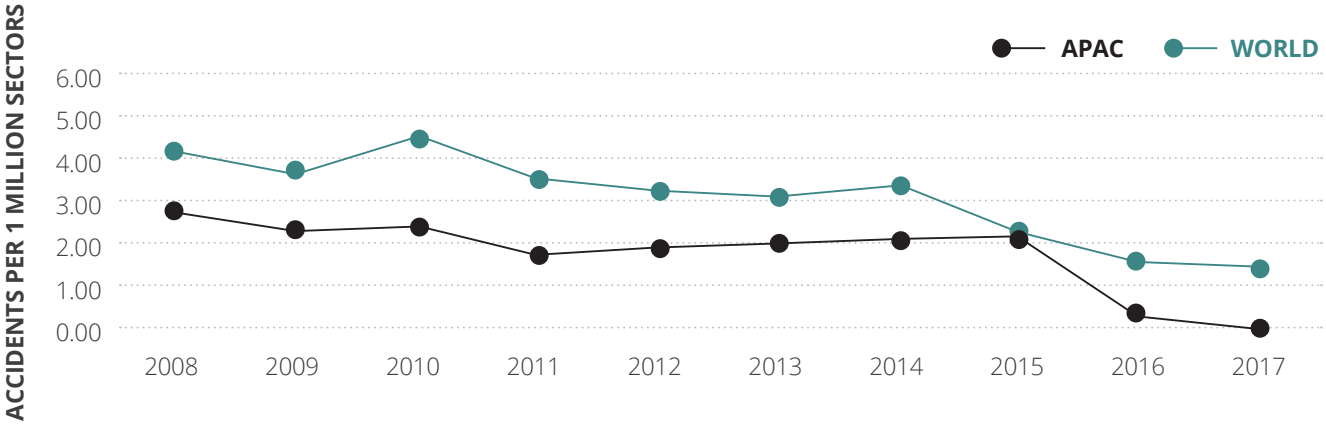


In terms of hull losses, the APAC region performed better than the global average with a five-year average rate of 0.45 per million sectors.

However, in terms of substantial damage, the APAC region's five-year average rate of 1.34 per million sectors was higher than the global average.

Accident Rate

CHART 7.2.3—APAC REGION'S ACCIDENT RATE (2008 TO 2017)



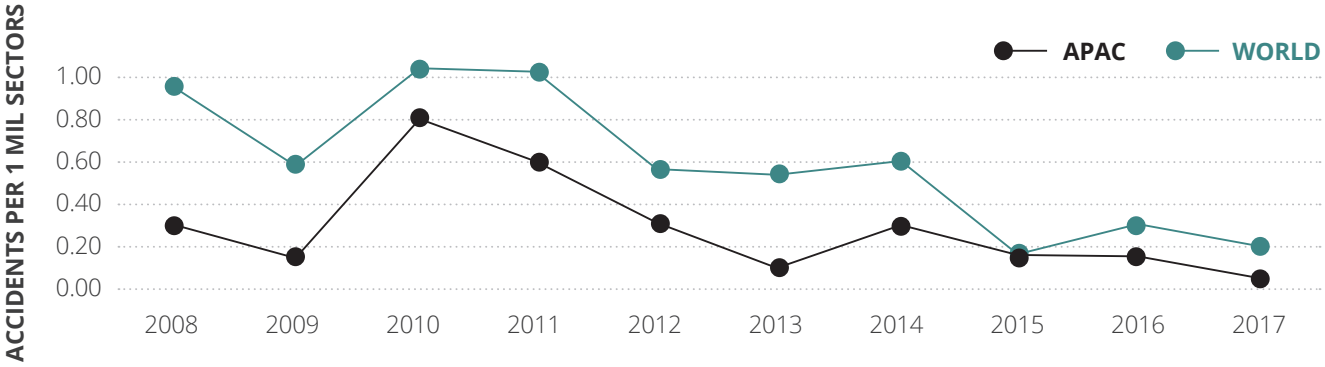
The APAC regions accident rate dropped from 1.23 per million sectors in 2016 to 0.89 per million sectors in 2017.

Over the last ten years, the APAC region's annual accident rate has been primarily lower than the global rate.

This is particularly noticeable since 2015.

Accident Rate

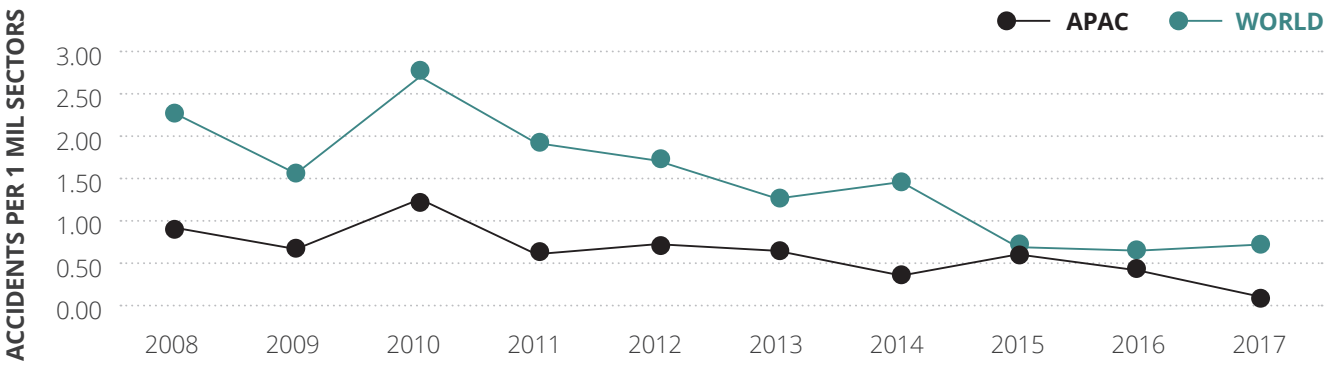
CHART 7.2.4—FATALITIES (2008 TO 2017)



There was one fatal accident in the APAC region in 2017, which resulted in two fatalities. Like historical results, the APAC's fatal accident risk of 0.08 per million sectors in 2017 was lower than the global rate of 0.25 per million sectors.

Accident Rate

CHART 7.2.5—HULL LOSSES (2008 TO 2017)



Over the last ten years, the APAC region's annual hull loss rate has been mainly lower than the global rate. The APAC's accident rate resulting in hull losses dropped from 0.33 per million sectors in 2016 to 0.28 per million sectors in 2017.

Accident Rate

High-risk accident categories

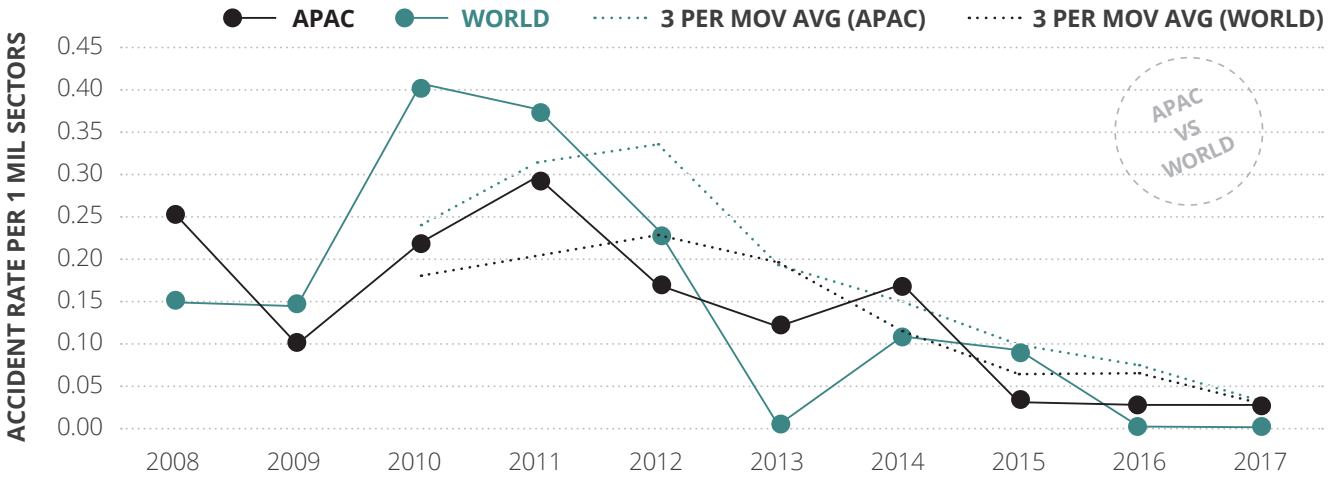
Controlled flight into terrain (CFIT), loss of control-inflight (LOC-I) and runway/taxiway excursion have been identified by IATA as the top three accident categories globally. Charts 7.2.6, 7.2.7 and 7.2.8 show the performance of each of these categories in the APAC region for the last ten years. Some of key findings linked with the APAC region for these categories include:

1. There were no accidents attributable to CFIT in 2017.

2. Accidents attributable to LOC-I recorded a decrease in 2017 compared to 2016. The rate of occurrence in 2017 was 0.08 accidents per million sectors, down from 0.25 accidents per million sectors in 2016.

3. Runway/taxiway excursions recorded an increase in 2017 compared to 2016. In 2017, there were 0.40 accidents per million sectors, up from 0.18 accidents per million sectors in 2016.

CHART 7.2.6 — ANNUAL CONTROLLED FLIGHT INTO TERRAIN (CFIT) ACCIDENT RATE



Accident Rate

CHART 7.2.7—ANNUAL LOSS OF CONTROL-INFLIGHT ACCIDENT RATE

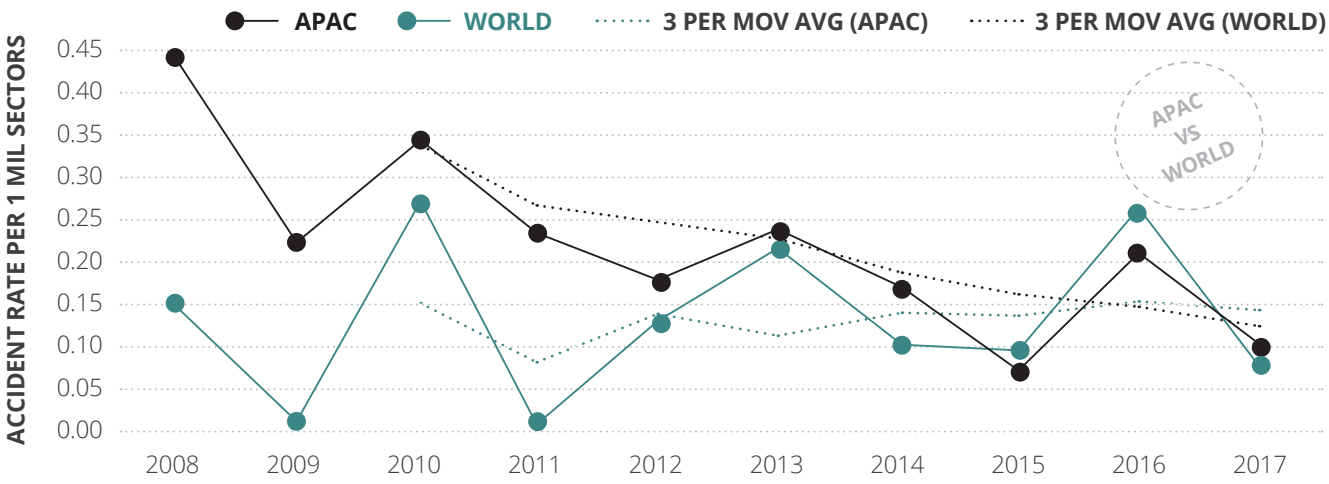
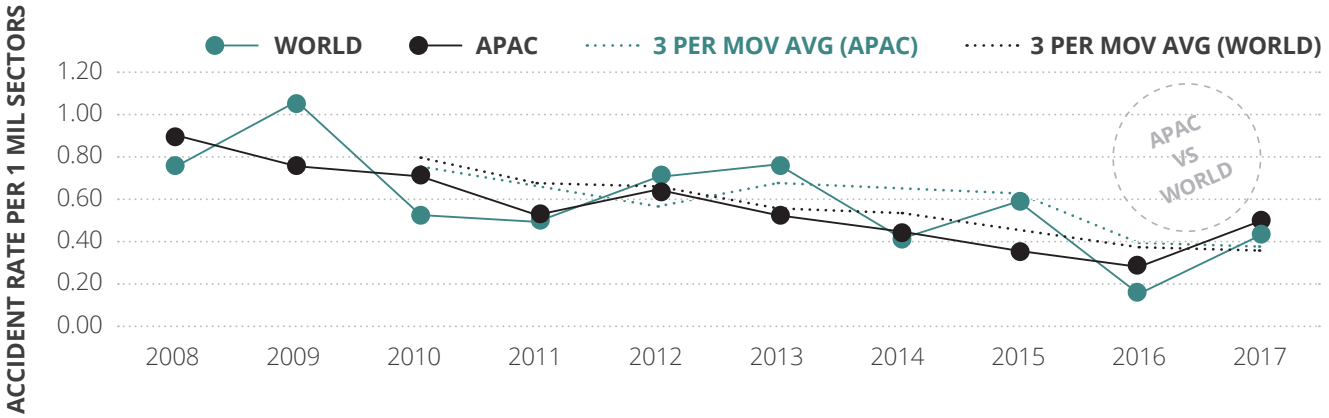


CHART 7.2.8—ANNUAL RUNWAY/TAXIWAY EXCURSION ACCIDENT RATE



Accident Rate

7.3—Asia Pacific Accident Information: CAST

CAST was founded in 1998 and has developed an integrated, data-driven strategy to reduce commercial aviation fatality risk in the United States and to work with airlines and international aviation organisations to reduce the worldwide commercial aviation fatal accident rate. CAST has representatives from the following government organisations, industry associations, and aerospace companies:

Government:

- Federal Aviation Administration
- National Aeronautics and Space Administration
- U.S. Department of Defence
- European Joint Aviation Authorities
- International Civil Aviation Organization

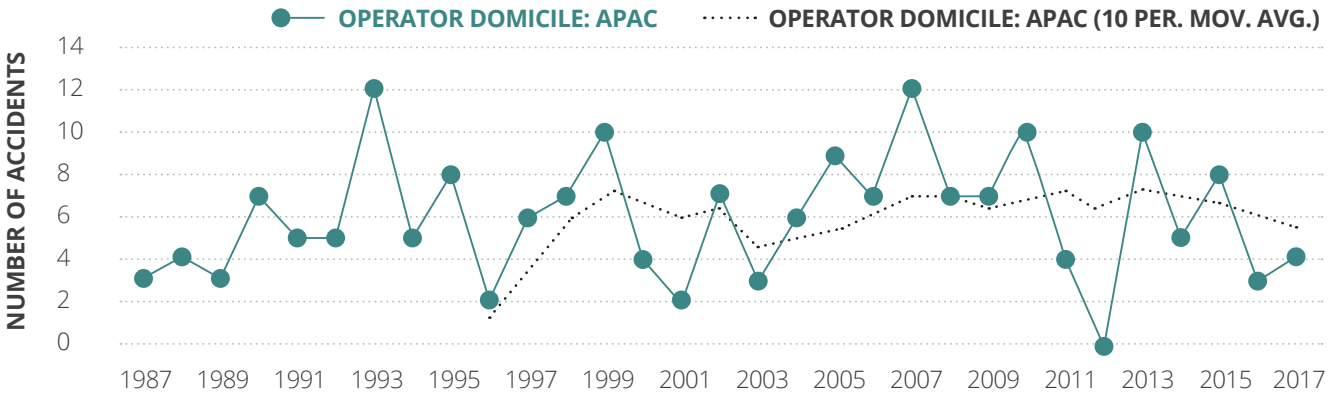
Industry:

- Aerospace Industries Association
- Airbus Industrie
- Air Line Pilots Association
- Allied Pilots Association
- Air Transport Association
- The Boeing Company
- Flight Safety Foundation
- International Air Transport Association
- Pratt & Whitney (also representing General Electric and Rolls Royce)
- Regional Airline Association

Accident Rate

WESTERN BUILT AEROPLANES: Part 121 equivalent operations

CHART 7.3.1—NUMBER OF HULL LOSS OR FATAL ACCIDENTS FOR OPERATORS BASED IN APAC



Note: Western-built aeroplanes, Part 121 equivalent operations

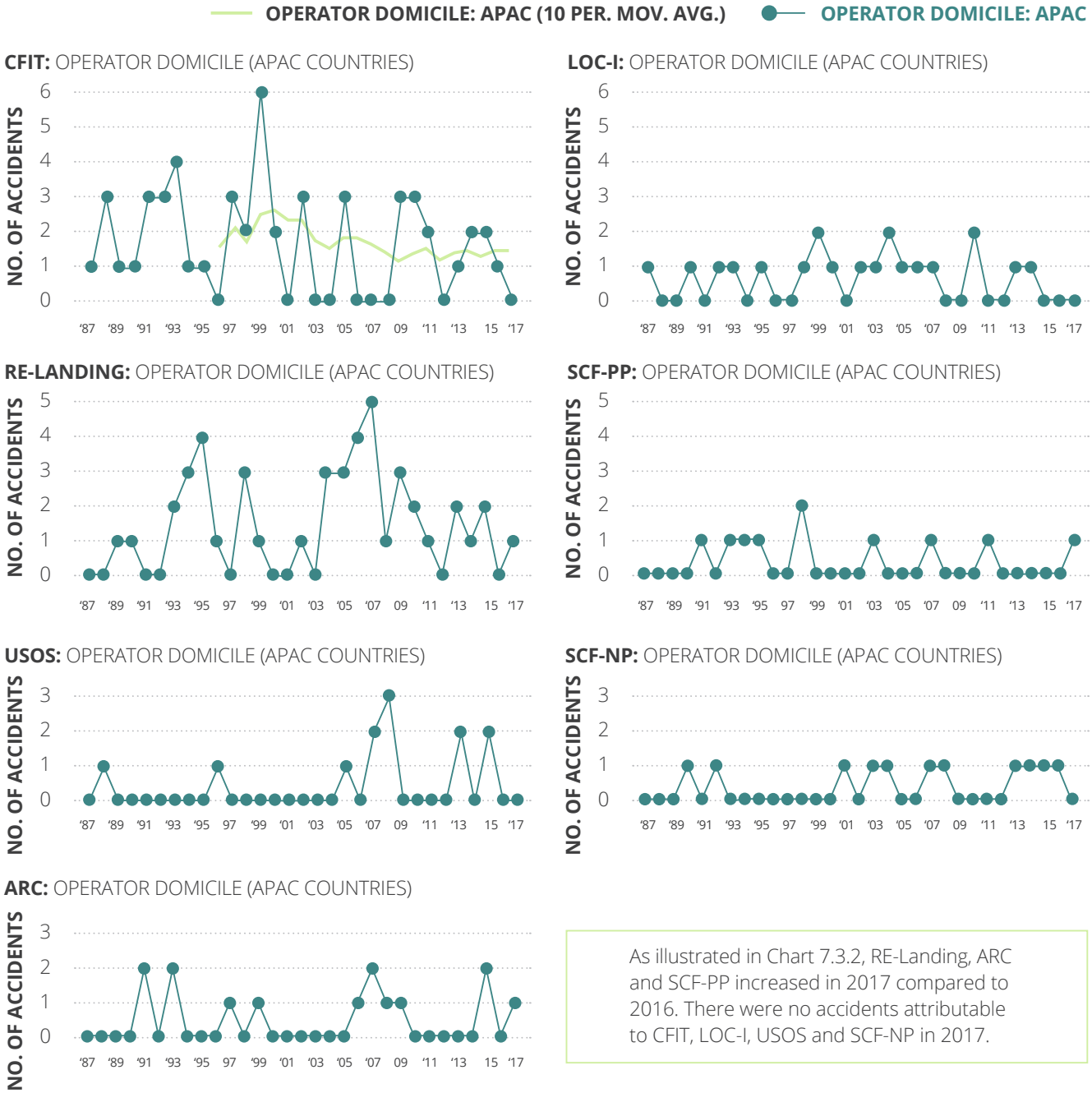
Chart 7.3.1 shows the number of accidents involving Western-built aeroplanes flown by operators based in APAC countries which resulted in hull loss or fatalities from 1987 to 2017.

The number of accidents increased slightly from three in 2016 to four in 2017. While the accident numbers fluctuate considerably on an annual basis, the ten-year moving average has been relatively stable, hovering around six accidents, since 2007.

Accident Rate

WESTERN BUILT AEROPLANES: Part 121 equivalent operations

CHART 7.3.2—BREAKDOWN OF ACCIDENT CATEGORIES FOR OPERATORS BASED IN APAC



As illustrated in Chart 7.3.2, RE-Landing, ARC and SCF-PP increased in 2017 compared to 2016. There were no accidents attributable to CFIT, LOC-I, USOS and SCF-NP in 2017.

Accident Categories

7.4—Most frequent accident categories within Asia Pacific: ICAO iSTARS

Table 7.4.1 illustrates the distribution of various accident categories from Excluding the UNK category, RS, CFIT, LOC-I were the top three fatal accident categories in the APAC region.

These three categories accounted for around 62 per cent of the total number of fatal accidents in the APAC region.

One fatal accident was recorded in the APAC region in 2017. The accident involved an Aircraft Industries L-410 aircraft that was classified as a runway safety (RS) accident.

Although RS, CFIT and LOC-I accounted for about 62 per cent of fatal accidents in the APAC region, most of them occurred in the first half of the ten-year period, with only three occurring in the last five years. Notably, there were no fatal accidents attributed to LOC-I and CFIT in 2017. There were also no fatal accidents attributed to CFIT over the past five years.

TABLE 7.4.1—APAC FATAL ACCIDENT CATEGORIES (2008–2017)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	TOTAL
CFIT	1	1	3	0	2	0	0	0	0	0	**7**
LOC-I	0	0	0	0	0	1	1	0	1	0	**3**
RS	1	1	1	0	0	1	0	1	0	1	**6**
SCF	0	0	0	0	1	0	0	0	1	0	**2**
OTH	0	0	0	1	0	0	1	0	0	0	**2**
UNK	0	0	0	2	1	0	1	0	0	0	**4**
F-NI	0	0	0	1	0	0	0	0	0	0	**1**
TURB	0	0	0	0	0	0	0	1	0	0	**1**
TOTAL	**2**	**2**	**4**	**4**	**4**	**2**	**3**	**2**	**2**	**1**	**26**

Frequent Accident Categories

TABLE 7.4.2—APAC SUB-REGIONS TOP THREE FATAL ACCIDENT CATEGORIES (2008–2017)

		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	TOTAL
PACIFIC REGION	CFIT	1	0	0	0	0	0	0	0	0	0	**1**
	LOC-I	0	0	0	0	0	0	0	0	0	0	**0**
	RS	0	0	0	0	0	0	0	0	0	0	**0**
	TOTAL	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**
NORTH ASIA REGION	CFIT	0	0	1	0	0	0	0	0	0	0	**1**
	LOC-I	0	0	0	0	0	0	0	0	0	0	**0**
	RS	0	0	0	0	0	1	0	0	0	0	**1**
	TOTAL	**0**	**0**	**1**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**2**
SOUTH ASIA REGION	CFIT	0	0	2	0	1	0	0	0	0	0	**3**
	LOC-I	0	0	0	0	0	0	0	0	1	0	**1**
	RS	1	0	1	0	0	0	0	0	0	1	**3**
	TOTAL	**1**	**0**	**3**	**0**	**1**	**0**	**0**	**0**	**1**	**1**	**7**
SOUTH EAST ASIA REGION	CFIT	0	1	0	0	1	0	0	0	0	0	**2**
	LOC-I	0	0	0	0	0	1	1	0	0	0	**2**
	RS	0	1	0	0	0	0	0	0	0	0	**1**
	TOTAL	**0**	**2**	**0**	**0**	**1**	**1**	**1**	**0**	**0**	**0**	**5**

Table 7.4.2 shows the breakdown of top three fatal accident categories by APAC sub-regions. The SEA sub-region recorded the most LOC-I fatal accidents (two) over the last ten years while the SA sub-region recorded the most CFIT fatal accidents (three). The SA sub-region recorded the most runway safety-related fatal accidents (three) over the same timeframe.

Frequent Accident Categories

TABLE 7.4.3—APAC ACCIDENT CATEGORIES (2015-2017)

CFIT	0	0	1	**1**
LOC-I	0	1	0	**1**
RS	10	7	12	**29**
SCF	2	4	0	**6**
OTH	4	3	7	**14**
UNK	2	0	0	**2**
F-NI	1	0	0	**1**
TURB	4	2	0	**6**
TOTAL	**23**	**17**	**20**	**60**
	2015	2016	2017	**TOTAL**

The top three accident categories for the APAC region in 2017 were:

1. runway safety (RS);
2. ramp which was classified under others (OTH);
3. ground collision.

Runway safety related accidents, which includes runway incursions/ excursions, tailstrikes and hard landings, was the most frequently occurring accident category in the APAC region over the last three years (2015–2017), as indicated in Table 7.4.3. This was followed by the OTH accident category which recorded 14 occurrences.

This was followed by the SCF and TURB categories which both recorded six accidents in the same timeframe.

Given the high number of occurrences in the OTH category, which includes ground collision and ramp incidents, RASG-APAC may potentially place additional focus on them in the future.

Frequent Accident Categories

TABLE 7.4.4—APAC SUB-REGION ACCIDENT CATEGORIES (RS, LOC-I, CFIT) (2015–2017)

		2015	2016	2017	TOTAL
PACIFIC REGION	CFIT	0	0	0	**0**
	LOC-I	0	0	0	**0**
	RS	0	0	1	**1**
	TOTAL	**0**	**0**	**1**	**1**
NORTH ASIA REGION	CFIT	0	0	0	**0**
	LOC-I	0	0	0	**0**
	RS	3	1	1	**5**
	TOTAL	**3**	**1**	**1**	**5**
SOUTH ASIA REGION	CFIT	0	0	0	**0**
	LOC-I	0	1	0	**1**
	RS	1	1	1	**3**
	TOTAL	**1**	**2**	**1**	**4**
SOUTH EAST ASIA REGION	CFIT	0	0	1	**1**
	LOC-I	0	0	0	**0**
	RS	6	5	9	**20**
	TOTAL	**6**	**5**	**10**	**21**

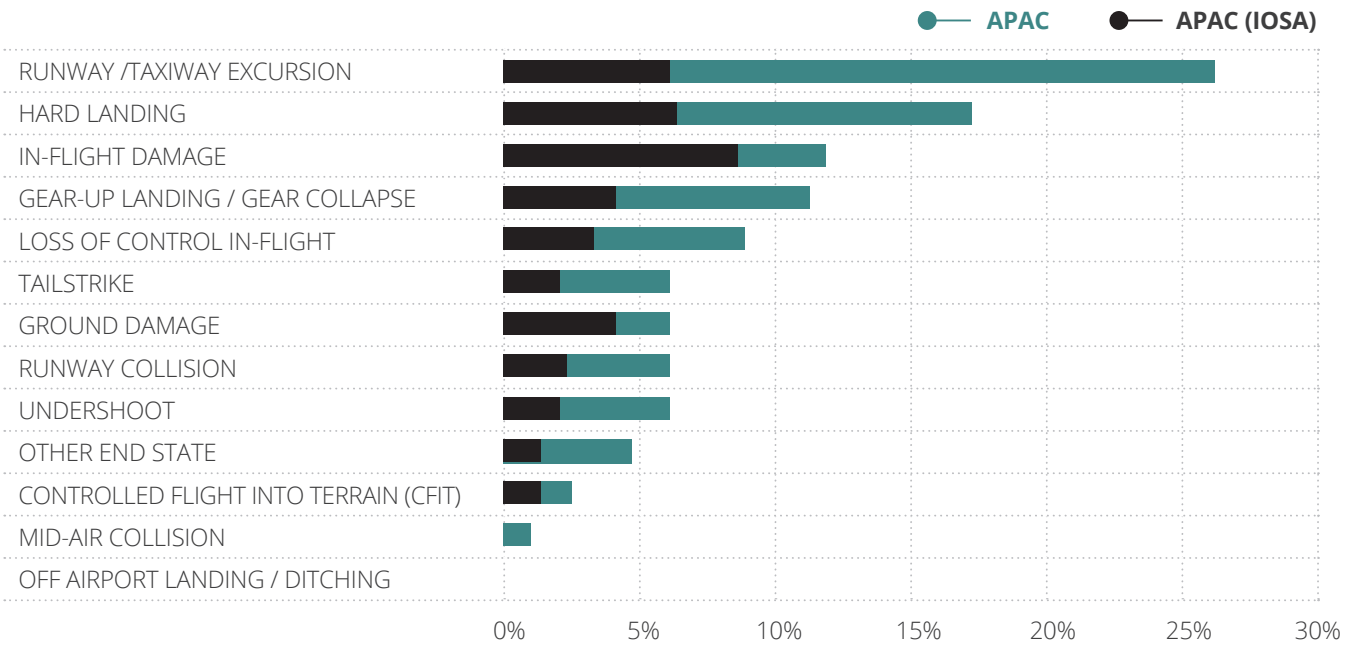
Table 7.4.4 shows that the SEA sub-region had the highest number of accidents related to RS between the 2015–2017 timeframe. All but one of the accidents recorded in 2017 were associated with runway safety events. RS was also the top accident category for the SA, NA and Pacific sub-regions.

Frequent Accident Categories

7.5—Most frequent accident categories within Asia Pacific: IATA

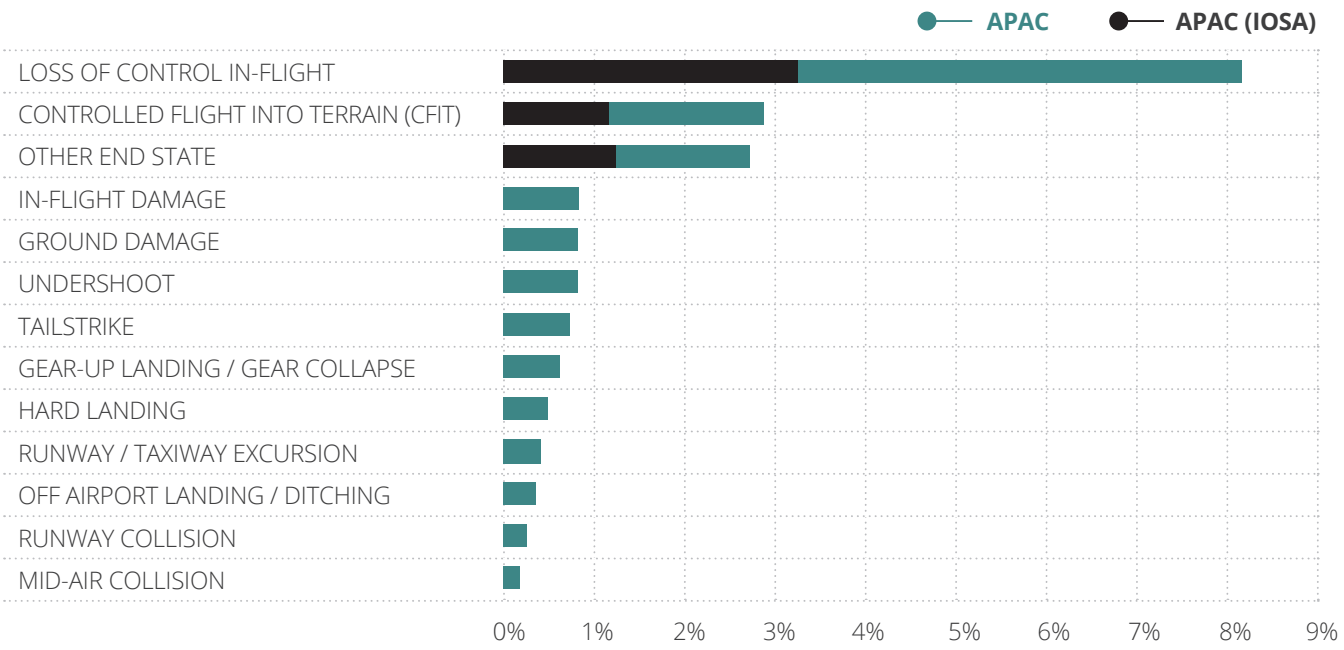
As illustrated in Chart 7.5.1 and Chart 7.5.2, over the last five years (from 2013–2017), runway/taxiway excursion, hard landing and in-flight damage were amongst the top three accident categories in the APAC region. For fatal accidents, the top three categories over the same timeframe were LOC-I, CFIT and other end-state respectively.

CHART 7.5.1—APAC ACCIDENT CATEGORY DISTRIBUTION (2013–2017)



Accident Category Distribution

CHART 7.5.2—APAC FATAL ACCIDENT CATEGORY DISTRIBUTION (2013–2017)



Accident Category Distribution

CHART 7.5.3—APAC ACCIDENTS BY FLIGHT PHASE (2013–2017)

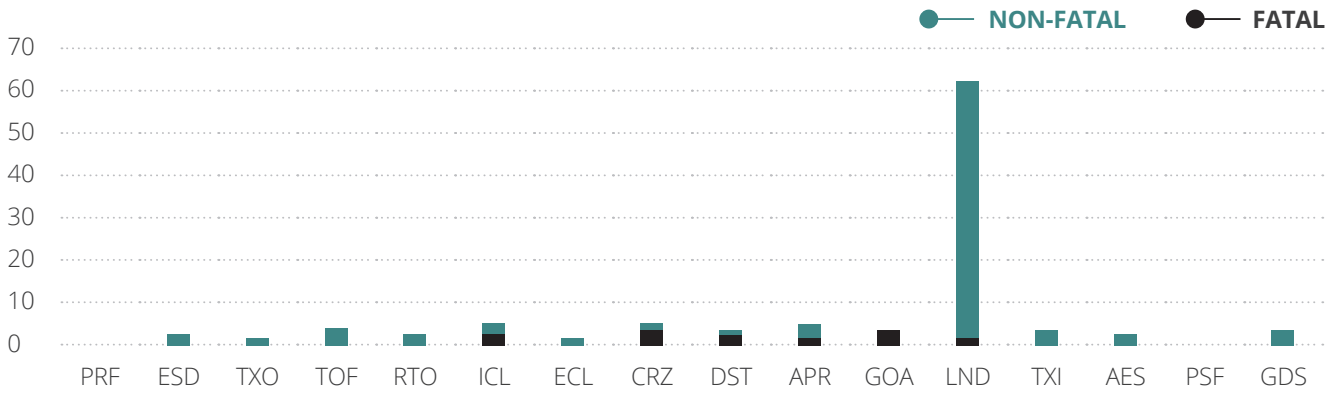


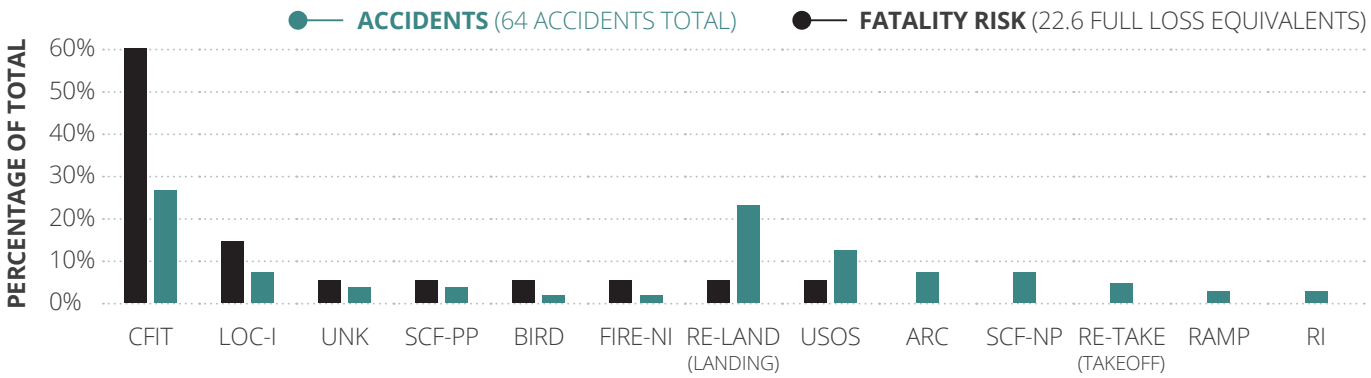
Chart 7.5.3 provides a depiction of accidents in the APAC region by phase of flight (2013–2017). The data clearly indicates that most accidents occurred during the landing phase of flight over the five-year period. In terms of fatal accidents, most were linked to the cruise, descent and initial climb phases.

Accident Category Distribution

7.6 Most frequent accident categories within Asia Pacific: CAST

As shown in Chart 7.6.1, the data provided by CAST identified CFIT, LOC-I and SCF-PP as the three most common accident categories resulting in hull loss or fatalities within the APAC region for the period between 2008 and 2017. In terms of frequency, CFIT and RE-Landing continue to be the most frequent accident categories while USOS (undershoot/overshoot) was the third most common.

CHART 7.6.1 ACCIDENTS CATEGORIES BY PERCENTAGE OF REGION TOTAL (2008–2017)



Proactive Safety Information

8—Proactive safety information

Proactive safety information is gathered through analysis of existing or real-time situations, a primary function of the safety assurance team with its audits, evaluations, employee reporting, and associated analysis and assessment processes. These involve actively seeking hazards in the existing processes (ICAO Doc 9859). This information can be obtained from several sources, but this report focuses on the ICAO universal safety oversight audit program continuous monitoring approach (USOAP CMA).

8.1—ICAO universal oversight audit program continuous monitoring approach (USOAP CMA)

USOAP audits focus on a State's capability to provide safety oversight by assessing whether it has effectively and consistently implemented the critical elements (CE) of a safety oversight system.

It also determines the State's level of implementation of ICAO's safety-related standards and recommended practices (SARPs), associated procedures and guidance material.

Eight critical elements are evaluated:

1. primary aviation legislation
2. specific operating regulations
3. state civil aviation system and safety oversight functions
4. technical personnel qualifications and training
5. technical guidance, tools and the provision of safety-critical information
6. licensing, certification, authorisation and approval obligations
7. surveillance obligations
8. resolution of safety concerns.

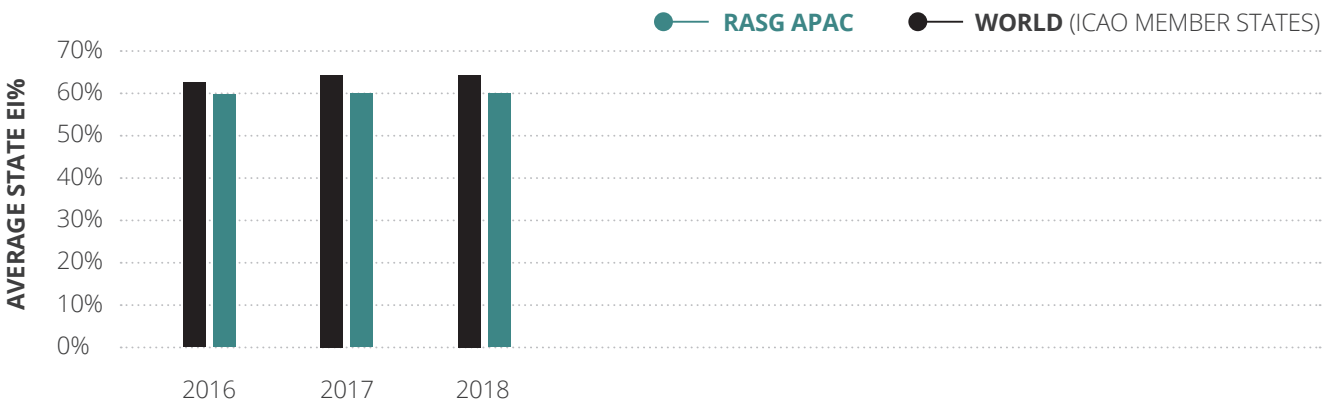
The USOAP CMA program was launched in January 2013. Comprehensive information relating to USOAP CMA is available on the USOAP CMA online framework at **www.icao.int/usoap**

Proactive Safety Information

The overall effective implementation (EI) for the RASG-APAC region (as on 4 June 2018) was 61.96 per cent (as shown in Chart 8.1.1).

The EI score has been stable for the past few years and reasonably below the global level which was 66.05 per cent in 2018.

CHART 8.1.1—RASG-APAC OVERALL IMPLEMENTATION



Proactive Safety Information

CHART 8.1.2—OVERALL EI FOR RASG-APAC STATES

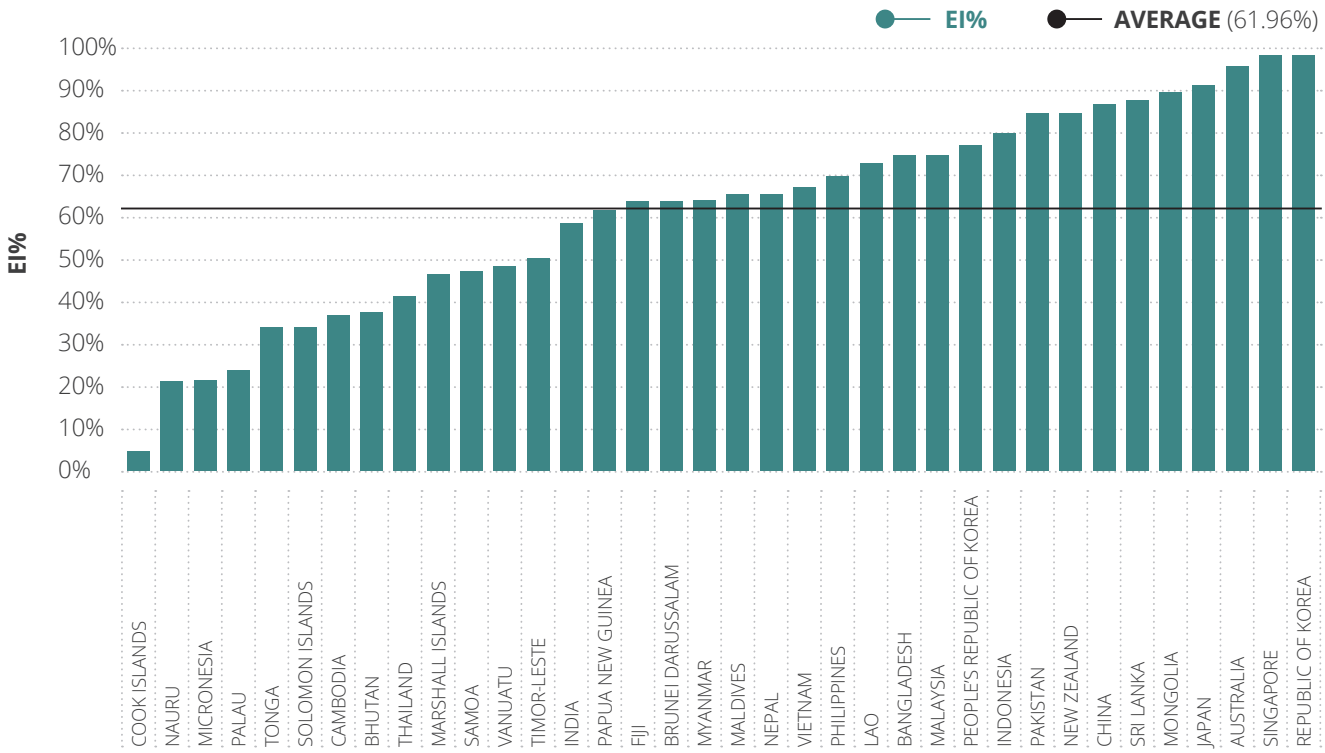
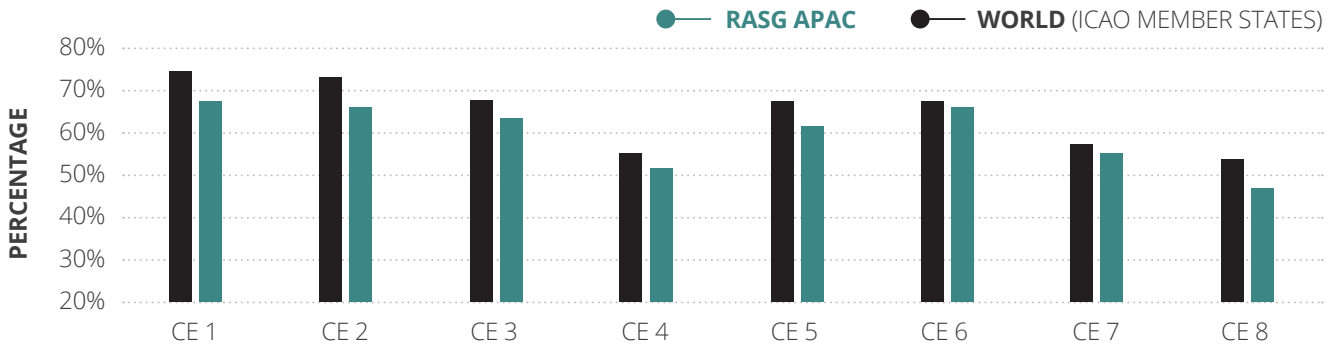


Chart 8.1.2 illustrates the overall EI by State. It should be noted that any changes or improvements to a State's EI can only be reflected after one of the following is conducted:

1. comprehensive systems approach (CSA) audit
2. ICAO coordinated validated mission
3. integrated validated mission
4. off-site monitoring activity
5. off-site safety system concern (SSC) protocol questions management activity.

Proactive Safety Information

CHART 8.1.3—OVERALL EI BY CRITICAL ELEMENT RASG-APAC STATES VS. ICAO MEMBER STATES

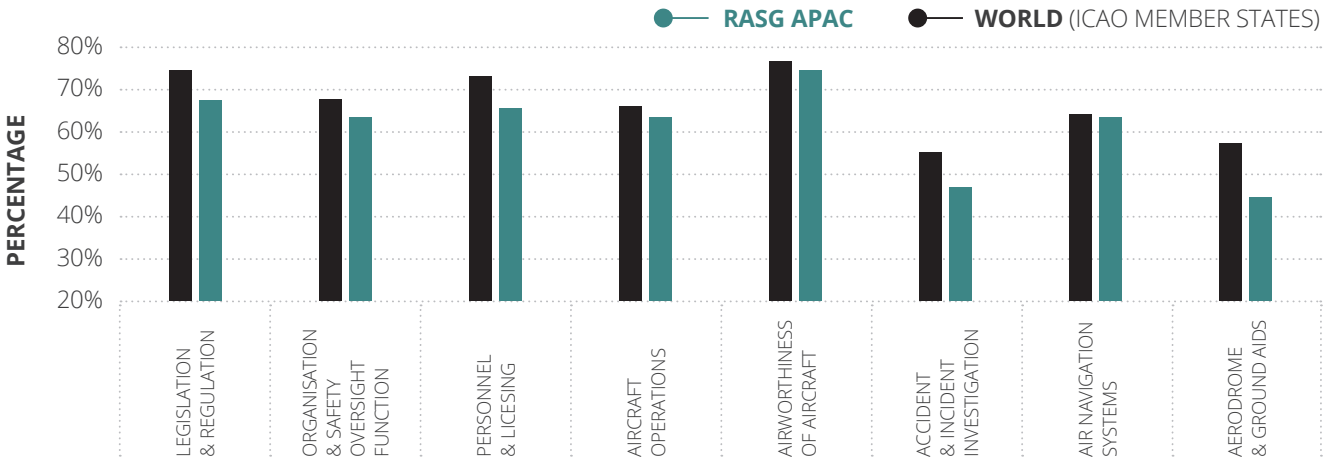


The EI by critical elements (CE) in Chart 8.1.3, revealed that resolution of safety concerns (CE 8) had the lowest implementation score of 47.82 per cent for the RASG-APAC.

In comparison to all ICAO member States, RASG-APAC had lower scores for all CEs with licensing, certification, authorisation and approval obligations (CE6) being the closest in comparison.

Chart 8.1.4 displays the overall EI by area compared to all ICAO member States. The data indicates that RASG-APAC is lower for all categories, with air navigation systems being the category with the closest score compared to all ICAO member States.

CHART 8.1.4—OVERALL EI BY AREA RASG-APAC STATES VS. TO ALL ICAO MEMBER STATES



Conclusion

From the analysis of the reactive safety information provided by ICAO, IATA and CAST, the most common fatal accident categories in the APAC region between 2013 and 2017 were: loss of control-inflight (LOC-I), controlled flight into terrain (CFIT), and runway safety

Reactive safety information

From the analysis of the reactive safety information provided by ICAO, IATA and CAST, the most common fatal accident categories in the APAC region between 2013 and 2017 were:

1. loss of control-inflight (LOC-I);
2. controlled flight into terrain (CFIT); and
3. runway safety

Safety information from IATA and CAST safety information also revealed that CFIT and LOC-I are the accident categories with the highest fatality risks in APAC region while runway excursions, hard landing and In-flight damage accounted for the highest number of accidents. It should also be noted that landing-related accidents continues to be the flight phase with the highest number of accidents.

The APAC region should continue to focus its efforts on mitigatng and minimising occurrences relating to these categories and phases.

Based on ICAO information, the accident category of ground collision has recorded a significant increase in 2017. Effort could be channelled into promoting mitigation measures to reduce such occurrences.

Proactive safety information

The effective implementation (EI) score for the RASG-APAC region increased in 2018 (61.96%) as compared to 2017 (59.26%). The EI for RASG-APAC region was lower than the global average by Critical Element (CE). Of these, *Technical personnel qualifications and training (CE4) and Resolution of safety concerns (CE-8)* were lowest at 47.82 and 50.59 per cent respectively. Both critical elements also contain the lowest scores across the global averages, suggesting that they appear to be a consistent issue across the world.

List of acronyms

ACAS Airborne collision avoidance systems

ADRM Aerodrome

AFI Africa (IATA Region)

AIS Aeronautical information service

AMAN Abrupt manoeuvre

ANSP Air navigation service provider

AOC Air operator certificate

APAC Asia Pacific

APR Approach

ARC Abnormal runway contact

ASIA PAC Asia/Pacific (ICAO Region)

ASPAC Asia/Pacific (IATA Region)

ATC Air traffic control

ATM Air traffic management

BIRD Birdstrike

CABIN Cabin safety events

CAST Commercial aviation safety team

CFIT Controlled flight into terrain

CICTT CAST/ICAO Common Taxonomy Team

CIS Commonwealth of Independent States (IATA Region)

CMA Continuous monitoring approach

CRM Crew resource management

CRZ Cruise

CVR Cockpit voice recorder

DFDR Digital flight data recorder

DGAC Directorate general of civil aviation

DH Decision height

EDTO Extended diversion time operations (replaces ETOPS)

E-GPWS Enhanced ground proximity warning system

ETOPS Extended range operations by turbine-engined aeroplanes

EUR Europe (ICAO and IATA Region)

EVAC Evacuation

FDA Flight data analysis

FLP Flight planning (IATA)

FMS Flight management system

F-NI Fire/smoke (none-impact)

FOQA Flight operations quality assurance

F-POST Fire/smoke (post-impact)

FUEL Fuel related

GASP ICAO global aviation safety plan

GCOL Ground collision

GNSS Global navigation satellite system

GOA Go-around

GPWS Ground proximity warning system

GSI Global safety initiative

HL Hull loss: aircraft destroyed, or damaged and not repaired

IATA International Air Transport Association

ICAO International Civil Aviation Organization

ICE Icing

ICL Initial climb

IMC Instrument meteorological conditions

INOP Inoperative

List of acronyms

IOSA ..... IATA operational safety audit

LALT ..... Low altitude operations

LATAM ..... Latin America and the Caribbean (IATA Region)

LEI ..... Lack of effective implementation

LND ..... Landing

LOC-G ..... Loss of control: ground

LOC-I ..... Loss of control: inflight

LOSA ..... Line operations safety audit

MAC ..... AIRPROX/TCAS alert/loss of separation/near miss collisions/mid-air collisions

MDA ..... Minimum descent altitude

MEL ..... Minimum equipment list

MENA ..... Middle East and North Africa (IATA REGION)

NAM ..... North America (ICAO and IATA Region)

NASIA ..... North Asia (IATA Region)

NAVAIDS ..... Navigational aids

NOTAM ..... Notice to airman

OTH ..... Other

RA ..... Resolution advisory

RAMP ..... Ground handling operations

RE LANDING ..... Runway excursion (Take-off or Landing)

RE-TAKE-OFF ..... Runway excursion: Landing

RE- ..... Runway excursion: Take-off

RI ..... Runway incursion

RI-A ..... Runway incursion: animal

RI-VAP ..... Runway incursion: vehicle, aircraft or person

RS ..... Runway safety

RTO ..... Rejected take-off

SAM ..... South America (ICAO Region)

SARPS ..... Standards and recommended practices (ICAO)

SCF-NP ..... System/component failure or malfunction: Non-powerplant

SCF-PP ..... System/component failure or malfunction: Powerplant

SD ..... Substantial damage

SEC ..... Security-related

SMS ..... Safety management system

SOP ..... Standard operating procedure

SRVSOP ..... Regional safety oversight system

SSP ..... State safety program

TAWS ..... Terrain awareness warning system

TCAS ..... Traffic collision and avoidance system

TCAS RA ..... Traffic collision and avoidance system: Resolution advisory

TEM ..... Threat and error management

TOF ..... Take-off

TURB ..... Turbulence encounter

TXI ..... Taxi

UAS ..... Undesirable aircraft state

UNK ..... Unknown or undetermined

USOAP ..... Universal safety oversight audit program

USOS ..... Undershoot/overshoot

WSTRW ..... Windshear or thunderstorm

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