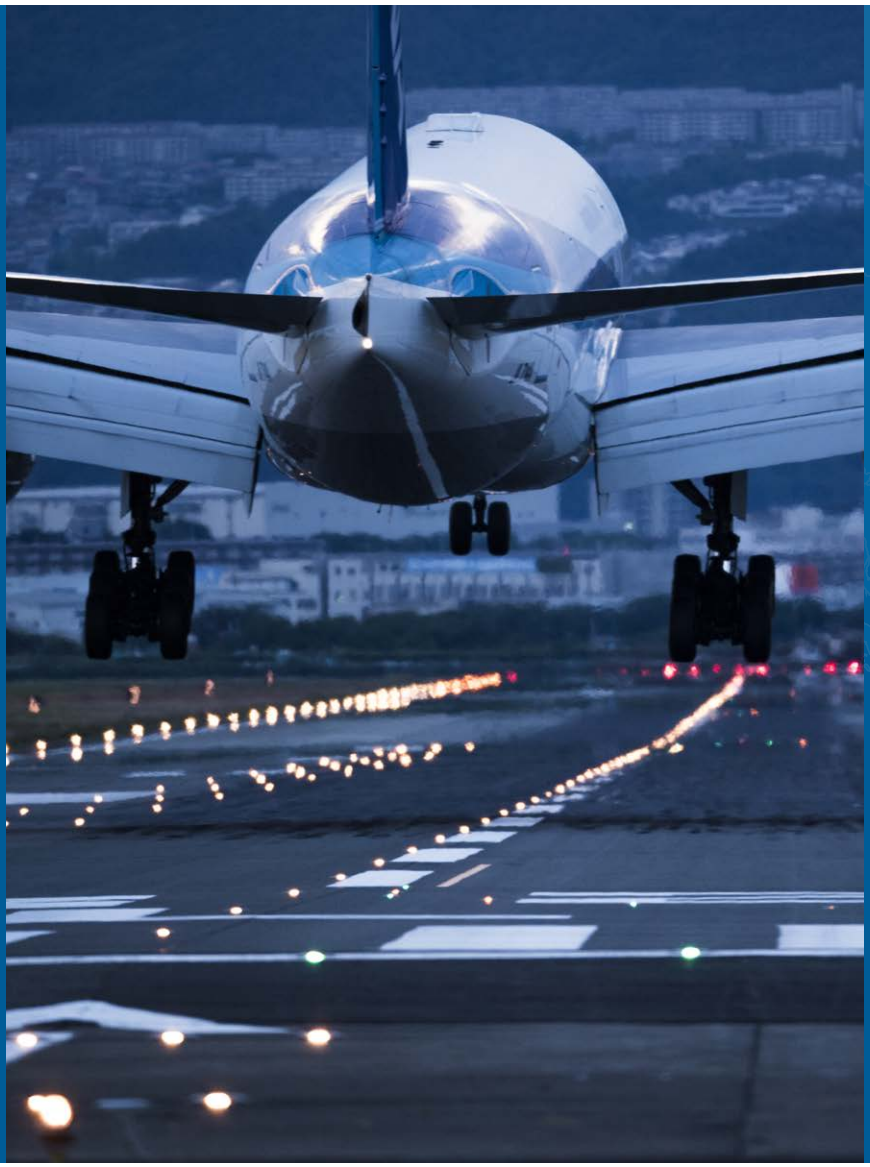


Annual Safety Report

2020

ASIA PACIFIC REGION

Disclaimer:
This document is disseminated under the sponsorship of the Regional Aviation Safety Group – Asia Pacific (RASG-APAC) in the interest of information exchange. The RASG-APAC assumes no liability for its contents or use thereof.

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 2020 RASG-APAC Annual Safety Report:

- International Civil Aviation Organization (ICAO)
- International Air Transport Association (IATA)
- Commercial Aviation Safety Team (CAST).

2007.4059

Contents

01 **Foreword**

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 Directorate General of Civil Aviation (DGAC) 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 International Civil Aviation Organisation (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 APRAST include recommending enhancement initiatives to the RASG-APAC which will reduce aviation risks. To do so, APRAST will:

- review, for application within the Asia Pacific region, existing safety enhancement initiatives (SEIs) which have already been developed through the efforts of well-established, multinational 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 SEIs. 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 APRAST, are three Working Groups:

- Safety Enhancement Initiative Working Group (SEI WG)
- Safety Reporting Program Working Group (SRP WG)
- Ad-hoc Working Group for the Regional Aviation Safety Plan (RASP).

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

As the APAC-AIG is now placed directly under RASG, the APAC-AIG will review the Global Aviation Safety Plan/Roadmap (GASP/R) Global Safety Initiative (GSI) 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 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 the Accident Investigation (AIG) Working Group (WG) will be to introduce, support, and develop actions that have the potential to effectively and economically reduce the regional aviation accident risk.

Safety Enhancement Initiative Working Group (SEI WG)

The role of the SEI WG is to assist APRAST in the development, implementation and review of SEIs to reduce aviation risks. These SEIs could be established based on the analysis of regional data, based on ICAO initiatives or the initiatives of other relevant organisations or regions or based on the risks and issues identified through the Universal Safety Oversight Audit Programme (USOAP) Continuous monitoring approach (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:

- 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
- assist APRAST in the provision of generic implementation guidance related to the SEIs to guide members through the SEI implementation process
- assist APRAST in the identification of assistance programmes such as, but not limited to, workshops and seminars to improve the level of implementation of developed SEIs, with the support of the Secretariat
- develop and conduct a process to review existing SEIs and provide recommendations to improve the effectiveness and level of implementation.

Safety Reporting Program Working Group (SRP WG)

The SRP WG's role is to gather safety information from various sources to determine the main aviation safety risks in the Asia-Pacific region. In addition, the SRP WG produces an Annual Safety Report, that includes:

- reactive information
- 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 APRAST, based on the identified risk areas.

An Ad-hoc Working Group was formed to formulate the APAC RASP, with this plan aligned to the GASP 2020-22. The development of National Aviation Safety Plan's (NASP) by APAC States will take reference from the GASP and the region's RASP, approved by RASG-APAC/9, in November 2019.

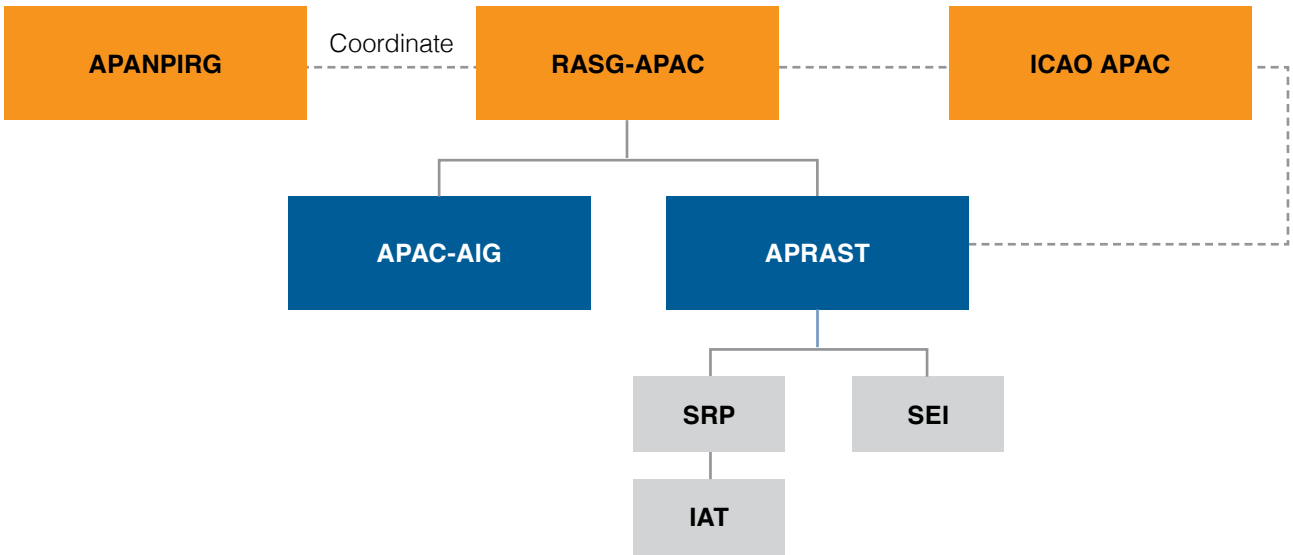
The organisational structure of the RASG-APAC and its subsidiary bodies is shown in Figure 1.1. The ICAO Asia Pacific Regional Office in Bangkok provides the secretariat support necessary for the RASG-APAC to function.

The 2020 Annual Safety Report, developed by the SRP WG and published by RASG-APAC, is the 8th edition of the safety report for the Asia Pacific region and is 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: https://www.icao.int/APAC/RASG/Pages/APAC-Safety-Report.aspx

For clarification or additional information please email: apac@icao.int

Figure 1.1 RASG-APAC Organisation



02 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, IATA, CAST and data from the Official Aviation Guide, checked and verified by ICAO.

Accident and fatal accident occurrence data was sourced from ICAO Integrated Safety Trend Analysis and Reporting System (iSTARS) for the reference period 2010–2016, with data for 2017–2019 being sourced from ICAO's Safety Indicator Study Group (SISG). In subsequent APAC Annual Safety Reports, SISG data will replace all iSTARS data beyond 2017 when SISG data was made available.

This 8th edition of the RASG-APAC Annual Safety Report focuses on reactive information relating to hull loss and fatal accidents (both on the ground and inflight) 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 CMA.

In this report, the most frequent accident categories are identified, in accordance with the CAST/ICAO Common Taxonomy Team which is also used by IATA, relating to fatality risk, as well as other significant emerging risk categories in the Asia Pacific region.

Figure 2.1 Asia Pacific region-countries associated with the ICAO Asia Pacific Regional Office

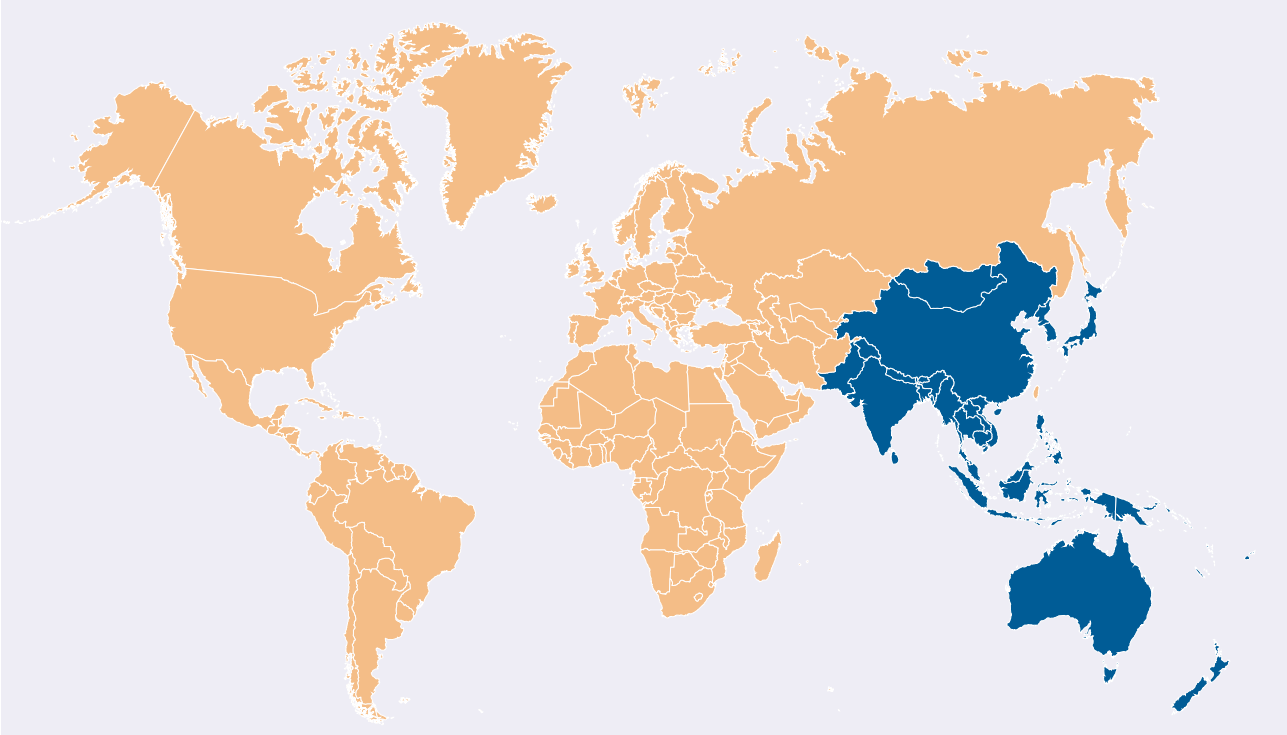


Table 2.1 Member States/Administration accredited with the ICAO Asia Pacific Office

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

03 Executive summary

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

Reactive information analysis[1]

In recent years, the global accident rate experienced a significant uptrend, jumping from 2.15 accidents per million departures in 2016 to 2.94 per million departures in 2019. On the other hand, the RASG-APAC rate has maintained a steady decline from 1.69 per million departures to 1.34 per million departures over the same period. On an annual basis, an increase in the RASG-APAC accident rate did occur in 2012 and 2015. The RASG-APAC's accident rate has remained lower than the global accident rate over the past decade. Overall, the five-year moving average accident rate, globally and for RASG-APAC, has shown a consistent downward trend.

The number of accidents attributable to States/ Administrations in the RASG-APAC region in 2019 was 17, three fewer than last year. There were zero fatal accidents in 2019, down from three in 2018.

For 2019, the RASG-APAC's five-year moving average accident rate of 1.75 per million departures remains lower than the global average rate of 2.57 per million departures. A similar number of accidents, accompanied by marginal growth in APAC's air traffic volume (from 12.3 to 12.7 million departures) resulted in a slight decrease in RASG-APAC region's accident rate (1.34 accidents per million departures compared to 1.62 in 2018).

The topmost frequent accidents for RASG-APAC region in 2019 related to turbulence, runway excursion and abnormal runway contact.

Proactive information analysis

The RASG-APAC region had an overall USOAP Effective Implementation (EI) score of 63.93 per cent in 2020, similar to its performance of 63.91 per cent in 2019. This result remains lower than the global level of 68.56 per cent.

In terms of Critical Elements (CE), the APAC region had lower EI scores for all categories as compared to the global average. By CE, CE-4 on *Technical personnel qualifications and training* and CE-8 on *Resolution of safety concerns* had the lowest EI scores within RASG-APAC, at 54.03 and 49.72 per cent respectively. By area, AIG and Aerodrome and Ground Aids (AGA) had the lowest EI scores of 50.40 per cent and 61.41 per cent respectively.

1 The safety information related to accidents is based on 2019 data. This is due to the length of time taken for investigative reports to be completed and the publication schedule of the ASR.

04 **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. Identified hazards and their associated risk can then be prioritised and appropriate mitigation actions taken.

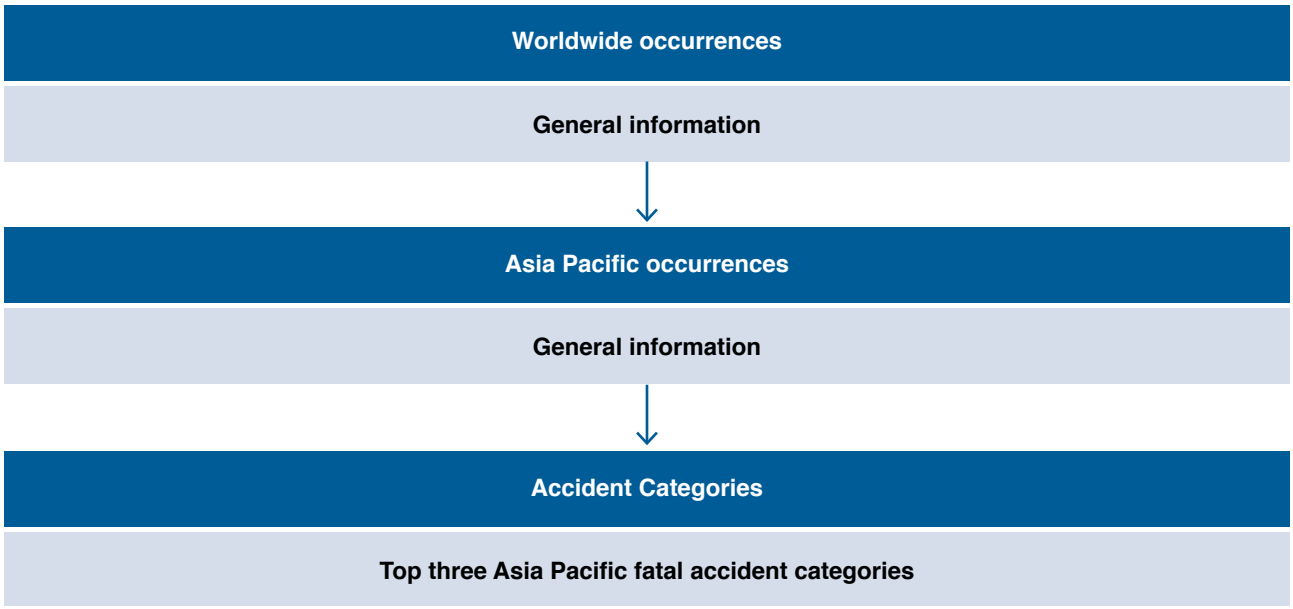
RASG-APAC can be viewed as a regional safety management process or a regional safety program (RSP) in the same way that a State Safety Program (SSP) is a national safety management process and a Safety Management System (SMS) is a service provider's safety management program. Using safety information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

05 Approach for analysis

Our approach for the analysis is to process the accident information provided by ICAO, IATA and CAST, involving commercial aircraft of maximum take-off weight (MTOW) greater than 5700 kg operated by (or registered with) the member 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, numbers and categories from a global versus APAC perspective, then on the sub-regions of North Asia, South Asia, South-East Asia and the Pacific.

The process is illustrated in Figure 5.1.

Figure 5.1 Approach for analysis



The grouping of States/Administrations into the four APAC sub-regions will be based on their membership with the respective Cooperative Development of Operational Safety and Continuing Airworthiness Programme (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 assist implementation and training in areas that are more relevant to their sub-regions.

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 (including Chinese Taipei)
- Hong Kong, China
- Macao, China
- Democratic People's Republic of Korea
- Japan
- Mongolia
- Republic of Korea

South-Asia (SA) region

States/Administrations that are members of COSCAP-SA:

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

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

Pacific region

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

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

06 Reactive safety information

Background

As defined in the fourth edition (2.5.2) of ICAO Document 9859, a reactive analysis method 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.

Data sources

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. It is important to note the definition of an accident differs between ICAO and IATA and this should be considered when comparing trends from these data providers.

Please note:

1. ICAO's reactive safety information is derived from Aviation Data Reporting Programme (ADREP) reports, validated by the Safety Indicator Study Group (SISG). The SISG reviews and validates aviation safety occurrence information supplied by member States' investigative bodies. The SISG commenced in 2017, with data prior to this being sourced from ICAO's iSTARS. The definition of 'accident' is based on ICAO Annex 13.
2. IATA's reactive safety information relates to accidents that result in hull loss, fatalities and substantial damage to aircraft. It contains statistics on accidents classified by the Accident Classification Technical Group (ACTG) and uses the same definitions for the IATA Annual Safety Report. All regional rates are based on the operator's State of registry and rates are always based on per million sectors (flights).
   - 'All Accident Rate' contains 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 ACTG criteria (commercial operation, jet or turboprop and MTOW > 5,700Kg) and of all accident categories; 'all accident rate' in the context of jet/hard landing means all jet accidents (hull loss and substantial damage) that had a hard landing.
   - Only accidents of the following categories are part of the database:
     - Controlled Flight-Into-Terrain (CFIT)
     - Loss of Control In-flight (LOC-I)
     - Runway Collision
     - Mid-air Collision
     - Runway / Taxiway Excursion
     - In-flight Damage
     - Ground Damage
     - Undershoot
     - Hard Landing
     - Gear-up Landing / Gear Collapse
     - Tail strike
     - Off Airport Landing / Ditching
     - Other End State.
   - IATA defines 'sector' as the operation of an aircraft between take-off at one location and landing at another location (other than a diversion)
   - IATA's North Asia (NASIA) and Asia Pacific (ASPAC) regions are equivalent to ICAO's APAC region.

The US CAST accident database has the following accident criteria:

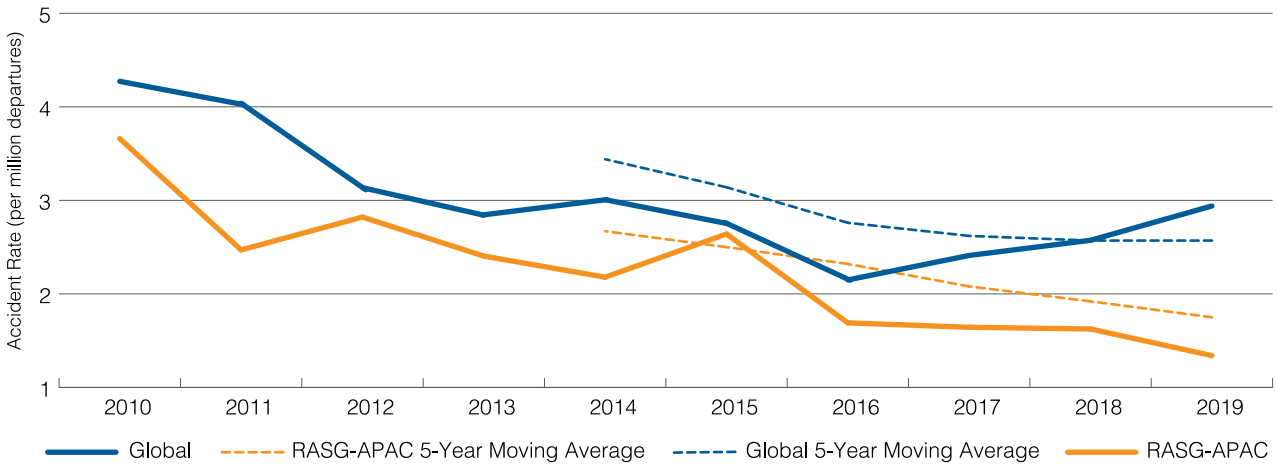
- severity criteria: fatal and/or hull loss accidents
- operational criteria: scheduled commercial operations, Part 121 and equivalent
- classification criteria: Cast ICAO Common Taxonomy Team (CICTT)
- fleet type criteria: Western-built aircraft.

Global and Asia Pacific **Safety Trends**

7.1 Global and APAC accident rates

Global accident rates, APAC accident rates and the accident rates for the four RASG-APAC sub-regions were compiled, based on information provided by ICAO, including accident data from iSTARS and the SISG and departures data from the Official Aviation Guide (OAG), with data cleansing and verification conducted by ICAO. All information presented is dependent on accurate information being supplied by member States.

Chart 7.1.1 ICAO iSTARS, SISG and OAG: Global accident rate versus APAC accident rate, including five-year Moving Average (2010–2019)



The accident rate in the APAC region has declined significantly over the last decade from 3.66 (2010) to 1.34 (2019) accidents per million departures. This compared favourably with the global trend where the rate of decline has been lower, with accident rates at 2.94 accidents per million departures in 2019, down from 4.27 in 2010.

Despite accident rates generally declining for the Asia Pacific region and globally over the last decade, different trends emerged from 2016 to 2018. Accident rates in the APAC region reached a plateau of approximately 1.6 accidents per million departures over the three years, while global results showed an increased accident rate over the same period.

The stabilisation in accident rates for APAC was due to the similar number of total accidents (around 20) and similar annual departures (around 12 million) each year from 2016 to 2019. ICAO's data for APAC showed fatal accident rates per million departures decreasing from 0.24 in 2018 to zero in 2019.

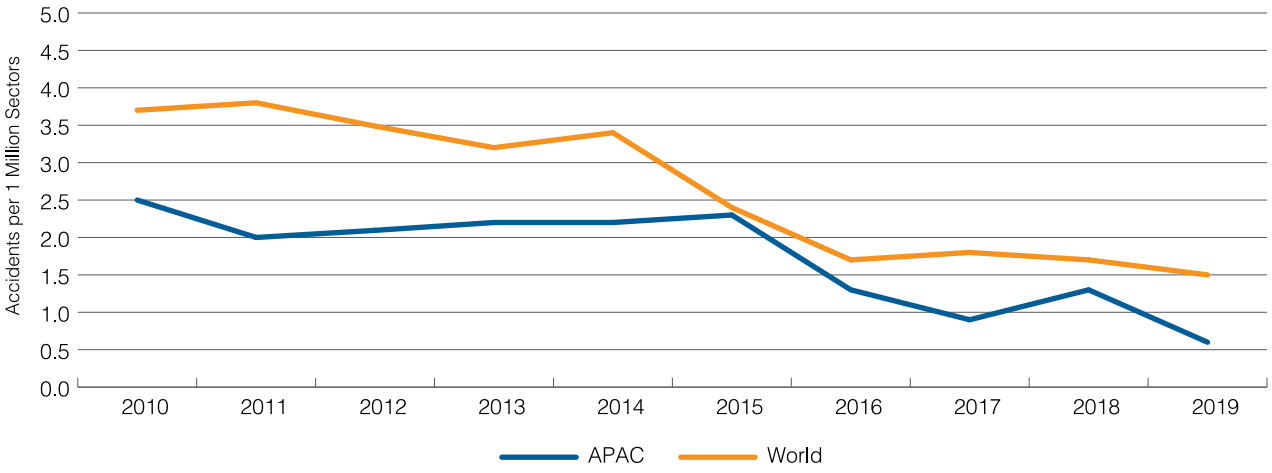
The five-year moving average does highlight that the medium-term trend remains positive with accident rates continuing to ease since 2014 within the APAC region.

Global accident rates and those for APAC have been supported by significant growth in departure numbers, rising by almost 30% globally and 80% in the APAC region for the decade to 2019.

Similar to the ICAO dataset, IATA shows a steady overall downward trend in APAC accident rates since 2010, with 2015 an exception. In Chart 7.1.2, while IATA data shows both global and APAC accident rates were lower in 2019 compared to 2018, APAC had a more pronounced reduction in accident rates over the two years.

Although there is a degree of consistency between ICAO and IATA data, there are some variations in trends exhibited. This may in part be due to the different accident definition used, i.e. hull loss, fatalities and substantial damage, relative to the definition used by ICAO iSTARS which extends to accidents involving serious injuries and accidents where aircraft damage may not have resulted in hull loss. The continued downtrend in global accident rates exhibited by IATA data, in contrast to the slight global uptrend shown by ICAO data, may be attributed to a higher proportion of accidents accounted for by ICAO but not IATA.

Chart 7.1.2 IATA: APAC region's Accident Rate (2010–2019)



7.2 Global and APAC accident numbers

It is important to recognise the inherent variability of accident numbers over time. To alleviate such variability, consideration of longer-term trends provides a more realistic perspective of safety performance.

As could be expected, ICAO accident statistics also show trends that are not completely dissimilar to accident rates, with non-fatal accidents globally, increasing in 2019 relative to the previous year. In contrast, the number of fatal accidents globally declined in 2019.

The number of fatal accidents that occurred globally in 2019 was six, below the five-year moving average of seven.

Results were more favourable in APAC, with non-fatal accidents of 17 in 2019, being below the five-year average of 18. Similar to the global results, the APAC region saw a decrease in fatal accidents, declining to zero in 2019, which was below the five-year moving average of two.

Chart 7.2.1 ICAO iSTARS, SISG and OAG: Number of accidents—RASG-APAC (2010–2019)

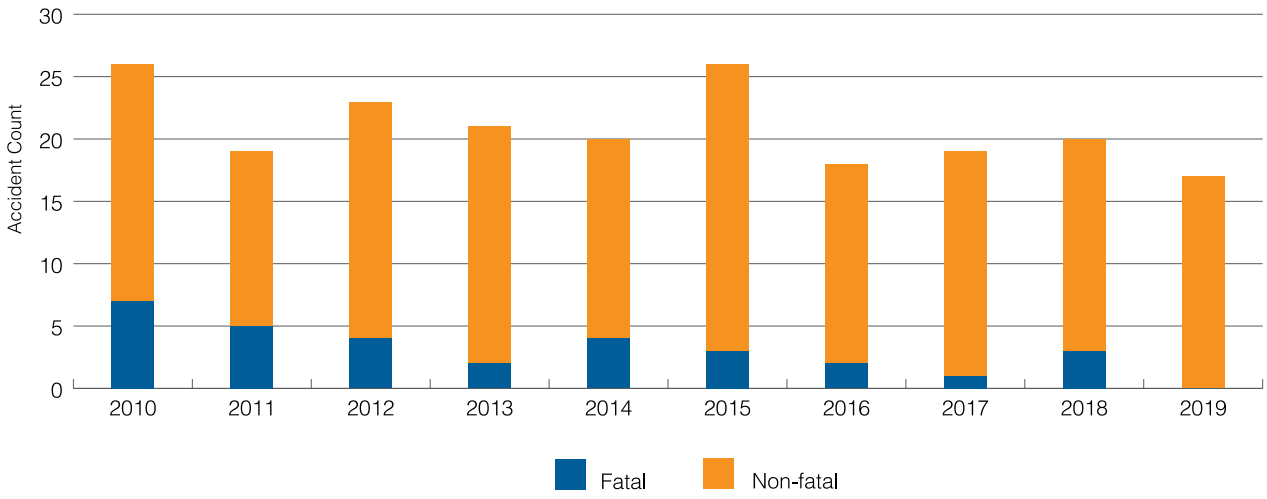


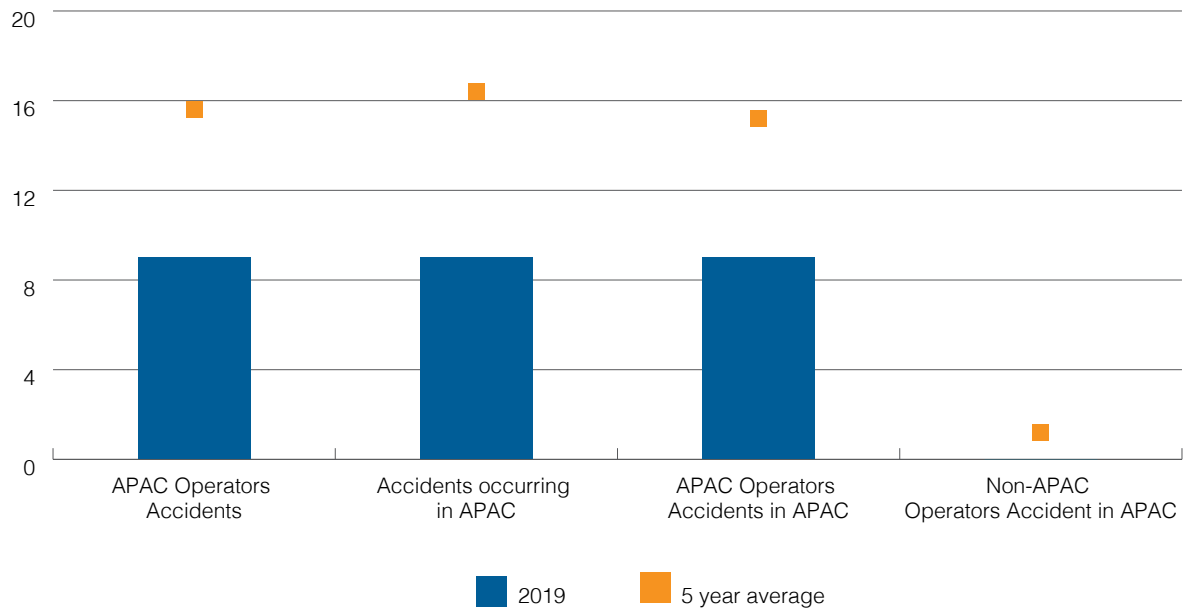
Table 7.2.1 IATA: Accident Count from 2015–2019 (Region of Occurrence vs Region of Operator)

	2015	2016	2017	2018	2019	Total
APAC Operators Accidents	24	15	12	18	9	**78**
Accidents occurring in APAC	27	17	12	17	9	**82**
APAC Operators Accidents in APAC	24	15	12	16	9	**76**
Non-APAC Operators Accidents in APAC	3	2	0	1	0	**6**

Table 7.2.1 provides an IATA breakdown of accident counts of APAC operators by Region of Occurrence (worldwide and in APAC region), and a breakdown by Region of Operator in APAC region (APAC and non-APAC operator). Not surprisingly, most APAC operator accidents occur within the APAC region while non-APAC operator accidents are very seldom in the APAC region.

The number of accidents occurring in APAC, and number of APAC operator accidents (within APAC and outside APAC) almost halved in 2019, based on IATA data. These numbers were the lowest seen over the past five years.

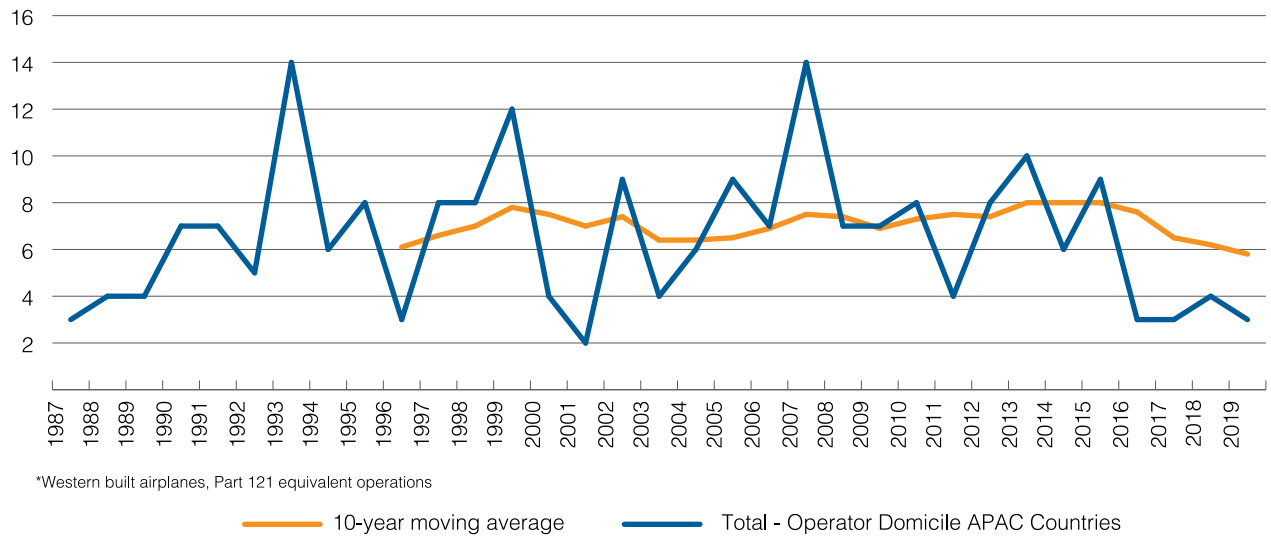
Chart 7.2.2 IATA: APAC Operator Accidents



Accident Trends (Hull Loss / Substantial Damage / Fatality Risk)

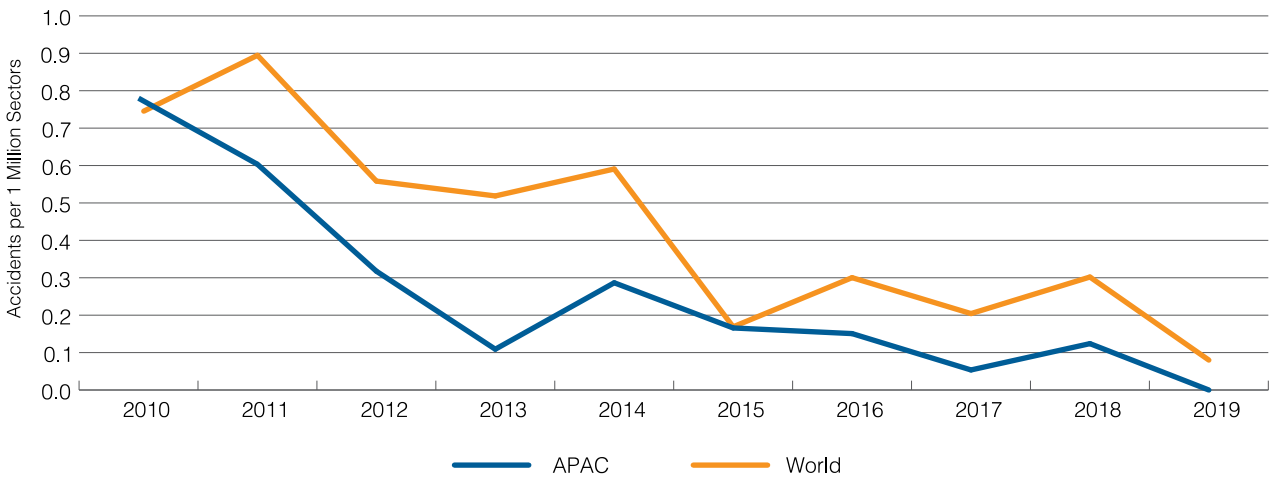
Data from CAST shown in Chart 7.2.3 shows the number of accidents of Western-built airplanes flown by operators based in APAC countries which resulted in hull loss or fatalities from 1987 to 2019. The number of accidents decreased slightly from four in 2018 to three in 2019, and since 2016 has been below the 10-year moving average. While the accident numbers fluctuate considerably on a yearly basis, the 10-year moving average also shows there has been a decline in hull losses and fatal accidents—from eight to six—over the past five years.

Chart 7.2.3 CAST: Number of hull loss or fatal accidents for operators based in APAC



As shown in Chart 7.2.4, APAC's fatal accident risk of 0.12 per million sectors in 2018, decreased to zero in 2019 in comparison with the global rate at 0.08 per million sectors.

Chart 7.2.4 IATA: Fatality Risk (2010–2019)



Over the last 10 years, the APAC region's yearly hull loss occurrence rate has also been lower than the global rate. APAC's accident rate resulting in hull losses has decreased from 0.21 per million sectors in 2018 to 0.14 per million sectors in 2019.

Chart 7.2.5 IATA: Hull losses (2010–2019)

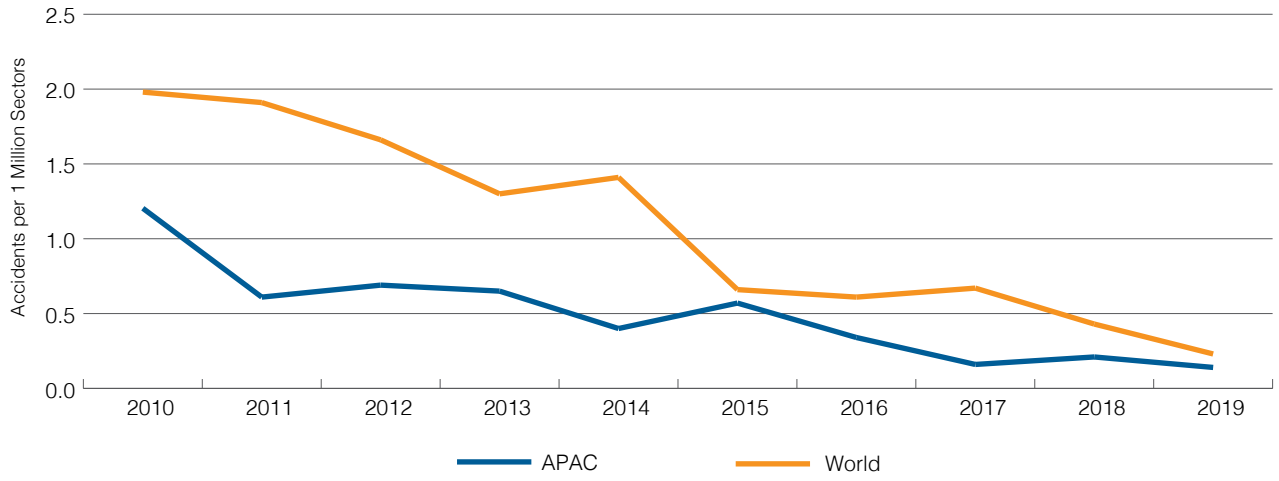


Table 7.2.2 IATA: APAC compared with other regions — Accident by Damage Type from 2015–2019

	World	AFI	MID	EUR	APAC	PA
Hull Loss	**72**	12	4	20	17	19
Substantial Damage	**219**	21	11	53	61	73
Sector Count (Millions)	**210.2**	6.5	9.0	53.5	63.5	77.6

Chart 7.2.6 IATA: Hull Loss Rates (2015–2019) per million sectors

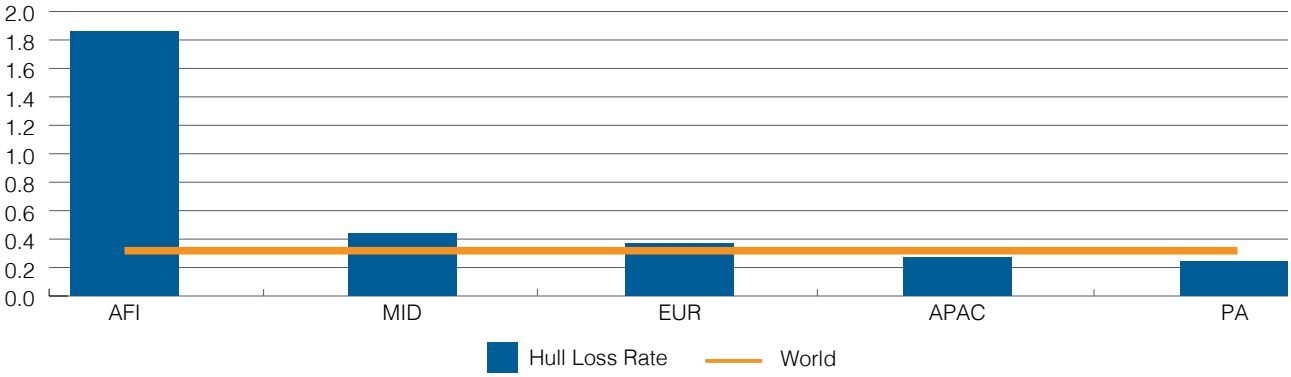
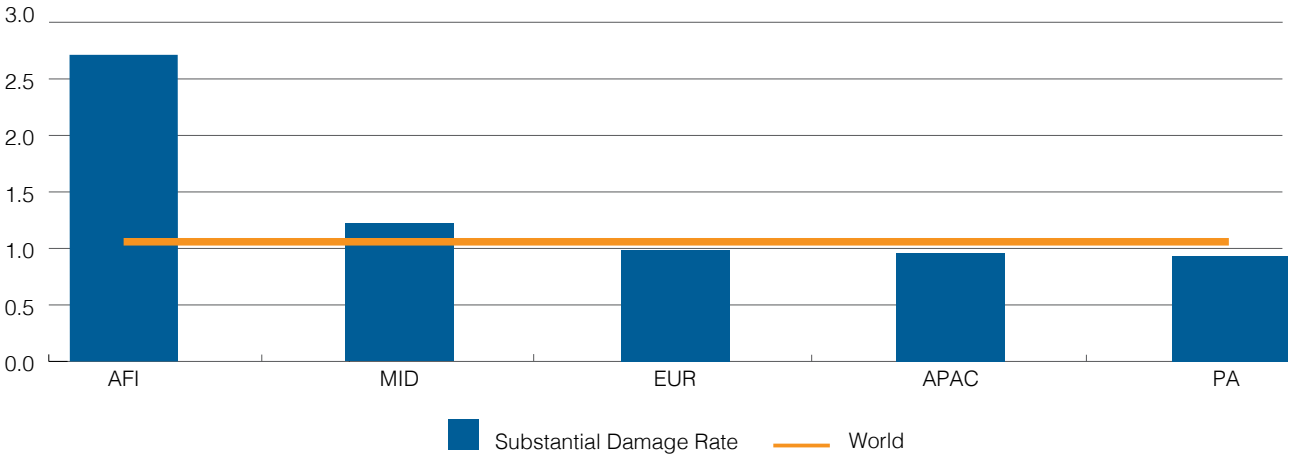


Chart 7.2.7 IATA: Substantial Damage Rates (2015–2019) per million sectors

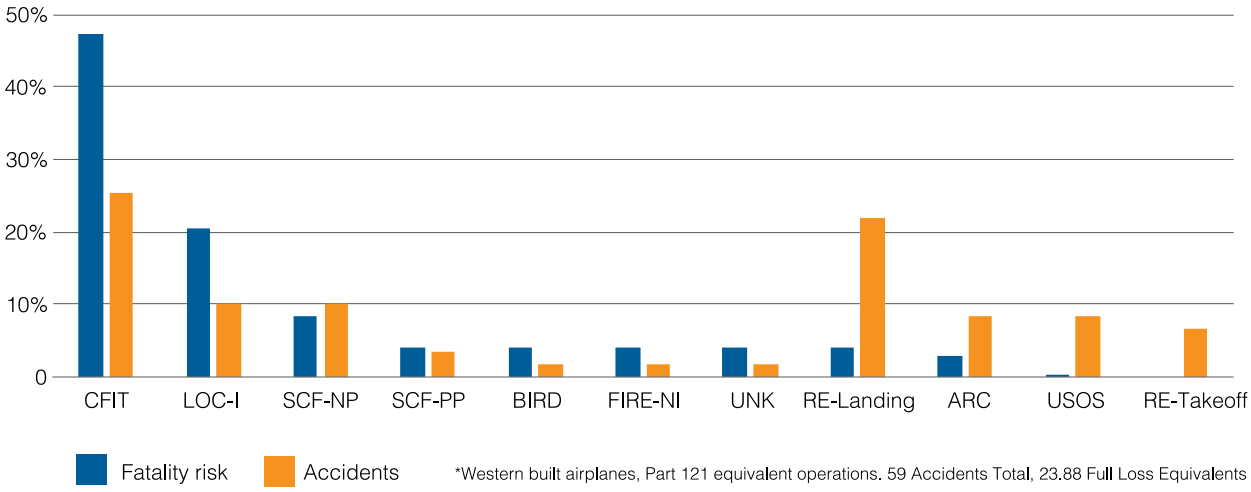


The APAC region also fared better than the global average with a five-year average hull loss rate of 0.27 per million sectors and a five-year average substantial damage rate of 0.96 per million sectors.

7.3 Global and APAC accident categories

Data from CAST, as shown in Chart 7.3.1, identified controlled flight into terrain (CFIT) and loss of control in flight (LOC-I) as the leading causes of fatality risk for APAC operator domicile countries, while CFIT and runway excursion (RE) on landing have been the leading causes for hull losses in the last 10 years.

Chart 7.3.1 CAST: High Risk Accident Categories



CFIT, LOC-I and Runway/Taxiway Excursion have also been identified by IATA as the high-risk accident categories globally. Charts 7.3.2, 7.3.3 and 7.3.4 show the performance of each of these categories in the APAC region for the last 10 years:

- The accident rate attributable to CFIT was zero in 2019, continuing a trend over the past four years for APAC.
- Accidents attributable to LOC-I also recorded a decrease in 2019, with the rate of occurrences at zero, down from 0.07 accidents per million sectors in 2018.
- Runway/taxiway excursion recorded a slight decrease in 2019, with 0.41 accidents per million sectors, down from 0.43 accidents per million sectors in 2018.

Chart 7.3.2 IATA: Annual controlled flight into terrain (CFIT) accident rate (APAC vs. World)

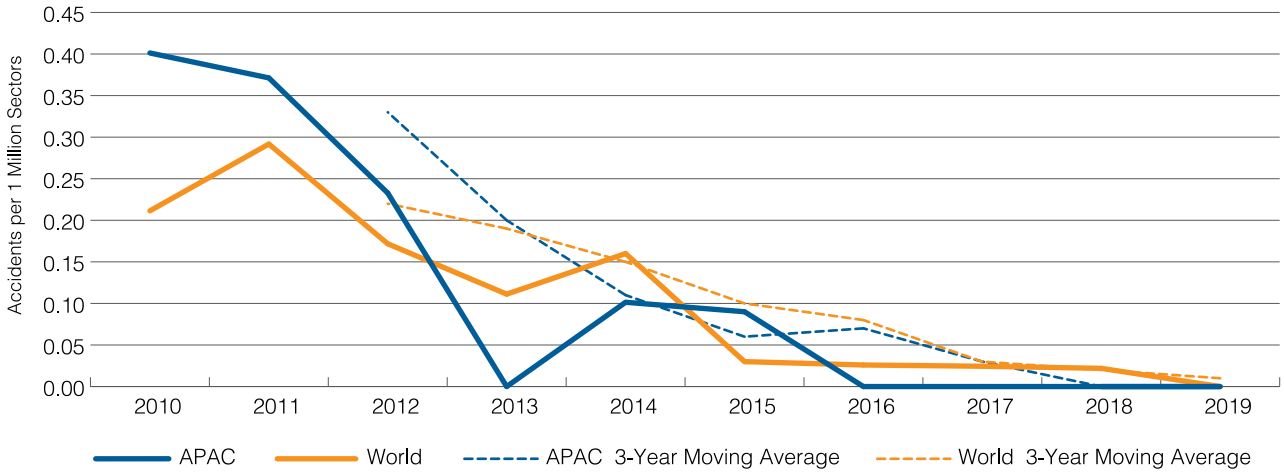


Chart 7.3.3 IATA: Annual loss of control in flight accident rate (APAC vs. World)

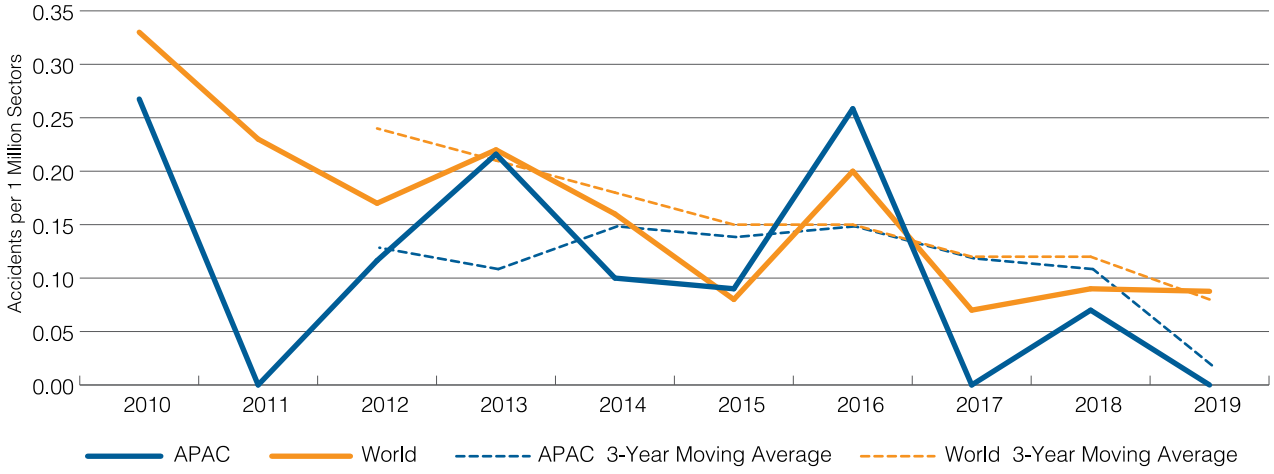
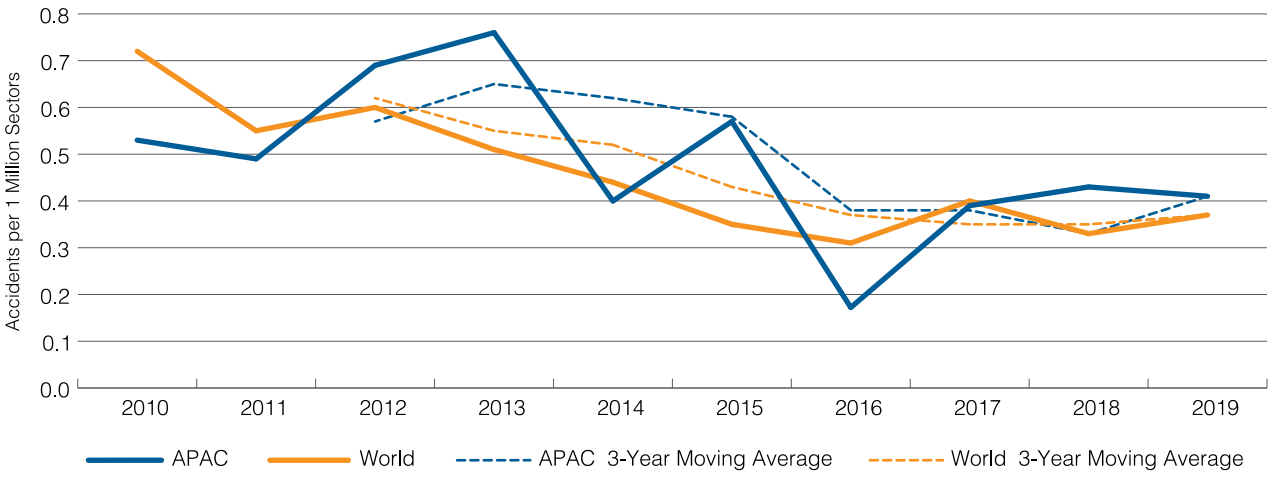


Chart 7.3.4 IATA: Annual runway/taxiway excursion accident rate (APAC vs. World)



Over the past decade, fatal accidents in APAC were most likely the result of controlled flight into terrain, runway safety or loss of control in flight (excluding those due to unknown or undetermined causes).

Table 7.3.1 iSTARS and SISG: APAC fatal accident categories (2010–2019)

Year	TURB	F-NI	UNK	OTH	SCF	RS	LOC-I	CFIT	RE	ADRM	USOS	Total	Runway Safety or related
2010	0	1	2	0	0	1	1	2	0	0	0	7	1
2011	0	1	1	0	0	1	1	1	0	0	0	5	1
2012	0	0	1	0	1	0	0	2	0	0	0	4	0
2013	0	0	0	0	0	1	1	0	0	0	0	2	1
2014	0	0	1	1	0	0	1	1	0	0	0	4	0
2015	1	0	0	0	0	1	0	0	0	0	1	3	2
2016	0	0	0	0	1	0	1	0	0	0	0	2	0
2017	0	0	0	0	0	0	0	0	0	0	1	1	1
2018	0	0	0	0	0	0	1	0	1	0	1	4	2
2019	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	**1**	**2**	**5**	**1**	**2**	**4**	**6**	**6**	**1**	**0**	**3**	**31**	**8**

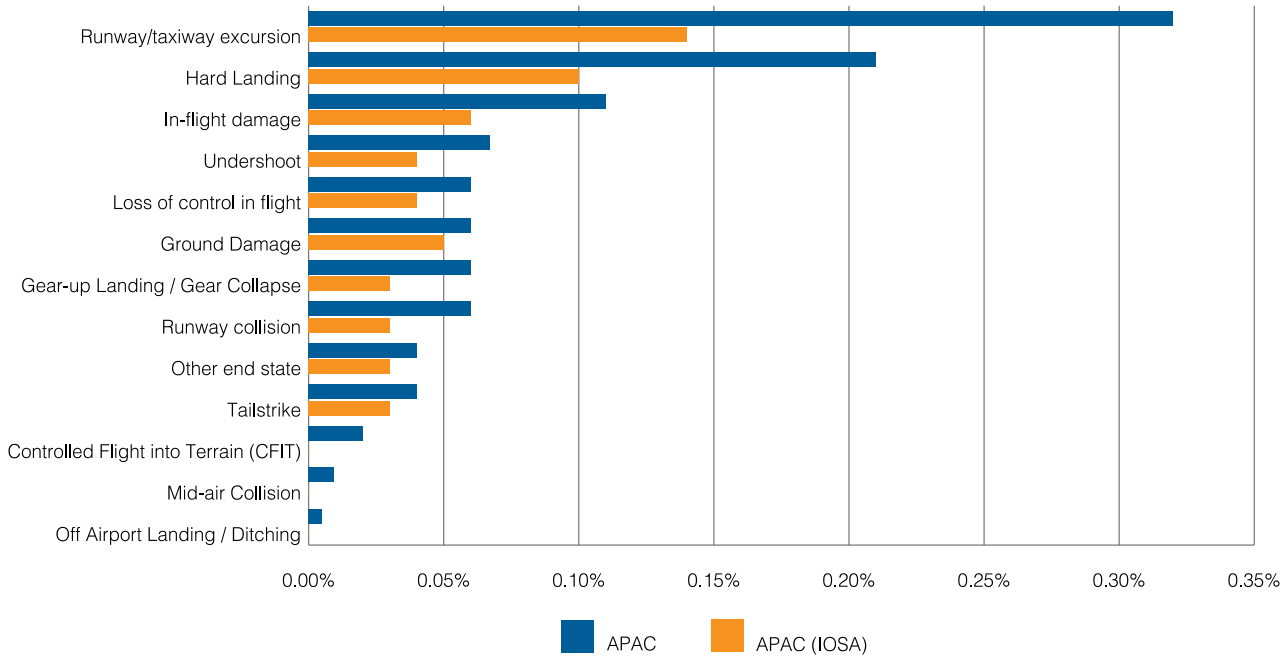
Table 7.3.2 iSTARS and SISG: APAC accident categories (2017–2019)

Year	TURB	F-NI	RE	GS	OTH	RS	LOC-I	CFIT	ADRM	ARC	RAMP	GCOL	AMAN	Total	Runway Safety or related events
2017	6	0	4	1	1	7	0	0	0	0	0	0	0	19	12
2018	3	0	6	0	2	8	1	0	0	0	0	0	0	20	14
2019	7	1	4	0	0	0	0	0	0	4	1	0	1	18	9
Total	**16**	**1**	**14**	**1**	**3**	**15**	**1**	**0**	**0**	**4**	**1**	**0**	**1**	**57**	**35**

More recently, the three most common accident categories for the APAC region in 2019 were turbulence (TURB), runway excursion (RE) and abnormal runway contact (ARC). Turbulence-related accidents were the most frequently occurring category in the APAC region over the last three years (2017–2019), as indicated in Table 7.3.2. This is followed by the runway safety and runway excursion accident categories which recorded 14 and 15 occurrences respectively, over the same timeframe.

As can be seen in Chart 7.3.5, over the last five years (from 2015 to 2019), runway excursion, hard landing and in-flight damage were in the top three accident categories in the region. For fatal accidents, the top three categories from 2015 to 2019 were LOC-I, undershoot and runway/taxiway excursion respectively. In the same period, Chart 7.3.7 shows that the most non-fatal accidents occur during the landing phase while the highest number of fatal accidents took place during the initial climb phase.

Chart 7.3.5 IATA: APAC accident category distribution (2015–2019)



IOSA refers to the IATA Operational Safety Audit (IOSA) Programme, an international evaluation system designed to assess the operational management and control systems of an airline.

Chart 7.3.6 IATA: APAC fatal accident category distribution (2015–2019)

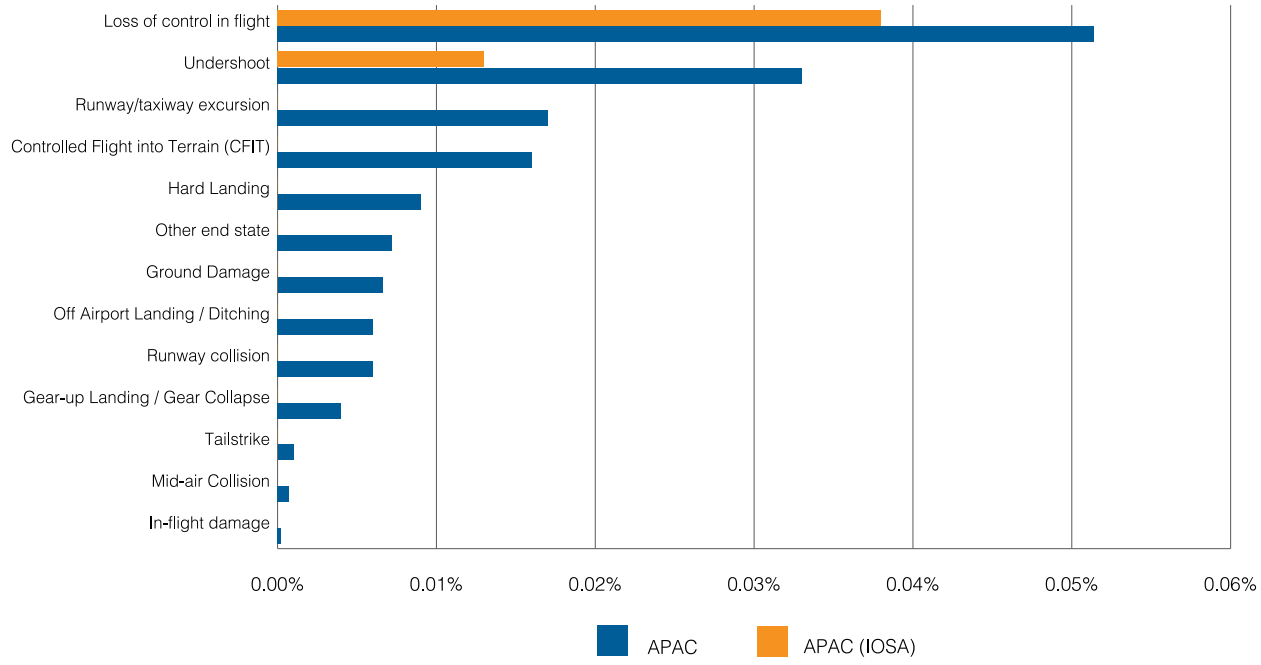
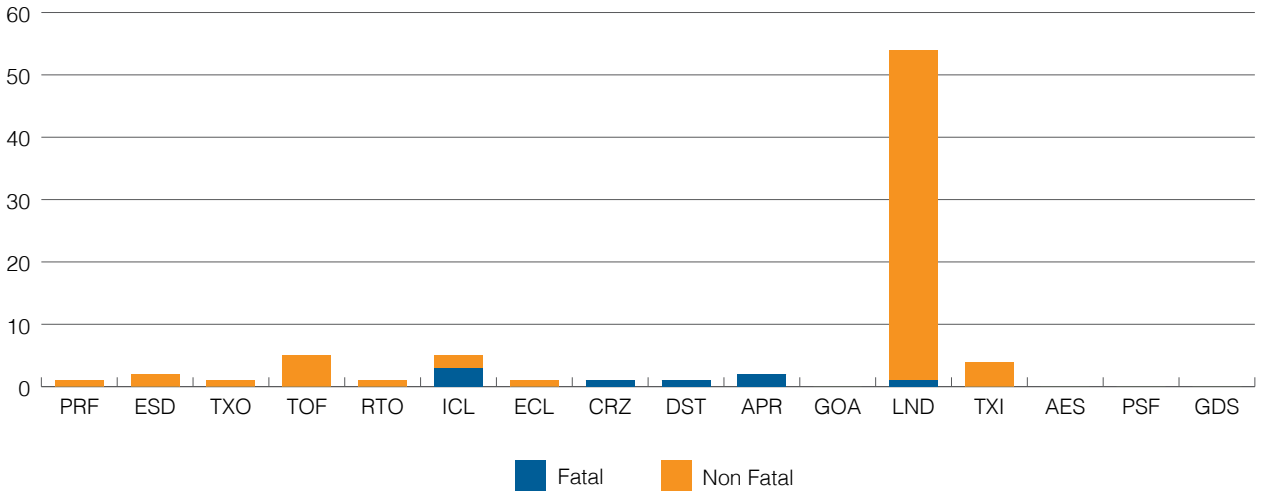


Chart 7.3.7 IATA: APAC accidents by flight phase (2015–2019)



7.4 Top contributing factors to accidents within Asia Pacific–IATA

Based on IATA's Top Contributing Factors to Accidents within Asia Pacific (Table 7.4.1), flight crew errors and latent conditions accounted for the highest proportion of contributing categories. Both flight crew errors and latent conditions have likely played a role in runway/taxiway excursions being the highest among other high-risk accident categories.

Regulatory oversight, meteorology, aircraft malfunction, manual handling/flight controls and undesired aircraft state including vertical/lateral/speed deviation, and overall crew performance were the top contributing factors in their respective categories, for accidents within the APAC region.

Table 7.4.1 – Top Contributing Factors to Accidents within Asia Pacific (2015–2019)

Contributing factors	% of All Accidents (involving Hull Loss or Substantial Damage)		% of Accidents (involving Hull Loss or Substantial Damage) IOSA Certified Airlines Only
Latent Conditions			
Regulatory Oversight	51%	Regulatory Oversight	41%
Safety Management	38%	Safety Management	33%
Flight Ops: Training Systems	23%	Flight Ops: Training Systems	23%
Environmental Threats			
Meteorology	38%	Meteorology	33%
Airport Facilities	23%	Thunderstorms	21%
Thunderstorms	19%	Airport Facilities	21%
Airline Threats			
Aircraft Malfunction	22%	Aircraft Malfunction	28%
Maintenance Events	12%	Maintenance Events	15%
Flight Crew Errors			
Manual Handling / Flight Controls	52%	Manual Handling / Flight Controls	51%
SOP Adherence / SOP Cross-verification	42%	SOP Adherence / SOP Cross-verification	41%
Pilot-to-Pilot Communication	19%	Pilot-to-Pilot Communication	26%
Undesired Aircraft States			
Vertical / Lateral / Speed Deviation	36%	Vertical / Lateral / Speed Deviation	38%
Unstable Approach	32%	Long/floated/bounced/firm/off-centre/ crabbed land	28%
Long/floated/bounced/firm/off-centre/ crabbed land	32%	Unstable Approach	23%
Countermeasures			
Overall Crew Performance	38%	Overall Crew Performance	33%
Monitor / Cross Check	29%	Monitor / Cross Check	26%
Leadership	19%	Leadership	21%

Asia-Pacific sub-regional safety trends

7.5 Sub-regional Accident Rates, Numbers and Categories

Chart 7.5.1 ICAO iSTARS, SISG and OAG: APAC sub-regional accident rate (2010–2019)

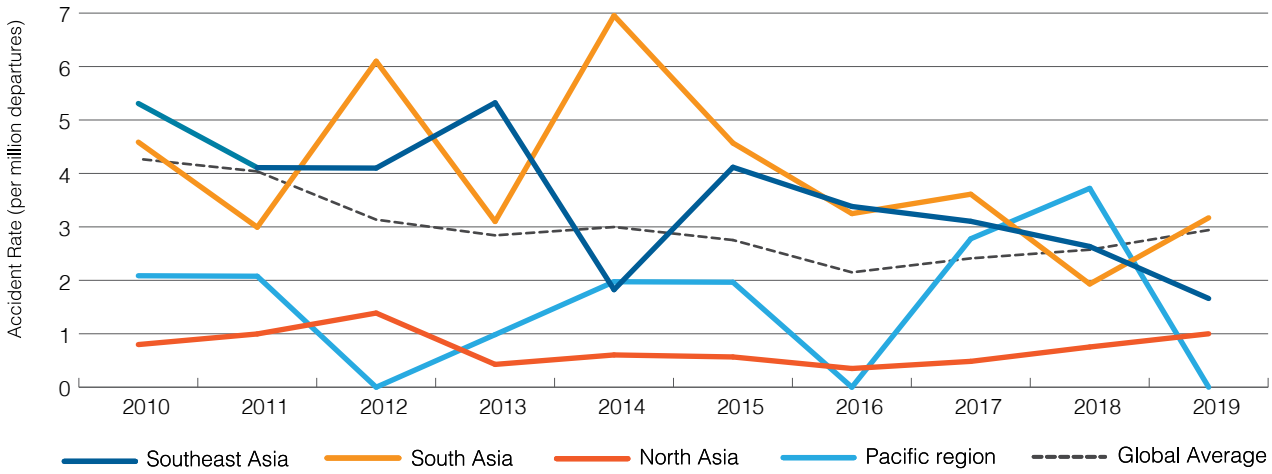
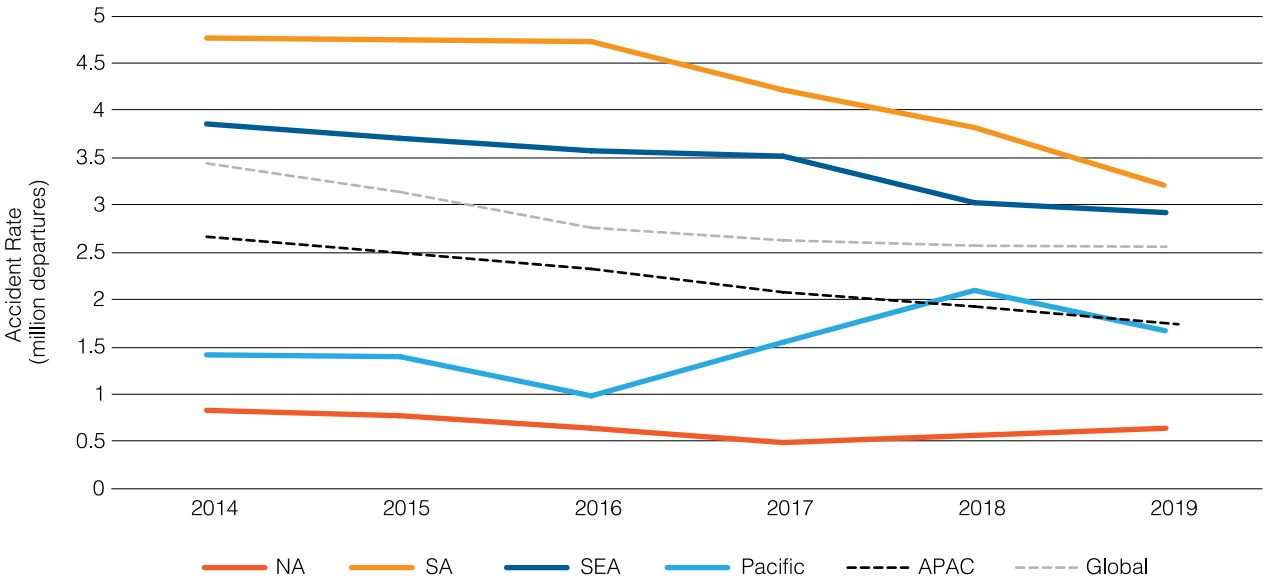


Chart 7.5.1 provides an illustration of the accident rates within APAC by sub-region. In line with the global uptrend, the North Asia and South Asia sub-regional accident rates also increased in 2019. In contrast, the Pacific sub-regional accident rate has dropped to zero from 3.72 per million departures in 2018 while the South-East Asia sub-region has seen a steady decrease in the accident rate from 4.12 per million departures in 2015 to 1.66 per million departures in 2019. With the exception of South Asia, all sub-regional accident rates were below the global average rate for 2019.

Notably, accident rates in the South Asia sub-region have increased from 1.93 per million departures in 2018 to 3.2 per million departures in 2019.

Chart 7.5.2 ICAO iSTARS, SISG and OAG: APAC sub-regional accident rate 5 Year Moving Average (2014–2019)

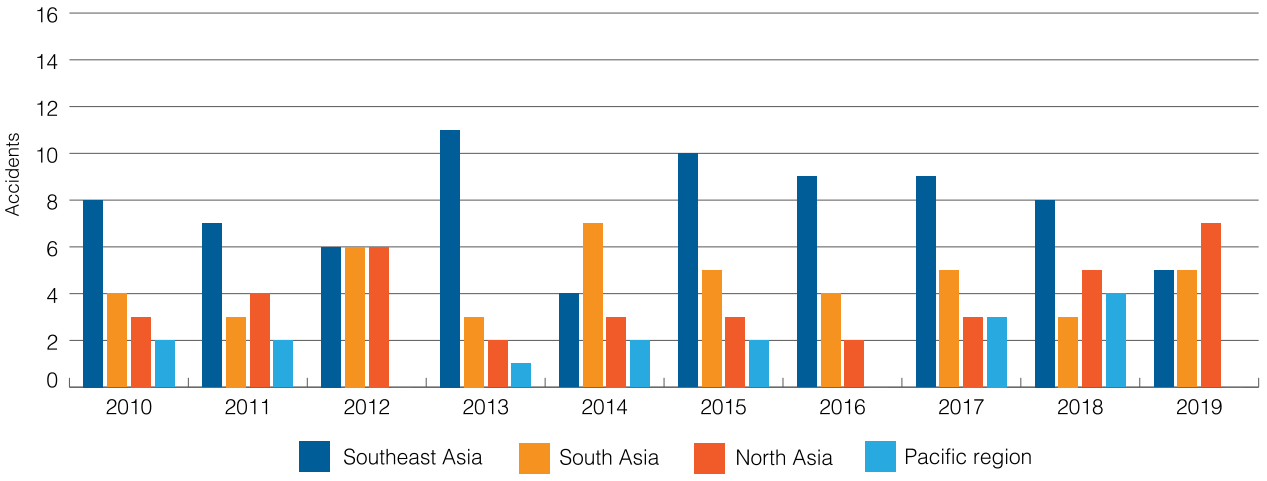


The five-year moving average shows a reduction in the accident rate trend for the South Asia and South-East Asia regions. Accident rates for these regions remain above the APAC and global average.

North Asia continued to have a five-year moving average accident rate below regional and global averages, with accident rates averaging less than one accident per million departures.

The Pacific region experienced a slight decrease in the five-year moving average accident rate in 2019 and remained below the APAC average.

Chart 7.5.3 iSTARS, SISG and OAG: APAC sub-regions accident numbers (2010–2019)



The distribution of the accidents shown in Chart 7.5.3 indicates that the SEA region had the highest total number of accidents (77) over the last 10 years and highest number each year among the sub-regions except in 2014 and 2019. In 2019, North Asia had seven accidents, the highest number since the previous record in 2012.

In 2019, both the SEA and SA region accounted for 29 per cent each of the total number of accidents in the APAC region, with North Asia representing 41 percent of accidents recorded in APAC over the same period.

Chart 7.5.4 iSTARS, SISG and OAG: APAC sub-regions fatal accident numbers (2010–2019)

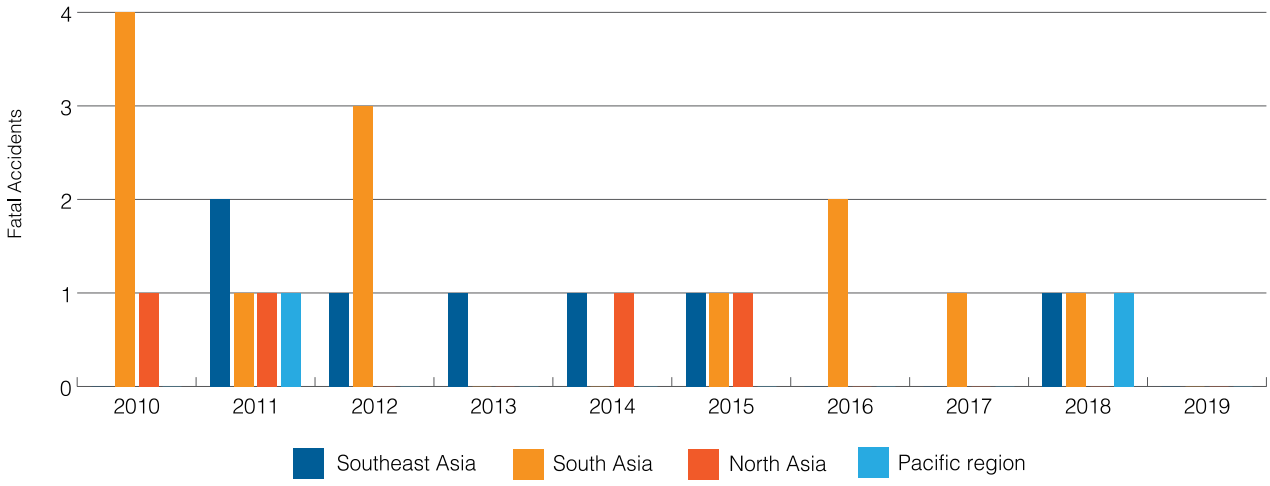


Table 7.5.1 iSTARS, SISG: APAC sub-regions top three fatal accident categories (2010–2019)

	SEA Region				SA Region				NA Region				Pacific Region			
Year	RS	LOC-I	CFIT	Total	RS	LOC-I	CFIT	Total	RS	LOC-I	CFIT	Total	RS	LOC-I	CFIT	Total
2010	0	0	0	0	1	0	2	3	0	1	0	1	0	0	0	0
2011	0	1	0	1	0	0	1	1	0	0	0	0	1	0	0	1
2012	0	0	1	1	0	0	1	1	0	0	0	0	0	0	0	0
2013	0	1	0	1	0	0	0	0	1	0	0	1	0	0	0	0
2014	0	1	0	1	0	0	0	0	0	0	1	1	0	0	0	0
2015	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0
2016	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0
2017	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0
2018	0	1	0	1	1	0	0	1	0	0	0	0	1	0	0	1
2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	**0**	**4**	**1**	**5**	**4**	**1**	**4**	**9**	**1**	**1**	**1**	**3**	**2**	**0**	**0**	**2**

Table 7.5.1 shows the breakdown of top three fatal accident categories by APAC sub-regions. The SEA sub-region recorded the most LOC-I fatal accidents (four) over the last 10 years while the SA region recorded the most runway safety-related fatal accidents (four) over the same period.

Table 7.5.2 APAC accident categories (RS, LOC-I, CFIT) (2017–2019)

	SEA Region				SA Region				NA Region				Pacific Region			
Year	RS	LOC-I	CFIT	Total	RS	LOC-I	CFIT	Total	RS	LOC-I	CFIT	Total	RS	LOC-I	CFIT	Total
2017	5	0	0	5	4	0	0	4	2	0	0	2	0	0	0	0
2018	4	1	0	5	3	0	0	3	4	0	0	4	3	0	0	3
2019	0	0	0	0	5	0	0	5	0	0	0	0	0	0	0	0
Total	**9**	**1**	**0**	**10**	**12**	**0**	**0**	**12**	**6**	**0**	**0**	**6**	**3**	**0**	**0**	**3**

Table 7.5.2 shows the SA sub-region had the highest number of accidents related to runway safety (RS) in 2017–2019. RS was also the top accident category for SEA, NA and Pacific regions.

07 Proactive safety information

Proactive safety information is gathered through analysis of existing or real-time situations, and is a primary function of the safety assurance team with 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 a number of sources, but this report focuses on the ICAO USOAP CMA.

8.1 ICAO Universal Oversight Audit Programme Continuous Monitoring Approach (USOAP CMA)

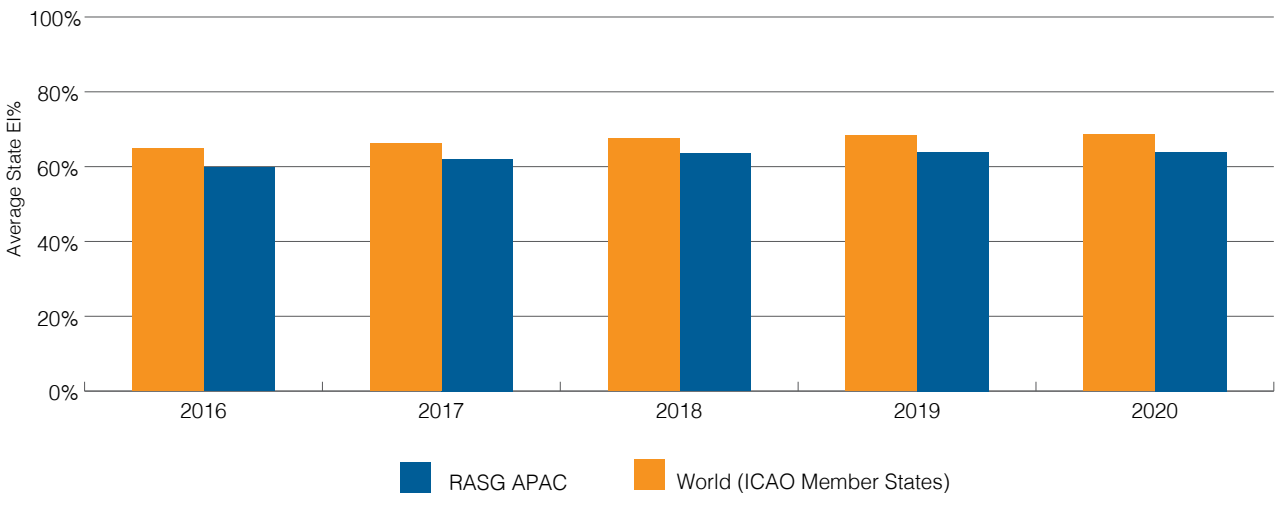
USOAP audits focus on a State's capability to provide safety oversight by assessing whether it has effectively and consistently implemented the critical elements (CE) of a safety oversight system. It also determines the State's level of implementation of ICAO's safety-related standards and recommended 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 programme was launched in January 2013. Comprehensive information relating to USOAP CMA is available on the USOAP CMA online framework at **www.icao.int/usoap**

The overall EI for the RASG-APAC region in 2020 increased to 63.93 per cent (as shown in Chart 8.1). The EI score has been mostly stable for the past few years and reasonably below the global level which was 68.56 per cent in 2020.

Chart 8.1 – RASG-APAC overall implementation

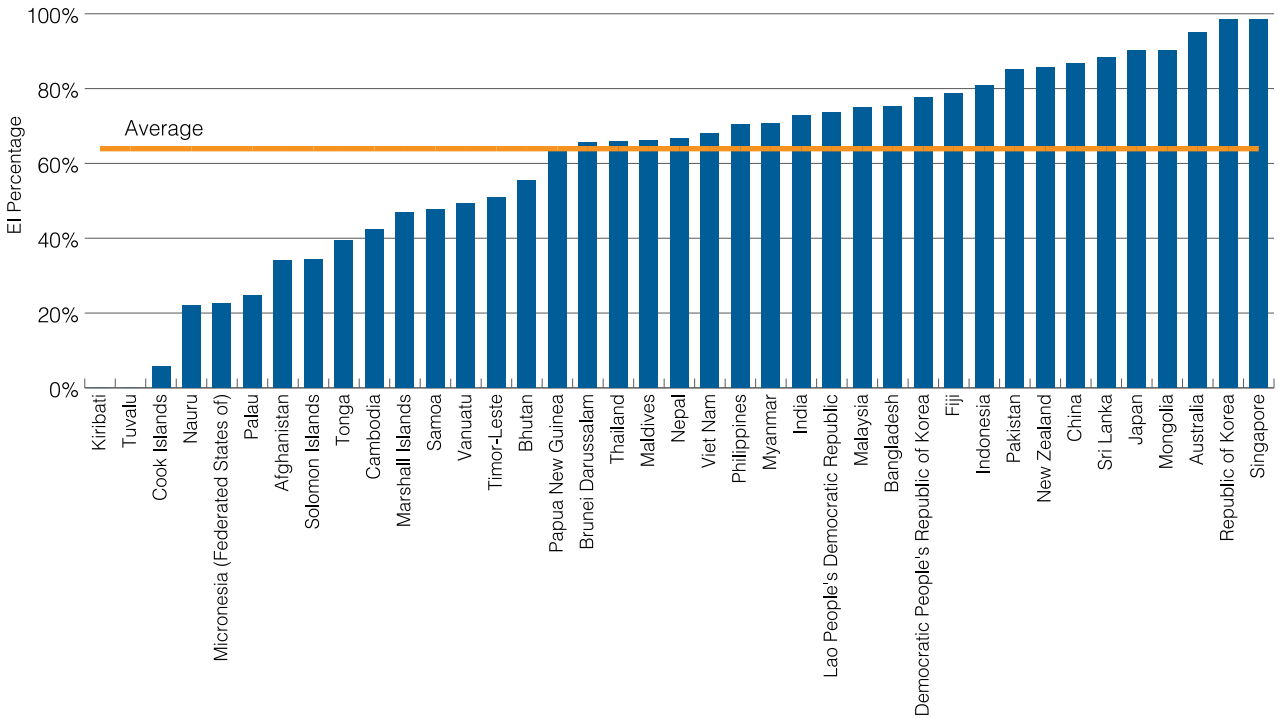


Note - Data was extracted from the iSTARS database on 15 August 2020.

Chart 8.2 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:

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

Chart 8.2 – Overall EI for RASG-APAC States



The EI by CE in Chart 8.3 revealed that resolution of safety concerns (CE 8) had the lowest implementation score of 49.7 per cent for the RASG-APAC, followed by CE 4 (54.03 per cent) and CE 7 (58.07 per cent) respectively. In comparison to all ICAO member States, RASG-APAC had lower average scores for all CEs with surveillance obligations (CE7) being the closest in comparison.

Chart 8.3 – Overall EI by critical element RASG-APAC States compared to all ICAO member States

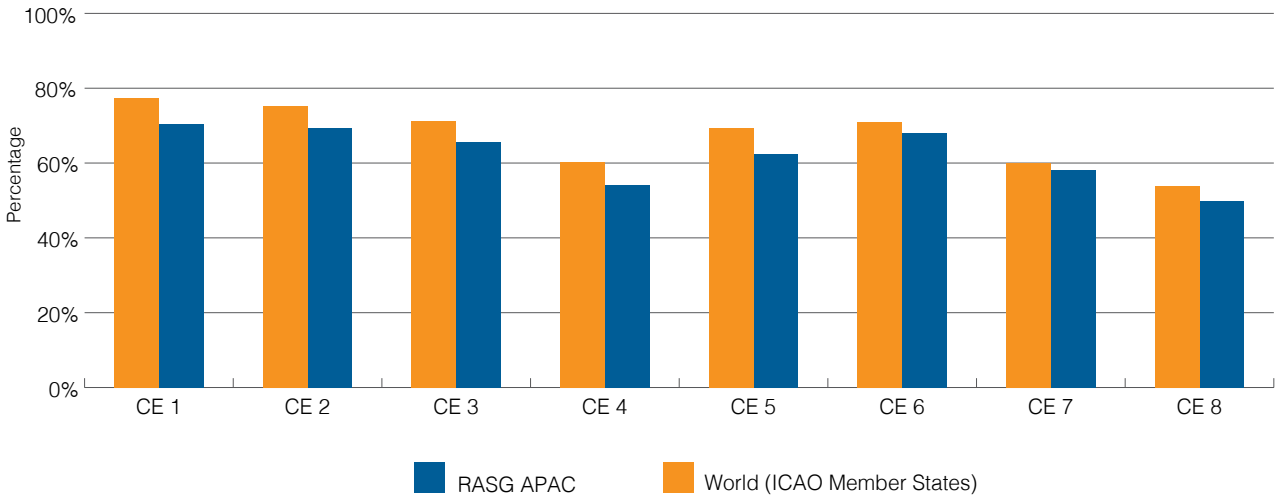
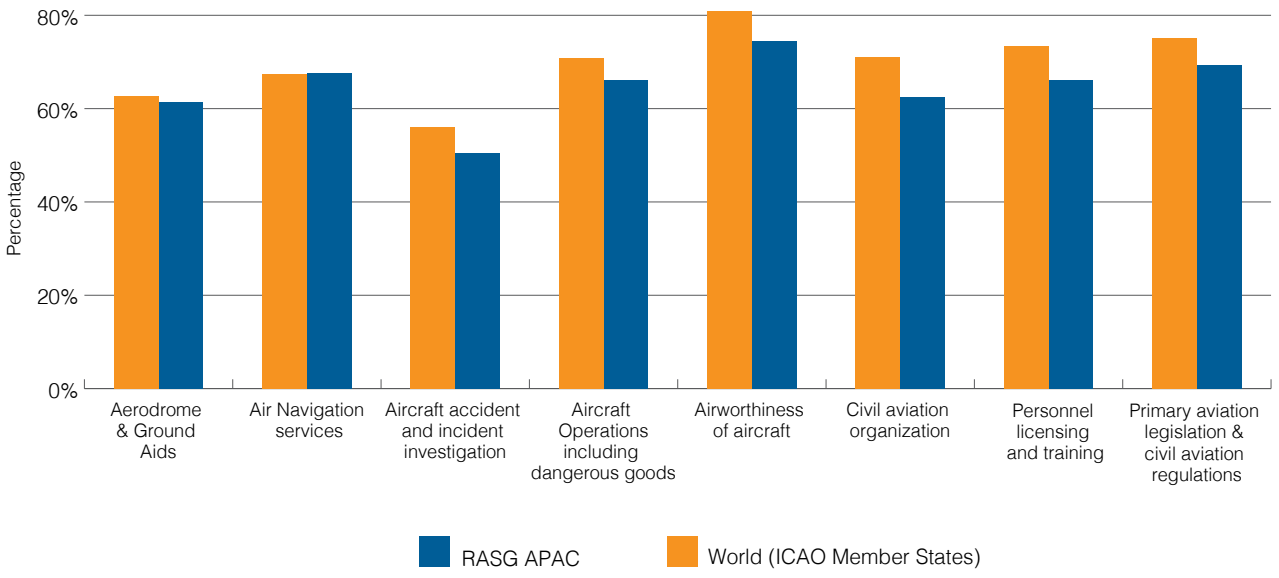


Chart 8.4 displays the overall EI by area compared to all ICAO member States. The data indicates that RASG-APAC has a marginally higher score than the world average for air navigation services, an achievement that was reached in the past year.

Chart 8.4 – Overall EI by area RASG-APAC States compared to all ICAO member States



08 Conclusion

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 2010 and 2019 were:

- loss of control in flight (LOC-I)
- controlled flight into terrain (CFIT)
- runway safety.

Safety information from IATA and CAST also revealed that CFIT, LOC-I, runway undershoot and runway/taxiway excursion are the accident categories with the highest fatality risks in APAC region, while runway/taxiway excursions, hard landing and in-flight damage accounted for the highest number of accidents. It should also be noted that landing-related accidents continue to be the flight phase with the most number of accidents. The APAC region should continue to focus its efforts on mitigating and minimising occurrences relating to these categories and phases.

Proactive safety information

The EI score for the RASG-APAC region marginally increased in 2020 (63.93 per cent) as compared to 2019 (63.91 per cent). The EI for the RASG-APAC region was lower than global average by CE. Of these, *Technical personnel qualifications and training* (*CE4*) and *Resolution of safety concerns* (*CE-8*) were lowest at 54.03 and 49.72 per cent respectively. Both of these critical elements also contain scores among the lowest across the global averages, suggesting they appear to be a consistent issue across the world.

09 List of acronyms

ACAS	Airborne collision avoidance systems
ADREP	Aviation Data Reporting Programme
ADRM	Aerodrome
AFI	Africa (IATA Region)
AGA	Aerodrome and ground aids
AIG	Accident Investigation Working Group
AIS	Aeronautical information service
AMAN	Abrupt manoeuvre
ANSP	Air navigation service provider
AOC	Air operator certificate
APAC	Asia Pacific
APR	Approach
APRAST Team	Asia Pacific Regional Aviation Safety
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
CE	Critical Element
CFIT	Controlled flight into terrain
CICTT	CAST/ICAO Common Taxonomy Team
CIS	Commonwealth of Independent States (IATA Region)
CMA	Continuous monitoring approach
COSCAP	Cooperative Development of Operational Safety and Continuing Airworthiness Programme
CRM	Crew resource management
CRZ	Cruise
CSA	Comprehensive systems approach
CVR	Cockpit voice recorder
DFDR	Digital flight data recorder
DGAC	Directorate General of Civil Aviation
DGCA	Directors-General of Civil Aviation Conference
DH	Decision height
E-GPWS	Enhanced ground proximity warning system
EI	Enhancement initiative(s)
ETOPS	Extended range operations by turbine-engine aeroplanes
EDTO	Extended diversion time operations (replaces ETOPS)
EUR	Europe (ICAO and IATA Region)
EVAC	Evacuation
FDA	Flight data analysis
FLP	Flight planning (IATA)
F-NI	Fire/smoke (none- impact)
FMS	Flight management system
FOQA	Flight operations quality assurance
F-POST	Fire/smoke (post-impact)
FUEL	Fuel related
GASP	ICAO global aviation safety plan
GASR	Global Aviation Safety Roadmap
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
IAT	Information Analysis Team
IATA	International Air Transport Association
ICAO	International Civil Aviation Organization
ICE	Icing
ICL	Initial climb
IMC	Instrument meteorological conditions
INOP	Inoperative
IOSA	IATA operational safety audit
iSTARS	Integrated Safety Trend Analysis and Reporting System
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
MED	Medical
MEL	Minimum equipment list
MENA	Middle East and North Africa (IATA REGION)
MTOW	Maximum take-off weight
NAM	North America (ICAO and IATA Region)
NASIA	North Asia (IATA Region)
NASP	National Aviation Safety Plan
NAVAIDS	Navigational aids
NOTAM	Notice to airmen
OAG	Official Aviation Guide
OTH	Other
RA	Resolution advisory
RAMP	Ground handling operations
RASG	Regional Aviation Safety Group
RASP	Regional Aviation Safety Plan
RE	Runway excursion (departure or landing)
RE-Landing	Runway excursion - Landing
Re-Take-off	Runway excursion - Take-off
RI	Runway incursion
RI-A	Runway incursion – animal
RI-VAP	Runway incursion – vehicle, aircraft or person
RS	Runway safety
RSP	Regional safety programme
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
SEI	Safety enhancement initiative
SISG	Safety Indicator Study Group (ICAO)
SMS	Safety management system
SOP	Standard operating procedure
SRP	Safety Reporting Program
SRVSOP	Regional safety oversight system
SSP	State safety programme
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 programme
USOS	Undershoot/overshoot
WG	Working Group