Annual Safety Report

2021

ASIA PACIFIC REGION

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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).

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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 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 programme. The objectives of the 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 the APRAST, are two Working Groups:

1. Safety Enhancement Initiative Working Group (SEI WG) and
2. Safety Reporting Programme Working Group (SRP WG);

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) 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 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 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, 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 Program (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. To be included in the Annual Safety Report are:

- Reactive information and
- 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 Regional Aviation Safety Plan (RASP) as the States will be adopting the GASP 2020–22 to align themselves in developing a National Aviation Safety Plan (NASP) taking reference from the GASP and the region's Regional Aviation Safety Plan (RASP), which was approved by RASG-APAC/9, in November 2019.

More recently, the Regional Aviation Safety Plan Implementation Group has been formed to support and facilitate the implementation of the related APRAST action items.

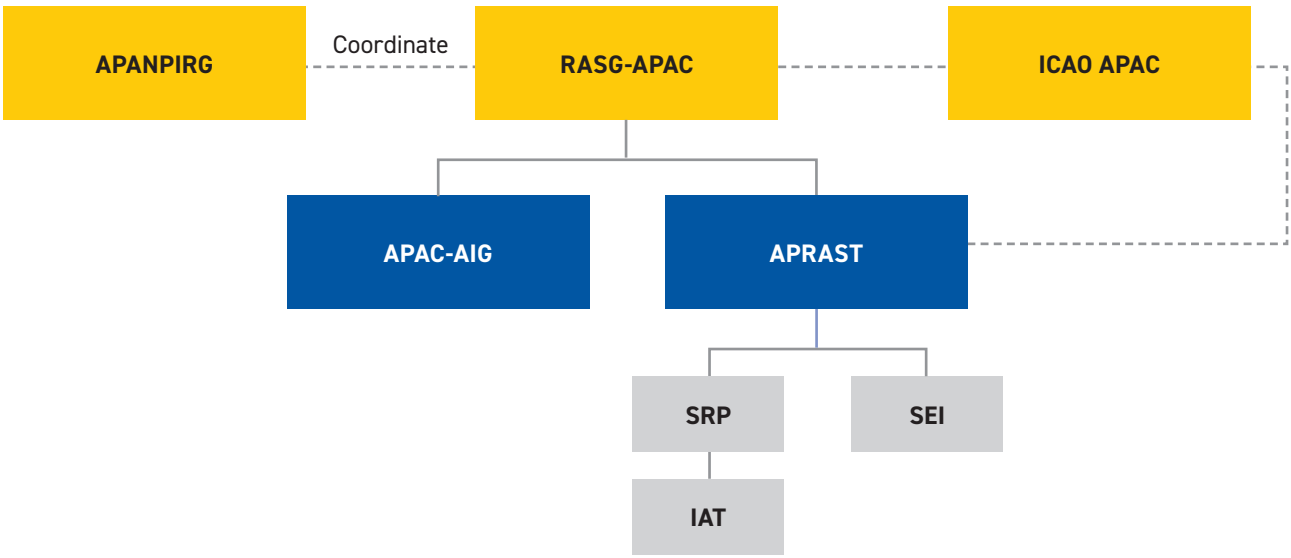
The organisational structure of the RASG-APAC and its subsidiary bodies is shown in Figure 1.1. The International Civil Aviation Organization (ICAO) Asia Pacific regional office in Bangkok provides the secretariat support necessary for the RASG-APAC to function.

The 2021 Annual Safety Report, developed by the SRP WG and published by RASG-APAC, is the 9th edition of the exclusive safety report for the Asia Pacific region based on data provided by ICAO, the US Commercial Aviation Safety Team (CAST) and the International Air Transport Association (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 iSTARS for the reference period 2011–2016, with data for 2017–2020 being sourced from ICAO's Safety Indicator Study Group (SISG), recently renamed the Occurrence Validation Study Group (OVSG). In subsequent APAC Annual Safety Reports, OVSG data will replace all iSTARS data beyond 2017, when OVSG data was made available.

This 9th 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 CMA.

In this report, the most frequent accident categories, 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, are identified.

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

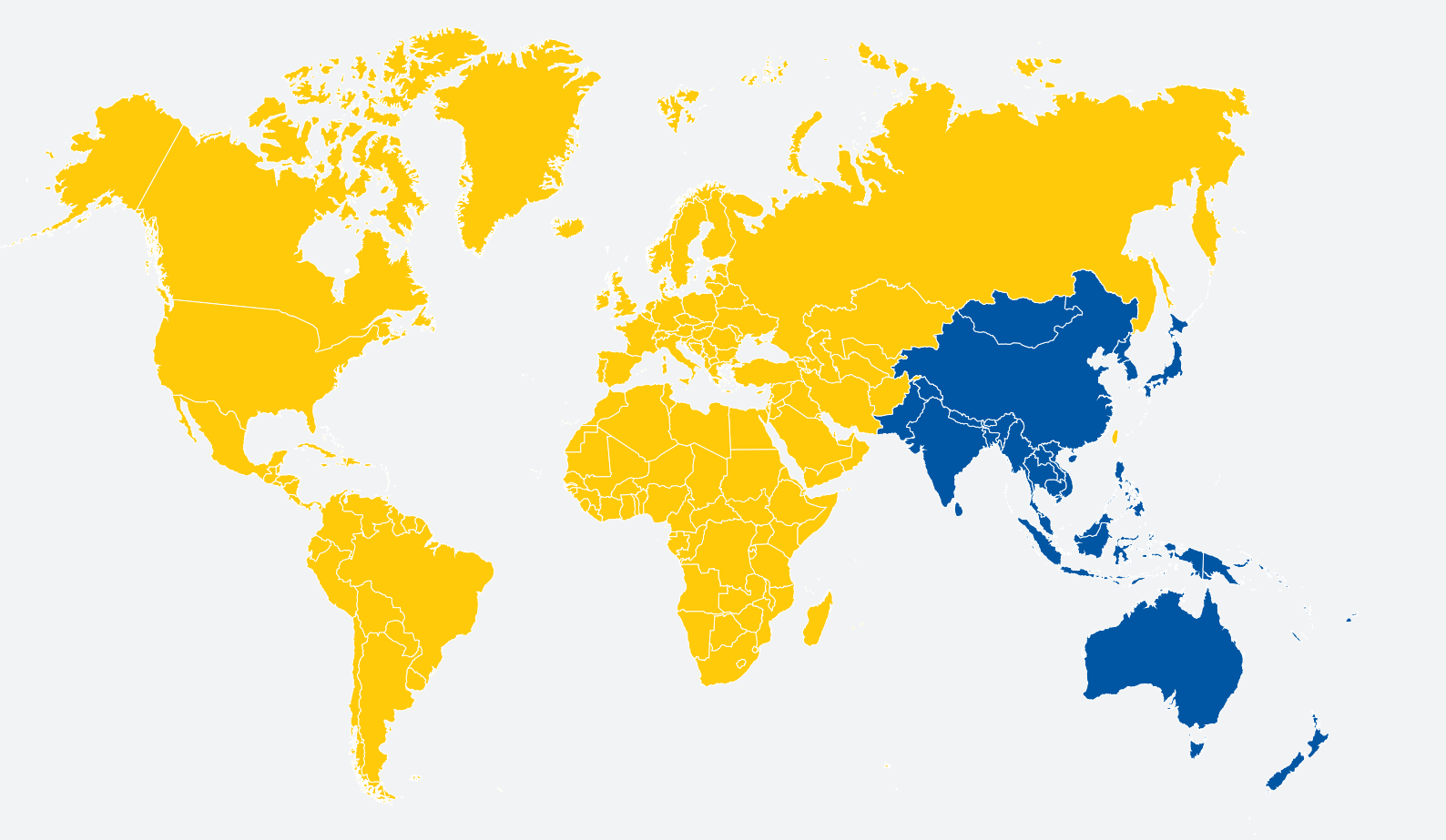


Table 2.1 Member States/Administration accredited with the ICAO Asia Pacific Office

Member States/Administration	
Afghanistan	Mongolia
Australia	Myanmar
Bangladesh	Nauru
Bhutan	Nepal
Brunei Darussalam	New Zealand
Cambodia	Pakistan
China	Palau
Hong Kong, China	Papua New Guinea
Macao, China	Philippines
Cook Islands	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 Information Analysis Team (IAT), a sub-group of the SRP Working Group 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 saw a gradual uptrend, rising from 2.15 accidents per million departures in 2016 to 2.96 per million departures in 2019 before easing to 2.14 accidents per million departures in 2020. On the other hand, the RASG-APAC accident rate has maintained a steady decline from 1.69 accidents per million departures in 2016 to 1.05 per million departures in 2020. On an annual basis however, 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 (with the exception of a marginal increase in 2019) and for RASG-APAC, has shown a consistent downward trend.

The number of accidents attributable to States/ Administrations in the RASG-APAC region in 2020 reduced to nine from 17 in 2019. In terms of fatalities, there were two fatal accidents in 2020, up from zero in 2019.

With both the global and APAC accident results, consideration must be given for the reduced activity levels resulting from the COVID–19 pandemic.

For 2020, the RASG-APAC's five-year moving average accident rate of one accident per 1.49 million departures, remains lower than the global average rate of one accident per 2.48 per million departures. The decline in accident numbers (down 47%) was more significant than the COVID–19 impact on departures (down 32%) contributing to the stronger APAC result relative to global accident rates.

The most frequent accidents, according to OVSG data, for RASG-APAC region in 2020 related to runway excursion and abnormal runway contact.

Proactive information analysis

The RASG-APAC region had an overall USOAP Effective Implementation (EI) score of 63.91 per cent in 2020, the same as in 2019. This result remains lower than the global level of 68.94 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–8 on Resolution of Safety Concerns and CE–4 on Technical Personnel Qualifications and Training had the lowest EI scores within RASG-APAC, at 49.6 and 54.03 per cent respectively. By area, Accident and Incident Investigation (AIG) and Aerodrome and Ground Aids (AGA) had the lowest EI scores of 50.50 per cent and 61.4 per cent respectively in RASG-APAC.

1 The safety information related to accidents is based on 2020 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 Programme (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 able to collectively focus on addressing these areas.

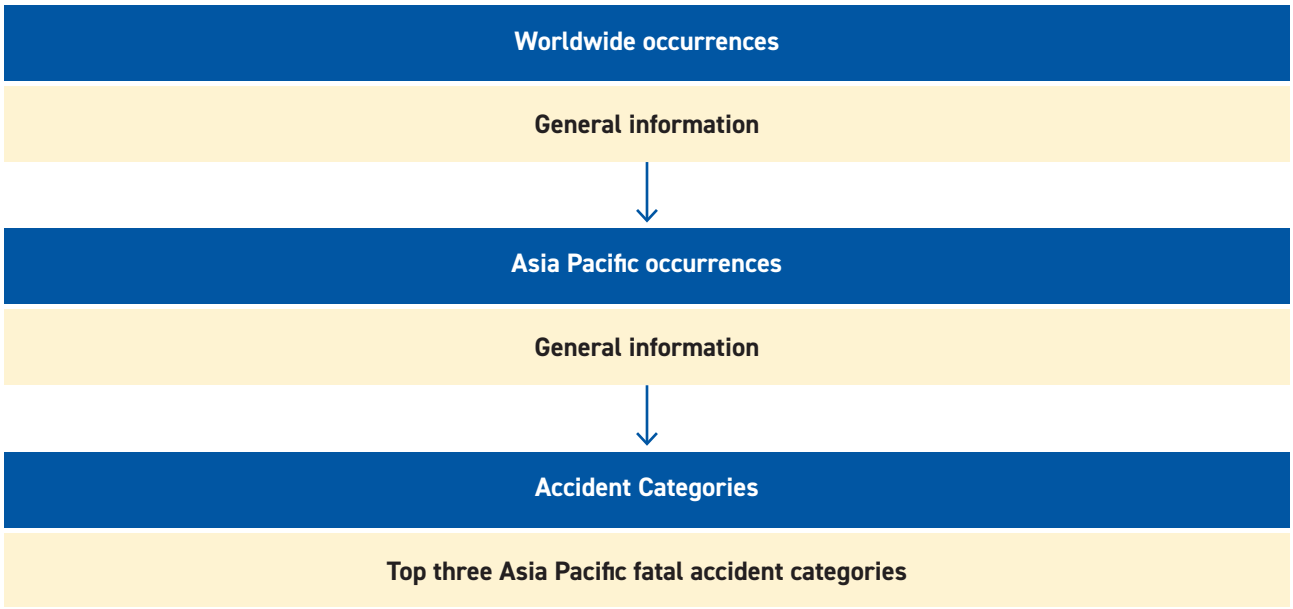
05 Approach for analysis

Our approach for the analysis is to process the accident information provided by ICAO, IATA and CAST, involving commercial aircraft having a 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, or 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 the 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 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 that 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 ADREP reports, validated by the OVSG . The OVSG reviews and validates aviation safety occurrence information supplied by member States' investigative bodies. The definition of an '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 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
  - Tailstrike
  - 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.

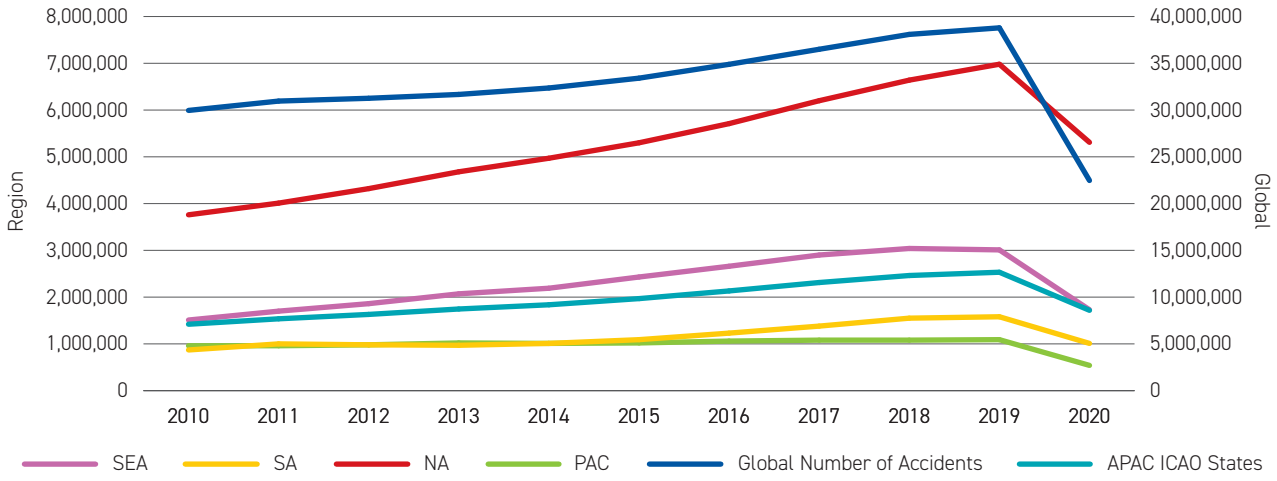
07 Global and Asia Pacific Safety Trends

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 OVSG 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.

The COVID–19 virus caused a significant reduction in the volume of air travel as countries closed their borders in order to deal with the pandemic. Comparing the flight numbers between 2019 and 2020, for both the APAC region and the rest of the world showed a reversal of the previous upward trend in traffic volume. Traffic volume was down 32.2% in the APAC region in 2020, a relatively small reduction in traffic volume as compared to the rest of the industry, where traffic volume declined by 42.1% globally between 2019 and 2020.

Chart 7.1.1 Change in Departures COVID 19 2020



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The accident rate in the APAC region has declined significantly over the last decade from 2.47 (2011) to 1.05 (2020) accidents per million departures. This compared favourably with the global trend where the rate of decline has been less, with accident rates at 2.14 accidents per million departures in 2020, down from 4.04 in 2011.

Comparing the accident rates between 2019 and 2020, a decrease is evident in both the APAC region and globally. The accident rate in APAC continued the downward trend with a rate of 1.05 accidents per million departures in 2020 as compared to a rate of 1.34 in the previous year. This was due to the large decrease in the number of accidents, which were down to nine in 2020 as compared to 17 in 2019. This resulted in a large decrease in the accident rate, even after considering the lower overall traffic volume in 2020. The rate of decline, on a 5-year trend basis eased globally in 2020, whereas for APAC, the 5-year trend continued at a similar rate of decline as in previous years.

Charts 7.1.2 and 7.1.3 ICAO iSTARS, OVSG and OAG: Global accident/fatal accident rate versus APAC accident/ fatal accident rate, including five-year Sliding Average (2011–2020)

Chart 7.1.2 Global vs RASG-APAC Accident Rate 2011-2020

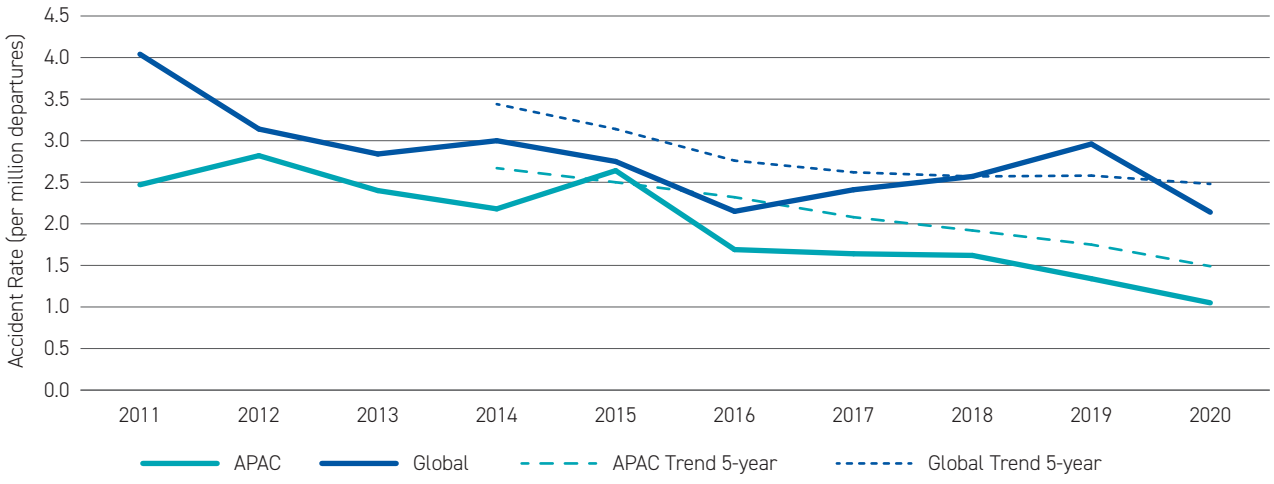
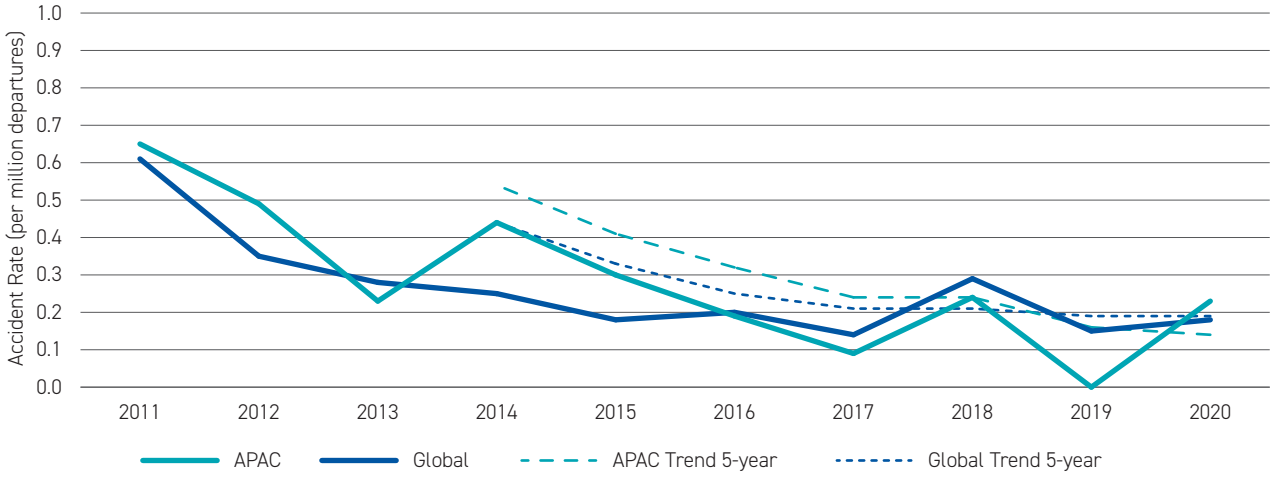


Chart 7.1.3 Global vs RASG-APAC FATAL Accident Rate 2011-2020



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Globally, the decrease in accident rates in 2020 shows a reversal of the accident rate trend over the previous three years, where the accident rate had been increasing between 2016 and 2019 from 2.15 to 2.96 respectively. In 2020, the accident rate decreased to 2.14 accidents per million departures, representing the lowest accident rate in the last decade.

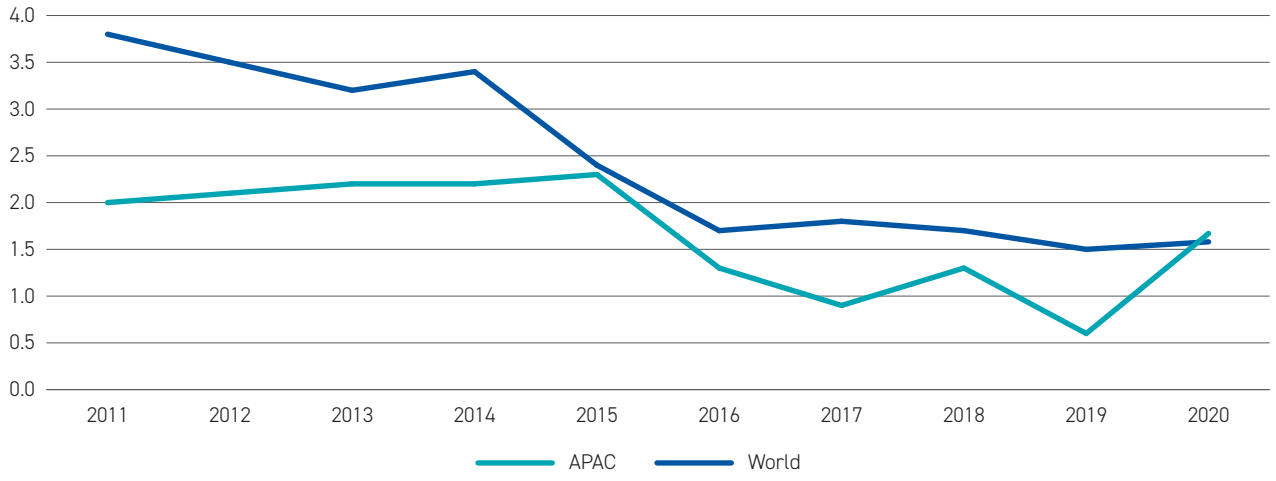
The five-year moving average does highlight that the medium-term trend remains positive with accident rates continuing to ease since 2014, both globally and within the APAC region.

On a 5-year trend basis, fatal accident rates globally and for the APAC region have stabilised at less than 0.2 fatal accidents per million departures.

Accident rates according to the IATA dataset are shown in Chart 7.1.4. The IATA dataset shows an increase in the accident rates both within APAC and globally in 2020 compared to 2019. This is in contrast with the data from the ICAO dataset in Chart 7.1.2, which shows a decrease in accident rates in the same period. However, both datasets continue to show an overall downward trend in the accident rates for both APAC and globally.

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.

Chart 7.1.4 IATA: APAC region's Accident Rate (2011 to 2020)



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.

The large reduction of traffic volume in 2020, due to the global pandemic, has contributed to a decrease in total accident numbers. In the APAC region, a total of 9 accidents were recorded, with 2 being fatal accidents. This represents a decrease from the previous years, with 17 total accidents in 2019. This decline is proportional to the decline in activity. A summary of the accident numbers over the past 10 years is shown in Chart 7.2.1.

Comparing this to the long-term trend in accident numbers shows a significant decrease in 2020 as compared to the prior 5-year average of 15. However, for fatal accidents, the 2 accidents reported in 2020 are in fact higher than the 5-year average for fatal accidents of 1.6.

Chart 7.2.1 ICAO iSTARS, OVSG and OAG: Number of accidents – RASG-APAC (2011–2020)

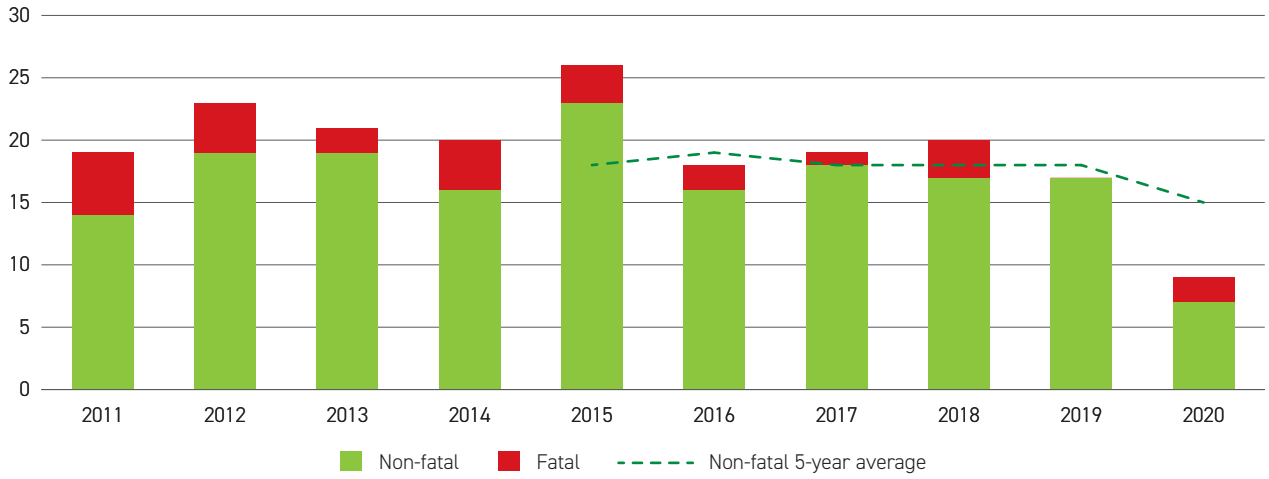


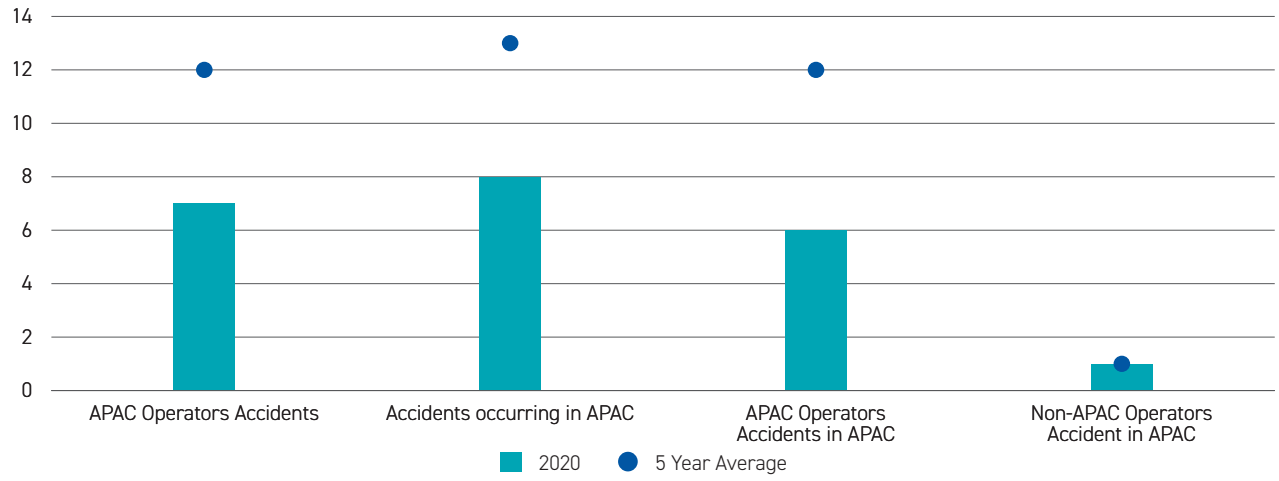
Table 7.2.1 IATA: Accident Count from 2016 to 2020 (Region of Occurrence vs Region of Operator)

	2016	2017	2018	2019	2020
APAC Operators Accidents	15	12	18	9	7
Accidents occurring in APAC	17	12	17	9	8
APAC Operators Accidents in APAC	15	12	16	9	6
Non-APAC Operators Accident in APAC	2	0	1	0	1

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) declined further in 2020, based on IATA data. These numbers were the lowest seen over the past five years, with this result likely impacted by the decline in activity post-onset of COVID–19.

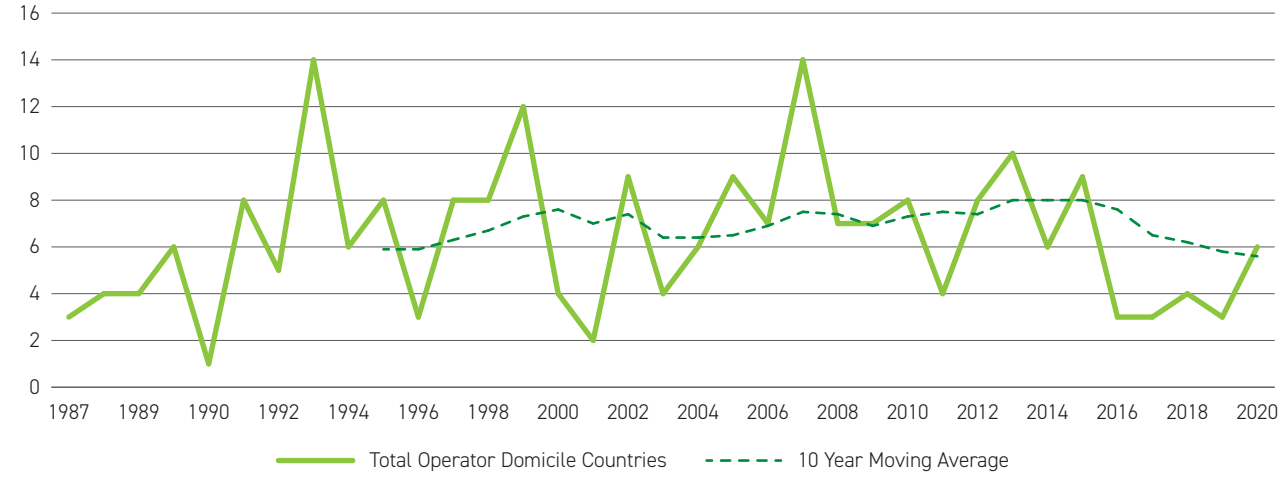
Chart 7.2.2 IATA: APAC Operator Accidents



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

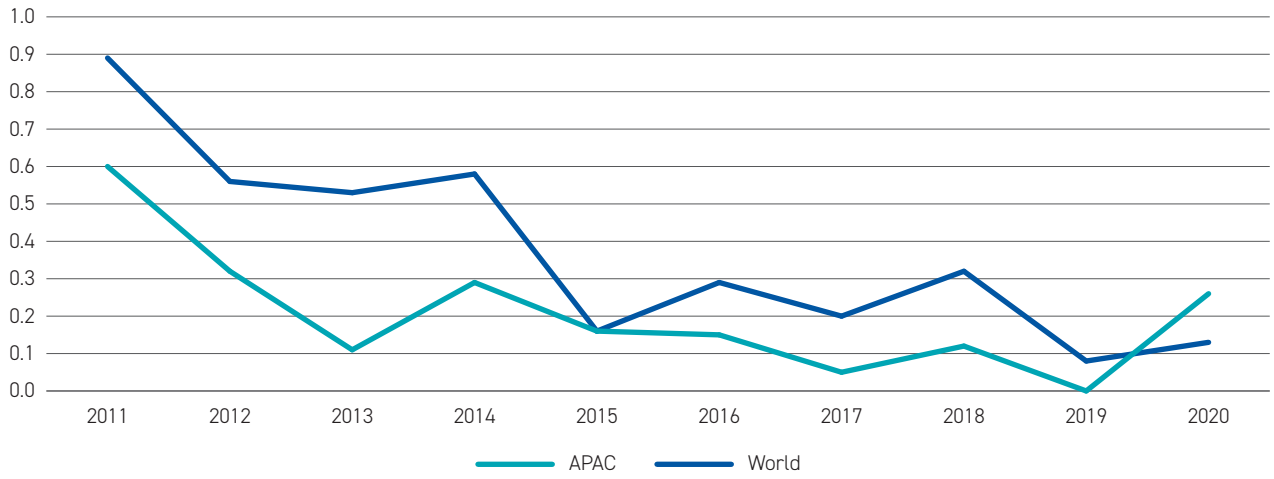
Data from CAST, shown in Chart 7.2.3, shows the number of accidents of Western-built airplanes flown by operators based in APAC countries which resulted in hull loss or fatalities from 1987 to 2020. The number of accidents decreased slightly from four in 2018 to three in 2019, before spiking to six in 2020 despite reduced activity levels from COVID–19. This level was on par with the 10 -year 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 nine (2015) to six (2020), over the past five years. Interestingly, the 10-year moving average for hull loss or fatal accident occurrences was similar in 2020 to fifteen years prior in 1995.

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



Two fatal accidents occurred in the APAC region in 2020, which resulted in four fatalities. 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 (2011 to 2020)



Over the last 10 years, the APAC region's yearly hull loss occurrence rate has also been lower than the global rate, with the exception of 2020, where the reverse was true. APAC's accident rate resulting in hull losses has increased from 0.14 accidents per million sectors in 2019 to 0.48 accidents per million sectors in 2020. This was comparable to the global overage of 0.41 accidents per million sectors.

Chart 7.2.5 IATA: Hull loss rates (2011 to 2020)

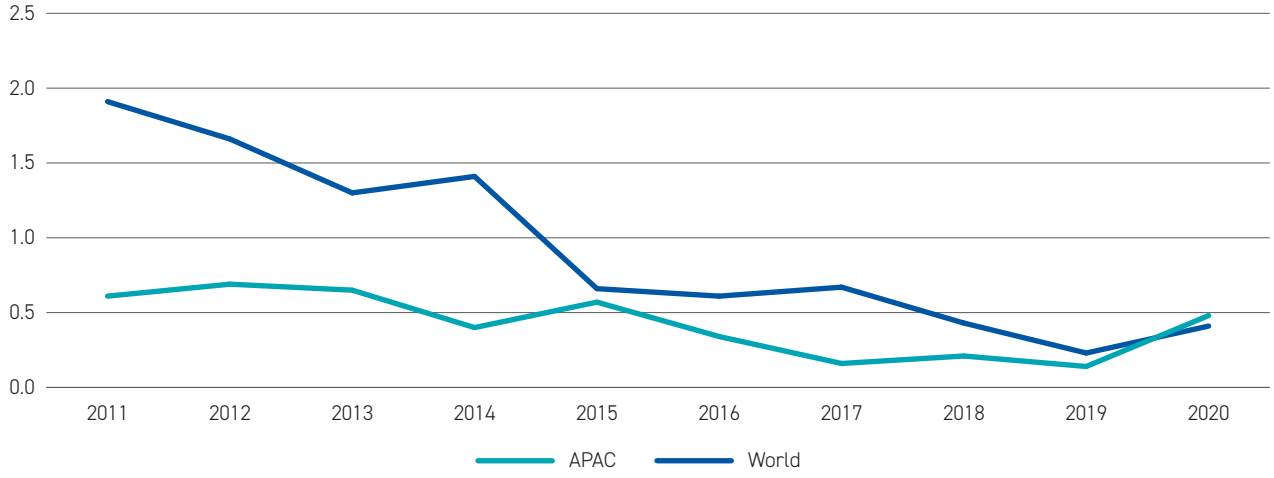
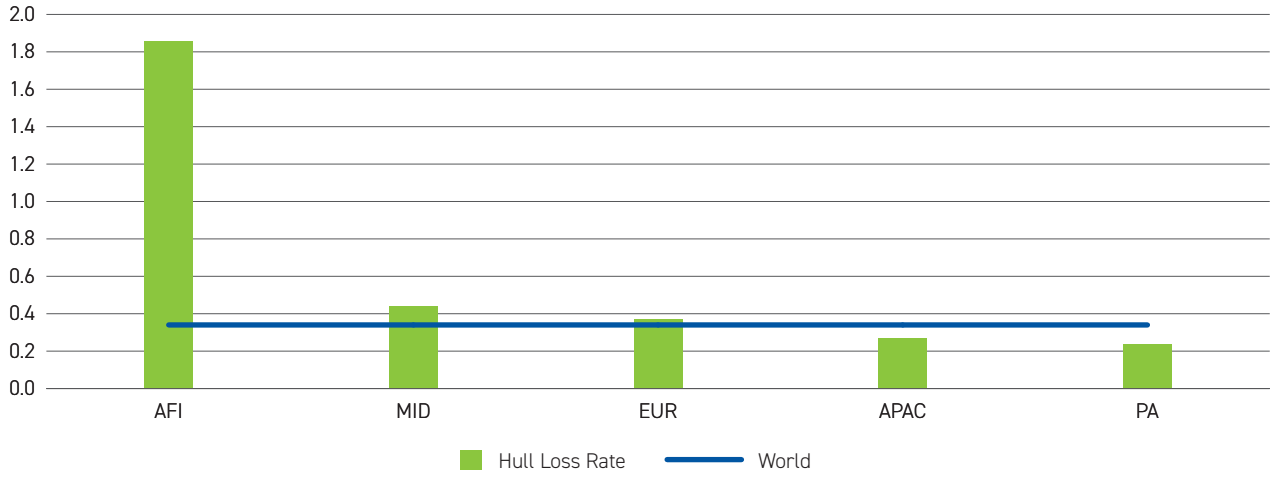
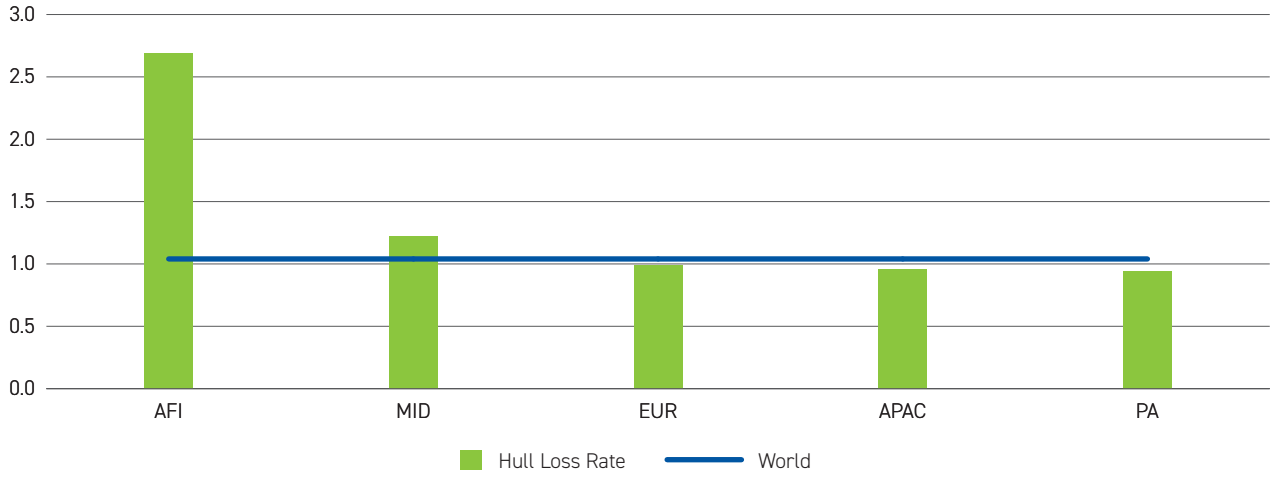


Chart 7.2.6 IATA: Hull Loss Rates (2016 to 2020) per million sectors



Focusing on the last 5-years and despite the increase in hull loss rates in APAC in 2020, APAC continues to compare favourably with other regions around the world remaining below the global average.

Chart 7.2.7 IATA: Substantial Damage Rates (2016 to 2020) per million sectors



The APAC Region fared better than the global average, albeit marginally, with a 5-year average substantial damage rate of 0.96 per million sectors flown.

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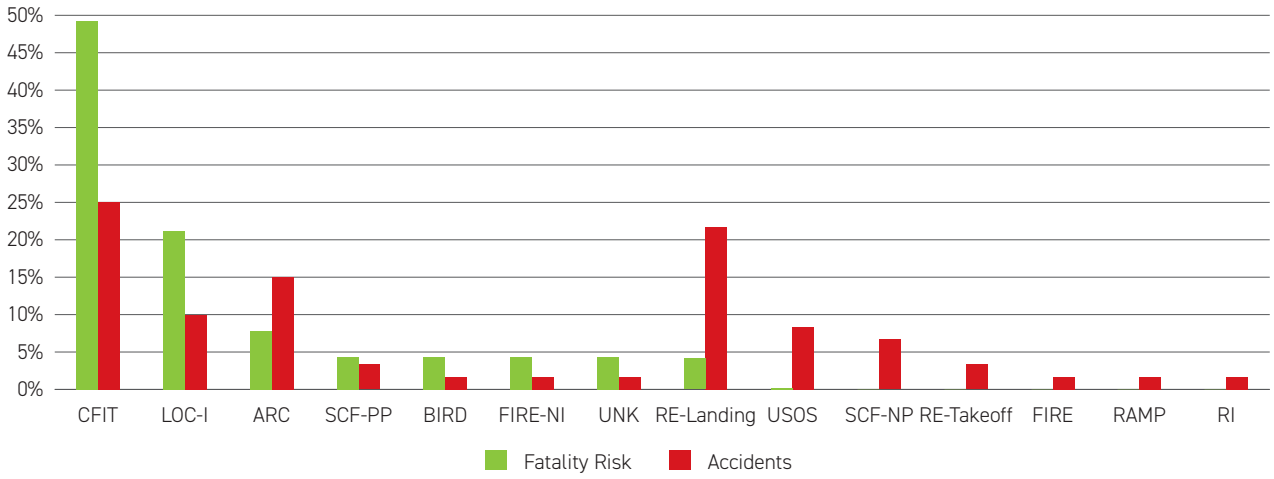
7.3 Global and APAC accident categories

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 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 2020, continuing a trend over the past five years for APAC.
- Accidents attributable to LOC-I also remained at zero in 2020.
- Runway/taxiway excursion recorded a significant decrease in 2020, with 0.06 accidents per million sectors, down from 0.41 accidents per million sectors in 2019.

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

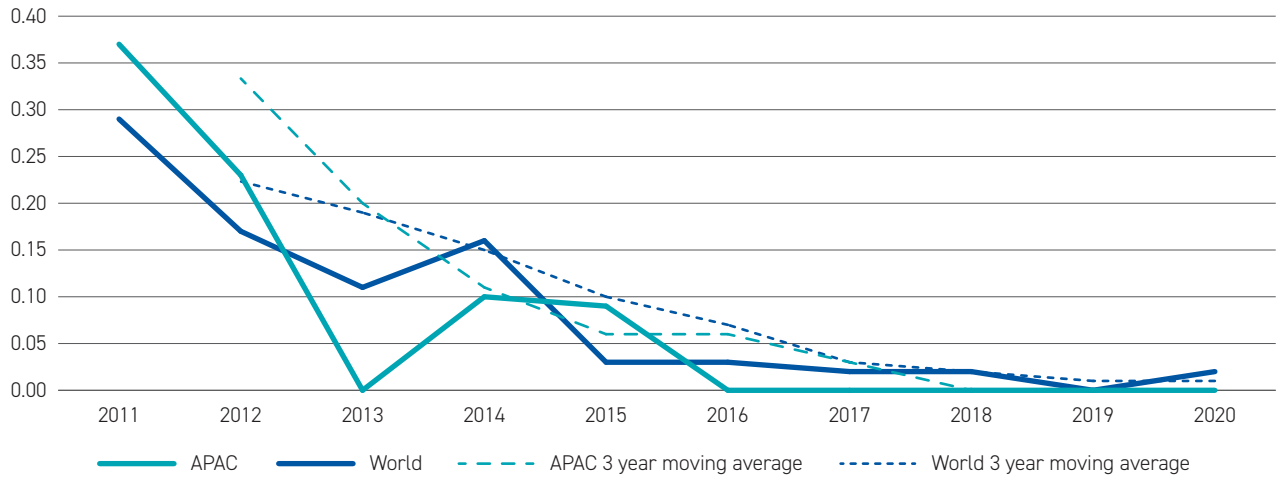


Chart 7.3.3 IATA: Annual loss of control in flight accident rate (APAC vs. World)

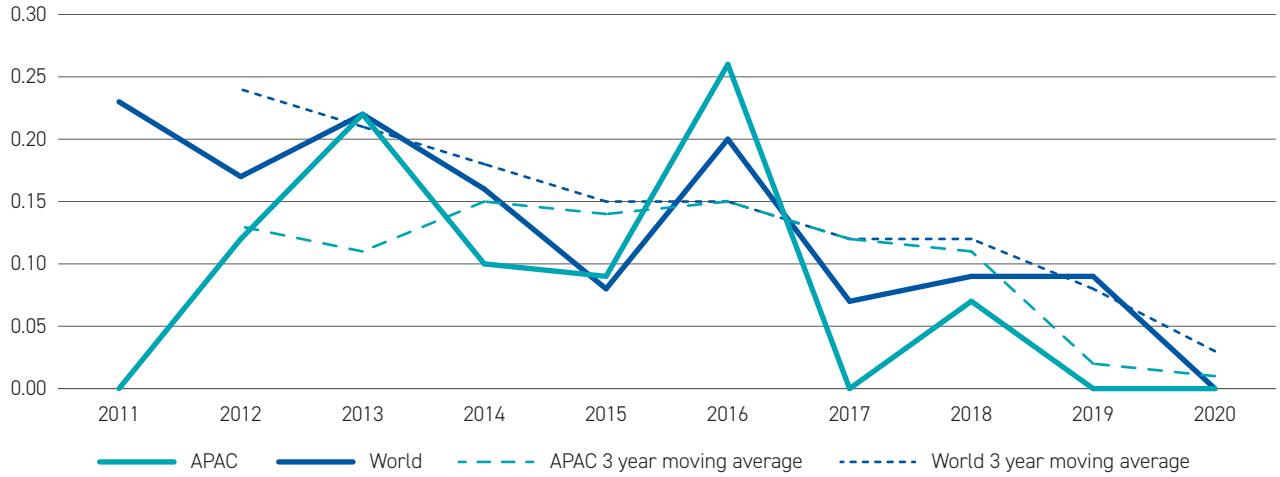
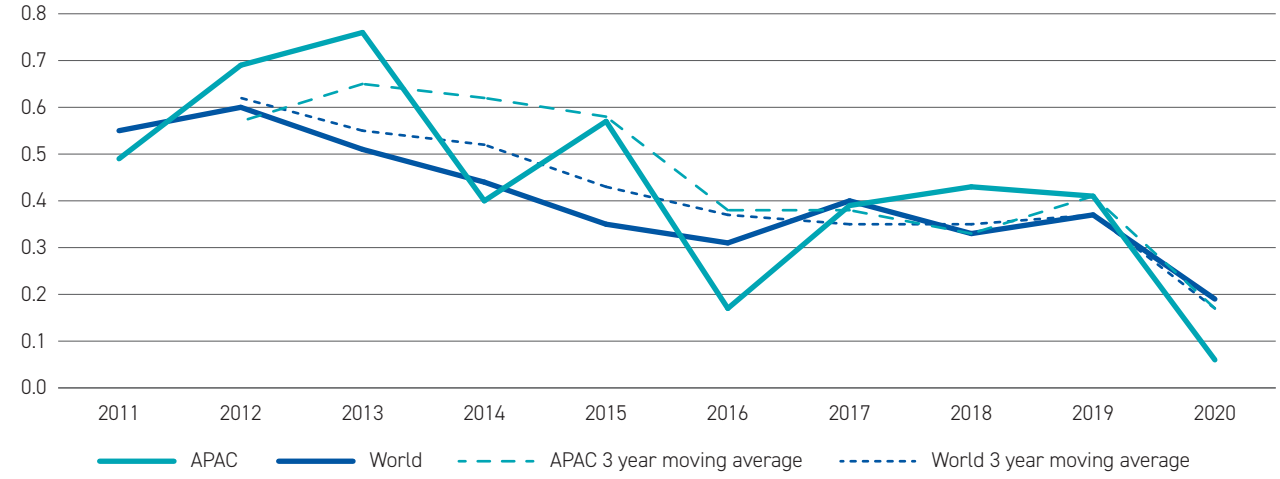


Chart 7.3.4 IATA: Annual runway/taxiway excursion accident rate (APAC vs. World)



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

Table 7.3.1 iSTARS and OVSG: APAC fatal accident categories (2011–2020)

	TURB	F-NI	UNK	OTH	SCF	RS	LOC-I	C-FIT	RE	ARC	ADRM	USOS	Total	Runway safety or related events
2011	0	1	1	0	0	1	1	1	0	0	0	0	5	1
2012	0	0	1	0	1	0	0	2	0	0	0	0	4	0
2013	0	0	0	0	0	1	1	0	0	0	0	0	2	1
2014	0	0	1	1	0	0	1	1	0	0	0	0	4	0
2015	1	0	0	0	0	1	0	0	0	0	0	1	3	1
2016	0	0	0	0	1	0	1	0	0	0	0	0	2	0
2017	0	0	0	0	0	0	0	0	0	0	0	1	1	0
2018	0	0	0	0	0	0	1	0	1	1	0	1	4	2
2019	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2020	0	0	0	0	0	0	0	0	1	1	0	0	2	2
Total	**1**	**1**	**3**	**1**	**2**	**3**	**5**	**4**	**2**	**2**	**0**	**3**	**27**	**7**

Table 7.3.2 iSTARS and OVSG: APAC accident categories (2017–2020)

	TURB	F-NI	RE	GS	Other	RS	LOC-I	C-FIT	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
2020	3	1	0	0	0	0	0	0	0	3	0	0	0	7	3
Total	**19**	**2**	**14**	**1**	**3**	**15**	**1**	**0**	**0**	**7**	**1**	**0**	**1**	**64**	**38**

More recently, the three most common accident categories for the APAC region in 2020 were turbulence (TURB), runway safety (RS), runway excursion and abnormal runway contact (ARC). Turbulence-related accidents were the most frequently occurring category in the APAC region over the last three years (2018–2020), as indicated in Table 7.3.2. This is followed by the runway excursion and runway safety accident categories which recorded 14 and 15 occurrences respectively, over the same timeframe.

As can be seen in Chart 7.3.2, data from IATA shows that over the last five years (from 2016 to 2020), runway excursion, hard landing and in-flight damage were in the top three accident categories in the region. For fatal accidents (Chart 7.3.1), the top two accident categories from 2016 to 2020 were LOC-I and runway undershoot. In the same period, Chart 7.3.5 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.

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Chart 7.3.5 IATA: APAC accident category distribution (2016–2020)

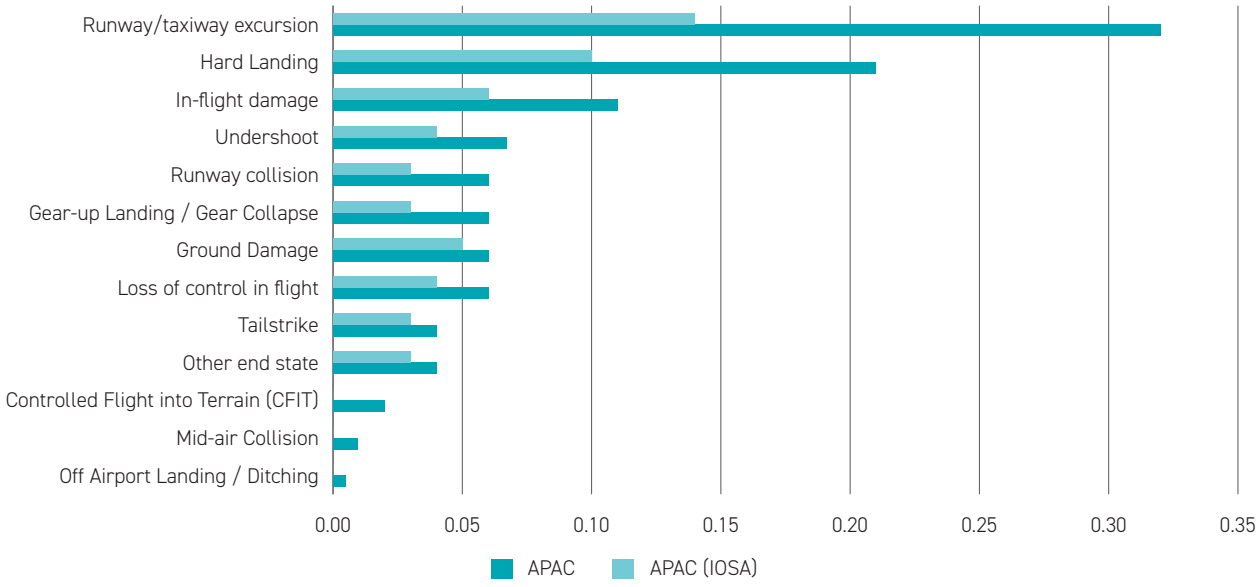
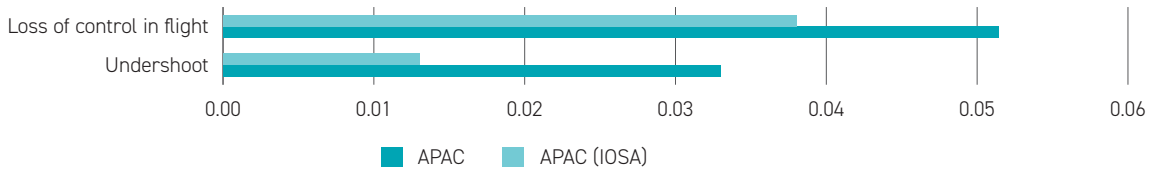
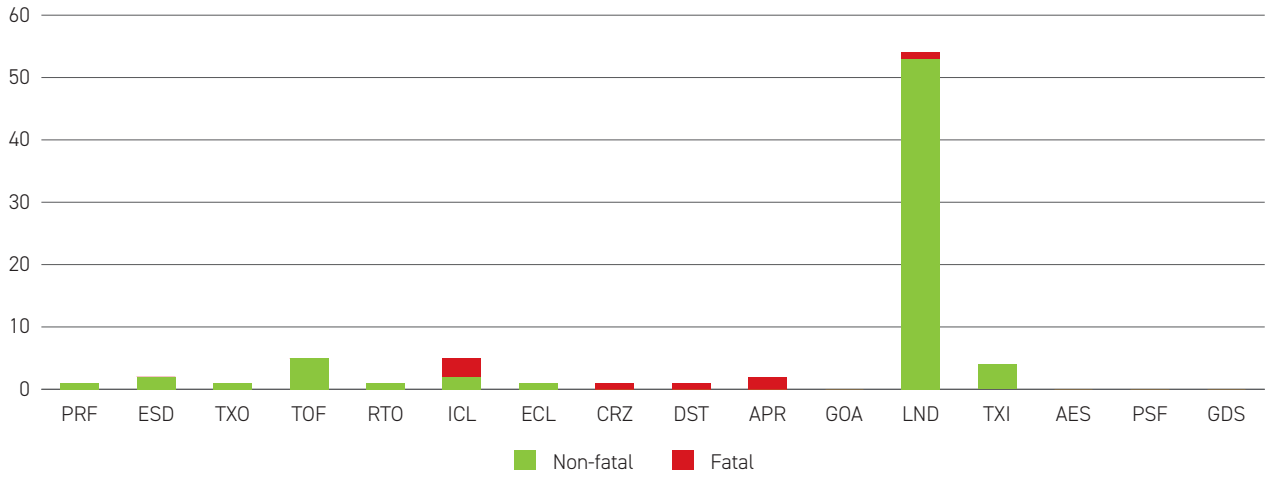


Chart 7.3.6 IATA: APAC fatal accident category distribution (2016–2020) *



**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 7.3.7 IATA: APAC accidents by flight phase (2016–2020)



Landing continues to be the phase where an accident is most likely in the APAC region with 53 such events in the APAC region over the past five years. More than three quarters (77%) of accidents involve landing with this representing a smaller proportion (13%) of non-fatal accidents.

The initial climb and approach phases of a flight accounted for the majority of fatal accidents in the APAC region in 2020.

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7.4 Top contributing factors to accidents within Asia Pacific

IATA's Top Contributing Factors to Accidents within Asia Pacific (Table 7.4.1), related to flight crew errors, latent conditions, counter measures, undesired aircraft states and environmental elements, accounted for the highest proportion of contributing categories over 2016–2020. The specific elements that related to these contributing factors are outlined below.

- Flight crew errors
  - manual handling / flight controls
  - standard operating procedure (SOP) adherence and SOP Cross-verification
- Latent Conditions
  - regulatory oversight
  - safety management
- Counter measures
  - overall crew performance
  - monitor/cross-check
- Undesired aircraft states
  - vertical / lateral / speed deviation
- Environmental
  - meteorology

The COVID-19 pandemic may have impacted the percentage of accidents involving various contributing factors.

Table 7.4.1 Top Contributing Factors to Accidents within Asia Pacific (2016–2020)

Contributing Factors	% of All Accidents (involving Hull Loss or Substantial Damage)	Contributing Factors	% of Accidents (involving Hull Loss or Substantial Damage) IOSA Certified Airlines Only
Latent Conditions			
Regulatory Oversight	45.0%	Regulatory Oversight	42.9%
Safety Management	40.0%	Safety Management	42.9%
Flight Ops: Training Systems	25.0%	Flight Ops: Training Systems	25.7%
Environmental Threats			
Meteorology	36.7%	Meteorology	34.3%
Airport Facilities	20.0%	Thunderstorms	25.7%
Thunderstorms	23.3%	Airport Facilities	25.7%
Airline Threats			
Aircraft Malfunction	26.7%	Aircraft Malfunction	28.6%
Maintenance Events	11.7%	Maintenance Events	11.4%
Flight Crew Errors			
Manual Handling / Flight Controls	53.3%	Manual Handling / Flight Controls	51.4%
SOP Adherence / SOP Cross-verification	43.3%	SOP Adherence / SOP Cross-verification	45.7%
Pilot-to-Pilot Communication	20.0%	Pilot-to-Pilot Communication	25.7%
Undesired Aircraft States			
Vertical / Lateral / Speed Deviation	38.3%	Vertical / Lateral / Speed Deviation	42.9%
Unstable Approach	30.0%	Long/floated/bounced/firm/ off-centre/crabbed land	34.3%
Long/floated/bounced/firm/ off-centre/crabbed land	35.0%	Unstable Approach	28.6%
Countermeasures			
Overall Crew Performance	41.7%	Overall Crew Performance	42.9%
Monitor / Cross Check	31.7%	Monitor / Cross Check	31.4%
Leadership	18.3%	Leadership	22.9%

Asia-Pacific sub-regional safety trends

7.5 Sub-regional Accident Rates, Numbers and Categories

Chart 7.5.1 ICAO iSTARS, OVSG and OAG: APAC sub-regional accident rate (2011–2020)

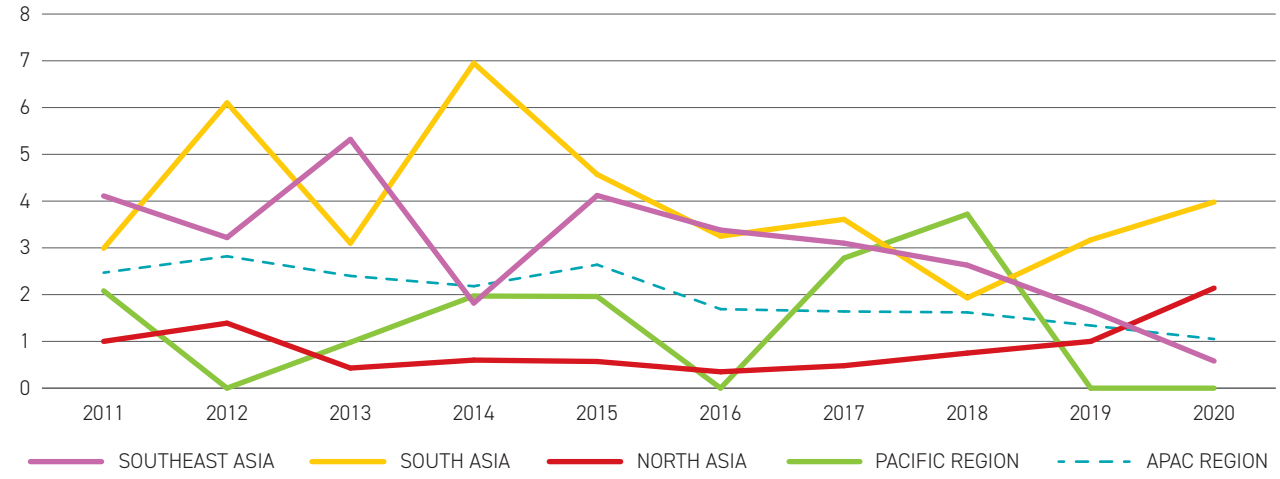


Chart 7.5.2 Fatal Accident Rate within APAC (by sub-region) 2011–2020

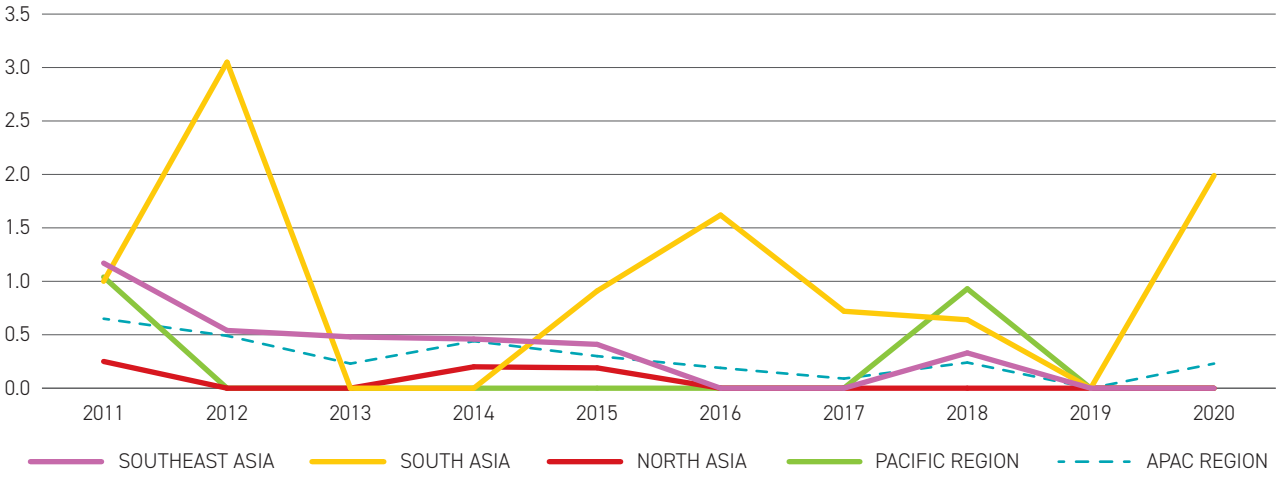
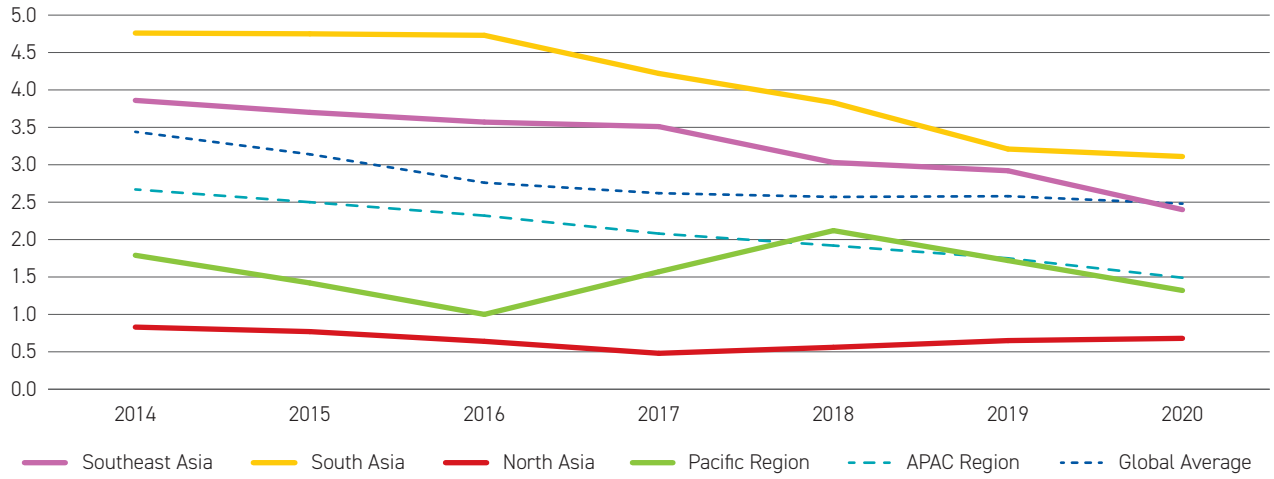


Chart 7.5.1 provides an illustration of the accident rates within APAC by sub-region. In line with the global uptrend, the North Asia and South Asia sub-regional accident rates also increased in 2020. In contrast, the Pacific sub-regional accident rate has dropped significantly from 3.72 accidents per million departures in 2018 to zero accidents per million departures in 2020, 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 0.58 accidents per million departures in 2020. 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 3.98 per million departures in 2020.

Chart 7.5.3 ICAO iSTARS, OVSG and OAG: APAC sub-regional accident rate 5-year moving average (per million departures) Year Moving Average (2014–2020)



The five-year moving average shows a reduction in the accident rate trend for all sub-regions excluding North Asia, however, North Asia maintains the lowest accident rate in the APAC region and despite the increase has an accident rate below 1 per million departures. This is well below both the APAC and global average.

Accident rates for the South Asia and South-East Asian regions remain above the APAC average. The Pacific region experienced a slight decrease in the five-year moving average accident rate to 2020 and now is below the APAC average.

Chart 7.5.4 Fatal Accident Rate (per million departures) within APAC (by sub-region) – 5-Year Moving Average 2014–2020

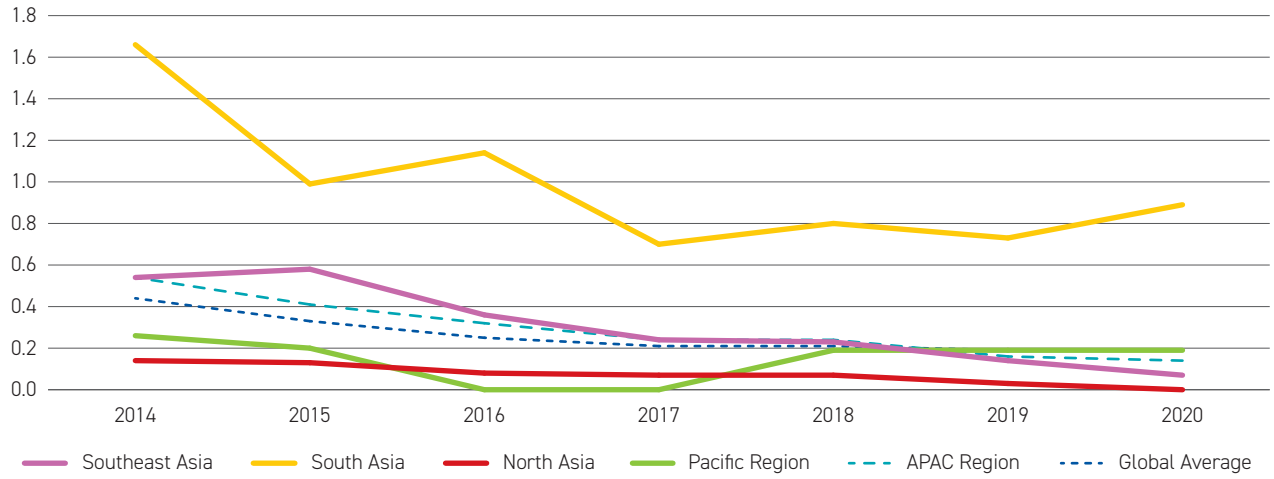
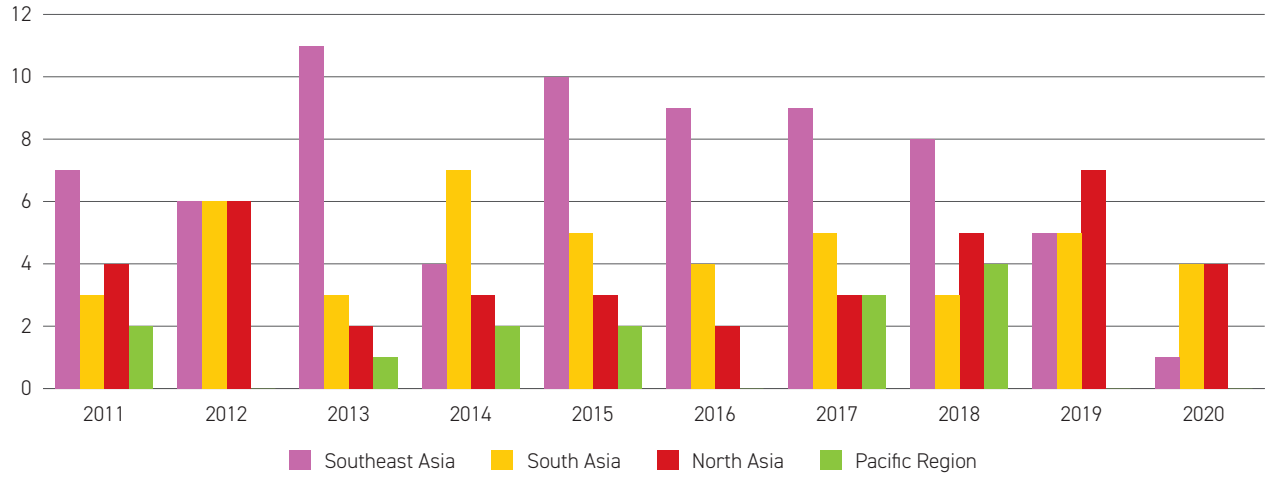


Chart 7.5.5 Number of Accidents within APAC – Sub-Region



The distribution of the accidents shown in Chart 7.5.5 indicates that the SEA region had the highest total number of accidents (70) over the last 10 years. South-east Asia had just one accident in 2020. South Asia and North Asia saw a similar number of accidents over the last decade with 45 and 39 accidents respectively. Fourteen accidents occurred in the Pacific Region over the past decade.

South Asia saw two fatal accidents in 2020 with other regions not seeing an such events.

Chart 7.5.6 iSTARS, OVSG and OAG: APAC sub-regions fatal accident numbers (2011–2020)

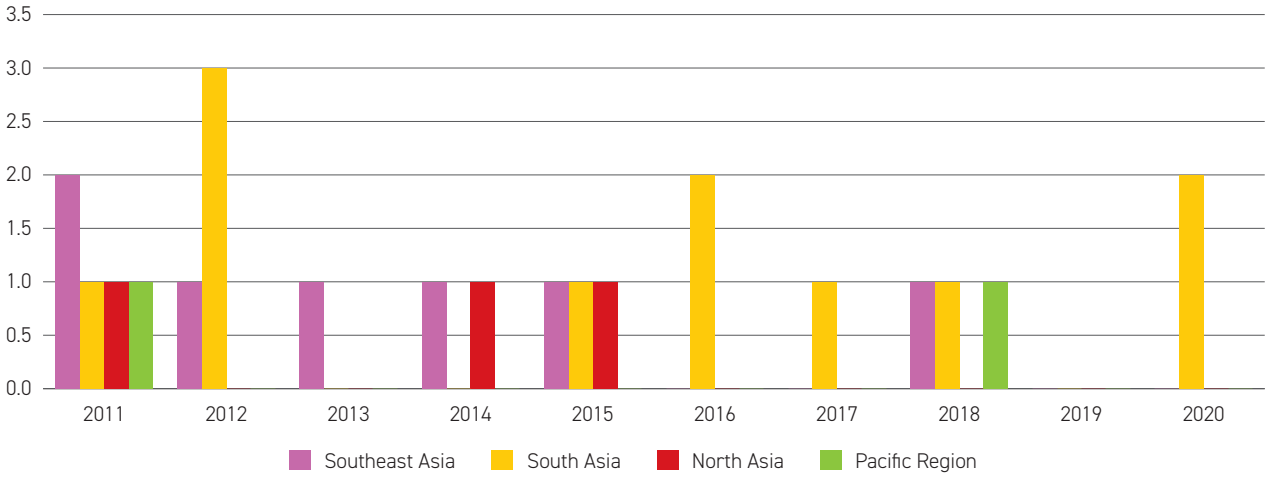


Table 7.5.1 iSTARS, OVSG: APAC sub-regions top three fatal accident categories (2011–2020)

	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
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
2020	0	0	0	0	3	0	0	3	0	0	0	0	0	0	0	0
Total	**0**	**4**	**1**	**5**	**6**	**1**	**2**	**9**	**1**	**0**	**1**	**2**	**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 (six) over the same period.

Fatal accident categories varied by sub-region in over the last decade with LOC-I being the most common cause in South-east Asia, while runway safety was most prominent in South Asia and the Pacific.

Table 7.5.2 shows that runway safety tends to be the most common category of accident (non-fatal) across all APAC sub-regions and particularly South-east Asia and South Asia over the past 4 years.

	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
2020	1	0	0	1	1	0	0	1	2	0	0	2	0	0	0	0
Total	**10**	**1**	**0**	**11**	**13**	**0**	**0**	**13**	**8**	**0**	**0**	**8**	**3**	**0**	**0**	**3**

08 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)

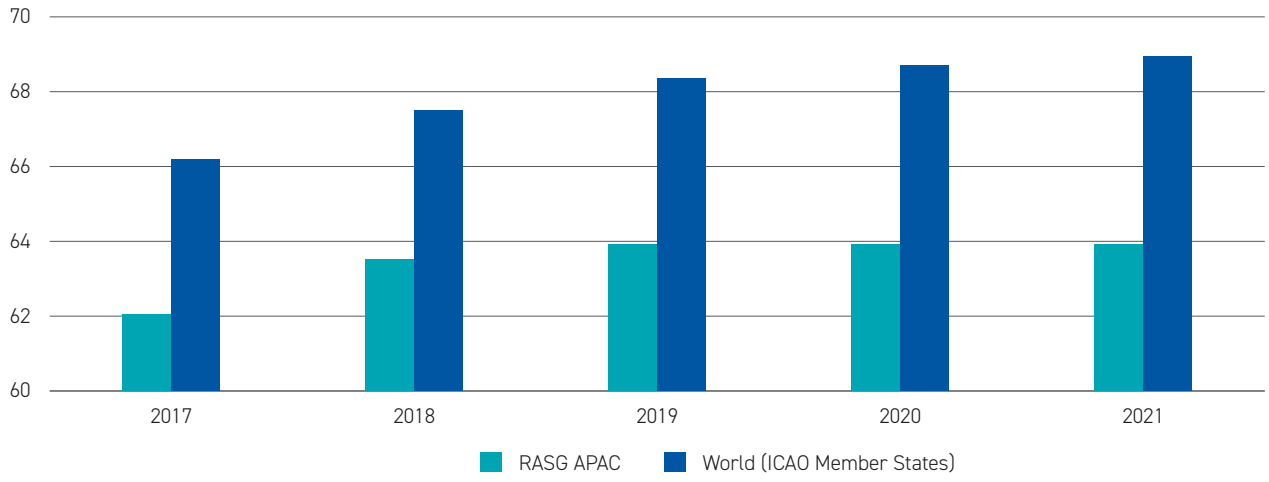
USOAP audits focus on a State's capability to provide safety oversight by assessing whether it has effectively and consistently implemented the critical elements (CE) of a safety oversight system. It also determines the State's level of implementation of ICAO's safety-related standards and recommended practices (SARPs), associated procedures and guidance material. Eight critical elements are evaluated:

1. Primary aviation legislation
2. Specific operating regulations
3. State system and functions
4. Qualified technical personnel
5. Technical guidance, tools and provision of safety-critical information
6. Licensing, certification, authorisation and approval obligations
7. Surveillance obligations
8. Resolution of safety issues.

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 remained stable at 63.91 per cent (as shown in Chart 8.1). The EI score has been stable for the past few years and reasonably below the global level which was 68.94 per cent in 2020.

Chart 8.1 – RASG-APAC overall implementation



Note – Data was extracted from the iSTARS database on the 20 July 2021.

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.

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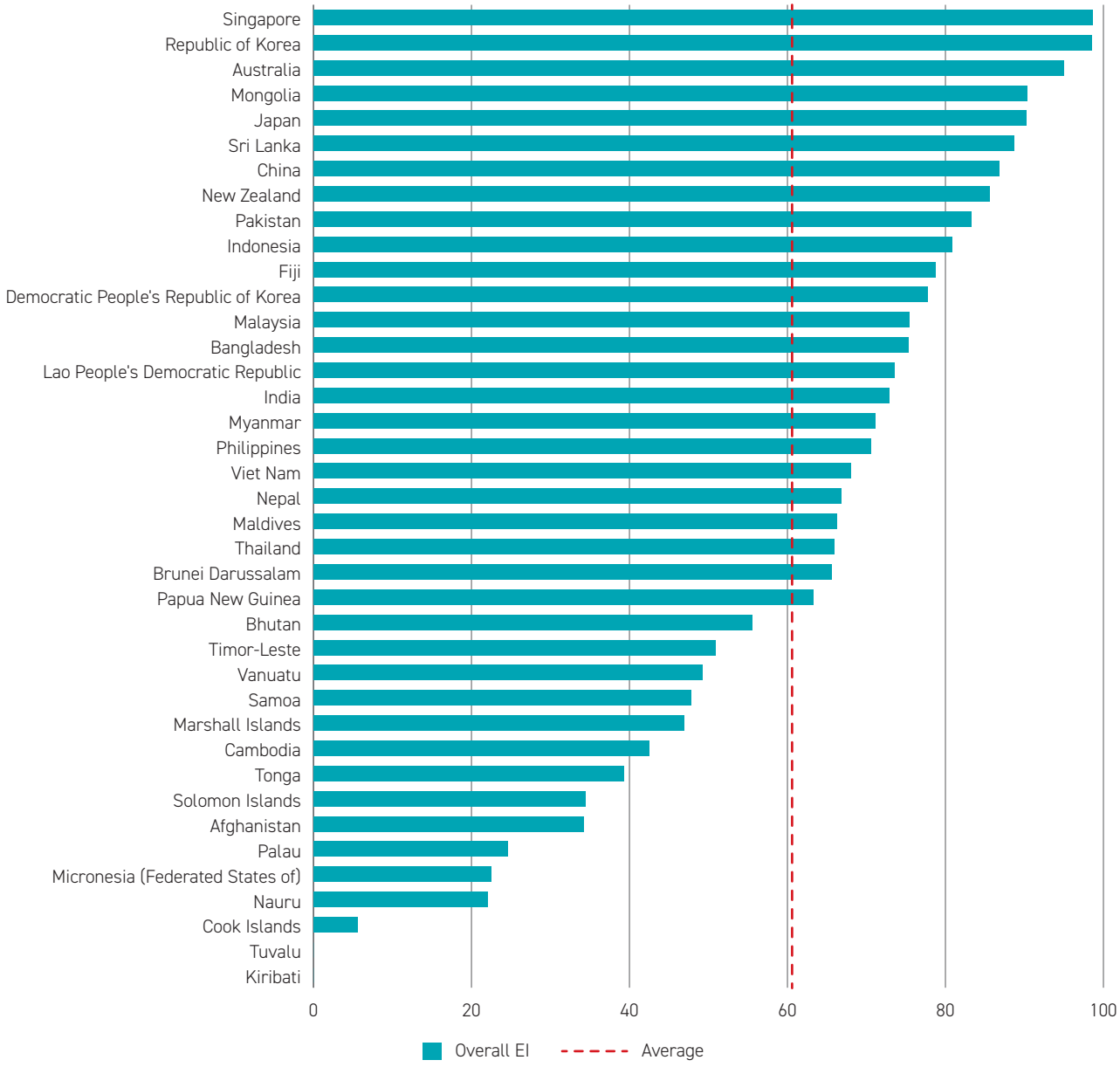
Chart 8.2 – Overall EI for RASG-APAC States



The EI by CE in Chart 8.3 revealed that resolution of safety concerns (CE 8) had the lowest implementation score of 49.6 per cent for the RASG-APAC, followed by CE 4 (54.03 per cent) and CE 7 (58.03 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

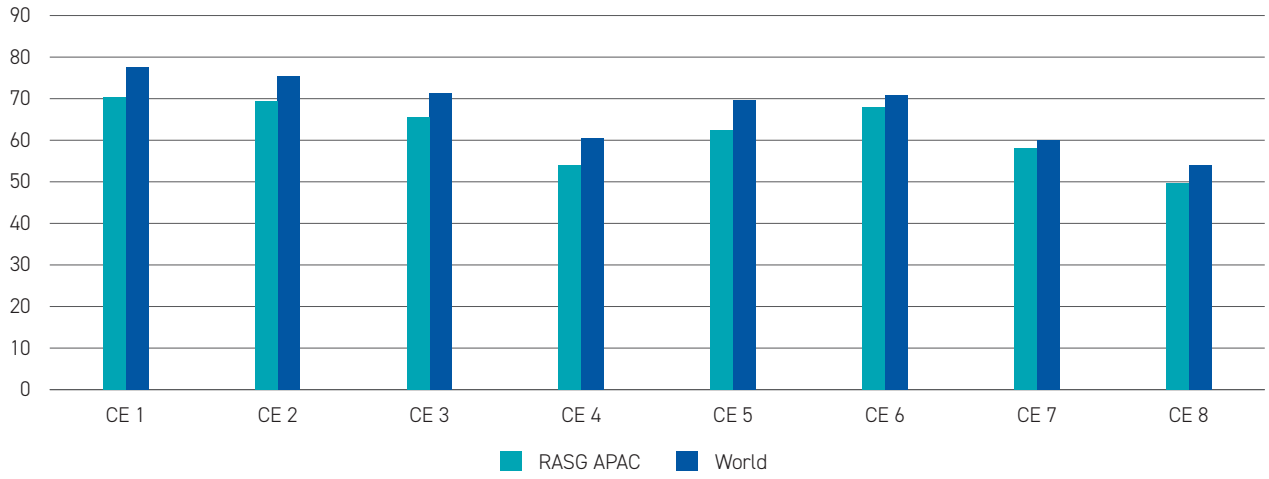
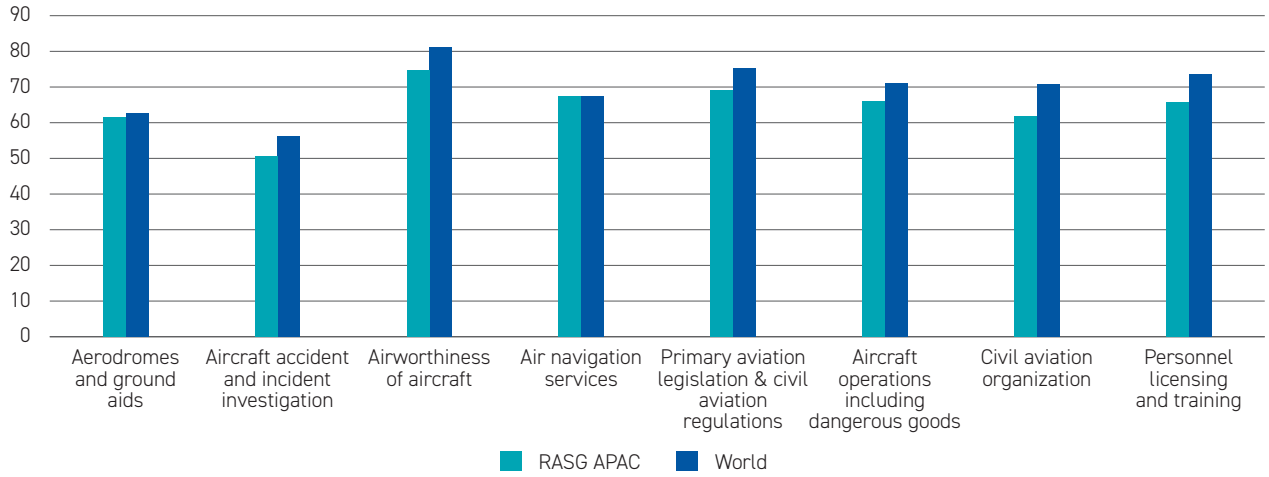


Chart 8.4 displays the overall EI by area compared to all ICAO member States. The data indicates that RASG-APAC has a lower score than the world average across most areas, performing best in Air Navigation Services, Aerodrome and Ground Aids and Aircraft Operations (including dangerous goods) relative to all ICAO Member States. The worst performing areas for APAC relative to all ICAO Member States, included Civil Aviation Organisation, Personnel Licensing and Training and Aircraft Accident and Incident Investigation.

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



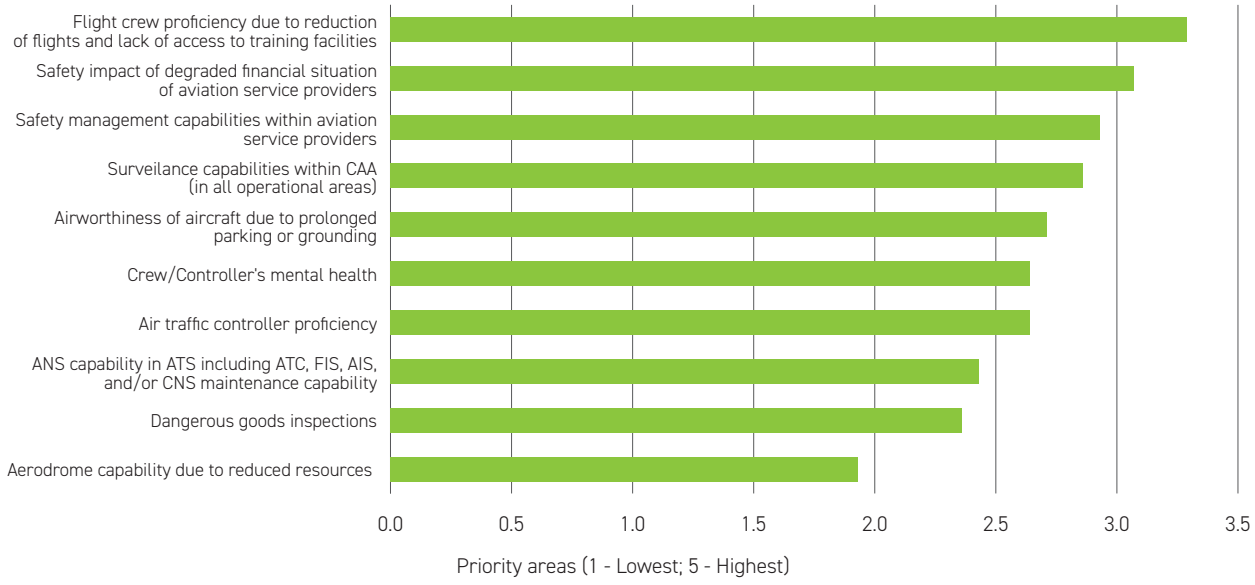
09 Safety risks arising from COVID–19

The COVID–19 pandemic has significantly impacted the aviation industry since its onset. In most parts of the world, aircraft operations have sharply declined, while aircraft are grounded and crew placed on furlough as the industry grapples with the economic impact. Border restrictions and national lockdowns have also inhibited crew's access to training and medical facilities which is critical for the crew to remain proficient. These developments have presented the industry with safety risks that must be properly managed. As the aviation industry strives to recover, it is imperative that the recovery is done so in a safe manner.

To this end, the Tenth Meeting of the Regional Aviation Safety Group – Asia Pacific (RASG-APAC/10) in December 2020 recognised the opportunity and need for greater sharing of information and ideas within the APAC region to improve the collective ability of the interconnected APAC region to recover from the pandemic safely. The RASG-APAC/10 (Decision 10/6) further requested for a survey to be conducted on the key risks faced by States/ Administrations, the mitigating measures implemented as well as challenges faced. The survey was subsequently administered by ICAO APRO from 3 March to 12 April 2021.

A total of 14 responses were received from States, and the key findings are summarised as follows:

Chart 9.1 – States' response to survey on priority areas



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Key safety risk areas

Key safety risk areas identified by States include:

i. flight crew proficiency
ii. safety impact of degraded financial situation of aviation service providers
iii. safety management capabilities within aviation service providers
iv. surveillance capabilities within the CAA and
v. airworthiness of aircraft

i. Flight crew proficiency

With the reduction of flights and restriction in access to flight simulators, several States highlighted that maintaining and regaining the proficiency of flight crew as well as crew mental well-being and health are some of the key challenges as aviation recovers.

Some of the mitigating measures implemented by States include temporary alleviation to flight-crew related requirements such as allowing the use of a flight simulation training device for maintaining recent type experience, reduced number of sectors required for Annual Line Check, extension of validity of medical and crew-specific examinations, no pairing of pilots with exemptions. Active rostering of crew to ensure competence of flight crew and closer monitoring of aviation safety risks related to flight crew proficiency were also carried out by States to mitigate the risks from the reduction in flying.

ii. Safety impact of degraded financial situation of aviation service providers

With the drop in revenue for service providers, some States expressed that organisations could face difficulties in carrying out timely operations with shortage in human and financial resources. There were also comments on the need for active financial support from other member States to sustain the mitigation effort. Regular monitoring of individual airlines' status of human resources, investment and financial standing and reduction or late payment of charges were allowed as a form of financial mitigation for the service providers.

iii. Safety management capabilities within aviation service providers

As the aviation industry recovers, States also highlighted the need to harmonise approach and routine re-assessment to prepare changes arising from the return to normal operation. Noting that resumption of operations could be intermittent and subject to occasional stoppage, additional risks could be introduced and needs to be effectively managed through the service providers' Safety Management System (SMS).

iv. Surveillance capabilities within the CAA

Movement restrictions imposed by some States had caused challenges to the CAA with regard to performing safety oversight activities. Safety oversight activities were either temporarily stopped, reduced, or shifted to remote/digital means. Some States expressed that their system and staff were not ready for remote surveillance activities. The evolving nature of pandemic also led to challenges in providing consistent guidance covering both domestic and international operations. The reduction in flights and unavailability of flight simulator also led to service providers' difficulty in complying with regulatory requirements. As such, CAAs had to either grant exemptions or amend or introduce new regulations to extend the validity of the requirements.

Some other mitigating measures include the establishment of spot check audit programme to increase awareness of the situation within the aviation industry and collaboratively work with stakeholders to address risk areas. More proactive and regular identification and tracking of key safety risks were also carried out, with heightened regulatory oversight in focus areas such as flight crew proficiency and airworthiness of aircraft.

v. Airworthiness of aircraft

As a significant proportion of aircraft were grounded since the onset of the pandemic, the airworthiness of aircraft due to prolonged inactivity was flagged as a safety risk area. More guidance materials were developed and issued by CAAs regarding storage and parking of aircraft; Enhanced inspections of aircraft under storage were also carried out to ensure compliance with the requirements.

10 Conclusion

Reactive safety information

From the analysis of the reactive safety information provided by ICAO, the most common fatal accident categories in the APAC region between 2011 and 2020 were:

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

Safety information from CAST showed the fatality risk to be highest with CFIT, LOC-I and abnormal runway contact accidents. IATA data also 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 remained stable in 2020 (63.91 per cent) as compared with 2019 (63.91 per cent). The EI for the RASG-APAC region was lower than global average by CE. Of these, T*echnical personnel qualifications and training (CE4*) and *Resolution of safety concerns* (*CE–8)* were lowest at 54.03 and 49.6 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.

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11 List of acronyms

ACAS	Airborne collision avoidance systems
ADREP	Aviation Data Reporting Programme
ADRM	Aerodrome
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	Asia Pacific Regional Aviation Safety Team
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 (non- 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
OVSG	Occurrence Validation 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