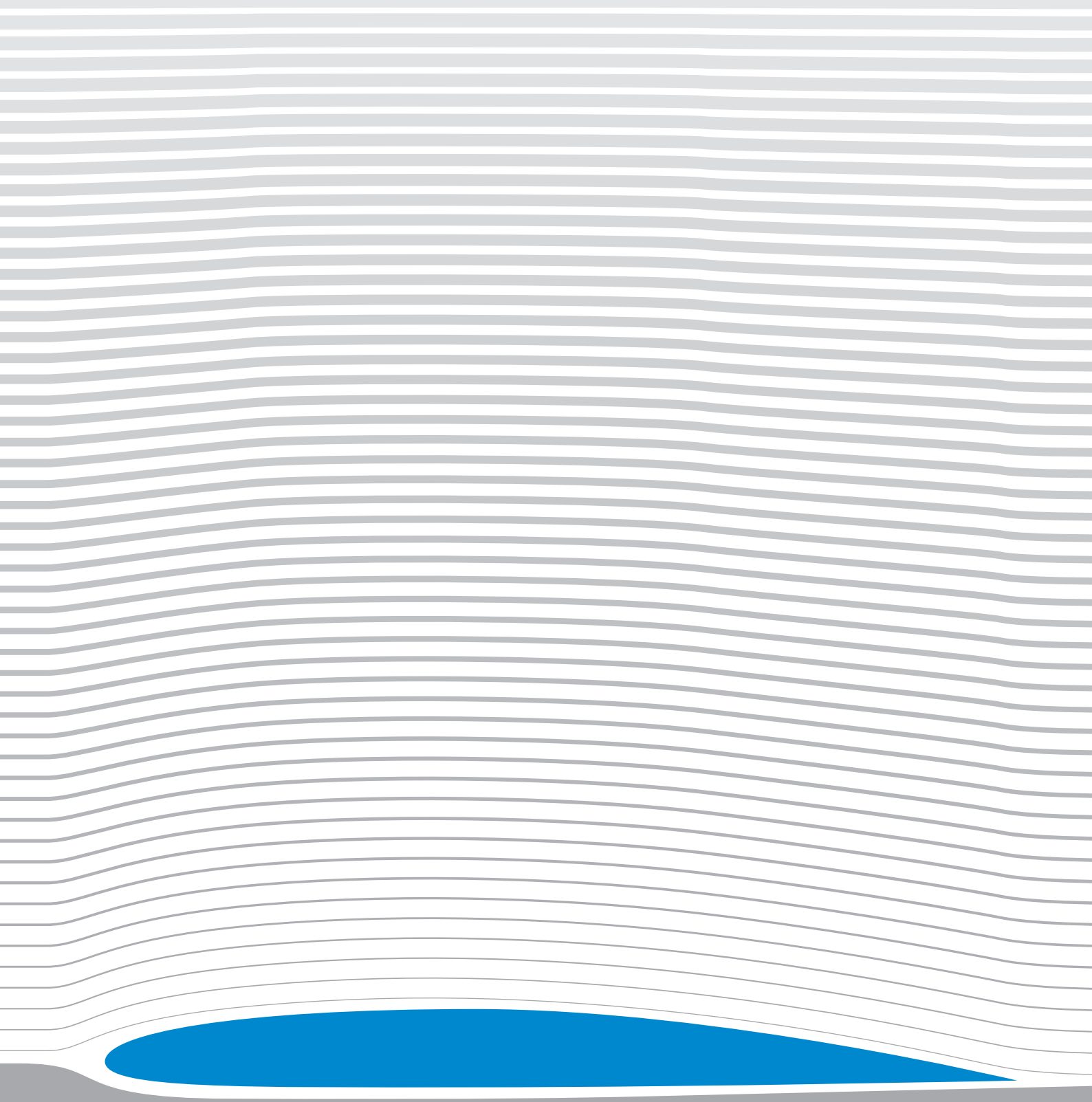
EASA
European Union Aviation Safety Agency

ANNUAL SAFETY RECOMMENDATIONS REVIEW 2019



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European Union Aviation Safety Agency

Strategy & Safety Management Directorate
Safety Intelligence & Performance Department

Annual Safety Recommendations Review 2019

Disclaimer:

The Annual Safety Recommendations Review is produced by the European Union Aviation Safety Agency (EASA). This edition provides an overview of the safety recommendations that have been addressed to EASA in 2019. It also presents the replies produced during the year.

This annual review aims at providing feedback on the follow-up given to safety recommendations in the context of openness, transparency and accountability that characterises European Public Administration.

Apart from its safety-related informative character, this review is also expected to provide relevant information related to safety concerns raised, for both EASA and its stakeholders, including the European public.

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Abbreviation list

AD	Airworthiness Directive
AFM	Aircraft Flight Manual
AMC	Acceptable Means of Compliance
ANS	Air Navigation Services
ANSV	Agenzia Nazionale per la Sicurezza del Volo (Italy)
AOA	Angle of Attack
BEA	Bureau d'Enquête et d'Analyse pour l'Aviation Civile (France)
BFU	German Federal Bureau of Aircraft Accident Investigation
BMVIT	Federal Ministry for Climate Action, Environment, Energy, Mobility, Innovation and Technology
CAG	Collaborative Analysis Group
CAT	Commercial Air Transport
CAW	Continuing Airworthiness
CS	Certification Specifications
CVR	Cockpit Voice Recorder
EASA	European Union Aviation Safety Agency
ED	Executive Director
ENCASIA	European Network of Civil Aviation Safety Investigation Authorities
EPAS	European Plan for Aviation Safety
EU	European Union
EUROCAE	European Organisation for Civil Aviation Equipment
FCS	Flight Control System
FCTM	Flight Crew Training Manual
FDR	Flight Data Recorder
FL	Flight Level
GA	General Aviation
GM	Guidance Material
HEMS	Helicopter Emergency Medical Services

ICAO	International Civil Aviation Organization
IFSD	In-Flight Shut Down
IPT	Intermediate Pressure Turbine
JRC	Joint Research Centre
MCAS	Manoeuvring Characteristics Augmentation System
MCTOM	Maximum Certified Take-Off Mass
MOPSC	Maximum Operational Passenger Seating Configuration
MSL	Median Sea Level
MS	Member States
NM	Nautical Miles
NMSB	Non-Modification Service Bulletin
NPA	Notice of Proposed Amendment
QMS	Quality Management System
OTKES	Onnettomuustutkintakeskus (Finland)
RMT	Rulemaking Task
RPAS	Remotely Piloted Aircraft Systems
RR	Rolls-Royce
SIA	Safety Investigation Authority
SIB	Safety Information Bulletin
SMS	Safety Management System
SRGC	Safety Recommendation of Global Concern
SRIS	Safety Recommendation Information System
SRM	Safety Risk Management
SRUR	Safety Recommendation of Union-wide Relevance
SSP	State Safety Plan
UA	Unmanned Aircraft
UTC	Coordinated Universal Time

Executive summary

Executive summary

The Annual Safety Recommendations Review provides information on the activity carried out by the Agency in the field of accident and incident investigation and follow-up in 2019. In addition, the review highlights a range of safety issues and Agency safety improvement actions that will be of interest to the European aviation community and the wider public.

This 13th edition reviews the activity performed in 2019 and presents:

- General statistical data on the safety recommendations addressed by safety investigation authorities to EASA in 2019;
- Information on the replies that EASA has given to past safety recommendations in 2019;
- Main safety issues that have been addressed through the actions taken.

The Agency has developed a key role in safety investigation follow-up within Europe. This has been reflected in the establishment of a rigorous process for managing the safety recommendations received. Thanks to its central position in the aviation safety system, the Agency is able to take action with respect to systemic problems and risk management.

The implementation of safety recommendations provides tangible improvements in safety as a result of the information that has been obtained during safety investigations. This methodical approach to investigatory work and the implementation of recommendations serves to ensure lessons are learned and help prevent future occurrences.

During 2019, Safety Investigation Authorities from 20 different States addressed 54 safety recommendations to EASA in the context of the Agency's remit, 38 originating from EASA Member States and 16 from non-EASA Member States. This volume is in line with the number of safety recommendations received in 2017 and 2018.

The majority of these safety recommendations were related to procedures or regulations. The second most frequent category were related to aircraft or aviation-related equipment/facilities.

23 of the safety recommendations received from EASA Member States (MS) were classified as being Safety Recommendations of Union-wide Relevance (SRUR) and 20 were classified as being Safety Recommendations of Global Concern (SRGC), i.e. of international interest.

The handling of safety recommendations in both a swift and responsible manner constitutes one of EASA's key responsibilities. In 2019, the Agency produced 101 replies to 98 safety recommendations:

- 62 of these were final replies (closing safety recommendations) with 39 percent of these replies assessed as agreed by EASA, and 42 percent assessed as partially agreed;
- The remaining 39 replies were updates providing information on the progress of the actions decided upon by the Agency and for which the relevant activities were not yet completed;
- 85 percent of the final responses provided by EASA and assessed by the originator of the recommendation were reported as "adequate" or "partially adequate".

Introduction

Introduction

Within the European Union (EU), the principles governing the investigation of accidents and serious incidents are defined in Regulation (EU) No 996/2010[1] of the European Parliament and of the Council of 20 October 2010 on the investigation and prevention of accidents and incidents in civil aviation.

Regulation (EU) No 996/2010 transposes international standards and recommended practices as described in Annex 13 to the Chicago Convention on International Civil Aviation. It sets outs an obligation for each Member State of the European Union to establish an independent permanent national civil aviation safety investigation authority, which shall investigate accidents and serious incidents in order to improve aviation safety and prevent future occurrences without apportioning blame or liability. Investigation reports and the related safety recommendations are sent to the aviation authorities concerned for consideration and action as needed.

Regulation (EC) No 2018/1139, the EASA Basic Regulation, states that: "The Agency and the national competent authorities shall undertake the necessary and effective actions to increase and promote awareness of civil aviation safety and disseminate safety related information relevant for the prevention of accidents and incidents".

EASA assigns a high priority to the follow-up of safety recommendations and has established effective procedures to that effect:

- EASA delivers a first response to incoming safety recommendations within 90 days;
- The safety recommendations are subject to a continuous internal monitoring process until all agreed corrective actions are closed;
- The Agency receives assessments of its responses from Safety Investigation Authorities (SIAs) and identifies when opinions diverge.

These procedures support the Agency in ensuring transparency with respect to its decisions and actions in line with its mission for safety. The Agency also supports effective cooperation with safety investigation by working with the European Network of Civil Aviation Safety Investigation Authorities (ENCASIA) in Working Group 6 on Safety Recommendations.

EASA also monitors safety recommendations that are issued to other aviation and non-aviation addressees. These types of safety recommendations listed below have noticeably increased over the past years:

- Safety Recommendations of Union-wide Relevance (SRUR) and with Global Concern (SRGC), addressing mainly systemic safety concerns;
- Safety recommendations addressing new developments at the national level, such as safety recommendations related to an increasing number of unmanned aircraft systems (drones/RPAS/UA), and 'dual-use' products which can be used for both military and civil aircraft;
- Safety recommendations addressing the implementation of the Quality Management System (QMS), Safety Management Systems (SMS) and State Safety Plan (SSP).

1 As amended by Regulation (EU) No 376/2014 and Regulation (EU) 2018/1139

- Security-related safety recommendations, such as criminal acts (interference) affecting aircraft, crew members, critical aviation infrastructure or the safety of airspace over conflict zones.

The Annual Safety Recommendations Review provides an overview of the follow-up performed by EASA in response to recommendations addressed to the Agency by Safety Investigation Authorities originating from the investigation of Accidents and Serious Incidents or from safety studies.

The first edition of this review was issued in 2007. This 13th edition reviews the 2019 activity and presents:

- General statistical data on the safety recommendations addressed by safety investigation authorities to EASA in 2019;
- Information on the replies that EASA has given to past safety recommendations in 2019;
- Main safety issues that have been addressed through the actions taken.

A process to identify, assess and mitigate safety risks at the European level has been established by EASA since 2016. At the heart of this system is the concept of safety risk management, involving the identification of safety issues, risk assessment and decision-making on the best course of action to mitigate these risks. EASA, the Member States (MS) and industry work together in this process through Collaborative Analysis Groups (CAG) and Advisory Bodies (ABs).

The Annual Safety Review published by the Agency provides the main and most visible elements from the European safety risk management process, such as key statistics relating to accidents and serious incidents, as well as an analysis of the key risk areas and safety risk portfolios for each domain. This risk management process is coordinated by EASA and feeds into the European Plan for Aviation Safety (EPAS).

Safety recommendations are a key input to the safety risk management process. They provide information on the deficiencies in the system as well as proposed solutions to mitigate the associated safety risks for the aviation system.

Safety Recommendations received in 2019

Safety Recommendations received in 2019

3.1 Overview of Safety Recommendations received in 2019

EASA is the most frequent single addressee of a Safety Recommendation. However collectively most safety recommendations issued during 2019 were addressed to the National Civil Aviation Authorities of EASA Member States.

During 2019, EASA received a total of 54 safety recommendations.

Figure 1 shows the total annual number of safety recommendations that the Agency has received over the past 10 years. The follow-up of safety recommendations and the role of EASA in that regard is mandated by Regulation (EU) No 996/2010. The issuance of safety recommendations addressed to EASA started to develop shortly before this regulation came into force in 2010. In the years from 2012 to 2016, the annual number of safety recommendations addressed to EASA remained almost constant. In 2017, this amount reduced by half. Although in 2018 and 2019 a marginal increase was recorded, the downward trend remains.

Figure 1: Safety Recommendations addressed to EASA per year

This trend is more pronounced if the safety recommendations issued by EASA Member States are considered alone. In 2019 only 38 safety recommendations came from EASA MS. This decrease can mostly be attributed to the following factors:

- the European aviation system is becoming increasingly more oriented towards *proactively* identifying safety issues and implementing the safety actions that would otherwise be raised during investigations;

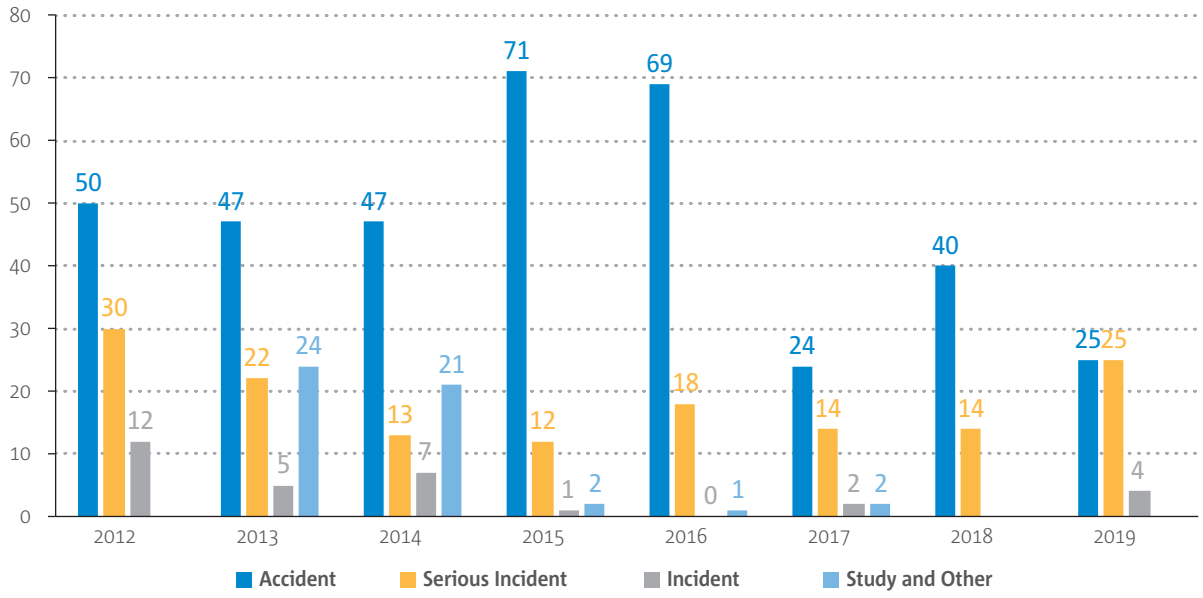
- the Agency is frequently involved in the initial phase of the draft reports, leading to draft safety recommendations being discussed in advance and in some cases either withdrawn or revisited as a result of this initial dialogue.

In 2019, the safety recommendations received related to 31 occurrences, comprising 17 accidents, 13 serious incidents and 1 incident. None arose from studies.

Overall, each investigation of the applicable occurrence resulted in between one to seven safety recommendations being addressed to the Agency.

Figure 2 shows the total number of safety recommendations received by occurrence class since 2012.

Figure 2: Annual Safety Recommendations by occurrence class 2012-2019



Traditionally most Safety Recommendations originate from accidents. In 2019 less than 50% arose from accidents whilst the remaining ones stemmed from serious incidents and incidents. This could be interpreted as a result of the safer aviation environment that has been developed over the past years leading to a lower number of accidents and therefore giving safety investigation authorities the opportunity to focus their attention more on the more proactively-orientated investigation of incidents and serious incidents.

The aircraft categories and operation types involved in the occurrences that resulted in safety recommendations in 2019 are listed in the table below.

Figure 3: Safety Recommendations received in 2019 by Type of Operation and Aircraft Category

Type of Operation	Aircraft Category					
	Fixed Wing				Rotorcraft Total	Grand Total
	Large Aeroplane	Small Aeroplane	Ultralight/ Microlight	Sailplane		
Commercial Air Transport	**34**	**1**			5	**40**
Cargo	**2**					**2**
Airline	2					2
Passenger	**32**	**1**			**5**	**38**
Airline	32	1				33
HEMS					1	1
Other					4	4
Non-Commercial Operations	**2**	**5**	2	**4**		**13**
Flight Training		3		3		6
Pleasure		2	2			4
Relocation	2			1		**3**
Specialised Operations (Aerial Work)		4				**4**
Parachute drop		2				2
Towing		2				2
Grand Total	**36**	**10**	**2**	**4**	**5**	**57***

** In 3 SRs, 2 aircraft were involved*

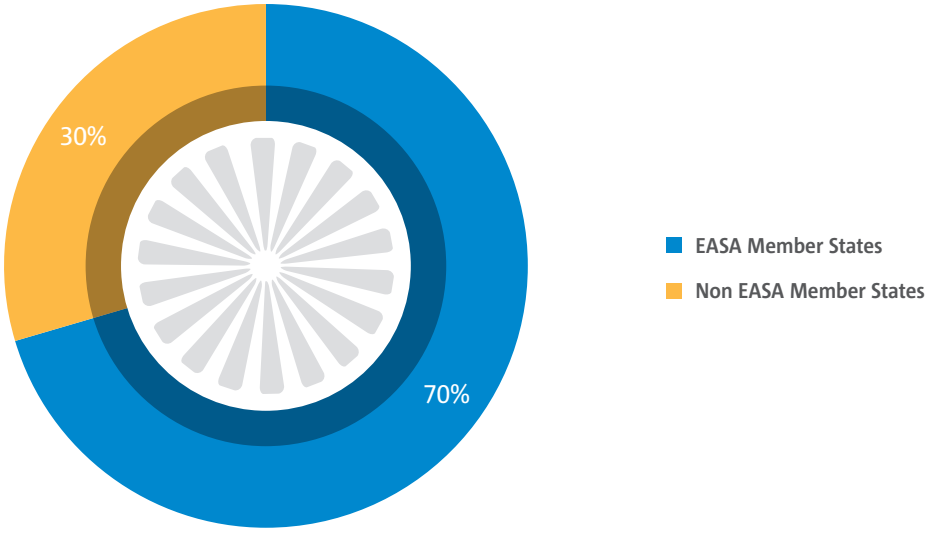
In comparison with previous years, this distribution shows a significant reduction in the number of safety recommendations referring to helicopters: only 5 out of 52 (9.6%). This is particularly marked when the comparison is limited to the past two years, with a similar total number of safety recommendations but the number of safety recommendations associated with rotorcraft being 10 out of 42 (23.85% in 2017) and 16 out of 52 (30.8% in 2018).

3.2 Origin of the Safety Recommendations received in 2019

In 2019, the Safety Investigation Authorities (SIAs) of 20 different States addressed 54 safety recommendations to EASA.

Figure 4 shows the percentage distribution of safety recommendations that were addressed to EASA in 2019 between EASA Member States and non-EASA Member States. The chart shows that EASA Member States issued 70% of the safety recommendations received by EASA in 2019.

Figure 4: Origin of Safety Recommendations received by EASA



One-third (33%) of the Safety Recommendations received in 2019 were related to four occurrences as follows:

1. An incident involving an ATR72, registered 9Y-TTC, which occurred on 5 May 2014 in Trinidad and Tobago. During descent of the aircraft, the crew felt strong vibrations followed by an alarm linked to the electronic controller which controls the right propeller.

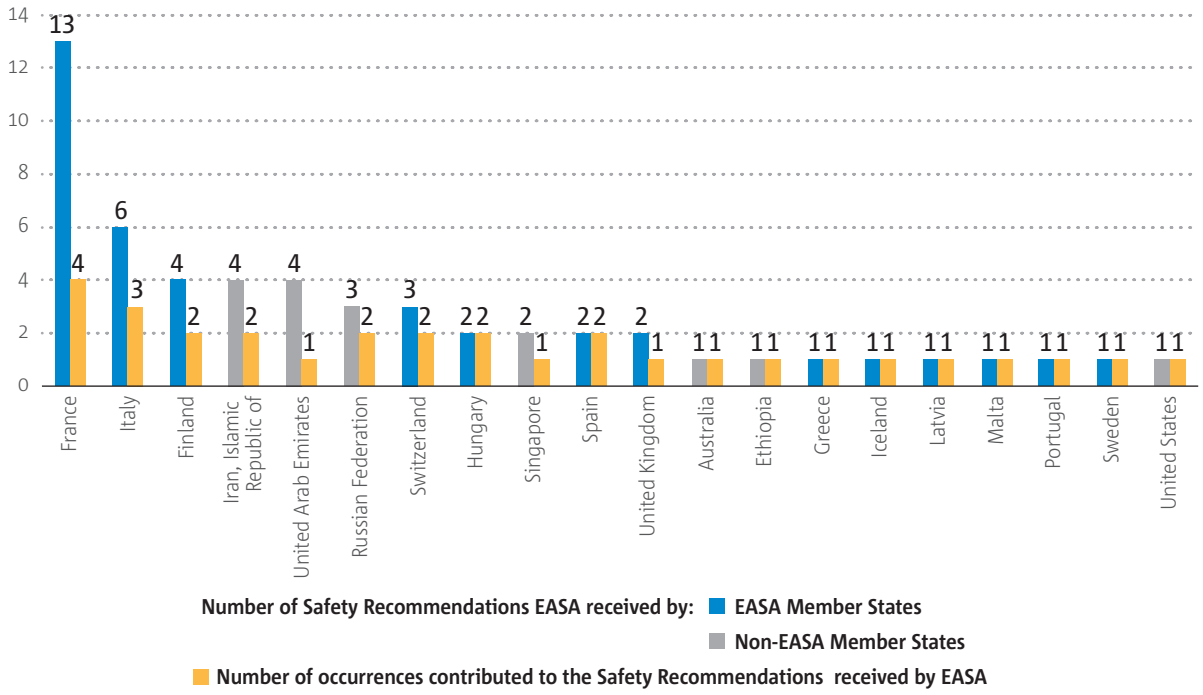
2. A serious incident involving an Airbus A340, registered F-GLZU, which occurred on 11 March 2017 in Colombia during take-off, where the aircraft's take-off was abnormally long and the aircraft flew over the opposite runway threshold at 6 ft.

3. A serious incident involving a Boeing 787, registered LN-LND, on 10 August 2019, which occurred while the aircraft was in climb. One of the RR Trent 1000 engines suffered a failure, causing debris to be ejected from the engine.

4. An accident involving a Leonardo AW139 helicopter, registered A6-AWN, which occurred on 29 April 2017 in the United Arab Emirates. The crew decided to ditch the helicopter because of excessive Main Gear Box oil temperature.

Figure 5 shows the contribution of the different SIAs to the total number of safety recommendations addressed to EASA in 2019, as well as the number of occurrences that contributed to these safety recommendations. The number of occurrences is not always proportional to the number of safety recommendations. In particular a high number of safety recommendations stem just from the four occurrences mentioned above. The figure therefore shows the SIAs of France and Italy having issued the highest number of safety recommendations, 13 and 6 respectively.

Figure 5: States contribution to Safety Recommendations received in 2019



The French Office of Investigation and Analysis for Civil Aviation Safety (Bureau d'Enquêtes et d'Analyses pour la sécurité de l'aviation civile – BEA) issued 13 safety recommendations that are related to 4 different occurrences. Seven of them arise from the serious incident concerning the long take-off of an Airbus A340 in Colombia and four of them stem from the serious incident involving an ATR72 with fracture of its propeller trunnion pin that occurred in Trinidad and Tobago. Both occurrences are described above. The other two safety recommendations that France issued arise from:

- An accident involving a Pitts S2-B aircraft registered F-GEAL at Meaux Esbly Airport on 8 December 2013. After an aerobatic flight, the propeller separated in flight from the engine and the pilot performed forced landing at the aerodrome.

- A serious incident involving an ATR72 registered PR-AQV that occurred in Brazil on 12 March 2019. The crew rejected take-off when they felt vibrations and noticed changes in the parameters of engine number 2.

The Italian National Flight Safety Agency (Agenzia Nazionale per la Sicurezza del Volo – ANSV) issued 6 safety recommendations, 3 of which are related to the serious incident involving a Boeing 787 as mentioned above. The remaining safety recommendations were related to:

- An accident involving a Pilatus PC6 aircraft registered S5-CMB which was engaged in a parachute launch flight on 11 June 2016, which crashed when the auxiliary parachute of a parachutist opened uncontrolled, leading to the parachutist to be dragged against the right stabilizer and causing the horizontal tail plane to detach.

- An accident involving an Agusta Bell AB139 helicopter, registered I-TNCC, which occurred on 5 March 2017. The main rotor blade impacted the ground while the helicopter was flying over an avalanche during a HEMS operation.

The Safety Investigation Authority of Finland (Onnettomuustutkintakeskus - OTKES) issued 4 safety recommendations that were related to 2 occurrences as follows:

- A serious incident involving an Airbus A319 aircraft which occurred on 3 August 2018. Smoke was detected in the cabin of the aircraft before take-off and the decision was made to evacuate the aircraft.

- A serious incident involving a SAAB 340 airliner, registered YL-RAF, that veered off the runway on 7 January 2019 during landing at Savonlinna Airport. The aircraft came to rest about 25 m outside of the runway at a 90 degrees angle to the runway. There was snow on the runway.

The Aircraft Accident Investigation Board of the Islamic Republic of Iran issued 4 safety recommendations related to 2 occurrences, as follows:

- An accident involving a Fokker 28, registered EP-FQF, on 16 February 2018 at Mashhad international airport. The left hand landing gear could not be extended and the aircraft veered off to the left of the runway during landing.

- A serious incident involving a Fokker 28, registered EP-CFP on 14 September 2016 at Teheran Mehrabad airport. During initial taxi from parking position the nose landing gear was broken.

The Air Accident Investigation Sector in the United Arab Emirates issued 4 Safety Recommendations, all related to the accident of the Agusta AW139 helicopter registered A6-AWN as described above.

The safety recommendations issued by SIAs in 2019 address a wide scope of subjects under the Agency's remit including product certification, air operations, flight crew and safety risk management. The aspects covered were, inter alia, the continued airworthiness of light aircraft, aircraft maintenance and inspection, aircraft equipment and facilities, recorded data systems as well as flight crew training, proficiency and check.

3.3 Involvement in accident and serious incident investigations

During 2019 the accidents with the highest death toll were those of the Ethiopian Boeing 737-8 MAX and the Aeroflot Sukhoi Superjet. A short description follows:

- On 10 March 2019 an Ethiopian Boeing 737-8 MAX, registered ET-AVJ performing flight ET-302 from Addis Ababa (Ethiopia) to Nairobi (Kenya) with 149 passengers and 8 crew, departed Addis Ababa's runway 07R and was climbing out of Addis Ababa when the aircraft levelled off at about 9000 feet MSL. Radar contact was lost shortly after at 08:44 (05:44 UTC). The aircraft wreckage was found near Ejere. There were no survivors.

- An Aeroflot Sukhoi Superjet 100-95, registered RA-89098 performing flight SU-1492 from Moscow Sheremetyevo to Murmansk (Russia) with 73 passengers and 5 crew, departed Sheremetyevo's runway 24C on 5 May 2019 at 18:04 (15:04 UTC) but stopped its climb at about FL100 following a lightning strike and returned to Sherementyevo for a landing on runway 24L at 18:31 (15:31UTC). During the landing the aircraft bounced twice. On the third touchdown it burst into flames, veered left off the runway and came to a stop on the grass adjacent to the runway. The aircraft burned and 41 occupants perished in the accident. 35 occupants were able to evacuate the aircraft via both front door emergency slides and 2 flight crew escaped via ropes through the cockpit windows.

Several other investigations of accidents and serious incidents were opened and/or conducted in which the Agency's role has mostly been focused on monitoring progress and providing technical expertise as required. A list of 2019 accident and incident investigations in which EASA was closely involved through its technical advisers is as follows:

- The accident of a Piper PA-46-310P Malibu, registered N264DB, on 21 January 2019 at 20:16 UTC. The wreckage was located on 3 February 2019 on the seabed approximately 22 nm north-north-west of Guernsey at a depth of 68 m.

- A GippsAero GA8 Airvan aircraft, registered SE-MES, impacted terrain in a steep fall from 4000 meter near Umeå, Sweden after take-off on 14 July 2019 at 12:09 UTC. The plane was going to drop parachutists when it crashed on Storsand island in the Umeå river. The aircraft was destroyed and the nine occupants were fatally injured.

- A Swiss Bombardier C-Series CS-300, registration HB-JCM performing flight LX-348 from Geneva to London Heathrow on 25 July 2019, was climbing through FL320 about 100nm southeast of Paris when the left hand engine (PW1524G) emitted a bang and streaks of flame prompted the crew to shut the engine down and divert to Paris Charles de Gaulle airport. The aircraft landed safely on runway 09R about 30 minutes later.

- An Ural Airlines Airbus A321-200, registration VQ-BOZ performing flight U6-178 from Moscow Zhukovsky to Simferopol (Ukraine) on 15 August 2019 with 226 passengers and 7 crew, was in the initial climb at 750 feet at about 06:15 local time (03:15 UTC) when the aircraft flew through a flock of birds and ingested birds into both engines (CFM56). Both engines failed, forcing the crew to stop the climb and land the aircraft in a corn field about 2.77nm past the runway with gear retracted. The occupants of the aircraft evacuated via slides, there were 10 injuries and 23 people asked for medical assistance. The aircraft sustained substantial damage.

- On 27 August 2019 an Air China Airbus A330-300, registration B-5958 performing flight CA-183 from Beijing to Tokyo Haneda, was boarding for departure, when smoke emanated from the aircraft prompting a rapid disembarkation of the people on board. The cabin and flight crew left the aircraft via the jet bridge after the passengers. Emergency services responded and extinguished a fire in the forward cargo hold. There were no injuries, the aircraft received substantial damage.

- During a sightseeing tour in connection with the Høstsprell-festival in Alta (Norway), the helicopter LN-OFU, an Airbus Helicopters AS 350 B3e, hit the ground in a mountainous area on 31 August 2019. All occupants, one pilot and five passengers, lost their lives.

- A Swiss International Airlines Bombardier C-Series CS-300, registration HB-JCA performing flight LX-358 on 16 September 2019 from Geneva to London Heathrow, with 77 people on board, was climbing through FL350 when the crew decided to return to Geneva due to a problem with one of the engines (PW1524G). The aircraft landed safely back on Geneva's runway 22 about 30 minutes after stopping the climb.

- An Airbus Helicopters H225 (EC 225LP), registration HL9619, with seven people aboard crashed into the sea near Dokdo islands in South Korea shortly after take-off from a helipad near the lighthouse atop one island. The aircraft departed on 31 October 2019 at 23:26 local time having picked up an injured fisherman.

- A Bek Air Fokker 100, registration UP-F1007 performing flight Z9-2100 from Almaty to Nur-Sultan (Kazakhstan) on 27 December 2019 with 93 passengers and 5 crew, departed Almaty's runway 05R at 07:21 local time (01:21 UTC) but lost height shortly after departure, impacted ground, broke through a concrete wall/fence and impacted a building. No fire broke out, the aircraft broke into several sections. 66 people were taken to hospital, 30 of them remain in hospital care, 12 people (including one of the initial survivors) were confirmed to have perished.

- An Airbus AS350 B2 helicopter, registration N985SA, was destroyed on 26 December 2019, at about 16:57 Hawaii standard time, by impact forces and a postcrash fire when it collided with terrain about 24 miles northwest of Lihue, Hawaii. The commercial pilot and six passengers were fatally injured.

Please note that safety actions that were taken immediately during or following an investigation do not appear in this publication if the Safety Investigation Authority did not issue an associated, formal safety recommendation to EASA in 2019.

Safety Recommendations replies in 2019

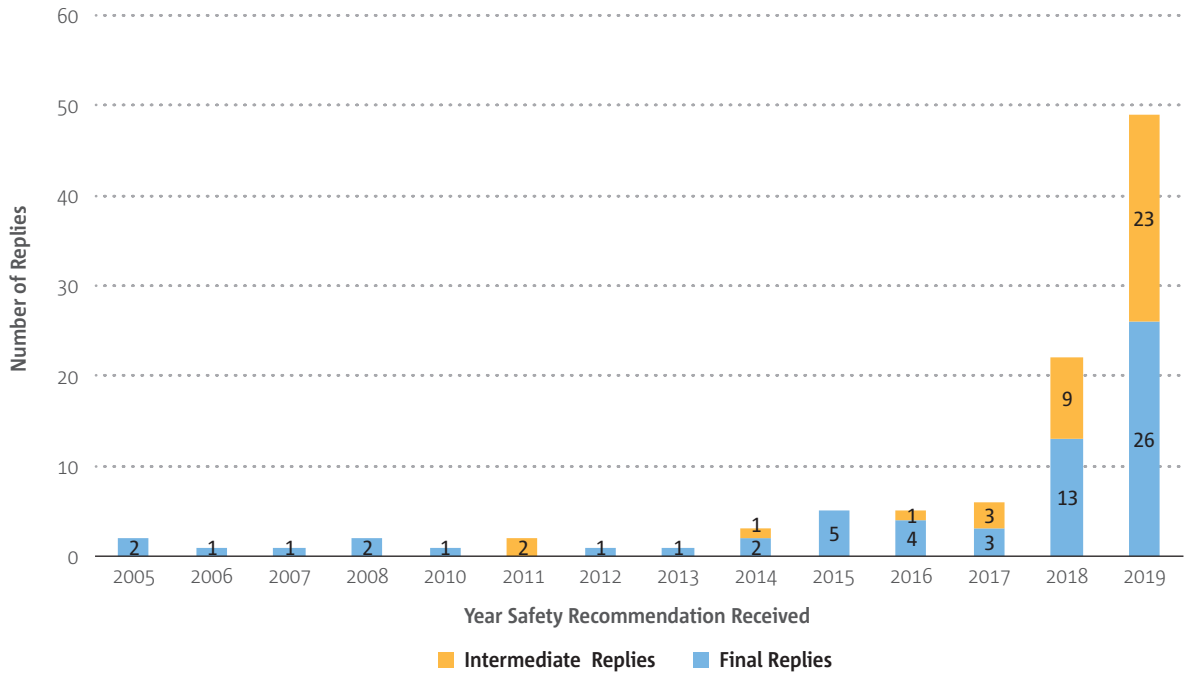
Safety Recommendations replies in 2019

4.1 Overview of Safety Recommendations replies in 2019

In 2019, EASA issued 101 replies to 98 safety recommendations. As updates are provided, several response letters can be issued for the same recommendation within a given year. The majority of replies produced in 2019 were EASA responses to safety recommendations received in the years 2015 to 2019.

However, replies to recommendations from earlier years were also issued, as per the table below, for those cases where follow-up actions and conclusions were reached, or which required updates and/or closure of the safety recommendation.

Figure 6: EASA responses to safety recommendations in 2019 by year received



4.2 Status of Safety Recommendations replies issued in 2019

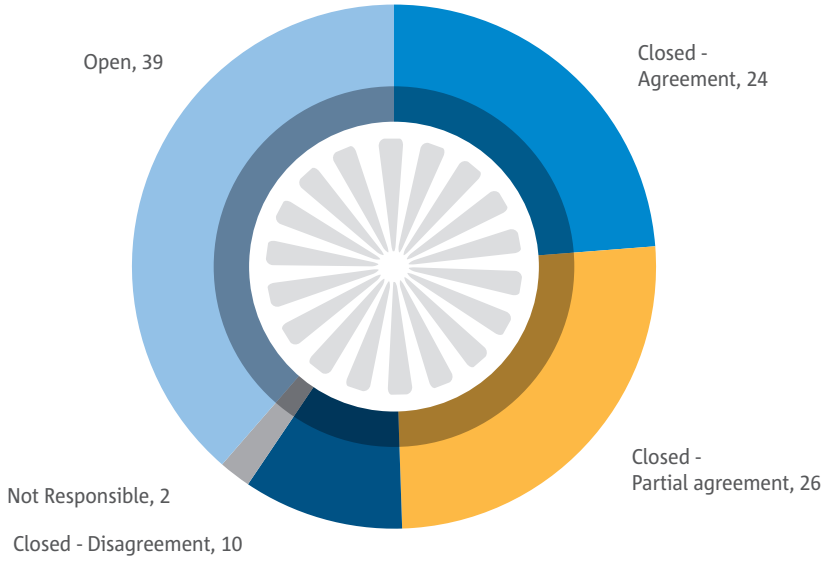
Each final response closing a safety recommendation and the response assessment by the originator is classified according to the categories[2] given in Annex C.

Among the 101 replies that were sent by EASA in 2019, summarised in figure 7, 62 were final replies that closed safety recommendations. These resulted in the following responses by EASA:

- EASA agreed to take corrective action in 50 cases, either by directly applying the recommended actions as was the case for 24 of them, or, for 26 of them, by partially agreeing, but taking corrective actions different to those recommended;
- In another 10 cases, the safety recommendations were evaluated and the safety benefit was not agreed with.
- In 2 cases, the safety recommendations fell outside EASA's mandate.

Figure 7 below shows this distribution:

Figure 7: Safety Recommendation Responses sent in 2019 [status, total number]



In monitoring safety recommendations, their status remains open until the action related to each recommendation is fully developed and completed.

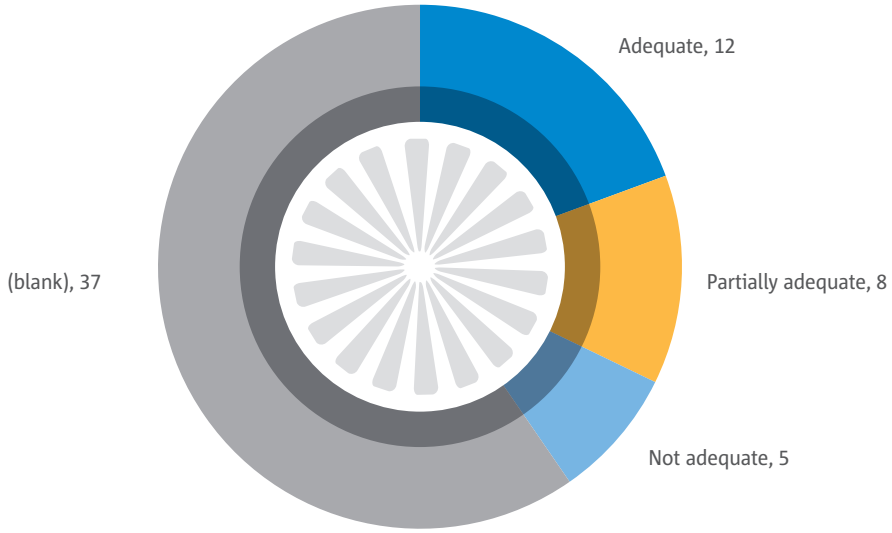
In addition to the 62 final replies closing a safety recommendation, 39 updating replies (intermediate responses) were issued. These updating replies provided information on the progress of the actions decided upon by the Agency for which the relevant activities have not yet been completed.

2 These definitions of classification categories were developed in collaboration with the European Network of Safety Investigation Authorities and are part of a taxonomy aimed at facilitating the management of safety recommendations.

To follow-up on whether or not the competent Safety Investigation Authority (SIA) considers the response to be adequate, or disagrees with the action that EASA has proposed, the Agency has implemented procedures in compliance with Regulation (EU) No 996/2010.

Figure 8 shows the total number of response assessments that EASA received from the SIAs based on the 62 closing replies sent in 2019[3]. As assessed, 20 of the responses provided by the Agency were deemed to be "adequate" or "partially adequate" (12 and 8 respectively), and 5 responses were deemed as "not adequate". With respect to the 37 remaining closing replies sent in 2019, EASA is awaiting the SIAs' assessment.

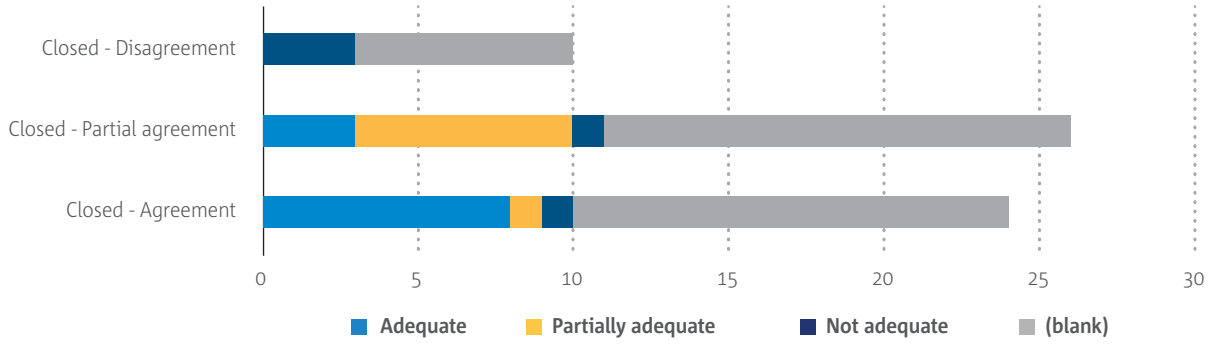
Figure 8: Response assessment received from the originator on the EASA Final Replies sent in 2019 [reference date: 31.03.2020]



3 The statistical reference date is 31 March 2019.

Figure 9 provides an overview of the recommendation assessments and/or classifications as determined by the addressee.

Figure 9: Assessment received by EASA on the Final Responses sent in 2019 [total, reference date: 31.03.2020]



Overview of key safety topics processed and actions carried out in 2019

Overview of key safety topics processed and actions carried out in 2019

In 2019, Safety Investigation Authorities from 20 different States issued 54 safety recommendations to EASA that addressed proposals within EASA's remit. Figure 10 provides a breakdown of the safety recommendation topics. Among the safety recommendations, the European SIAs classified 23 as being of Union-wide Relevance (SRUR) and 20 as being of Global Concern (SRGC). The handling of the safety recommendations in both an expeditious and responsible manner constitutes one of EASA's key responsibilities.

➡ Figure 10: Safety Recommendations addressed to EASA per topic by EU SIAs4

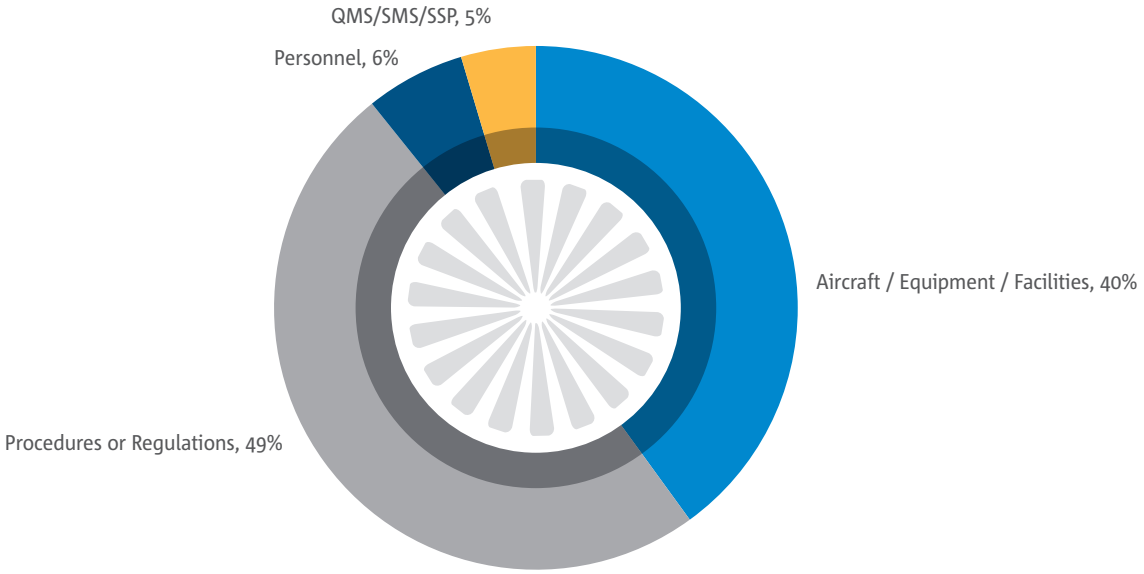


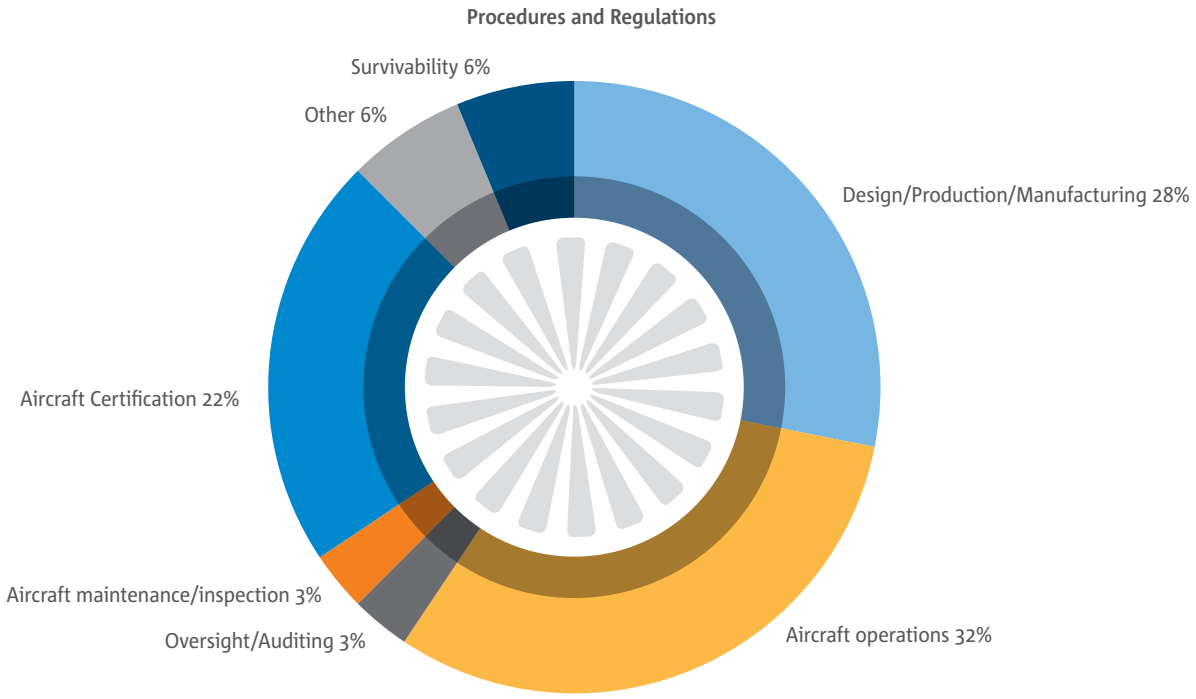
Figure 10 provides information on the main topics by safety recommendation, according to the taxonomy used in the European Safety Recommendation Information System (SRIS). The majority, 49 percent of safety recommendations received by EASA in 2019, make proposals for "procedures or regulations" [32 safety recommendations], while 40 percent address safety topics in the field of "aircraft or aviation-related equipment/ facilities" [26 safety recommendations].

6 percent of the safety recommendations that EASA received in 2019 refer to safety topics in the field of "Personnel" [4 safety recommendations] and 5 percent in the field of "Quality Management System/Safety Management System/State Safety Plan [QMS/SMS/SSP]" [3 safety recommendations]. The above distribution is consistent with the data that the European Network of Civil Aviation Authorities (ENCASIA) presented in its Annual Report.

4 Note: data in Figure 10 also contains safety topics estimated by EASA for 3 safety recommendations not recorded in EU SRIS by the SIAs of the MS.

A further breakdown of the topics related to procedures and regulations is also provided below in figure 11, with the majority of these related to aircraft operations.

Figure 11: Safety Recommendations addressed to EASA per topic related to procedures and regulations



Among the actions taken in 2019, several key safety topics are outlined below with accompanying information on the action that the Agency has taken. The description highlights the safety issues that were underlined by the safety recommendations, together with the actions taken by the Agency in response.

5.1 Explosive door opening on parked aeroplanes

Incidents and accidents are known internationally in which injuries and even fatalities have occurred, inside or outside the aircraft, as a result of the explosive opening of cabin doors.

The main cause of these occurrences lies in the unintentional development of an excessive pressure differential between inside and outside the aircraft. Such a difference in pressure can develop if the air-conditioning system is powered by the auxiliary power unit or another external source while all the aircraft's doors and the outflow valve are closed.

An event in Finland in January 2018 caused the death of a crew member who died at the scene of the accident as a result of an explosive door opening. On the basis of the investigation of the accident the Finnish Safety Investigation Authority recommended that:

- EASA inform air operators, ground handling organisations and aerodrome rescue and fire fighting organisations of a safety threat which may be caused by aircraft pressurisation on the ground and consequent explosive door openings. The bulletin must include the actions with which the safety threat can be controlled, as well as a reminder to provide the associated training to all persons involved with handling aircraft on the ground.

EASA Actions:

EASA decided to take an action to remind the relevant organisations about the importance of implementing the defences associated with this safety issue, which are provided through the existing European Union civil aviation regulations; in particular, those related to the aeroplane manufacturers' procedures, the organisations' standard operating procedures, and the provision of training for all personnel involved in the handling of affected aeroplanes on the ground.

On 12 February 2019, EASA therefore published Safety Information Bulletin SIB No. 2019-02 'Explosive door opening on parked aeroplanes'.

The aim of the SIB is to inform air operators, aerodrome operators, approved training organisations, maintenance organisations, continuing airworthiness management organisations and competent authorities, about the risk of an explosive door opening due to the inadvertent development of an excessive differential pressure between the inside and the outside of a parked aeroplane. Organisations are recommended to identify if this risk is present in their activities, and, if so, to establish procedures that reflect the associated instructions provided by the aeroplane type certificate holder, and to provide training to all personnel involved in the handling of the affected aeroplanes on the ground.

5.2 Evacuations initiated by cabin crew

Failure to evacuate the aircraft in a timely, orderly and safe manner may lead to the death or injury of passengers and crew.

Evacuations initiated by the cabin crew are not normally practiced. However, the cabin crew may initiate evacuation if the situation is life-threatening and there is no contact with the captain.

When the cabin crew initiates an evacuation, the engines may not immediately be shut off because engine shutdown is only the fifth item on the aircraft manufacturer's emergency evacuation checklist. If the evacuation has already begun, there is the immediate danger of deplaning passengers being ingested into an engine.

The Finnish SIA identified these risks in a report on a serious incident involving an Airbus A319 that occurred on 03 August 2018. Consequently, they recommended that EASA should:

- Ensure that operators, in their procedures and training, take into account the situation where evacuation is initiated without waiting for the captain's command.

- Ensure that Airbus S.A.S, in their emergency evacuation procedures, re-evaluate the situation where it becomes necessary to immediately shut down the engines

EASA Actions:

Emergency evacuations are addressed under the existing EU civil aviation regulations [Commission Regulation (EU) No 965/2012 on air operations, Commission Regulation (EU) No 1178/2011 on air crew, and the associated EASA Executive Director Decisions [containing Acceptable Means of Compliance (AMC) and Guidance Material (GM)], and Regulation (EU) 2018/1139 'the basic regulation'].

These regulations provide a framework which requires the operator to identify the risks (for example, for different emergency scenarios) associated with their specific operation and fleet, and provide suitable mitigation (for example, through effective procedures/checklists, and training/checking for the operating air crew).

In particular, with regard to the operator's management system, see the following provisions under the air operations regulation: ORO.GEN.200 (a)(3) and (a)(4); ORO.GEN.110 (f) and (h); (a)(5) and (b)(16) of AMC1 ORO.GEN.110(f)(h); ORO.GEN.110 (b); ORO.MLR.100 (a) and (b); AMC3 ORO.MLR.100 (a), B, 3 and 11. Also see points 1.2 and 8.11 of Annex V of the basic regulation.

With regard to the organisation requirements concerning air crew competencies, see ORO.GEN.110 (e), ORO.FC and ORO.CC of the air operations regulation; Article 22 of the basic regulation; Part-CC of the air crew regulation.

Evacuations initiated by cabin crew (for example, due to smoke in the cabin) shall be addressed by the operator through implementation of the above-mentioned provisions. In particular, see point 1.8 of Appendix 1 to Part-CC of the air crew regulation on the initial training course and examination 'Training Programme' for the cabin crew attestation: "The training programme of the initial training course shall include at least the following: 1.8. The importance of identifying when cabin crew members have the authority and responsibility to initiate an evacuation and other emergency procedures."

Through their oversight, certification and enforcement responsibilities under ARO.GEN.300 of the air operations regulation, the EASA Member State competent authorities are required to verify that operators under their jurisdiction comply with the applicable requirements.

Furthermore, EASA monitors the application of the EU civil aviation regulations by Member States' competent authorities, by conducting standardisation inspections in accordance with Commission Implementing Regulation (EU) No 628/2013.

In conclusion, the safety issue of evacuations initiated by cabin crew is considered by EASA to be suitably addressed under the existing legislation. Any related emerging safety issues will be captured and monitored through the established European Safety Risk Management (SRM) process. The generic topic of emergency evacuations has been captured as a candidate safety issue by the Commercial Air Transport (fixed wing) Collaborative Analysis Group which provides input to the SRM process. This is undergoing further processing, including development of recommendations for actions in accordance with the best intervention strategy, with potential inclusion in the European Plan for Aviation Safety (EPAS).

EASA has also contacted Airbus to discuss the emergency evacuation checklist and specifically the situation where it becomes necessary to immediately shut down the engines.

5.3 Propulsion Products

In contrast with the general reduction trend, the number of safety recommendations related to propulsion products addressed to EASA has shown an increase (10 in 2019, while 3 in 2018 and 2 in 2017). This trend has also been observed at EU level by ENCASIA.

Among them, following the investigation into a serious incident related to an Airbus A330 that occurred in 2018, the Transport Safety Investigation Bureau of Singapore addressed 2 safety recommendations to EASA related to Trent 700 engine.

- The European Aviation Safety Agency require the engine manufacturer to address potential contributing factors associated with the design of the fan blade that could lead to the failure of the fan blade.

- The European Aviation Safety Agency require the engine manufacturer to address the current C-Scan ultrasound inspection process so as to improve detection success of potential defect sizes that could lead to the failure of the fan blade.

Furthermore, a Boeing 787 serious incident that occurred in Italy triggered the issuance of the following 2 safety recommendations related to the Trent 1000 engine, recommending that EASA:

- Take immediate actions to achieve a higher level of safety, also taking in consideration, but not limiting EASA initiatives to, defining different and more stringent time limits for the Trent 1000 pre-mod 72-H818 IPT blades.

- Re-evaluate the whole validity of the service management adopted by the manufacturer for the Trent 1000 pre-mod 72-H818 IPT blades, endorsed by the AD 2019-0135.

In addition to these abovementioned safety recommendations, a number of new safety investigations on propulsion related events have been conducted during 2019 (e.g.: IFSDs of PW1500 installed on A220 in Europe; IFSDs of PW1100G powered A320neo), together with the continued investigation of events occurred in previous years (e.g.: uncontained fan disk failure of the EA GP7200 on A380 over Greenland in 2018; Southwest N772SW CFM56 FBO in 2018; other).

With the exception of the events on the A220/PW1500 and A320neo/PW1100G fleets, those events hereby quoted have happened on mature fleets. While the fleet reliability and safety is confirmed, EASA is ensuring, thorough product certification process, continued airworthiness management, evaluation of the safety recommendations, and safety investigations of in-service events, that the safety margins are not compromised by possibly reaching the limits imposed by the existing technology. These measures are essential to satisfy an exigent market in constant demand of additional improvements in performance, and reduction in fuel consumption.

EASA considers that there is however the need to conduct a more thorough and structured review of these elements.

EASA Actions:

Actions carried out by the Agency and engine manufacturers, including those specifically addressing the above safety recommendations, have aimed at ensuring that safety is not compromised and reliability is maintained within acceptable limits, often at the expense of service disruption and maintenance burden.

The industry is also competing to develop more efficient products that also meet increasingly stringent environmental standards. This involves the introduction of new technologies and optimising designs as far as possible. Market competition can help accelerate this process, but this could come at the expense of maturity.

The Agency intends to start gathering data to establish whether product safety standards are being kept sustainable in the medium term and to evaluate any possible need for additional certification requirements and possible work with the industry to develop further maturity testing and safety substantiation.

In this respect, this item has been added to the Commercial Air Transport (CAT) safety risk portfolio for consideration as a potential emerging safety issue.

5.4 Design of the B737 MAX Flight Control System

The accident of the Ethiopian Boeing 737-8 MAX in March 2019 shocked the aviation community, occurring just a few months after the accident of Lion Boeing 737-8 MAX near Jakarta and raising a number of questions regarding the design of the Flight Control System (FCS) of the aircraft.

The Ethiopian Aircraft Accident Investigation Bureau in its preliminary report issued a safety recommendation to the aviation authorities as a matter of urgency, which EASA took immediately on board, that:

- Aviation Authorities shall verify that the review of the aircraft flight control system related to flight controllability has been adequately addressed by the manufacturer before the release of the aircraft to operations.

EASA Actions:

EASA had already issued Emergency Airworthiness Directive AD No. 2019-0051-E (then revised and issued as AD No. 2019-0051R1) mandating the suspension of flight operations for the Boeing models 737-8 and 737-9 (commercially known as MAX) which have so far received an EASA type design approval.

The manufacturer applied to EASA for the validation of design changes to these aircraft models, which are due to be certified first by the airworthiness authority of the State of Design (the primary certifying authority), namely the United States Federal Aviation Administration (FAA), prior to the return to service of the aircraft. These design changes affect the flight control system [more specifically, the manoeuvring characteristics augmentation system function (MCAS)] and associated systems [in particular, the display of information related to the angle of attack (AOA)].

Before lifting the suspension for the affected models, EASA is performing a design review beyond the validation of the design changes proposed by the manufacturer of the design of the Flight Control System (FCS) and all associated functions/systems including, but not limited to, the displays, alerting system, autopilot, and air data system. In particular:

1. Check of the completeness and correctness of the functional hazard assessments for failure conditions where pilot action or interaction has been considered for mitigation.

2. Review of the development, assurance methodology and related activities performed for type certification.

3. Review of the flight controls and autopilot design with respect to systems response to high AOA conditions, automatic trim orders and conditions leading to autopilot disconnect or automatic nose down.

4. Assessment of the differences between the flight crew training for the 8737 NG and the 8737-8 and -9 MAX models.

5.5 Incorrect rotation

On 11 March 2017, an Air France Airbus A340 conducting a flight from Bogota to Paris Charles de Gaulle performed a long take-off run during its departure from Bogota's runway 13R. The aircraft crossed the runway end at about 5 feet instead of 35 feet above ground level.

The occurrence was classified as a serious incident and the French BEA, who conducted the investigation, addressed several Safety Recommendations to EASA, among which included that:

- EASA in coordination with Airbus, re-examine the validity of the initial certification hypotheses of the A340-300 take-off performance.

- EASA in coordination with Airbus, take the necessary measures to re-establish consistency between the take-off performance in operations and that established during certification on the Airbus A340-300.

- Pending measures taken to re-establish consistency between the performance reached in operation and that established by the certification, EASA, in coordination with the national oversight authorities, require operators operating the A340-300 to set up safety measures to reduce the observed variability in the pilots' rotation technique.

- Pending measures taken to re-establish consistency between the performance reached in operation and that established by the certification, EASA, in coordination with the national oversight authorities, require operators operating the A340-300 to set up safety measures to restore sufficient take-off distance margins by comparing the possible difference between the take-off performance reached in operations and that established during certification.

EASA Actions:

EASA reviewed the relevant hypothesis and justification documents of the A340-300 type certification and found them to adequately justify the A340-300 certified take-off performance.

The methodology used to generate the A340 performance data, as for any other aircraft and consolidated certification procedures, was to conduct a series of take-offs (both All Engines Operative (AEO) and One Engine Inoperative (OEI)) using a range of stick inputs and rotation rates. Data from these test points was used to generate a mean rotation profile that would be assumed by the generic performance model in the generation of take-off data. The aim of the certification exercise for the performance part is, inter alia, to make sure that the

take-off technique can be executed without requiring exceptional piloting skill and the Aircraft Flight Manual (AFM) performance can be adequately achieved.

In addition, EASA participated in a simulator session organised by Airbus in June 2018 in which EASA confirmed that the A340-300 certified take-off performance could be achieved by properly trained crews of average skills, applying the techniques recommended by Airbus, without the use of exceptional piloting skills or vigilance.

With regard to take-off performance, EASA published Safety Information Bulletin - SIB 2017-20 ("Slow Rotation Take-off") in November 2017. In the SIB, EASA recommends that operators of 4-engine wide-body aeroplanes, and approved training organisations providing relevant flight training, assess whether their operating procedures may be affected by the safety issue of slow rotation during take-off. If so, they should apply their hazard identification and risk management processes. In the SIB, EASA also recommends that the relevant competent authorities consider the SIB in their continuous oversight of applicable operators and approved training organisations.

Moreover, Airbus modified the A340 Flight Crew Training Manual (FCTM) to better describe the take-off rotation technique, and to clarify the consequences of incorrect application of the technique. Although the FCTM is not required to be approved by EASA, EASA has, nevertheless, reviewed the updated version and found it to be adequate.

In addition, EASA approved an A340 Training Area of Special Emphasis on the take-off rotation technique, to emphasise the knowledge of the use of the sidestick controller to perform the correct rotation technique including: how to initiate the rotation, how to achieve and maintain the rotation rate, how to achieve the pitch attitude after lift-off.

EASA considers that the above actions taken provide all the elements necessary to ensure consistency in the pilots' rotation technique. The safety issue "Incorrect Rotation at Take-off" is also included in the Safety Risk Portfolio for large aeroplanes

5.6 Sailplanes rigging and maintenance

Most sailplanes are built in Europe and are designed in compliance with EASA Certification Specification CS-22. These define the minimum standards for safety and cover a wide range of characteristics such as controllability and strength.

Following the investigation of an accident which occurred in Austria in 2010 in which a Blanik L13 sailplane was involved, the Austrian BMVIT issued 2 safety recommendations addressed to the State of Design and to the L13 Blanik sailplanes' Type Certificate Holder.

- The requirements for the aircraft continuing airworthiness records of L13 Blanik sailplanes are set out in Annex I (Part-M) of Regulation (EU) No 1321/2014, item M.A.305, which requires, that the records shall consist of an aircraft logbook and log cards for any service life limited component as appropriate, which shall contain the current status of service life limited components. To keep the log cards for any service life limited component of L13 Blanik sailplanes current, recording of glider operation data shall cover the Average Operation Conditions to be fulfilled with respect to the service life limits of the sailplane provided that complete aircraft logbook information on the relevant times and cycles are available for each flight and any other information necessary for continuing airworthiness. The L13 Blanik operating instructions should include details which glider operation data are to be kept in the aircraft logbook since the manufacture of the sailplane, to allow monitoring and compliance with

the Average Operation Conditions to be fulfilled with respect to the service life limits of the sailplane and to ensure any applicable limit that may have been laid down as well as details how to proceed in the event of missing or incomplete information of any single flight.

- L13 Blanik sailplanes required general overhaul after any Major Damage of the glider according to Mandatory Bulletin MB L13 / 059 dated 01.07.1985 or after any Bigger Glider Damage according to OVERHAUL MANUAL FOR L13, L13A GLIDERS no. Do-L13-3031.3, edited 1960, revised 1997, revision 10.10.1997. MB L13/059 and OVERHAUL MANUAL FOR L13, L13A GLIDERS no. Do-L13-3031.3 left open the question of which damages to L13 Blanik sailplanes were to be classified as Major Damage in the sense of MB L13 / 059 requiring a general overhaul of the glider. The L13 Blanik service instructions should specify which damages to L13 Blanik sailplanes are to be classified as Major Damage requiring a general overhaul of the glider."

An inadequately connected wing or horizontal stabilizer could lead to a separation from the fuselage, potentially resulting in loss of the sailplane. Inadequate or unconnected controls could lead to loss of control of the sailplane. Following the investigation of a Schleicher sailplane accident that occurred in Germany, in which a student pilot was fatally injured and for which findings led to the conclusion that the bolt of the left aileron connection was not secured as intended, the German BFU recommended that:

- EASA should ensure that aircraft type certificate holders specify procedures for the connection of rudders and flaps so that manual function checks of the safety devices of rudder and flap connections are included as well.

EASA Actions:

The Agency took timely actions on the abovementioned safety concerns raised by the SIAs of Austria and Germany. In particular:

- The Type Certificate Holder, Blanik Aircraft CZ s.r.o., fully implemented the recommendations into the L-13 sailplane flight manual and maintenance manual and also released revision No.2 of the mandatory service bulletin MB L13/117a. The implementation of the recommendation was approved by EASA within major change approval No.: 10071067 dated 26 September 2019.

- In order to mitigate any safety risk related to the improper execution of rigging procedures and its subsequent inspection, EASA published Safety Information Bulletin (SIB) 2019-07 on 30 April 2019, applicable to all sailplanes and powered sailplanes subject to rigging.

The SIB describes reported incidents related to wing, horizontal stabilizer and controls not being connected or not being correctly connected, and recommends proactive measures to prevent these occurrences. Furthermore, the SIB includes descriptions of the connections for old and new designs and explains how to properly engage and secure the surfaces.

In addition, it includes recommendations for positive control checks on the surfaces, and how to deal with interruptions during rigging and/or connecting, and covers all rigging issues from the technical and human factors point of view.

5.7 HEMS flights by day

There are several unique hazards faced by Helicopter Emergency Medical Services (HEMS) operations. The time pressure, planning challenges and environmental factors associated with air ambulance operations makes them inherently high risk operations.

EASA has received several Safety Recommendations over the last years related to this topic.

One of them was addressed to EASA by ANSV following an accident that occurred in Italy in 2017. The ANSV recommends that EASA:

- Draw up GM applicable to daytime flights, conceptually similar to the discussed GM1 SPA.HEMS.130 (e) (2) (ii), which provide indications about the opportunity of using two pilots in specific geographical areas where the orography and the possible sudden changes in visibility can make the conduct of the flight problematic, requiring, even as a preventive measure, the monitoring of controls and instruments.

EASA Actions:

EASA is evaluating this safety recommendation within the framework of the ongoing EASA rulemaking task RMT.0325 on helicopter emergency medical services (HEMS) performance and public interest sites. The associated Notice of Proposed Amendment, NPA 2018-04, was published on 18 June 2018. The NPA includes proposals to:

1. Foster efficient and proportional rules regarding:

    a. HEMS requirements for high altitudes;

    b. A new HEMS concept to cover mountain operations and rescue operations (other than search and rescue operations);

2. Maintain a high aviation safety level by reviewing the requirements related to HEMS flights by day or night, regarding equipment, training, minima, and operating/hospital site illumination.

As indicated in the European Plan for Aviation Safety 2020-2024, the next deliverable, an EASA Opinion, is planned to be published by Q3 2021.

5.8 Flight Recorders

Flight recorders ensure that, in the event of an accident or incident, investigators have the data to help understand more about the chain of events leading up to it. These data have contributed to a better identification of accident causes, and in turn more effective corrective actions by regulators and the industry.

Several Safety Recommendations were received over the past year related to mandating the carriage of lightweight flight recorders and to making the installation of crash-protected flight recorders on board large aeroplanes and helicopters more robust.

More specifically they recommend that EASA:

- For newly manufactured aircraft, should require that no single electrical bus failure terminates the recording on both cockpit voice recorder and flight data recorder.
- For newly manufactured aircraft, should require that the cockpit voice recorder and cockpit area microphone are provided with an independent 10 minute back-up power source, to which the cockpit voice recorder and cockpit area microphone are switched automatically, in the event that normal power is interrupted.
- Review the certification requirements for automatically stopping flight recorders within 10 minutes after a crash impact, with a view to including a specific reference prohibiting the use of `g` switches as a means of compliance as recommended in ED112 issued by EUROCAE Working Group 50.
- Should introduce a requirement that the cockpit voice recorder should continue to record in the event of power failure.
- Make mandatory the installation of flight recorders for aeroplanes operated for commercial air transport, regardless of the date of issuance of the individual certificate of airworthiness.
- Mandate the ICAO Annex 6 flight recorder requirements for all helicopter emergency medical service operations, regardless of aircraft weight. The last two hours of flight crew communications and cockpit area audio should be recorded. The cockpit area audio recording should continue for 10 minutes after the loss of normal electrical power.
- Require or promote the installation of on-board recorders on aeroplanes categorised as high performance aircraft in accordance with the type of aircraft operation.
- Introduce a requisite regarding on board recorders to guarantee their functioning also in the case of a power failure and, specifically to the A320 family, in case the speed is insufficient for Ram Air Turbine functioning.

EASA Actions:

These Recommendations were considered within the framework of EASA rulemaking tasks RMT.0271 and RMT.0272 'In-flight recording for light aircraft' as well as RMT.0249 entitled "Recorders installation and maintenance thereof - certification aspects".

With regards to the carriage of lightweight flight recorders:

- EASA Opinion No 02/2019, published on 22 February 2019, contained proposed amendments to the air operations regulation stemming from RMT.0271 and RMT.0272. This Opinion was subsequently adopted, and the associated Commission Implementing Regulation (EU) 2019/1387 was published on 05 September 2019. The Regulation extends the flight recorder carriage requirements to turbine-engined aeroplanes with an MCTOM (Maximum Certified Take-Off Mass) of 2 250 kg or more, or an MOPSC (Maximum Operational Passenger Seating Configuration) of more than nine, and to turbine-engined helicopters with a MCTOM of 2 250 kg or more when they are commercially operated and first issued with an individual certificate of airworthiness on or after 05 September 2022.

- EASA also published Safety Information Bulletin (SIB) 2019-15R1 on 19 November 2019 regarding Flight Recorders on Small Rotorcraft. EASA also produced, with the help of the European Safety Promotion Network Rotorcraft, a web article promoting the carriage of flight recorders on board light helicopters, which is published on the EASA website (see https://www.easa.europa.eu/flight-recorders-light-helicopters)

With regards to making the installation of crash-protected flight recorders on board large aeroplanes and helicopters more robust**:**

- EASA published ED Decision 2019/013/R of 15 July 2019 under the framework of EASA rulemaking task RMT.0249 entitled "Recorders installation and maintenance thereof - certification aspects". ED Decision 2019/013/R amends the flight recorders-related provisions in the certification specifications for large aeroplanes (CS-25) and for large rotorcraft (CS-29). Amongst others, this ED Decision addresses the following items:

  — CVR power supply: ensure that a cockpit voice recorder (CVR) continues to record after the interruption of the normal electrical power source, and to prevent the failure of a single power supply from disabling both the flight data recorder (FDR) and the CVR;

  — Automatic stopping of the recording after an accident: ensure that a negative acceleration sensor ('g-switch') is not used as the sole means to detect a crash impact and to automatically stop a flight recorder after the detection of such a crash impact. In addition, conditions have been introduced to address the use of the recorder start-and-stop logic to provide a means to automatically stop the CVR after a crash impact.

Conclusions

Conclusions

In 2019, EASA received a total of 54 safety recommendations that originated from 31 occurrences (18 accidents, 12 serious incidents and 1 incident). These were sent by the Safety Investigation Authorities of 20 different States.

- 38 safety recommendations originated from EASA Member States and 16 from non-EASA Member States;
- 23 were classified as being of Union-wide Relevance (SRUR) (i.e. of EASA Member State interest only);
- 20 were classified as safety recommendations of Global Concern (SRGC) (i.e. of international interest) and;
- 49% were related to procedures or regulations, while 40% were related to aircraft or aviation-related equipment/facilities.

The number of safety recommendations that EASA received in 2019 is exactly the same as the previous year, and in line with the significant reduction that has been recorded since 2017 when compared to the number of safety recommendations received between 2012 and 2016. One of the factors that contributed to a slight increase compared to 2017 is that in 2019 three investigation reports were published which contained significant batches of safety recommendations addressed to the Agency (7, 4 and 3 respectively).

In 2019 the Agency produced 101 replies in response to 98 safety recommendations:

- 62 of them were final (closing safety recommendations) with 39% of them being in agreement, and 42% with partial agreement;
- The remaining 39 replies provided information updating the Safety Investigation Authorities on the progress of the actions decided upon by the Agency for which the relevant activities have not yet been completed;
- 80 percent of the final responses provided by EASA and assessed by the originator of the recommendation were classified as “adequate” or “partially adequate”.

The number of replies provided in 2019 is consistent with the number of replies provided in 2018. In particular, the 62 closing replies sent in 2019 meant a significant reduction in the number of safety recommendations currently open for the Agency. Furthermore, the actions taken by the Agency in response to the safety recommendations involved several key safety topics that are currently part of the European Plan for Aviation Safety (EPAS) and which are included in the European safety risk management process.

List of 2019 Safety Recommendations Replies

Definitions

Definitions

Accident: occurrence associated with the operation of an aircraft which, in the case of a manned aircraft, takes place between the time any person boards the aircraft with the intention of flight until such time as all such persons have disembarked, or in the case of an unmanned aircraft, takes place between the time the aircraft is ready to move with the purpose of flight until such time it comes to rest at the end of the flight and the primary propulsion system is shut down, in which:

(a) a person is fatally or seriously injured as a result of:

— being in the aircraft, or,

— direct contact with any part of the aircraft, including parts which have become detached from the aircraft, or,

— direct exposure to jet blast,

except when the injuries are from natural causes, self- inflicted or inflicted by other persons, or when the injuries are to stowaways hiding outside the areas normally available to the passengers and crew; or

(b) the aircraft sustains damage or structural failure which adversely affects the structural strength, performance or flight characteristics of the aircraft, and would normally require major repair or replacement of the affected component, except for engine failure or damage, when the damage is limited to a single engine, (including its cowlings or accessories), to propellers, wing tips, antennas, probes, vanes, tires, brakes, wheels, fairings, panels, landing gear doors, windscreens, the aircraft skin (such as small dents or puncture holes) or minor damages to main rotor blades, tail rotor blades, landing gear, and those resulting from hail or bird strike, (including holes in the radome); or

(c) the aircraft is missing or is completely inaccessible;

Incident: an occurrence, other than an accident, associated with the operation of an aircraft which affects or would affect the safety of operation;

Serious incident: an incident involving circumstances indicating that there was a high probability of an accident and is associated with the operation of an aircraft, which in the case of a manned aircraft, takes place between the time any person boards the aircraft with the intention of flight until such time as all such persons have disembarked, or in the case of an unmanned aircraft, takes place between the time the aircraft is ready to move with the purpose of flight until such time it comes to rest at the end of the flight and the primary propulsion system is shut down.

A list of examples of serious incidents is given below. The list is not exhaustive and only serves as guidance with respect to the definition of 'serious incident':

- a near collision requiring an avoidance manoeuvre to avoid a collision or an unsafe situation or when an avoidance action would have been appropriate,

- controlled flight into terrain only marginally avoided,

- aborted take-offs on a closed or engaged runway, on a taxiway, excluding authorised operations by helicopters, or from an unassigned runway,
- take-offs from a closed or engaged runway, from a taxiway, excluding authorised operations by helicopters, or from an unassigned runway,
- landings or attempted landings on a closed or engaged runway, on a taxiway, excluding authorised operations by helicopters, or from an unassigned runway,
- gross failures to achieve predicted performance during take-off or initial climb,
- fires and smoke in the passenger compartment, in cargo compartments or engine fires, even though such fires were extinguished by the use of extinguishing agents,
- events requiring the emergency use of oxygen by the flight crew,
- aircraft structural failure or engine disintegration, including uncontained turbine engine failures, not classified as an accident,
- multiple malfunctions of one or more aircraft systems seriously affecting the operation of the aircraft,
- flight crew incapacitation in flight,
- fuel quantity requiring the declaration of an emergency by the pilot,
- runway incursions classified with severity A according to the Manual on the Prevention of Runway Incursions (ICAO Doc 9870) which contains information on the severity classifications,
- take-off or landing incidents. Incidents such as undershooting, overrunning or running off the side of runways,
- system failures, weather phenomena, operation outside the approved flight envelope or other occurrences which could have caused difficulties controlling the aircraft,
- failure of more than one system in a redundancy system mandatory for flight guidance and navigation.

Safety investigation: process conducted by a safety investigation authority for the purpose of accident and incident prevention which includes the gathering and analysis of information, the drawing of conclusions, including the determination of cause(s) and/or contributing factors and, when appropriate, the making of safety recommendations;

Safety recommendation: proposal of a safety investigation authority, based on information derived from a safety investigation or other sources such as safety studies, made with the intention of preventing accidents and incidents.

Safety Recommendation of Global Concern (SRGC)5: is defined as a safety recommendation made to a State civil aviation authority, to a regional certification authority, or to ICAO regarding a systemic deficiency having a probability of recurrence with potential for significant consequences, and requiring timely action to improve safety.

5 Source: ICAO Manual of Aircraft Accident and Incident Investigation (Doc 9756 -2014), Part IV Reporting, Chapter 1.6 RELEASE AND DISTRIBUTION OF SAFETY RECOMMENDATIONS.

An SRGC would meet one or more of the following criteria:

a) the deficiency underlying the recommendation is systemic and not solely a local issue;

b) the probability of recurrence of the accident and the adverse consequences are high;

c) the risk to persons, equipment and/or environment is high;

d) the urgency for taking effective remedial safety action is high;

e) there is a history of recurrence of the relevant deficiency;

f) the deficiency underlying the recommendation constitutes a risk to the airworthiness, design, manufacture, maintenance, operation and/or regulation of the involved aircraft type;

g) the deficiency underlying the recommendation constitutes a risk to more than one aircraft type, to more than one operator, to more than one manufacturer and/or to more than one State; and

h) the mitigation of the risks associated with the deficiency will require coordinated efforts of more than one entity of the air transport industry, such as civil aviation authority(ies), manufacturer(s) and operator(s).

Safety Recommendation of Union-wide Relevance (SRUR): a safety recommendation identified by the European Network of Civil Aviation Safety Investigation Authorities according to Article 7 (g) of Regulation (EU) No 996/2010.

A safety recommendation of Union-wide Relevance (SRUR) would meet one or more of the following criteria:

- The deficiency underlying the safety recommendation is systemic, not related to a specific aircraft type, operator, manufacturer component, maintenance organization, air navigation service and/or approved training organisation, and not solely a national issue, or;

- There is a history of recurrence across Europe of the relevant deficiency.

Technical Adviser (Article 8 of REGULATION (EU) No 996/2010)

1. Safety investigation authorities shall, provided that the requirement of no conflict of interest is satisfied, invite EASA and national civil aviation authorities of the Member States concerned, within the scope of their respective competence, to appoint a representative to participate:

   (a) as an adviser to the investigator-in-charge in any safety investigation under Article 5(1) and (2), conducted in the territory of a Member State or in the location referred to in Article 5(2) under the control and at the discretion of the investigator-in-charge;

   (b) as an adviser appointed under this Regulation to assist accredited representative(s) of the Member States in any safety investigation conducted in a third country to which a safety investigation authority is invited to designate an accredited representative in accordance with international standards and recommended practices for aircraft accident and incident investigation, under the supervision of the accredited representative.

2. The participants referred to in paragraph 1 shall be entitled, in particular to:

   (a) visit the scene of the accident and examine the wreckage;

   (b) suggest areas of questioning and obtain witness information;

   (c) receive copies of all pertinent documents and obtain relevant factual information;

   (d) participate in the read-outs of recorded media, except cockpit voice or image recorders;

   (e) participate in off-scene investigative activities such as component examinations, tests and simulations, technical briefings and investigation progress meetings, except when related to the determination of the causes or the formulation of safety recommendations.

3. EASA and the national civil aviation authorities shall support the investigation in which they participate by supplying the requested information, advisers and equipment to the safety investigation authority in charge.

Safety Recommendations Classification

Safety Recommendations classification

This classification has been established in the scope of the safety recommendations taxonomy working group in cooperation with representatives from European Safety Investigation Bodies, Eurocontrol, the European Joint Research Center (JRC) and EASA. The aim of this group was to initiate a taxonomy dedicated to recommendations.

This activity took place in 2007 and is being used to implement a safety recommendation database developed by the JRC.

In addition to common definitions, the taxonomy also defines a unique pre-defined format for referencing safety recommendations. This format is composed by a 4 digits originating state name followed by the year it was issued and then a three digits number (ex: UNKG-2007-001 for recommendation #1 issued by United Kingdom in 2007). Consequently, all references comply with this taxonomy foreseeing that existing safety recommendations will be imported in a central database and shared with a community of users.

Recommendation assessment: assessment given to a safety recommendation by the addressee as defined below:

- **Agreement:** safety recommendation for which the safety concern is agreed by the addressee and subsequent action is planned or implemented.
- **Partial agreement:** safety recommendation considered relevant by the addressee but not applicable and for which a safety issue has been recognised and a new orientation has been given to the recommended action.
- **Disagreement:** safety recommendation considered not relevant or not applicable by the addressee.
- **No longer applicable:** safety recommendation has been superseded or has become no longer applicable.
- **Not Responsible:** safety recommendation wrongly allocated or not in the scope of responsibility of the addressee.
- **More information required:** safety recommendation for which more information is required by the addressee before any action initiated. Additional information should be sent by the originator.
- **Unknown:** safety recommendation which was issued before any tracking implementation status and for which insufficient information to assign any other status has been received.

Response assessment: The classification of the response as determined by the originator (when a response is received):

- **Adequate:** safety recommendation for which appropriate action is planned or implemented or sufficient evidence of completed action satisfying the objective has been received by the originator.

- **Partially adequate:** safety recommendation for which the planned action or the action taken will reduce but not substantially reduce or eliminate the deficiency or for which a safety issue has been recognised and a new orientation has been given to the recommended action.

- **Not adequate:** safety recommendation for which no action has been taken or proposed that will reduce or eliminate the deficiency, or for which the proposed action is considered not applicable/ unacceptable.

- **Response is awaited:** safety recommendation for which no response has been received.

- **Response received awaiting assessment:** response to the safety recommendation has been received by the originator and is awaiting assessment.

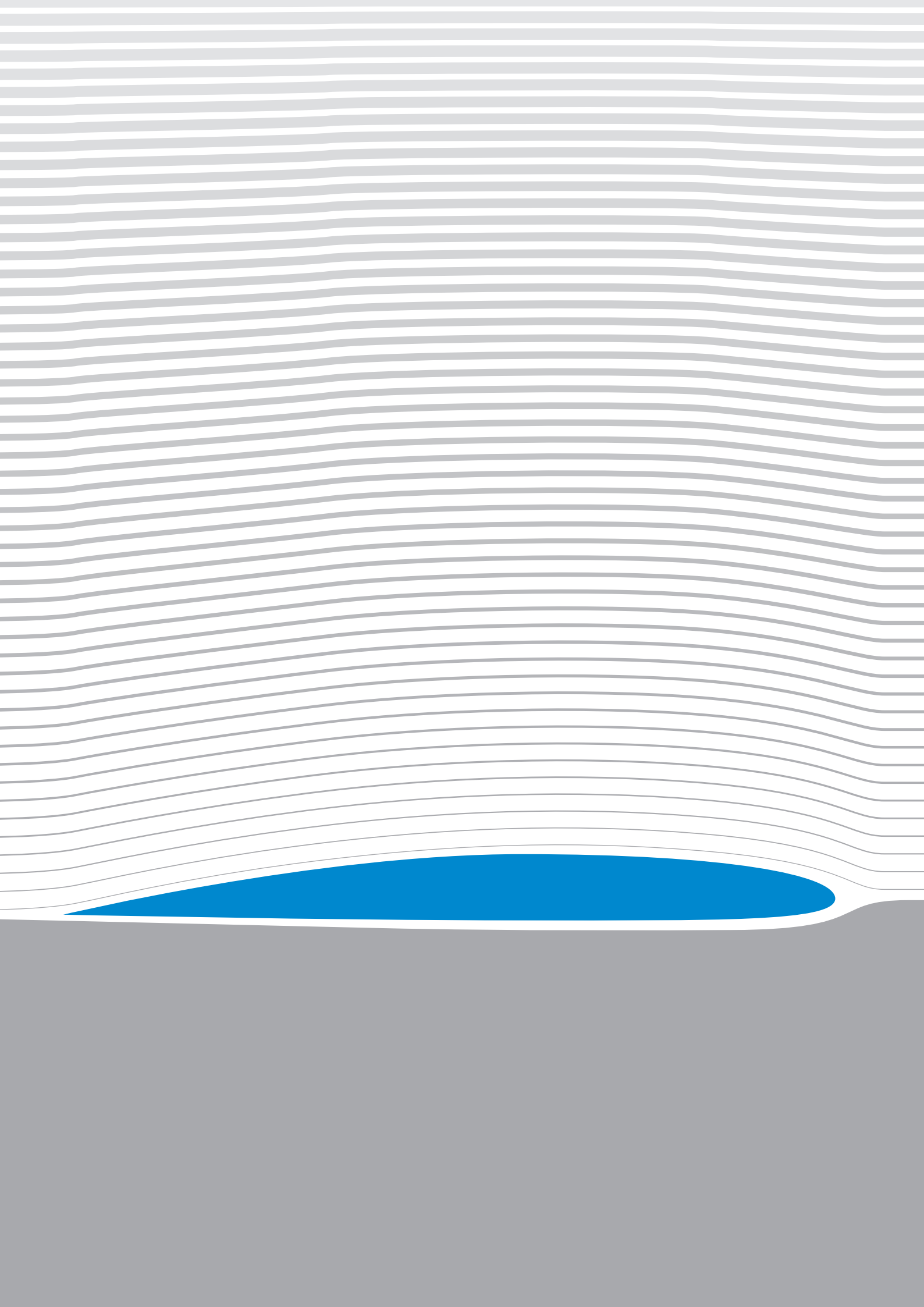
- **Superseded:** if the recommendation has been superseded by another recommendation.

- **Unknown:** the safety recommendation is one which was issued before any tracking implementation status and for which insufficient information to assign any other status has been received.

Status of a safety recommendation: progress of the implementation of the response to a recommendation as defined below:

- **Open safety recommendation**: safety recommendation for which the reply has not yet been defined or the appropriate action addressing the safety concern is still in progress.

- **Closed safety recommendation:** safety recommendation for which appropriate action has been taken and completed addressing the safety issue.



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